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Index to Volume XLIII

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each subject. In addition, a geographical reference is published wherever the article relates to any particular railway company. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the name of the electric railway to which the article refers. Groupings are made under the names of the city in which the main office of the company is located, and cross references are given for the names of the railways, which appear in alphabetical order. An exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, and cross references are supplied. Below will be found a list of the more common keywords used in the index. This list has been subdivided for convenience into sixteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index. As an example, if a reader wished to locate an article on power-driven motor trucks he would obviously look in the list under the general subject "vehicles," and of the four keywords that appear under this only "Commercial Vehicles" could apply to the article in question. The reader would therefore refer to this keyword under "C" in the body of the index.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service commissions
Public service corporations

CARS

Car design
Cars (descriptive)
Cleaning of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Tower cars
Ventilation of cars
Work cars
Wrecking cars

CAR EQUIPMENT

Axles
Bearings
Brakes, air
Controllers and wiring
Couplers
Current-collection
Fenders and wheel guards
Gears
Headlights
Journals
Motors
Trucks, car
Wheels

EMPLOYEES

Employees
Strikes

FARES

Fare collection (including apparatus)
Fares
Freight rates
Through routes and joint rates
Tickets
Transfers

FINANCIAL AND STATISTICS

Accounting
Appraisal of railway property
Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations, cities

HEAVY ELECTRIC TRACTION

Heavy electric traction
High tension d.c. railways
Interurban railways
Locomotives
Single-phase railways

MAINTENANCE OF EQUIPMENT

Cleaning of cars
Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Washing of cars
Welding, special methods

OPERATION

Dispatching trains
Multiple-unit trains
Operating records and costs
Passenger handling records
Rules
Schedules and time tables
Signals
Stopping of cars
Telephones
Trailer operation
Yards

POWER

Boilers and equipment
Cables
Catenary construction
Converters
Overhead construction
Poles
Power distribution
Power generation
Power stations
Purchased power
Storage batteries
Substations
Transmission lines
Trolley wire
Turbo-generators and equipment

RECORDS

Maintenance records and costs
Operating records and costs
Passenger handling records
Record forms

STRUCTURES

Bridges
Carhouses
Freight stations
Power stations
Repair shops
Terminal stations and terminals
Waiting stations

TRACK

Pavement
Rail joints and bonds
Rails
Ties
Track construction
Track maintenance

TRAFFIC

Advertising
Freight and express
Parks and pleasure resorts
Public, relations with
Publicity
Routing of cars
Signs on cars
Traffic investigations, cities

VEHICLES (not on tracks)

Commercial vehicles
Motor buses
Service and tower wagons
Trackless trolleys

MISCELLANEOUS

Fire protection and insurance
Lightning
Municipal ownership
Organization charts
Public, relations with
Standardization
Storerooms
Timber preservation

In addition to the groups of articles covered by these headings the papers and reports from electric railway and steam railroad associations are grouped under the names of the various societies. Proceedings of other associations are indexed only in accordance with the subject discussed. The heading "Cars" includes all extended descriptions of individual types of cars, but short accounts of cars displaying no important innovations appear only under the name of the railway to which they apply. Under the headings "Financial" and "Statistics" appear all articles relating generally to capitalization, earnings and operating costs, as distinguished from the detailed and highly subdivided figures that are entered under "Operating Records and Costs." Short descriptions of machine tools appear only under the heading "Repair Shop Equipment" and are not indexed alphabetically, because of the wide choice in most cases of the proper key word.

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*Denotes Portrait.

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"ELECTRIC RAILWAY JOURNAL" FOR 1914

With this issue we begin the forty-third volume of the ELECTRIC RAILWAY JOURNAL. We also present our usual tables of statistics and publish as a special feature a number of interesting reviews of the industry by outside contributors. This symposium should be found of especial value because all of the articles are on subjects of general interest. At the same time they relate so closely to the industry that there is hardly a single electric railway company to which each one of the topics considered should not appeal as a matter of purely local concern. We realize that many of our readers have given a great deal of attention to these and kindred matters, and as it was impossible to cover all phases of the industry in this number we cordially invite others to continue the discussion begun here in later numbers of this paper. Our statistics include as usual data in regard to orders during the past year for cars and new track and a list of foreclosures and receiverships among electric railway companies. We also present a list of the block signal installations during 1913, as this is a phase of the industry which is rapidly becoming more important. The statistics of cars ordered and built and miles of new track constructed during the year reflect conditions among electric railway companies with which most of our readers are well acquainted. The gross business of the companies is increasing and demands new rolling stock, but the low margin of profit at present deters capital from entering upon the construction of new lines. When the Empire State of New York shows added electric city and interurban mileage of only 40 miles, and New Jersey and Illinois can be credited with only 12 miles and 25 miles of new track respectively, something must be wrong with the conditions. It is the solution of this and of the other problems which are confronting the industry to which this paper will devote its energies during the coming year, and while expressing its great appreciation of the cordial support and assistance which it has received from its readers in the past, it solicits a continuation of the same co-operative help in its efforts toward improved conditions in the electric railway field.

ELECTROLYSIS MITIGATION VS. ELIMINATION

The report of two members of the Bureau of Standards on the subject of electrolysis published elsewhere in this issue is perhaps one of the most comprehensive, and certainly one of the most positive, statements on the problems which have ever been published. The authors take the general position that damage from electrolysis can be most successfully minimized by a process which is inherently one of elimination of the cause rather than one of mitigation of the evil effects, and it cannot be denied that they have made out a strong case. In the systems of mitigation which may be applied to the affected pipe lines they include the two best-known schemes, namely, the use of insulated joints and the installation of drainage connections to the pipes. Both are admitted to be of certain value as palliatives which may be properly introduced in exceptional locations; but in the end the authors openly condemn them for any further use. As the drainage system has been heretofore so generally commended and possibly put to wider use than any other, this conclusion must come as a distinct surprise, and the unequivocal support accorded instead to the insulated return feeder system without boosters is certainly a warrant for most of us to revise or at least consider a revision of our ideas on the question of the prevention of electrolysis of underground metallic structures.

STEAM BOILERS FOR LARGE TURBINES

The new 30,000-kw turbines for the Interborough Rapid Transit Company are a good example of the extraordinary progress made in power plant practice as well as in equipment design during the last decade. Each of these new units will displace an engine and generator about twelve years old and of 7500-kw capacity, because, even with their auxiliaries, each machine will occupy less floor space—the reduction in unit bulk being 75 per cent. At the same time, the boilers required for each will be only those originally installed to supply steam to a 7500-kw engine. Obviously this condition could not have been brought about by a 75 per cent reduction in unit steam consumption, because the improved efficiency of the turbines over the best types of reciprocating engines is at most a question of fractions, which are important but small in actual amount. Instead, the condition which enables eight 520-hp. boilers to supply steam for a 30,000-kw turbine with a water rate of at least 11 lb. per kw has been produced by changes in power plant practices alone. Extremely thick fires subjected to a heavy blast pressure have so reduced the excess air once considered necessary for complete combustion that, with all boilers working and an evaporation of more than 8 lb. per square foot of heating surface, the flue temperatures are actually too low to permit the effective use of economizers. Except for the installation of high-capacity stokers the boilers have not been changed since the time when an evaporation of 4 lb. was considered excessive. It is true, of course, that superheaters are to be added, yet the additional heating surface thus provided constitutes but a small part of the total and is not applied for the generation of steam. Each boiler is to be taken out of service for cleaning the two bottom rows of tubes once every two months and for general cleaning and inspection once in eight months, so that at least once a week the battery of eight boilers for each 30,000-kw turbine is reduced in effective rated capacity to 3640 hp—more than 8 kw per boiler horsepower—a figure which is extraordinary even when judged by the practice of the past five years.

TREND OF THE TECHNICAL BRANCHES OF THE INDUSTRY

In 1913, as shown in the statistics published elsewhere in this issue, there has been a slight lull in car building. This may be in part the cause of the small number of new car designs brought out during 1913 as compared with 1912. However, judging by the relative number of cars of the new designs placed in service in cities other than those in which they originated, there seems to be little hope that they are going to be as potent an influence in operation as was at first expected.

The fully inclosed vestibule with folding or inside steps seems to be coming rapidly into favor, the object being the reduction of boarding accidents as well as the superior degree of protection in cold weather. The elimination of bulkheads is a logical step beyond this, and more of such designs may be expected during the coming year. For city cars the use of the near-side stop seems due for very general adoption as it appears to meet with rapidly increasing favor from both operating men and the public, and as a corollary the increased use of the front platform by passengers seems also to be inevitable unless center-entrance cars should come into wide use.

Lighting of cars will undoubtedly take a prominent place among the technical subjects receiving special consideration during the next few months. The recent commercial development of the tungsten lamp affords an opportunity for the application of scientific methods of illumination as it cuts the power required for light to less than half that required with the old carbon lamps, thus permitting the consideration of indirect lighting schemes which a year or more ago would have been prohibitively expensive.

In motors and electrical equipment generally no marked changes have taken place, although there appears to be a tendency toward the use of indirect, or multiple-unit, control systems, even by railways which display no indication of trying two-car train operation. This lack of innovation is obviously due to the very thorough standardization which is being effected in this class of material. Mechanical features, however, have continued to display the gradual changes necessitated some time ago by the growing use of steel in place of wood. The use of steel for car wheels in place of cast iron is also increasing in certain localities, although there are numerous supporters of each type. Cars of light weight which have become a commercial possibility through advanced ideas in design are, generally speaking, continuing to grow in favor, not only on account of the consequent saving in power but also because of the reduction in track maintenance.

Few repair shops were built during the past year, and in view of the improved methods and equipment introduced on every hand it is hardly likely, without an extraordinary growth of business, that the necessity for more space will require many more shops to be built in 1914. Repair shop practice in many particulars has been undergoing rapid changes, and other modifications will no doubt continue to be developed. Welding processes have made enormous strides in the past year, and it is safe to say that the use of this great labor saver and means for renewing scrapped apparatus will become nearly universal during the next twelve months. In the painting and washing of cars the way has been pointed out whereby material savings can be made, and the new processes, namely, baked enamel painting and automatic washing, may be expected to come into increasing use.

In the field of operation it may be said that the use of trains in city service is still a moot question. However, with the test which the Public Service Railway of New Jersey has so generously undertaken to run, it is likely that the coming year will see a final settlement one way or the other. The year has been a good one as regards block signaling on electric railways, and it is to be hoped that this tendency toward procuring automatic means for reducing accidents will continue. The development of schemes to provide track-circuit block signals and indicators with a directional sense was an important recent step in the art, and these cannot fail to play a prominent part in the installations for the coming year.

The problems in generation of power have recently been characterized by a somewhat sudden awakening to the fact that steam boilers are capable of vastly increased outputs, operation without difficulty at 400 per cent of rating being an actual accomplishment. Turbo-generators are still growing, as exemplified by the new 30,000-kw units for the Interborough Rapid Transit Company, and the fact that these machines are of the pure reaction type would serve as evidence that the advantages of low steam velocities were too great to be overlooked, in contradistinction to beliefs of the supporters of the combined type having reaction blading at the low pressure end and several impulse wheels with nozzles to handle high-pressure steam.

Power station construction during 1913 has been singularly limited, although part of this may be ascribed to the fact that comparatively few new roads have been built in this period. The compactness of new types of power units and their auxiliaries has also permitted extensions to take care of increased service with little, if any, increase in building capacity. The purchase of power from outside sources is still growing gradually in popularity and shows every indication of continuing in that direction, the most notable recent event in this field being the revision after five years' operation of the Chicago contracts between the railways and the Commonwealth Edison Company.

The past year also has seen two important accomplishments in the field of electric railway power transmission, namely, the adoption by the American Electric Railway Association of an approved overhead construction for 600-volt lines, including a standard cap and cone, and the completion of a report on the joint use of poles, the latter to be considered at the midyear meeting of the association. It is possible in some cases that the problems of power transmission may be affected by the introduction in this country of the locomobile, or small self-contained engine and boiler, which has been used for many years in Germany. Indeed, the agitation over both this type of prime mover and the Diesel oil engine might indicate a belief in some quarters that these European methods were about to gain a foothold here.

In steam railroad electrification the feature of the past year has been the large number of announcements of lines to be equipped. One of these lines, the Chicago, Milwaukee & Puget Sound Railroad, is undertaking the most extensive electrification project yet attempted outside of the New Haven work by equipping 168 miles of single track. This installation naturally overshadows all of the others, but it does not necessarily detract from their importance, because its successful operation after completion cannot fail to drive many other lines into the fold. In connection with the Norfolk & Western electrification a new system of electric traction has been originated, current being collected from a single-phase overhead conductor and converted to the polyphase form for use in induction motors, and as the installation will be completed in 1914 its operation will be watched with a great deal of interest. The most notable electrification completed during the year has been that of the Butte, Anaconda & Pacific Railroad—a 22-mile line handling heavy ore shipments from the mines along the route to the smelters in Butte, Mont.—because it is the first in this country to use direct current at 2400 volts. Notwithstanding the high voltage, no difficulties of any kind have developed in the first months of operation.

In regard to matters pertaining to maintenance of way it may be said that the division of opinion as to the advantages of concrete underneath the ties is still in existence. The use of stone ballast, sometimes with concrete above the ties and sometimes with it underneath the ballast, seems to have a slight preference numerically, steel-tie constructions being very limited in number. The grinding of rail joints, the building up of cupped rails with the electric arc and, in fact, the use of every refinement available for making a perfectly smooth rail surface have progressed in favor to a marked degree. Finally, a great deal of attention has been devoted to the still unexplained phenomenon of rail corrugation, for which a number of plausible but divergent theories have been advanced. Indeed, the true economy of ample expenditures in the track department is now generally recognized, and during the coming year this work cannot fail to receive still greater attention.

THE RAILWAY BUSINESS SITUATION

Conditions in the electric railway industry did not undergo serious change in their fundamental aspects during the year 1913. There was rather an extension of the same kind of problems that the preceding several years had seen. The questions of the times which were with us a year ago and are still prominent are mainly those of public relations, capital values, rates, regulation and high operating expenses. The labor problem was a little more insistent in 1913, but the pronounced development in welfare work on the part of some companies probably lessened the emphasis upon this feature of operation. The companies undoubtedly have a keener appreciation of the difficulties of their situation, and in many places corrective steps are being taken which would not have been thought necessary a few years ago.

We speak of the general problems of the industry as serious, but in fact where they really seriously concern individual companies they threaten grave results. Only those officials of companies who have gone through the mill of great changes enforced by the drastic public demands of the last few years realize what can happen to them and to the properties in their care. There was an example in Chicago which antedated the era of regulation, but which included in its settlement some of the changes that would have been required under regulation. The shock of the New York receivership, although almost coincident with the commencement of public utility regulation in New York State, might have been hastened by the new law, as some people said, but it was inevitable anyway. There are still many troubled points in various parts of the country, and they appear to increase rather than to diminish in number. The problems thus are localized, although they have identifying features which show the close resemblance of one to another.

It is impossible in any satisfactory survey to refrain from reference to Cleveland. The ideal conception of the ordinance there was that it would be automatic in action. When the interest fund increased the rate of fare would decrease; when the interest fund decreased the rate of fare would increase. The model of automatic action displayed for the admiration of beholders was very simple and attractive. In practice, however, the ordinance works automatically to reduce the rate of fare when the interest fund increases. It does not work so smoothly and automatically to increase the rate of fare when the interest fund decreases. It is easier to let rates down than to force them up. The service can be disguised when the fare cannot. The public does not realize when the service is shaped to the end of a 3-cent fare. Its consciousness is keenly alert, however, when a change in the rate of fare is made. It is possible to make a change in service without public announcement. It is not possible to make a change in fare without immediate public notice. These considerations have fostered the low-fare experiment in Cleveland. How long they will be controlling, however, it is impossible to say. Unless in some way the influence of the increase in cost and the readjustment assured by the finding of the board of arbitration can be overcome, they point to a higher fare in the future.

There is unrest in other cities also. In Toledo the financially rehabilitated company is going ahead to render service without regard to the franchise situation. By so doing it should pave the way for an equitable settlement. The Detroit situation is still far from settlement. After long negotiation an ordinance providing for a new franchise for the Metropolitan Street Railway line in Kansas City has been introduced in the Council. It carries out many of the radical ideas advanced in the last few years in reference to public utility corporations. In Des Moines a new tentative franchise has been prepared. No solution of the San Francisco difficulties has been reached. In these cities there is a curious mixture of the old theory of operation under a limited municipal franchise with the modern theory of stringent regulation, except that one of the best features of the modern theory is lost to sight, namely, the elimination of the limited franchise and the substitution of a franchise that is indeterminate or perpetual if proper service is rendered. There are the cities fighting on the one hand for rigorous terms in municipal franchises, while on the other hand the modern policy of flexible regulation by state commission gains in strength. State regulation is greatly to be preferred to municipal regulation, and we believe that it is only a question of time when all states will assume full control. If time brings that about, one of the best of the results will be the elimination of the continuous and paralyzing controversies between city and company. The city electric railway is so easily the prey of politicians under the old-time conditions that effective state regulation would be a relief.

There is a tendency to dwell upon this issue because it means so much to the companies and because it is ever prominently before them in these days. Both this question and the more internal one of higher operating expenses insistently confront the companies and demand settlement. The solution to the problem, unfortunately, is not one that is capable of standardization. Each company has the issue to meet for itself. It cannot avoid it but must do the best that it can to reach a settlement that will be fair to its security holders and its employees. In so doing, however, it needs to have the co-operation and not the antagonism of the public that uses its facilities.

THE RELATIONS OF THE CITY AND THE PUBLIC UTILITY

Practically the entire gamut of theories as to the relationship between public utilities and the public was traversed at the meeting of the American Economic Association in Minneapolis during the past week, and among the speakers were several outspoken advocates of municipal ownership and operation. No one can deny that during the past ten or twelve years a great change has taken place in the generally accepted ideas on the proper relations between the utilities and the state. Previous to that time, it is true, there had been a strict regulation of public utility capitalization in a few states, notably in Massachusetts, but generally throughout the country the public utilities and their franchises were held to be a class of property with which the owner could do about as he pleased.

The development a few years later of the commission idea of regulation, under which the state began to take control over the rates charged and the services rendered by the utilities, was a logical outcome of the new theory of public regulation, which now gained tremendous impetus. This theory, if we define it briefly, is that while public utility enterprises are in a sense private property, they must be administered in such a way that the owners can obtain from them only a fair return upon a fair valuation and that all surplus from their operation above this amount should go in some form to the public. Hardly had this thought become generally accepted when the situation became complicated by a large and still growing demand for improvements and greater luxuries in the service required from the utilities as well as an increase in the cost of labor and of all the materials which the utilities have to purchase to conduct their operations. If it had not been for these circumstances, there would probably have been a countrywide demand for a great reduction in the rates charged by electric railways. But the cost of operation had gone up instead of going down, and the position of the electric and steam railroads has changed from that of fighting a decrease to that of pleading for an increase.

It would manifestly be impossible, in view of the complex nature of the question, to lay down any hard and fast rules which would apply in all cases, yet we believe that the main directions in which progress should be made can be determined to some extent at least by the process of elimination. Thus, one suggested solution which we believe should be discarded at the outset, certainly so far as electric railways are concerned, is that of municipal operation. The actual management of the electric railways of the country should be in private hands, regulated so far as is necessary, if politics in our large cities are to be kept free from a great opportunity to apply the spoils system upon a large scale. This danger alone would be sufficient to eliminate the possibility of municipal ownership from consideration, but it would also be the height of injustice to the individual taxpayers to allow the city authorities to use the city credit to engage in a business involving such risk of financial failure as that of the construction and operation of electric railroads.

If, then, it is decided that the properties are to remain in private hands, there remain for consideration three main questions, namely, the valuation to be placed upon the present business and property, the rate which the companies shall be allowed to make upon this valuation, and the status of the future relations between the two parties. If the problem is confined entirely to these points, we believe that it will not be difficult to reach a satisfactory agreement in individual cases. The rate of return will necessarily depend upon that which can be earned in other enterprises in the same locality involving a similar risk, for obviously if it is any less no more capital can be induced to engage in the business. Other conditions being equal, this rate would have to be higher in a rapidly growing community where there is greater demand for capital than in the older and more stable parts of the country. Again, where the city is a partner and the proportion of the returns to the city, taken either as service or as direct payments, are paid before the utility earns its return, the risk is increased and a higher rate would have to be allowed than if the property was first permitted to earn a specified rate of return and the profits were then divided. The first New York subway was built under the former plan, and the company took all the risk. The present extensions are being built under the second plan. There are a number of other precedents where different rates of return have been agreed upon, depending upon different degrees of risk. We ourselves believe that a profit-sharing plan between the company and the city, under which there is an incentive to the railway company to have an economical administration of its affairs, is far better than a fixed limit to the rate of return, as, for instance, in Cleveland.

In regard to the amount of investment or valuation upon which this rate of return shall be estimated, we believe that in general it should not be less than the actual investment made in good faith in the property plus the accrued return on this investment not paid out to the security holders. We say "in general" because adverse business conditions in which the public has had no part have adversely affected many of these enterprises. In some cases they have been built in locations where the possible traffic did not warrant the construction of any line; in other cases there has been bad management, and in still others conditions which probably could not have been foreseen or avoided have made reorganization and a reduction of capitalization necessary. But where a road has been encouraged by both the law and the public to install an electric railway and establish certain rates on a franchise presumably unchangeable in its conditions, and where it has been conservatively managed and has made such improvements as were required from time to time by the progress of the art, its existing investment should be recognized. Then, if the community wishes to permit a higher rate sufficient gradually to amortize the difference between present value and present investment, such a plan can be inaugurated. In the future we see no reason to expect similar problems to arise. With the valuation and rate of return fixed, the rate to be paid by customers for the service can easily be determined. These principles seem in general to be those which should be the controlling ones in the settlement of this question.

INTANGIBLE VALUES IN SETTLEMENT CASES

The propriety of assigning any value to the so-called intangible assets of a street railway at the time of sale or valuation is often assailed, one of the latest instances being in connection with the recent valuation for the proposed purchase of the Toronto Railway, which the city is thinking about taking over before the end of the franchise period. Just why the average layman should look with so much distrust upon the word "intangible" is not easily explainable, for the basic idea underlying intangible values is one that he can easily obtain if he wishes and, what is more, readily comprehend. Intangible values may be roughly divided into two classes, one connected with the organization and maintenance of the company as distinct from the property, the other concerned with the building up of the business. The former include the preliminary technical expenses, legal expenses during the formation of the company not connected with construction expenses, cost of consolidation and reorganization, reconstruction due to unforeseen contingencies, brokerage, discount on securities and a reasonable promoter's profit. All of these items represent expenditures that are not limited entirely in their application to the accounting or fiscal period in which they originate; they are connected with the vital corporate being as long as it is in existence. The outlays for these items are therefore properly spread over the entire franchise period, and the proportion for the time unexpired is treated as a deferred charge to expense, an asset to the company. Now, when from any cause a company sells out before the expiration of its corporate right, the vendee, a municipality for example, should reimburse the company for these expenses that are applicable to the remaining period when the municipality and not the company is receiving the income. In other words, these assets represent money values paid out the use of which has not been yet enjoyed—intangible values, in short, that must be recognized.

As for the second class of intangible assets, franchise rights, these should be even clearer to the average citizen, for they are not so involved with accounting principles. The important points are two: An electric railway often begins its operations at a loss, and for some years the net earnings are likely to be meager indeed. In fact, a surprisingly large portion of a franchise period is spent in perfecting the organization, instituting economies and efficiencies and building up traffic and good will so that in the last years of franchise life a real substantial return on the investment may be secured. Hence, when a company, in the belief that it has a certain number of years of life remaining, has succeeded in laying the foundation for future profits it is perfectly justified in asking that a municipality desiring to purchase the property make up for these profits at their present value.

Problems of the Electric Railway Industry

The Electric Railways Enter the Year of 1914 Facing Widely Diversified Problems, and Different Aspects of Many of These Are Discussed by Prominent Men in the Industry

Opportunities Before the American Association

By CHARLES N. BLACK, President American Electric Railway Association

The problems confronting the electric railway interests of the country to-day are many and varied, and there has been no more critical time in the history of the industry than the present. The remarkable growth of American cities and the demands of modern business have made the question of transportation one of the most important of those confronting our municipalities. While the solution of this question, even under the most favorable conditions and with the hearty co-operation of the public, the various commissions and other governmental agencies, would be far from simple, it is greatly complicated by lack of such co-operation, due in a large measure simply to ignorance.

It is idle to waste time in arguments as to what causes brought about the present hostile tendency of the public to all public service corporations. We are confronted with a fact, not a theory, and the task before the electric railway industry to-day is to clear away the ignorance which is so prevalent in all sections of the country and among all classes of society and which must be dissipated before it is reasonable to hope for the establishment of any real and permanent progress.

Isolated and spasmodic attempts have been made by some of the larger electric railways through the local press to dispel the prejudice which has arisen in the mind of the public and to give it a clearer conception of the many serious and difficult problems which have arisen, but apparently little real progress over the country as a whole has been made, and if we are to better these conditions concerted action on the part of every electric railway in the country will be required. No better tool for this work is available than the American Electric Railway Association, with its membership extending into every state in the Union and controlling more than 80 per cent of the mileage of the country.

While in the past the work of the association has been of inestimable value, it has been confined in a large measure to the technical side of the industry, and it has touched on the broader problems and public questions in more or less of a desultory fashion. A far wider and more important field of work now presents itself, and it is incumbent upon the association to undertake the solution of the present problems with the same energy and in the same broad-minded manner as it has taken up and solved many of the difficult technical questions in the past.

With this end in view, there has been appointed a committee on public relations, consisting of the ablest men in the industry, together with leading representatives from the principal manufacturing and banking interests which are closely allied with the electric railway companies. It is expected that this committee will formulate not only some comprehensive and effective publicity campaign but also a financial plan for carrying it out successfully, and it will then be the duty of every member of the association to lend most hearty and active co-operation. Upon the solution of this problem depends the very life of the industry, for unless the prevailing ignorance and prejudice can be dispelled it will be absolutely impossible to secure capital for additions and betterments to existing properties, to say nothing of the necessities for the financing of new projects.

During the past few years a large number of the states have appointed public service commissions, whose authority, generally speaking, is very broad. The members of these commissions have been recruited almost without exception from a class of men who have had no experience in the electric railway industry, and in order to avoid ill-advised and destructive orders from these commissions the task of educating the individual members has devolved upon the managers and operators of the electric railroads.

Generally speaking, this has been successfully accomplished, with the result that it has been the exception where any really pernicious or unfair requirements have been promulgated. While local conditions naturally control in a large measure the policy of any company in its dealings with a public service commission, the committee on public relations can advantageously study and discuss the effects on the industry as a whole, both financially and otherwise, of the appointment of these commissions.

Another vital matter which is coming up more frequently every year is the question of the renewal of expiring franchises. Municipal ownership numbers among its advocates a large proportion in every community, and unless a franchise can be drawn in such a manner as to be absolutely fair to the public, encourage the settlement and building up of the outlying districts of a community and, at the same time, hold out such promise of financial returns as will encourage capital to embark in the electric railway industry, municipal ownership will receive a really tremendous impetus.

These are but a few of the very important problems which are confronting the industry and will require the very best work of the ablest men connected with the association, if they are to be solved in a successful manner.

The affiliated associations of the American Electric Railway Association carry on a work that is practically continuous. The consideration of questions of technique and of operation is their province, and the constantly changing conditions incident to the marvelous progress in the science of transportation offer an opportunity for co-operative effort along the lines of their special activities which has been and is being taken advantage of in a most satisfactory manner. Among these may be mentioned the preparation and publication of the "Engineering Manual," which will undoubtedly prove of the very greatest use to the engineering staff of the various member companies of the association.

Any description of the work of the association would be incomplete without reference to the Fare Research Bureau, which has recently been organized under the charge of a recognized expert and which promises to be of great value in the settlement of a very serious question.

How to Have Good Public Relations

By C. LOOMIS ALLEN, of Allen & Peck, Inc.

The problem of public relations has been discussed for a good many years as an abstract question. It is, however, an intensely practical question. The results that flow from the attitude of the company on this problem are tangible. There cannot be bad public relations without a corresponding adverse effect upon the earnings and credit of a company. There cannot be good public relations without a favorable effect upon the credit and earnings.

The wisest thing that each company can do is to face this problem squarely. It should analyze conditions in its community. There is no use in disregarding plain facts. Conditions in each community are either favorable or unfavorable. There is not a middle ground. If bad public relations exist, the reasons ought to be clear. Such relations cannot exist unless at some time in its history the company has been at fault. If the company is still at fault in its attitude in any respect, that attitude should be changed without delay. If other agencies than the public are at fault, the company should exert every honest effort to set them straight. How this can be done is a problem by itself in each case, but satisfactory general policies will always help.

Suppose, for instance, the company has followed the policy of secrecy. It has not given information either to the public or the newspapers. It has the reputation of not giving satisfactory replies to inquiries. Neither the public nor the newspapers are met with courtesy when they ask fair questions about matters that ought to be of common knowledge. The way to overcome the result of such a mistaken policy is to enforce rigorously a new attitude of publicity. Let the company welcome the newspapers and the public. If they learn more than they have a fair right to learn the harm done will not be nearly so great as if they learn less than they have a fair right to learn. Furthermore, when they find that they can get easily the information that they ought to have, the basis is laid for a new feeling toward the company.

Public utility companies ought to make it possible for the newspapers to be their friends. They cannot expect the newspapers to have this attitude unless they try their utmost to solve the problems before them to the satisfaction of the public they serve. In their work of serving the public the newspapers seek the news in their communities. If they cannot get news worth printing about the company from its accredited officials, they are likely to try to get it in other ways. They know that the company has news. If the company makes it difficult or impossible for them to get the news, they try to get it through underground channels, and the result is a garbled report for which the company is, in the main, responsible.

There is plenty of legitimate news about an electric railway. The great difficulty is that the officials of the railway do not know what the newspapers would like to publish. The newspaper men on most papers want to be fair, and if the company is fair with them they will respect its confidences. No public utility official, however, can expect to treat newspaper men in the community unfairly and receive from them that considerate treatment which he, as a representative of his company, ought to have for the sake of his company as well as for his own sake.

The best medium of communication and friendship between the railway and the newspapers which carry the news about the railway to the public is a trained newspaper man in the employ of the company. This does not mean that if a newspaper representative calls to interview the president or the general manager of the company he is to be told that that official is busy and be referred to the publicity agent. A trained newspaper man should be in the employ of the company, not as a substitute for the officials but to supplement all that they can do to tell about railway matters which are of interest to the public. Such a man, if worth his salt, will be on the lookout for items of news in every department that the newspapers will be very glad to print.

He will write articles of the same kind that he would write if he were employed by the newspaper. When this is done he will, after discussing the items with the management of the railway company, offer them to the newspapers, always being careful to use the same judgment about news as a representative of the railway that he would use as a representative of the newspaper. He should not ask the newspapers to print what he knows they ought not to print.

The adoption of this policy will help the railway in one of its main difficulties, that of teaching the public that there is a railway side to the great and serious problem of public relations which ought to be understood better than it has been in the past. A clear public understanding of what the railway side of the story really is will help to pave the way for good public relations, which are absolutely necessary if the company is to become or remain prosperous.

Increased Cost of Electric Railway Operation

By CHAUNCEY ELDRIDGE, of Tucker, Anthony & Company, Boston, Mass.

The most serious problem confronting the electric railway at present is the increasing cost of operation, including fixed charges and taxes. Interurban and city roads both feel the pressure of rising expenses, and the situation is rendered doubly difficult by the demands of the investing public for higher returns upon capital —returns which would have been considered out of the question a few years ago. Hemmed in by the established 5-cent fare unit, the urban electric road is face to face with a financial problem of no small moment. In the Middle West many interurban lines started operation on the basis of an average fare of 1½ cents per mile, with commutation and other reduced rates yielding only 1¼ cents. It has been absolutely demonstrated that an interurban road cannot be properly operated to-day, paying its running costs, fixed charges and allowing anything for depreciation, on the basis of a 1½-cent fare per passenger mile. On city lines the inflexible 5-cent fare unit with nothing less than extraordinary transfer privileges frequently permits a maximum ride of 20 miles, and everybody knows that it costs a company two or three times the nickel unit so to transport the long-distance rider.

Analyses of the actual cost of operation in the city of Cleveland, Ohio, show that more than 4 cents per passenger must be collected if a reasonable amount is

to be laid aside for depreciation and maintenance, yet there is a constant cry from the public for decreased rates. The average community would embrace a proposition for a 2-cent urban car fare without regard to the actual cost imposed upon the operating organization. The 3-cent fare in Cleveland was undertaken by a former municipal administration as a temporary expedient, but the whole policy of the present city government seems to be to cut its cloth to the 3-cent standard rather than to maintain the best service and ascertain the limits which that service sets. Such a policy, if persisted in, leads to the junk heap.

The most apparent source of relief from the adverse conditions now bearing down upon electric railways is through the education of various state commissions to the point of appreciating the burdens imposed upon the companies, not only by popular demands for lower fares but by the growing costs of labor of material and of capital and by the urgent pressure upon railway managements for larger, faster and more luxurious cars and improved service in every way. There is a tendency on the part of these tribunals toward according to the transportation companies a fairer hearing than has sometimes been the case in the past, and these boards, in many cases, are much less inclined to drastic action, biased by the popular appeal, than they were a few years ago. On a typical interurban road, charging the legal steam railroad rate of 2 cents per mile, under the jurisdiction of one of the newer commissions, the board has resisted a demand on the part of the public for reduced fares and increased stops, the latter having been granted in but two or three instances where an absolutely valid reason could be shown for such interruption of the schedule. This commission has declared that the road has been in operation too short a time to justify any invasion of its charges along the lines proposed. Five years ago little likelihood of decisions of this kind existed in many states, and had the petition been presented at that time the tendency of such boards to use their powers almost exclusively on behalf of the public would have militated against the equitable treatment of the problem.

It is unlikely that the cost of operation can be reduced in any permanent way by electric railways, although there may be temporary decreases in the expense of labor and materials during periods of business recession. There is some opportunity for adding to income by the development of electric express and freight service, but in the main the relief needed must be sought through the commission channel. Ultimately, it is possible, the general public may awaken to the real situation and co-operate to some degree at least with public utility managers handling transportation service along the line of conceding a fair return upon the capital invested in the enterprise; but the direct education of the public is very costly, and it is probable that only after several unfortunate examples will the people as a whole give the matter its due consideration. The interurban road stands in a somewhat better position in regard to fare matters than the city system. Its average revenue per passenger may be five times that of the latter, and its management deals with a correspondingly small number of patrons. The existence of fare zones also affords a certain flexibility in the adjustment of rates. The state commission is the controlling factor in the situation, however, and the immediate future of the industry rests very largely in its hands.

The Central Electric Railway Association and the Interurbans

By **ARTHUR W. BRADY**, President Union Traction Company of Indiana

While the membership of the Central Electric Railway Association is made up of both urban and interurban companies, the principal work of the association has lain in the interurban field. In no part of the country has there been a greater development of interurban railways than in the Central West. This development has been due to several causes. The principal factors are found in physical conditions generally favorable to construction, the lack of other means of transportation furnishing the frequent service required and desired by the public and a population of sufficient density to appear to justify the necessary investments of capital.

The interurban lines were built under varying conditions and according to varying standards. Some of them were built by street railway companies as extensions of their systems. Others were built as independent railways, connecting perhaps at terminals and other points with street railway systems, over the lines of which the interurban cars were operated under trackage contract. Some of these lines were constructed out of funds furnished in ample amounts by strong groups of capitalists, while others were built out of local contributions, inspired by public spirit as much as the hope of profit and often made without knowledge of the requirements of railroad construction of any kind. It is not strange that the lines thus built differ greatly among themselves in the standards of construction employed. Many builders adopted urban street railroad standards as the standards for interurban construction. A few adopted steam railroad standards. Between these extremes practices varied greatly. Because franchises over highways were in many instances freely granted to the projectors of a desired interurban line, the cost of a private right-of-way was sometimes avoided, and the line was built on a highway. Because street cars could be operated without regard to gradients or curves, in many of the earlier interurban lines the steepness of grades and the sharpness of curves were frequently looked upon as items of little importance. In the rails, joints, ties, overhead construction, cars, motors—in practically everything—widely diverse standards ruled.

As it was with construction, so it was with maintenance and operation. Many of the operators and managers of the early interurban lines were men of little, if any, railroad experience. Some of the more experienced ones had gained their experience in street railway operation, others in steam railroad operation. Here, again, methods varied almost in proportion to the number of lines. So it was also with practices involving the patrons of the lines. On one line every effort would be made to induce the use of tickets by the traveling public, while on other lines no tickets at all were sold and fares were collected in 5-cent zones, so that the passenger would be called upon to pay his fare a number of times on a journey of any distance. On some lines baggage was carried in every car, while on others baggage was carried only on infrequent cars, if carried at all. On some lines baggage was carried free, while on others no baggage was carried without charge. Some lines carried freight in cars used also for the carriage of passengers. On other lines all freight was carried on express cars used only for that purpose, while on still others no freight at all was carried. The ticketing of passengers, the checking of baggage and the interchange of freight were practically unknown.

The lack of system and standardization which thus characterized interurban lines in the earlier development was largely due to the exceedingly rapid rate at which that development had proceeded. The resulting condition was serious. Several thousand miles of interurban railway existed in the Middle West, connected together at many points, but, because of diverse practices and standards and lack of harmonious co-operation, the lines were incapable of accomplishing for public or owners all that both could rightly demand of them.

The Central Electric Railway Association, which in its origin was the successor to certain state organizations, has a record of successful accomplishment in establishing order, system and standardization in place of the confused condition which formerly existed. The record thus made is not the work merely of the association named but also in large part that of its affiliated associations, the Central Electric Traffic Association and the Central Electric Railway Accountants' Association. The meetings of the association bring together men active in all branches of electric railway work, including representatives of the principal manufacturing concerns connected with the industry. The papers read and discussions had are of a highly practical nature. It is safe to say that, taken as a whole, no better presentations have been made at meetings of any other association of the best practices in electric railway construction, maintenance and operation. No two successive meetings are held in the same state. Generally one or more special cars bring members from distant points. The result is that, instead of the state of isolation which formerly existed, the men in charge of operation and maintenance on one line have now a fairly good knowledge of what has been done and is being done on other lines throughout a wide territory. This opportunity to make comparisons itself leads to improvement, as well as to uniformity and standardization, for what one line borrows from another almost universally means the displacement of an inferior by a better practice. The work of the active committee on standardization of the association has contributed greatly to the same result.

Only a few years ago it was almost impossible to secure reliable information with reference to a journey of length by interurban railways. It will be remembered that one of the great newspapers of the country, being unable to ascertain the facts from the electric railways themselves, some years ago started a representative from Chicago to New York to discover whether the through trip could be made by electric railway. So far as the territory of the Central Electric Railway Association is concerned, such information is now easily accessible.

Through the work of the Traffic Association, a well-engraved map has been published and widely distributed showing interurban lines between Chicago and eastern Illinois on the west and Pittsburgh and Buffalo on the east, taking in southern Michigan as its northern limits and northern Kentucky as its southern limits. Furthermore, elaborate tariffs for interurban traffic, freight and passenger, have been issued, and a convenient means of filing changes with interstate and state commissions is supplied. Any interurban agent is now enabled quickly and easily to give information as to routes and rates between all points in the Central Electric territory. Moreover, baggage regulations have been standardized and simplified, and provisions have been established for the interchange of rolling stock. Thanks to the Accountants' Association, standard methods of interline accounting have been adopted, so that the lines themselves are able to handle interline business without difficulty. It is now practically as easy and convenient for one desiring to travel or to make shipments throughout the Central Electric territory to use the interurban lines as to use the steam lines.

To the unification and standardization of the interurban railway work which has thus been brought about in Central Electric territory several factors have contributed. It may be safely affirmed, however, that one of the most potent of these factors is the continuous and energetic labors which the lines have themselves put forth through the Central Electric Railway Association, the Central Electric Traffic Association and the Central Electric Railway Accountants' Association

Purchased Power and the Street Railway

By CHARLES L. AYLING, of Baker, Ayling & Company, Boston, Mass.

The increased cost of operation on the modern street railway and the difficulty of offsetting it by raising the fare unit are fully appreciated in financial and administrative circles to-day. To preserve net earnings so far as possible under these conditions it is a great advantage to fix as many expenses as may be upon a definite basis. By such a policy the margin of a reasonable return from an established fare unit may be to some extent safeguarded. Could the cost of transportation as measured in wages have been fixed five years ago, conditions in the industry would have been very different to-day. Economies are being sought in many directions, however, and among these the use of purchased power is a positive factor in standardizing the expenses of operation.

Every probability points to a material increase in the cost of coal in the not distant future, and it is unlikely that station labor costs will be reduced per employee as time passes. The latter item has risen in parallel with platform costs in the last few years, not only through reductions in the length of shifts from twelve to eight hours in many plants but through direct increases in wages.

The production of power by large steam and hydro-electric stations is attaining new importance in many localities, however, and the street railway is beginning to realize that in most cases at any rate it cannot produce energy as cheaply as these large plants can supply it, thanks to the diversity factor resulting from non-coincident peaks. Investigations by the Commonwealth Edison Company of Chicago have shown that the combination of manufacturing, trolley and lighting loads saves certainly 20 per cent in plant capacity and hence in investment and corresponding fixed charges. Centralized power supply reduces the ultimate cost of electric transportation to everyone who may be concerned.

The Connecticut River Transmission Company and its affiliated organizations, with which the writer is most familiar on account of the financing of their developments through Baker, Ayling & Company and their management by Chace & Harriman, furnish a suggestive example of power supply for economical reasons to street railways in central New England. The high-tension steel tower lines of this system extend from Pittsfield and Adams on the west to Worcester, Marlboro and the Rhode Island line on the east.

During a period of operation which has covered less than four years these companies have been established and are now delivering power at the rate of 150,000,000 kw-hr. per annum, an output in excess of the combined production of all the central stations in those portions of Massachusetts inclosed by their lines. Power is supplied to the Worcester Consolidated Street Railway at three important points; the Massachusetts Northern Street Railways are operated entirely by hydroelectric service from Gardner to Athol; power is being delivered to the Springfield Street Railway at Palmer, and a contract for a large block of power has lately been closed with the Berkshire Street Railway. Arrangements have also been made to furnish power to the Boston & Maine Railroad at Zylonite, Mass., for the operation of the heavy electric locomotives in the Hoosac Tunnel.

One feature of operation which has been of much advantage to street railways purchasing power from large plants is the improved voltage regulation secured under traffic peak conditions. This results in a material betterment of the running time of the cars, especially on holidays and Sundays, and it cuts down wear on the motors as well. Again, the making of power contracts for a long period, often from ten to thirty years, definitely fixes the price of electricity and rids the operating company of this element of uncertainty in its running costs throughout the entire life of the agreement.

In other words, such a program gives stability to net earnings, and it does it by virtue of the economic advantages of wholesale power production and distribution. The cost of attendance in a steam generating plant in a large power system may be 20 per cent of the gross income, whereas in the hydroelectric plant it runs from 5 to 10 per cent of the gross. In the production, transmission and distribution of electric power from large hydroelectric plants with supplementary steam equipment, used only when water is short, unit costs tend to run low, permitting the quotation of favorable rates and offering the street railway at least a measure of escape from the conditions which at present heavily oppress it.

Rolling Stock Design

By E. W. HOLST, Superintendent of Equipment Bay State Street Railway

The selection of rolling stock for street railway service is pre-eminently a problem whose solution depends upon local conditions, and the design of passenger cars, particularly for operation in cities, is therefore a matter which cannot be settled in an off-hand way. To the layman the task of transporting the public on an urban street railway doubtless appears much the same in one place as in another. Most thickly populated communities have their rush hours and midday traffic, substantially all are served by electric roads upon the basis of the 5-cent fare with more or less liberal transfer privileges; the use of tracks laid in the public thoroughfares is universal, and there are other features of the service which make the passenger feel at home aboard a street car entirely apart from the city in which he happens to be traveling. From the popular viewpoint, therefore, it would seem to be a simple matter to provide an increase in rolling stock when the growth of traffic, existing or anticipated, exceeds the capacity of the operating equipment.

In reality, the ideal car for city service, the standard design which is capable of meeting local requirements pretty much anywhere, does not exist. One has only to review the tendencies in car-body design of the past five years to realize that the more local conditions are studied the less becomes the possibility of ordering cars from stock and putting them into service with the expectation that they will meet the approval of the traveling public and afford the most economical operation and maintenance. Each case must be studied on its merits.

A glance at some of the factors influencing car design will show why a single type or standard of construction cannot fulfil the requirements of diversified service in dissimilar communities. Were all cities alike the problem would be fairly simple, but each town has characteristics from the street railway point of view which individualize its transportation conditions. The width of streets, use of single-end or double-end operation, spacing of tracks, limitations of overhang, curvature of the line, presence and character of grades, bridge, station and platform clearances, facilities for loading and unloading passengers, strength of bridges, and the type of rolling stock units already in service, together with the schedule speeds and stop requirements in force or contemplated, are some of the features external to the car itself which influence the design.

Inside the car a still greater number of conditions must be taken into account before the best rolling-stock type can be determined in a given instance, and even here the test of actual service on a limited scale is generally desirable before large investments are committed to radical departures in design. The reason is not that the engineering features of a car may require modification but that the actual fitness of the equipment in caring for the comfort and convenience of the traveling public are best demonstrated by the use of the car by the passengers and operating crews. An inch or two added to the width of a seat or an aisle may be a powerful factor in deflecting traffic to an operating company under competitive conditions. The location of heaters, effectiveness of the interior illumination, shape of seat backs, width and length of window sills or arm rests, the percentage of the car side occupied by window glass—these and many other details bear upon the popularity of a car type.

In addition to these considerations the problem of fare collection, the desirability of keeping the conductor at work at a fixed point, the expediency of the center entrance, the disposition of seats and location of the aisle space, the proportion of standing space which should be allowed in specific instances, the necessities of internal circulation on the part of passengers after boarding the car and on approaching stops, the adaptability of the prepayment feature and the effectiveness of moving the passengers in a general forward direction through the car as a means of reducing congestion are all points whose importance varies not only in different cities but frequently on different divisions and routes of the same railway.

Methods of operation long accepted in one community may be most unfavorably received in another. In one case a desire to preserve the lowest possible fare may result in a density of car loading which would be regarded as abnormal elsewhere. In another adherence for local reasons to single-ended operation and the concentration of boarding and alighting at a single door may yield satisfactory service despite the fact that it pockets the passengers and possibly renders the collection of fares in rush hours a good deal of a problem. Local traffic regulations affect car design, as do also the character of patronage handled, the relation of midday to rush-hour travel, the motor equipment required to maintain the desired schedule and the limitations of wheel diameter, truck design and requirements in heights of car steps.

In the development of different types of cars to meet the foregoing varied conditions in combinations peculiar to each community can be seen the advance of the industry toward the more scientific treatment of its transportation questions. There is little doubt that for city service the prepayment type of car bids fair to increase in popularity among electric railway managers, and in forms specially designed to prevent acidents due to improper boarding or alighting. Obviously, the reduction of car weights in new designs demands the attention of all those who appreciate the economies of such a program, and there is no question that this phase of car development is viewed with much greater interest than a few years ago. Again, the close attention now given to motor selection for stated service and the recognition by many of the wisdom of occasionally studying the fitness of such equipment to handle changed traffic conditions bear witness to improved conceptions of engineering responsibility.

With regard to the widely discussed question as to the use of all-steel or wooden construction, the writer is of the opinion that for a surface car designed for local operation all-steel construction will not be so desirable in the long run, for the reason that the metal post, roof, sash and fittings, whether riveted or braced, are in time subject to damage through jarring and loosening at joints, resulting in rusting, increased wear and excess maintenance besides having a tendency to be cooler in winter and noisier in operation. Better flexibility of construction is obtained by the use of combinations of wood and steel, the latter being particularly useful in underframing and side construction up to the window sills. To low cost of maintenance and economical operation must be accorded due consideration in the design and selection of every important detail of car equipment.

European Railway Electrification

By GEORGE GIBBS, Consulting Engineer, New York

In the summer of 1913 I spent about two months in a visit to Europe for both pleasure and professional purposes. On this trip I enjoyed the opportunity of discussing electrification problems with such men as Charles H. Merz, consulting engineer for the Melbourne electrification; Philip Dawson, consulting engineer for the London, Brighton & South Coast Railway, both at London; Dr. W. Reichel, director Siemens-Schuckert Works; G. Wittfeld, Geheimer Oberbaurat, in general charge of the Prussian State Railways electrification, and the managers of the Allgemeine Company, all at Berlin. In Paris I met M. Jullien, chief engineer of the electrification work of the Midi Railway in the Pyrénées. Every facility was offered to me to obtain information, and at Berlin, particularly, I had the pleasure of going through the works of the two great electrical manufacturing companies mentioned. On a previous visit to Europe I had inspected the Dessau-Bitterfeld line, but lack of time prevented a trip to the newly opened Lötschberg Railway during the course of this visit.

A study of the work done on the Continent shows that all of the electric railway engineers have followed the same principles as their steam brethren, namely, their constructions are very light as compared with American standards, even for like conditions. Line and equipment are much more complicated and refined than would be considered desirable for the rough-and-tumble conditions of America, but unquestionably the work done in Europe is beautifully designed and conscientiously maintained.

So far, the Dessau-Bitterfeld line has been used practically as an experimental ground. Every suggestion for the improvement of line and locomotives is being tried out there. The authorities now have an immense mass of data which still remains to be sifted out and classified for practical deductions. Mr. Wittfeld informed me that, although the Dessau-Bitterfeld side-rod locomotives looked so very light, almost flimsy in fact, the only trouble of consequence given by them had been the breakage of the forked ends of the main rods. Forged solid ends had been substituted, and he felt that the end of locomotive troubles was in sight. The maintenance of these and other foreign electric locomotives is so systematic and thorough that they do not carry protective devices against short-circuits, like slip joints between the armature and shaft, such as are considered necessary on American locomotives.

The electrification of the Berlin Stadtbahn is a project much favored by the public, but it has made its way to official adoption very slowly, partly on account of the opposition of steam interests and partly on account of the probability that electrification, while increasing capacity, will not be profitable at the present ridiculously low fares. To reduce the cost of electrification it was first proposed to use front and end locomotives in order to retain the passenger coaches, which are of special type and not readily available for use on other steam lines. Now the electrical interests appear to appreciate that motor car operation would be far better than the clumsy locomotive arrangement, but many lack the courage to recommend the former because of the additional expense. When locomotives were suggested, single-phase was proposed for their propulsion, for the reason that some of the trackage forms part of trunk lines. The whole question has now been reopened, however, and the authorities may decide to use another system for suburban work exclusively.

On the Continent generally, however, there is no question that single-phase is in the ascendant. In Germany all the authorities seem to be agreed upon it, and the same fact holds true of Austria and Switzerland. Both of the great manufacturers, the Siemens-Schuckert and Allgemeine companies, consider the single-phase system the proper one for heavy work, although these companies also build high-tension direct-current equipment for lines of interurban character. Both deprecated the controversial character of American discussions on choice of systems. In Italy the three-phase system is favored by the Italian State Railways, more particularly because of the mountainous character of so many lines, such as the present Valtellina and Giovi electrifications.

In France not much is going on at this time except the electrification of some suburban lines out of Paris and the experimental single-phase line of the Midi Railway. The latter is a forerunner for an ambitious electrification of some 250 miles of mountain branch railways which are to receive energy from hydroelectric sources. The types of locomotives have already been selected.

The confidential data on the London, Brighton & South Cost single-phase electrification show most satisfying results. The only electrical trouble of importance was a faulty design of brush holder, and this defect has since been corrected.

The Distribution of Power for Traction

By LOUIS BELL, Ph.D., Consulting Engineer, Boston, Mass.

The past year has shown singularly little development in the methods of transmission and distribution applied to electrical traction. There are interesting promises for the future, but for the present there is not much to boast about. So far as the pure transmission side of the work goes, railway working both here and abroad is on a comfortably conservative basis of voltage. There is not much occasion for going to extreme pressures. The Oregon Electric Railway and one or two others in this country take advantage of transmission at 60,000 volts or thereabouts, and the Dessau-Bitterfeld single-phase road in Germany transmits at 66,000 volts and is actually working underground cables at this pressure. Most electric railway transmissions are, of course, less than half such figures as these. On a few recent lines suspension insulators are in use, but for the most part pressures are not high enough to call for this type of construction, and railway transmission lines as a whole are of rather commonplace construction, such as has been long familiar in this country.

Abroad, steel poles are very much more freely used than here, and one interesting innovation in transmission line construction along railways is the use of a solid drawn tubular steel pole. These poles are about 40 ft. high and look as if made in three or four sections. They are, however, integral Mannesmann steel tubes, and the apparent joints are merely reductions in diameter. The poles start at the bottom at about 8 in. in diameter and are reduced to a scant 4 in. at the top. They are quite thin and are set in concrete bases a couple of feet square, more or less. Such poles are spaced at 150 ft., or a little more, and carry usually two circuits, one on each side. They are very strong and reliable and take up extremely little space above the ground on the right-of-way as compared with the ordinary square latticed construction used on the Continent for such cases. The tubular poles cost perhaps half as much again as the lattice, but they give great promise of durability and are extremely convenient, inasmuch as the danger of rusting and the care required are a minimum.

The distribution of the working current displays more interesting novelties than the distribution itself in recent railway practice, especially abroad. The working conductors on recent Continental lines are nearly always suspended from a catenary carried either by brackets or on the more important lines by overhead bridges, and late constructions generally show two trolley wires in the same horizontal plane, a few inches apart, the spacing being regulated according to convenience on curves and sidings. The trolley wires are very commonly of figure 8 form and of cross-section equivalent to something like 000 B. & S. The advantage seems to be threefold, namely, first, added conductivity; second, added collecting surface for heavy work, and, third, the lessened wear on the bow collectors, which are universally employed on recent European roads. The supports of the catenary are 150 ft. to 175 ft. apart commonly, and where steel bridges are used they are of very light and graceful construction, which might be followed to very good advantage by builders in this country.

There does not seem yet to be very much change in the trolley voltages either abroad or here. There are a few excellent examples of 1200-volt practice on a large scale scattered over this country and over Europe, and a very few at higher voltages. Twenty-four hundred volts is a pressure frequently talked about, but it is not much beyond the experimental stage at present any more than it has been in the past. Nearly all these high-voltage d.c. lines are, as the readers of the ELECTRIC RAILWAY JOURNAL well know, of substantially standard apparatus with the motors running in series at the higher voltage. The Midi railway in France is trying some 850-volt motors on a three-rail system, and a few experimental machines of still higher voltage are in use elsewhere.

On the other hand, in the case of single-phase lines, there seems to be a distinct upward tendency in the working pressure, taking full advantage of the transformation on the locomotive. Ten thousand volts is frequent enough. The Midi railway before referred to is working its a.c. electrified line at 12,000, and the Mittenwald railway running out from Innsbruck has gone to 15,000 on the working conductor. Experience seems to show no particular difficulty in collecting at these voltages. Indeed, the experiments tried a decade since on the Zossen line made it very evident that high-voltage collection is on the whole rather easy. Of course, for such voltages as those referred to, the matter of insulation is comparatively simple, and if one is going to transform on the locomotive it can be done just as comfortably from 15,000 as from 5000, with material gain in the conducting system.

It is worth noting that on recent European roads the locomotives are quite generally made with coupled driving wheels driven from a jackshaft with a single gear reduction by herringbone gears from the motor or motors, an arrangement which the Continental engineers believe gives considerable advantage from the standpoint of motor construction and operation. Meanwhile, at engineering meetings this year, both at home and abroad, there have been most vigorous, not to say violent, discussions regarding the relative methods of a. c. and d.c. operation. It is very doubtful whether anybody has really been converted from either system to the other by any of the arguments advanced, as the differences of opinion seem to be constitutional. It is extremely easy to estimate on hypothetical cases which favor one or the other construction. Meanwhile the a.c. traction motors seem to be "making good" from a practical standpoint and retain a very considerable advantage in the matter of cheap distribution and easy collection of energy.

The writer would very much like to see, however, the d.c. contingent break away from conventional motor voltages and push on to much higher pressures on the working conductor than have yet been tried. With the positively coupled motors used on Continental locomotives there ought to be no particular difficulty in going up to 5000 volts on the trolley wire, which would put quite a different phase on the relative costs of distribution. Anyone who has seen the big Thury machines in actual operation ceases to worry about the difficulties of commutation in such a case, particularly since the Thury commutators are quite short, and there seems to be no difficulty whatever in increasing the output of the machines so far as amperage may be concerned.

It is very evident that the last word has not been said on high-voltage d.c. work for traction. Nor is there any difficulty in building the motor generators necessary to supply such a line as that here considered, and it is an open question whether the motor generator very commonly used in Europe for supplying railway circuits from transmission lines does not gain in the stability of operation all that it loses through its inherently lower efficiency.

The Design of Electric Locomotives

By A. H. ARMSTRONG, Railway and Traction Department General Electric Company

Many years of experience in the operation of steam locomotives have resulted in the recognition of more or less standard designs of its running gear and superstructure. Minor difference may exist as to wheel arrangement and valve gear, but the side-rod drive common to all steam locomotives is the natural means of transmitting the power of the expanding steam in the cylinder to the rotating drivers.

The electric locomotive, on the contrary, presents a wide diversity in methods of drive. The extreme flexibility of the electric motor and its adaptability to many successful forms of construction account in part for the many experimental locomotives built. It is also undoubtedly true that the type of motor adopted, whether alternating or direct current, may impose its limitations upon the mechanical design of the locomotive structures. For example, the simplicity of gearless construction used in the New York Central direct-current motor locomotives can be approximately reached with alternating-current motors only by resorting to an undesirable combination of quill and spring drive. We may, therefore, in some cases, look for the reason for unusual forms of construction not to any mechanical superiority or excellence offered by the design adopted but rather to the type of motor used, the limitations of which may enforce a departure from simpler and more familiar methods of drive.

It was natural that the earlier design of electric locomotives should follow the construction found successful in the operation of double-truck motor cars with four motors which drive the four axles through single gearing. Many locomotives of this design, weighing 40 to 60 tons total, have given long years of satisfactory service, and it cannot be doubted that this type of construction constitutes commonly accepted practice for moderate operating speeds. With the need of heavier freight locomotives it was found desirable to introduce twin-gear drive between motor and driving axles in order to equalize stresses. There also came the introduction of the hinged joint between the two trucks constituting the running gear of the locomotive, and this found expression in the forms of construction evidenced in the Detroit tunnel, B. & O. tunnel, Great Northern, and Butte, Anaconda & Pacific locomotives. All of these locomotives comprise the same general design of twin-geared drive and bogie trucks connected by articulated joint, and all are operating with unqualified success at the moderate freight speeds for which they were designed. Two of the Butte, Anaconda & Pacific locomotives are equipped for passenger service with a gear ratio that permits reaching a speed of approximately 50 m.p.h., and the riding qualities of the locomotive at this speed appear to be entirely satisfactory.

Judging from the success attending the operation of twin-geared motor drive, it appears justifiable to look upon this form of construction as well adapted to meet the requirements of moderate-speed freight locomotive service. It would appear also that locomotives of the large capacity demanded for the heaviest freight service can be built with this type of construction without exceeding accepted practice of weight limitations per axle. This statement applies, however, only to electric locomotives equipped with direct-current motors, as the alternating-current motor locomotive design must make adequate provision for a transformer and possibly a phase converter in addition to the motor and control equipment. It is evident that a combination locomotive comprising both driving motors and substation equipment cannot be worked out so satisfactorily as the simpler direct-current type equipped with motors and control only. The locomotive cab provides none too ample space in which properly to install direct-current motor control, air compressor, blower, etc. When, in addition, space must be provided for the transformer and possibly the phase converter required with alternating-current motors which themselves may project up in the cab if side-rod drive is used, then the limited cab space available makes it extremely difficult to locate the several pieces of apparatus so as to afford convenient access for inspection and repairs. Very large alternating-current motor locomotives will probably require idle axles to carry the additional weight of auxiliary control apparatus. The use of guiding axles on freight locomotives therefore may become more a question of type of motor used, whether alternating or direct current, rather than be due to any necessity to use such guiding axles for moderate-speed freight locomotives in order to get good riding qualities.

It may sometimes be overlooked that the whole argument for electrification rests upon the superior qualifications of the electric over the steam locomotive. The fundamental principle of design should therefore provide for the greatest simplicity of motor construction and drive as well as afford ready access to wearing parts. Simplicity and accessibility both contribute to the reliability, high efficiency and low cost of maintenance characteristic of the direct-current motor locomotive, and two general types of construction appear to have demonstrated their fitness for freight and passenger service respectively.

Heavy freight service seems to demand a locomotive weighing approximately 200 tons upon the drivers and capable of delivering continuously a tractive effort of 16 per cent of the weight on drivers, or 64,000 lb., at a speed of approximately 15 m.p.h. For convenience in making shop repairs it seems desirable that this locomotive shall comprise two half units of 100 tons each, carried on two four-wheel bogie trucks connected by a hinged joint. The motors will, of course, be cooled by forced air and will drive through twin gears. Usually such a locomotive may conservatively have a trailing tonnage rating of 1300 tons on 2 per cent ruling gradients where curves are compensated and should also be capable of hauling 2600 tons on level tangent track at a maximum speed of 30 m.p.h. In general, these are the locomotive requirements upon mountain grade divisions, and they can be admirably met by direct-current motor locomotives of similar type but somewhat larger capacity than those now in successful operation on the Butte, Anaconda & Pacific Railway.

For high-speed passenger service it is desirable to provide a locomotive having superior riding qualities at maximum speeds approaching possibly 75 m.p.h. It is in this class of service that the simplicity of gearless construction is more fully appreciated, as evidenced in the latest New York Central type of locomotive, which is capable of hauling a 1000-ton train at a speed of 60 m.p.h. with an efficiency averaging 90 per cent throughout its operating range. The direct current is the only type of motor possessing the inherent qualifications necessary for gearless construction, and the direct-current gearless motor locomotive of low or high voltage may be looked upon as particularly adapted to meet the requirements of high-speed service.

One of the serious problems of mountain division operation is the matter of braking heavy trains on down grades. During the past year a method of motor control has been perfected which will permit the motors to reverse their function, act as generators driven by the descending train and return electric energy to the trolley distributing system. This so-called "regenerative electric braking" feature of the electric locomotive should insure greater safety in handling heavy trains on down grades and effect some economy by reason of power returned to the system.

American practice in electric locomotive construction differs materially from that abroad, as has been very well brought out in the editorial columns of the ELECTRIC RAILWAY JOURNAL. This is partly due to the necessities of train operation, but also in some measure to the methods obtaining in shop practice and in roundhouses. The electric locomotive in America should not only be designed of proper capacity for the service to be performed but should be of such simple, rugged construction as to minimize its liability to break down as well as its cost of upkeep with the character of labor available.

The two types of locomotives briefly touched upon in this article, twin-geared construction for freight service and gearless construction for high-speed passenger service, both reflect the greatest simplicity in the character of the direct-current motors and control used as well as mechanical transmission of power from the armature to the driving wheels. While other forms of construction may show special merit in some particulars, it is safe to say that these two types of construction are capable of meeting all requirements of main-line freight and passenger train haulage.

Correction of the Street Railway Situation

By E. H. GAY, Banker, Boston, Mass.

The present street railway situation parallels that of the steam railroads in that the need of increased revenue for the service performed applies equally to both. In Massachusetts, despite conservative capitalization represented by issues composed of one-half bonds and one-half full-paid capital stock, the margin of surplus earnings over fixed charges is so narrow, owing to increasing cost of operation and especially because of growing demands of labor, that the only salvation of the roads, both urban and interurban, lies in higher fares. This situation is shown in the fact that the street railways of this state whose bonds are eligible for savings bank investments may be counted on the fingers of one hand, all the other companies having failed to earn the necessary 5 per cent dividends upon their stock for the period prescribed by law, although that stock represents $100 paid in for each share of the same face value.

The situation of the Boston Elevated Railway Company is typical of the inability of the 5-cent fare to meet the demands of the public for extended service on the one hand, of labor for increased compensation on the other, and the reasonable return to the investor as the third party in interest. Here is a great system upon which fall the heavy burdens of constantly increasing fixed charges resulting both from the enlarged demands of labor and the necessity of building subways costing in the vicinity of $1,000,000 a mile, and which nevertheless result in carrying the passenger far beyond the profitable limits of the 5-cent fare, with a freedom of transfer which would be difficult to parallel, either in this country or abroad. It would seem that ultimately a fare unit in excess of 5 cents must be adopted under such conditions and that sooner or later the transfer privileges must be curtailed, since it has been figured that barely 2 mills out of each nickel are left the company after the cost of operation, fixed charges and interest are met. It seems to be clear that the city road must ere long depart from the rigid 5-cent fare unit and that some measure at least of increased income must be accorded it by regulating authorities. The city of Cleveland is an example in point, where the late Mayor Johnson's pet theory of a 3-cent fare was put into practice by the authorities on certain of the city lines, only to be abandoned after a few months' trial when it was ascertained that heavy losses in operation were resulting from it.

Those who look to municipal ownership as the panacea for the present difficulties of the street railway may not be aware of the findings of the independent experts of the National Civic Federation, who discovered in examining the accounting methods of municipally owned systems abroad like that in Glasgow, Scotland, that wholly inadequate provision had been made for depreciation, with the result that a serious situation will soon confront these enterprises. Comparing services in Boston and Glasgow, one finds that the zone system in use in the latter city is not so cheap as the single-fare unit of the former, outside a very limited radius. Again, the incompetency of applicants for responsible positions under the political conditions of municipal ownership as they would exist in America is not a thing to view with complacency. Abroad, the public service is considered from an entirely different angle than here, and the usual conditions of American politics are foreign to the situation.

There are many splendid street railway properties in this country, and if encouraged to develop upon the basis of a reasonable return to the investor, great good will result. One of the most important ways in which the street railway situation can be bettered is by co-operation on the part of municipal authorities in granting long-term franchises—an action which encourages the spending of money for facilities not now available under limited franchise concessions. The twenty-five-year limit of Ohio, for example, greatly handicaps the sale of bonds whose customary term of life expires with the franchise or close to the time when the latter is yielded up. Under such conditions there is a strong tendency to strip a property of its needed facilities as the term of the bonds approaches its end, whereas with a long-term franchise the very opposite practice would be encouraged. Funds would be put into the property for its constant betterment, and an assured length of years accorded in a long-term agreement would go far to insure first-class facilities as well as to maintain the investment on a sound basis. Experiences in Detroit and Minneapolis illustrate this point. In Detroit, an otherwise excellent street railway field, expiring franchises on a portion of the lines have led to such uncertainty between the city officials and the company's officers that further development and improvement of the lines affected are at a standstill pending the final settlement of the terms of extension. In Minneapolis and St. Paul, on the other hand, we find the premier street railway system in America, if not in the world, largely attributable to the company's franchises having been declared by the courts in effect perpetual, which furnishes a constant incentive to the company to furnish to the riding community the ideal transit facilities which they now enjoy.

The legitimate economies of street railway operation, like those of the steam roads, appear to have been worked close to the limit, notwithstanding the pronouncements of Messrs. Brandeis et al. Nearly everything but labor has been liquidated in the transportation world, and sooner or later the great laws of supply and demand will accomplish this unfinished task. Conditions are by no means hopeless in the electric traction industry, but unless the communities served show more disposition to recognize a reasonable return upon the capital invested, both through the sanction of a higher fare commensurate with the increased demands of labor and greater cost of all materials entering into the cost of operation and by the granting of more liberal franchises for the encouragement of permanent improvements, the development of street railways with all the benefits which they confer in assisting to develop centers of population will be held back to the lasting injury of the public welfare, to the employees themselves and to private enterprise.

Buying and Building Cars

By JOHN J. CUMMINGS, President M'Guire-Cummings Manufacturing Company

During the past few years sharp competition in many lines of enterprise has been eliminated, but this condition in no wise applies to the manufacture and sale of street cars. The manufacturer of such equipment must figure very closely indeed to secure a sufficient business to maintain the requisite volume of work in his plant in order to minimize his overhead expense and fixed charges, and it is evident that this competition is of great benefit to the purchaser of such products. Nevertheless, the length to which competition can go and still benefit business is sharply defined.

In drawing up specifications covering the construction of street cars the purchaser may work a severe hardship on the manufacturer with no resultant advantage, because the desire on the part of the buyer for opportunities is an ever-present menace to the wholesome benefits of reasonable competition. When buying reaches the point of bargaining alone on prices computed on cold and rigid specifications, the transaction is not mutually satisfactory, and the best specifications are those which can enlist the skill of the manufacturer in full and place upon his shoulders the burden of responsibility for ultimate values. Indeed, the tendency of to-day among buyers is to take more advantage of the manufacturer's ability, his character and his reputation, and the wisdom of this tendency is evidenced more and more in the actual values delivered for the purchase money and the better satisfaction of both parties to the transaction. There are qualities in the products of street car manufacturers over and above those which can be produced under the specifications alone. It is the latent and ultimate value put into the product that has made the industry of street car manufacture worthy of its present high place.

To argue for loosely drawn specifications would be as unwise as it is unbusinesslike. Specifications should be comprehensively drawn, it goes without saying, but room should be left for letting in the knowledge, skill and experience of the manufacturer. The plain argument of this is that specifications may be too good. They may be too specific. They may be so exact and so finely detailed and so comprehensive in their minuteness that nothing is left to the genius of the manufacturer.

If certain materials made by others than the car builder are specified and if no deviation is allowed therefrom, it effectually forbids the car builder to reap any benefit from that competition which the purchaser has himself used to his great advantage. If it is deemed advisable by the railway company to insist upon certain specialties being used, it should contract for such material from the maker and ship to the car builder's plant, allowing him a fair cost and margin of profit for the handling and installation and for assuming the responsibility for delays in shipment and the possible errors in manufacturing such specialties; in fact, such delays and errors might seriously hamper the work at a great cost to the car builder, tying up the facilities of his plant to such an extent that other work could not proceed on its scheduled time.

While sharp buying may result, as it sometimes does, in picking up opportunities, the wisest buyers of today are realizing that the manufacturer must have a living profit if a real bargain is to be obtained. Buying at the expense of the manufacturer rather than to the mutual advantage of both manufacturer and user is a makeshift in business and is not of any permanent value.

The history of companies that have been engaged in the manufacture of street cars does not show the receipt of abnormal profits. On the other hand, the business has been fraught with peril; and certainly, taking into consideration the value of the plants, the necessary working capital involved and the special knowledge and ability required to operate successfully in this business, the manufacturer should be allowed an equitable profit over and above his cost. Moreover, consideration must be given to those dull periods that invariably overtake even the most successful business every few years, and for which provision must be made.

If the manufacturer is called upon to furnish equipment of a highly complicated nature and of a small volume, which requires considerable original thought and research, or if he must procure special machinery or erect or install additional apparatus, he is then entitled to a special profit.

The tendency of railway companies has been to discontinue the manufacture of their own equipment, as the apparent savings thus obtained have been offset by costs and problems that were not realized at the outset. Many things have to be taken into account in the manufacture of street cars, and it is not unreasonable to believe that many such things were overlooked in the beginning, because, in order to manufacture economically, large sums of money have to be invested in the erection of special plants, and their direction and supervision have to be accompanied by special knowledge. Deficiency at any point means either loss of quality in the product or unexpected and oppressive increases in the initial costs. The managements have also been confronted with the problem of keeping the men in the new departments engaged in work that would give the full productive value of their efforts and skill, insuring maximum productive efficiency, and thus keep the capital invested at a reasonable figure.

Another disadvantage experienced by the railway companies in the manufacture of their own equipment has been the consequent detraction from attention in the operation of their properties. The officials of such companies were already heavily burdened by their duties, and they found themselves engaged in two distinct undertakings, neither of which received the attention it required.

In the matter of purchasing materials the railway companies did not enjoy the advantage of the car builder. The one bought at wholesale, the other at retail. To illustrate the point—the car manufacturer bought for the full capacity of his plant, which was necessarily greater than that of the individual railway company's shops, so that the latter were restricted to the purchase of materials in comparatively small quantities in accordance with their limited requirements. The manufacturer is also in position to dispose of his overplus of material, inasmuch as he has diverse outlets, while the railway company has only its own needs to take up its manufacturing output.

The railway company is not, therefore, to be regarded as a serious competitor of the car manufacturer. There will be railways now and then which will insist on having the experience before being convinced, but in the main the car manufacturer will continue to be the great source of production, and the railways will best be served by leaving the manufacture of cars to the car builder, whose knowledge and experience and desire really to give value received work to improve quality of product at a lessened cost.

The Design of Rapid Transit Cars

By F. M. BRINCKERHOFF, of L. B. Stillwell, Consulting Engineer, New York

The success which has attended the use of "stepless" or center-entrance cars in city service has been of great interest to car designers as well as to operating officials, whose common problem has been the rapid and safe loading and unloading of passengers with a minimum of platform expense. Combined with the prepayment system of fare collection, the center-entrance car seems to be making a favorable record. The low-step feature of this type of car permits a loading and unloading rate approximating that of cars at elevated station platforms, and the access to the doorway from both directions when within greatly facilitates passenger movement.

Similarly, when designing cars for use in rapid transit or subway service, full consideration must be given to their ability to develop the full capacity of the exceedingly costly right-of-way upon which they are to be operated. As the permissible headway fixes the number of train units per hour, it is obvious that in order to handle the maximum number of passengers per hour the cars composing the trains not only must be as commodious as possible but must be arranged also for rapid loading and unloading of passengers and their free circulation when within the car.

For rapid transit cars the two matters of seating arrangement and door arrangement are so interdependent that they must be treated together. In arranging the seats the designer of to-day endeavors to strike such a balance between maximum seating capacity and maximum total capacity that the cars will be effective during periods of extreme congestion but will not fail to provide a large number of seats under the ordinary conditions of traffic. Obviously, the longitudinal seat gives a minimum seating capacity and a maximum of standing room. On the other hand, and especially where the cars are wide, in accordance with the recent tendency in subway design, the transverse seat gives a very high seating capacity but a limited standing room; moreover, transverse seats interfere seriously with the opportunity for providing freedom of movement inside of the car. A combination of transverse and longitudinal seats, therefore, seems to be desirable under many conditions.

The most important requirement for the location of door openings is that they shall be accessible from both directions inside of the car. The old-style end door for cars used in dense passenger service is, in many instances, being displaced by center-entrance doors, and where the requirements of the service warrant the use of large cars more than one door is necessary. The result is that the unit method of seat and door arrangement seems to be most desirable. By the unit arrangement is meant the division of each car into a series of practically similar units, each unit or section having one door and a carefully determined number of longitudinal and transverse seats, the relative number of the two types depending upon the relative importance, under the existing conditions, of total capacity and seating capacity. Involved in the design of each unit are numerous other problems mainly surrounding the question of passenger movement inside of the car. A sufficient open space must be provided in front of the doorway to avoid interference between passengers because the impatience of passengers desiring to enter the car often leads to a certain amount of crossing of the lines of movement inside the car. This condition makes advisable the use of stanchions, preferably grouped near the door of each unit, but so spaced that persons holding to the stanchions will not interfere with the movements of passengers desiring to enter or leave the car.

Hand straps, it may be said, do not afford the same degree of confidence and sense of security that is inherent in the vertical stanchion, which offers a firm hand hold to invite passengers to approach the exit door while the car is still in motion. The tendency in this direction is displayed even in surface-car design, as most of the new center-entrance types have stanchions near the door rather than hand straps along the aisle.

With the arrangement of doors and seats is involved to a considerable extent the matter of framing, because when the doors are placed in the sides of the car between bolsters it is, of course, necessary to provide means for carrying the load strains across the door openings. Some form of truss-type side framing is becoming the rule in the present-day car. By carrying the load upon the side-framing of the car, which acts as a truss, the weight of the structure is minimized and the cost of maintenance is very greatly reduced. When the entire car body, including sills, side frame and roof, acts as a whole in developing the structural strength of the car to support the load, there will be a notable reduction in weight of structure and a very desirable stiffness will be secured.

In the day of wooden cars the type of framing which included a heavy supporting structure below the car floor and a light roof above it was permissible because the wood had sufficient inherent elasticity to permit considerable deflection without destructive motion at the joints. This is not the case with steel.

A seating and door arrangement as outlined above naturally obviates any necessity for vestibules at the ends of the car, the units at the ends having their side doors located near the bolsters, with provision as required for a motorman's cab. For cars which have to operate in the open, as on an elevated structure, in distinction from a subway, the closed vestibule has a certain value as an aid in keeping the car warm in cold weather. In many cases, however, the loss in seating capacity will overbalance any advantage gained in this way.

With regard to car flooring, it may be said that the present state of the art of car design takes full cognizance of all sanitary considerations. Non-absorbent material for car floorings and non-corrugated surfaces are the rule, and every effort is made to avoid abrupt changes in outline which might form pockets for collecting dirt. Such fundamental considerations are imposed by the desire for improved appearance as well as to reduce the cost of car cleaning. The actual materials used for the floors of rapid transit cars are of various compositions, of a cement-like nature, applied upon a metal sub-flooring. The surface can be reduced during the process of setting to any desired degree of smoothness, although a high polish for a car floor, while greatly aiding in the work of cleaning, is obviously not desirable. All of the composition floorings in general use are of such a character that no slipping is likely to occur. Carborundum as an admixture has been tried as a means for producing an anti-slip tread together with increased life, but has been given up because it has been found that part of the carborundum ultimately became freed from the cement in which it was embedded, acting in the loose form as an abrasive of the floor itself.

Car roofs are changing rapidly from the monitor-deck type with movable deck sash, which provided as much ventilation as was formerly considered necessary. To-day a great number of cars with plain arched and compound arched roofs are being constructed, although with the plain arch it is, of course, necessary to use some form of the projecting type of ventilator. Abundant ventilation is difficult of attainment in winter without a cooling effect upon the air in the car, so that it is interesting to note the recent experiments which demonstrate that agitation of the air in a closed compartment eliminates much of the mental and physical effect of insufficient ventilation. It might be said that approved practice is for a car design such that ample ventilation can be secured even at the most congested periods, the amount of air actually admitted being modified by shutters to suit the requirements of the periods of ordinary traffic. With regard to lighting, the introduction of the tungsten lamp has made indirect and semi-direct schemes of illumination at least a possibility, and much thought is being given to perfecting systems which avoid the unpleasant effect of the direct rays from high-power incandescent lamps. Many experiments are now being made to determine the commercial advantages of both indirect and semi-indirect lighting, and it is not impossible that the practice in lighting cars will be revolutionized within the next year or two.

Street Railway Motor Control Systems

By CLARENCE RENSHAW, Railway Engineering Department, Westinghouse Electric & Manufacturing Company

In the persistent search for operating economies which has become one of the important activities of most railway companies, the cost of power offers a shining mark. Unit costs of power, as a rule, afford little opportunity for economizing, but the amount consumed is usually susceptible to reduction. Decreased weight was the first means proposed for taking advantage of this opportunity, and drastic requirements that apparatus must be light in weight are, on occasion, still written into the specifications of railway companies with this idea in mind. However, the fact that high service efficiency rather than mere reduction in weight is the real object to be sought is now being more generally recognized, and there is much less talk than formerly of the 5 cents per pound per year which reductions in weight are supposed to effect. On account of this awakening to the true conditions, the advantages of slow-speed motors and field control are receiving more attention.

A full year's service has now been obtained in various parts of the country with considerable numbers of field control equipments. These cover a wide range of sizes and have been operated under a variety of conditions, both in city and interurban service, and the results have fully confirmed the claims made as to the importance of this innovation in railway engineering.

In city service the combination in one equipment of the equivalent of a low-speed gearing for efficient acceleration with a high-speed gearing for free running, as secured by field control, results not only in economy of power but in many cases enables a smaller size of motor to be employed than otherwise would be necessary.

In interurban service the effective action of this combination has permitted the more general employment of a common-standard equipment for both local and limited service. In one instance, on certain cars for fast limited service, a number of equipments of quadruple 125-hp non-field-control motors were replaced by quadruple 100-hp motors with field control. The new motors in this case were able not only to handle the limited service equally well with the old, but on account of the superior starting characteristics, due to the field control, were able also to operate local trains. This the larger motors had been unable to do.

The results which have been secured with field control and its adoption in New York, Brooklyn, Chicago, Indianapolis, Rochester, Elmira and other places assure its standing for city service. The use of nearly 200 equipments by the Michigan United Traction Company, Pacific Electric Railway, British Columbia Electric Railway, Public Service Railway, Maryland Electric Railways and others indorses its superiority for interurban service.

One of the most noticeable points in the general control situation is the tendency to seek simplicity and reliability rather than refinements and to omit every piece of apparatus and all complicating features which are not absolutely necessary. This is evidenced in the line of drum control by the omission of the bridging feature from some of the latest forms of standard controllers. Instead of the bridging transition, a return has been made to the simpler shunting method, and this has been found entirely satisfactory for traction purposes.

The large proportion of equipments which are now supplied with indirect or multiple-unit control has been due apparently to the production of equipments such as type "HL" in which the principle referred to above has been followed. In doing this many of the desirable but not absolutely necessary features which complicated former equipments have been rigorously excluded in the interest of simplicity and reliability.

Although a number of equipments for the smaller sizes of motors have been installed, the general use of multiple-unit control has been confined largely to equipments of quadruple 40-hp or 50-hp motors or even larger. For such sizes its weight has been less, or at least no greater, than that of the corresponding drum-type equipment. The many advantages which this control has shown in such applications have now led to the production of similar equipments for less powerful motors, and in these the fundamental pieces of apparatus have been made smaller and lighter. This has been done without sacrificing the ruggedness and reliability of the larger type, and while the small multiple-unit-control equipments have not been on the market sufficiently long to have come into wide use, it seems probable that they will play a considerable part in extending the use of train operation.

An interesting innovation in the field of train control has been the new type applied to the stepless cars of the New York Railways. In these equipments multiple-unit operation has been obtained not by the use of power-operated switches or contactors but by the synchronous movement of drum-type controllers on the various cars in a train by pneumatically operated driving heads. This arrangement is a return to the same general principle in use on the earlier types of equipments of the Brooklyn Rapid Transit Company. As compared with these early types, however, the mechanism of the new equipment has been greatly simplified. Just what place it will assume in the general scheme of railway control it is, as yet, too early to predict. It offers, however, many interesting possibilities.

In view of the general effort which is being made to improve the service to the public, it is not surprising that train operation has been discussed more actively, perhaps, than any other single subject. Comprehensive tests in city service made by one large company have shown conclusively that, when operated in a train, two cars could clear a congested crossing in 80 per cent of the time required when operated singly. This means that under some conditions 25 per cent more cars can be operated during rush hours. The tests also seemed to indicate that many other advantages could be secured.

In theory, at least, the use of the multiple-unit train for interurban service has generally been indorsed without question. On account of the simple and reliable character of the apparatus now available few equipments are being sold for such service which do not provide for train control. Even for strictly city service, cars are being equipped with it in many cases, regardless of whether train operation is contemplated immediately or not. This is shown by the latest orders from Boston, Brooklyn, New York and elsewhere, and the fact that control of the multiple-unit type was furnished with over 40 per cent of the total number of railway equipments sold by one of the large manufacturers during the year is an even stronger indication of the tendency of the times.

The Manufacturer and the Industry

By GUY E. TRIPP, Chairman Westinghouse Electric & Manufacturing Company

As the electric railway industry is generally described it includes only the companies directly conducting electric railway operation. There is, however, a larger electric railway industry which is much greater in the number of its employees and the totals of its investment responsibilities than the statistics shown by the electric railway companies alone. In this larger industry the manufacturers of electric railway apparatus have an important place. They are part of the great body of people of this country that in whole or in part are dependent directly or indirectly upon the prosperity of the electric railway industry. The prosperity of electric railways affects them just as surely as it does the families of employees of electric railways and holders of stock and bonds of the railways. The manufacturers, as large employers, have a responsibility for the success of their own properties and for the welfare of their employees and the families dependent upon them. They cannot discharge this responsibility properly without doing what they can to make the consuming part of the electric railway industry prosperous and to keep it in that condition.

The bond between the manufacturer and the railway is necessarily much closer than that of the ordinary seller and buyer in many walks of life. It should be a co-operative relation. If in the past this co-operative relation has not been as close as it ought to have been, there is every reason why we should make a fresh start and have it well defined and developed in the future. The electric railway cannot solve its problems alone. It needs the help of friends. It needs to have voices raised not only in its defence but in its praise where praise is due. Manufacturers understand the problems of the electric railway company. They have helped to solve many of them. To the extent that they have done so they have indirectly helped their own business. To the extent that they have failed to do so they have indirectly hurt their own business.

Manufacturers have used their best efforts and the efficiency of their organizations in order to solve mechanical problems confronting electric railways. At present the chief problems of the railways are not mechanical in nature. They are more serious. They are partly financial but more largely of the nature of public relations. If the manufacturers could apply the same energy and ability to aiding in the settlement of the public relations problems of their customers that they have in settling the mechanical problems, they would help to turn the current of public opinion. It is not so easy for the manufacturers to do this as to study and settle the problems they find within their own establishments, but it is a task that they have no right to ignore. They make up a large and influential element of the community and their views on public questions concerning the railways will be heard with respect.

The duty of the manufacturers, then, should be to do what they can to create a favorable sentiment on the part of the public toward the electric railways. They can help to explain what the railways are trying to do and why it is necessary for them to have adequate earnings in order that they may provide such enlargements of facilities as are constantly needed in a growing community. They can help to show what the railway will do if it is permitted to have the prosperity which it needs in order to attract investors to its securities.

The manufacturers have so intimate a knowledge of the affairs of most of the companies with which they come in contact that they may be able in some cases to give advice as to ways and means of solving the problems that create the present unrest in relations with the public. I believe that executives of the railway companies will find the great body of the manufacturers sincerely anxious to do all that they can to promote the welfare of the industry. If the manufacturers who are especially familiar with railway conditions are asked individually to point out conditions which in their judgment might be remedied in the interest of a better understanding of railway affairs, they will be glad to comply. This is a part of the service that the manufacturer ought to render the railway. Serving and speaking from the outside, he can often do for the railway company what it cannot do for itself. In so doing he promotes the stability of the industry and thus promotes the stability of his own business.

The Manufacturer's Relation to the Industry

By CORNELL S. HAWLEY, President of the American Electric Railway Manufacturers' Association

The manufacturers of electric railway equipment and material are among the best friends of the industry. They occupy a vantage point from which the work of the transportation companies is far better understood than when viewed by the man in the street or by the ordinary passenger on the cars. Many of the manufacturers' representatives are technically trained men; others formerly were engaged in operating work or some branch of electric railway activity closely related to their present business connections, and few employees of traction companies better appreciate the conditions under which the service is conducted. All this means that when unfair or uninformed criticisms are raised in the hearing of the manufacturer or his alert representative the railway company's side of the case is often quietly but effectively put forth, hasty opinions being discarded and a measure at least of understanding being inculcated regarding the obstacles which the electric transportation system is constantly trying to overcome. In guiding public sentiment into the channel of truth the manufacturers of the country are not only helping their customers to obtain the "square deal," but they are indirectly putting their own industry upon a sounder foundation.

On the engineering side the interests of the manufacturers and the operating companies are constantly growing closer. The former are earnestly striving to eliminate equipment defects and are naturally very much alive to possible improvements brought to their attention by operating or other railway officers. The thorough study given in many cases by manufacturers when new or modified equipment is placed in service is not always realized, but it is frequently true that the detection of minor difficulties during service "try-outs" is brought about as a result of a patient and inconspicuous program of investigation which now and then keeps a man traveling about on a road for weeks and even months after the apparatus has been delivered. When research work is undertaken at the initiative of the railways, the manufacturers practically without exception are glad to co-operate in the undertaking, realizing that whatever benefits the operating companies in the long run is good for themselves. Progress in design and construction of equipment depend largely upon the freedom with which the apparatus user makes his desires known to the manufacturer, but the latter is doing a large amount of original work which is of value to the industry as a whole, based simply upon his observation and that of his representatives in the trying domain of practical service.

The manufacturers are co-operating along broader lines, also, as illustrated in the coast-to-coast trip with representatives of the American Electric Railway Association in 1912. The good results of this trip, which contributed to bring about better public relations everywhere between public utilities and the inhabitants of their respective territories, are due to both branches of the industry's greatest organization. More advanced standards of equipment are sought, with correspondingly better service plans as an outcome of this cooperative work. It was an excellent thing for local boards of trade and other business organizations to see the unanimity of purpose among all the interests represented on this trip and to realize that the railways and the equipment shops are mutually related in their general views as well as in the rôles of buyers and sellers. In brief, the Manufacturers' Association and all its individual members stand in somewhat the same relation to the electric railways and the public as the Railway Business Association does in the steam railroad field, and will not be found wanting whenever the need for real co-operation arises.

Municipal Ownership Versus Private Enterprise

By EVERETT W. BURDETT, General Counsel of the National Electric Light Association, Boston, Mass.

In the operation of public utilities there are two extremes to be avoided. The first is the exploitation of public services by irresponsible and unchecked private enterprises, left unrestricted as to the methods they employ, the service they give or the rates they exact. The selfishness and cupidity of men is such that they cannot generally be trusted to promote or even regard the rights of others in connection with their endeavors to promote their own interests. To give to private bankers or promoters a free rein in the capitalization of agencies for public service and in the exaction of the rates thereby made necessary for such service as they see fit to give is to make the interests of the public entirely subservient to those of private persons. It cannot now be tolerated, although it has not been long since that condition prevailed in this country. And it was largely, perhaps principally, because of that fact that the movement for municipal ownership and operation of public utility agencies acquired its greatest momentum here. No such condition now exists, and therefore no such basis can now be claimed for the establishment of municipally owned and operated public services.

The other extreme condition to be avoided is that of municipal ownership. While this is open to none of the objections attaching to unrestrained and unregulated private enterprise, it involves difficulties and disasters all its own. Good public service is one which not only adequately meets present necessities but has an eye to the future, and it grows and expands and improves with the increases of the demands laid upon it. Such a live, progressive, expanding and ever out-reaching policy can rest upon only one foundation —individual initiative and enterprise. Men must have some reward in sight to excite their best efforts and achieve the best results. Bureaucracy never invents, initiates or expands in business matters. In the nature of things it cannot achieve the best results, because it lacks the incentive to bring them about. It has no interest it must earn, no dividends to pay, no salaries to raise. In municipal work it is the position, not the man, which fixes the compensation. In private enterprise it is the position *and* the man which determine the compensation. And it is not stagnant or stationary. The manager who is engaged at $5,000 a year may be found to be easily worth twice or thrice that sum. And if he is, he gets it; because if one private enterprise will not pay him what he is worth another will. The great difficulty is to find the men—not to fix or pay their salaries.

There is a middle course between the two extremes which have been mentioned, which best solves the problem under the conditions existing in this country. It is the employment of private capital under private management but subject to such restrictions and regulations as may be imposed in the public interest. This course preserves the advantages of private enterprise and prevents the abuses which the unrestricted exploitation of private business is almost certain to create. It avoids the stagnation and lack of initiative which make the results of municipal operation so unsatisfactory and yet safeguards the interests of the public in the only particulars in which the public is legitimately interested—namely, in the quality and adequacy of service and in the rates exacted for it. Fortunately, this is the principle which has now been accepted nearly everywhere in this country, the practical application of which will (or ought to) deprive the theory of municipal ownership of the advocacy of all intelligent persons not bent on the application of a theory without reference to its results. Of course, the latter kind of people will follow their theory, right or wrong, and no effort need be wasted to convince them of the practical fallacy inherent in their ideas.

I am not saying that municipal ownership and operation cannot succeed under bureaucratic conditions. I think it does succeed under such conditions in Germany and measurably in Great Britain, although it is attended with results to private enterprise and initiative which are most unfortunate, especially in Great Britain. But, assuming all one pleases in favor of municipal enterprises in those countries, it is no argument for the trial of the experiment in the United States. The conditions are so totally different in the different countries that no conclusive argument can be drawn from one to the other. The burgomaster of a German city is an expert on municipal problems and administration, obtained wherever he can be found, just as a railroad president is in this country. He is surrounded by other experts, and so far as he is controlled by the popular voice at all, it is through a municipal council chosen principally by the taxpaying members of the electorate.

In Great Britain the scheme of municipal administration is entirely unlike that in Germany, but it has peculiarities of its own which are highly calculated to produce good results. Space does not here permit of even the briefest analysis of these conditions, interesting as it might be.

Suffice it to say that neither the German nor the British methods or ideals prevail in this country, and —what is more important—they cannot be made to prevail here until there has been a radical and complete change both in our theories respecting municipal activities and in the methods of working out those theories in practice. That day, alas! is far away. Until it comes, if it ever does, the wise thing to do is to accept and promote publicly regulated private enterprise.

The Advantages to the Public of Centralized Management of Public Utilities

By EDWIN S. WEBSTER, Stone & Webster, Boston, Mass.

A great deal has been said in regard to the advantages to the investor of centralized management in public utilities. A phase of the question which is not so well understood is the benefits which are enjoyed by the general public through this plan of operation. They are equal to those derived by the stockholders, if, indeed, they are not of greater magnitude.

The first benefit which we might consider is that which results from expert ability in engineering and management. A centralized organization, while retaining the best features of local administration, permits the local railway company or lighting company, as the case may be, to utilize the technical experience of the home office and the services of a corps of engineers, operating men and accountants in a way impossible to a single and isolated property. The economies of construction and operation in this manner enable the local company to render a better service for a given price than would otherwise be possible. To refer to the question of engineering only. A great deal depends upon proper engineering in these days of rapid technical progress, not only as regards the financial success of the enterprise but in the safeguarding of the public against the installation of unsuitable types of apparatus and the use of equipment of uncertain reliability and of doubtful efficiency. The same is true in regard to the business management of the affairs of the company. The past contains too many examples of properties built where the demand for service was insufficient to warrant the investment, of existing properties unwisely extended and developed, of defective bookkeeping methods and consequent failure to appreciate the real financial conditions, of inadequate provision for maintenance and physical renewal. Faults of judgment like these, if they impair the ability of the company to give proper service or make necessary extensions, are no less serious to the community than to the company.

Again, no more important service is rendered in consolidated management than the handling of the securities which are usually placed in its charge. In this connection a large organization with important banking and financial relations throughout the continent can do a great deal in broadening the market for such securities, in distributing information to bankers, institutions and investors, and in providing a recognized channel through which individual purchasers and sellers may be brought together. Here, again, the advantage to the public is as great as that to the company because if it is unable through inability to raise capital to keep pace with the demands for service, the public interests suffer. It is not too much to say that there are many towns in this country enjoying electric light and power as well as railway service which would have been without these conveniences if it had not been for the activities and enterprise of those managing a group of such properties.

A consolidated management with large financial resources can afford to build for the future and provide a larger and better service than a purely local management. This is partly because it can obtain the necessary capital more easily and partly because through its greater facilities for analyzing the technical and business conditions surrounding enterprises of this kind it can determine where extensions will be profitable and can act promptly upon such conclusions. Few isolated companies are in as good a position to make these decisions or to take as favorable advantage of the conditions in the material and equipment market as the centralized organization to which such action is a matter of daily experience.

It is sometimes maintained that the cost of centralized management is an obstacle to its adoption, but experience has shown that the increased financial stability resulting, the conservative yet healthy development encouraged, the savings in running expenses frequently effected and the economy brought about in the application of capital to the needs of the property are worth far more than the moderate percentage of revenue which represents the compensation of the administering organization. The larger the property, the less this percentage should be, since the cost of management does not increase in proportion to the gross volume of business. Neither can the tendency apparent in some industries toward decentralization be urged as an argument against the consolidated management of public utility companies.

This kind of management does not exist for the purpose of monopoly or to acquire one property for the sake of its effect on another. It is not even necessary that the ownership in the different properties managed be the same. Frequently different properties under central management are quite separate and distinct in their operation, ownership and finances, and the benefits that accrue are those that apply in other cases where things are done in a large way by those who have the training and experience to do them well.

Is Regulation by Commission a Permanent Part of Our Economic Scheme?

By J. D. MORTIMER, Vice-President the North American Company

The recollection of the attempt in the seventies by granger legislatures to regulate railroad rates and operation, its failure and its subsequent revival through the creation of the Interstate Commerce Commission and state railroad and public service commissions naturally lead us to examine the causes of the present movement and inquire as to whether there is reason to expect any cyclic changes in this present popular economic principle. This inquiry may further be justified by the murmur of discontent that is heard at intervals, arising from other cults, when a commission's decision does not satisfy the supposed popular appetite or when the expense of sustaining commissions is brought into sharp relief with the apparent results achieved.

The popular economic theory upon which public utility laws are based is that the utilities are enjoying valuable franchises granted by the people for which the latter receive nothing compared with the values given, while the corporations are earning large dividends on franchises by charging exorbitant rates or overcrowding the straphangers. In point of fact, the only bases upon which regulation can be justified are:

(a) That rates of charge for service shall be based on the cost of production, and the minimum production costs and lowest rates can be obtained only with maximum output and density of business, that is, through monopolistic production; but monopolistic production is detrimental to the interests of the public, unless owned or controlled by the state.

(b) That the services rendered by public utilities are necessary for the maintenance of the present system of distribution and mode of living of the people; that is, they are of the same general nature as streets, parks, police protection, tribunals of justice, etc., and as such so seriously affect the social welfare of every being that they must be placed at the disposal of each under like conditions and be subjected to special treatment in law to attain this end, pending the actual merger into the general functions of the state.

The knowledge that rates in turn depend upon requirements in the way of service caused the framers of the public utility laws to vest in the regulating commissions some control over service rendered by the utilities, and the belief that rates might in some way be affected by the issue of capital obligations or tend to impair the ability of the utility to perform its public duty led to the control of new issues of securities. In the desire to control rates, the theory of a regulated monopoly has in large part been recognized, and most statutes give to the commissions power to determine whether there should be monopoly or competition.

Concurrently with the development of the theories of regulation and their enactment into laws or their appearance in decisions, a school of municipal government has been developing the principles of municipal "home rule." The demand for "home rule" comes from those most strongly supporting initiative and referendum and principally from the largest urban centers of the state. They express a dislike of having the country-folk legislators frame the general laws for their metropolitan cities. The growing concentration of population in the larger cities does not make it appear that the "home rule" movement is being opposed by many strong natural economic forces.

In the ultimate development of "home rule" powers, there is necessarily a sharp conflict as to where the control of municipal public utilities shall lie. Thus there appears to be a movement which, if continued, may result in breaking down in places the principles upon which state-wide regulation is now being prosecuted. The municipal control of public utilities would bring with it a return to the politics of the past, and much harm may arise from ignorance and impelling political motives on the part of the electric regulators, be they commissioners or aldermen.

On the other hand, the more thoughtful students and people of every urban community appreciate the fact that few municipalities are so organized in the way of government that the same can be said to be other than most inefficient. The more general recognition of this fact has brought forth many suggestions, the most promising of which in theory proposes the conduct of municipal affairs along lines which would guide any well-organized business.

Although experience may develop isolated instances where successful municipal government will from time to time obtain, it is unsafe to predict that the administration of municipalities can be placed on a business basis so long as the personnel of the municipal government is in large part determined by popular suffrage. However, with an increasing efficiency of government, it is not unreasonable to expect a lessened desire on the part of municipal officials to regulate privately owned utilities. Should these very marked improvements in municipal government come to pass, the day of municipal ownership and operation of public utilities will probably draw nearer. In the advent of general municipal ownership, state regulation would be almost entirely excluded from the cities, unless it were vested with new functions not now developed.

The economic principles underlying the theory of vesting in the state the right to regulate public utilities have not been completely developed or adequately recognized. With the more complete recognition of these principles there will be changes in the theory of law, and there will naturally follow changes in the law itself. That there will be different schools of economics, with different resulting theories and consequently variations in the principles of law, seems certain, but in the long run and to the extent that regulation becomes a part of our permanent economic scheme, there will be a stronger association of legal responsibility and authority that is or may be administrative in its nature. The lack of responsibility and absence of any real sobering influence on the individual members of regulating commissions are serious defects in the economic structure of regulation. While time works changes and mistakes eventually produce competent commissioners, the general knowledge of these facts does not seem to prevent each new commissioner from undertaking his office in the firm conviction that he has been specially chosen to right in one year all the imagined wrongs of eons gone by.

In developing the economic structure it seems desirable that the laws should give to the regulating body all the authority necessary to perform all the acts required in the complete scheme. That this authority will come in time, no one can, with any certainty, deny, and until this condition does obtain, regulation will not have a fair trial as the panacea for the ills it is hoped to correct thereby. And if with increased authority there comes a feeling of responsibility, what may now seem to some as the worst that could possibly happen may, in this event, prove to be the best.

Commissions in determining their courses of action naturally, in many cases, are influenced by conflicting emotions. On the one hand, they may fear popular clamor in case of a decision adverse to the end sought in the name of the people, and on the other hand they are often impressed with the necessity of preserving the integrity of the capital invested in the utility under review. While commissions must be guided by the laws granting them their powers, most of the problems presented to them cannot be solved by reference to the present statutes but require consideration and recognition of many other factors and usually the exercise of broad judgment. This permits widely different decisions under substantially similar sets of facts and conditions, varying with the mental attitude and capacity of the individual commissioners. That an attempt will be made to make more definite the principles of law governing commissions seems certain, if regulation by commission is to be long continued.

A regulating commission to perform its functions requires a rather extensive staff and office organization. The annual cost may vary from a few thousand dollars to in excess of $1,000,000, depending upon the scope of the work undertaken by the commission.

It is true that in almost every state there has been a rapid increase in the state tax burden. While this is in part due to expenditures which naturally fall within the scope of the old-time activities of the state, it seems certain that important increases have come through the recent multiplication of the functions of the state government. Most of these newer functions were begun in the anticipation that they would be self-supporting, but from various causes such has not proved to be the case. Among these functions assumed by the state and calling for support by taxes is that of regulation of the public utilities.

There are many people who, in these days of declining purchasing power of money, seriously complain of increased taxes and are prone to question whether these new state functions are attaining the end which at first seemed to justify their undertaking. It is not improbable that in many states reform administrations will seriously curtail the activities of the regulating commissions by reducing the appropriations for their operation. With decreased activity and the lengthening of the time required to reach decisions on complaints, there will be an increase in the dissatisfaction with this branch of government. Whether this will result in the enactment of radically different legislation depends upon the circumstances that obtain in the particular case. In fact, it seems probable that all these various forces are self-corrective in the long run and an extreme tendency either of the law or the practice of regulation will subsequently be followed by a reversion to conservatism as the apparent need therefor develops.

After the foregoing review of the causes leading to the enactment of laws providing for the regulation of public utilities and an examination of the popular forces which are working for and against the continuation of these laws it seems a reasonable conclusion that, while regulation may form a part of our permanent economic scheme, it will be subject to cyclic changes, either in law or practice, arising from requirements for political issues and from forces which cannot be controlled but must be permitted to expend their energy or otherwise prove self-corrective.

Management by Large Operators

By ARTHUR ST. GEORGE JOYCE, E. W. Clark & Company

There are many reasons why the management of public utilities on a large scale brings about economy in operation and better service.

Large operators in any line of business can usually do everything a little better and a little cheaper than small operators, and this is particularly true of such public utilities as electric railway, light and power companies.

In the first place money must be raised, and here large firms constantly in touch with the market have great advantages. They know exactly how and when to finance any proposition and through their high standing can secure money at lower rates of interest than would be possible for a local concern. This question of raising money is of particular importance in the public utility business, because the investment and consequently the interest charges are so great in comparison to gross earnings. The development of water-powers frequently depends primarily on the rates which must be paid for money, and this is true to a less extent in other branches of the business.

When the money has been raised, large operators turn the work over to their own construction departments. On account of their wide experience all over the country, they are able to do any kind of construction much better and more economically than it could be handled locally.

By purchasing in the wholesale markets the materials needed by all their companies for either construction or operation the very lowest prices are obtained, which in the aggregate produce a large saving. In this way the individual companies have the advantage of the best materials at bottom prices.

In operation the large scale of doing business makes it possible to secure and hold the very best managers and engineers for the benefit of the various properties. In legal matters, also, large operators have advantages for they are able to secure the services of attorneys of the widest experience in many states. Just at the present time, for instance, this is of special advantage in connection with rate and valuation cases before public utility commissions.

Where the properties are in the same general region or are simply a consolidation of street railway and electric light companies, additional saving can be made through the construction of a large central power station. Such a plant is generally cheaper to construct per kilowatt of capacity and also requires a smaller proportion of reserve than would be necessary in a number of local stations. Then, of course, the operating expenses per kilowatt-hour would be decreased. If the properties are in the same locality, the system can be tied together with transmission lines and the old power stations may then be shut down entirely or used only for reserve.

Greater efficiency in transmission of electrical power is resulting all over the country in the development of large water-power plants and steam stations, which supply the electrical requirements within a very wide radius.

There are many other ways in which the large operator can make economies, which at the same time improve service and leave a reasonable return for stockholders.

Public Relations

By FRANK W. ROLLINS, of E. H. Rollins & Sons, Boston, Mass.

The serious situation which confronts the railways of this country at present is due to two primary causes—constantly rising cost of operation in the face of a fixed fare unit and a one-sided regulation. The latter makes it extremely difficult for properties to charge an adequate price for the service rendered, and the public demands the best possible facilities with little appreciation of their real cost. Unless the transportation industry is permitted to readjust its rates and schedules to meet present conditions, it appears that government ownership, with all its possibilities of inefficiency and demoralization of initiative, will be the only outcome.

I do not believe in public ownership except in the case of such enterprises as water-works and sewers, and in common with many other observers of industrial conditions in the United States, I look to a wise publicity on the part of the burdened railways as the "way out" of the present unsatisfactory situation. Certainly it is not unreasonable to ask for rates which will enable the best service to be rendered, pay its entire cost of operation and fixed charges, and include a fair dividend of say 6 per cent upon the investment. The good sense of the American people ought to respond to a clear presentation of the street railway's case and enable the industry to push forward to a larger usefulness and a more enduring reward for its broadened services to civilization.

The Holding Company—Its Advantages and Disadvantages

By FRANK R. FORD, of Ford, Bacon & Davis, Consulting Engineers, New York

The holding company to-day is politically and popularly under suspicion. It is not so much a question as to whether its field of activities will be enlarged as whether it will survive the present attack and continue as a part of the economic machine. Therefore it is of interest to consider the extent that this corporate device has been used in the electric railway industry and to weigh its advantages and disadvantages from the standpoints of both the public and the share owners.

The development of the holding company as applied to electric railways took place largely in the decade from 1895 to 1905, following immediately the period of electrification of horse car lines and during the period of rapid financial development of these properties.

Among other public utilities the great development of the holding company within the past six or eight years has been in the lighting and power field, during which time electric railways have been considered either as a positive disadvantage to holding companies formed mainly to acquire lighting or power companies or have been taken in under sufferance because already consolidated with lighting companies.

Consequently, the electric railway holding company of to-day is usually of a more settled character than the newer public utility holding company, and while its difficulties are more evident, it may be only because they are better understood.

STATISTICS OF ELECTRIC RAILWAY HOLDING COMPANIES

As far as the limitations of published reports render it possible, information has been obtained of the electric railway companies of the United States concerning their relationship to holding companies. As of June 30, 1912, or Dec. 31, 1912, there were 951 companies operating 41,754 miles of track. Of this total 27.1 per cent, which operated 49.5 per cent of the mileage, were controlled by holding companies. The tabulation of operating companies is summarized as follows:

TABLE I.—PROPORTION OF OPERATING ELECTRIC RAILWAY COMPANIES HELD OR INDEPENDENT

	Number of Operating Companies	Per Cent of Total	Miles of Track	Per Cent of Total
Held operating companies..	257	27.1	20,717	49.5
Ind. operating companies...	694	72.9	21,037	50.5
Total	951	100	41,754	100

In the following statistics a holding company is considered as one which does not of itself operate a railway but has control of one or more operating companies through the medium of stock ownership. If such control is also through a lease, the lessee company is considered as an operating company. In cases where the operating company controls another operating company through ownership of stock the former is considered as an operating company. Elevated railways, subways and interurban electric railways are included. Electrified steam railroad mileage is omitted, but electric railway companies controlled by steam railroad companies are included.

KINDS AND DEGREES OF CONTROL

The character of the holding organization may be subdivided into:

1. Incorporated holding companies.
2. Steam railroads.
3. Voluntary associations or trusts.
4. Management associations.

The first class is further differentiated into (a) holding companies controlling one connected operating system of electric railways, even though a number of other kinds of business in the same place or in other places are also controlled, and (b) holding companies controlling more than one separate operating electric railway system, these being generally located in several states. These two classes are referred to as holding companies controlling single systems and holding companies controlling two or more systems.

The steam railroads referred to control in some instances one company and in others more than one. In the case of one operating electric railway company at least there is a joint control by two railroads.

The voluntary associations are almost entirely the Massachusetts form of trust, managed by trustees and issuing certificates of ownership in the securities controlled by them.

Management associations denote those banking or engineering firms, corporations or organizations holding either directly or indirectly through affiliated companies a stock control of the subsidiary operating companies. In some cases such control may be only through management contracts. In many instances the method or extent of such control is not contained in published reports and undoubtedly a number of cases of such control are not included as they are not evidenced by public records.

A summary of these various kinds of control is as follows:

Table II—Kinds of Control

Character of Holding Concern	Number of Primary Holding Concerns
Incorporated holding companies (single system)	60
Incorporated holding companies (two or more systems)	27
Steam railroads	10
Voluntary associations or trusts	9
Management associations	10
Total holding concerns	116

In many instances the holding company whose securities are owned by the public controls the operating electric railway company through one or through several holding companies in succession, and in some cases the succession of control is from a holding company through an operating company to one or more operating companies. These degrees of control are shown in the following table:

Table III—Degrees of Control

Degree	Number of Concerns	Total
First	66 holding companies	66
Second	35 holding companies	
	153 operating companies	188
Third	14 holding companies	
	76 operating companies	90
Fourth	1 holding company	
	21 operating companies	22
Fifth	6 operating companies	6
Sixth	1 operating company	1
Total	116 holding companies	
	257 operating companies	373

Explaining the figures given in Table III and the various degrees of control, it may be stated that the sixty-six primary holding concerns control thirty-five underlying holding companies and 153 operating companies, or a total of 188 companies. Part of these companies in turn control fourteen holding companies and seventy-six operating companies, or a total of ninety. Part of these in turn control one holding company and twenty-one operating companies, or a total of twenty-two. Some of these in turn control six operating companies, and one of these in turn controls one separate operating company. There is, therefore, one operating company which is five degrees removed from the primary holding company, while there are, as shown, a number of operating companies or holding companies that are several degrees removed from the primary holding company which controls them directly or indirectly.

CENSUS STATISTICS

Unfortunately the United States "Census of Electric Railways" for 1912 has not yet been published, as doubtless it will contain reliable information and statistics on the subject of the holding company.

The 1907 "Census of Street and Electric Railways" reported upon seventy financing or holding companies having a total capitalization outstanding of $954,695,373, but these figures and the few details published were not complete.

STATE OF INCORPORATION

The three most popular states of incorporation of the holding company are New Jersey, Maine and Delaware, these comprising over one-half of the incorporated holding companies. The following table gives the state of incorporation of various holding organizations, including not only the sixty-six primary holding concerns but also holding companies of the other degrees of control shown in Table III. The state containing the principal office of the management firm or association is given in some instances instead of the place of incorporation.

It is of interest to note that two of the holding companies are incorporated in Canada, although, as stated, the operating electric railway company in each case is located in the United States.

Table IV—State of Incorporation of Holding Concerns

States	Incorporated Holding Companies Controlling Two or More Systems	Incorporated Holding Companies Controlling Single System	Steam Railroads	Voluntary Associations	Management Associations	Total
New Jersey	9	11	..	..	..	20
New York	4	3	2	..	5	14
Massachusetts	..	2	1	8	2	13
Maine	3	9	..	..	..	12
Delaware	2	9	..	..	..	11
Pennsylvania	1	3	2	..	1	7
Illinois	1	2	..	1	2	6
Connecticut	2	1	1	..	..	4
California	..	4	..	..	..	4
Virginia	1	2	..	..	..	3
Colorado	1	1	..	..	..	2
Indiana	..	2	..	..	..	2
New Hampshire	1	1	..	..	..	2
Georgia	..	1	..	..	..	1
Kansas	..	1	..	..	..	1
Louisiana	..	1	..	..	..	1
Montana	..	1	..	..	..	1
North Carolina	..	1	..	..	..	1
Ohio	1	..	..	..	..	1
Texas	..	1	..	..	..	1
West Virginia	..	1	..	..	..	1
Wisconsin	..	..	1	..	..	1
Kentucky	..	1	..	..	..	1
Minnesota	..	..	1	..	..	1
Utah	..	..	1	..	..	1
Washington	..	..	1	..	..	1
Arizona	..	1	..	..	..	1
Canada	1	1	..	..	..	2
Total	27	60	10	9	10	116

KINDS OF BUSINESS DONE

There are many varieties of business other than the electric railway business done both by the holding companies and by the operating electric railway companies. Of the sixty-six primary holding concerns only fourteen do exclusively an electric railway business. Of the remaining fifty-two concerns a large proportion do an electric light, power and gas business, these being apparently the natural adjuncts to the electric railway. A summary of these kinds of business is as follows:

Table V—Kinds of Business Done

	Primary Holding Concerns	Held Operating Companies	Independent Operating Companies
Total number of concerns	66	257	694
Deduct those doing electric railway business only	14	177	576
Remaining concerns doing other business of following kinds:	52	80	118
Electric light and power	44	80	118
Gas	33	40	29
Heating	14	10	7
Water	12	4	8
Steam railroad	9	..	..
Ice	3	2	3
Irrigation	2	..	..
Manufacturing	2	..	..
Real estate	1	..	4
Oil	1	..	1
Telephone	1	..	..
Steamboat	..	..	2

CONTROL OF LARGE CITY RAILWAY SYSTEM

Of the twenty-eight cities of over 200,000 population in the United States, the principal electric railway systems may be classified as in Table VI.

It is interesting to note that of these twenty-eight cities there are only four which contain more than one principal operating system, and of these there are probably only two cities which can be said to have separate and independent ownership. It thus appears that the street railway industry in large cities in the United States has become a natural monopoly, subject as a general rule to the regulation of a public service commission.

TABLE VI—KIND OF CONTROL OF LARGE CITY RAILWAY SYSTEMS

Character of Control	Number of Companies	Miles of Track
Held operating companies (single system)......	7	3,123
Held operating companies (two or more systems)	12	4,968
Independent operating companies	14	5,079
Total	33	13,170

ADVANTAGES OF THE HOLDING COMPANY

A list of the principal advantages of the holding company follows:

1. Financial.

(a) Better market for construction securities of subsidiary companies on account of the wider market and also of the larger and more regular supply of securities for the banking outlet.

(b) More stable and larger market for stock of holding company than for smaller issues of the independent operating companies.

(c) Holding company can finance temporarily with its own surplus funds or through the large metropolitan banks, as well as the local banks, thus providing reserve financing until the securities of the subsidiary companies can be marketed.

(d) Holding company can finance the subsidiary companies with the proceeds of its own collateral trust bonds based on securities of subsidiary companies, or with its own debentures, notes, preferred or common stocks.

2. Operating.

(a) Holding company has a wider field for selection of local officers and can also promote from its own and the subsidiary companies' trained organizations.

(b) Holding company can, with its more experienced and more complete organization, efficiently supervise the operating results of the subsidiary companies, drawing comparisons between them and with other properties, and can apply remedies for conditions that are out of line.

(c) In case of local calamity or extraordinary difficulties the holding company can assist with all of its organizations or furnish a financial reserve to be drawn upon.

(d) Holding company can standardize operating methods and policies, thus securing greater economy and higher efficiency for the company and better service for the public.

3. Engineering.

(a) Holding company can standardize its designs and methods to the benefit of the public and also of financial results.

(b) On larger volume of work holding company can employ more experienced and efficient engineers for general supervision of the construction work.

4. Purchasing.

(a) Owing to purchases on a large scale, holding company can buy more cheaply the construction and maintenance materials, machinery and supplies.

(b) Holding company can standardize specifications.

(c) Holding company can purchase in larger markets and keep more closely in touch with current prices.

5. Accounting.

(a) Holding company can supervise and audit accounts of the subsidiary companies, besides bringing to bear upon the problems arising more experienced men. It can also standardize accounting and statistical forms and methods and can assist the operating officials to establish proper policies as to depreciation and other reserve funds, insurance, damages, etc.

6. Legal.

(a) Corporate and general legal matters can be better cared for by the holding company, whose legal department is usually of larger experience than is ordinarily found in a small local company.

(b) Services of trained engineers and attorneys are always available for testimony and counsel in cases before courts and public service commissions.

7. General.

(a) The combination of revenue and earnings of widely separated properties produces an assurance of normal income.

(b) Various economies of production on a large scale are secured.

DISADVANTAGES OF THE HOLDING COMPANY

1. Financial.

(a) Overcapitalization of the holding company. While this has been the case with some holding companies, it is not believed to be a general condition of these concerns. In many cases it is the subsidiary company that is overcapitalized. On the other hand, objection has been raised that through moderate stock capitalization and large collateral trust bond issues of some holding companies control of large and valuable equities is obtained through a small investment by a few persons.

(b) Opportunity for general misapprehension by the public as to the character and value of the collateral trust bonds and notes of the holding company and the preferred and common stocks following such debt by reason of complex intercorporate relationships.

(c) The minority stockholders of the subsidiary companies generally have no market for their securities and little if any voice in the company's management.

(d) Tendency to monopolize industry. There is a distinct tendency toward the control by one or more large interests of such a considerable group of public utility companies as to influence a large section of this field, and thus possibly to prevent fair competition in various departments of the business and to favor affiliated banking, manufacturing and other interests to the disadvantage both of the utilities controlled and of fair competition in those lines.

2. Operating, engineering, purchasing.

(a) Operation of subsidiary companies from a distance is not desirable. To obviate this disadvantage as far as possible, the local management and organization should be autonomous and conducted by the best obtainable talent. The directors should be strong local men who would not hesitate to direct the affairs of the company, although not largely interested financially. Moreover, the central organization of the company should be experienced, capable and competent to supervise the operations of the subsidiary companies. If this work is not properly looked after and if all centralized services for which charges are made, such as financing, purchasing, etc., are not efficiently performed, the holding company develops merely into a device for collecting tribute from minority stockholders of the subsidiary companies, or from the public. On the whole, notwithstanding the possible disadvantage of foreign control, it is believed that where the holding company's management is efficient, benefits to the public have always resulted.

(b) Loss of initiative of subsidiary officials. It is a question in some cases whether the officers of the subsidiary companies do not lose initiative and individuality by leaning too much upon the organization of the holding company and failing to take their proper responsibility. Experience shows, however, that if the supervision of the holding company is properly exercised and the subsidiary officials are men of ability, they will feel that their work is being compared with that of a number of other organizations, and that they are being held responsible for results.

3. Accounting.

(a) The revaluation of assets is sometimes subject to abuse. This method has been used at times to misrepresent profits or to conceal losses.

4. General.

(a) Profits of subsidiary companies are sometimes impossible to realize in cash, so that there should always be a large margin between book profits and dividends paid.

(b) Multiple taxation of the assets and income of holding companies and their subsidiaries is a serious problem of increasing importance.

CHARGES FOR SERVICES OF HOLDING COMPANY

It is interesting to note various methods which have been employed to charge the subsidiary companies for the services of the holding company or its officials. In some cases these charges are made by management associations of engineers or bankers and in some cases by the holding company itself acting in such capacity. Usually the purchase by the holding company of the issues of securities of the subsidiary companies is the subject of a special arrangement for each instance with varying compensation in addition to the payments referred to below.

Some holding companies make no charge whatever for their services to the subsidiary companies, making no profit out of their control and meeting their own operating expense from dividends and interest received from the subsidiary companies. Others, while making no profit upon the operation, apportion part of their operating expenses to the subsidiaries. Others again charge the entire amount of such expenses to the subsidiary companies.

Those making charges for services which represent more than the expenditure by the holding company do this by one or more of the following methods:

1. A fee is charged for management supervision based on a percentage of the net earnings of the subsidiary companies. In this case the percentage fee for supervision covers the cost of purchasing. No charge is made for engineering except in special cases where large contracts are entered into.

2. A fee is charged based upon a percentage of the gross earnings of the subsidiary companies. This charge includes supervision of management, auditing and some legal work. In addition a percentage engineering fee is paid on all construction charges by the subsidiary companies and a percentage fee is also charged for all articles purchased by the holding company organization.

3. A fee in round amount is charged each subsidiary company both for management and central accounting by the holding company, with an additional percentage fee for articles purchased. No additional charge is made for supervision of engineering.

4. Each subsidiary company is charged a salary for the president of the holding organization, who is chairman of the board of directors of the subsidiary company, the total of such charges being a reasonable amount and paid direct to the said president. In this case no fee is charged for management supervision but a separate fee of a percentage of construction expenditures of the subsidiary companies is charged for engineering supervision.

5. A fee is charged the subsidiary companies of a percentage of the gross earnings for management and each subsidiary company is also assessed for the direct expenses paid for its benefit by the holding company. In addition for engineering services a percentage fee is charged upon all construction items of the subsidiary company together with reimbursement for expenses of the engineering organization of the holding company.

6. Various representatives of the holding company are elected to executive positions in each of the subsidiary companies, each position paying as large a salary as the company can afford or as it should pay if the same position were filled locally. The salary checks from the local companies are taken possession of by the holding company and its officials paid at merely their market value by the holding company. In this way the excess of these salaries defrays the other general expenses, clerk hire, rent, etc., of the holding company. In addition the subsidiary company is charged a percentage on all construction expenditures.

Unless in the division of traffic, business or rates, in general it may be said that steam railroads and industrial holding companies have not gone nearly so far in the matter of making a profit from charges for the management of the subsidiary companies as have some of the public utility holding companies. The usual practice is to prorate the actual expenses of the holding company among the subsidiary companies. This condition is due probably to the more compact and interrelated organizations or physical connection of railroad and industrial properties rather than the widely separated company units common in the electric railway holding organizations.

While the holding company has within its power the possibility of securing much improved results for the securities of the subsidiary companies and for the local public, worth generally much more than its charges, in some cases the reverse is undoubtedly true. Here the holding company may be merely a device to secure unearned profits through a stock ownership controlling both parties to the management or engineering contract. In the latter cases doubtless the stockholders and the public will eventually correct the situation.

SOME LEGAL LIMITATIONS

As shown in the above statistics, the favored states for the incorporation of holding companies are New Jersey, Maine, Delaware, Massachusetts, Connecticut and Virginia. New Jersey has always been in the lead, but the recent passage of what are known as the "Seven Sisters" laws through the efforts of former Governor Wilson has changed the legal status of these companies. It is now probably unlawful for them to enlarge their stock ownership or to purchase the stock of other companies, which with other disabilities hamper their operations. Consequently, it is believed that a number of these corporations will re-incorporate in other more favorable states in spite of the difficulties of this course. At least one of these New Jersey companies has already proposed this reincorporation to its stockholders. Another is contemplating the same course, for which it has greater facility due to having originally incorporated in its charter a "migratory clause" permitting it, with the consent of a majority of the stockholders, to liquidate and re-incorporate in another state.

Some states, notably New York, have of recent years amended their corporation laws so as not to permit the incorporation of holding companies which may control operating electric railway companies. The same result is secured in a number of states under public service corporation laws which prevent the acquisition of more than a small percentage of the stock of a street railway company by any other corporation.

Owing to the popular objection that the corporation of one state is largely relieved from responsibility or from supervision in another, legislation may later be secured permitting holding companies doing business in more than one state to secure a federal charter so that all subsidiary companies could become merely local branches of the main company but subject to federal regulation.

While the laws of few if any of the states permit local street railways to be physically owned and operated by a foreign corporation, this is usually not the case with manufacturing companies, a number of which while incorporated in one state own and operate separate properties and plants in several other states.

CONCLUSIONS.

In general the holding company in some form is believed to be an approved, economic device for insuring financial results, standardizing operations and strengthening financial, operating and engineering methods and organizations, and while it is susceptible to misuse it has also, as stated, definite economic advantages and has come to stay.

MEETING OF AMERICAN ASSOCIATION FOR LABOR LEGISLATION

The annual meeting of the American Association for Labor Legislation was held in Washington on Dec. 30 and 31. Among the subjects discussed were "Administration and Industrial Relations," "Sickness Insurance" and "Working Hours in Continuous Industries."

One of the papers presented before the association was by Charles H. Crownhart, chairman Wisconsin Industrial Commission, on the subject "Labor Laws—Enforcement Through Administrative Orders." In his paper Mr. Crownhart said in part:

"The Wisconsin Legislature of 1905 enacted the rule as to railroad rates that 'all such rates should be reasonable.' What *is* a reasonable rate is a question of fact. The Legislature created the Railroad Commission to determine the fact in the first instance and to establish that fact by order. This act has been sustained in the courts.

"Following this, in 1911 the Legislature applied the same principle to labor legislation. It has been found impracticable, if not impossible, for the Legislature to keep abreast of the times in safety legislation. The elements of safety in industry are so many and so complex that details could not be expressed in the law without vital omissions and often without bad mistakes of inclusion. Safety in industry was found to be an expert's problem quite as much as fixing rates of public utilities. So the Legislature laid down the simple rule that all places of employment must be safe, and 'safe' was defined to mean 'such freedom from danger to the life, health or safety of employees or frequenters as the nature of the employment will reasonably permit.' Then the Legislature created the means appropriate for enforcing the rule. It created an Industrial Commission, with the duty of determining the facts as to safety and promulgating such facts by order. The order is really the declaration of the legislative rule as applied to the particular fact found.

"The Wisconsin commission has the authority to publish bulletins for the information of all concerned. In this way it is able to bring home to those affected by its orders knowledge of the orders and of the duty of the employer and employee under them. The orders are direct, simple and easily understood. When people understand the justice of laws it is not hard to secure enforcement. The commission does not require any safeguard which cannot be proved to be practical, nor does it require any which the commission cannot show how to install.

"The Wisconsin commission has representatives of employers' associations, workmen's associations, insurance companies and experts from the department, selected as a committee on safety to draft tentative orders. The members of the committee are clean-cut, practical men of affairs. They approach the subject earnestly and devote much time and attention to it. The tentative orders are drafted, printed, submitted to all employers and others interested and criticisms invited.

A hearing is granted where any interested party may make objections. The tentative orders are then revised and adopted by the commission. Additions and alterations are made from time to time as necessity requires. We now have twenty general orders common to all industries; five general orders applicable to woodworking establishments; five as to safety in laundries; three as to sanitation in laundries; fifty-three as to safety of elevators; eighteen as to ventilation and exhaust systems; six as to shop lighting, and twenty as to toilet rooms and general sanitation. Orders are in course of preparation covering the subjects of a building code, outside construction work, electrical construction and boiler manufacture, installation and operation.

"The result of this plan of enforcement of safety orders has been excellent. No prosecutions have been necessary in a period of two years. Extensions of time to comply with the orders have been granted by the commission as the occasion required. Employers and employees have actively co-operated with the commission to secure safety, and the standard of safety in Wisconsin is now higher than it has ever been in its history, and yet the employees are but obeying and carrying out the details of law which they have been largely instrumental in creating and making.

"With us the workmen's compensation act is an added incentive for a high standard of safety. The act is administered by the Industrial Commission. Not only does the employer have to pay compensation where his employee is accidentally injured, but if the injury results from failure to conform to the commission's orders, 15 per cent is added to the injured workman's compensation as a penalty. Likewise employees are required to obey the commission's orders on pain of 15 per cent reduction of compensation if injury results from their failure."

One of the sessions was a joint meeting with the American Political Science Association. Prof. W. W. Willoughby, of Johns Hopkins University, president American Political Science Association, addressed this meeting on "The Individual and the State." Prof. W. F. Willoughby, Princeton University, president American Association for Labor Legislation, addressed the meeting on "The Philosophy of Labor Legislation."

At the annual business meeting reports were presented by the following committees: workmen's compensation, industrial hygiene, women's work, enforcement of labor laws, one day of rest in seven, social insurance, standard schedules and tabulations and the New York legislative committee.

A paper on "The Practicability of Compulsory Sickness Insurance in America" was read by Joseph P. Chamberlain, Legislative Drafting Association, New York. The leading points in the paper were that the present insurance of the poor is enormously and hopelessly expensive and promotes extravagant funerals; that workmen do not oppose compulsory insurance, and that contribution by employers is already accepted in principle; that the enormous value of the organization of hospital funds, fraternal society and trade union benefits, so that their combined force can be brought to bear upon the problems of sickness, on the spread of information, on the enforcement and improvement of legislation, is at present entirely dissipated, and finally that the problem of sickness insurance through legislation is the problem of the immediate future in America.

New Electric Railway Track Built in 1913

A Compilation of Statistics on New Track Made Up from Reports Received from the Different Electric Railway Companies in the United States and Canada

The new track built and placed in service during 1913 by city systems, interurban lines and electrified steam railroads is tabulated in the accompanying lists. The statistics were compiled from reports received from the railway companies themselves, and the record is complete except in the case of a few of the smaller properties whose replies were not received in time for inclusion in the list. All items which appear are, of course, accurate. It is possible, however, that there may be some omitted mileage, either because of the failure of the companies to report it or because the construction was reported during 1912 and hence appeared in the statistical table published in the issue of this paper for Jan. 4, 1913.

The following summary shows the electric railway mileage built or put into operation each year since 1907 in the United States and Canada:

1907	1,880 miles.
1908	1,258.5 miles.
1909	887.1 miles.
1910	1,397.2 miles.
1911	1,191.5 miles.
1912	950.2 miles.
1913	1,018.9 miles.

Texas heads the list of states with 177.77 miles reported. This total includes the longest interurban railway built in the United States during 1913, namely, the Southern Traction Company, which built 154 miles of track connecting Waco, Dallas and Corsicana, Tex.

Missouri is second with 74.52 miles of track constructed. The largest part of this mileage is represented by the Kansas City, Clay County & St. Joseph Railway, which was completed and placed in operation during the past year. This line is 69.17 miles long and extends from Kansas City to Liberty, Excelsior Springs, Dearborn and St. Joseph.

Pennsylvania with 55.79 miles is third, of which the Philadelphia Rapid Transit Company built 21.58 miles. The Hershey Transit Company completed a 10-mile line connecting Hershey and Lebanon.

In Minnesota, which has a total of 54.22 miles, the Electric Short Line Railway and the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company built 25 and 18 miles of track, respectively. Two long extensions were built in Iowa. The Iowa Railway & Light Company completed a 17-mile line between Cedar Rapids, Bertram, Mount Vernon and Lisbon. A 20-mile line was built by the Waterloo, Cedar Falls & Northern Railway between Laporte City, Brandon and Urbana, Ia. In Massachusetts the majority of new track is credited to the Berkshire Street Railway, which completed a 24.44-mile line connecting Lee, Becket, Otis, Blandford and Huntington. The electric railways of Canada built 147.86 miles of track, compared with 78.37, or an increase of 47 per cent over 1912.

	Miles.
ALABAMA	
Alabama City, Gadsden & Attalla Ry.—Between Gadsden and Noccalula Falls	3.10
Birmingham, Ensley & Bessemer R. R.—Birmingham	6.00
Birmingham Railway, Light & Power Co	6.26
Mobile Light & Railroad Co	1.25
	16.61
ARIZONA	
Phoenix Railway	3.50
	3.50
CALIFORNIA	
City Railway Company of Los Angeles	12.80
Crescent City Railway—Between Bloomington and Rialto	3.43
Glendale & Eagle Rock Ry.—Between Glendale and La Cresenta	4.00
Petaluma & Santa Rosa Ry.—Between Liberty and Two Rocks	5.37
San Diego Electric Railway—San Diego	0.50
San Francisco-Oakland Terminal Rys	9.02
Santa Barbara & Suburban Ry	0.63
Stockton Terminal & Eastern R. R	3.20
United Railroads of San Francisco	2.25
	41.20
COLORADO	
Denver City Tramway	0.85
Denver & Northwestern Ry	1.15
	2.00
CONNECTICUT	
Connecticut Co.	1.40
New London & East Lyme Street Ry	13.20
Shore Line Electric Ry.—Between Deep River and Chester.	4.66
Waterbury & Milldale Tramway	3.60
	22.86
DISTRICT OF COLUMBIA	
Washington Utilities Co.—Between Clarendon and Arlington Junction, Va	2.25
	2.25
FLORIDA	
St. Johns Electric Co.—Between South Beach and Chautauqua Beach	1.50
St. Petersburg & Gulf Ry.—Davista	7.00
	8.50
GEORGIA	
Georgia Railway & Power Co.—In Atlanta and between Decatur, Clarkston and Stone Mountain	14.50
Rome Railway & Light Co	0.75
Waycross Street & Suburban Ry.—Waycross	2.92
	18.17
IDAHO	
Caldwell Traction Co., Ltd.—Between Summit, McCrory, Lake Lowell, Divide, Homestead, Sunny Slope and McNeil	3.50
IDAHO (*Continued*)	Miles.
Idaho Railway, Light & Power Co.—Boise	3.50
	7.00
ILLINOIS	
Centralia Traction Co.—Between Centralia and Wamac	3.00
Chicago City Ry	9.50
Chicago & Joliet Electric Ry	0.85
Chicago Railways—Chicago	2.00
Decatur Railway & Light Co	0.70
East St. Louis Ry	1.50
Freeport Railway & Light Co	1.00
Kankakee & Urbana Traction Co	0.75
Quincy Ry.—Quincy	4.00
Rock Island & Southern Ry	1.50
	24.80
INDIANA	
Chicago, South Bend & Northern Indiana Ry.—South Bend.	1.00
Union Traction Company of Indiana—Between Cowan, Oakville, Springport and Mount Summit	16.90
	17.90
IOWA	
Cedar Rapids & Marion City Ry	4.00
Clinton Street Ry	3.00
Iowa Railway & Light Co.—Between Cedar Rapids, Bertram, Mount Vernon and Lisbon	17.00
Tri-City Ry	1.54
Union Electric Co	1.00
Waterloo, Cedar Falls & Northern Ry.—Between Laporte City, Brandon and Urbana, Ia	20.00
	46.54
KANSAS	
Arkansas Valley Interurban Ry.—Between Newton and Bethel College	2.00
Joplin & Pittsburg Ry	1.61
Manhattan City & Interurban Ry	2.50
Salina Street Ry	1.50
Topeka Ry.—Topeka	1.50
	9.11
LOUISIANA	
Baton Rouge Electric Co.—Baton Rouge	2.31
New Orleans Railway & Light Co	0.72
	3.03
MAINE	
Aroostock Valley R. R. Co.—Between Carson and West Caribou	7.13
Bangor Railway & Electric Co.—In Bangor and through Hampden	1.33
Rockland, South Thomaston & St. George Ry	1.25
	9.71
MARYLAND	
United Railways & Electric Co.—Baltimore	0.33
	0.33

MASSACHUSETTS

	Miles
Bay State Street Ry	1.86
Berkshire Street Ry.—Between Lee, Becket, Otis, Blandford and Huntington	24.44
Interstate Consolidated Street Ry	0.13
Nahant & Lynn Street Railway Co	0.50
Northampton Street Railway Co	0.25
Oak Bluffs Street Ry	0.60
Springfield Street Ry	1.62
Union Street Ry	0.55
Worcester Consolidated Street Ry.—In Tatnuck and Worcester	2.28
	32.23

MICHIGAN

Benton Harbor-St. Joe Railway & Light Co.—Between Coloma and Watervliet	2.50
Escanaba Traction Co	1.00
Michigan United Traction Co	1.80
Saginaw-Bay City Railway	1.00
	6.30

MINNESOTA

Electric Short Line Ry.—Between Minneapolis and Minnetonka	25.00
Minneapolis, St. Paul, Rochester & Dubuque Electric Trac. Co.	1.75
St. Paul Southern Electric Ry.—Between St. Paul and Hastings	18.00
Twin City Rapid Transit Co	9.47
	54.22

MISSISSIPPI

Hattiesburg Traction Co	2.00
Meridian Light & Railway Co	0.93
	2.93

MISSOURI

City Light & Traction Co.—Sedalia	1.50
Grand View Railroad—Between Luxemburg, Point Breeze and Continental	1.50
Kansas City, Clay County & St. Joseph Ry.—Between Kansas City, Liberty, Excelsior Springs, Dearborn and St. Joseph	69.17
St. Joseph Railway, Light, Heat & Power Co	1.51
United Railways Company of St. Louis	0.84
	74.52

MONTANA

Billings Traction Co	1.00
Butte Electric Ry.—Butte	0.75
Great Falls Street Ry	0.75
Missoula Street Ry.—Missoula	0.56
	3.06

NEBRASKA

Omaha & Council Bluffs Street Ry	1.00
Omaha, Lincoln & Beatrice Ry	0.75
	1.75

NEVADA

Fallon Electric R. R.—Between Fallon, Stillwater, Harrigan and Harrigan South	20.00
	20.00

NEW JERSEY

Atlantic Coast Electric Ry.—Through New Jersey State camp grounds	0.76
Cape May, Delaware Bay & Sewell's Point R. R.—Through East Cape May	1.00
Jersey Central Traction Co	0.50
Public Service R. R.—Between Elizabeth, Linden Township, Roosevelt Borough and Woodbridge Township	5.93
Public Service Ry	4.25
	12.44

NEW YORK

Black River Traction Co	0.30
Brooklyn Rapid Transit Co	0.14
Cortland County Traction Co	0.28
Dry Dock, East Broadway & Battery R. R	0.46
Elmira Water, Light & Railway Co	0.38
Hornell Traction Co	1.00
International Ry.	2.68
Jamestown Street Ry.—Jamestown	0.84
Manhattan Bridge Three-Cent Line—New York	2.00
Manhattan & Queens Traction Corporation—New York	13.62
New York, Auburn & Lansing R. R	0.40
New York & Queens County Ry	1.92
New York State Rys., Rochester Lines	3.42
New York State Rys., Utica Lines—In Utica and through German Flatts, Ilion and Mohawk	6.06
Suffolk Traction Co.—Between Blue Point and Bayport	0.50
Union Ry.	2.14
Westchester Electric R. R.	0.77
Yonkers R. R.	3.14
	40.05

NORTH CAROLINA

Charlotte Electric Ry.—Charlotte	5.00
	5.00

OHIO

Dayton, Covington & Piqua Traction Co	1.14
Northern Ohio Traction & Light Co	17.00
Ohio River Electric Railway & Power Co	0.60
	18.74

OKLAHOMA

Oklahoma Ry.—Between Moore and Norman, Okla	9.00
Sand Springs Ry	5.50
	14.50

OREGON

Oregon Electric Ry.—A 5-mile line from Orenco to Bowers Junction and a 5-mile line from Gray to Corvallis	10.00
Portland Railway, Light & Power Co	12.67
	22.67

PENNSYLVANIA

	Miles
Altoona & Logan Valley Electric Ry.—Altoona	0.77
Butler Passenger Ry.—Butler	0.50
Conestoga Traction Co.—In Lancaster and between Lancaster and Rohrerstown	1.77
Harrisburg Rys.—Harrisburg	0.50
Hershey Transit Co.—Between Hershey, Hummelstown, Campbellstown, Mount Pleasant and Lebanon	10.00
Lehigh Valley Transit Co.—Allentown	2.50
Philadelphia Rapid Transit Co.—Philadelphia and between Philadelphia and Chester	21.58
Pittsburgh Rys	6.04
Pottstown & Phoenixville Ry	2.50
Scranton Ry.—Scranton	1.94
West Side Electric Street Ry.—Between Ellsworth, Bentleyville, Weaver and Jonestown	6.00
York Rys	1.69
	55.79

RHODE ISLAND

Rhode Island Co	2.96
	2.96

SOUTH CAROLINA

Charleston-Isle of Palms Traction Co	0.25
	0.25

TENNESSEE

Chattanooga Railway & Light Co	1.00
Knoxville Railway & Light Co	8.73
Lookout Mountain Ry	6.00
	15.73

TEXAS

Corpus Christi Street & Interurban Ry	2.00
El Paso Electric Ry	2.33
Houston Electric Co	5.24
Northern Texas Traction Co	6.50
Port Arthur Traction Co	0.50
San Antonio Traction Co	1.70
Southern Traction Co.—Between Waco, Dallas and Corsicana	154.00
Texas City Street Ry.—Texas City	3.00
Uvalde & Leona Valley Interurban Ry	2.50
	177.77

UTAH

Ogden Rapid Transit Co.—Ogden	4.00
Utah Light & Railway Co.—Between Salt Lake City, Bountiful and Centerville	10.30
	14.30

VIRGINIA

Charlottesville & Albemarle Ry	0.25
Norfolk & Southern R. R., Electric Div.—From Lake Station to State Rifle Range	2.50
Virginia Railway & Power Co.—In Richmond and Petersburg	1.86
	4.61

WASHINGTON

Puget Sound Traction, Light & Power Co., Bellingham Div.	9.87
Puget Sound Traction, Light & Power Co., Seattle Div	3.01
Seattle Municipal Ry.—Seattle	7.67
Washington Water Power Co	0.27
Willapa Harbor Ry	0.20
Yakima Valley Transportation Co.—Between Selah and Taylor, Wash	6.60
	27.62

WEST VIRGINIA

Charleston-Dunbar Traction Co	2.50
Charleston Interurban R. R	0.32
Monongahela Valley Traction Co.—Between McWhorter, Lost Creek, Janelew and Weston	18.00
Ohio Valley Electric Ry	1.00
Parkersburg, Marietta & Interurban Ry	0.60
	22.42

WISCONSIN

Milwaukee Electric Railway & Light Co	7.33
Southern Wisconsin Ry	0.38
	7.71

CANADA

Berlin & Waterloo Street Ry.—Berlin	1.50
British Columbia Electric Railway Co., Ltd.—Includes new track in Vancouver and suburban system, also Victoria City system Saanich interurban line	36 07
Calgary Street Ry	12.00
Edmonton Radial Ry	13.67
Hull Electric Co.—Extension to Connaught Park Jockey Club	1.50
International Transit Co	0.50
London Street Ry.—London	1.74
Montreal & Southern Counties Ry.—Includes electrification of 18-mile section of Central Vermont Ry. between St. Lambert and Marieville	21.50
Montreal Tramways	8.00
Niagara, St. Catharines & Toronto Ry.—Through St. Catharines	12.00
Ottawa Electric Ry.—Ottawa	5.00
Port Arthur & Fort William Electric Ry	5.00
Quebec Railway, Light & Power Co	1.54
Regina Municipal Ry	3.25
Sandwich, Windsor & Amherstburg Ry	1.32
Saskatoon Municipal Ry.—In Saskatoon and extension to Sutherland	7.00
Toronto Ry.—Toronto	2.21
Trans St. Mary's Traction Co	0.08
Winnipeg, Selkirk & Lake Winnipeg Ry.—Includes a new line between Middle Church and Stony Mountain	13.98
	147.86

GRAND TOTAL

United States and Canada	1,071.94

Electric Rolling Stock Ordered in 1913

A Tabulation Showing the Number, Type, Length and Manufacture of All Cars Built During the Year Compiled from Official Returns Made by the Railway Companies

The tables below show in detail the number of cars of all kinds as well as electric locomotives which were either purchased by electric railways or else built in the companies' shops during the past year. The total number of rolling equipments of all kinds was 5514, a decrease of approximately 8 per cent from the number listed for the previous year. The tables, in accordance with the usual procedure, have been made up from the orders noted from week to week in the rolling stock columns of the ELECTRIC RAILWAY JOURNAL and from returns made at the close of the year by the electric railways of the United States, Canada and Mexico. These figures were checked against reports received from practically all of the car builders, and every effort has been made to make the record complete, although there may be some omissions of a minor character.

The following summary shows the records in condensed form for the past seven years, and gives the number of cars, classified in accordance to the service in which they are used, from 1907 to 1913.

Year	City Cars	Interurban Cars	Freight & Misc. Cars	Total
1907	3483	1327	1406	6216
1908	2208	727	176	3111
1909	2537	1245	1175	4957
1910	3571	990	820	5381
1911	2884	626	505	4015
1912	4531	783	687	6001
1913	3820	547	1147	5514

The number of electric locomotives ordered was sixty-eight, as against sixty-five in the preceding year. The largest order is that of the Norfolk & Western Railway which has placed an order for twenty-four electric locomotives for freight service. The New York Central & Hudson River Railroad ordered fifteen locomotives.

The total number of cars of all types built in companies' shops was 772 as compared with 429 cars in 1912, or an increase of 44 per cent.

Purchaser	*No.*	*Class*	*Length*	*Serv.*	*Truck*	*Builder*
Ala. Cy., Gads'n & Attalla Ry.	1	Open	34-0	Int.	Brill	Pullman
	1	Closed	39-0	Int.	Brill	Pullman
Albany Southern R. R.	1	El.Loco.	34-7	Fght.	Was'n	Gen.Elec.
Alton, Granite & St.L. Tr. Co.	7	Closed	33-4	Int.	Brill	American
	10	Closed	26-0	City	Brill	American
Altoona & Logan Vy. El. Ry.	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Amarillo St. Ry.	2	Closed	20-8	City	Brill	American
Asheville & East Tenn. R. R.	1	Closed	41-0	Int.	Tay.	Southern
Asheville Pwr. & Lt. Co.	6	Closed	20-8	City	Brill	Brill
Ashtabula R. T. Co.	1	Closed	25-4	City	Brill	Kuhlman
Athens Ry. & Elec. Co.	1	Closed	39-6	City	Brill	Southern
	1	Closed	28-6	City	Dup.	Southern
Aurora, Elgin & Chicago R. R.	6	Closed	53-8½	Int.	Bald.	Jewett
	4	Closed	28-0	City	Bald.	St. Louis
Austin St. Ry.	4	Closed	23-0	City	Brill	American
Bangor Ry. & Elec. Co.	3	Closed	30-8	Int.	Brill	Wason
	1	Ex.&Ft.	35-0	Int.	Brill	Wason
Bartlesville Int. Ry.	1	Closed	21-0	City	St. L.	St. Louis
Bay State St. Ry.	50	Closed	28-0	Int.	St. L.	Laconia
	12	Express	39-0	Int.	Bald.	Laconia
Belt Line Ry.	79	St.Bat.	18-0	City	Brill	Brill
Berkshire St. Ry.	1	Substa.	38-0	Int.	M'G-C.	McGuire-C.
Berlin St. Ry.	1	Flat	30-0	Int.	Lacon.	Laconia
Billings Trac. Co.	1	St. Bat.	18-0	City	Brill	Brill
	2	St. Bat.	27-6	City	Beach	Ry.St.Bat.
Binghamton Ry.	2	Open	41-4	Int.		Jones
Birmingham, Ens. & Bes. R.R.	5	Closed	....	Int.		Southern
	20	Dump	21-0	Constr.	Oliv.	Oliver
	6	Flat	40-0	Const.	Oliv.	Oliver
Birmingham Ry. L. & P. Co.	3	Closed	....	City		Co. Shops
	1	Express	45-0	City	M'G-C.	McGuire-C.
Black River Trac. Co.	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Boston Elevated Ry.	30	Closed	37-2½	City	Brill	Pr. Steel
	25	Closed	37-2½	City	Brill	A. C. & F.
	100	Closed	34-4	City	Tay.	Jewett
Boston & Worcester St. Ry.	2	Closed	36-0	City		Wason
	4	Express	40-2	Int.		Osg.-Brad.
Brandon Munic. Ry.	1	Sweeper	46-0	City	M'G-C.	Preston
Bristol Trac. Co.	2	Closed	....	City		Southern
Brit. Columbia Elec. Railway	3	Closed	43-4	Int.	Std.	Co. Shops
	2	Closed	38-0	Int.	Std.	Co. Shops
	30	Ft., Box	40-0	Int.	Seat.	Seattle
	30	Ft., Flat	41-0	Int.	Seat.	Seattle
	3	Sweeper	28-3	City	Otta.	Ottawa
	15	Logging	42-0	Int.	Seat.	Seattle
Brooklyn R. T. Co.	2	El.Loco.	31-7	Swit'h	Wason	Gen. Elec.
	100	Closed	67-3½	Sub.	—	A. C. & F.
Burlingame Elec. Co.	1	St. Bat.	27-6	City	Beach	Ry. St. Bat.
Butte Elec. Ry.	4	Closed	40-6	City	Co.	Niles
Caldwell Trac. Co.	1	Closed	44-6	Int.	Bald.	Niles
Calgary St. Ry.	6	Pass.Tr.	44-0	City	Brill	Brill
	1	Flat	44-0	City	Brill	Co. Shops
	2	Sprinkler	30-0	City	Brill	Preston
California St. Cable R.R.	3	Closed	30-0	City	Co.	Co. Shops
Canadian Northern Railway	6	El.Loco.	37-4	Term.	G.E.	Gen. Elec.
Canadian Pacific Ry.	4	El.Loco.	38-4	Main	G.E.	Gen. Elec.
Cape Breton Elec. Co., Ltd.	3	Closed	31-4	City	Bald.	Cincinnati
Cape May, Del. Bay & Sew. Point R. R.	2	St.Bat.	21-0	City	Brill	St. Louis
Capital Trac. Co.	5	Closed	30-8	City	Std.	Brill
Cedar Rap. & Marion Cy. Ry.	10	Closed	44-8	City	St. L.	St. Louis
Centerville Lt. & Traction Co.	1	Closed	20-8	City	Brill	American
Central Illinois Pub. Ser. Co.	4	Closed	30-0	City	Brill	Brill
Charleston Con. Ry. & Ltg Co	1	Closed	20-8	City	Brill	Cincinnati
Charleston-Dunbar Trac. Co.	1	Closed	52-0	Int.	Brill	Jewett
	4	Closed	45-0	City	Bald.	Niles
Charleston Int.R. R.	4	Closed	35-0	Int.	Std.	Jewett
	2	Closed	35-0	Int.	Std.	Jewett
Charleston-Isle of Palms Trac. Co.	2	Ft., Flat	30-0	Int.	Co.	Co. Shops
Charlotte Elec. Railway	20	Closed	40-0	City	Brill	Southern
Charlottesville & Albemarle Ry.	5	Closed	21-0	City	Brill	Brill
Chattanooga Trac. Co.	4	Closed	45-1	Int.	Brill	Brill
	1	Bag.&Ex.	40-0	Int.	Brill	Brill
Chicago City Ry.	100	Closed	32-0	City	Brill	Brill
	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Chicago Elevated Rys.	62	Closed	48-0	Elev.	Bald.	Cincinnati
	66	Pass.Trail.	48-0	Elev.	Bald.	Cincinnati
Chicago & Joliet Elec. Ry.	10	Closed	28-0	City	Brill	St. Louis
Chicago & West Towns Ry.	30	Closed	45-0	City	M'G-C.	McGuire-C.
Chicago, Ottawa & Peoria Ry.	4	Closed	57-0	Int.	St. L.	St. Louis
	3	Closed	28-0	City	St. L.	St. Louis
	4	Pass.Tr.	57-0	City	St. L.	St. Louis
	2	Work	....	Int.	St. L.	St. Louis
Chicago Rys.	50	Closed	32-5	City	Brill	Southern
	50	Closed	32-5	City	Brill	American
	100	Closed	32-5	City	Brill	Co. Shops
	1	Sn.-Plow	....	City		Wason
	6	Sweeper	28-3	City	M'G-C.	McGuire-C.
Cin., Milf'd & Lov'l'd Trac. Co.	4	Work	....	Int.	War.	Warner
Cincinnati Trac. Co.	60	Pass.Tr.	43-0	City	Bald.	Cincinnati
City Railway, Dayton, Ohio	20	Closed	29-6	City	Std.	Cincinnati
City Ry. Co. of Los Angeles	75	Cent.Ent.	46-7	City	St. L.	St. Louis
Cleveland Ry.	100	Closed	35-5½	City	Brill	Kuhlman
	2	Closed	35-5½	City		Kuhlman
	100	Pass.Tr.	48-0	City	Brill	Kuhlman
	2	Sweeper	28-3	City	M'G-C.	McGuire-C.
	10	Dump	33-6	City	Std.	Oren.-Arthur Koppel
Clinton St. Ry.	7	Closed	26-6	City	St. L.	St. Louis
	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
	1	Sprinkler	25-6	City	M'G-C.	McGuire-C.
Columbia Ry., Gas. & El. Co.	1	Closed	45-0	City	Brill	Co. Shops
	1	Closed	53-0	City	Bald.	Co. Shops
Columbus, New Albany & Johnstown Trac. Co.	1	Closed	50-0	Int.	M'G-C.	McGuire-C.
	1	Express	40-0	Int.	M'G-C.	McGuire-C.
Columbus Railway & Light Co.	1	D'le-deck	45-6	City	Brill	Brill
Connecticut Co.	5	Dump	48-10	Both	Wason	Wason
Connecticut Valley St. Ry.	1	Open	41-7½	City		McGuire-C.
Cumberland Co. Pwr. & Lt. Co.	10	Closed	30-8	City	Brill	Wason
Dallas Consol. Elec. St. Ry.	23	Closed	26-6	City	Brill	St. Louis
	1	Closed	26-6	City	Bald.	St. Louis
	1	Const.	....	City	St. L.	American
Dayton, Springfield & Southern Xenia Southern Ry.	2	Closed	30-0	City	M'G-C.	McGuire-C
Dayton & Troy Elec. Ry.	2	Trail.Bx.	46-0	Int.	B. & S.	Bar. & Sm'
Decatur Ry. & Lt. Co.	4	Closed	28-0	City	St. L.	St. Louis
Delta Elec.Lt.,Pwr.& Mfg.Co.	11	Closed	16-0	City	Peck.	Jones
Denver City Tramway	26	Pass.Tr.	38-0	City	Woeb.	Woeber
Detroit River Tunnel Co.	4	El.Loco.	39-6	Tun.	G. E.	Gen. Elec.
	1	Wr'ck Cr.	....	Tun.	Ind.Wk.	Gen. Elec.
Detroit United Railway	50	Closed	23-1½	City	Std.	Cincinnati
Dominion Pwr. & Trans. Co., Ltd.	3	Closed	56-0	Int.	Bald.	Preston
	12	Closed	43-0	City	Brill	Preston
	2	Ft. Ex.	59-0	Int.	Tay.	Preston
	2	Ft. Ex.	59-0	Int.	Tay.	Tillsonburg
	2	Dump	35-0	City	Std.	Oren-Arthur Koppel
Duluth St. Ry.	2	Closed	27-9	City	Co.	Co. Shops
Easton Rapid Transit Co.	6	Closed	20-8	City	Brill	Brill
E. St. L., Col. & Waterloo Ry.	3	Closed	55-0	Int.	Brill	American
	2	Pass.Tr.	40-0	Int.	Brill	American
East St. Louis Ry.	5	Closed	28-8	City	Brill	American
East St. Louis & Sub. Railway.	3	Closed	33-4	Int.	Brill	American
Edmonton Int. Ry.	1	Gasoline	48-6	Int.	M'G-C.	Drake
Edmonton Radial Ry.	35	Closed	23-3¾	City	Std.	Preston
	1	Closed	48-0	Int.	M'G-C.	McGuire-C.
	1	Sprinkler	30-6	City	M'G-C.	McGuire-C.
	1	Dump	....	City	Can.	Canadian
	1	Line	38-0	City	Bem.	Co. Shops
Electric Short Line	1	Gasoline	56-0	Int.	St. L.	Drake
	1	Gas.-El.	50-0	Int.	Was'n	Gen. Elec.
Emigration Canyon R. R.	2	Closed	47-0	Int.	Bald.	Niles
Ephrata & Lebanon St. Ry.	1	Sto.Bat.	27-6	City	Beach	Ry. St. Bat.
Evanston Trac. Co.	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Five-Mile Beach Elec. Ry.	2	Open	34-0¾	City	Brill	Brill
Ft. Dodges, Des Moines & Southern R. R.	500	Ft., Box	36-0	Int.	H&K	Hask.&Bar.
Fort Wayne & No. Ind. Tr. Co.	1	Closed	55-0	Int.	Bald.	Co. Shops
Fox & Illinois Union Ry.	1	Substa.	27-0	Int.	M'G-C.	McGuire-C.

Purchaser	No.	Class	Length	Serv.	Truck	Builder
Frankford, Tac. & Holmes. St. Ry	2	Closed	33-4	Int.	Brill	Brill
Gary & Int. Ry	4	Closed	44-0	Int.	M'G-C.	McGuire-C.
Gastonia (N. C.) Trac. Co	2	Closed	....	Int.		Southern
Georgia Ry. & Pwr. Co	25	Closed	40-0	City	Brill	Co. Shops
	6	Closed	47-0	Int.	Brill	Co. Shops
	2	Pass.Tr.	40-0	Int.	Brill	Co. Shops
	1	Express	42-0	Int.	Brill	Co. Shops
	2	Sand	25-0	City	Brill	Co. Shops
Grand Rapids, Hol. & Chic. Ry.	4	Closed	50-0	Int.	Bald.	Jewett
	6	Closed	61-0	Int	Bald.	St. Louis
Great Falls St. Railway	4	Closed	25-9	City	Brill	Brill
Greenville, Spartanburg & Anderson Ry	6	El.Loco.	37-4	Fght.	Wason	Gen. Elec.
Guelph Radial Ry	3	Closed	46-6	City	Std.	Preston
Gulfport & Miss. Coast Trac. Co	1	Closed	....	City		Southern
Hagerstown & Frederick Ry	7	Closed	34-6	Int.	Brill	Brill
Halifax Elec. Tram	6	Closed	21-0	City	Co.	Nova Scotia
Ham. Whiting & East Chi. Ry.	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
	1	Sprinkler	29-6	City	M'G-C.	McGuire-C.
Hattiesburg Trac. Co	3	Closed	....	City	Brill	Co. Shops
	2	Closed	....	City	Brill	Southern
	1	Work	....	City	Brill	Co. Shops
Harrisburg Railway	7	Closed	30-8	City	Brill	Brill
Hershey Transit Co	2	Closed	30-8	City	Brill	Brill
	1	Sprinkler	18-0	City	Peck.	Co. Shops
Hillsboro Ry	2	Closed	30-0	City	M'G-C.	McGuire-C.
Holyoke St. Railway	5	Closed	30-8½	City	Bald.	Wason
Hornell Trac. Co	1	Closed	28-0	Int.	Brill	Brill
Houston Elec. Co	10	Closed	26-6	City	Brill	St. Louis
Hudson Valley Railway	3	Closed	38-6½	Int.	A. L.	Wason
Hull Elec. Co	4	Pass.Tr.	43-0	Int.	Brill	Ottawa
Illinois Trac. System	6	Closed	57-0	Int.	St. L.	St. Louis
	6	El.Loco.	....	Int.	St. L.	Co. Shops
	4	Work	....	Int.	St. L.	St. Louis
	1	Parlor	57-0	Int.	St. L.	St. Louis
	1	Sleeping	....	Int.	St. L.	St. Louis
Indianapolis & Cin. Trac. Co.	3	Express	56-0	Int.	A. L.	Cincinnati
Indianapolis Trac. & Term. Co.	25	Closed	33-2½	City	Std.	Cincinnati
International Ry	100	Closed	34-1½	City	Brill	Brill
	12	One-Man	21-0	City	Brill	Brill
	1	El.Loco.	35-2	Fght.	Bald.	Westingh.
	2	Derrick	....	City	Co.	Co. Shops
	1	Trail Flat	....	City	Co.	Co. Shops
	2	Flat	....	City	Co.	Co. Shops
	1	Supply	29-0	City	Brill	Co Shops
	10	Dump	13-4	City	K-J.	Kil. & Jac.
Inter-Urban Ry	60	Express	38-0	Int.	M'G-C.	McGuire-C.
Interurban Ry. & Term. Co.	5	Closed	50-0	Int.	Std.	Cincinnati
	2	Freight	50-0	Int.	Std.	Cincinnati
	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Iowa Ry. & Lt. Co	2	Closed	60-0	Int.	M'G-C.	McGuire-C.
	5	Closed	32-0	City	M'G-C.	McGuire-C.
	6	Closed	44-0	City	M'G-C.	McGuire-C.
Jackson Lt. & Trac. Co	3	Closed	32-6	City	M'G-C.	McGuire-C.
Jacksonville Trac. Co	10	Closed	26-6	City	Std.	St. Louis
	1	Sprinkler	29-6	City	M'G-C.	McGuire-C.
Jefferson County Trac. Co.	4	Closed	....	Int.		Southern
	4	Pass.Tr.	....	Int.		Southern
	1	Baggage	....	Int.		Southern
Jefferson Trac. Co	2	Closed	20-0	City	Brill	Brill
Jersey Central Trac. Co	1	Sn.-Plow	35-0	City	Co.	Co. Shops
Johnstown Pass. Railway	5	Closed	28-0	City	Brill	Kuhlman
Kankakee Elec. Ry	1	Closed	32-0	City	St. L.	Kan.Con.Co
Kankakee & Urbana Trac. Co.	2	Closed	53-0	Int.	Brill	American
Lehigh Valley Transit Co	6	Closed	56-0	Int.		Jewett
	3	Exp.Car	50-0	Int.		Jewett
	6	Flat	20-0	Int.	Old	Co. Shops
Lewiston, Augusta & Waterville St. Ry	3	Flat	36-0	Int.	Lacon.	Laconia
	1	Work	45-0	Fght.	Brill	Laconia
Lewiston & Reedsville El. Ry.	3	Closed	28-0	City	Brill	Brill
London St. Ry	6	Closed	20-8	City	Brill	Preston
Long Island R. R	12	Pass.Tr.	54-0	Int.	AC&F	A.C.&F.
	58	Closed	54-0	Int.	AC&F	A.C.&F.
	20	Baggage	40-0	Int.	AC&F	A.C.&F.
	3	St.Bat.	33-0	Steam	Beach	Ry.St.Bat.
Lookout Mountain Ry	10	Closed	28-8	Int.	Brill	American
Los Angeles & San Diego Beach Ry	2	Pass Tr.	42-0	Int.	Beach	St. Louis
	3	St.Bat.	40-0	Int.	Beach	Ry.St.Bat.
Louisville Ry	10	Pass.Tr.	36-4	City	St. L.	Co. Shops
Lynchburg Trac. & Light. Co.	1	Work	40-0	City	Brill	Brill
Mahoning & Shenango Ry. & Lt. Co	2	Sweeper	28-3	City	M'G-C.	McGuire-C.
Manhattan Bridge Three-Cent Line	6	Closed	33-2½	City	Bald.	Cincinnati
Manhattan & Queens Tr. Corp.	25	Closed	46-0	City	St. L.	St. Louis
	1	Closed	46-0	City	St. L.	Smith-Wal.
	1	Sn.-Plow	21-0	City	Brill	Brill
Marine Ry	1	Sweeper	....	City	S.-W.	Smith-Wal.
Maryland Elec. Co	1	St.Bat.	27-6	City	Beach	Ry.St.Bat.
Mason City & Clear Lake R.R.	12	Closed	56-0	Int.	Brill	Wason
Meridian Lt. & Ry. Co	1	Line	30-0	Int.	Peck.	Co. Shops
	8	Closed	....	City	Brill	Southern
	2	Closed.	....	City	Brill	American
Mesaba Ry	2	Closed	21-0	City	St. L.	St Louis
Metropolitan St. Ry	5	Closed	40-0	Int.	Bald.	Niles
	2	Dump	38-1½	City		Oren.-Arthur-Koppel
Michigan United Trac. Co	6	Closed	61-0	Int.	Bald.	St. Louis
	7	Closed	70-0	Int.	Bald.	St. Louis
	10	Closed	52-0	Int.	Bald.	St. Louis
	4	Pass.Tr.	61-0	Int.	Bald.	St. Louis
	4	Baggage	50-0	Int.	Bald.	St. Louis
	4	Express	50-0	Int.	Bald.	St. Louis
Middle West Utilities Co.	1	Exhib.	60-0	Int.	M'G-C.	McGuire-C
Milledgeville Railway	1	St.Bat.	18-0	City	Brill	Brill
Milwaukee Elec. Ry. & Lt. Co.	30	Closed	47-0	City	Bald.	Co. Shops
	10	Closed	32-0	City	Brill	Co. Shops
	8	Sweeper	32-4	City	M'G-C.	McGuire-C.
	2	Work	40-0	Gen.	Co.	Co. Shops
	25	Dump	15-10	Gen.	W.W.S.	West. W. Scraper Wks
	10	Flat	15-4	Gen.	W.W.S.	West. W. Scraper Wks
Minneapolis, St. Paul, Roch. & Dubuque Elec. Trac. Co	5	Gas.-El.	72-0	Int.	Wason	Gen. Elec.
	3	Gas.-El. Loco.	35-0	Int.	Wason	Gen. Elec.
Modesto Empire Trac. Co	1	St.Bat.	27-6	City	Beach	Ry.St.Bat.
Monongahela Val. Trac. Co.	6	Closed	42-0	Int.	Brill	Jewett
	2	Closed	20-0	City	Brill	Kuhlman
	2	Closed	42-0	Int.		Jewett
Montreal & Southern Counties Ry	8	Closed	54-2	Int.	Nat.S.C.	Nat.Stl.Car
	2	Express	49-4	Int.	Nat.S.C.	Nat.Stl.Car
Montreal Tramways	100	Closed	45-6	City	Can.	Canadian
	100	Closed	45-6	City	Brill	Ottawa
	25	Closed	37-6	City	Brill	Brill
	25	Pass.Tr.	37-6	City	Brill	Brill
	1	Sweeper	....	City	Can.	Ottawa
	2	Prison	47-7	City	Brill	Co. Shops
	2	Rail. Tr.	63-0	City	Can.	Co. Shops
	1	Supply	44-0	City	Brill	Co. Shops
Morris Co. Trac. Co	1	Sweeper	24-1¾	City	Brill	Brill
Newbern-Ghent St. Ry	1	St.Bat.	18-2	City	Cin.	Cincinnati
New York, Auburn & Lansing R. R	1	El.Loco.	30-0	Fght.	Rus.	Russell
New York Central & Hudson River R. R	24	Closed	53-0	Int.	Std.	Pr. Steel
	9	El.Loco.	55-2	Main	A. L.	Gen. Elec.
	6	El.Loco.	56-10	Main	A. L.	Gen. Elec.
New York Rys	45	St.Bat.	28-9	City		A.C.&F.
N. Y. State Rys., Roch. Lines.	25	Closed	39-11	City	Brill	Kuhlman
	25	Pass.Tr.	47-7¼	City	Bald.	Kuhlman
	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
N. Y. State Rys., Utica Lines.	10	Closed	30-11	City	Brill	Cincinnati
	4	Closed	34-4	Int.	Brill	Kuhlman
	12	Sweeper	24-1¾	City	Brill	Brill
Niagara Gorge R. R	1	Express	40-0	Int.	Brill	Co. Shops
Nipissing Central Ry	1	Sn.-Plow	30-0	Int.	Rus.	Russell
Norfolk Southern R. R	5	Closed	52-0	Int.	Brill	Southern
Norfolk & Western Railway	24	El.Loco.	52-0	Main	Bald.	Westingh.
Northampton St. Ry	2	Open	43-0	City	Std.	Wason
	2	Closed	30-8	Int.	Bald.	Wason
	2	Closed	30-0	City	Std.	Brill
North Carolina Pub. Ser. Co.	6	Closed	....	City		Southern
Northern Massachus. St. Ry	4	Closed	25-0	Int.	Tay.	Wason
Northern Ohio Trac. & Light Co	6	Gondola	36-0	City		
Northern Texas Trac. Co	4	Closed	51-0	Int.	Bald.	St. Louis
	10	Closed	26-6	City	Brill	St. Louis
Northwestern Penn. Railway	2	Closed	51-0	Int.	Bald.	Niles
	2	Closed	51-0	Int.	Bald.	Niles
Oakland, Antioch & East. Ry.	4	Closed	56-0	Int.		Wason
	8	Closed	56-0	Int.	Bald.	Cincinnati
	2	El.Loco.	39-0	Int.	Bald.	Westingh.
	1	Parlor	58-0	Int.		Wason
Ogden R. T. Co	2	Observ.	....	Int.	Co.	Co. Shops
Ohio Elec. Ry	5	Cl.Exp.	49-0	Int.	Cin.	Cincinnati
	2	Tr. Exc'n	60-0	Int.	Std.	Cincinnati
	5	Express	50-0	Int.	Bald.	Cincinnati
	15	Fr't Trail	38-6	Int.	Std.	Cincinnati
Ohio Valley Elec. Ry	8	Closed	30-0	City	Old	St. Louis
	10	Closed	38-0	City	St. L.	St. Louis
	1	Crane	42-0	Int.	Rus.	Russell
Oil Belt Ry	2	Gasoline	70-0	Int.	M'G-C.	Brake
	1	Ex.-Loco.	40-0	Int.	M'G-C.	Brake
Oklahoma Ry	1	Bag.&Ex.	35-0	Int.	Std.	Co. Shops
	1	Line	35-0	Int.	Std.	Co. Shops
Omaha & Council Bluffs St. Ry.	15	Closed	42-0	City	Brill	Co. Shops
	10	Pass.Tr.	46-0	City	Bald.	Co. Shops
	1	Dump	30-8	City	M'G-C.	McGuire-C.
Oregon Elec. Ry	6	Express	62-8½	Int.	Bald.	St. Louis
	6	Exp.Tr.	62-8½	Int.	Std.	St. Louis
Ottawa Elec. Ry	10	Closed	45-3	City	Brill	Ottawa
	2	Sweeper	....	City	Brill	Ottawa
Pacific Pwr. & Lt. Co	1	Closed	21-0	City	Brill	Brill
Park. Marietta & Int. Ry	2	Closed	41-0	Int.	Brill	Co. Shops
	2	Express	38-0	Int.	Brill	Co. Shops
	2	Box	38-0	Int.	Brill	Co. Shops
	2	Gondola	38-0	Int.	Ralst.	Co. Shops
	1	Work.	24-0	City	Brill	Co. Shops
Pascagoula St. Ry. & Pwr. Co.	4	Closed	18-0	Int.	Brill	American
Peninsular Ry	8	Closed	55-6¼	Int.		Jewett
People's Ry	1	Closed	28-0	City	Std.	Cincinnati
People's St. Ry	2	Closed	36-0	Int.	Brill	Brill
Peoria Ry	4	Closed	28-0	City	St. L.	St. Louis
Phila. & Garrett. St. Ry	2	Closed	51-0	Int.		Jewett
Philadelphia R. T. Co.	500	Closed	34-1¾	City	Brill	Brill
	1	Ft., Box	36-0	Int.	Brill	Brill
	6	Flat	40-0	City	Brill	Brill
	5	Sweeper	27-6	City	Brill	Brill
Phoenix Ry	4	Calif.	38-8	City	Brill	American
Phoenixville, Valley Forge & Staf. Elec. Ry	2	Open	43-0	Int.	Brill	Brill
Piedmont & Northern Lines	8	Pass.Tr.	....	Int.		Southern
	2	Parlor	....	Int.		Southern
Pine Bluff Co	1	Sprinkler	22-6	City	M'G-C.	McGuire-C.
Pittsburgh & Butler St. Ry	1	Express	50-0	Int.	Rus.	Russell
Pittsburgh Rys	50	Closed	45-2	City	St. L.	St Louis
	5	Doub.D'k	47-2	City	M'G-C.	McGuire-C.
	1	Substa.	27-0	City	M'G-C.	McGuire-C
Port Arthur & Ft. William. Elec. Ry	2	Closed	47-6	City	Brill	Ottawa
	4	Closed	45-3	City	Brill	Ottawa
	2	Pass.Tr.	46-6	City	Brill	Ottawa
	6	Closed	30-0	City	Brill	Ottawa
	1	Sweeper	....	City	Otta.	Ottawa
Portland, Gray & Lewiston R. R	1	Flat	35-0	Int.		Wason
Public Service R. R	10	Closed	34-5¾	Int.	Std.	Co. Shops
	2	Closed	32-0	City	Std.	Co. Shops
	1	Sn.-Plow	30-0	Int.	Tay.	Russell
Public Service Ry	7	Closed	32-0	City	Std.	Co. Shops
	20	Closed	34-5¾	City	Std.	Co. Shops
	2	Sn.-Plow	30-0	Int.	Tay.	Russell
	11	Work	40-0	Int.	Tay.	Co. Shops
	1	Work	28-8	Int.	Tay.	Co. Shops
	1	Private	44-0	Int.	Std.	Co. Shops
Public Utilities Co	8	Closed	28-0	City	Bald.	St. Louis
Puget Sound Trac. Lt. & Pr. Co., Bellingham Division	1	Closed	50-0	City	Std.	Co. Shops
Puget Sound Trac. Lt. & Pr. Co., Seattle Division	9	Closed	38-4	City	Std.	Cincinnati
	1	Closed	38-4	City	Bald	Cincinnati
Quebec Ry. Lt. & Pwr. Co	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Quincy Ry	4	One-Man	21-0	City	St. L.	St. Louis
Regina Munic. Ry	6	Closed	22-0	City	Brill	Preston
	16	Closed	28-0	City	Brill	Preston
	6	Dump	8-0	City	Vel.	Velcter

Purchaser	No.	Class	Length	Serv.	Truck	Builder
Regina Munic Ry	6	Flat	14-0	City	Brill	Ry. Shops
	1	Sweeper	36-0	City	M'G-C.	McGuire-C.
	2	Work	9-0	City	City	Ry. Shops
	1	Haul.	28-0	City	Brill	Ry. Shops
Rio Grande Valley Elec. Ry	4	Closed	40-0	Int.	St. L.	St. Louis
	1	Baggage	40-0	Int.	St. L.	St. Louis
Rockford City Trac. Co	6	Closed	28-0	City	Bald.	St. Louis
	4	Closed	28-0	City	St. L.	St. Louis
	13	Work	14-0	Gen.	W.W.S.	West. W. Scraper Wks
Saginaw-Bay City Ry	2	Open	32-1	City		Kuhlman
	6	Closed	28-0	City	Bald.	St. Louis
Saginaw & FlintRy	1	Express	48-0	Int.	Bald.	St. Louis
St. Joseph Valley Ry	1	St. Bat.	52-0½	Int.	Beach	Ry.St.Bat.
St. Petersburg & Gulf Ry	2	Closed	30-8	City	Brill	Brill
Salt Lake & Ogden Ry	8	Closed	56-0	Int.	Bald.	Niles
	1	Work	....	Int.	Bald.	Co. Shops
Salt Lake & Utah .R R	3	Gas.Mot.	....	Int.		Hall-Scott
San Antonio Trac. Co	14	Closed	28-10	City	Brill	American
San Diego Elec. Ry	35	Closed	48-7	City	Brill	McGuire-C.
Sand Springs Ry	4	Pass.Tr.	34-0	Int.	St. L.	St. Louis
	1	El.Loco.	34-4	Sw'ch	Bald.	Westingh.
Sand., Wind. & Amherst Ry	2	Closed	20-8	City	Brill	Kuhlman
	2	Closed	31-3	City	Brill	Kuhlman
Santa Barbara & Sub. Ry	5	Closed	39-4	City	Brill	Brill
Saskatoon Elec. Ry	12	Closed	46-6	City	Brill	Preston
Savannah Elec. Co	3	Closed	28-0	City	Std.	St. Louis
Schenectady Ry	7	Closed	28-0	City	Tay.	St. Louis
Scioto Valley Trac. Co	2	Tr., Box	36-0	Int.	B.&S.	Bar.&Smith
Scranton & Binghamton Ry	1	Coal	....	City	Brill	Brill
Scranton Ry	5	Closed	30-6	City	Tay.	Southern
Seattle Munic. St. Ry	12	Closed	31-1	City	Std.	Cincinnati
Selma St. & Sub. Ry	1	Closed	26-0	City	Phila.	Co. Shops
	1	Closed	24-0	City	Co.	Co. Shops
Sheboygan Ry. & Elec. Co	2	Flat	30-0	Int.	Co.	Co. Shops
Shore Line Elec. Ry	8	Closed	30-8	Int.	Brill	Wason
	1	Express	40-0	Int.	Brill	Wason
Shreveport Trac. Co	3	Closed	28-10	City	Brill	American
Sioux Falls Trac. System	1	Closed	26-6	City		St. Louis
South Carolina Lt. Pwr. & Rys. Co	5	Closed	20-8	City	Brill	American
So. Covington & Cincinnati St. Ry	20	Closed	21-0	City	Brill	Cincinnati
	1	Substa.	27-0	Int.	M'G-C.	McGuire-C.
Southern Trac. Co	22	Closed	54-0	Int.	Brill	St. Louis
	6	Closed	26-6	City	Brill	St. Louis
	10	Pass.Tr.	53-0	Int.	Brill	American
	8	Express	52-0	Int.	Brill	American
	2	Work	52-0	Int.	Brill	American
Southern Trac. Co. of Illinois	6	Closed	....	City	St. L.	St. Louis
Southwestern Trac. & Pr. Co	1	Closed	40-5	City	Brill	American
South Oregon Ry	1	Closed	21-0	City	St. L.	St. Louis
Southwest Missouri R. R	3	Closed	44½-0	Int.	Tay.	Co. Shops
	1	Line	31½-0	City	Brill	Co. Shops
Springfield Ry	10	Closed	28-0	City	Bald.	Cincinnati
Springfield St. Ry	4	Closed	35-0	Int.	Std.	Wason
	9	Closed	28-0	City	Std.	Osg.-Brad.
	6	Closed	30-3½	City	Std.	Wason
	1	Express	40-0	Int.	Std.	Wason
	2	Sweeper	23-11	City	Rus.	Russell
Stark Elec. R. R	2	Closed	45-0	Int.	Bald.	Jewett
Ster. Dixon & East. Elec. Ry	1	Closed	30-0	City	M'G-C.	McGuire-C.
	1	Closed	48-0	Int.	M'G-C.	McGuire-C.
Suburban R. R	10	Closed	45-0	City	M'G-C.	McGuire-C.
	1	Sweeper	28-3	City	M'G-C.	McGuire-C.
Syracuse & Suburban Ry	2	Closed	34-4	City	Brill	Brill
Terre Haute, Ind. & East. Trac. Co., Terre Haute Div.	2	Gondola	32-0	Both	Co.	Co. Shops
	2	Flat	34-0	Both	Co.	Co. Shops
	1	Line	42-0	Both	Bald.	McGuire-C.
Texas City St. Ry	2	Closed	30-0	City	M'G-C.	McGuire-C.
	2	Closed	28-9	City	M'G-C.	McGuire-C.
Third Avenue Ry	4	Sweeper	22-6	City	Brill	Brill
Tidewater Southern Ry	3	Closed	51-0	Int.		Jewett
	1	Express	45-0	Int.	Brill	Jewett
Toledo Rys. & Lt. Co	30	Closed	44-10	City		McGuire-C.
	10	Closed	....	City		Co. Shops
	3	Sweeper	28-3	City	M'G-C.	McGuire-C
Toronto Ry	24	Closed	23-0	City	Can.	Co. Shops
	1	Closed	27½-0	City	Can.	Co. Shops
	75	Closed	30-0	City	Can.	Co. Shops
	1	Work	40-0	City	Co.	Co. Shops
Toronto Sub. Ry	2	Closed	33-0	City	Tay.	Preston
	2	Closed	46-0	City	Brill	Preston
Tri City Ry	25	Closed	28-0	City	St. L.	St. Louis
	35	Closed	30-8	City	Brill	American
	3	Sweepers	28-4	City	M'G-C.	McGuire-C.
Twin City R. T. Co	107	Closed	46-8	City	Co.	Co. Shops
	1	Crane	43-10	City	Co.	Co. Shops
Twin Falls Ry	2	St.Bat.	35-0	Int.	Beach	Ry.Sto.Bat.
Union Elec. Co	3	Closed	27-4	City	Brill	American
	3	Closed	27-4	City	Bald.	American
Union St. Ry	12	Closed	30-0	City	Std.	Osg.-Brad.
	1	Closed	26-0	City	Brill	Brill
	1	Closed	26-0	City	St. L.	St. Louis
	1	Line	30-0	City	Std.	Co. Shops
Union Trac. Co. of Indiana	2	Exp.	55-0	Int.	Bald.	Co. Shops
United Rys. Co. of St. Louis	6	Open	47-0	City	Co.	Co. Shops
	100	Closed	42-3	City	Co.	Co. Shops
	3	Closed	45-0	City	Co.	Co. Shops
	13	Closed	47-2¾	City	Co.	Co. Shops
	34	Pass.Tr.	45-0	City	Co.	Co. Shops
	2	Dump	40-6	City	Co.	Oren.-Arthur Koppel
	1	Line	35-6¼	City	Co.	Co. Shops
United Rys. & Elec. Co	60	Closed	30-8	City	Brill	Brill
	2	Dump	....	City		Co. Shops
	1	Crane	....	City	Brill	Co. Shops
United Trac. Co	12	Closed	30-11	City	Tay.	Cincinnati
Urbana & Champaign Ry. Gas & Elec. Co	3	Closed	28-0	City	St. L.	St. Louis
Valley Trac. Co	4	Closed	30-8	City	Brill	Brill
Vicksburg Lt. & Trac. Co	2	Closed	21-0	City	Old	St. Louis
Virginia Ry. & Pwr. Co	20	Closed	48-8	City	Brill	Cincinnati
Washington Ry. & Elec. Co	5	Closed	46-0	City	Bald.	Southern
	1	Dou.D'k	42-0	City	Bald.	Southern
Washington Utilities Co	2	Flat	36-0	Int.	Brill	Co. Shops
	1	Line	18-0	Int.	Brill	Co. Shops
Waterbury & Milldale Tramway	2	Closed	30-8	Int.	Brill	Wason
Waterloo, Cedar Falls & North. Ry	6	Closed	32-0	City	M'G-C.	McGuire-C.
Western N. Y. & Pa. Trac.Co	1	Closed	20-8	City	Brill	Brill
	1	Express	40-0	City	Brill	Wason
	1	Sn.-Plow	....	Int.		Russell
Western Ohio Ry	4	Tr., Box	46-0	Int.	B.&S.	Bar.&Smith
West Jersey & Seashore R. R	6	Open	....	City		Southern
	26	Closed	34-1½	City	Brill	Brill
Westside Elec. St. Ry	2	Closed	48-0	Int.	Bald.	Niles
Wichita R. R. & Lt. Co	6	One-Man	21-0	City	St. L.	St. Louis
Wilkes-Barre Ry	4	Closed	28-0	City	Brill	Brill
	6	Closed	36-8	Int.	Brill	Brill
Williamsport Pass. Ry	6	Closed	28-0	City	Brill	Brill
Wilmington, New Castle & Del. City Ry	1	St.Bat.	35-6	Int.	Beach	Ry.St.Bat.
Windsor, Essex & Lake Shore Ry	2	Closed	55-0	Int.	Bald.	Tillsonburg
Winnipeg Elec. Ry	40	Closed	33-0	City	Co.	Co. Shops
	1	Flat	....	City	Co.	Co. Shops
Wisconsin Ry. Lt. & Pwr. Co	4	Closed	21-0	City	St. L.	St. Louis
Worcester Consol. St. Ry	15	Closed	28-0	City	Std.	Osg.-Brad.
	6	Closed	35-0	Int.	Std.	Wason
	4	Express	40-0	Int.	Std.	Wason
Yakima Valley Trans. Co	2	Closed	45-0	Int.	Brill	Jewett
	1	Express	45-0	Int.	Brill	Jewett
York Rys	3	Closed	34-0	Int.	Bald.	Brill
	1	Pass.Tr.	44-0	Int.	Bald.	Co. Shops
	1	Sweeper	24-1½	Int.	Brill	Brill
Youngstown & Ohio Riv. R. R.	1	El.Loco.	37-6	Fght.	Bald.	Westingh.

BLOCK SIGNAL INSTALLATIONS IN 1913

As the past year has been an exceptionally active one in electric railway signaling, a list has been compiled of the installations made during that period. The statistics show, in addition to the name of the road making each installation, the number of signals, the route mileage protected—where this is known—and the name of the manufacturer. In the column headed "Remarks" the type of signal has been indicated, whether of the trolley-contact, cab-signal or track-circuit type, and in the latter case the style of indication, either semaphore or light or both, is noted. Where the protection is furnished for double track this fact is indicated, all installations without the notation being on single track.

Name of Road	No. Sig.	Miles	Manufacturer	Remarks
Alabama Cy., G. & A. Ry.	2	..	Nachod	Trolley Contact
Altoona & Logan Valley	5	..	Nachod	Trolley Contact
American Railways	2	..	U.S. El. Sig	Trolley Contact
Bangor Ry	12	..	C. N. Wood	Trolley Contact
Bay State St. Ry	50	..	U.S. El. Sig	Trolley Contact
Birmingham Ry	14	..	U.S. El. Sig	Trolley Contact
Brooklyn R. T	26	2.4	Gen. Ry. Sig	Track Circ.-Light D.T.-Auto stops
Beaumont Trac	4	..	U.S. El. Sig	Trolley Contact
Boston El. Ry	8	..	U.S. El. Sig	Trolley Contact
Butte, A. & P	16	3.8	Union S. & S	Track Circ.-Sema. D.T.
British Col. El. Ry	4	..	U.S. El. Sig	Trolley Contact
Burlington C. T	2	..	Nachod	Trolley Contact
Chicago, L.S. & S.B	80	55	Union S. & S	Track Circ.-Sema.
Chicago, S. B. & N. I	20	9.5	Union S. & S	Track Circ.-Sema.
Chicago, S. B. & N. I	2	..	Nachod	Trolley Contact
Chicago, S. B. & N. I	2	..	U.S. El. Sig	Trolley Contact
Chicago & Milwaukee	2	..	Nachod	Trolley Contact
Chattanooga Ry	46	..	C. N. Wood	Trolley Contact
Citizens' Traction	10	..	Nachod	Trolley Contact
Columbus Ry	12	..	C. N. Wood	Trolley Contact
Connecticut Co	13	..	U.S. El. Sig	Trolley Contact
Detroit M. & T	2	0.6	Union S. & S	Track Circ.-Sema.
Dallas Consol. St. Ry	1	..	U.S. El. Sig	Trolley Contact
E. St. Louis, C. & W	4	..	Nachod	Curve Protection
E. St. Louis & Sub	2	..	Nachod	Trolley Contact
Easton Transit Co	6	..	U.S. El. Sig	Trolley Contact
Elmira St. Ry	4	..	U.S. El. Sig	Trolley Contact
Fort Wayne & N. I. T	24	24.4	Gen. Ry. Sig	Track Circ.-Light.
Fitchburg & Leo's't'r	1	..	U.S. El. Sig	Trolley Contact
Fonda J. & G	2	..	Auto. Sig.&App.	Trolley Contact
Galesburg & K	2	..	Nachod	Trolley Contact
Gray's Harbor Ry	2	..	Nachod	Trolley Contact
Gary & Int	4	4.8	Gen. Ry. Sig	Track Circ.-Light.
Halifax El. Tr'way	8	..	U.S. El. Sig	Trolley Contact
Holyoke St. Ry	2	..	C. N. Wood	Trolley Contact
Holyoke St. Ry	4	..	U.S. El. Sig	Trolley Contact
Illinois Traction	79	77.	Union S. & S	Track Circ.-Sema.
Illinois Traction	1	..	U.S. El. Sig	Trolley Contact
Indianapolis C. & S	54	23.8	Union S. & S	Track Circ.-Sema. and Light
Ind'p'ls & Cin. Trac'n	81	27.	Northey-Simmen	Cab Signals
International Ry	4	..	C. N. Wood	Trolley Contact
International Ry	6	..	U.S. El. Sig	Trolley Contact
Jackson L. & T. Co	2	..	U.S. El. Sig	Trolley Contact
Joliet & Southern	5	..	U.S. El. Sig	Trolley Contact
Kansas City Western	8	..	C. N. Wood	Trolley Contact
Knoxville Ry. & Lt	10	..	U.S. El. Sig	Trolley Contact
Kokomo, M. & W	4	5.5	Gen. Ry. Sig	Track Circ.-Sema.
Lake Shore Elect	6	..	Auto.Sig.&App	Tr'y Cont. (4 D.T.)
Lehigh Valley T. C	5	..	Nachod	Tr'y Cont. (1 D.T.)
Lewiston, A. & W	4	..	C. N. Wood	Trolley Contact
Louisville & Northern	8	3.5	Union S. & S	Track Circ.-Sema. and Light.
Manhattan & Queens	2	..	U.S. El. Sig	Trolley Contact
Manchester St. Ry	2	..	U.S. El. Sig	Trolley Contact
Mesaba Railway	34	36.	Northey-Simmen	Cab Signal
Mass. & Northeastern	4	..	U.S. El. Sig	Trolley Contact
Mansfield Ry	4	..	U.S. El. Sig	Trolley Contact

Name of Road	*No. Sig.*	*Miles*	*Manufacturer*	*Remarks*
Michigan United	10	..	Nachod	Trolley Contact
Middlesex & Boston	6	..	U.S. El. Sig	Trolley Contact
Mahoning & Shenango	8	..	Nachod	Trolley Contact
Monongahela V. T. Co	6	..	U.S. El. Sig	Trolley Contact
Muskegon T. & L	2	..	Nachod	Trolley Contact
Nashville-Gallatin	38	24.	Northey-Simmen	Cab Signal
Nashville Ry	2	..	U.S. El. Sig	Trolley Contact
N. Y. State Rys	90	39.	Gen. Ry. Sig	Track Circ.-Sema.
N. Y. State Rys	123	39.	Gen. Ry. Sig	Track Circ.-Sema.
N. Y. State Rys	18	9	Union S. & S	Track Circ.-Sema. D.T.
Northampton St. Ry	4	..	U.S. El. Sig	Trolley Contact
Norwest. Pacific	2	0.25	Union S. & S	Track Circ.-Sema. D.T.
Northwest Penn	2	..	C. N. Wood	Trolley Contact
Northern Ohio Traction	6	..	Nachod	Curve & Gantlet Protection
Northern Illinois L. & T.	2	..	U.S. El. Sig	Trolley Contact
Northern Electric	4	0.2	Union S. & S	Track Circ.-Light
Oakland A. & E	51	83	Union S. & S	Track Circ.-Light
Ogden R. T. Co	2	..	U.S. El. Sig	Trolley Contact
Ohio Electric	8	4.7	Union S. & S	Track Circ.-Sema. and Light
Ottawa El. Ry	2	..	U.S. El. Sig	Trolley Contact
Pacific Electric	101	13	Union S. & S	Track Circ.-Sema. and Light-D.T.
Parkersburg M. & I	23	..	Nachod	Trolley Contact
Phila. R. T	10	..	Nachod	Contactors for Subway Signals
Phila. & Westchester	2	..	Nachod	Contactors for Subway Signals
Portland (Ore.) Ry., L&P.	28	..	U.S. El. Sig	Trolley Contact
Portland (Me.) Ry	2	..	C. N. Wood	Trolley Contact
Puget Sound El. Ry	55	28	Gen. Ry. Sig	Track Circ.-9m. D.T., 19m. S.T.
Public Service Ry	28	9.5	Union S. & S	Track Circ.-Sema. and Light
Rhode Island Co	62	..	C. N. Wood	Trolley Contact
Roanoke Ry	2	..	Nachod	Trolley Contact
San Francisco,-Oakland	4	..	U.S. El. Sig	Trolley Contact
Schenectady Ry	2	..	Nachod	Trolley Contact
Springfield St. Ry	8	..	C. N. Wood	Trolley Contact
Springfield St. Ry	2	..	U.S. El. Sig	Trolley Contact
Scranton & Binghamton	36	10.1	Union S. & S	Track Circ.-Sema. and Light
Shore Line El. Ry	2	..	U.S. El. Sig	Trolley Contact
Southern El. Dev. Co	2	..	Nachod	Trolley Contact
South. Wisconsin	2	..	Nachod	Trolley Contact
Southern Pacific	14	2.5	Union S. & S	Track Circ.-Sema. D.T.
Southwestern T. Co	1	..	U.S. El. Sig	Trolley Contact
Staten Island Midland	4	..	U.S. El. Sig	Trolley Contact
T.H., I. & E	6	..	C. N. Wood	Trolley Contact
T. H., I. & E	26	33	Gen. Ry. Sig	Track Circ.-Light
Texas Traction	6	..	Nachod	Trolley Contact
Transit Supply Co	5	..	Nachod	Spur Tracks
Union Trac. of Ind	43	39	Gen. Ry. Sig	Track Circ.-Light
Union Ry., New Bedford	2	..	C. N. Wood	Trolley Contact
Union Ry., New Bedford	2	..	U.S. El. Sig	Trolley Contact
Valley Traction Co	10	..	Nachod	Trolley Contact
Virginia Ry. & Pr. Co	18	..	Nachod	Headway Recorders
Wash. & Great Falls	10	..	Nachod	Trolley Contact
West. Penn. T. Co	2	..	Nachod	Trolley Contact
Wheeling T. Co	8	..	Nachod	Trolley Contact
Wilkes-Barre Ry	3	..	Nachod	Trolley Contact
Wilkes-Barre & Hazl'n	2	..	Nachod	Third-Rail Contact
Worcester Cons	57	..	U.S. El. Sig	Trolley Contact

RECEIVERSHIPS AND FORECLOSURE SALES IN 1913

Records of electric railway companies for which receivers were appointed in 1913 show that the number of companies which became involved in financial difficulties and their total single-track mileage were smaller than in the preceding year, but that the amounts of outstanding stock and the outstanding funded debt were much larger in 1913. This was caused by the receivership of the American Waterworks & Guarantee Company, which, being only a holding company, did not increase the mileage total, but with its $20,000,000 of stock and its $37,589,000 of summarized subsidiary funded debt caused a large rise in the outstanding stock and funded debt totals. The record of receiverships for 1913 compares with the preceding four years as follows:

	No. of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	22	558	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.9	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200

A number of the companies placed under receivership had not reached the stage of operation of completed systems, and the mileage given is for the number of miles in actual operation, wherever that figure was ascertainable. In all cases where both steam and electric service were given the mileage represents only the sections devoted to electric operation, although the entire capitalization is included in the table. It has been attempted in all cases to take the figures from the latest sources; but with some companies, especially those newly constructed and those that do not publish a yearly report, the information secured has been vague and sometimes even useless for the purposes of this table. As will be noticed from the accompanying list, most of the companies under receivership in 1913 operated a small mileage. An interesting fact in connection with this table is that two of the receiverships, those of the Cincinnati & Columbus Traction Company and of the Cincinnati, Lawrenceburg & Aurora Street Railway, were the direct result of the disastrous flood that visited the Ohio valley in the spring.

ELECTRIC RAILWAY RECEIVERSHIPS IN 1913

	Mileage	Outstanding Stock	Outstanding Funded Debt
American Water Works & Guarantee Co.	....	$20,000,000	$37,589,000*
Bowling Green Railway	7.50	50,000	20,000
Buffalo Southern Railway	25.35	547,200	600,000
Cincinnati & Columbus Traction Co.	53.00	1,904,500	748,000
Cincinnati, Lawrenceburg & Aurora Street Railway	32.20	808,900	750,000
Fayetteville Street Railway & Power Co.	4.00	......	......
Goldsboro Traction Co.	6.00	200,000	12,500
Kansas City, Ozark & Southern Ry.	15.00	300,000	......
Loramie & Minster Electric Ry.	17.70	20,500	42,700
Mansfield Railway, Light & Power Co.	21.00	1,000,000	942,000
Mexico, Santa Fé & Perry Traction Co.	27.00	850,000	1,600,000†
Northern Illinois Electric Ry.	12.00	......	......
Pekin & Petersburg Interurban Ry.	7.00	50,000†	50,000
Richmond & Henrico Ry.	9.12	1,250,000	1,250,000
Sunbury & Susquehanna Ry.	7.00	1,000,000†	1,200,000†
Titusville Electric Trac. Co.	17.50	300,000	300,000
Tri-City Railway & Electric Co.	75.47	2,575,800	2,168,000
Watsonville Railway & Navigation Co.	6.00	150,000	......
	342.84	$31,006,900	$47,272,200

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*Holding company has no bond issues; figure represents summary of funded debt of subsidiaries.

†Authorized amount; outstanding amount not known.

The record of electric railways sold at foreclosure during 1913 is as extensive as far as the number of companies is concerned as the list of 1912, and the mileage, outstanding stock and outstanding funded debt all show substantial increases over the previous year. It should be noted in this connection that the foreclosure sale of the Geneva & Auburn Railway, included in the 1912 table, did not actually take place until March, 1913, and, furthermore, that the 1912 sale of the Illinois and Wisconsin divisions of the Chicago & Milwaukee Electric Railroad was set aside by the court in 1913 on the ground of suppression of bids and has not yet been legally consummated. The adjustment of the 1912 totals to reflect these facts gives the amounts as shown in the accompanying comparative table for the last five years:

	No. of Companies	Miles of Track	Outstanding Stock	Outstanding Funded Debt
1909	21	488	$22,265,700	$21,174,000
1910	22	724.36	19,106,613	26,374,065
1911	25	660.72	91,354,800	115,092,750
1912	18	267.18	14,197,300	10,685,250
1913	18	311.28	15,743,700	19,526,000

As has been found to be the case in previous years, when a table of foreclosure sales has been compiled, some electric railways for which receivers were appointed in 1913 were able to carry out a reorganization plan through a foreclosure sale before the end of the year, as is shown by the accompanying list. The Lackawanna & Wyoming Valley Rapid Transit Company, too, is included among the foreclosed companies, although it is not an operating company. The sale of the South Shore Traction Company represents the sale of 9 miles of line between Babylon and Amityville and various other unconnected sections and construction material in Nassau and Suffolk Counties, Long Island; the sale of the property of this company in New York County was included in the 1912 table. Although the sale of the Chicago & Oak Park Elevated Railroad was ordered by the United States District Court of Chicago on July 17, 1913, the company is omitted, for no date of sale has been selected by the receiver.

In addition to the properties mentioned in the foregoing lists other companies have undergone various forms of reorganizations, readjustments and change of ownership, but they have been omitted because of a lack of formal receiverships and foreclosure sales.

ELECTRIC RAILWAY FORECLOSURE SALES IN 1913

	Mileage	Outstanding Stock	Outstanding Funded Debt
Bowling Green Ry.	7.50	$50,000	$20,000
Cassville & Western Ry.	5.00	100,000	......
Columbus, Marion & Bucyrus R. R.	17.18	500,000	510,000
Dedham & Franklin Street Ry.	9.50	75,000	100,000
Erie & Central Pennsylvania Ry.	....	1,000,000	40,000
Fayetteville Street Railway & Power Co.	4.00	......	......
Fort Dodge, Des Moines & Southern R. R.	106.00	3,200,000	6,600,000
Geneva & Auburn Ry.	17.85	450,000	400,000
Goldsboro Traction Co.	6.00	200,000	12,500
Highland Park & Lake Burien R. R.	9.00	......	......
Lackawanna & Wyoming Valley Rapid Transit Co.	....	6,500,000	7,683,000
Medfield & Medway Street Ry.	11.25	100,000	100,000
Mexico, Santa Fé & Perry Trac. Co.	27.00	850,000	1,600,000†
Nebraska Traction & Power Co.	20.00	248,700	214,000
Pittsburgh, McKeesport & Westmoreland Ry.	9.00	500,000	431,500
South Shore Traction Co.	9.00	600,000	435,000
Springfield, Clear Lake & Rochester Interurban Ry.	11.00	120,000	60,000
Toledo & Chicago Interurban Ry.	42.00	1,250,000	1,320,000
	311.28	$15,743,700	$19,526,000

†Authorized amount; outstanding amount not known.

ILLINOIS TRACTION SCHOOL FOR STEAM BOILER OPERATORS

The Illinois Traction System has made an arrangement whereby it will conduct a school of instruction in boiler-room operation at its Peoria (Ill.) generating station for its superintendents, stationary engineers and boiler-room foremen. This is probably the first school of the kind to be established in a street railway power plant. It is planned to equip one boiler in the Peoria plant with a full set of both indicating and recording instruments to show and record all draft and temperature changes which take place under different methods of firing, and both the coal and the water consumed by the boiler will be measured continuously, so that a test of considerable refinement may be conducted at a moment's notice. It is planned to have large-scale diagrams of the boiler on which the actual draft instruments will be shown. This will permit the draft changes throughout the entire boiler to be observed at a glance, and the effect of damper and fuel bed changes may be noted immediately. The following recording instruments will be installed: A recording Venturi meter; a coal weigher; a recording steam-flow meter; a recording gas analysis instrument; recording thermometers for the feed water, flue temperature and steam temperature; recording gages for the furnace and damper drafts, and a thermo-electric pyrometer for furnace temperatures.

The management believes that this course of instruction will indicate to engineers and firemen the value of different parts of the boiler, the most efficient methods of firing, the use of the various instruments necessary in detecting heat losses, the possibility of smokeless combustion, the effect of soot and scale accumulations, the results obtained from various sizes and kinds of coal, and the influence of various percentages of CO_2 in the flue gases. When a condition of high efficiency is obtained, the attendant methods of firing will be immediately duplicated in the operation of the rest of the plant as a practical demonstration of the possibilities in applying improved methods. The school will be established by Harrington & Peebles, advisory engineers on boiler-room economy.

ELECTRICAL EQUIPMENT FOR THE CHICAGO, MILWAUKEE & PUGET SOUND ELECTRIFICATION

As announced last week, the Chicago, Milwaukee & St. Paul Railway, after careful consideration, has decided to use the 2400-volt d.c. catenary system for the proposed electrification of its Rocky Mountain division between Three Forks and Deer Lodge, Mont., a distance of 113 miles, corresponding to approximately 168 miles of single track. This covers one freight division.

The trolley will be fed from five substations containing synchronous motor-generator sets, step-down transformers and necessary switching apparatus installed at the following sites: Morel, 17 miles east of Deer Lodge; Newcomb, 46 miles east of Deer Lodge; Grace, 63 miles east of Deer Lodge; Piedmont, 78 miles east of Deer Lodge, and one at Three Forks. The sites of these substations may be varied slightly if later investigation shows such changes desirable. These stations will receive energy from the 100,000-volt transmission line of the Great Falls (Mont.) Power Company, as mentioned in the preliminary description of the line which follows.

LOCOMOTIVES

No decision has been reached with regard to the type of either the passenger or the freight locomotives. It is probable that twelve locomotives will be needed for freight service. The freight locomotives will be required to haul a trailing load of 2500 tons up a 1 per cent grade at a speed of approximately 15 m.p.h. The passenger locomotives will be required to handle a trailing load of 800 tons on level track at approximately 50 m.p.h. and on a 2 per cent grade at approximately 24 m.p.h. The current will be taken by means of roller pantograph collectors. Heat for trains will be obtained by means of oil-burning steam boilers, for which ample room will be provided. All the locomotives, both freight and passenger, will have regenerative control. The air brakes will be used only for making stops and in emergencies.

SUBSTATIONS

Based upon the investigation of the locomotive performance on the ruling grades in the electrified zone, it has been decided to install in each substation supplying gradients of more than 1 per cent a capacity of three 1500-kw units, two being in operation and the third held in reserve. Although the starting of a train calls for practically 100 per cent overload upon the two units in operation, a 200 per cent overload for five minutes' guarantee will furnish ample capacity to start a train of maximum tonnage on a maximum grade.

For gradients up to 1 per cent energy will be furnished from a two-unit substation containing two 1500-kw motor-generator sets, each having a maximum load capacity of 4500 kw for a period of five minutes. It is the intention to use one 1500-kw unit in operation with the second as reserve, to be used in emergencies such as disablement of the operating unit or a congestion of trains requiring them to be operated in fleets.

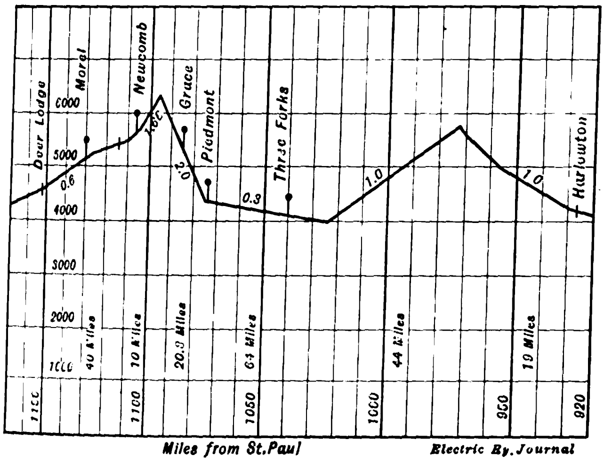
Basing the substation capacity and location on the foregoing limitations, it is proposed to install three three-unit and two two-unit substations on the 113-mile division between Deer Lodge and Three Forks, Mont. In each case the substation building will be designed to accommodate an additional unit which may be installed when future traffic conditions make it desirable.

All of the substation units are to be of the same size and will comprise a sixty-cycle synchronous motor direct-connected to two 750-kw, 1200-volt d.c. generators connected in series for 2400 volts. Each motor-generator set will be fed from three single-phase step-down transformers reducing from a transmission potential of 100,000 volts to 2300 volts at the synchronous-motor terminals. Each motor-generator set will be equipped with two exciters, one for the synchronous motor and the other for the fields of the generators, thus making the motor-generator set, step-down transformer and exciting generators, together with the controlling switchboard, a complete unit in itself.

It is proposed to erect the substation buildings of brick on concrete foundations with a concrete roof supported on steel girders which will provide a foundation for the overhead high-voltage busbars. Each building will be equipped with a crane of sufficient capacity to move the heaviest part of the substation apparatus. The transformers will be of the self-oil-cooled type, placed in a roofed transformer room with tracks, to facilitate installation and repairs. An accompanying table presents the equipment and capacity of each substation.

TROLLEY CONSTRUCTION

Energy will be supplied to the locomotives by means of roller pantographs from an overhead copper trolley wire at least 24 ft. above the rail. The trolley wire will be of No. 0000 copper and suspended from a steel catenary cable. This catenary construction will be supported by bracket arms extending from wooden poles, except on the sharper curves, where two poles and span wire construction will be employed. The single-pole bracket construction is to be followed wherever possible, because it affords less obstruction to view and is also less expensive than span construction. Where two or more tracks are to be spanned span construction with wooden poles will be employed. Where the number of tracks exceeds four steel construction will serve.



C., M. & P. S. Electrification—Profile of Line Between Limits of Ultimate Electrification

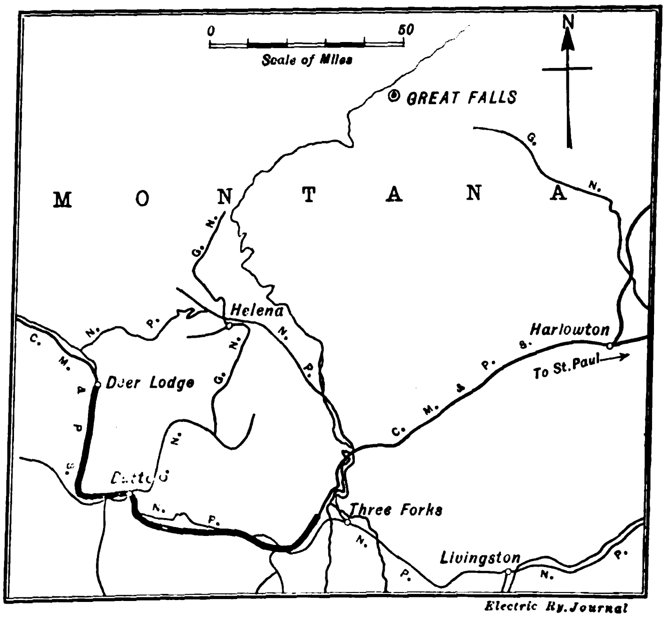
SUBSTATIONS AND THEIR EQUIPMENT

Location	Equipment, Kw	Total Capacity, Kw
Morel	Two 1500	3000
Newcomb	Three 1500	4500
Grace	Three 1500	4500
Piedmont	Three 1500	4500
Three Forks	Two 1500	3000

The overhead trolley will be supplemented by feeder copper in order to restrict the energy losses in the 2400-volt conducting circuit to a reasonable amount. However, only a portion of the complete feeder system will be installed until such time as the maximum tonnage of trains has been reached and the frequency of train service more definitely determined. For immediate installation the feeder copper will be as follows: Deer Lodge to Colorado Junction, 750,000 circ. mil; Colorado Junction to Piedmont, 1,000,000 circ. mil; Piedmont to Three Forks, 500,000 circ. mil. The details of track bonding have not yet been decided.

TRANSMISSION LINE

The Great Falls (Mont.) Power Company purposes to construct new transmission lines where necessary to deliver electricity to the Chicago, Milwaukee & St. Paul Railroad electrified zone. This power will be supplied in about the following capacities: Deer Lodge, 20,000 kw; Butte, 10,000 kw; Three Forks, 3000 kw. This arrangement necessitates building a new duplicate transmission line from Great Falls to Deer Lodge. As the proposed feeding-in points of the Great Falls Power Company do not coincide in all cases with the location of the substations, the railway will install a transmission line to tie in these feeding points to each of the several substation sites. This transmission line will follow the railway company's right-of-way, except at some points where it is possible to cut across the country and save distance.



C., M. & P. S. Electrification—Map Showing Electrified Section of Line

Owing to the great distance from the right-of-way of the railway company to the source of power at Great Falls, it was found necessary to adopt a transmission potential of 100,000 volts both for the Great Falls transmission lines and for the single-circuit transmission line on the railway company's right-of-way. This high potential permits a shift in loads to different parts of the system without excessive loss. The transmission line built along the railway company's right-of-way and connecting the several substations will include the 100,000-volt line suspended upon 45-ft. wooden poles by means of a six-unit suspension-type insulator.

It has been recently reported that an engineer in Rio de Janeiro has applied to the Municipal Council for a concession to construct an underground electric railway to connect the suburb of Cascadura with the center of the city. It is stated that there will be considerable difficulties to overcome owing to the marshy and sandy nature of the subsoil.

American Economic Association Meeting

During the First Two Days of This Convention, Which Was Held in Minneapolis on Dec. 27-30, the Discussion Centered on Valuations and Rate Making

Public utility relationships occupied a large share of the attention of those attending the twenty-sixth annual meeting of the American Economic Association, begun in Minneapolis Dec. 27. The first session was devoted entirely to the presentation and discussion of a paper on "Control of Public Service Corporations" by Prof. John H. Gray, of the University of Minnesota. President David Kinley, of the University of Illinois, was in the chair, and the attendance at the opening session was about 200.

PROFESSOR GRAY ATTACKS RATE MAKING BY VALUATION

In presenting a brief summary of a voluminous paper, Professor Gray advanced as his main thesis the pronouncement that public service commissions were on the wrong track in making valuation the basis of rate control. He said that public utility commissions were on trial; they would have to win success or the people would go to public ownership. There was no ground whatever for valuing public utilities. It should be remembered that these utilities were public enterprises in every sense of the word. The relation of the state or sovereign power to them was that of principal and agent. The speaker discussed some of the vagaries of valuations. The rule, "a fair return on the fair value of the property used for the convenience of the public," was the finding of the courts. In law the country was now committed to it, but the effort to put this rule into practice would lead to chaos.

Private owners were true pioneers. Like other pioneers, say like a man who owns a gold mine, they were unwilling to accept the fair return dictum of the courts; they still wanted speculative gains, and they were honest in their belief. The Supreme Court had not laid down any rule for arriving at fair value. Professor Gray ridiculed the cost-of-reproduction-new theory of making valuations. In the last analysis all value ascertained by this method rested on human judgment. The companies, with their combined wealth, hired men of large intellect as experts in rate cases. Such men received more credence, when they gave their opinion in evidence, than perhaps less able experts representing the side of the public. The speaker cited the Des Moines gas case, where the company was said to have paid $150,000 for expert evidence in a comparatively unimportant case. In the matter of the so-called intangible values the gates were opened for the wildest flights of fancy. Some of these intangibles were reviewed, such as interest during construction, charges for engineering and for general organization, promoters' expenses, contractors' profits, etc. Going value and good will likewise received the speaker's disapproval as elements to be taken into consideration in fixing rates.

The commissions had proved to be but as the fifth wheel to the wagon. The courts were still the controlling bodies. This would continue to be the case until the constitution was changed by a formal action or by interpretation. The theory of principal and agent was the only one upon which to arrive at a satisfactory relation between the public and the utilities. The sovereign state was the principal. After allowing a fair wage to the agency, it should have the benefit of all gains and also stand all the losses. There should be no valuation for rate regulation but history—that is, a statement of outlay of money spent and services rendered—nothing more.

In relation to franchise contracts, Professor Gray gave it as his opinion that the Supreme Court had already discovered that contract ordinances were inconsistent with the modern theories of regulation. He also thought that "the courts, state and federal, are moving very rapidly to a point where, without any formal reversals, they will find a way to abolish most of the existing franchises by a strained interpretation, which leads to the conclusion that the franchises were invalid from the beginning for lack of power on the part of the municipality."

Early losses should be repaid, but they should not be added to value, but rather repaid by higher rates through a reasonable term of years. They should not be capitalized for all time. Professor Gray also made the point that the commissions were reviewed by the courts and were not responsible in any proper sense. The courts in their turn were influenced by the findings of the commissioners. The speaker referred to "learned courts and tethered commissions." He cited the Fall River case where the Supreme Court of Massachusetts not only completely overruled the commission in that state in relation to the issuing of stock for extensions where a large surplus existed, but virtually abolished the powers of the commission by ruling that in such matters the commission was acting in a quasi-judicial capacity and must proceed on the same principles as the court would do.

DISCUSSION

E. W. Bemis, public utility expert, Chicago, urged that courses on rate regulation and the court decisions relating to them be established in universities. He believed that regulation was here to stay and was doing a great deal of good in many directions, such as uniform accounting, control of service, control of rates and the training of men in the study of public service problems. But regulation had serious dangers. Giving too much of the unearned increment to the companies was one. The state should not ignore the investor, but its chief solicitude should be to protect the consumer. If monopoly earnings were not too large there could be no watered stock. There was great danger, also, in the attitude of commissions toward municipal ownership. The city should have the right to make or lose as it pleased, considering the question of municipal utilities. Mr. Bemis thought that in relation to regulatory commissions the country was at a stage where it should pause and study.

Prof. J. E. Brindley, Iowa State College, did not agree with Professor Gray in the latter's declaration that rate making based on valuation was a fallacy. It was impracticable to fix rates on the basis of a statement of outlay. Some of the statements in Professor Gray's paper were criticised as extreme. Regulating boards should regulate and control and should not destroy private initiative—"if we are to have private initiative," added Professor Brindley. Professor Gray's principal-and-agent plan, if put into execution, would probably result in poor service, receiverships and state ownerships.

Prof. James E. Boyle, University of North Dakota, said that Professor Gray had presented his criticisms in a striking manner. It was to be regretted that the author did not give more attention to suggesting remedies. At the present time public ownership of utilities would be a dangerous undertaking. The speaker expressed his belief that private initiative was not due wholly to hope of speculative gains, and he cited the examples of art, literature and science. The Cook plan of one single private company owning all the railroads of the country, controlled by the government, and with its earnings guaranteed by the government, looked feasible, but was, perhaps, too radical for the present day. There seemed to be an inevitable drift toward public ownership.

James E. Allison, consulting engineer, St. Louis, and formerly a member of the St. Louis Public Service Commission, thought Professor Gray too pessimistic. He said that the author of the paper set up men of straw to demolish. There was a contractual relation between principal and agent. What that contract was, in the case of public utility regulations, was the crux of the question. To fix rates there must be a valuation or something to take its place. Original-cost and reproduction-cost valuations would often work out to about the same results. Mr. Allison said that Professor Gray was unduly alarmed about interest during construction. This was a real construction charge. The fair rate of return was that return at which capital could be induced to go into the enterprise. To attempt to set up a lower rate was to run counter to an economic law.

Prof. William F. Gephart, Washington University, asked if it was indeed true that the time of risk and speculative profits had passed in public utility enterprises. Utilities that involve risks were planned to-day in large cities and in small ones. Commissions do valuable work in improving the character of service as well as in regulating rates. There was a widespread belief that a large portion of public utilities were over-capitalized and charge rates that were too high. This might lead to public ownership, but there would still be difficulties to encounter, for many men believed that governments exist to grant gratuities of some kind. Professor Gephart remarked that there was not much of a constructive character to show as the result of a decade of work by public utility commissions.

Howard C. Hopson, of the staff of the New York Public Service Commission for the Second District, Albany, N. Y., said that commissions were going back in making valuations to the plan based on investment, gradually abandoning the cost-of-reproduction theory. There could be no mathematical formula to be used in working out a correct public utility rate. The personnel of the commission was very important. This speaker also pointed out that even where the principle of monopoly in public utility service was conceded, there was still to be considered the element of competition between utilities for capital. In a few years the country would be face to face with the problem of securing the maximum amount of service from utilities without bringing about an increase of rates.

Prof. R. E. Heilman, University of Iowa, discussed the subject of the authorization of securities by commissions, intimating that in years to come the commissions might have to grant higher rates to take care of all the securities which they had themselves sanctioned.

Roger W. Babson, financial writer, Wellesley Hills, Mass., remarked tersely that theory will have little to do with the settlement of the public utility question. This question will be settled when it is determined who has the larger number of votes—the men who use the utilities or the men who hold investments in them.

Several local speakers advocated public ownership vigorously. One said that the system of regulating public utilities by state commissions was fundamentally wrong. Another announced that he did not believe that a law creating a public service commission would be passed in the State of Minnesota. The Governor has become convinced that it would be unwise to call a special session of the Legislature for this purpose. This gentleman referred to the Chicago traction settlement ordinances of 1907 as "infamous" and said that they meant disguised taxation. Another local speaker said that organized labor had something to say on the question, and that the matters in dispute could not be settled on the scientific basis of political economy.

In a brief closing speech, Professor Gray declared that commissions had practically arrived at a point where the companies were guaranteed against losses. As to private initiative, he wanted to know if there could be in fact any system of control that would be effective without destroying the opportunity for private gains.

DR. MEYER AND OTHERS DISCUSS RAILROAD RATE MAKING

Prof. W. A. Scott, of the University of Wisconsin, presided at the third session of the annual meeting of the American Economic Association, which was held in the main auditorium of the New College of Engineering of the University of Minnesota, Minneapolis, on Dec. 29. The main feature was a paper on "Certain Considerations in Railway Rate Making," by Dr. B. H. Meyer, of Washington, D. C., member of the Interstate Commerce Commission. The subject was considered under three main divisions—value of the property, cost of service and the considerations of sound public policy involved. Each of these must be interpreted in the light of the others. The speaker intimated that even if public ownership was brought about, the question of rates would still arise. He remarked that the competitive theory of railroad rate making had been practically abandoned. In making a valuation the securities issued should not be recognized as the equivalent of property for rate-making purposes. Cost accounting by railroads was advocated. In attempting to fix railroad rates it was more important that justice be promoted in a large way than that a standard be sought which might be used as a yardstick in all cases.

DISCUSSION

Prof. Josef Schumpeter, University of Graz, Austria (exchange professor at Columbia University), declared that the actions of politicians, commissions and judges were apt to be considered rather primitive from the viewpoint of political science. He said that the phrase "what the traffic will bear" did not always indicate such a bad condition as was sometimes thought; many systems of monopolistic prices were not injurious. Railroad monopoly was quite different from all other monopolies; it could not be taxed without injuring development. Perhaps the theories underlying rate making were understood by economists, but the working out of details in practice was drudgery, and most theoretical economists were unwilling to undertake it. The speaker did not see the relevance of valuation of property in fixing railroad rates. It should be remembered, however, that what economists contributed was only one of many factors to be considered in the problem. Society should be rather careful not to drive the entrepreneur out of human progress. In Europe the establishment of railroad rates by the State had caused dissatisfaction and also losses to the public purse. The United Sates had the most splendid system of railroads the world had ever seen.

Prof. A. A. Young, Cornell University, agreed with Dr. Meyer in relation to the latter's three fundamentals. He thought it rather humiliating that what progress had been made had been due to commissions and courts rather than to economists. He discussed the equitable ascertainment of railroad rate unit costs. "What we want," he said, "is that system of rates that will insure the most advantageous distribution." Under existing circumstances, rates based on cost of service were hardly a debatable proposition. A long-time view of the case should be taken. In that view fixed charges then became variable charges; they increased largely on account of the growth of traffic. Charging "what the traffic will bear" was sometimes allowable, as where a railroad had made long extensions in a sparsely settled country to develop it. Rate systems tended to equalize rates of distribution from different communities. This necessitated delicate adjustments, and Professor Young thought that railroad rates were more difficult to adjust than tariff schedules. Even on other than economic grounds the cost of service principle must be given great weight, as it satisfied the demand for justice, which had to be reckoned with. It was the fundamental system of railroad rate making, but individual deviations might be allowed if justified.

Prof. E. R. Dewsnup, University of Illinois, argued that if railroad competition was really complete, normal prices would be determined by normal cost of service. Theoretically, competition was capable of producing better results than the best regulation. But practical conditions intervened, because real free competition could not be made to exist. During a period of development should the railroad not be allowed to pay its way by a discriminating tariff? Few railroads anywhere were pure monopolies. The speaker devoted part of his time to a discussion of the application of "joint costs" to railroad transportation.

Prof. F. H. Dixon, Dartmouth College, agreed in general with the reasoning of Dr. Meyer's paper. He discussed the extension of the cost principle in rate making. Railroads had themselves employed the cost methods in presenting their figures and asking for increase of rates. A more complete and accurate knowledge of costs would benefit both the railroads and the public. Cost accounting was not exactly the same in railroading and in industry. The railroad manager had a much more complex problem than the industrial manager in determining the relation of cost and price. The speaker advised caution in enforcing the demand on railroads for this new accounting. "Let us not," he said, "spend $5 to save 30 cents."

Prof. A. J. Boynton, University of Kansas, considered the general aspect of the question, and remarked on the number of conflicting theories. "Is there," he asked, "any real theory of rates justifying the name?" What was needed was an amalgamation of theories with such additions and modifications as might be found necessary. But theories now existing were not sufficiently refined for that purpose. Professor Boynton looked forward to the refining, but not over-refining, of theories, and to the fusing of them into a composite system. However, theories were not of much use unless based on statistical studies. Then, too, the adequate financial needs of the railroad corporations in the future should not be overlooked.

Prof. Lewis H. Haney, University of Texas, made a valuable contribution to the discussion. He said that he was convinced that only perfected accounts and more interpretative statistical data were needed to make "joint costs" logically and rationally assignable. Discussing valuation, Professor Haney said that the cost of the property, whether "original" or "reduplication," should be learned, so that the interest charges might be correctly determined and distributed. After a theoretical consideration of this branch of the subject he said that he believed that much remained to be done in applying marginal analysis to the determination of railroad values. Taking up another branch of the subject, the speaker said that he believed that no conflict existed between a cost basis and the so-called "principle of public policy." To ignore costs meant much more than throwing rate making into politics; it meant economic waste on a gigantic scale. It was specious to urge that coal, sand and other low-grade commodities could not be moved at cost rates. By what right was their low price assumed? Was it expedient that the railroads, backed by government, should take it upon themselves to supply goods at less than cost? In the long run the only way to prevent waste of energy and natural resources was to let competitive prices determine. As a practical matter, particular exceptions had to be made, but these cases should frankly be put on the ground of charity, just as poorhouses were provided for those who cannot pay for their own subsistence. Rates should be fixed, if possible, as they would be fixed under normally competitive conditions. Until recently few men realized the extent of the railroad's public character or the significance of the doctrine of "joint costs." Now that the ground had been cleared and the true economic nature of the common carrier established, the time was ripe for a co-ordination and a synthesis of the fragmentary partial theories now receiving attention. Competition could not obtain in the railroad field, but that did not mean that the forces of demand and supply were not operative there. Why, then, not set out to solve the problem of constructing a rate yardstick by the demand and supply route? Taking for granted railroad monopoly, why not seek to approximate the effect of competition on rates by constructing schedules of shippers' demand prices and carriers' supply prices? Difficulties will arise, and a rule must be sought to determine the portion of joint expense that each class of traffic would bear under competition. This was the heart of the problem. The speaker then discussed normal demand and supply curves and also described what he called the "distance utility" of the service. This "distance utility" should be combined with the "specific value" of the commodity to get the total utility of the service and determine the final or specific demand curve. The interesting basis of rate making proposed by Prof. Haney proceeded from a recognition of joint expenses and was intended to take into consideration elements of truth in various theories. While costs were estimated as a supply-limiting force, demand forces were also taken in consideration. It was intended to be one composite principle that could be applied in all normal cases, the uniformity lying in the rule, the variety in its applications. It was based on the fact that demand and supply were the ultimate forces, however, joint and composite they might be. It gave the result that these forces would bring about under fair competition if railways could compete.

DR. BROOKS DISCUSSES SYNDICALISM

At the morning session of Dec. 30 Dr. John Graham Brooks, of Cambridge, Mass., gave a summary of his paper on "Syndicalism." He said that this movement is a part of the great reaction all over the world against capitalism, the imperfections of the parliamentary system and the law's delays. Another feature of the plan contemplates an ideal state of labor co-partnership without the complicated organization of force based on law. Syndicalism may be justified as a sort of stinging whip from without to awaken society to the need for better things. The syndicalists believe that labor will eventually control capital. The general idea of Dr. Brooks' remarks was that, while syndicalism does not deserve serious consideration at present, economists should give serious attention to the movement to see if it does not contain some measure of truth. At the afternoon session of the same day Prof. Willard E. Hotchkiss, of the Northwestern University, Chicago, read a paper on "Recent Trust Decisions and Business." An abstract of the discussion on these two papers will appear next week.

Methods of Mitigating Electrolysis from Street Railway Currents

The Authors, Who Are Respectively Chief Physicist and Associate Physicist United States Bureau of Standards, Washington, D. C., Discuss the Most Important Methods of Electrolysis Mitigation and Present Definite Conclusions Regarding Their Relative Merits

BY E. B. ROSA AND BURTON M'CULLOM

In the effort to reduce or eliminate damage to pipe systems and other subsurface structures due to stray earth currents from street railways, a great many methods have been tried or proposed. Some have been widely used with more or less benefit in many instances and apparent failure in others. In the case of most of these little systematic effort has been made to develop them to meet most advantageously the requirements of practical service. In this paper is given a brief discussion of the most important methods of electrolysis mitigation that have been proposed, together with conclusions as to their relative merits.

SURFACE INSULATION OF PIPES

Painting or otherwise insulating the surface of pipes, as by the use of treated papers and textiles, was early resorted to as a possible means of protecting pipes from electrolysis, and this method is still used in some instances. It is doubtful, however, whether there exists any instance in which it has been definitely proved that insulating paints have effectively protected pipes from electrolysis for any considerable period of time, while there are many instances where they have failed and where their presence has actually done harm. Practically all paints are classed as insulators, but in practice a given paint may endure for a long period in some places, while in other places in the same city it may deteriorate rapidly and become worthless in a comparatively short time. This is due partly, no doubt, to differences in soil conditions, but the general failure of these paints under conditions where electrolysis was to be expected indicates that the stray currents themselves have much to do with the destruction of the coatings. We have carried out a considerable number of experiments with a view of throwing further light on this point and also to determine if possible something of the relative value of different coatings as a possible protection against electrolysis. In all, about forty different kinds of commercial paints have been tested, and of these not a single one has withstood the action of the very moderate test voltage of 4 volts for any considerable length of time, failure of the coating with consequent pitting of the pipe occurring within a few months in all cases.

The explanation of the failure of the coating lies in the fact that none of the paints tested is absolutely impervious to moisture, and when brought into the presence of water a slight trace of moisture ultimately permeates the coating. When this occurs at any point the coating becomes slightly conducting, and if any electromotive force is applied, a trace of current flows at first, giving rise to slight electrolysis which is accompanied by the formation of more or less gas beneath the coating. As this gas accumulates and expands the coating is finally ruptured, after which the current flow is greatly increased at the point of break-down and rapid electrolysis of the exposed iron follows. In some cases, if the coating is sufficiently porous to permit the gases to escape, it may remain intact and electrolysis may continue beneath the coating, eating through the metal without any superficial evidence of failure of the paint. This phenomenon is frequently observed in practice. The vital weakness of all the paints thus far tested is due to the fact that they are not entirely non-absorbent. If a paint could be secured which is absolutely impervious to soil moisture and which would remain so for an indefinite period, it would prove an effective preventive of electrolysis, and all efforts to produce such a protective paint should be directed to this one point of making it absolutely and permanently moisture-proof.

The manner in which these paints usually fail under electric stress shows that they may under certain circumstances increase the trouble from electrolysis. Breaking down as they do at isolated points, the discharge of current from the pipes is concentrated at those points and the pitting is likely to be more serious than if the paint were not used at all. In all areas, therefore, where the pipes are strongly positive to the earth these paints are likely to do more harm than good, and it would be better to omit them altogether. But in places where the pipes are practically neutral, or negative to earth, they can do no harm even if they do fail in spots, and in such places they may be of value in reducing current flow in pipes and in preventing soil corrosion.

The method of coating pipes with treated textiles or tarred paper is open to somewhat the same objections that have been made to the use of insulating paints, the only difference being that the time required for their initial failure is usually greater than in the case of paint. The principal reason for this is the greater thickness of the coating that usually results from this method of insulation. We have tested a considerable number of such coatings with uniformly disappointing results, failure always occurring within a few months whenever a low potential difference is impressed on the coating. Where no electromotive force is impressed on the pipes provided with such a coating it appears often to remain in good condition for several years, and for this reason it appears to be at least of temporary value as a preventive of self-corrosion. Its use is probably justified in neutral or negative areas, but in all positive areas it would tend to aggravate rather than reduce the rate of deterioration of the pipes. Its use is not, therefore, to be recommended except in neutral or negative areas, where it would undoubtedly be beneficial, the only question being whether or not it is worth the cost. As a means of preventing or even reducing electrolytic damage in positive areas this method of surface insulation does not appear to be practicable at the present time.

INSULATING JOINTS IN PIPES

Another method of reducing current flow in pipes, and one which has found rather extensive application within the last few years, is that of breaking up the continuity of the pipe lines by the use of insulating or resistance joints. In ordinary wrought-iron or steel mains with screwed or riveted joints the resistance of the joints is usually small in comparison with that of the pipes, and when such pipes are laid in localities where there is an appreciable potential gradient in the direction of the pipe, currents of considerable magnitude will usually be carried by the pipes. In the case of cast-iron mains the resistance of the joint is often as great as, or greater than, that of the section of pipes, and it is not uncommon to find a lead joint having a resistance equal to that of several hundred feet or more of pipe. It is due largely to this high joint resistance and to some extent also to the higher specific resistance of cast iron that cast-iron mains usually carry less current under similar conditions than wrought-iron or steel mains. Experience has shown, however, that the resistance of lead joints is not sufficient to reduce the current to a safe value, and attempts have been made still further to increase the resistance of the pipes by the introduction of specially designed joints of high resistance.

We cannot here go into detail in regard to the merits of this method or the proper procedure in applying it. These have been treated in the technological papers referred to at the end of this paper. It is sufficient to state here some of the conclusions at which we have arrived as a result of our investigation of this method. If properly installed, with joints of proper construction and used with sufficient frequency, it can be made very effective in minimizing electrolysis troubles. The higher the potential gradients in different parts of the system the more frequently the insulating joints must be used. In most cases it would not be necessary to make every joint insulating, one-third or one-fourth of the joints being usually sufficient even under severe voltage conditions while in many parts of the system a much smaller percentage would suffice. Where new lines are being laid it is a comparatively simple matter to insert the necessary number of such joints, but in the case of old systems the expense becomes great unless the potential gradients in the earth are first reduced by other means, so that a comparatively small number of insulating joints will suffice. Chiefly for this reason, we do not in general recommend this method as the principal means of protecting pipe systems already laid with the lead joints. When, however, proper precautions are taken, such as those described in detail in a later part of this paper, to reduce potential gradients to a comparatively low value, this method of insulating joints may well be applied for the purpose of eliminating such residual electrolysis as might otherwise remain if the system were not so protected. With potential gradients reduced to as low a point as practicable under a properly designed negative return, a comparatively small number of insulating joints not exceeding 5 or 10 per cent of the total number would be sufficient to give practically complete protection to the pipes. We wish to emphasize, however, that we regard this method as valuable chiefly as an auxiliary method which may be used in connection with and supplementary to a negative return system of proper design.

PIPE DRAINAGE SYSTEMS

A system of electrolysis mitigation which has received wider application in this country than any other method is that which is best characterized as the "pipe drainage system." This method has taken a variety of forms, among the principal ones being direct taps between pipes and rails. In this form no extensive negative feeder system is used, but at various points throughout the positive areas where the pipes are close to the tracks short heavy cables are connected between the pipes and rails with the view of keeping the pipes at nearly the same potential as the tracks. It is true that by the use of a sufficient number of such taps it would be possible to prevent any considerable difference of potential between pipes and tracks, but this does not insure relief from electrolysis. In order that such equality of potential may exist it is necessary that the potential gradients along the pipes throughout the region affected shall be the same as in the rails, and under the conditions which commonly prevail in the positive areas this potential gradient is quite high, often reaching 5 volts to 10 volts per 1000 ft. and even higher. Such gradients are sufficient to produce heavy current flow in the pipes, and in case occasional high-resistance joints are encountered the heavy fall of potential across the joint will generally cause large leakage of current from the pipes resulting in rapid injury to the pipes. In case of local defects developing in the track bonding, practically all of the railway current may be forced to return by way of the pipes or cable sheaths, and the danger of excessive leakage from the pipes and overheating of cable sheaths is largely increased and may sometimes reach very serious proportions.

Another form of pipe drainage consists in running negative feeders direct from the negative bus to various points of the pipe system. This form of pipe drainage has three practical embodiments. In one of these uninsulated negative feeders are run from the busbar and tied to the pipes, some directly at the power house and others at more remote points. In this case the longer feeders have to have a very large cross-section, or else the resistance will be so large that they will draw very little current from the pipes and their purpose will be thus defeated. In some cases it has been proposed to run these long feeders parallel to the pipes and tap them to the pipes at frequent intervals. It will be quite evident that this arrangement is open to the same objection as the plan of using uninsulated negative feeders to rails, in that it leads to large expense for copper, particularly in case it becomes necessary to carry the feeders to points far from the power house. In order to overcome this difficulty in some installations, boosters have been connected to the longer feeders, in which case they can be made much smaller and by proper excitation of the booster any desired amount of current can be taken from the pipes of each feeder. There seems to be no reason why the same results cannot be obtained by omitting the boosters and inserting resistance in the power house taps to pipes and in the short feeders, since in this way any desired distribution of current in the feeders can be obtained without the complication and operating cost of the boosters. The advantages of this latter plan would be very great in the case of a large system, since with the booster system a separate booster would be required for each feeder. The use of resistance taps can, as a rule, be made both economical and effective when used in connection with a somewhat similar system applied to rails, as described later.

We cannot here go into detail in regard to the advantages and disadvantages of the pipe drainage system, but will mention a few of the more important considerations respecting it.

First, it has been objected that it is not a permanent system, requiring constant watching and changing when the distribution of the street railway load or of the pipe systems undergoes any marked change. This objection is no doubt an important one where the uninsulated system of pipe feeders is used, but it would not be of serious moment in the case of the insulated feeders with resistance taps, since by the insertion of proper resistances in the various feeders they could be adapted to widely varying conditions as regards load distribution.

A second objection, already referred to, is the fact that any form of pipe drainage will necessarily increase to a greater or less degree the amount of current carried by the pipes, which is accompanied by the ever-present danger of trouble developing in the vicinity of high-resistance joints at obscure and unlooked-for places. This objection is much more serious in the case of direct taps between pipes and rails and uninsulated pipe feeders than when boosters or resistance taps are used, since in the latter cases a proper distribution of current can be maintained that will greatly reduce this danger, although we do not believe that it is in general practicable to eliminate it to a satisfactory degree, unless at the same time measures are taken to reduce potential gradients in the earth to a relatively low value.

A third objection is that the connection of the pipe system to the busbars or rails lowers the potential of the pipes and tends to make them negative to other pipe and lead cable systems, thereby endangering the latter. The advocates of this system attempt to avoid this objection by recommending that all pipe and cable systems be included in the installation. This is sometimes practicable and sometimes not, depending on local conditions; but in any case it would greatly extend the area in which acute troubles might be expected and the expense of watching and guarding against trouble would be largely increased.

A fourth objection, resulting from the great tendency of this system to increase the current flow in the pipes, is the increased life and fire hazard which it introduces, particularly in connection with gas systems. The failure to bond the pipes properly before making any disconnections, or the accidental opening of the bond while the pipe line is broken, is likely to ignite escaping gas with more or less disastrous results to both life and property. Although serious accidents of this kind are comparatively infrequent, they are nevertheless worthy of consideration. Further, the possibility of such accidents increases the labor and cost of making repairs on account of the precautions that have to be taken.

A fifth objection, and an important one, is that the application of this system requires that all pipe systems to which it is applied shall be electrically continuous throughout. In addition to the possibility of high-resistance lead joints already pointed out, we are confronted with the fact that in a great many installations, cement joints, rubber gasket joints and other insulating joints are now largely used. Where used, these will usually be found distributed to a greater or less extent throughout the system, and if the drainage plan were applied to a pipe system containing any considerable number of these insulating joints it would result in the certain destruction of the pipes near many of them within a comparatively short time. As a rule the points at which isolated insulating joints occur or those in which the insulating jointed sections connect to the lines having lead joints would be the ones that would be in greatest danger. For this reason the application of a general plan of pipe drainage as the chief means of electrolysis mitigation would be particularly unfortunate in case any one of the pipe systems contained any considerable number of insulating joints.

A sixth objection to the general application of the pipe drainage system as a means of electrolysis mitigation arises from the tendency toward the production of an excessive amount of alkali at the surface of a negative electrode embedded in earth. This will occur to a much greater extent in some soils than in others, depending on the chemical content of the soils. The concentration of alkali at the negative terminal will have no detrimental effect in the case of iron pipe but may tend considerably to increase the self-corrosion in the case of lead service pipe. If the soil is of such a nature as to present favorable conditions for the production of alkali at the negative terminal, considerable increase in the corrosion of lead services may be expected from this source provided the pipes are maintained too strongly negative throughout a large part of the day. Further, the application of the pipe drainage system makes the pipes more strongly negative throughout the entire system, and it is undesirable to create this condition unless it is known that local soil conditions are such as not to give rise to any serious increase in alkalinity under the voltage conditions that would exist.

What appears to us, however, as being the greatest objection to the pipe drainage system, and this applies also to all the other methods applied directly to the pipes, is the fact that they are designed to relieve the symptoms rather than to remove the cause of the trouble. They are, therefore, fundamentally in the nature of a palliative, rather than a remedy. In general, our study of the pipe-drainage method has convinced us that while it may under certain conditions be useful as a secondary means of lessening trouble, its installation as the principal means of electrolysis mitigation is an unwise procedure, not so much because the immediate consequences are bad, since the contrary is quite the rule, but because of the ultimate consequences to which this method, when once resorted to, must inevitably lead.

In its practical working out it exhibits two opposing tendencies, namely, (1) the reduction of the difference of potential between pipes and rails in the positive areas, with consequent reduction of damage at those points, and (2) an increase of the danger to the pipes throughout the entire system, as indicated above.

As a rule, in the early stages of its application the effect is apt to be apparently beneficial, reducing the danger in positive areas more than it increases it elsewhere. As the system grows and the load increases, more and heavier bonds or cables become necessary, and the current in the pipes may become so great that the consequent damage due to the causes above mentioned will be of greater moment than the reduction of troubles in the positive areas, and any further extension of the drainage becomes a menace to the system. It is due largely to the slow and obscure manner in which trouble develops that this method has come to be so widely used. Since it transfers the trouble from where it has been most evident to a new locality, where perhaps it may require several years to manifest itself anew, there is sure to be a lull in the storm which creates a favorable impression very difficult to dispel even when trouble later recurs. Recently it has been proposed to limit these secondary effects by placing a limit on the amount of current taken from the pipes by the drainage cables, the plan being that when this total drainage current reaches, say, 10 per cent or thereabouts of the total railway load, the track conductivity is to be increased by copper cables in order to keep the drainage current below the prescribed limit. In some systems which we have investigated in which the unlimited pipe drainage system has been applied it has been found that in order to reduce the potential conditions to the desired limits it was necessary to draw from the pipes from 40 to 50 per cent or more of the total railway load. It is evident that if we attempt by means of ordinary uninsulated negative copper cables in parallel with the track to decrease the total leakage to 10 per cent, the cost of the copper required will be so great as to render the plan wholly impracticable. We confidently believe that a system worked out on these lines will ultimately lead to much greater expense and less satisfactory protection than will result from other installations designed along the lines outlined in a later section of this report.

CHEMICAL PROTECTION

Among other methods proposed for protecting pipes from electrolysis may be mentioned chemical protection, which contemplates surrounding the pipes with certain chemicals, such as lime, etc., which are known to have a tendency to inhibit corrosion under certain circumstances; the use of cement coatings on the pipes; cathodic protection, or protection of pipes by maintaining them negative to certain structures by means of battery, motor generator, etc.; favorable location of pipes with respect to rails; the use of non-corrodable conducting coatings, and what may be termed electric screens, which are sheets of metal placed near to or surrounding a portion of the pipe and electrically connected thereto. While certain of these may have a temporary value for reducing electrolysis troubles under very special conditions, our investigations have convinced us that none of these methods can be seriously considered in connection with the permanent mitigation of electrolysis under average conditions of practice.

METHODS APPLIED TO THE RAILWAY RETURN SYSTEM

None of the systems of electrolysis protection mentioned above has to do with the nature or condition of the street railway return system, and in the practical working out of such methods the railway return system is usually ignored. It would appear more logical to attack the problem by beginning at the source of the evil and to prevent, to a large extent at least, the leakage of the currents from the railway return conductors into the earth.

Of the various methods that have been proposed for application to the negative return of the railway system, the majority are either inadequate or impracticable under ordinary conditions when considered solely as means for reducing electrolysis troubles. Among these may be mentioned alternating-current traction, grounding of tracks and busbars, periodic reversal of trolley polarity and the use of the double-trolley system. There is no question, of course, that the double-trolley system, if properly installed, would entirely eliminate electrolysis from railway currents. This system as at present used in Cincinnati, Ohio, and Havana, Cuba, and the corresponding underground conduit system as used in Washington and in New York City eliminate almost completely the danger of electrolysis, the small leakage which does occur being of no practical consequence. The chief objections to their use are the cost of installation and the increased operating difficulties which are involved. The cost of installation in fact does not appear to be justified merely as a means of electrolysis protection, inasmuch as a very satisfactory degree of protection can be obtained by other and much more economical means.

PROPER CONSTRUCTION AND MAINTENANCE OF TRACK

Proper maintenance of the track in order to secure high conductance is everywhere recognized as a necessary condition in electric railway operation, but it does not always receive the attention that its importance justifies. Experience to date indicates that welded or other types of electrically continuous joints are very satisfactory in all cases where the tracks are laid in paved streets or otherwise suitably reinforced. As a precautionary measure, however, some engineers prefer to bond also over all joints. Cross bonding between the rails is also much resorted to as a precaution against the troubles arising from bad joints. These cross bonds are usually placed at intervals of from 200 ft. to 500 ft. and those distances are sufficient if the cross bonds and rail joints are fairly well maintained. All special work should be shunted by copper cables capable of carrying all of the current passing over the tracks at that point. A properly drained roadbed is also a very effective aid in reducing the leakage of stray currents from the rails, since the conductance of the leakage path is mainly dependent on the amount of moisture which is contained in the material forming the roadbed and the earth beneath. Indeed, we have made tests on long lines of track without intersections to cause complications, in which it was found that leakage from the rails to earth was almost entirely eliminated because of the high resistance of the leakage path.

UNINSULATED NEGATIVE FEEDER SYSTEM

The uninsulated negative feeder system has been much used in this country as a means of increasing the conductance of the track, especially in the regions near the power houses, where, as a rule, the current densities become high. The benefits that accrue from its use are threefold, namely: (1) the reduction in potential drop in the rails, thereby lessening damage due to electrolysis; (2) the saving in power; (3) the maintenance of a more uniform voltage on the cars, especially at times of peak load, thus giving rise to improved car service and better car lighting and reducing the maximum demand.

When these benefits are carefully considered it seems somewhat surprising that the use of negative feeders is not more common than it is. While we do not regard this as being in general an economical system, it is proper to consider here its merits as compared with systems in which no feeders are used. In the matter of the second item—the saving in power—it is easy to show that in this feature alone much can be gained by the addition of negative copper provided the drop of potential in the track is fairly high. With feeders costing $4,000 per mile installed for cables of 1,000,000 circ. mil section, the most economical potential gradient to allow in the rails is about 3 volts effective per 1000 ft. (root mean square for twenty-four-hour period) with energy costing 1 cent per kw-hr. Wherever the potential gradient exceeds that figure the addition of copper in parallel with the rails produces an annual saving more than sufficient to pay all proper charges, including interest, taxes and depreciation on the copper required to reduce the mean effective potential gradient to 3 volts. With energy costing 2 cents per kw-hr. the most economical gradient limit is a little over 2 volts per 1000 ft. When these values are exceeded in any locality, that section of the track is not only being operated at an unnecessary loss but conditions as regards electrolysis are unnecessarily bad, much worse in fact than they would be under the more economical installation. If we attempt to carry the voltage limit below this value, the cost of the necessary copper increases very rapidly and soon becomes prohibitive. On the other hand, it is generally recognized that a mean effective potential gradient of 3 volts per 1000 ft. is much too high to permit a reasonable degree of immunity from electrolysis, since under ordinary conditions of load factor this would correspond to a peak value of about 6 volts per 1000 ft., so that some other method must be employed if a fair degree of economy is to be maintained. Such economy is afforded in varying degree by the insulated negative feeder systems which we shall now consider.

INSULATED NEGATIVE FEEDER SYSTEM

In the insulated negative feeder system, instead of tying the track rails directly to the negative bus and depending on the rails and such copper as may be in parallel therewith to return the current to the power house, the connection at the power house is either removed or given a suitable resistance, and insulated feeders are run from the negative bus to various points of the track, as shown in Fig. 1. By this means two important results may be achieved. In the first place, the current being drawn from the rails at numerous points, high-current densities, and consequently high-potential gradients in the rail, are avoided. In the second place, it is possible, by so designing the system that the drop of potential on all of the feeders is the same, so to subdivide the current flow in the tracks that the direction of the flow will be frequently reversed, thus preventing the accumulation of large potential differences between points on the tracks some distance apart. It will be evident that in this case the actual drop of potential on the different feeders is of secondary importance so long as it is practically the same in all, in so far as the potential difference in the track are concerned. We can thus impose any desired potential restrictions on the track and still be free to design the feeders to give maximum economy, something we cannot do when the feeders are connected in parallel with the tracks, as is most commonly the case in practice.

A graphic representation of what can be accomplished by using a system of insulating feeders of this sort is shown in Figs. 1, 2 and 3. Fig. 1 shows the arrangement of a negative return in which no negative feeders or simply uninsulated cables are used and the rails are tied directly to the negative bus at the power house, a uniform distribution of load being assumed. The curve at the top shows how the potential of the rails vary from point to point.

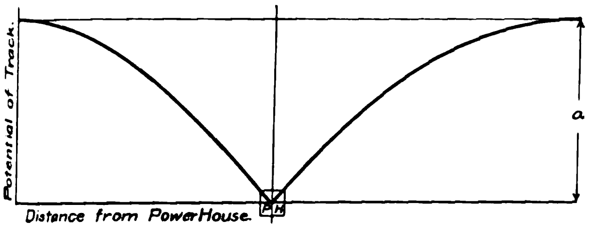


Fig. 1—Electrolysis—Potential Drop in Rail with Uninsulated Feeders

The curves of Fig. 2 show the result in the same system with insulated negative feeders run to a number of points on the track and so arranged that the drop of potential is the same on all during an average condition of load. It is seen that the current flow in the tracks is here so subdivided that the total differences become very small, and consequently the tendency to set up large differences of potential between rails and surrounding structures is practically eliminated.

An examination of the two curves shows that the maximum potential difference in the rails has been reduced to one-sixteenth of its former value by the installation of only two negative feeders on each side of the station. It is evident, however, that these great reductions in potential differences in the tracks are obtained at a sacrifice of the track conductance of which very little use is made in the latter case.

Between these two extremes any desired compromise can be obtained; that is, if instead of making the drop on all of the feeders the same we make the drop on the feeders smaller as we approach the power house, we shall have a continual gradient in the rails all the way to the station, thus utilizing the conductance of the tracks to any desired extent. This will result in a more economical installation but at the expense of somewhat greater potential differences in the track return system, as shown in Fig. 3. These insulated-feeder systems embrace a number of modifications, chief among which are the following scheme:

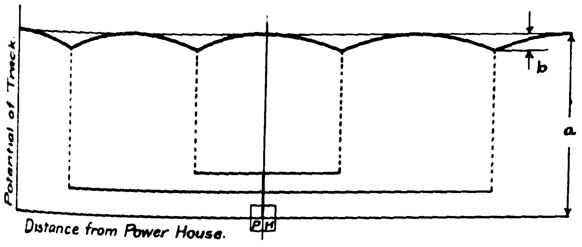


Fig. 2—Electrolysis—Result from Use of Several Insulated Feeders Having Equal Potential Drop

BOOSTERS IN SEPARATE FEEDERS

A method which has found considerable application in Europe but is comparatively little used in this country is that of carrying insulated negative feeders to various points on the track and inserting a booster in each feeder. The two advantages of this method are that a great economy of copper in the negative feeders can be obtained as compared with uninsulated negative feeders and, by varying the voltage of the individual boosters, almost any desired potential condition can be obtained in the track network. To offset these advantages we have the large first cost of the boosters and an increased depreciation and operation cost. In a large district as many as a dozen or more negative feeders may be required, and the use of a booster with each of these would obviously introduce considerable complication in the operation of the station.

In this, as in all other insulated negative feeder systems, the most important characteristic is the fact that the potential gradients in the tracks may be reduced to any desired degree independently of the current density used in the feeders. If the voltage of the booster be kept about equal to the total drop on the cable to which it is connected, the potentials of the various points of tap to the rails will be approximately the same, so that large differences in potential between different points in the track will not occur. In consequence of this the copper feeders can be designed solely from the point of view of economy, and thus a much more economical installation can be obtained than would be possible with an uninsulated feeder system, in which the drop on the cable must be no greater than the drop on the rails. When it is desired to reduce the potential gradients in the tracks to 1 volt per 1000 ft. or lower this method will be, under most conditions, much more economical, all cost considered, than the uninsulated negative feeder system mentioned above, the saving of first cost of copper being more than sufficient to compensate for the cost of the boosters and the capitalized value of the annual depreciation and increased energy loss.

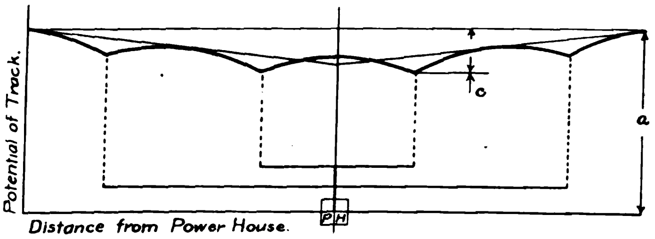


Fig. 3—Electrolysis—Result from Use of Insulated Feeders Having Drop in Potential Adjusted to Utilize Conductance of Rail

While this system is capable of giving very satisfactory results, so far as potential conditions in the tracks are concerned, we do not believe that the expense and complication of it are justified, particularly in view of the fact that practically as good results can be obtained by other methods which are simpler to install and to operate and at the same time much cheaper in point of first cost and maintenance. The sole advantage of this system over those described below is that a somewhat more flexible control over the individual feeders is obtained, but this is of doubtful value, since the simpler methods afford practically all that is needed in this respect, as will presently appear.

INSULATED NEGATIVE FEEDERS WITHOUT BOOSTERS

If insulated negative feeders are used without boosters, the layout of the negative feeder system will be very similar to that in the case of the booster system described above, the chief difference being in the elimination of the boosters. The potential drop necessary to force the required current through the negative feeders without the use of additional copper is obtained by removing the direct tie between negative bus and rails at the power house and substituting in its place a properly designed resistance tap. The layout then becomes substantially as shown diagrammatically in Fig. 4.

In designing the feeders a careful study is made of the load distribution over the entire territory supplied by the station under consideration, and from this study the most natural points for taking off the current are selected and the number of amperes to be taken off at each point determined. A preliminary value of potential drop on the first feeder is then assumed and from this drop and the current to be carried by the feeder, together with its length, the cross-section of the feeder must be designed consistently with the first, so as to avoid potential gradients in the tracks greater than the value determined upon as the limiting allowable average gradient. Beginning thus the drop on feeder No. 2 is the drop on No. 1 minus the allowable drop on the distance *a* between the points at which the two feeders tap the rails. For instance, if the assumed drop on No. 1 is 15 volts and the distance between the two taps is, say, 1200 ft. and we are permitting a maximum drop of 1 volt per 1000 ft. in the tracks, the average gradient between *C* and *D* will, in general, be less than this figure, depending on the amount of load originating between these points. The average value of this can be determined from the car schedule. Assuming it to be 0.7 volt, for example, the total drop between *C* and *D* will be 0.84 volt. The total drop on feeder No. 2 will therefore be 15 — 0.84 = 14.16 volts. From this value and the current assigned to this feeder its cross-section can be calculated, the length being, of course, already fixed.

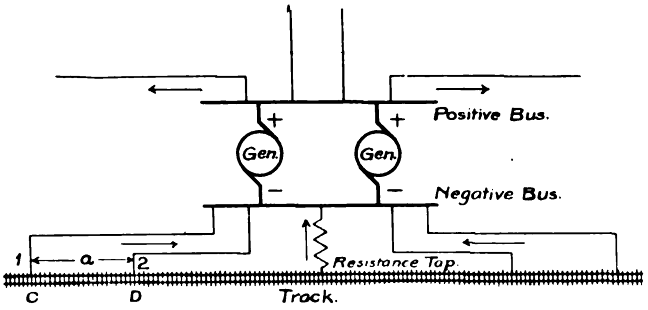


Fig. 4—Electrolysis—Insulated Negative Feeder System

We proceed in a precisely similar manner for the other feeders and the resistance taps near the power house. Sometimes the cross-section of the feeder as thus calculated will be too small to carry the required current without overheating, and when this is the case the feeder must be made sufficiently large to carry the current and an additional resistance inserted, preferably at the power house, to give the necessary voltage drop.

When this calculation is completed we are ready to determine whether the original assumption made in regard to voltage drop on the first feeder was the one that would give approximately the most economical installation. To determine this we sum up the total cost of the feeders installed, and determine the proper annual charge, including interest, taxes and depreciation, and also calculate the total annual value of the energy lost in the feeders and resistance taps. If these are approximately equal, the voltage drop assumed was the proper one. If, however, the annual charge on the feeder system is less than the cost of lost energy,* the voltage assumed is too high and vice versa, and a correction must be made. This correction can be very easily and simply applied without recalculating the feeder system, as in the first instance. For example, if the annual cost of the feeders is found to exceed that of the energy lost by 20 per cent, we must increase the mean voltage drop by 10 per cent and reduce the area of the feeders by about 10 per cent, which change will bring the cost to approximate equality, the condition for most economical installation. If E_1 is the original voltage drop calculated for any given feeder and E_2 is the weighted mean voltage drop for all feeders, then the increase of voltage on any feeder being 1/10 E_2 we must reduce the cross-section of the feeder by the factor

$$\frac{E_1}{E_1 + \frac{E_2}{10}}$$

The value of E_1 in each case is the initial voltage drop calculated for that particular feeder, so that each feeder is corrected by a different factor. When the correction is made in this way there is no change in the potential gradient assumed for the rails.

The simplicity of this system as compared with the negative booster system is obvious. In fact, the chief objections that have been urged against the negative booster system are overcome, namely, the cost of booster equipment, together with elaborate switchboard apparatus for controlling it, the space occupied by the boosters, which is out of all proportion to their kilowatt capacity because of the large number of small machines required, and, finally, the time and expense involved in caring for these machines. In the matter of power loss there will in most cases be an advantage in favor of the plain insulated feeder system. In either case the loss in the cables would be approximately the same, since all but the very short cables would be designed for maximum economy. The difference in power loss would be approximately the difference between the losses in the boosters and the loss in the resistance taps. The efficiency of such small motor-driven boosters operating at a low load factor would hardly exceed 50 per cent, so that if the loss in the resistance taps is less than 50 per cent of the total feeder loss, the latter plan would give rise to even less power loss than the booster method.

Against these decided advantages of the resistance tap method over the booster method may be set the possible objection that the former is less flexible than the latter and cannot be made to respond as readily to meet the exigency of shifting loads. This objection is apparent rather than real, since the really important consideration is to take care of average normal conditions, and this the system will do automatically if properly designed. Abnormal conditions, such as blockades or other temporary bunching of the load in one locality, are usually of so short duration that such disturbances in the rail gradients as would result therefrom would have no appreciable influence on the electrolysis problem. This method is a thoroughly practical one, and if properly installed can be made to reduce potential gradients in the rails to any desired degree, and under many circumstances it is the most economical effective means that can be installed for reducing electrolysis.

Several modifications of these feeder systems may be used under certain conditions, but space does not permit a discussion of them here. A combination of the two insulated feeder systems above discussed may also be used in some cases, as, for instance, in case of a number of comparatively short feeders going to nearby points, and one or two very long feeders extending much farther from the station. In such a case the plain insulated feeder system may be applied to the district near the power house and a booster inserted in the long feeder to provide the voltage necessary to bring the average current flow in the cable up to the most economical value.

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*More precisely, the condition for maximum economy is that condition which gives a minimum total annual cost. Under most conditions this will be practically the same as the conditions of equality of cost of lost energy and annual charge on the copper.

CONCLUSIONS

The insulated feeder system is available for general application, is comparatively cheap to install and introduces but slight complication into the operation of the system. It is possible by the proper application of this method to reduce the potential gradients in the earth to almost any desired degree at a comparatively small cost, and it can consequently be made very effective in relieving electrolysis troubles. In special cases, however, it may sometimes be better, where conditions are favorable, to combine one of these methods with either the insertion of a moderate number of insulating joints in pipes or with the use of a very limited amount of pipe drainage, the insulated feeder system being applied to reduce potential gradients throughout the system to a very low value and one or the other of the previously mentioned auxiliary systems used to practically eliminate any residual electrolysis that might still remain.

Insulated feeder systems of the general type described have in recent years been advocated by a number of engineers in this country, but their application has been limited to a few instances, and for the most part to rather special conditions, and for this reason no adequate experimental data as to their actual performance under practical conditions of service have been published. The writers have recently had opportunity to carry out somewhat complete investigations on feeder systems of this character, and the results of these investigations will be published in the near future. To those desiring to study in greater detail the principles so briefly referred to in the foregoing paper we refer to the following technological papers issued by the Bureau of Standards, which can be secured at any time upon request: "Methods of Preventing Electrolysis from Street Railway Currents," "Special Studies in Electrolysis Mitigation," and "Electrolysis from Street Railway Currents and Its Prevention."

COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

President J. H. Hanna of the American Electric Railway Engineering Association has appointed the following members to represent that association on the joint committee with the American Electric Railway Accountants' Association on the life of railway physical property: Martin Schreiber, Public Service Railway of Newark, N. J.; R. B. Rifenberick, Detroit United Railway, and Edwin Gruhl, Milwaukee Electric Railway & Light Company.

A recent meeting of the Boosters' Club of the public utilities of New Albany, Ind., including the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, was largely devoted to a discussion and description of the new block signal installation on the Louisville & Northern between Watson Junction and Sellersburg, Ind. The signaling system covers a distance of 4.13 miles. In 1914 signal equipment will be installed between Watson Junction and Jeffersonville, Ind., and ultimately all of the lines of both of the traction companies referred to will be protected by interlocking automatic signals.

PROGRAM OF MIDYEAR MEETING

As already announced, the midyear meeting of the American Electric Railway Association will be held in New York on Jan. 29-31. Jan. 29 and Jan. 31 will be given up to meetings of the various committees, and the general meeting of the association will be held on Friday, Jan. 30, in the Engineering Societies Building, where the meetings of the various committees will also be held. The annual dinner will be held at the Waldorf-Astoria on the evening of Jan. 29.

PROGRAM OF GENERAL MEETING

The program for the general meeting on Jan. 30 is being arranged by the subjects committee of the American Association. Although it is not as yet complete in all its details, it will include:

An address by Halford Erickson, of the Railroad Commission of Wisconsin, on "The Economic Aspects of Regulation Compared with Profit Sharing with Municipalities."

An address by F. W. Hild, general manager Portland Railway, Light & Power Company, Portland, Ore., on "The Effect of Rate of Fare on Riding Habit."

An address on "Inherent Hazards of the Electric Railway Industry," by a speaker whose name will be announced later.

An address on "Present-Day Influence of Labor on Legislation," by a speaker whose name is yet to be announced.

The report of the committee on the joint use of poles, which was referred back to the committee on that subject by the Atlantic City Convention, with instructions to secure the criticism, comment and objections of member companies thereto and embody them in a supplemental report.

A report by Martin Schreiber, acting for the committee on company sections and individual membership, dealing with the question of company sections.

ARRANGEMENTS FOR DINNER

The arrangements for the annual dinner are in the hands of a joint committee of the American and Manufacturers' associations, the names being published in a recent issue of this paper. President Black of the American Association will preside. The speakers already selected are: Guy E. Tripp, chairman board of directors Westinghouse Electric & Manufacturing Company, and H. W. Anderson, of Richmond, Va. In addition there will be another speaker of national reputation. President Cornell S. Hawley, president of the Manufacturers' Association, has also been invited to make remarks.

The committee in charge announces that the dinner will start promptly at 7 p. m. The tables seat eight persons each. Members of the American Association will make their reservations with Secretary Burritt; members of the Manufacturers' Association will make their reservations with Secretary McConnaughy. The price of the tickets will be $10 each. A letter containing full information and inclosing the necessary blanks, etc., will be sent to each member in ample time.

CORNELL REUNION

As a result of the dinner held at Atlantic City during the last convention by the Cornell men who were in attendance at the big meeting, a committee was appointed to assemble the Cornell men at the association's midyear dinner. The committee consists of Prof. Henry H. Norris, chairman, and R. E. Danforth, Thomas Farmer, Jr., H. C. Holloway and E. A. Stillman. Chairman Norris would like to have all Cornell men who are engaged in electric railway business, directly or indirectly, send their names to him at Ithaca, N. Y. He is also anxious to secure the names of those who will attend the dinner, so as to make seating arrangements.

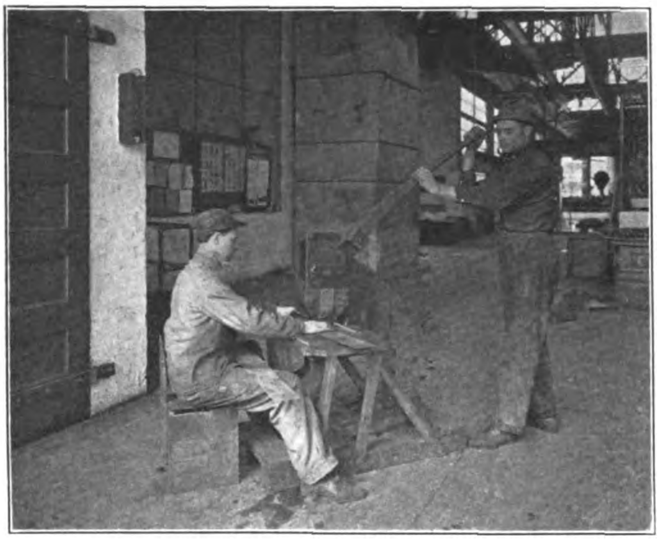
Shop and Equipment Practice

This Department Is Devoted to Short Articles of Especial Interest to Men in the Power Stations, Shops and Carhouses of Electric Railways

MANUFACTURING SIGN BOXES AND SIGNS

BY P. V. SEE, SUPERINTENDENT CAR EQUIPMENT HUDSON & MANHATTAN RAILROAD

Small car shops seldom have the opportunity to manufacture any article in such large quantities that the refinements of tools and machinery that are secured in factories can be adopted. At the Jersey City shops of the Hudson & Manhattan Railroad, however, the cost of making 400 sign holders and 2000 signs has been greatly reduced by the use of some very cheap dies.



Hand Punch for Making Signs

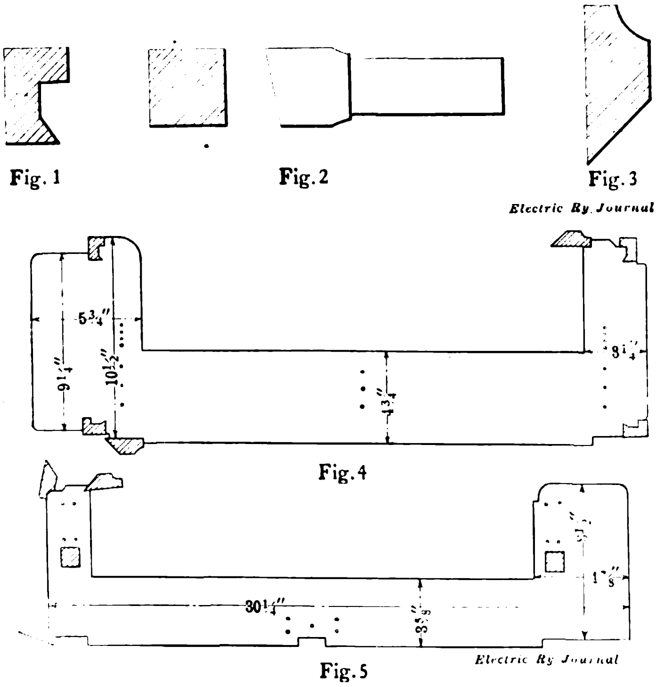


Fig. 1

Fig. 2

Fig. 3

Electric Ry. Journal

Fig. 4

Fig. 5

Electric Ry. Journal

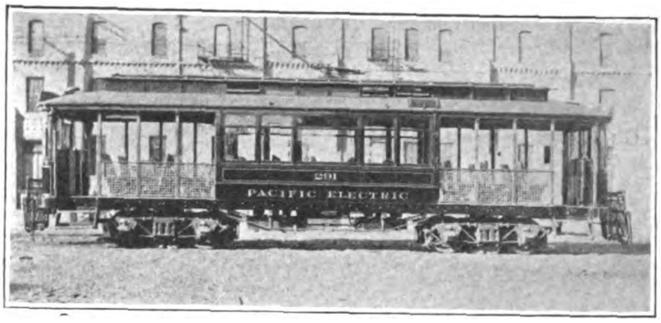
Details of Dies and Applications of Same to Sign Boxes

An old sheet-metal geared hand punch was used for the work, as shown in the half-tone view. The dies were made from scrap tool steel left over from lathe tools which had become too short to use in the wheel lathe. This steel was annealed and rough-forged and then shaped and hand-filed. The edges of the die shown in Fig. 1 were so designed that the same die would work in various places on the box, so that it was used six times on each box. The die shown in Fig. 2, which was used twice on each frame, cut out three sides of a square and bent the metal at the same stroke. The three edges of the die shown in Fig. 3 were so designed that the die was used in ten places on each box. The applications of the dies are shown in the diagrams Figs. 4 and 5.

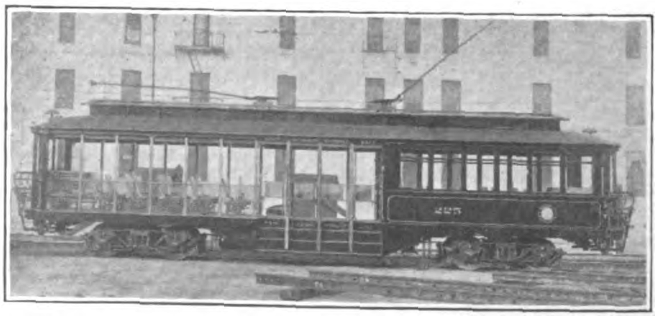
When the proper stops were placed on the punch the most ignorant laborer could be used to do the work. All the boxes were found to set together perfectly, and the dies were still in good shape after the job was finished.

COMBINATION CAR REBUILT FOR PREPAYMENT SERVICE

The Pacific Electric Railway, of Los Angeles, Cal., has recently reconstructed one of its standard combination cars for center-entrance prepayment service. These cars are those used in local service, for which the company's standard in the past has been a California type of car with closed section in the center 14 ft. 8 in. in length, with ten cross seats, and an open section at each end 12 ft. 2 in. in length over bumper, with six cross seats.



Pacific Electric Railway—Center-Entrance Car Before Conversion



Pacific Electric Railway—Center-Entrance Car After Conversion

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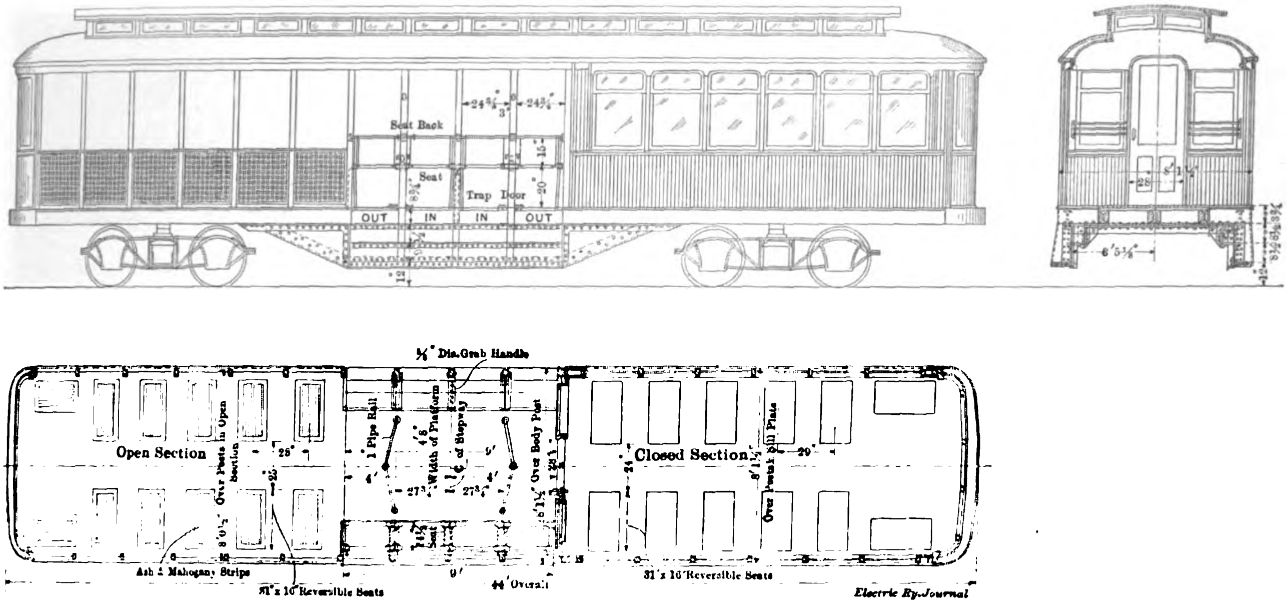
*[Articles on new methods and apparatus for publication in this department are solicited. —EDS.]

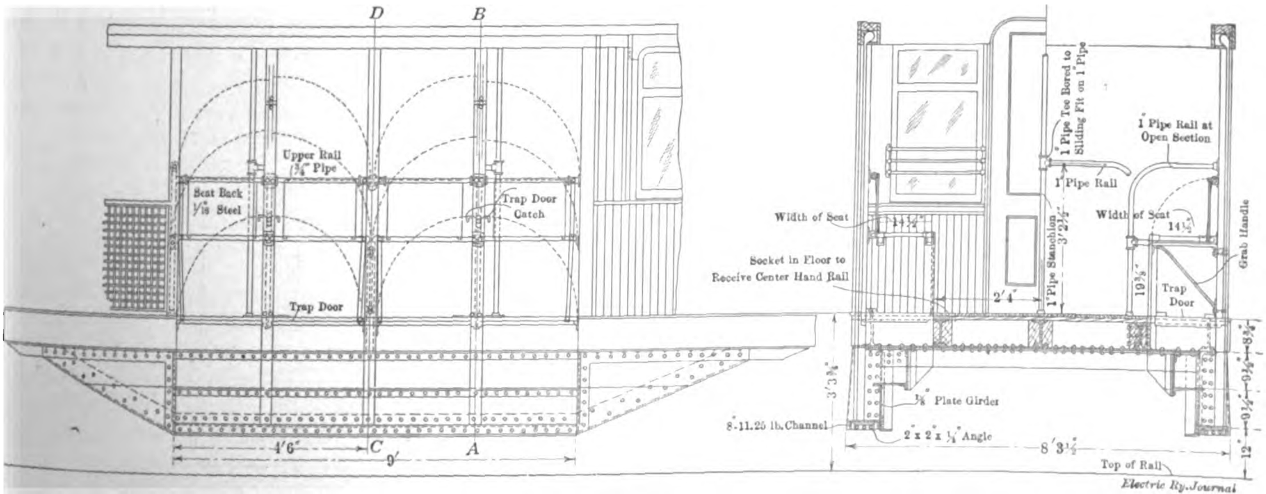
The halftone illustration of car No. 291 shows the present standard California type of car of the Pacific Electric Railway for local service, as described. The seating capacity is forty-four. The second halftone engraving, that of car No. 225, shows this same car converted for center-entrance prepayment operation. This center entrance has two entering and two exit gangways, and as the car is operated from either end, the entrance not in use is provided with collapsible seats of an ingenious pattern, to be described later.


Seat Back
Seat
Trap Door
24¾"
3"
24¾"
15"
20"
8¾"
OUT
IN
IN
OUT
12"
28
8'1½"
6'5⅛"
⅝" Dia. Grab Handle
Open Section
Over Posts in Open Section
8'0½"
28"
23"
1 Pipe Rail
Width of Platform
4'6"
℄ of Stepway
9'
4'
27¾"
27¾"
Seat
Over Body Post
8'1½"
Closed Section
24
Over Posts at Sill Plate
8'1½"
29"
Ash & Mahogany Strips
31"x 16" Reversible Seats
9'
44' Overall
31"x 16" Reversible Seats
Electric Ry. Journal

Pacific Electric Railway—Plan and Elevation of Rebuilt Center-Entrance Cars

The car was converted by cutting it directly through the center and inserting a middle section 9 ft. in length, reinforced at the bottom by three plate girders, one at the center and one 2 ft. 4 in. each side of the center. A section and side elevation of this center platform with reinforcement is shown on one of the drawings, in which it will be seen that the angles forming the steps for each center entrance are part of the reinforcing structure, which is bolted to the side sills of each end of the divided car.

The platform arrangement is also shown. As will be seen, the two entrances in the center are separated on the platform from the two exits, one at each side, by sections of 1-in. pipe rail, which hinge to a center stanchion and can be swung around when the direction of movement of the car is changed. The four collapsible seats on the center loading platform opposite the steps are 27¼ in. in length, and with the flooring under them fold up vertically when not in use, as shown in the side elevation. The angle supports for these seats serve as grab-handles when the seats are not in use and are made of ⅝-in. pipe.


D
B
Upper Rail ¾" Pipe
Seat Back 1/16" Steel
Trap Door Catch
Trap Door
4'6"
C
9'
A
1" Pipe Tee Bored to Sliding Fit on 1" Pipe
1" Pipe Rail at Open Section
1" Pipe Rail
Width of Seat
14½"
Width of Seat
14½"
Socket in Floor to Receive Center Hand Rail
1" Pipe Stanchion
3'2½"
2'4"
19⅜"
Trap Door
Grab Handle
3'3¾"
⅜" Plate Girder
8"-11.25 lb. Channel
2"x 2"x ¼" Angle
8'3½"
8¾"
9½"
9½"
12"
Top of Rail
Electric Ry. Journal

Pacific Electric Railway—Sections Showing Framing at Center Entrance of Rebuilt Cars

To reach the necessary height of the car floor, four steps are used, respectively 12 in., 9½ in., 9½ in. and 8¾ in. in height. The step tread adopted is of the Mason safety carborundum type. The car has been equipped with fixed headlights of the Crouse-Hinds pattern.

As yet only one of these cars has been reconverted, and as it is in trial service no plans have been made to change any other cars in the same way. It is expected that the cost of conversion if others were changed would be about $1,100 per car.

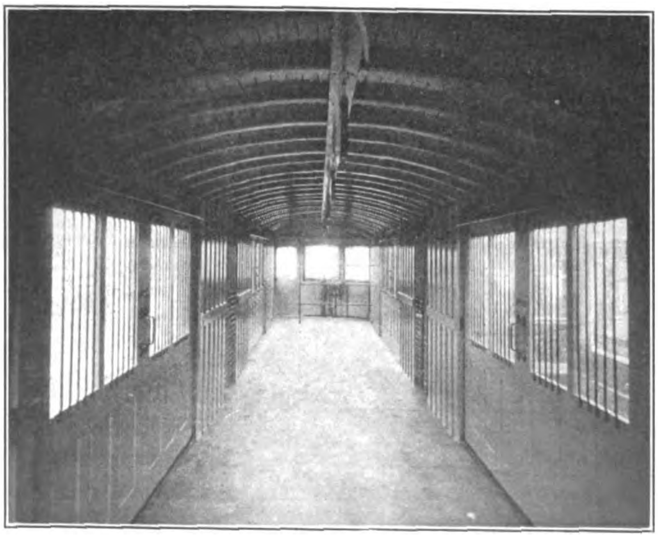
INSTANTANEOUS ELECTRIC WATER HEATER FOR CAR WASHING

Home-made water-heating devices of many descriptions have been employed in the car-washing departments of street and interurban railways and have usually involved the combination of a heater and a hot-water storage tank. Such a plant, however, was not considered practicable by the mechanical department of the Cincinnati Traction Company owing to several controlling factors imposed by local conditions. Hot water was desired throughout the year, and therefore it could not be furnished by the steam-heating plant. Again, car washing was done in one end of the paint shop bay, so that a coal heater could not be employed unless it was installed at some outside point, and, finally, it was desirable to have hot water at a pressure, a condition which could not be obtained continuously with an ordinary coal-type heater with a tank. With these limits in mind a home-made electric water heater was designed and installed. Although the cost of heating water electrically was greater than by other methods, the device met all the requirements, and the quantity of current used was so small as not to make the cost prohibitive.

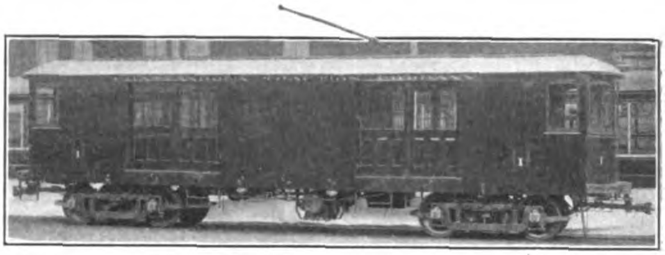
For all practical purposes this home-made water heater is instantaneous. It consists of a box 8 ft. long by 2 ft. square in section, built of 1¼-in. yellow pine. The box is lined with ¼-in. transite board to insulate the wood from the heater coils. Eight 17-amp electric-coil heaters are installed on the bottom and sides of the box, arranged in two circuits, with four heaters in each. These are supplied with energy through a direct connection to the 550-volt trolley by way of a knife switch, and they are sufficient to maintain a temperature of 210 deg. in the box. The heater coils on the bottom of the box serve as supports for the 1-in. wrought-iron pipe coils which are arranged in a rack four coils high and six coils wide. These pipes form a continuous coil which is connected with the city water supply at one end and to a hose connection at the other. When the valves provided at each end of the coil are open, cold water flows through and the heat maintained in the box by the electric heaters is sufficient to raise the temperature of the water to a point suitable for car washing before it reaches the hose connection. In actual service this heater has been found of ample capacity to supply four scrubbers with all the hot water they can use in a ten-hour day.

EXPRESS BAGGAGE CAR FOR CHATTANOOGA

The Chattanooga Traction Company has recently purchased from The J. G. Brill Company the baggage-express car shown in the two accompanying illustrations. A notable feature of this car is the great amount of glazing used. This will be seen from the construction of the double doors on each side and the windows at the ends. This arrangement naturally makes for the very light interior which is so well shown in the second illustration. The doors are barred, of course, to avoid breakage. This car is 40 ft. long over the crown pieces and 8 ft. 6 in. wide over the sills. Its general construction is of wood with a plain arch roof.



The Light Interior of the Chattanooga Express Car

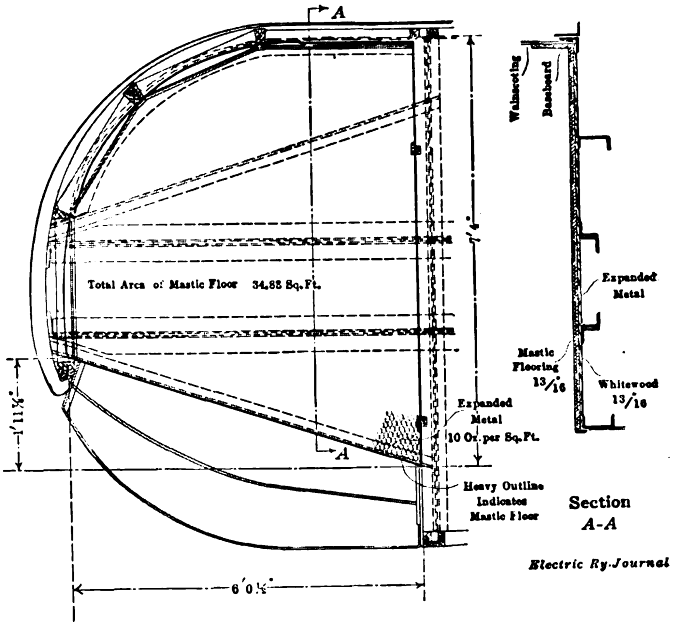


Side View of Express Car Showing Large Glazed Areas

The weight of the car body itself is 22,700 lb. It is mounted on No. 27 M.C.B.-1 trucks fitted with Carnegie rolled-steel wheels and operated with four GE-210 inside-hung motors. Other equipment features include Ohio Brass sanders, Tomlinson couplers and arc headlights. This car is a good example of high-grade equipment for other than passenger service.

TWIN CITY CAR DETAILS

The Twin City Rapid Transit Company, which maintains a car-building plant, has embodied in its cars several constructional features which are believed to be original with the company. For example, in the flooring which is planed and matched in the woodmill the useful wear is increased by placing the tongue and groove lower than usual. One sketch shows that the car wheels carry "squeak deadeners." These are round wooden blocks 4 in. in diameter and ⅞ in. thick, clamped on both sides of the wheel web near the rim. Canvas-rubber pads are placed under the blocks and the whole deadener is bound together by means of a ½-in. bolt. While the noise made when a car takes a crossing is not eliminated entirely by this muffler, it replaces the shrill squeal with a dull low-pitched rumble. The company is also trying other noise-muffling attachments, such as softer brakeshoes and canvas-rubber pads for insertion under the equalizer bar springs and even under the window sash.



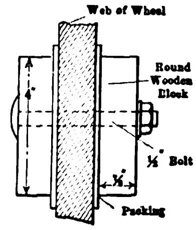
Car Platform Arranged for Mastic Flooring

Part of the trucks in use were made by the Baldwin

Locomotive Works, but at present all are made by the railway. These trucks are a light M. C. B. design. They are made complete with the exception of the journal boxes. General Electric motors (the standard now being Nos. 203 and 216) are used, but their riveted steel gear cases and all motor repair parts are made in the shops. The two sizes of Bessemer steel axles which suffice for the entire system have given absolutely no trouble from cracking. Truck parts, as well as other standard pieces, are made interchangeable and kept in stock so that a car injured in a collision can be repaired without delay by replacing damaged parts.

The rear platform of the Twin City cars, as shown in an accompanying drawing, is interesting in several ways. It is 6 ft. long with double steps set within the line of the side sills, the deep channel knees being set close together. Between the knees are floor supports made by two pairs of light angles. This steel frame carries a whitewood flooring on which a mastic flooring is troweled. The mastic is held together by 10-oz. expanded metal. The steps are of the standard pattern made up of corrugated strip in the shops. At the foot of the steps are four woven-wire safety gates which are operated by the motorman. Aside from these features the platform equipment is standard, including, for the interurban cars, red tail lamps.

Two car improvements now under way are of particular interest. The sheet-iron covers of the controllers on several hundred of the older cars are being replaced with wooden ones of oak veneered on both sides and supplied with a poplar foundation. These covers will eliminate frequent cause of short-circuits. Another safety installation is the equipment of all cars with a simple switch cabinet of transite board built on a wooden frame. This cabinet is located close under the hood against the front bulkhead of the car and is ventilated to the roof. It contains the circuit-breaker, pump switch, fuses and lamp switches.



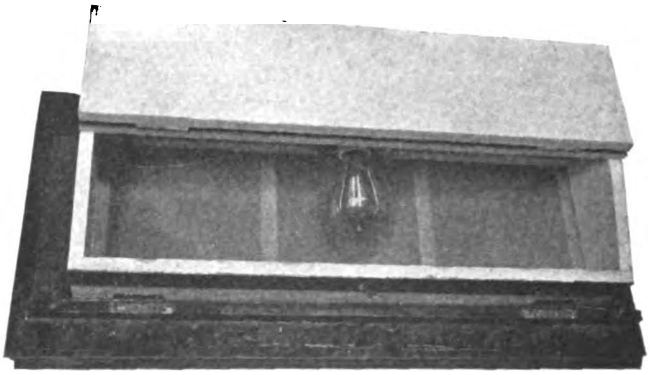
Details of Squeak Deadener

DETROIT UNITED TRAIN NUMBER SIGN

A novel illuminated train number sign for the interurban cars of the Detroit United Railway Company, Detroit, Mich., has been designed by its mechanical department within the last year. The novel features include illuminated numerals, which may be easily changed to any series of three numbers in a cheap yet substantially constructed sign box, and the method of mounting this box in the car window.

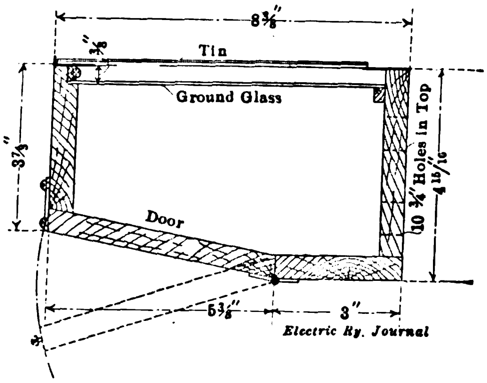
Essentially the sign consists of a box 5 in. wide by 8½ in deep by 23¾ in. long, constructed of ⅝-in. poplar. The back of the sign, which tapers from 5 in. at the top to 3⅞ in. at the bottom, is provided with a 5⅜-in. door. The front is covered with 18-gage tin, through which three openings, 6½ in. by 6⅜ in. in size, have been cut. Each opening is provided with guides to take the number slides. Just back of this tin frame, and separated from it by an air space of ⅜ in., is a ground-glass partition which incloses the lamp compartment and serves as the illuminated background for the train numbers when in position in the metal front. The interior of the box is painted white, and a 16-cp lamp mounted near the center of the top supplies sign illumination. Properly to distribute the light to the three numbers, a piece of close-meshed wire screen slightly larger than the vertical cross-section of the lamp is attached to the top of the sign between the lamp and the number plates.

In order to prevent the numbers from being placed in the sign incorrectly a rivet is set in one metal guide of each pair 2 in. from the bottom. The numbered slide, which is similar to an ordinary metal stencil, is notched on one side up 2 in. from the bottom and is 5/32 in. wide. This simple arrangement makes it impossible to insert numbers in the sign box in the reverse position. Ventilation is provided by ten ¾-in. holes bored through the top of the box.

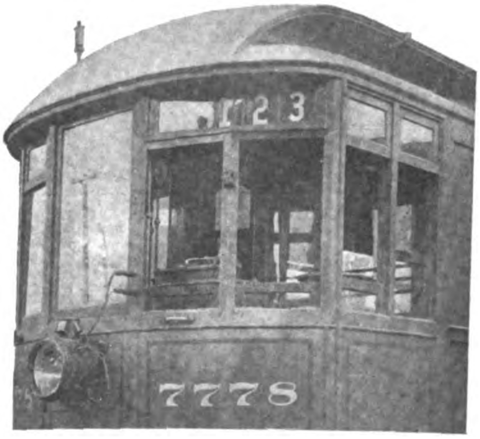


Back View of Illuminated Train Number Sign

When mounted in the cars these sign boxes are placed in the upper sash to the left of the front vestibule, being hinged to the sash rail at the bottom and hooked to the upper rail. This arrangement permits the sign to be unhooked and dropped so that the numbers may be changed as required by the different runs. The sign lamps receive their energy from the car-lighting circuit, being in series with the lamps in the car.



Cross-Section Through Box



Illuminated Train Number Sign on Interurban Car

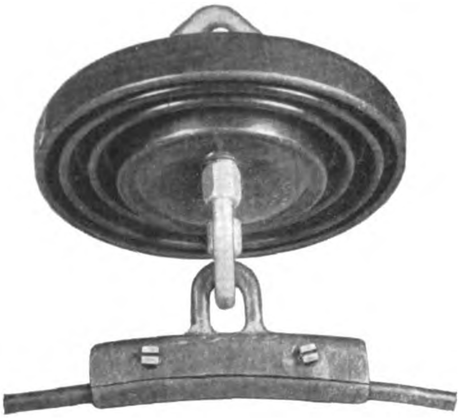
Each box is provided with a receptacle and the front vestibule has a cord and plug so that electrical connection may readily be made. A case containing a series of ten numbers, three of each kind, letters "W" and

"X" for work train and extra, and one blank slide, has been placed conveniently in the motorman's cab of each car. A view and sketch of this sign are shown in the illustrations.

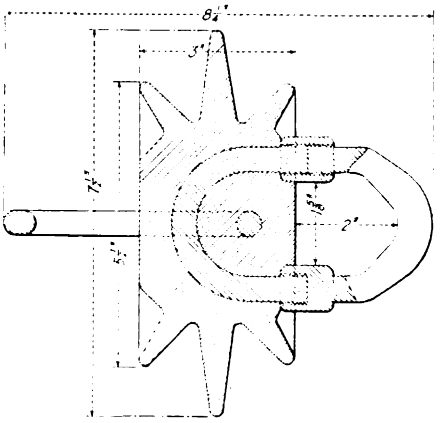
LINE AND STRAIN INSULATORS

The line and strain insulators illustrated herewith were invented by Louis Steinberger and are being put on the market by the Electrose Manufacturing Company, Brooklyn, N. Y. Each insulator is made up of an integral and uniformly solid mass of insulating material with a strain or suspension member embedded therein. The latter is interlinked in such a manner that even if all the insulating material should be removed or destroyed, it would be impossible for the line to fall to the ground.

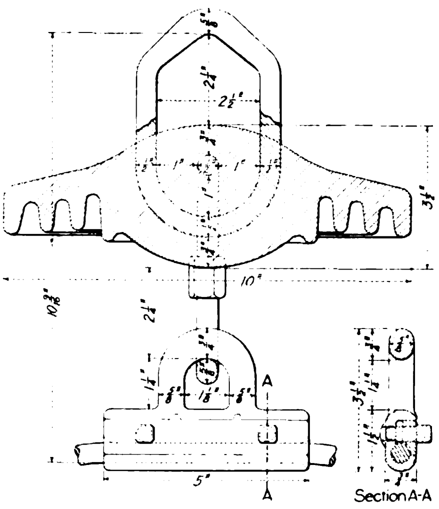
The line clamp has a smooth bore for gripping the wire or cable, thereby preventing crystallization and the possible breaking of the conductor at or near the clamp. The clamp is designed to grip conductors of various diameters. It is light in weight, but it is sufficiently strong to break the conductor before any slippage can take place. The metal parts of these insulators are made of galvanized drop-forged steel.



Insulator with Clamp Attached



Strain Insulator



Section of Suspension Insulator

The disk strain insulators are made in sizes having diameters of 5½ in., 7½ in., 10½ in., 12½ in. and 14½ in., and the disk strain and suspension insulators in diameters of 8 in., 10 in., 12 in., 14 in. and 16 in. The accompanying table gives test values obtained with the 7½-in. disk strain insulator and the 10-in. disk strain and suspension insulator.

TEST VOLTAGES

	7½-In. Disk Strain Insulator. Volts	10-In. Disk Strain and Suspension Insulator, Volts
Line voltage	25,000	25,000
Rain arc value	55,000	55,000
Dry arc value	74,000	100,000
Puncture value, under oil	120,000	150,000

In addition to the excellent electrical characteristics of the insulators, they possess many desirable features from the mechanical point of view. There are no loose parts to be lost and no special tools are required for connecting or disconnecting the units. By means of a plain wrench, a nail or even a piece of wire two or more units may be connected or disconnected in a fraction of a minute.

The Topeka (Kan.) Railway was host to 350 employees at a recent company dinner. A performance at one of the Topeka theaters also was seen at the company's expense. Special cars were provided to take the employees between the theater and the banquet hall.

RAILWAY-CROSSING ACCIDENT STATISTICS COMPILED

In making an effort to ascertain wherein the responsibility for crossing accidents might rest, some observations were recently made by one of the railroads with offices in San Francisco. The observations were made in San Francisco, Oakland, Stockton, Lodi and Sacramento. The total of the pedestrians and drivers of teams and motor vehicles who crossed during the period of observation was 25,296. Of this number thirty-five stopped and looked in both directions before crossing, 8950 kept moving and looked in both directions, 1694 kept moving and looked in one way only, and 14,617 kept moving and looked straight ahead.

ELECTRIFICATION OF CHRISTIANIA-DRAMMEN RAILWAY APPROVED

The Norwegian Royal Commission on Water Power has recently issued a report on the question of the power supply for the electrification of the Norwegian railroads. At present there are 1850 miles of steam railroads in Norway, and, according to this report, the maximum demand of all these lines, if electrified, would be about 85,600 kw and the annual consumption 118,000,000 kw-hr. The State owns twenty-nine waterfalls, which could develop more than 500,000 kw. Of these falls, thirteen have been purchased expressly for railway supply. It is estimated that the railways in the southern half of Norway could be supplied almost entirely from one large station to be erected at the Nore falls west of Christiania. The cost of this development is put at $17,250,000, or about $150 per kw, for a maximum load of 117,000 kw, and the cost of supply at $20 per kw per annum. It is intended to develop all the power stations at fifty cycles, three-phase, and to utilize a large proportion of the available energy for power and lighting supply. Calculations on the relative cost of steam and electric traction show that all that the existing railways could afford to pay for electrical energy would average only 0.66 cent per kw-hr. for the same total operating costs as with steam, or less than $10 per kw per annum as compared with the generating cost of $20 per kw per annum estimated above. On certain lines with comparatively dense traffic electrification would be economical at the latter power cost, and in view of the rising price of coal and the economic advantage to the nation of a universal power supply, the commission recommends its gradual introduction.

LONDON LETTER

(From Our Regular Correspondent)

Preliminary arrangements have been made for a tramway and light railway exhibition in the Agricultural Hall in 1915. The exhibition will be promoted by the *Tramway and Railway World*, which was responsible for the exhibitions of 1900, 1902 and 1905. Since 1905 there have been no tramway exhibitions.

The highways committee of the London County Council has reported that it has been impressed for some time with the necessity of linking the existing dead-end termini and of otherwise consolidating the Council's tramway system. It expresses the opinion that the lack of success of the many schemes which have been put forward from time to time has been due partly to the failure of the Council to submit to Parliament a comprehensive scheme of development which could be defended in its entirety as essential for the efficient working of the undertaking. The committee has directed the chief officer of tramways, the comptroller, the chief engineer and the appraiser to prepare a report on the subject. Application for sanction of the running of a large number of trail cars on certain of the southern tramways has been made to the Board of Trade. The idea of the highways committee is to provide 150 new trailers and equip 200 of the existing electric cars with couplers. It is also reported that in consequence of the falling off in tram receipts as a result of motor-bus competition reductions have been obtained in the assessment of the tramways in nearly all the boroughs affected. A proposal for the operation of "express" tramcars on the "skip-stop" for the suburbs is also being considered. At present the speed of the cars averages 9 m.p.h. The highways committee has decided to install automatic chocolate machines on the Council's tramcars running from the Hammersmith depot for a period of six months as an experiment. Another recent development of London traveling is the all-night bus service, and the first owl cars were run a few months ago as an experiment. The first service was from Cricklewood in North London to Liverpool Street via Piccadilly Circus and the Strand. A second all-night service, covering a different part of the city, has just been started.

The annual report of the Morecambe Tramway is interesting on account of the fact that it is the only tramway in Great Britain which is being operated by petrol-driven tramcars. At the annual meeting the secretary stated that had it not been for these cars the tramway would have gone into bankruptcy. During the year the cars traveled 52,065 miles and carried 424,136 passengers. A dividend of 3 per cent has been declared.

J. M. McElroy, general manager of the Manchester Tramways, is preparing a comprehensive report dealing with the transportation question of Manchester. Some of his recommendations will be based on his recent study of electric railway practice in the United States. The tramway system in Manchester is very profitable, but there are serious complaints of insufficiency of traveling facilities, and there is great congestion of traffic in certain streets. Many accidents, also, occur in Manchester to passengers while boarding or leaving cars, and the chief constable and the chairman of the watch committee have visited several of the large Continental cities to investigate the traffic methods adopted in these places, with a view to minimizing accidents. The result of their investigations will be embodied in a report to be issued simultaneously with that of Mr. McElroy. With a view to warning tramway passengers of the danger of accident as they are leaving the cars, the tramways committee has recently placed a notice on the cars warning people about passing vehicles as they alight from the cars.

Three provisional orders to be presented to Parliament by the Corporation of Glasgow ask powers for considerable engineering constructional work and for new governing regulations within the city. With respect to tramways there are twenty-eight separate proposals, most of them either of a minor character or prolongations of existing routes, varying in length from a few furlongs to about 3 miles and extending in the aggregate to 21 miles of double track. Perhaps the most interesting proposal is that the Corporation should run lines across the proposed new Clyde bridge close to the present Broomielaw Bridge, powers for the construction of which have also been asked. The Corporation also desires running powers over the Airdrie and Coatbridge tramways, so that its cars may connect directly with these towns. Included in this order there is also a proposal for the construction of a bridge across the River Kelvin for carrying tramways, of certain new streets, and of several short railways giving the railways working connections with Merklands Cattle Wharf.

The tramway committee of the Edinburgh Council has recommended that a service of motor omnibuses should be procured for a southern route in the city, giving a ten minutes' service with six buses, the probable cost being £5,100.

The estimates of the engineer in connection with the ambitious scheme of tramways being promoted by the urban district councils of Wombwell, Wath, Bolton-on-Dearne and Thurnscoe, under the title of the Dearne Valley Light Railway Board, are now available. The capital cost of the traction undertaking is estimated at £151,891. The cost of construction and equipment and acquisition of land and buildings is estimated at £90,046. The estimate of the cost of constructing the permanent way is based on three scales of cost per mile—£2,640, £3,360 and £4,880—according to the changing character of the districts traversed. Rolling stock is put down at £22,560, which, supposing the cars to cost an average of £800 apiece, would make provision for twenty-six. This, over the length of route proposed, would be adequate for a ten to fifteen minutes' service over all the route. If the scheme is carried out in its entirety, there will be direct intercommunication with the towns of Barnsley, Mexbrough, Rotherham and Sheffield, with provision for linking up with Doncaster at Thurnscoe. It will be possible to have through running on the tramway systems of the Corporations of Barnsley, Rotherham and Sheffield, as well as on that of the Mexbrough & Swinton Tramway.

The process of linking up the tube railway system with the various main line termini in London has been completed by the extension of the Bakerloo line to Paddington Station. All the principal London stations are now in direct communication with every important district in the metropolitan area. The new tube station has been constructed under the railway approach on the arrival side, and access to the platforms is by escalators. The rise is 39 ft. 4 in. and both the up and down escalators have been built in a large single tunnel with a flight of steps between them. The railway is being continued from Paddington to Queen's Park, a distance of about 2½ miles. It is expected that this work will be completed by Jan. 15. Escalators will be installed at all three stations on this extension—Warwick Avenue, Maida Vale and Kilburn Park —and it is proposed to construct escalators at Tottenham Court Road, Piccadilly Circus, Trafalgar Square, and at the Oxford Circus station of the Central London Railway Company.

With a view to bettering the service on the Central London Railway during the busiest hours, changes have been introduced in the running of the trains. In future from about 8 a. m. to 10 a. m. and from 4 p. m. until about 7 p. m. one station will be omitted by all trains of the company. The stations through which trains will run without stopping are restricted to three, Lancaster Gate, Queen's Road and Holland Park. Another great improvement to be carried out is the removal of the British Museum station to a site next to that of the Holborn station on the Piccadilly tube. The distance between the stations has long been a source of inconvenience. The new stations will be connected, and there will be "glides" to and from the platforms. The through journey from Piccadilly and stations west of it to the Bank and the city generally will be greatly shortened.

Within three months electric trains will be running on the London & North-Western Railway line between Willesden and Earl's Court. This is the first section of the company's electrification scheme to be completed. The work on this stretch of line is now virtually finished, and within a few weeks the new rolling stock will be delivered.

A. C. S.

News of Electric Railways

Company's Side in Indianapolis Arbitration

The Indianapolis Traction & Terminal Company on Dec. 22 commenced the presentation of its side of the case in the hearings before the Public Service Commission of Indiana, which body is sitting as an arbitration board to decide for a term of three years the wages and working conditions of the employees of the company. W. H. Latta, attorney for the company, introduced as witnesses retail grocers from different parts of the city, representing all classes of trade. These men testified that in general the prices of foodstuffs are very little higher than five years ago, but said that people insist on having everything in packages in preference to buying in bulk at a much cheaper rate and require 60 per cent of their purchases delivered. It was shown that delivery service adds 8 to 10 per cent to the cost of the provisions thus purchased. It was shown by some of the grocers that the increase in the price of meats applies particularly to the choice cuts and has been brought about by the increased demand for these cuts, and that there has been little, if any, increase in the price of the cheaper cuts. Canned goods were shown to be selling at about the same price as in the last few years, but it was stated that the quality was better. Witnesses testified that vegetables were much higher out of season than in season, but that their sales of these vegetables were larger when out of season.

The credit system was blamed by the grocers for inducing people to overbuy and also to purchase many things they do not actually need. The owner of the largest retail shoestore in the state testified that just as good wearing shoes could still be purchased for $3.50 as for $5, $6 or $7, but that they did not have the same "style," and as the working people now insist on buying much more stylish shoes than formerly, they pay the increased price for style and not for service.

A member of the City Council of Indianapolis, who is connected with one of the large clothing stores, testified that clothing prices have not advanced materially in the last twenty years, but that more high-grade goods are manufactured and sold now than formerly, and the tendency of the people is to dress better. He stated that a street car man's uniform costs $9 to $10, which is a dollar or so higher than a few years ago, due to the increased prices of blue cloth. Rental agents testified that the rental prices of medium-priced houses have not been materially increased during the last five years.

The company then filed reports with the commission showing the number of hours worked by the motormen and conductors at the different carhouses, as compared with what the men might have earned if they had not taken time off. At the College Avenue carhouse the motormen could have earned an average of $75.68 per month; the actual earnings averaged $70.44. The average earnings of the conductors at this carhouse if they had worked full time would have been $72.81 a month; actual earnings averaged $64.74. At the Louisiana Street carhouse the average actual earnings of the motormen were $60.02 a month, although the schedule called for a possible earning of $73.01. The conductors could have earned $70.10, but their actual average on account of time off was $57.37. At the West Washington Street carhouse the motormen actually averaged $63.98 a month, against a possible average of $74.27. Conductors at this carhouse actually earned an average of $61.67, whereas their possible earnings would have averaged $71.74 a month.

In order to bring testimony to bear on the contention made by employees that power house and shop men are not receiving the prevailing rate of wages, officials of other utilities of the city of Indianapolis appeared as witnesses for the company. Mr. Darrow, general manager of the Merchants' Light & Heat Company, testified as to the scale of wages paid the employees of that company. Under the chief engineer there is an assistant engineer in charge of each power house, receiving $29.25 per week. Other power station engineers are paid $18, $19 and $22 a week; firemen, $15 and $16 a week; switchboard men, $12 to $15 a week; turbine men, $15 to $18 a week; ash and coal handlers, $14 and $15; watchmen $10.50. The men work twelve hours a day. Mr. Darrow said that his company is able to get competent men to operate its plants for these wages. The West Washington street plant of the company develops about 15,000 hp.

Thomas A. Wynn, vice-president of the Indianapolis Light & Heat Company, testified that his company operates two power stations in the city, generating approximately 17,000 kw at each plant. The general supervising engineer of the company receives $200 a month. At each of the power stations the chief operating engineer receives $150 a month; assistant engineer, $110 a month; engineers, $90 a month; switchboard operators, $70 a month; substation operators, $65 a month; firemen, $60; repair men, $85; boiler washers and ash and coal handlers, $55; head firemen, $70; oilers, $60; laborers, $2 a day.

Charles H. Hurd, vice-president of the Indianapolis Water Company, read the scale of wages maintained in the power house of that company, as follows: chief engineer, $150 a month; assistant engineer, $100 a month; engineers, $80 and $83.33 a month; head oilers, $67.50; oilers, $64 and $60; head firemen, $75; firemen, $70; assistant firemen, $66; repair men (machinists), $75; common laborers on construction work where they do not work steadily, 20 cents an hour.

L. M. Clark, master mechanic of the Indianapolis Traction & Terminal Company, testified that about 160 men are employed in the West Washington Street shops of the company, and that during the six years he has been master mechanic there has never been any difficulty experienced in obtaining competent workmen at the rate of wages paid by the company.

Charles Hogate, chief engineer of the two power plants of the company, stated that the day men worked eleven hours and the night men thirteen hours, and that the shifts were exchanged every two weeks. The main load is carried by the new power station at West Tenth Street, the West Washington Street plant being operated during the peak loads and shut down from 8.30 p. m. to 5 a. m. Mr. Hogate stated that there was no dissatisfaction in the power stations prior to the recent labor troubles, and that he has always been able to obtain and hold competent men at the present rate of wages.

Harvey G. Shafer, superintendent of the Nordyke & Marmon Company, a large manufacturer of machinery, automobiles, etc., testified that at that plant pattern makers received 30 to 40 cents an hour, machinists 25 to 32½ cents, helpers 22½ cents, carpenters 25 to 31½ cents, painters 25 to 37½ cents, laborers 17½ cents up, firemen 21 cents, toolmakers 32½ to 40 cents an hour. This plant is operated as an open shop.

Eugene Darrach, treasurer of the Interstate Car Company, testified that his company pays the following wages; foreman blacksmiths, $25 a week; blacksmiths, 35, 29½, 27½, 25 and 22 cents an hour; blacksmiths' helpers, 19 to 22 cents an hour; laborers in car department, 17 to 20 cents an hour; laborers in foundry, 20 to 21 cents. Car builders average about 40 cents an hour; mill hands, 22½ to 27½ cents; helpers, 19 to 21 cents; laborers, 19 to 20 cents.

Foremen of the different carhouses of the company testified on Dec. 23 that prior to the strike they had never heard of any complaints from the men as to the way they were being treated by the officers of the company, and that when labor agitators were in the city and talk of a strike was started many of the men went to the foremen and expressed themselves as not being in favor of any such action. The foremen explained to the commission the method of assignment of runs, the revolving board for the extra men, etc. They stated very positively to the commission that the discipline among the men since the strike and the formation of a union has not been nearly so good as prior to that time, that extra men did not report on time, and that regular men who used to "ask" off now told the foremen when they intended to lie off.

On account of the Christmas holidays, the commission adjourned after the hearings of Dec. 22 and Dec. 23 until Dec. 29, when the company continued the presentation of its testimony.

The business men of Indianapolis have issued a statement, "Indianapolis Industrial Condition," in which they have set forth the facts in regard to labor conditions in Indianapolis, in an effort to set the city right before the country.

Annual Report of the Interstate Commerce Commission

The twenty-seventh annual report of the Interstate Commerce Commission dated Dec. 15 was sent to Congress on Dec. 19. A number of matters of direct interest to the officers of electric railways are contained in the report. Referring to the case of the commission against the Omaha & Council Bluffs Street Railway, which was followed from time to time in the ELECTRIC RAILWAY JOURNAL and involved an order of the commission reducing rates for the transportation of passengers from Council Bluffs to Omaha on a street railway operated between the cities, the commission says:

"In deciding that the order of the commission was void for want of jurisdiction the Supreme Court held that the act to regulate commerce does not apply to street railways, even though they cross State lines, where passengers are the only traffic carried and the railway serves but one community."

Under the heading "Division of Carriers' Accounts" the commission says:

"A system of accounts for telegraph and cable companies has been completed and will be made effective Jan. 1, 1914. The remaining classifications to complete the systems of accounts for electric railways, express companies, and sleeping car companies are still in preparation, substantial progress having been made during the year. A list of the accounting classifications of the commission, so far as completed at that time, was given in the last report, and it is considered unnecessary to repeat the information here.

"The act to regulate commerce prohibits the destruction of any accounts, records, or memoranda of carriers, except upon specific orders of the commission naming the records that may be destroyed and prescribing the length of time such records shall be preserved before their destruction. Prior to July 1, 1912, such orders had been issued applying to steam roads, express companies, and sleeping car companies. During the past year similar orders have been issued applying to electric railways and water carriers."

Under the heading "Investigation of Accidents" the commission says:

"In previous reports the commission has recommended legislation requiring the standardization of operating rules. It is vital to the safe movement of trains that rules shall be explicit and uniform in character, so that they may be easily understood and that there may be no doubt as to their application. To this end federal legislation is necessary. Such legislation also should require proper supervision of employees to insure that the rules are obeyed, as well as systematic instruction and examinations at stated intervals to make certain that no employee is permitted to be in a responsible position unless he is thoroughly familiar with his duties and competent to perform them."

Under the heading "Valuation" the commission outlines the plans which it has adopted for carrying out the provisions of the act of March 1, 1913, providing for the valuation of the property of all common carriers subject to the act to regulate commerce. Reference is made to the division of the county into districts for the purpose of facilitating this work. As to the preliminary method of procedure the commission says:

"The present plan is to select a railroad in each one of these divisions which can be valued in an experimental way. An attempt will be made to choose railroads of different classes so that as great a variety of problems will be presented as possible. This initial work will be undertaken with deliberation, and no attempt will be made unduly to expand or hasten operations until the result of these preliminary studies can be appreciated. After a few months of this kind of work in different parts of the country and under varying conditions the commission and its engineers will better understand the exact difficulties which must be met and the methods by which the work can be prosecuted to the best advantage. To make more certain of its ground the commission referred its scheme of organization and its plans for the beginning of this work to a committee consisting of John Skelton Williams, Charles F. Staples, Henry C. Adams, Edward W. Bemis, and Oscar T. Crosby. This committee, after mature consideration, approved our plans with certain suggestions for modifications, most of which have been adopted."

In the recommendations which it makes the commission says in part:

"We recommend that the commission be authorized to make orders, after investigation, respecting the construction and maintenance of the physical properties of railroads engaged in interstate commerce and rules and regulations pertaining to the use and operation of such properties. In previous reports the commission has indicated the desirability of legislation upon the subject of control over railway capitalization. Without attempting to add to the reasons previously advanced, we renew those recommendations."

The summary of casualties to persons on interstate electric railways reporting to the commission for the years ended June 30, 1913 and 1912, follows:

Item	1913		1912	
	Killed	Injured	Killed	Injured
Passengers:				
In train accidents	10	1,252	7	1,462
Other causes	26	1,789	28	1.400
Total	36	3,041	35	2,862
Employees on duty:				
In train accidents	18	154	14	144
In coupling accidents	1	19	2	18
Overhead obstructions, etc	6	34	..	22
Falling from cars, etc	8	138	13	96
Other causes	17	203	17	159
Total	50	548	46	439
Total passengers and employees on duty	86	3,589	81	3.301
Employees not on duty:				
In train accidents	..	5	..	11
In coupling accidents	..	....	..	....
Overhead obstructions, etc	..	....	..	1
Falling from cars, etc	1	19	1	11
Other causes	2	4	..	1
Total	3	28	1	24
Other persons:				
Not trespassing—				
In train accidents	1	8	..	7
Other causes	196	860	118	652
Total	197	868	118	659
Trespassers—				
In train accidents	..	....	..	....
Other causes	117	123	100	128
Total	117	123	100	128
Total accidents involving train operation	403	4,608	300	4,112
Industrial accidents to employees not involving train operation	19	798	24	550
Grand total	422	5,406	324	4,662

Increase in Accident Claims in Cleveland

At the regular meeting of the City Council of Cleveland on the evening of Dec. 16, a resolution offered by Councilman Lyman O. Newell, calling for a report on the number of accidents, deaths, amount of damage claims paid and cost of operating the cars of the Cleveland Railway during October, as compared with the same month in 1912, was referred to the street railway committee without instructions as to when to report on the measure.

It is stated that the figures in the company's office show that 3702 persons were injured during the first eleven months of 1913, or almost 1000 more than during the same time in 1912. Thirty persons were killed during the eleven months this year, it is said, while only seventeen were fatally injured during the same period in 1912. The amount paid for damage claims for the eleven months of this year was $245,819 and in 1912 the aggregate for the same time was $193,869. It is said that in September and October, 1913, the company paid $18,000 more in damage claims each month than for the corresponding months in the previous year.

Pennsylvania Railroad Contracts for Energy for Its Philadelphia Lines

The Pennsylvania Railroad has announced that the contract for the electrical energy for the electrification of its lines between Broad Street station, Philadelphia, Pa., and Paoli, and also between the Broad Street station and Chestnut Hill, has been let to the Philadelphia Electric Company. All of the local trains on those lines will probably be operated by electrical energy before the end of 1914 and the first electric trains out of Broad Street station are expected to be running about September next. The contract is for five years. At the beginning the Pennsylvania Railroad will use about 4500 hp, a minimum of 3750 kw, with a load factor of 25 per cent, being specified. The energy is to be furnished for the main line to Paoli and any addition or extension thereto, the railroad reserving the right to call on the Philadelphia Electric Company for any additional energy that may be necessary for its general system from time to time. With the completion of the present work as planned, the Pennsylvania Railroad will have 32 miles of electrified lines in the Philadelphia suburban district. The cost of the energy to the railroad for the Paoli line for the first year will be about $150,000.

The Philadelphia Electric Company now feeds a load of 35,000 hp daily for the Philadelphia Rapid Transit Company. J. B. McCall, president of the company, says that no change or enlargement beyond the usual will be necessary for supplying the energy for the Pennsylvania lines. At present, the Christian Street station of the Philadelphia Electric Company has equipment with a rated capacity of 115,000 hp, and during the next year the addition of steam turbines will bring this rating up to 187,000 hp. Until the contract between the Pennsylvania Railroad and the Philadelphia Electric Company is actually signed, none of its details will be available for publication.

Terms of Purchase of Presidio & Ferries Railroad, San Francisco, by the City

The Supervisors of San Francisco, Cal., acting on behalf of the city, and the Presidio & Ferries Railroad, represented by George Newhall, president and general manager, have agreed upon $300,000 minimum and $360,000 maximum as the price at which the property of the company is to be taken over by the city. The exact figure will be arbitrated within seventy-five days from the date of the contract, which was Dec. 3, 1913. The franchise of the company expired on Dec. 10. The terms of the contract follow:

1. The price to be between $300,000 and $360,000.
2. A board of arbitration to fix the value upon a reproduction cost basis, minus depreciation on all property purchased.
3. The arbitrators named are Thomas H. Mullins, the engineer who rebuilt the line after the catastrophe of 1906, representing the company, and the city engineer, representing the city. In case these arbitrators fail to agree in sixty days, the points in controversy are to be referred to A. M. Hunt, whose decision shall be binding on both parties to the contract.
4. The city was to pay $50,000 in cash on Dec. 10 to the company.
5. The balance agreed upon by arbitration is payable within sixty days from the date in which the agreement is reached.
6. In event of failure on the part of the city to sell sufficient bonds to complete the purchase within the stipulated time the company is either to purchase sufficient bonds to make up the deficiency, or find purchasers therefor, and agrees further that bonds so purchased shall not be sold within one year for less than par value and accrued interest.
7. The loop upon Larkin, Vallejo and Gough Streets, and upon three blocks of cable road, for which franchises were more recently granted to expire with the franchise upon the main system, with the proviso that the city should not be required to purchase track or other stationary equipment, is expressly omitted from those properties which the city is to purchase.
8. The city is to rent the carhouse at Gough and Filbert Streets for a period of one year at $150 a month, with an option of two more years on the same terms.

In addition a resolution was passed at the request of Mr. Newhall that provides that wherever possible and whenever necessary the city will give employment to present employees of the company. This is subject, of course, to the restrictions of the charter. Employees of the company will be obliged to take the usual civil service examinations, but having passed these, will have preference over other eligibles to the same position.

C. W. Barron and Colonel Williams on Corporation Publicity Methods

At a recent hearing before the Public Service Commission of Massachusetts concerning miscellaneous expenditures of the New York, New Haven & Hartford Railroad covering seven months preceding last July C. W. Barron, publisher of the Boston *News Bureau*, made some very interesting statements in regard to the publicity campaign of the company and read some correspondence which he had with the company in which he made suggestions concerning publicity work by public corporations that should be of interest to electric railway managers who are conducting such campaigns or have such campaigns in contemplation. The New York, New Haven & Hartford Railroad in November, 1912, sent to Mr. Barron's office certain data to be made up into the form of an advertisement for the newspapers. Mr. Barron objected to the advertisement or to the railroad spending money for any such advertising as was suggested. He declared it was not the business of a public service corporation to spend money to tell how good it was or who owned it. It could properly spend money only tobuild up business, and building up business it would secure both credit and goodwill.

In his correspondence with Edgar J. Rich, general solicitor of the company, and with Charles S. Mellen, then president, Mr. Barron laid down some rules on advertising. In one of his letters he said:

"Advertising at random and giving advertising under pressure, or sporadically, as may be persistently demanded, is very bad policy. It encourages persistency and application and causes a bad impression, not only upon the man who receives the advertising—he knows he is getting it because of his persistency—but upon the publisher and all the staff upon higher class papers in the same field, who know the reason the moment such an advertisement appears why that publication gets it and they do not. Every advertisement from a public service corporation is very carefully scanned by publishers, news men and editors, the moment it appears.

"It is highly important that the impression be given that the advertiser handling the funds of the public service corporation knows his business and that the management of the corporation is straight and square, for the newspaper men will judge the management right in the field where they themselves are experts.

"Next to securing the safety of passengers there is nothing more important in my judgment in railroad direction than the policy of the management as presented in public view. An unfilled promise direct or implied to the public or a newspaper may have dire consequences years afterward.

"J. Edward Addicks lost the gas field in Boston and his fortune by two false steps with the newspapers, although these never came into public view.

"I think Mr. Riggs (executive assistant to the president in charge of publicity) agrees with me that the policy in his handling news respecting the railroad is that he is there with his staff to give full information to the newspapers so far as they want it, and the impression should never go forth anywhere that he is there to get something into the newspapers in the interests of the corporation which he represents.

"I explained to Mr. Riggs where I thought the dangers were if his department in any way undertook to hand out advertising. In brief, the smaller papers will publish columns of news and demand expanding advertising, according to the news space they give, and then it would be found later that the traffic department could not indorse such advertising expenditures from any results obtained, and the cutting down of this expense or the cutting out of newspapers leaves a trail of consequences."

In a letter to Mr. Rich dated Jan. 30, 1913, Mr. Barron said:

"The mistake has been that Mr. Mellen has believed the public would see his upbuilding for New England and in the end appreciate it, but the public and private agitators got in ahead. While Mr. Mellen did nothing but work, the agitators agitated and inflamed public opinion with cries of 'monopoly,' 'wrecks' and 'financial jugglery' until corporation credit and good-will with investors and the people and even the safety of the working organization and the lives of passengers were in danger from the demoralization of such attacks. There was only one thing to do, and that was to win the people. Therefore, whenever any publishers have called me and solicited advertising, I have said: 'What is your circulation?' and when they have responded, 'Circulation does not count. New Haven wants friends and advertising is the way to get them and we are entitled to that advertising,' I have responded as follows: 'The New Haven Railroad is not through me buying any newspaper friendship, or paying any indebtedness to any newspaper or newspaper publisher. I am placing advertising that speaks to the people. If you reach the people show me your circulation and the character of the people you reach. Otherwise there is no obligation so far as I am concerned, or so far as I know, concerning the New Haven Railroad or the New England lines.' "

Mr. Barron explained that while the New Haven, Boston & Maine, and Maine Central, separately, could not afford to educate the country to "sail from Boston" or visit New England, the united New England lines could afford such a campaign.

The attitude of the management of the Brooklyn Rapid Transit Company toward its patrons and the newspapers has been dealt with before on numerous occasions in the ELECTRIC RAILWAY JOURNAL. As recently as the issue of this paper for Nov. 22, 1913, extracts were published from an article which appeared in the New York *Evening Post* dealing with Timothy S. Williams, president of the Brooklyn Rapid Transit Company, and the results which have been obtained under the "open-door" policy in Brooklyn. Colonel Williams in the current issue of *Printers' Ink* has outlined his views on the use of paid space for influencing public opinion. Like Mr. Barron he believes in the straight, forceful story backed by deeds. Colonel Williams is quoted in part as follows:

"The essential thing, I think, is for a public service corporation to convince the public—not only by its utterances and its attitude but by its acts—that it is honestly and intelligently trying to conduct its business, and then not to hesitate fully to inform the public of all the facts and conditions which attach to honest and intelligent administration. If a corporation is imbued with high purposes and intelligent policies it has nothing to fear from taking the public into its confidence, and it can afford to hit out straight from the shoulder at all those influences—official or otherwise—which interfere with honest and intelligent administration.

"Properly conducted, the advertising columns of the newspapers can be used to great advantage by a corporation. Assuming that the corporation is right, it can afford to be perfectly frank in its advertising utterances. No matter what views the newspaper may hold editorially on subjects relating to corporations, the advertising space at the disposal of a corporation can be utilized not only in defensive but offensive campaigns. The same situation prevails as to official or individual complaints and attacks. If a corporation is unjustly treated, either by the public or by public officials, I see no reason why it should not make the facts known, so that all intelligent people may form their independent judgments.

"We are all in one sense or another servants of the community in which we live. Each has his own part to play, and to the extent that that part involves common actors each must respect the rôle of others. In this great play, in which public officials, public service corporations and the public generally have their respective parts, the joint performance should be such that lookers-on may determine which players are responsible for failures. I am thoroughly convinced that frank talk straight from the shoulder is a good policy for corporations, as it is generally for individuals."

Bids Opened for Section of Seventh Avenue Subway, New York

The Interborough Rapid Transit Company, New York, N. Y., through its subsidiary, the Rapid Transit Subway Construction Company, has put in the lowest bid for the construction of the section of the new Seventh Avenue subway line stretching from a little north of Thirtieth Street to 100 ft. south of Forty-third Street. This includes two express stops, one at Thirty-third Street, to serve the traffic to and from the station of the Pennsylvania Railroad and the other at Forty-second Street, on account of the large number of passengers starting their trips from that point and the connection with the shuttle service to the Grand Central Station and the Steinway tunnel line to Queens. The names of the bidders and the prices bid were as follows:

Rapid Transit Subway Construction Company	$2,292,000
United States Realty & Improvement Company	2,303,000
Booth & Flinn	2,365,000
Godwin Construction Company	2,397,000
Franklin Contracting Company and Coleman Brothers	2,442,000
Holbrook, Cabot & Rollins Corporation	2,576,000
E. E. Smith Contracting Company	2,600,000
Oscar Daniels Company	2,606,000
Hugh Nawn Contracting Company	2,611,603
Canavan Brothers Company	2,616,000
Degnon Contracting Company	2,625,658
Carter Construction Company	2,712,000
Mason & Hanger Company	2,749,117
P. McGovern & Company	3,178,000

On Dec. 31, 1913, the commission awarded the contract for the construction of this section of the subway to the Rapid Transit Subway Construction Company.

Valuation of Cincinnati Traction Company's Property Urged.—Alfred Bettman, city solicitor of Cincinnati, and E. W. Doty, member of the Public Utilities Commission, conferred with Governor Cox of Ohio on Dec. 15 and urged him to arrange for an appropriation by the commission for the purpose of making a physical valuation of the Cincinnati Traction Company's property. The state officials are now engaged in making up the budget to be presented to the Legislature at the special session which will be called within a short time.

Plans for Unified Operating in Chicago Approved.—The ordinance providing for unified operation of the surface lines in Chicago has been approved by the stockholders of the Chicago City Railway and Chicago Railways and acceptance of the ordinance has been filed with the city clerk by the companies, and also the Calumet & South Chicago Railway and the Southern Street Railway. The ordinance will go into effect on Feb. 1. A summary of the terms of the surface railway unification ordinance was published in the ELECTRIC RAILWAY JOURNAL of Nov. 22, 1913, page 1112.

The Newark Terminal Plans.—The Board of Public Utility Commissioners of New Jersey has announced its attitude toward the terminal improvement plans of the Public Service Railway for Newark as follows: "The Board of Public Utility Commissioners has not disposed of the applications for the approval of the ordinances of the city of Newark affecting the Public Service Railway. The board has decided to ask the company for further information as to the system of transfers it proposes to install prior to the building of the terminal and the contemplated re-routing of cars prior to the building of such terminal."

Plans for Municipal Ownership in Seattle.—In the estimate furnished by City Engineer A. H. Dimock, of Seattle, Wash., the cost of rehabilitating and extending the Highland Park & Lake Burien Railroad, the property of which within the city was recently donated to the city, is placed at more than $2,000,000. It is regarded as likely that the City Council will authorize an issue of bonds to provide funds to make the improvements, the bonds to be a lien on the railway property. The negotiations looking toward the city taking over the property of the company within the city were referred to in the ELECTRIC RAILWAY JOURNAL of March 22, 1913, May 24, 1913, Aug. 2, 1913, and Aug. 23, 1913.

Kansas City Ordinance in May.—Indications now are that the Metropolitan Street Railway franchise ordinance will not be presented to the people of Kansas City for a vote until after the municipal election in April. It was expected until recently that the special election would take place before the regular one scheduled for April. The committee of the Council which is considering amendments has been deliberate about its work and the ordinance will probably reach the Council shortly. Reviews by Federal Judge Hook and the Missouri Public Utilities Commission also must take place before the ordinance is ready for a vote. Prospects, therefore, are that Kansas City residents will vote on the franchise some time in May. No important action was taken during the week ended Dec. 27, 1913, though the joint committee of the Council resumed its sessions.

Road in Batavia to Be Sold to City.—At a conference before Public Service Commissioner Hodson recently the representatives of the city of Batavia and Godfrey Morgan, one of the owners of the Buffalo & Williamsville Electric Railway, agreed to have their respective engineers determine the value of the property of the company in Batavia with a view to agreeing upon terms for a transfer of the property to the city. If the representatives of the city and the company fail to agree, a third engineer will be chosen and the amount fixed by him will be accepted by the railroad and paid by the city. The application of the Buffalo & Williamsville Electric Railway for permission to abandon its line in Batavia has been before the Public Service Commission for several months. Just prior to the last hearing engineers for the New York Central & Hudson River Railroad inspected the property with a view of buying and it was reported that road would operate heavy interurban cars between Buffalo and Batavia and later to Rochester over this line. The city of Batavia is in the market, according to Mayor Louis Wiard, for a number of small cars to be operated over the tracks which it is about to buy.

Separate Contracts for Rails for New York Subways.—The Public Service Commission for the First District of New York has decided to make separate contracts with manufacturers for the supply of steel rails and other track equipment for the new subways and elevated railroads to be built by the city of New York under the dual system plan. Formerly the practice was to let contracts for the work and allow the contractor to purchase the materials. Under the new plan the commission will advertise for bids for the supply of such materials, and after awarding the contracts will make another contract with contractors experienced in building railroads to do the work of track laying, etc. Of the 324 miles of single-track construction called for by the dual system contracts, the work on city-owned lines will cover 260 miles. As the specifications call for steel rails weighing 100 lb. to the yard, it is calculated that the commission will purchase about 520 miles of single rails, which, at 100 lb. to the yard, will weigh about 45,760 tons. On account of sidings, etc., it is probable that the actual amount will exceed these figures. A public hearing on the form on contract for supplying such materials will be held by the commission on Jan. 9.

Results Under First of New Rapid Transit Operating Contracts in New York.—The New York Consolidated Railroad, which is the Brooklyn Rapid Transit operating company under the new subway contracts, has filed with the Public Service Commission for the First District of New York a report showing the result of operations under contract No. 4, the main operating contract for the New York Municipal Railway Corporation's part of the dual system. The report covers the month of October, as well as the period from Aug. 4, 1913, when the operation of the Centre Street loop subway began, to Oct. 31. It shows that the gross receipts for October fell $54,426 below the amount needed to pay rentals, taxes, operating expenses, maintenance and depreciation, the preferential due the company and the interest on its investment, while for the whole period the shortage was $61,679. Counting in the interest and sinking fund paid by the city on the cost of construction, the deficit for October was $82,863 and the deficit for the entire period $144,239. During August, the first month of operation, the company made a much better showing, as the gross revenue for that month came within $2,814 of paying all charges, including the city's interest and sinking fund. The difference is accounted for by the fact that the summer traffic is very much heavier than at other seasons, especially on the Coney Island lines.

Financial and Corporate

Stock and Money Markets

Dec. 30, 1913.

The tone of the trading on the New York Stock Exchange to-day was irregular. There were moderate gains in many issues following the opening. The demand was broad throughout the day. A declining tendency prevailed in the afternoon and the leading issues sold off around a point from the midday range. Rates in the money market to-day were: Call, 2@6 per cent; thirty days, 4½@5 per cent; sixty and ninety days, 4½@4¾ per cent; four, five and six months, 4½@5 per cent.

The early trading in Philadelphia to-day was confined largely to local issues. The market closed weak. Local issues were lightly dealt in despite the early tendency.

A steady tone and fair activity ruled on the Chicago Stock Exchange to-day. Bonds were dull but steady.

The Boston market was fairly broad to-day. In the afternoon the heavy tone of the New York market was reflected in the trading in Boston.

The trading in Baltimore was broader to-day, but the total of transactions was small. The sales of stock totaled 273 shares, while the sales of bonds totaled $38,300, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 24	Dec. 30
American Brake Shoe & Foundry (com.)	86	90
American Brake Shoe & Foundry (pref.)	126½	127
American Cities Company (com.)	36	36
American Cities Company (pref.)	60	61
American Light & Traction Company (com.)	334	335
American Light & Traction Company (pref.)	106	106
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (com.)	a42	42
Aurora, Elgin & Chicago Railroad (pref.)	a84	83
Boston Elevated Railway	86½	85½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	58	58
Boston & Worcester Electric Companies (com.)	*6½	*6½
Boston & Worcester Electric Companies (pref.)	37	36½
Brooklyn Rapid Transit Company	88	87⅞
Capital Traction Company, Washington	110½	111
Chicago City Railway	160	160
Chicago Elevated Railways (com.)	25	25
Chicago Elevated Railways (pref.)	75	75
Chicago Railways, ptcptg., ctf. 1	91½	90
Chicago Railways, ptcptg., ctf. 2	28¼	28
Chicago Railways, ptcptg., ctf. 3	7	7
Chicago Railways, ptcptg., ctf. 4	1¾	1¾
Cincinnati Street Railway	107½	102
Cleveland Railway	103½	103½
Cleveland, Southwestern & Columbus Ry. (com.)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	30
Columbus Railway & Light Co	18	18
Columbus Railway (com.)	59¼	59¼
Columbus Railway (pref.)	88	88
Denver & Northwestern Railway	*80	*80
Detroit United Railways	80	80
General Electric Company	140	138¾
Georgia Railway & Electric Company (com.)	119¼	120
Georgia Railway & Electric Company (pref.)	84	84
Interborough Metropolitan Company (com.)	15	14¾
Interborough Metropolitan Company (pref.)	60¼	60
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*90	*90
Kansas City Railway & Light Company (com.)	*20	*20
Kansas City Railway & Light Company (pref.)	*30	*30
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	*24	*24
Manhattan Railway	125	125
Massachusetts Electric Companies (com.)	10¼	13
Massachusetts Electric Companies (pref.)	63	63½
Milwaukee Electric Ry. & Light Co. (pref.)	*95	*95
Norfolk Railway & Light Company	24¾	*24¾
North American Company	67	67
Northern Ohio Light & Traction Co. (com.)	70	58
Northern Ohio Light & Traction Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	39	40⅞
Philadelphia Company, Pittsburgh (pref.)	39	40
Philadelphia Rapid Transit Company	18	18½
Portland Railway, Light & Power Company	53	53
Public Service Corporation	105	107
Third Avenue Railway, New York	41⅝	41⅝
Toledo Traction, Light & Power Co. (com.)	30	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	105½	106
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*80	*80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	24⅞	25
United Rys. Inv. Company (com.)	20	21¼
United Rys. Inv. Company (pref.)	37	39
Virginia Railway & Power Company (com.)	56	50
Virginia Railway & Power Company (pref.)	99¼	98
Washington Ry. & Electric Company (com.)	85	85½
Washington Ry. & Electric Company (pref.)	87	87
West End Street Railway, Boston (com.)	68	69
West End Street Railway, Boston (pref.)	90	90
Westinghouse Elec. & Mfg. Company	65	65½
Westinghouse Elec. & Mfg. Co. (1st pref.)	114	116¼

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*Last sale. a Asked.

Changes in Personnel of the Rhode Island Company

A. E. Potter, A. T. Potter and L. S. Storrs, were elected directors of the Rhode Island Company, Providence, R. I., on Dec. 27, 1913, succeeding C. F. Brooker, James Hemingway and William Skinner. Mr. Potter was also elected president of the company and Howard Elliott was elected chairman of the board. Announcement was also made that E. D. Robbins, heretofore general counsel for the New York, New Haven & Hartford Railroad, which controls the Rhode Island Company, had been appointed general counsel for the board of directors. He will be called upon for advice relative to the corporate, intercorporate and financial relations of the allied companies. Edward G. Buckland, a vice-president of the New York, New Haven & Hartford Railroad and of the Rhode Island Company, will take charge of the general legal business and litigation of the company and will represent the New Haven Railroad in its dealings with Congress, Legislatures and other government bodies. Howard Elliott, chairman of the board of the New Haven company, following the meeting on Dec. 27, gave out a statement in which he declared that no plan had been formulated for the segregation of the properties of the company. He stated that the subject of separation had been discussed, together with other matters, including the ratification of an amendment to the contract regarding the Grand Central terminal. Mr. Elliott, speaking of the new officers of the Rhode Island Company, said:

"They will be charged with the important duty of looking after the affairs of the Rhode Island Company, getting close to the people, and handling the great bulk of the business without interference or advice from any other source. Of course, on large questions like capital expenditures and long-time contracts it will be right and proper for them to consult with me."

Speaking about the probable segregation, he said:

"Just now our financial and governmental problem is a serious one, but I hope in time both will be solved, and that I can have a little time to see the properties and the country they serve. We have decided upon no plan. We discussed segregation as we do at every meeting. I can say that we are making progress. The board of directors met for the purpose of ratifying an amendment to the contract with the New York Central & Hudson River Railroad in regard to the Grand Central terminal. This amendment had been under consideration for some time and negotiations were only just completed, and it was necessary to authorize the amendment by the full board. The amendment made more clear the relations of the companies in regard to the so-called 'aerial rights,' or the use of the space above the tracks."

Brooklyn Rapid Transit Absorbs Coney Island & Brooklyn Railroad

The Public Service Commission for the First District of New York has authorized the Coney Island & Gravesend Railway, a subsidiary of the Brooklyn Rapid Transit Company, to purchase 26,370 shares of the capital stock of the Coney Island & Brooklyn Railroad at par. The total authorized capital of the Coney Island & Brooklyn Railroad is 30,000 shares at a par value of $100 each, and of this amount 29,839 shares are outstanding. Commissioner George V. S. Williams, in his opinion recommending the authorization, says that while transfers are not exchanged between the Coney Island & Brooklyn Railroad and the Brooklyn Rapid Transit lines, "it does appear from the testimony of Mr. Meneeley, the vice-president and treasurer of both the Coney Island & Gravesend Railway and the Brooklyn Rapid Transit Company, that he expects to make recommendations for transfers between the lines of the Coney Island & Brooklyn Railroad and the Brooklyn Heights Railroad and the Nassau Electric Railroad lines (both subsidiary companies of the Brooklyn Rapid Transit system) at a number of intersections, and the commission has under consideration a proposition made on behalf of the Brooklyn Rapid Transit Company to issue transfers at every intersection of any of the lines controlled by it, which, of course, would mean transfers from the Coney Island & Brooklyn Railroad at every intersection of other trolley lines in the borough, in case the order should be granted."

Commissioner Maltbie has written an opinion dissenting from the action of the Public Service Commission in authorizing the merger of the companies.

The Coney Island & Brooklyn Railroad operates 48.24 miles of single track and 472 passenger cars. Except for the Van Brunt Street & Erie Basin Railroad, 3 miles long, it was the only line in Brooklyn not included in the system of the Brooklyn Rapid Transit Company. The company was chartered in 1860 and it absorbed the Prospect Park & Flatbush Railroad on April 1, 1891. On Sept. 1, 1897, the company leased the Franklin Avenue division of the Brooklyn City & Newtown Railroad. On Dec. 4, 1897, the entire system of the Brooklyn City & Newtown Railroad was leased for 999 years, and in 1910 it was absorbed. The company also owns and operates the De Kalb Avenue & North Beach Railroad and the New York & Brooklyn Bridge Extension. The dividend record of the company follows: in 1893, 4 per cent on $500,000, 3 per cent on $1,000,000; in 1894, 1895, 1896 and 1897, 6 per cent; in 1898, 9 per cent; in 1899, 9½ per cent; in 1900, 10 per cent; in 1901, 12 per cent; in 1902, 1903 and 1904, 16 per cent; in 1905, 14 per cent; in 1906, 8 per cent on $2,000,000; in 1907 (February only), 2 per cent on $2,000,000; none since.

Results of Hudson & Manhattan Readjustment

The Hudson Companies, which controls the Hudson & Manhattan Railroad, is sending out a circular to its shareholders outlining the results of the recent voluntary readjustment. The circular reads in part as follows:

"The readjustment of the debt of the Hudson & Manhattan Railroad and the provisions in connection therewith for paying the then outstanding $21,157,000 of notes of the Hudson Companies have been carried out. The resulting condition of the Hudson Companies is as follows:

"Assets: Hudson & Manhattan preferred stock, $2,307,600; Hudson & Manhattan common stock, $25,171,200; Greeley Square Realty Company 5 per cent bonds, $2,450,000; Greeley Square Realty Company preferred stock, $1,000,000; Greeley Square Realty Company common, $1,000,000; real estate, cost less mortgage, $127,254; accounts receivable, $26,382; mortgages receivable, $10,000; cash, $498,329.

"Debt—Note issue, 5 per cent, $1,500,000; accounts payable, $33,081.

"The Hudson Companies' 5 per cent note issue is increased by $500,000, from $1,000,000 to $1,500,000. On the other hand, the companies' cash is increased by practically the same amount. This additional cash was procured in this way, in order to provide for a payment upon the principal of the underlying mortgages upon the property of the Greeley Square Realty Company. This company owns the property at Thirty-third Street and Broadway under lease to Gimbel Brothers, subject to two underlying mortgages or the principal sum of $6,500,000."

Alton, Granite City & St. Louis Traction Company, Alton, Ill.—The stockholders of the Alton, Granite City & St. Louis Traction Company have voted to increase the capital stock of the company from $3,000,000 to $3,400,000.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—The Bloomington & Normal Railway & Light Company has filed with the Secretary of State a certificate of increase in the capital stock of the company from $1,500,000 to $1,650,000.

Bowling Green (Ky.) Railway.—Master Commissioner W. R. Speck, who had been acting as receiver for the Bowling Green Railway, has sold the property of the company at auction, following an order of court. John S. Lewis was the purchaser at $20,600. The only other bidder was T. Lindsey Fitch, of the Kentucky Public Service Company, who bid $20,550. The sale was made following a petition of the Fidelity & Columbia Trust Company, Louisville, trustee for the bondholders.

Cairo Electric & Traction Company, Cairo, Ill.—The stockholders of the Cairo Electric & Traction Company have voted to increase the capital stock of the company from $150,000 to $300,000.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—An order has been entered by Federal Judge Landis, instructing W. O. Johnson, receiver for the Chicago & Milwaukee Electric Railroad, to pay $27,000 in interest to holders of the $1,080,000 of bonds of the road. This figure represents the semi-annual interest payment. It is to be made Jan. 14, on which day the interest falls due.

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—The Galesburg Railway, Lighting & Power Company, which was incorporated in Illinois some time ago by the McKinley interests with a preliminary capital of $50,000, has increased its stock to $3,500,000 and arranged to take over the Galesburg Railway & Light company, the Galesburg Gas & Electric Light Company, the Knoxville Electric Light & Power Company, the Abingdon Light & Power Company and the People's Traction Company, Galesburg.

Interborough Rapid Transit Company, New York, N. Y.—Supreme Court Justice Van Siclen in Brooklyn has dismissed the complaint in a suit brought by Clarence H. Venner, a minority stockholder in the Interborough Rapid Transit Company, against the directors of the corporation, including August Belmont, Cornelius Vanderbilt and others. The action was brought to compel the defendants, as directors of the company to account for 15,000 shares of capital stock involving $4,500,000 which it was alleged had been issued to Belmont's firm illegally. In dismissing the complaint Justice Van Siclen said: "This court is not convinced that the essential facts in the complaint have been admitted or proved by a fair preponderance of evidence, and without deciding whether the facts will permit a recovery by an action of some other character, feels compelled to dismiss the complaint and direct judgment for the defendant with costs and allowances. Obviously no weight or virtue can be added to this court's memorandum by indulging in invectives or branding the plaintiff, Venner, or his so-called vehicle, the Continental Security Company. If heretofore the judicial records and published opinions of various state and federal courts tend to establish that said Venner is an artificer of litigation and a menace to corporate society, an added curse will work no cure."

Ohio Service Company, Dennison, Ohio.—The Ohio Service Company has been authorized by the Public Utilities Commission of Ohio to issue its capital stock of the total par value of $30,000 to be delivered in full payment of the purchase price for the assets, physical property and rights owned by the Twin City Traction Company in Dennison and Uhrichsville, Ohio, the purchase of which property by the Ohio Service Company was consented to and approved by the commission on Oct. 10, 1913.

People's Traction Company, Galesburg, Ill.—The stockholders of the People's Traction Company have approved an increase in the capital stock of the company from $150,000 to $300,000.

Public Service Corporation of New Jersey, Newark, N. J.—As a result of the refusal of the Board of Public Utility Commissioners of New Jersey to sanction the sale of $620,000, par value, of first mortgage bonds of the North Hudson County Railway, to the Fidelity Trust Company, at 97 and accrued interest, an invitation was extended by the company for competitive bids. Julius S. Rippel, who protested previously to the commission that he had not had an opportunity to bid for the issue originally, offered to buy the issue at 99. Clark, Dodge & Company submitted a bid on behalf of themselves and W. E. R. Smith & Company offered 99½ and interest for the issue. F. A. Peters, Paterson, bid 99 for a lot of $10,000. The Fidelity Trust Company notified the Public Service Corporation that it was unwilling to increase its bid of 97, and that it therefore withdrew from the competition. The Public Utility Commission has now made an order authorizing the sale of the bonds at a price not less than 99½. The plans for issuing these bonds were referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 29, 1913, and Dec. 13, 1913.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The stockholders of the Puget Sound Traction, Light & Power Company have authorized an issue of notes or short-time bonds to refund two-year mortgage notes, of which $7,500,000 mature on Feb. 1, 1914, and to provide for extensions and improvements. Part of the $7,500,000 of notes are to be met out of the proceeds of the $2,686,200 of preferred stock sold recently.

Reading Transit & Light Company, Reading, Pa.—The Reading Transit & Light Company proposes to create a limited open-end mortgage for $50,000,000 to provide funds to retire the $750,000 of ten-year 6 per cent debentures now outstanding and provide for extensions and improvements. The total amount of bonds which it is proposed to issue at this time has not been announced.

Shore Line Electric Railway, Norwich, Conn.—The stockholders of the New London & East Lyme Street Railway have ratified the lease executed by that company to the Shore Line Electric Railway on Aug. 1, 1913, for the period of twenty-one years of all the properties and franchises of the company.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—The Youngstown & Ohio River Railroad has declared a dividend of 1 per cent on its preferred stock. This is a reduction of one-quarter of 1 per cent as the stock is 5 per cent cumulative preferred.

Dividends Declared

Boston (Mass.) Suburban Electric Companies, quarterly, $1, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Cincinnati, Ohio, quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizens' Traction Company, Oil City, Pa., $1, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Nashville Railway & Light Company, Nashville, Tenn., 1¼ per cent, preferred.

New England Investment & Security Company, Springfield, Mass., $2, preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-quarters of 1 per cent.

Union Passenger Railway, Philadelphia, Pa., $4.75.

West Philadelphia (Pa.) Railway, $5.

ELECTRIC RAILWAY MONTHLY EARNINGS

FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Oct.,	'13	$157,218	$91,713	$60,760	$45,177	$15,583
1 "	"	'12	144,752	85,291	54,870	43,583	11,287
10 "	"	'13	1,492,471	875,961	569,722	436,373	133,349
10 "	"	'12	1,405,674	840,277	520,408	424,410	95,998

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	Oct.,	'13	$57,663	*$35,348	$22,315	$13,067	$9,248
1 "	"	'12	47,619	*30,393	17,226	10,174	7,052
12 "	"	'13	622,741	*410,292	212,448	138,986	73,462
12 "	"	'12	593,491	*380,387	213,105	116,013	97,092

PENSACOLA (FLA.) ELECTRIC COMPANY

1m.,	Oct.,	'13	$25,399	*$15,769	$9,630	$7,240	$2,390
1 "	"	'12	24,759	*15,858	8,900	6,377	2,523
12 "	"	'13	285,168	*181,560	103,609	79,479	24,130
12 "	"	'12	286,942	*178,167	108,775	75,184	33,591

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	Oct.,	'13	$744,519	*$419,485	$325,034	$174,468	$150,566
1 "	"	'12	715,378	*396,814	318,564	169,366	149,198
12 "	"	'13	8,506,260	*4,952,648	3,553,612	2,056,446	1,497,166
12 "	"	'12	......	......	......	......	......

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m.,	Nov.,	'13	$251,260	*$151,014	$100,246	$43,517	$56,729
1 "	"	'12	233,971	*133,957	100,015	43,662	56,353
12 "	"	'13	2,979,608	*1,817,448	1,162,161	536,967	625,194
12 "	"	'12	2,638,427	*1,578,557	1,059,871	529,417	530,454

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	Oct.,	'13	$69,381	*$47,654	$21,728	$22,803	†$1,075
1 "	"	'12	63,886	*48,639	15,247	16,336	1,089
12 "	"	'13	813,665	*555,473	258,193	250,636	7,557
12 "	"	'12	740,582	*548,567	192,015	191,737	278

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

1m.,	Oct.,	'13	$454,126	$222,402	$231,724	$134,962	$96,762
1 "	"	'12	414,561	204,673	209,888	124,725	85,163
4 "	"	'13	1,771,933	882,086	889,847	532,888	356,959
4 "	"	'12	1,649,490	817,535	831,955	496,114	335,841

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* Includes taxes.

† Deficit.

Traffic and Transportation

Seattle Company Appeals from Rate Decision

Formal notice has been filed with the Public Service Commission of the appeal taken by the Puget Sound Traction, Light & Power Company, Seattle, Wash., from the commission's decision in ordering the company to sell six street car tickets for 25 cents on the cars in Seattle. Three allegations are set forth as the basis for the writ: that the commission had no jurisdiction to issue the order without first having determined the reasonableness of the 4-cent fare; that in fact the 4-cent fare will result in inadequate returns to the company, and that the order virtually abrogates the terms of the franchise existing between the city and the company. The writ of review is returnable Jan. 14, 1914.

A statement addressed to the public by Jacob Furth, president of the company, setting forth the reasons for the appeal to the courts from the order of the commission, follows in part:

"The company is about to apply to the courts to reverse the order recently made by the Public Service Commission requiring the company to sell upon its cars 25 tickets for $1 and six tickets for 25 cents. The provisions of the contract between the city and the company establishing street railway fares and regulating the sale of tickets are just as plain and clear now as they were when the city deliberately executed the contract in consideration of benefits to be received by it and which ever since such execution it has continued to receive.

"The city had endeavored to have the franchise read that the grantees should sell upon their cars twenty-five tickets for $1. The applicants for the franchise had notified the city that they would neither bid for nor accept a franchise containing such provision. The franchise was then worded so that the grantees should not be obliged to sell commutation tickets upon the cars, but should be obliged to keep them on sale 'at their main office and power stations within the city.' From 1900 until 1911 no claim was ever made that the company was under any obligation, legal or moral, to sell commutation tickets except at the places agreed on in the franchise. In the summer of 1911 the company, at the request of the city, established twelve places for the sale of commutation tickets in addition to the places required by the franchise. In October, 1911, after the company had complied with such request of the city, the Council, against the protest of the company that its action was a violation of the contract between the city and the company, was a breach of good faith and was without authority, passed a bill requiring the company, under penalty of not exceeding $100 fine or thirty days' imprisonment for each offense, to sell upon all cars twenty-five tickets for $1 and six for 25 cents. The Mayor vetoed the bill. The Council passed the bill over the veto of the Mayor and against the protest of the company, and the bill became an ordinance of the city.

"The evidence of the company before the commission showed that the company was not earning a fair return upon the value of its property and there was no evidence introduced to the contrary. The commission held that even though the company was complying with all of the provisions of its franchise, even though its rates did not exceed the maximum fixed in the franchise and the statute, and even though a franchise requiring the sale of tickets upon the cars at six for 25 cents would not have been accepted, the company could be forced by order of the commission at the instance of the city and in advance of a valuation, to yield $60,000 a year which under its contract with the city it was entitled to earn. The decision, while so reducing the earnings of the company, left the city free to collect 2 per cent on the gross earnings of the street railway, amounting to more than $70,000 a year.

"The company believes that the commission has made an honest but serious mistake in the decision rendered. It does not believe that the decision is maintainable either at law or in equity, or that it is in accordance with sound business principles. The decisions of the commission are, under the law creating the commission, reviewable by the courts, and to the courts the company is forced to appeal for relief from an order which impairs its contract and deprives it of its property without due process of law."

Change in Display of Route Signs.—At the suggestion of the Public Service Commission of the Second District of New York, the International Railway, Buffalo, which operates in Buffalo, Niagara Falls and Lockport and between these points, will place the route number of its cars on the side instead of in the front. This applies merely to the new near-side cars.

Amendment Proposed to Kansas City Traffic Code.—An amendment to the traffic code has been presented in the Kansas City Council, as the result of the confusion attending the various interpretations of the motor ordinance. This has been changed to provide that automobiles shall stop at least 10 ft. in the rear of a street car which has stopped at a street intersection. One or two police judges recently held that motorists could pass street cars provided they maintained the distance of 10 ft. The amendment will eliminate such rulings.

Suburban Fare Concession at Birmingham.—A concession in reference to transfers from Wylam and Fairview to the central part of Birmingham has been announced by the Birmingham Railway, Light & Power Company, Birmingham, Ala. At this time it is necessary to pay 10 cents to travel from Fairfield to Birmingham or from Wylam to Birmingham. It is anounced that the company will grant a reduction in this fare. The plan is to charge 5 cents fare from Wylam or Fairfield to the central part of Birmingham without, for instance, giving a transfer to East Lake or to Powderly.

Petition for Smoking Cars Dismissed.—The Public Service Commission for the First District of New York has dismissed the proceeding instituted to inquire whether the street railroad corporations of Greater New York should be required to operate smoking cars or cars containing smoking compartments on the surface and elevated lines. No opinion was written, the order simply reciting that the commission is of the opinion "that under the circumstances appearing it would not be reasonable to require said street railroad corporations to operate smoking cars or cars containing smoking compartments."

Christmas in Missouri.—Two special cars were necessary to hold the Christmas gifts of J. R. Harrigan, of the Kansas City, Clay County & St. Joseph Electric Railway, to the 200 employees of the road. Mr. Harrigan presented every attaché of the line with a basket containing a chicken, a quart of oysters, celery and other accompaniments. The Metropolitan Street Railway, Kansas City, distributed cigars to its men. The Topeka (Kan.) Railway gave turkeys to the married employees, silverware to their wives and gloves to the bachelors. A vaudeville performance also was tendered at the company's annual entertainment to the employees.

Dinner of Missouri Railroad Employees.—The ninth annual dinner of the Electric Railway Club, composed of all the officers and employees of the Southwest Missouri Railroad, Webb City, Mo., was held recently. The dinner this year was notably successful. Many leading citizens of the communities through which the company operates attended as guests. The club owns a very attractive club house, which was illustrated on the back of the menu card used at the dinner. Members of the club receive a stipend when incapacitated for work by injury or sickness. The company is also carrying group insurance in the Equitable Life, New York, to which members of the club are eligible. The company pays half of the premium on these policies and the insured pays the other half. Each policy is for $1,000.

Decision in Seattle Transfer Case.—The Supreme Court of the United States has dismissed the appeal of William R. Crawford, former president of the Seattle, Renton & Southern Railway, from the decision of the Washington Supreme Court upholding the requirement for the exchange of transfers between the cars of the Puget Sound Traction, Light & Power Company and the Seattle, Renton & Southern Railway on a basis of 50 per cent of the fare received to each company. A. G. Linhoff, appearing as relator, brought suit in the King County Superior Court several years ago against the two companies to require them to exchange transfers on a 50 per cent basis. Judge Wilson R. Gay held in favor of the city and directed the issuance of such transfers, and the Supreme Court of the State of Washington affirmed that decision. The issuance of transfers began at that time and has continued since.

Protest Against Re-routing in Buffalo.—Application has been made to the Public Service Commission of the Second District of New York by Main Street merchants and property owners to require the International Railway to reroute its Hoyt and Elmwood cars, the two most important lines from the West Side residential district, down Main Street, as formerly. The cars were taken off Main Street last spring because of the heavy traffic on Buffalo's principal thoroughfare. Property owners and merchants say business has dropped off and property depreciated in value since these two lines have been routed down Franklin Street, two blocks to the west of Main Street. At a hearing before Commissioner Hodson held in Buffalo, E. G. Connette, president of the company, and Thomas Penney, former president, but now legal adviser, explained that sixty cars a minute are operated both ways in Main Street and during the rush hours 120 cars a minute are operated in both directions. They said it would be almost impossible to maintain schedules with two more lines operating up and down Main Street. Decision was reserved by the commission.

Praise for the Public Service Railway.—In commenting editorially on the increase in the wages of its trainmen announced recently by the Public Service Railway the Newark *News* said: "The spirit underlying the announcement of an increase in wages for employees of the Public Service Railway is laudable for more reasons than one. It is generous, it is good business and it has an element of consideration for the public. The rate of increase is sufficiently large to enable each of the employees to better his mode of living. Increased wages will enable the company to set a higher standard in the personnel of its operating force through widening the field of available men. This means greater efficiency in smoother operation, a decrease in the wear and tear—because of carelessness and incompetency—on its rolling stock, and in diminished proneness to accidents, which are expensive both in injury to the company and frequently in damage suits. The public will be benefited, obviously, in greater safety, better service and more considerate treatment. The Public Service Railway has plenty of rules, and good rules, for observance by its employees, the difficulty having been in getting them carried out. With a greater incentive for the employees to obey the rules more carefully, the reward of the Public Service Railway should be found in greater facility and economy of operation."

Ordinances in Interest of Interurban Lines Introduced in Little Rock.—Negotiations between the promoters of the Little Rock, Pine Bluff & Eastern Traction Company, the officials of the Little Rock Railway & Electric Company and representatives of the city of Little Rock which have been in progress since Sept. 8, 1913, have resulted in three ordinances being presented to the City Council to provide for an interurban railway to Pine Bluff and street railway connection with Argenta. These three ordinances, which represent the three-cornered agreement, have been read once and referred to the Mayor, city attorney, street, finance and ordinance committees. Mayor Taylor has effected an agreement with the Little Rock, Pine Bluff & Eastern Traction Company, the Little Rock Railway & Electric Company and the Inter-City Terminal Railway, which is to take control of the Argenta lines and extend street car service into Little Rock, whereby a 5-cent fare is guaranteed from all points in Argenta to all points on the downtown loop, and transfer privileges are secured to all points in either city at the rate of 7 cents for one continuous passage. The Inter-City Terminal Railway is to permit interurban cars to come in over its lines and along the downtown loop, which extends down Spring Street, Capitol Avenue, Main and Markham Streets. The city is to receive compensation from both the Inter-City Terminal Railway and the Little Rock, Pine Bluff & Eastern Traction Company for entering the city, and each is to put up a $20,000 bond.

Personal Mention

Mr. Robert E. Wirsching has been appointed to the Board of Public Utilities of Los Angeles, Cal., to succeed Mr. O. O. McReynolds.

Mr. D. W. Pontius has been appointed traffic manager of the Visalia Electric Railroad, with headquarters in Los Angeles, Cal.

Mr. C. B. Vorce has resigned as construction engineer for the British Columbia Electric Railway, Vancouver, B. C. Mr. Vorce became connected with the British Columbia Electric Railway in October, 1910, coming from New York, where he was connected with the engineering firm of Sanderson & Porter.

Mr. Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford Railroad, president of the Connecticut Company, New Haven, Conn., and president of the Rhode Island Company, Providence, R. I., has been elected chairman of the board of the Rhode Island Company, a newly created position.

Mr. Frank H. Funk has been appointed a member of the Illinois Railroad & Warehouse Commission by Governor Dunne in place of James A. Willoughby, resigned. In making this appointment the Governor let it be known that Mr. Funk would be a member of the new Public Utilities Commission when it is formed. Mr. Funk was the Progressive nominee for Governor in 1912, and served several terms as State Senator from the Bloomington district.

Mr. A. E. Potter, general manager of the Rhode Island Company, Providence, R. I., has been elected president of the company to succeed Mr. Howard Elliott, who has been elected chairman of the board of directors, a newly created position. Mr. Potter is a native of Providence, and is forty years of age. He entered the employ of the Union Railway, Providence, out of which grew the Rhode Island Company, in 1892, as assistant to the superintendent of tracks. He served in this capacity until 1895, when he was appointed superintendent of transportation, the duties of which office he was subsequently elected to perform after the Union Company was absorbed by the Rhode Island Company in 1902. In 1906 Mr. Potter was promoted from superintendent of transportation of the company to general manager, to succeed Mr. R. I. Todd, who resigned to become general manager of the Indianapolis Traction & Terminal Company. Mr. Potter has served continuously as general manager of the company since that time. The system of the Rhode Island Company in Providence and elsewhere in Rhode Island comprises 583 miles of track.

A. E. Potter

Mr. J. H. McClure has been appointed general superintendent of the Citizens' Traction Company, Oil City, Pa., one of the public utility properties operated by Day & Zimmermann, Philadelphia, as general managers. In the early part of the year Mr. W. W. Cole, of Day & Zimmermann, was sent to the Citizens' Traction Company property, as acting general manager, to perfect a reorganization of the property and to direct a large amount of construction work. Mr. Cole has spent most of his time during the past nine months on the property, and has successfully concluded his labors. Mr. McClure has entered upon his duties and will be permanently located at Oil City. He has for several years been a member of the Day & Zimmermann forces and is one of the firm's prominent efficiency engineers, having given particular attention to schedules and car operations. Mr. McClure has in the past few years made a number of visits to the Citizens' Traction Company property on expert work.

Mr. T. L. Miller, assistant to Mr. F. R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed purchasing agent for all the properties operated by this company to succeed Mr. C. T. Munz, resigned. Mr. Miller's appointment as assistant to the president was announced in the May 18, 1912, issue of the ELECTRIC RAILWAY JOURNAL, accompanied with his biography.

J. F. Calderwood

Mr. John F. Calderwood resigned as vice-president and general manager of the Brooklyn Rapid Transit System on Jan. 1, but will retain his connection with the company in an advisory capacity. He will take a year's vacation before resuming active work. Mr. Calderwood became connected with the Brooklyn Rapid Transit Company in 1902 as assistant to Mr. J. L. Greatsinger, then president of the company. He had previously been comptroller of the Twin City Rapid Transit Company, Minneapolis, Minn. Mr. Calderwood was born at Reford near Detroit, Mich., on May 27, 1859. He was educated in the public and high schools of Fenton and at the University of Michigan. After teaching a year in a normal college he entered the employ of a lumber company at Bay City, Mich., and later became accountant and credit manager of a carpet concern in Minneapolis. In 1888 he was elected comptroller of Minneapolis and at the close of the term accepted the office of comptroller of the Minneapolis Street Railway, which with the St. Paul City Railway was afterward consolidated as the Twin City Rapid Transit Company. For some time previous to the purchase of the Third Avenue Railroad in New York by the Metropolitan Street Railway in 1900 Mr. Calderwood spent some time in the East at the request of the owners of the property to rehabilitate it. The knowledge of street railway finance and management displayed by him during this period as well as his previous record led to his appointment with the Brooklyn Rapid Transit Company. The lines which were under Mr. Calderwood's management in Brooklyn constitute a system of 542½ miles of surface single track and 71¼ miles of elevated single track, while the extensive subway system under the dual plan now under construction will add very considerably to what is probably the largest trackage under any one city railway in the world. Mr. Calderwood was one of the founders of the American Electric Railway Accountans' Association and one of its first presidents. He was largely instrumental in the establishment and adoption of the standard system of accounts of that association. Mr. Calderwood was a frequent contributor to the STREET RAILWAY JOURNAL on accounting topics, but was compelled to discontinue this work on account of the exactions of his duties in Brooklyn. When Mr. Calderwood came to Brooklyn he took charge of a system which was still loose-jointed in many parts and operating with steam on the elevated lines and out-of-date cars on the surface lines. He leaves it as one of the most progressive electric railway organizations in the United States and one that has before it wonderful possibilities of still greater expansion through the development of the new rapid transit routes. The company has announced that with Mr. Calderwood's retirement the position of general manager will be abolished.

Mr. W. W. Cole, who has been acting general manager of the Citizens' Traction Company, Oil City, Pa., to perfect the reorganization of the property and direct reconstruction work, will return to the eastern part of Pennsylvania and again take up his important field of work with Day & Zimmermann, Philadelphia, Pa., who operate the properties at Oil City. Mr. Cole will divide his time largely between the Philadelphia and New York offices of Day & Zimmermann, as he did before he located temporarily in Oil City and will only occasionally visit the Citizens' Traction Company property hereafter, as it is necessary to look after certain expert work. As an indication of their recognition of his work and the high personal esteem in which he is held by the people in general, a number of the prominent citizens of Oil City tendered a complimentary banquet to Mr. Cole on the occasion of his leaving Oil City to return to Philadelphia and New York.

Mr. Edward D. Robbins, general counsel of the New York, New Haven & Hartford Railroad, has been appointed general counsel of the board of directors. He will be relieved of the administrative legal work by Mr. Edward G. Buckland, vice-president. Mr. Robbins will be called upon for advice regarding the corporate, intercorporate and financial relations of the company and the legal rights and duties of the several parts toward one another and about other important matters that may be assigned to him by the board. He will report to Mr. Howard Elliott, the chairman, and will maintain offices in Boston and New Haven.

Mr. A. D. Furlong, who has been third vice-president, general manager and purchasing agent of the Springfield (Ill.) Consolidated Railway, has been appointed general manager of the Saginaw-Bay City Railway and has been elected vice-president of the Saginaw & Flint Railway, Saginaw, Mich., to succeed Mr. John A. Cleveland, who as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, has been appointed to a position in the office of Hodenpyl, Hardy & Company, New York, N. Y. Mr. Furlong entered the service of the Hodenpyl, Hardy & Company syndicate in the summer of 1906 as a collector in the gas and electric light department of the Pontiac (Mich.) Light Company. Later he filled the position of stenographer to the local manager of the Pontiac Light Company. Subsequently he held the positions of bookkeeper and chief clerk and secretary and general manager of the same company. On Feb. 1, 1912, he left the employ of the Pontiac Light Company to assume the position of general superintendent with the Springfield properties. In January, 1913, he was elected vice-president and appointed general manager of the Springfield Consolidated Railway, Springfield Gas Light Company and the Springfield Light, Heat & Power Company.

Edward Karow

Mr. Edward Karow, who for the past year has been in the office of Mr. Horace Lowry, vice-president of the Twin City Rapid Transit Company, Minneapolis, Minn., as assistant, has been appointed superintendent of the Minneapolis division of the Twin City lines. Mr. Karow was born in 1884 and was graduated in 1905 from Princeton University, with the degree of civil engineer. In 1907 he received the post-graduate degree of electrical engineer from Princeton. He spent one year in the testing department of the General Electric Company at Schenectady, N. Y., one year in the office of the same company designing direct-current machinery, and three years in the railway commercial department of the company. He then became connected with the Twin City Rapid Transit Company as assistant to the vice-president.

Mr. Slaughter W. Huff, president and general manager of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., has been elected vice-president of the Transit Development Company, Brooklyn, and will be elected vice-president of the Brooklyn Rapid Transit Company and the other companies in the Brooklyn Rapid Transit System, with assigned duties, to succeed Mr. J. F. Calderwood, whose resignation is announced elsewhere in this column. As stated on page 57 of this issue the Public Service Commission of the First District of New York has authorized the Coney Island & Gravesend Railway, a subsidiary of the Brooklyn Rapid Transit Company, to purchase 26,370 shares of the 29,839 shares of stock of the Coney Island & Brooklyn Railroad now outstanding.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Wisconsin, Illinois & Indiana Electric Railway, Chicago, Ill.**—Application for a charter has been made by this company in Illinois to build an electric railway from the northern line of McHenry County south through the counties of Cook, Dupage, Kankakee, Will, Livingston and McLean. Capital stock, $500,000. Incorporators: J. C. Williams and H. M. Walker, Evanston; J. B. Hubling, Downers Grove, and James L. Clark and C. H. Seeberger, Chicago.

Fort Scott & Pittsburg Railway, Fort Scott, Kan.—Incorporated in Kansas to build a 38-mile line from Fort Scott to Pittsburg via Frontenac, Garland, Arcadia and Mulberry. Capital stock, $100,000. Incorporators: A. P. Dickman, C. D. Samble, W. J. Calhoun, A. N. Keene, J. R. Kearns, Robert B. Barr and Walter Glunz. [E. R. J., May 17, '13.]

***Dan River Railway, King, N. C.**—Incorporated in North Carolina to build interurban electric railways in Stokes and other counties adjacent. Headquarters, King. Capital stock authorized, $500,000. Incorporators: Harlee Miller, Clemmons, N. C.; E. T. Knapp, Bethania, N. C., and Ernest C. Butler, Hamilton, N. Y.

***Saluda-Hendersonville Interurban Railway, King's Mountain, N. C.**—Chartered in North Carolina to build an electric railway from Saluda to Hendersonville, 10 miles. Capital stock authorized, $125,000. Incorporators: J. M. Torrence, W. A. Mauray, C. E. Neisler and J. S. Stanton, Henderson, N. C.

***Charleston Northern Railway, Darlington, S. C.**—Incorporated in South Carolina to build an electric or steam railway from Andrews to Charleston, 57 miles. Capital stock, $28,000 to $1,000,000. Officers: D. T. McKeithan, Darlington, president, and George S. Dargan, Darlington, secretary.

***Shelbyville, Petersburg & Decatur Railroad, Shelbyville, Tenn.**—Incorporated in Tennessee to build a steam or electric railway from Shelbyville, Tenn., to Decatur, Ala. Capital stock, $10,000. S. P. Kirkpatrick, incorporator.

FRANCHISES

Little Rock, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has asked the Council for three franchises in Little Rock.

Winslow, Ariz.—J. F. Mahoney, Winslow, has asked the Council for a franchise for an electric railway in Winslow.

Jacksonville, Fla.—The Jacksonville & St. Augustine Public Service Corporation has received a franchise from the Council through South Jacksonville. This 40-mile line will connect Jacksonville and St. Augustine. Thomas R. Osmond, Jacksonville, general manager. [E. R. J., Aug. 23, '13.]

Atlanta, Ga.—The Georgia Railway & Electric Company has asked the Council for a franchise for extensions of its lines in Atlanta.

Baltimore, Md.—The United Railways & Electric Company has received the approval of its franchise on Callow Avenue from the Public Service Commission of the State of Maryland.

Springfield, Mass.—The Springfield Street Railway has received permission from the Public Service Commission for a double-track location in North Main Street in Springfield.

High Point, N. C.—The Yadkin River Railway has received a franchise from the Council in High Point.

Sewickley, Pa.—The Pittsburgh Railways has asked the Council for a franchise for a line from the Edgeworth borough line to the approach of the Coraopolis bridge along the old Fort Wayne right-of-way.

Dallas, Tex.—The Dallas Consolidated Electric Railway has received a franchise from the Council to double-track certain sections of San Jacinto Street and Washington Street in Dallas.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Among the extensions planned in the near future will be a 1-mile line from Vinesville to Fairfield and a 1½-mile line from Boyles to Dolcito Quarry.

Northern Electric Railway, Chico, Cal.—Work will be begun in the spring on a 40-mile extension from Woodland to Colusa.

Pacific Electric Railway, Los Angeles, Cal.—A contract has been awarded to Robert Sherer & Company, Los Angeles, for 5 miles of grading between Hawthorne and El Segundo for a new short line from Ionia Avenue on Rodondo Beach line to El Segundo, via Hawthorne. Plans are being considered to extend the Daisy Avenue line from its present terminus at State Street to the new residential section in the northwest section of Long Beach.

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company has asked the permission of the State Railroad Commission to begin the construction of the section of its line from Red Bluff to a point on the Oakland, Antioch & Eastern Railway 11½ miles south of Dixon or a few miles from Denverton. The line will be extended to Rio Vista on the Sacramento River, where it will have water connections. This 160-mile line will extend through the west side of the Sacramento Valley. C. L. Donohoe, Willows, president. [E. R. J., Dec. 20, '13.]

Kellogg, Idaho.—An electric railway to be built and operated between Wardner and Kellogg is being promoted by local interests headed by C. Wiese. It is reported that the Bunker Hill-Sullivan Mining Company, Wardner, will be financially interested in the project. [E. R. J., Dec. 6, '13.]

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—This company has increased its capital stock from $2,500 to $3,500,000. This line will connect Marion, Harrisburg, Benton, Johnson City and Herrin. William Rothman, Chicago, is interested. [E. R. J., Dec. 27, '13.]

***Kansas City Southwestern Electric Railway, Kansas City, Kan.**—Plans are being made to build this line between Olathe and Ottawa. W. B. Strang, Overland Park, Kan., president.

Madisonville, Ky.—James R. Rash, referred to recently in connection with a proposed electric line from Madisonville to Nortonville, Ky., states that the project has about been given up. [E. R. J., Aug. 16, '13.]

Madisonville-Nortonville Light, Power & Traction Company, Madisonville, Ky.—Surveys have been completed between Madisonville and Earlington, 4 miles, and construction will be begun in April on this 12-mile railway to connect Madisonville and Nortonville via Earlington, Martons, Barnsley and Victoria. James Breathitt, Jr., Hopkinsville, is interested. [E. R. J., Nov. 22, '13.]

Osage, Ozark & Springfield Electric Railway, Fristoe, Mo.—It is stated that this railway has not yet developed beyond the preliminary stage on account of being unable to secure financial backing. E. E. Trippe, Fristoe, is interested. [E. R. J., April 15. '11.]

Missouri & Kansas Interurban Railway, Kansas City, Mo.—Plans are being considered to build an extension to Lawrence, 25 miles.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Residents of Kenwood and Fairfax additions to the city of Omaha have asked this company for an extension of the Dodge Lake Street line to Fontanelle Park.

***Fair Haven, N. Y.**—Frank Hendrick, Sterling, and associates are considering plans to build an electric railway to connect Oswego, Sodus and Fair Haven, along the shore of Lake Ontario.

Long Island Railroad, New York, N. Y.—Surveys are being made to double-track the section of the line between Easthampton and Montauk.

Waynesville & Canton Electric Railway, Waynesville, N. C.—Work will not be begun on this line until financial backing has been secured. This 12-mile railway will connect Hazelwood and Canton via White Sulphur Springs, Waynesville, Clyde and Lake Junaluska. Headquarters, 48 Patton Avenue, Asheville, N. C. Henry T. Sharp, Asheville, promoter. [E. R. J., June 28, '13.]

***Beach, N. D.**—Preliminary arrangements are being made to build an electric line between Beach, Burkey, Williams, Alha, Carlyle and Dennis to Baker, Mont. Terminals will be at Beach, N. D., and Baker, Mont. No names are yet given of those interested in the project.

Cincinnati (Ohio) Traction Company.—This company has received permission from the Park Commissioners to build the new Bond Hill line in Cincinnati over the Reading Road.

Cleveland (Ohio) Railway.—This company has placed in operation its new line through the Shaker Heights district.

Cleveland, Alliance & Mahoning Valley Railway Company, Cleveland, Ohio.—The Warren division was placed in operation between Ravenna and Newton Falls on Dec. 15. Two-hour service is given between these points. It is planned to have the Alliance and Warren divisions merged into a line that will be extended to Cleveland. [E. R. J., Oct. 25, '13.]

Toledo Traction, Light & Power Company, Toledo, Ohio.—Plans are being considered to build a line from Alvordton to Hillsdale.

Ardmore & Western Interurban Railway, Ardmore, Okla.—Plans are being made to begin work in the spring on this 100-mile electric railway to connect Ardmore, Springer, Glenn, Woodford, Milo, Oil City, Cornish, Orr and Brock. John Owens, Ardmore, president. [E. R. J., June 28, '13.]

Imperial Traction Company, Ottawa, Ont.—Plans are being made to begin work in the spring on the line from Smithsville to Bridgeburg via Hamilton. [E. R. J., Nov. 8, '13.]

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—The new St. Catharines-Niagara-on-the-Lake line of this railway has been placed in operation.

Lehigh Valley Transit Company, Allentown, Pa.—Plans are being made to straighten and shorten the line between Norristown and Allentown.

Hershey (Pa.) Transit Company.—Plans are being made to build a line between Hershey, Grantville, Ono, Jonestown and Fredericksburg, via the counties of Lebanon and Dauphin.

Montreal (Que.) Tramways.—Work will be begun early in the spring on the extension along Van Horne Avenue to the western limits of Montreal.

***Jackson, Tenn.**—The Merchants & Manufacturers' Association, Jackson, Tenn., is negotiating with New York interests for the construction of a trackless trolley line to Bemis. R. S. Fletcher, Jr., is secretary of the association.

Nashville (Tenn.) Traction Company.—Preliminary arrangements are being made to begin work on Feb. 1, 1914, on the 34 miles of new track in Nashville. The Detroit & Nashville Construction Company is being organized for the purpose of doing the construction work for the traction company. W. O. Parmer, Nashville, president. [E. R. J., Dec. 20, '13.]

Ogden (Utah) Rapid Transit Company.—Surveys have just been completed for another possible route for a line between Ogden and Logan.

Twin State Gas & Electric Company, Brattleboro, Vt.—An extension through Esteyville in the near future is being contemplated.

***Blaine-Lynden Electric Railway, Blaine, Wash.**—This company has been organized to build an electric railway between Blaine and Lynden and will connect with the British Columbia Electric Railway's extension from Cloverdale to White Rock.

Seattle (Wash.) Municipal Railway.—Construction of 38.4 miles of double track, or 84.25 miles of single track, as an addition to the municipal line, now consisting of a line 4 miles long extending from Third Avenue and Stewart Street to Salmon Bay, is the plan of the city utilities committee of the City Council in Seattle.

***Minneapolis, Merrill & Marinette Railway, Madison, Wis.**—An amendment to the articles of incorporation of this company has been filed to change its route from Merrill northwest to Prentice to a new plan to build from Merrill northwest to Antigo. John O'Day, president, and F. W. Kubasta, Merrill, secretary.

SHOPS AND BUILDINGS

Geary Street Municipal Railway, San Francisco, Cal.—Plans are being made to build a one-story addition to the Geary Street carhouses in San Francisco. The structure will be of reinforced construction. The cost is estimated to be about $60,000.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—Plans are being contemplated to purchase a site in Davenport on which the company plans to build new carhouses.

Interstate Street Railway, Attleboro, Mass.—Work will be begun soon on a new passenger station at Jay Street in North Attleboro.

Mesaba Electric Railway, Duluth, Minn.—Plans are being considered by this company to build a new carhouse next spring in Virginia, Minn.

Public Service Railway, Newark, N. J.—A new office building will soon be built in West Hoboken, where all commercial offices of the company will be located.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—This company and the Salt Lake & Utah Railway plan to build soon a new joint interurban terminal on the block bounded by Main Street, West Temple Street, Second Street and Third South Street in Salt Lake City.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—Work will be begun at once to build two new power houses. One will be located at San Bernardino and the other in the vicinity of Etiwanda. Contracts for construction of these will be let in the near future. Both structures will be of reinforced-concrete construction.

Danbury & Bethel Railroad, Danbury, Conn.—This company has ordered one 600-kw steam turbine with exciters and two 600-volt, 200-kw rotary converters with transformers and switchboards from the General Electric Company.

New York Central & Hudson River Railroad, New York, N. Y.—This company has ordered two 2000-kw rotary converters and six 735-kw transformers from the General Electric Company.

New York State Railways, Rochester, N. Y.—Work has been begun by this company on its new substation in Rochester. The structure will be of brick and reinforced concrete construction. There will be a main machine room with a separate room for office and separate transformer room. The equipment for the station has been ordered.

Sand Springs Railway, Tulsa, Okla.—One 200-kw, 600-volt d. c., two-phase, sixty-cycle, 1200-r.p.m. a. c. self-starting rotary converter, two 110-kva, 2200-volt to rotary voltage, single-phase, sixty-cycle, O. I. S. C. transformers and one switchboard to control above will be installed by this company at its power plant in Tulsa. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Chambersburg & Shippensburg Railway, Chambersburg, Pa.—This company will install one 200-kw, 600-volt d. c. three-phase, sixty-cycle, 1200-r.p.m. a. c. self-starting rotary converters, three 75-kw, 13,500 to rotary voltage, single-phase, sixty-cycle transformers and one switchboard for the control of the above apparatus in its power house in Chambersburg. The contract for this apparatus has been placed with the Westinghouse Electric & Manufacturing Company.

Greenville (S. C.) Traction Company.—One 500-kw, 600-volt d. c., six-phase, sixty-cycle, 900-r.p.m. a. c. and d. c. self-starting rotary converter, three 185-kva, 12,900-volt to rotary voltage, single-phase, sixty-cycle, O. I. S. C. transformers and one switchboard to control the above apparatus will be installed by this company at its power plant in Greenville. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

Greenville Railway & Light Company, Greenville, Tex.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 200-kw, 600-volt d. c., three-phase, sixty-cycle, 1200-r. p. m., compound-wound, self-starting a. c. rotary converter and one switchboard for the control of same.

Manufactures and Supplies

ROLLING STOCK

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has ordered two parlor cars and ten trailers from the Southern Car Company.

City of Batavia, New York, N. Y., is reported to be in the market for a number of small cars to be operated over the tracks of the Buffalo & Williamsville Electric Railway in Batavia, which the city is about to purchase.

Brooklyn (N. Y.) Rapid Transit Company, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 4, 1913, as having issued specifications for 100 steel subway cars, has ordered these cars from the American Car & Foundry Company.

Chicago (Ill.) Elevated Railways, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, as being in the market for 120 cars, has ordered 128 cars from the Cincinnati Car Company, including sixty-two motor and sixty-six trail cars. Wide and center-entrance doors, Baldwin M. C. B. trucks, General Electric field control motors, Westinghouse multiple-unit control and automatic air brakes are specified.

TRADE NOTES

United States Electric Signal Company, West Newton, Mass., has appointed Roland F. Gammons, 2d, vice-president and treasurer of the company.

Railway Traction & Supply Company, Chicago, Ill., has sold a trial order of 120 Wyoming vacuum sanders to the Cincinnati Traction Company, Cincinnati, Ohio.

Griffin Wheel Company, Chicago, Ill., has elected Thomas A. Griffin as chairman of its board of directors. Franklyn L. Whitcomb, formerly vice-president of the company, has been appointed president to succeed Mr. Griffin.

Barnes & Kobert Manufacturing Company, New Haven, Conn., has organized a sales department and appointed as sales manager R. H. Harper, who for the past ten years has been manager of the railway department of the Western Electric Company.

Manning, Maxwell & Moore, Inc., New York, N. Y., have appointed E. M. Chadwick, formerly with the Fairbanks Company, as manager of their Buffalo branch. D. A. Hamilton, formerly with the Reed Prentice Company, has been appointed assistant at the Detroit branch of the company.

General Electric Company, Schenectady, N. Y., has received an order from the Detroit United Railway for 252 two-motor car equipments. This item is a correction of one in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, in which an error was made in regard to the number of motor equipments ordered.

Weir Frog Company, Cincinnati, Ohio, announces that after litigation extending over seven years it has successfully defended its right to make its well-known derailing device, in general use where steam roads are crossed by interurban roads and where the law requires that the derailing device be operated at a distance from the railroad crossing.

Standard Underground Cable Company, Pittsburgh, Pa., has appointed E. J. Pietzcker Western and Southwestern sales manager in charge of its Chicago and St. Louis offices. W. M. Rogers has been appointed as assistant Western sales manager and R. C. Houck as assistant Southwestern sales manager. E. E. Woodbury has been transferred from the Pittsburgh to the St. Louis office.

Lord Manufacturing Company, New York, N. Y., announces that hereafter it will manufacture and sell the standard railway appliances which for the past twenty years have been handled by the Sterling-Meaker Company, Newark, N. J. These specialties are Giant brakes, Sterling safety brake, roller-bearing trolley bases, fenders and wheelguards, sand boxes and ticket punches.

American Abrasive Metals Company, New York, N. Y., received an order for its Feralun safety treads to be used on the hundred new cars which were ordered by the Chicago City Railway from The J. G. Brill Company. This item is a correction of one which appeared in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, in which it was erroneously stated that the step treads ordered were Universal safety treads.

Nichols-Lintern Company, Cleveland, Ohio, has received orders for sander equipment for 376 cars of the Columbus Railway & Light Company and fifty cars of the Cleveland Railways. Other sander orders have been received from the Scioto Valley Traction Company, Northern Ohio Traction & Light Company, Toledo & Western Railway; for selector switches from the G. C. Kuhlman Car Company; for switches from the New York State Railways; for ventilators from the Union Traction Company of Indiana, Muncie & Portland Traction Company, Scioto Valley Traction Company, Northern Ohio Traction & Light Company, Fairmont & Mannington Railway, Youngstown & Ohio River Railroad, Lake Shore Electric Railway, Mahoning & Shenango Railway & Light Company.

ADVERTISING LITERATURE

Universal Trolley Wheel Company, Northampton, Mass., has issued a New Year's circular describing its composite self-lubricating trolley wheel.

Trussed Concrete Steel Company, Detroit, Mich., has issued a catalog describing its various methods of waterproofing and dampproofing by means of its technical points.

The J. G. Brill Company, Philadelphia, Pa., printed in the December, 1913, issue of the *Brill Magazine* an illustrated biography of J. B. Hamilton, general manager of the Leeds Corporation Tramways, Leeds, England. Among the feature articles are the following: "Conditions which Govern the Type of Cars for City Service in Copenhagen, Denmark," "Semi-Convertible Cars for the Lacroze System, Buenos Aires," "Cars of Various Types for Brazil," "Double-Deck Cars for South Africa," "Longitudinal Seat Car for Concepcion" and "Passenger and Freight Cars for Piraju."

NEW PUBLICATION

Illinois Public Utility Commission Law and Municipal Ownership Law. By William J. Norton, M.E., Chicago, Ill. Published by the author. Size, 8½ in. x 11 in., 200 pages. Price, $2.

Mr. Norton's work as secretary of the rate research committee of the National Electric Light Association and his former position as assistant secretary of the New York Public Service Commission, First District, especially fitted him to prepare the valuable volume which he has issued in reference to the new Illinois law. An index-digest arranges in convenient form references to the sections of the law which relate to special subjects, such as definitions of the principal terms used, references to administrative powers, points relating to proceedings before the commission, what the utility may do and what it must do. One of the most interesting features of this unique volume is the series of comments on different sections of the Illinois law appended at the bottoms of the pages. These do a great deal to interpret the measure for the benefit of public utility operators in Illinois who are confronted with regulation in 1914 and for others who want to study the measure. To those who study the subject of regulation and the affairs of the various commissions, the notes of Mr. Norton are the most interesting part of his work, because they throw into relief the conflicting practices of various commissions and provisions of various laws dealing with this topic. For instance, in the reference to valuation, Mr. Norton calls attention to the importance of the clause providing that the commission shall have power to ascertain any fact which in its judgment may or does have any bearing on the value of the property of public utilities. He calls attention to the clause of the Indiana law requiring that the commission shall give weight to the reasonable cost of bringing the property to its then state of efficiency and also cites various cases dealing with the subject of valuation. Again, Mr. Norton, in his reference to another clause, states that the Indiana commission in 1913 used a clause similar to that in the Illinois law to require utilities to give the value of all property useful to the public and to state the estimated amount of going value included. He adds: "This was a real abuse of authority and unnecessarily worried the utilities." In many ways the book invites careful study by observers of public utility regulation.

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Consolidation of Street Railway Journal and Electric Railway Review

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EQUIPMENT AND ITS MAINTENANCE

With the first issue of this year we began to group in one department, now named "Equipment and Its Maintenance," the various short technical articles which formerly were scattered throughout each issue. A paper which covers every activity of the big and highly specialized field of electric railroading necessarily must print much matter that is essential only to a portion of its readers. This extension of the departmental plan which has been used in our news columns for years thus has the merit of keeping a certain class of electrical and mechanical data in the same relative position in each issue. By this means even the most casual reader will see all that is likely to interest him. While the character of the material is not new, we hope that its publication in a more prominent form will stimulate the writing of many similar articles by the very men who are solving daily the technical problems of the industry. We realize that the practical railway man has not got a great deal of time to write, but there is no reason why he should not be willing to send us occasionally a short description of any new device or method which he believes would help his fellow workers out of trouble in like circumstances. In short, we want the mechanical or electrical man, whether he is in the power, line, track or car department, to look upon "Equipment and Its Maintenance" as a feature of the Electric Railway Journal peculiarly his own.

LIGHT WANTED ON ELECTRIFICATION DECISIONS

It would greatly clarify the situation on the different systems of steam railroad electrification if each company when making a decision should state clearly the reasons which led to its adoption of the one finally selected. In the case of the Melbourne electrification, for example, Mr. Merz frankly published the figures which had led him to recommend high-tension direct current. Consequently, others had the opportunity of checking his data with quotations supplied by the manufacturers of the several systems. Several decisions to electrify steam railroad track with one or another of the different systems have been reached in this country, but no definite statement of the reasons for the choice made has been made public by the railroad company. It is time also that further details should be available in regard to the cost of maintenance of the different systems in use, as this has a direct relation to the cost of operation. At present there is a noticeable absence of data of this kind from several of the roads which have electrical equipments in operation. It is not fair to other railroads considering electrification to oblige them to take up the subject absolutely from the beginning, but this is almost necessary under present conditions.

INDECISION ON MUNICIPAL OWNERSHIP IN TORONTO

Within the last few weeks the conditions surrounding the proposed municipal purchase of the Toronto Street Railway and the Toronto Electric Light Company have become more involved than ever, largely as a result of the vacillation of the public authorities in acting upon Mayor Hocken's plan. When this plan was originally proposed and adopted the Board of Control ordered the corporation counsel to prepare a definite agreement based upon it, and this resolution was adopted by the City Council. On Dec. 16 a resolution was presented to the Board of Control to the effect that the negotiations for the purchase should be ended, but the resolution was voted down. On the day following the pendulum swung the other way, and upon reconsideration the resolution was adopted by the board. Scarcely any time elapsed, however, before the City Council completely nullified this action of the Board of Control and voted to continue the purchase negotiations. Thus matters stood on Jan. 1 at the time of the city election, and it cannot be said that the result of this election has served to clear the atmosphere. At first glance it would seem that the governing idea in the minds of the majority was opposition to the street railway purchase, but, although Mayor Hocken was reelected by a bare plurality over a young man whose only platform was that he was opposed to the purchase, yet by a decisive vote the people returned a Board of Control composed of men who either were in favor of the purchase or had not opposed it. Evidently the citizens of Toronto looked with favor upon Mayor Hocken's recommendation for the creation of a commission of independent citizens to study the traction situation, and they returned municipal governing bodies that will at least keep the transportation question open until some plan is definitely submitted to the people for approval. In circumstances like these any predictions as to the ultimate outcome of the purchase plan seem futile. That there is a decided opposition to the city's taking over the property is certain, this being due partly to a distaste for municipal ownership and partly to the fact that the intangible values, as ascertained by Bion J. Arnold, were higher than most of those in favor of the plan expected. It is pertinent to state, in this latter connection, however, that no one has yet proved them wrong. The fact is that the cost of taking over a prosperous railway, the task of creating and managing a unified and expanded service for the whole city and the responsibility of basing these extensions upon estimated future growth and development are burdens which the people of Toronto may well be reluctant to assume. Whether the glamour of municipal ownership, however, will completely fade before the eyes of the citizens of Toronto upon a more complete investigation is a possibility of the future rather than a fact at present assured.

COLLECTIVE LIFE INSURANCE

The acceptance by 2000 employees of the partnership insurance offer made by the Third Avenue Railway, New York, in accordance with the plan described at length in our issue for Aug. 23, 1913, marks a noteworthy extension of welfare work on a businesslike basis. Hitherto the company has had only a mutual benefit association of the usual type. This association pays a death benefit of $250, but now those association members who enter into the insurance plan will receive in place thereof a life insurance policy for $1,000. The partnership feature of this agreement is that the company contributes $4 a year for every $7 paid by the policy holder. To the employee this arrangement means that for the trifling sum of 15 cents a week his family will not be left in total distress in the event of his death. To the company it means that the expenditure of less than 9 cents a week per individual will prove a substantial incentive for the best men to remain in its employment.

The "actuarial" aspect of this bulk insurance plan is, of course, of particular interest because the assessments are so much less than any mutual benefit association could afford to set. The obvious reason for this condition is that on any single railway the fluctuating mortality from year to year must be absorbed by a few hundred or few thousand persons, whereas the policy holders of an important life insurance company are numbered by hundreds of thousands. Hence it would be dangerous to apply the standard mortality tables to any one place because extraordinary local epidemics or unhealthful weather conditions would not be canceled by a lower death rate elsewhere.

The Third Avenue Railway has avoided this risk by having a standard insurance company underwrite all of the policies collectively. In this way it also avoids the burden of operating a separate insurance department. That the insurance company should be able to grant materially lower rates may be readily understood inasmuch as it is relieved of three sources of great expense. The first of these is the abolition of examinations, made possible because the applicants as a whole present a low risk on account of their high average health. The second expense saved is the separate solicitation and underwriting of thousands of small policies, and, finally, there is no expense of collection of premiums because all of the accounts are guaranteed by the railway. The saving in the actual cost of a policy to the employee by this system of collective insurance with part payment by his employer is especially evident in comparison with the cost of the industrial policies usually taken out by men who earn platform wages. These industrial policies are naturally the most costly since the premiums are usually collected in amounts of less than one dollar.

It is not astonishing, therefore, that the employees of the Third Avenue Railway should have accepted the insurance proposition in such large numbers. As an indication of the trend of the times, it is worth mention that a still larger railway system is planning to go even farther by insuring absolutely free of cost all men who have been in its employ for a given number of years. The great attraction of collective partnership or free insurance, in general, is that it can be adopted as evidence of good will by many a company which could not afford an increase in wages or the costlier forms of welfare work.

SAFETY IN THE REPAIR SHOP

The increasing attention now being paid to safeguarding workmen from accidents in industrial plants suggests the desirability of similar campaigns in repair shops. Here and there, no doubt, a good deal of consideration has been given by railway companies to this subject, but a good many accident hazards remain to be eliminated and comprehensive studies of dangerous conditions in machine and woodworking shops generally offer helpful suggestions. Some studies of this kind have been made by the accident insurance companies and a recent bulletin published by one of them throws considerable light on the whole subject of industrial accident prevention.

For instance, it is generally assumed by most of those who have not looked into accident prevention from the practical end that mishaps in the shop are attributable for the most part to the absence of safety devices in places where danger is known to exist. But in reality there are many other contributory causes. Ignorance, carelessness, unsuitable clothing, poor lighting, ill-conditioned and crowded departments and defects in machines and buildings all bear upon the problem. In the railway car shop there is a low density of labor which tends toward greater safety in the performance of work, but the hazards associated with open belts and gears, with exposed shafting, poor wiring, loose material and equipment and poor lighting deserve careful study on many roads.

In the car shop no less than in the industrial plant employees should receive so far as possible complete and detailed instructions as to their work, special emphasis being laid upon the dangerous features, with particular regard to newly employed men and apprentices. Attention should be directed not only to the dangers incident to each individual's particular employment but also to hazardous conditions in his immediate vicinity. Whenever a man is transferred from one department to another or is placed in charge of a different machine, he should be fully instructed in his new duties and warned of any dangers that may be associated with its unfamiliar operations. A workman who repeatedly receives even minor injuries while performing the same kind of work should be transferred to safer employment or even dismissed, if necessary, to eliminate a poor moral hazard exerting a dangerous influence upon fellow-employees. In the car shop as well as in the factory an unbuttoned coat or a torn sleeve may lead to a fatal accident in connection with machine rotating parts which look more or less harmless to the inexperienced eye.

Obviously the best time to make safety provisions is when the machines are being laid out in the drafting room, and it is gratifying that designers of heavy machine tools are giving more and more thought to protective features. The designer can take care of the safeguard problem in the cheapest way while working on the details of the machine, but if the machine is built without regard to these features, it is often difficult and sometimes impossible to add effective protection after construction. Hence the shop foreman or master mechanic should specify to the tool builder certain safety requirements and these should be demanded when the tool is bought.

Only brief mention can be given of the safeguards which are rapidly becoming standardized in shop practice, for their application depends in detail upon local conditions. The protection of moving parts by metallic nettings instead of solid metal screens is a step forward on account of the increased facility of inspection afforded. Gear wheels always need careful protection, especially when they are within reach of the floor or near bearings or other machine parts requiring frequent attention. It is not uncommon to find gears which are only partly hooded or covered with a guard having too narrow a width. Complete inclosure of reversible gears and spoked wheels and the use of counterbored set screws turned flush with the surrounding surfaces are important protective measures, and unrailed platforms, detached belt shifters, unspiked or uncapped ladders and exposed electric contacts within reach of the floor are all potent sources of trouble. Skilled labor abounds in most car repair shops in all departments, and the average of intelligence is far above that of the ordinary mill worker. But the high standard of employees is no excuse for the absence of preventive measures indicated as necessary by periodical surveys of such establishments.

EFFICIENCY IN SERVICE CARS

The shabby, unkempt service cars of many electric railways look more like traction outcasts than like apparatus of high efficiency. In fact, it has been so customary to build service cars out of odds and ends and to operate them with valetudinarian motors and control that it is almost a shock to find some that have actually been designed and equipped to do their work in the best possible way. The small system on which a single service car of each type suffices may be readily excused for following the practice of using second-hand material because better equipment could not be exploited to its maximum efficiency and the savings possible in energy consumption. crew time and maintenance from such modern service cars might not be enough to offset the higher first cost of a really new car. The large system, however, owes it to itself to see whether its fleet of junk-type service cars cannot profitably be displaced by cars which are capable of bigger mileage because of specialized design and modern equipment. This is clearly an instance where true economy will be found to lie in the installation of equipment designed for the work in hand.

Of two cases in point, one is afforded by an all-steel stores car which will operate the mileage of the three older cars, and the two men required to operate it will perform with greater ease the work formerly done by six. No elaborate calculations are required to show what this means in reducing labor cost and energy consumption, but there are also the less tangible advantages that one well-equipped car will have fewer mishaps than three poorly equipped cars and that a spick and span vehicle advertises the company to its patrons more commendably than three near-pensioners in rolling stock.

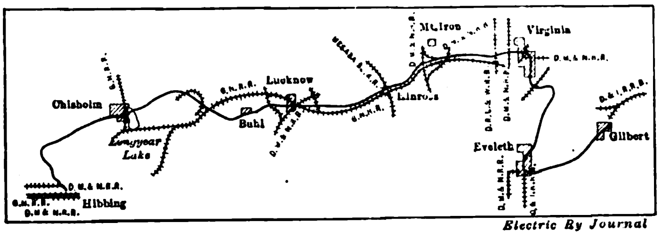
A second case is that of a company which has followed the same idea in the design of a steel ballast car which hauls 9 per cent more load per trip than three of the old-time trailers. The better unloading apparatus and motor equipment on this car also make it easy for it to do one more trip per day than the old trains. In this instance two men perform easily a job which before was a hard task for four men.

As many of the lines on the system in mind have heavy traffic, the reduction in track space from 80 ft. to 49 ft. for given loads is not to be despised. A recent accident where the last car of an old ballast train broke away on a grade and dashed off the curve into a house also proved an effective, though unexpected, argument for the superior safety of single big-car operation. One of the most satisfying facts is that the company which uses the new ballast cars is no longer flooded with complaints such as threatened to wipe out the prosperous business which it had created in the transportation of stone. It is not pretended that the new cars are altogether inconspicuous, but they do give an impression of massive strength and efficient design which make a pleasing contrast to strings of ever-tilting "dumpies," shedding stones in their journey, as Hans of the fairy tale marked his path by dropping pebbles between his home and the forest.

New Interurban Railway in the Minnesota Iron Range

A Description of the Mesaba Railway, a 35-Mile, 725-Volt Line with Interesting Construction and Operating Features and a Complete Cab-Signal System

The new Mesaba Railway in the Minnesota Iron Range district is a good example of an interurban electric line recently built in a growing community. The population served by this 35-mile line exceeds 55,000 and is distributed among nine cities and "locations," as the mining settlements are called, varying in size from 500 to 15,000 people. This population is largely made up of the laborers in the open-pit iron mines along the Iron Range, which extends in an east and west direction across that part of Minnesota lying 80 miles north of Duluth and Lake Superior. Although this great iron ore district is served by a network of steam railroads, none of them is interested in a passenger business. All their energies are being directed toward increasing the ore tonnage, which is a most profitable source of revenue.



Electric Ry Journal

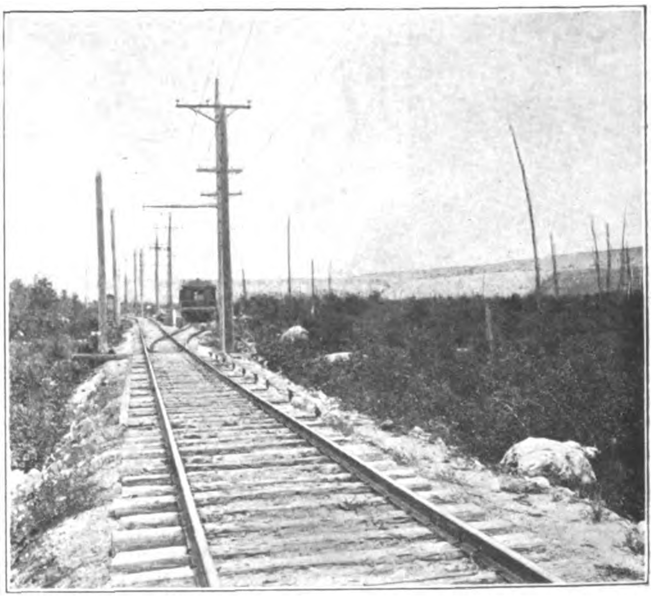
Mesaba Railway—Map of Route

In considering the possibilities of an electric railway through this district the promoters of the Mesaba Railway found that at least one of the steam roads, the Duluth, Missabe & Northern Railroad, furnished passenger train service between most of the important towns, but that transfers were necessary at junction points on an indirect route, and long delays between trains were frequent. The principal industry of the district was iron mining and lumbering, and there was a natural channel of intercommunication between the "locations" and the cities. This fact was quite evident from the amount of passenger traffic between these centers, even under the inconvenient service offered by the steam roads before the advent of the electric line.

Another inducement to the promotion of an electric line in this locality was the possibility of a lighting and power business, inasmuch as the service rendered to most of the larger communities was by isolated, inefficient generating plants. Already three of the larger cities have made contracts with the railway company, and others are negotiating for a similar service. Then, too, the present terminals of the electric line are well within the iron-mining district. A territory almost as rich in iron ore deposits as that now served and one which abounds in "locations" and growing towns lies both to the west and east. The intention is to extend the line in the near future to serve these communities, and ultimately a lighting and power business will be developed in the entire territory.

Some unusual difficulties were encountered in the construction of this line, although the natural topography is that of a slightly rolling country which, under ordinary conditions, would require the average amount of grading to produce a normal interurban line. These difficulties took the form of great mounds of earth stripping removed from the surface of the open-pit iron mines. To project the line through these would have increased the cost of grading to a point where it would have been prohibitive. Hence, it was decided to build the line around them with easy curves and at the same time obtain a reasonable grade line. Other characteristics of this country which tended to increase the cost of construction included sink-holes or bogs in which it was practically impossible to obtain a permanent bearing, and at other points the line was constructed through fields of large boulders.

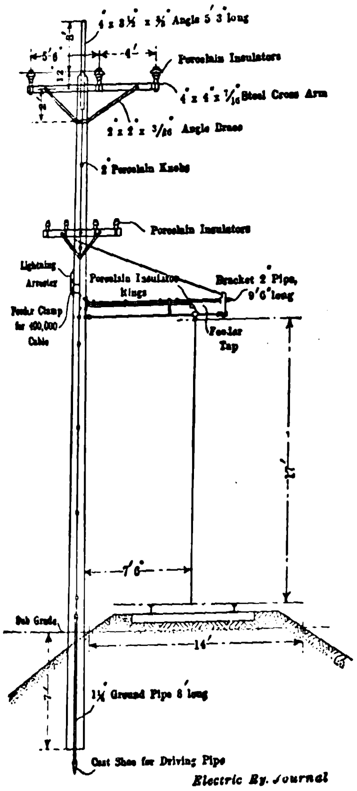
Mesaba Railway—General View Showing Character of Country and Construction


Mesaba Railway—View Showing Siding and Contact Rails for Signal System

TRACK AND ROADWAY

The line was built on a private right-of-way, 50 ft. in width, through the rural districts and in the streets through the cities and villages. As the rural population was very small with little or no farming, it was unnecessary to fence the right-of-way. Fortunately, too, there were but few streams requiring bridges. In fact, the only waterways of any consequence were a few shallow lakes. To offset the advantage of a scarcity of waterways, however, numerous railroad crossings were necessary. Some were obviated from an operating standpoint by grade separations, and others were crossed at grade. Grade crossings were introduced only where a grade separation was not feasible or was unwarranted because the track was one on which only a few trains were operated each day. The most important of these grade separations was at Kinross, where combination wooden-trestle approaches to a steel girder cross the intersection of two steam roads. A view of this crossing is shown in one of the illustrations.

The standard roadway construction employed includes a 14-ft. roadbed on embankments with 3-ft. ditches on each side of the roadbed in excavation. The track is laid on 6 in. of gravel ballast taken from a pit on the company's right-of-way and consists of 6-in. x 8-in. x 8-ft. tamarack ties, 70-lb. A. S. C. E. rail, 24-in. angle bars and 26-in. Ohio Brass Company's compressed terminal bonds. The latter are quite unusual as they are of the concealed type, but as they are longer than the joint, the terminals are exposed. This arrangement permits of easy inspection to determine when the bonds become defective.

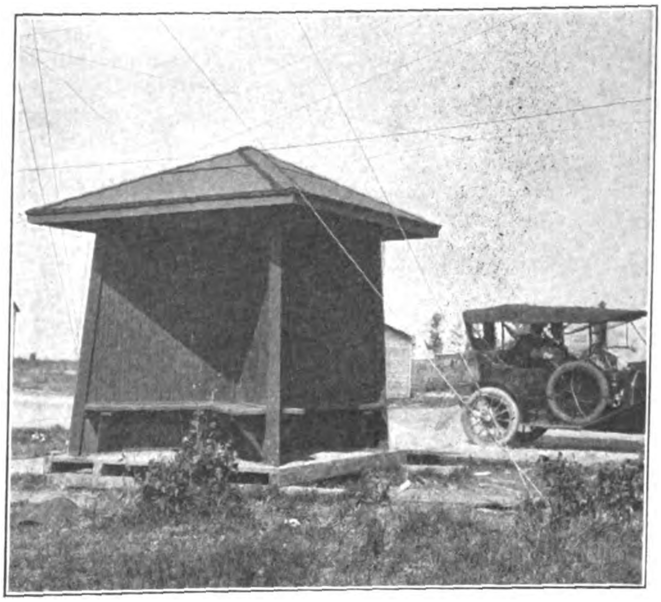

4" x 3½" x ⅜" Angle 5' 3" long
5' 6"
4'
Porcelain Insulators
4" x 4" x 7/16" Steel Cross Arm
2" x 2" x 3/16" Angle Brace
2" Porcelain Knobs
Porcelain Insulators
Lightning Arrester
Porcelain Insulator Rings
Bracket 2" Pipe, 9' 6" long
Feeder Clamp for 400,000 Cable
Feeder Tap
17'
7' 6"
Sub Grade
14'
7'
1¼" Ground Pipe 8' long
Cast Shoe for Driving Pipe
Electric Ry. Journal

Mesaba Railway—Typical Roadway Section

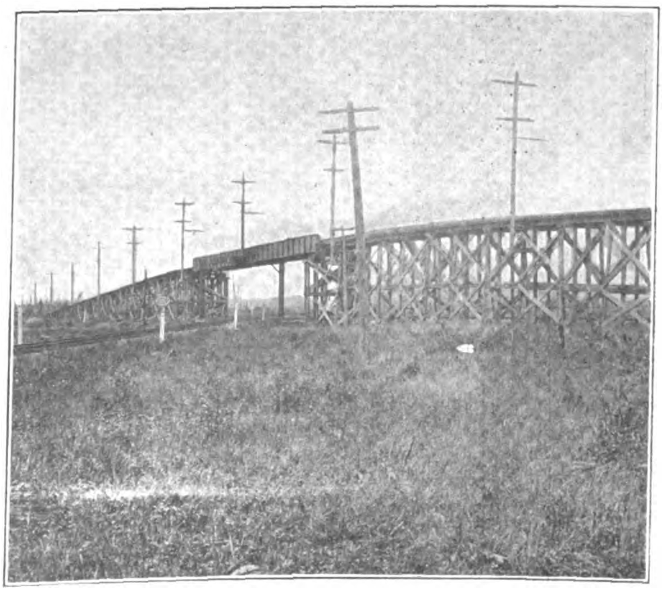
OVERHEAD CONSTRUCTION

Except for one or two unusual features, the overhead lines conform to general practice. The trolley is supported on pipe mast-arms, 17 ft. above the top of the rail, and in turn the mast-arm is attached to a 40-ft. Idaho cedar pole which also carries the telephone, signal and transmission line wires.

One novel feature in the overhead line construction is the cross-arm used to support the transmission lines. This arm is a 4-in. x 4-in. x 7/16-in. structural-steel angle, set 2 ft. off center, in order to give a 4-ft. clearance between the two transmission lines on one side of the pole and a 5-ft. 6-in. interval between the middle line and the third line on the opposite side of the pole. Another structural angle, 4 in. x 3½ in. x ⅜ in. in section and 5 ft. 3 in. in length, is bolted to the side of the pole opposite the transmission line cross-arm and serves to support the ground wire. A direct ground is obtained by a connection both to the transmission line cross-arm and the structural angle supporting the ground wire above the top of the pole. This ground wire is carried down the side of the pole on 2-in. porcelain knobs and connected to ground by 1¼-in. pipe 8 ft. long. The base of this pipe is provided with a cast-iron shoe for driving, and the top has a special grounding cap. In appearance this cap resembles an ordinary hexagon nut, except that it is tapped out only on one side to fit over the head of the 1¼-in. ground pipe. A horizontal slot is cut in the cap 7/16 in. below the top, and a tapered hole slightly off center is drilled from the top of the cap through this slot. The depth of the slot and the location of the tapered hole are such as to leave sufficient space between the inside edge of the slot and the hole to wedge securely the grounding wire when a pin is driven into the tapered opening.



Mesaba Railway—Typical Way Shelter



Mesaba Railway—Combination Wooden Trestle Approaches to Steel Girder Bridge at Kinross

POWER STATION

The power station of the Mesaba Railway Company is situated on the property of the Virginia & Rainy Lake Lumber Company, approximately one-quarter mile from the main track where it enters the city of

Virginia. At this location it was possible to obtain refuse from the lumber mill for fuel, and water is taken from a lake situated but a short distance from the power-house site. This location was selected also because it was desirable for a substation.

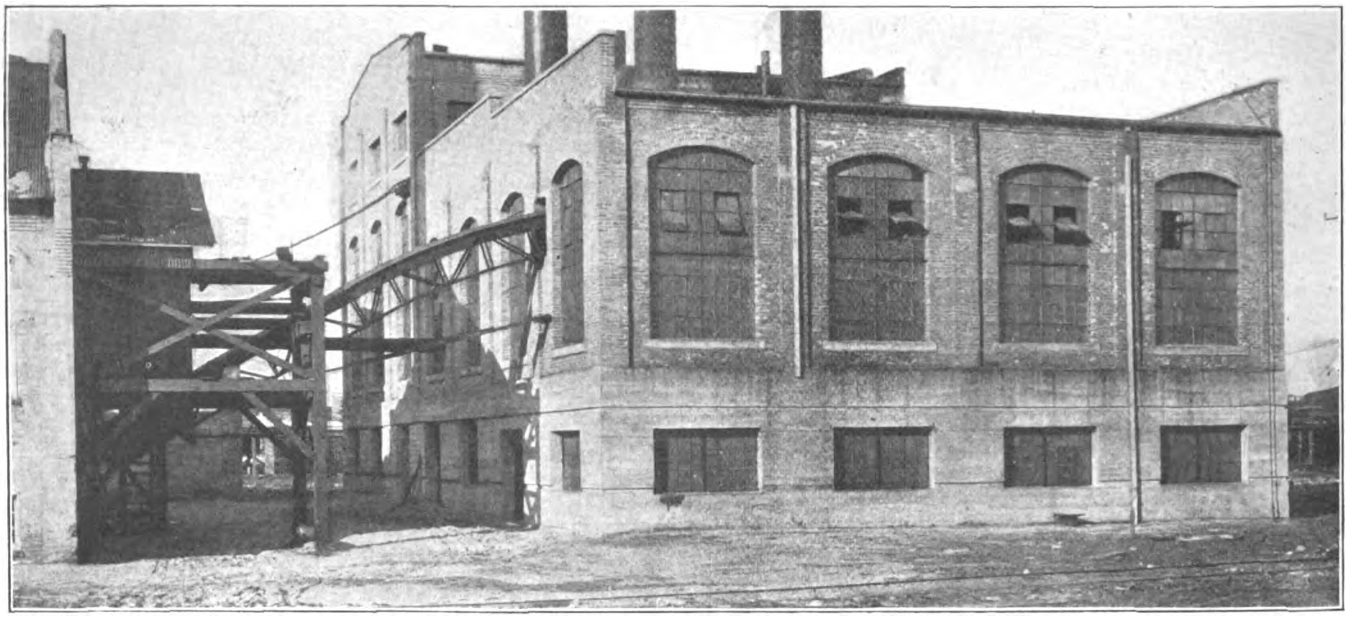
Owing to the high cost of coal in this locality, the large quantity of wood fuel available from the lumber mill was practically a governing factor in the selection of this power-house site. Prior to the construction of the power house, however, it was ascertained that there was a large surplus of fuel over that required to operate the lumber company's generating plant. The character of this fuel, which consists of wet or green sawdust and small pieces of pine wood, may be seen in the illustration showing the fuel deck. An overhead conveyor from the mill of the Virginia & Rainy Lake Lumber Company delivers this fuel into the firing room of the electric railway power station. The sixteen openings in the bottom of the conveyor trough, uniformly spaced across the boiler room, are opened and closed by hand levers. Twelve of them supply chutes which deposit the fuel directly into the fire box, and four open into short spouts which deposit it on the fuel deck. The quantity deposited on the fuel deck during the six days of the week when the lumber mill is in operation is sufficient to last during the period when the mill shuts down from Saturday night to Monday morning. During this time it is necessary to charge the fireboxes by hand.

The power house proper is in a building 60 ft. x 120 ft. in plan. It is built on concrete foundation supported by piling, and the superstructure is of steel, brick and concrete. The power house building is divided into two sections, namely, the boiler room and the generator room, and each is built with a basement. The boiler equipment embraces three 300-hp Edge-Moor horizontal water-tube boilers with four fuel chutes and firing doors to each. These boilers were designed for 175-lb. pressure at 75 deg. superheat and were guaranteed to develop 450 hp each, with a 1-in. draft at the breeching outlet. They are served by three 150-ft. guyed steel stacks 4 ft. 6 in. in diameter. The boiler feed water is heated to approximately 204 deg. in Hoppes heaters, which are served by a turbine-driven boiler-feed pump. The feed-water heater is supplied with exhaust steam from the boiler-feed pump, the general service pump and the turbine-driven exciter.

Wood fuel made it necessary to equip the fireboxes with unusually large grate areas, and each contains approximately 90 sq. ft. No attempt is made to spread the fuel over the grate after it has passed through the firing doors from the fuel deck. It forms a cone-shaped pile on the grate under each firing door and burns around the edge of the pile. As it is necessary for the fireman to attend to the fuel chutes on a floor directly over the fireboxes, the essential insulation against heat was obtained by supporting the floor on a Dutch oven extension with thick arches.

It was originally intended that the line voltage of the Mesaba Railway would be 1200 volts, but before actual construction had begun it was decided that the motor generators should be designed for 750 volts d.c. and operate at 600 volts. Shortly after operation started it was found the traffic was much heavier than anticipated and that the copper was barely sufficient during the peaks. Accordingly, it was decided to take advantage of the higher pressure for which the generators were designed and raise the voltage to 750. This could be done without any other serious difficulty, as the railway motors, although designed for 600-volt operation, were of the interpole type which permitted an increase in pressure to 750 volts without danger to economy of operation. Sixty cycles have been used for the transmission frequency, partly because of the lighting and power business and partly because that is the frequency used in the Virginia & Rainy Lake Lumber Company's power plant. A three-phase line has been installed between the two switchboards so each station may synchronize with the other in case an interruption does occur, and as an extra precaution, the main steam headers of the two stations are also connected.

The generating equipment includes two 750-kw, 600-volt, three-phase, 60-cycle horizontal condensing turbines operating at 80 per cent power factor and 3600 r.p.m. At the present time one of these units is held as a spare, but the rapid increase in the load anticipated in the near future, owing to new contracts for light and power service, will soon require the spare unit to be placed in regular service. The governors on the turbo-generators are controlled by a motor from the switchboard and each generator panel is also equipped with a wattless component indicator. Station excitation is obtained from a 35-kw, 125-volt, 3600-r.p.m. non-condensing turbine exciter. In conjunction with this self-

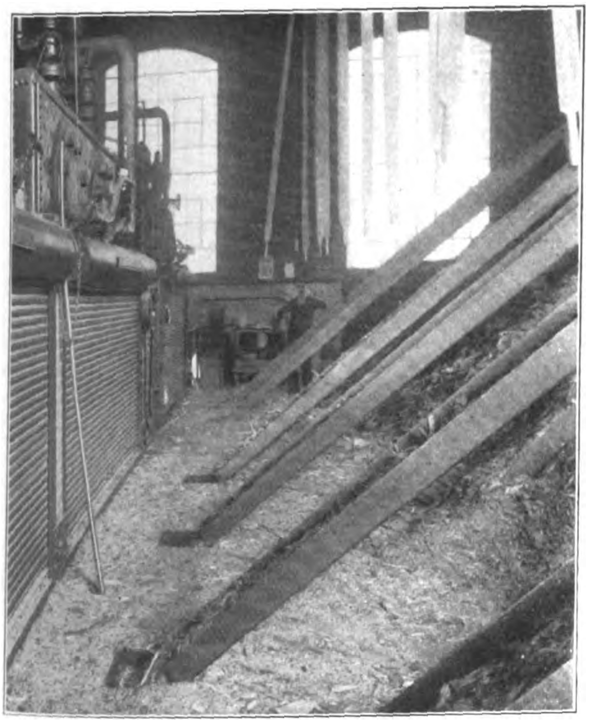


Mesaba Railway—Generating Station at Virginia, Minn.

contained unit, a motor-driven exciter designed to run in parallel has been installed for regular service, the turbine exciter being used only in case the plant is shut down. The motor-driven exciter set consists of a 75-hp, 1200-r.p.m., 600-volt, three-phase induction motor direct-connected to a 60-kw, 125-volt compound-wound exciter.

In the portion of the turbine room used as a substation two 300-kw, 750-volt synchronous motor-generator sets have been installed. These are General Electric two-bearing machines with compound-wound generators which feed the line at 750 volts d.c. One of these units serves as a spare at the present time. The motor-generator sets are served by three 250-kva water-cooled transformers.

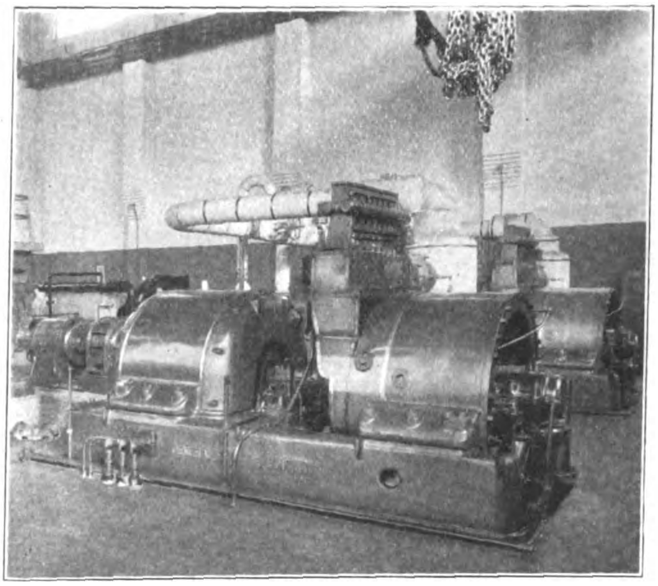
A switchboard gallery is located in one corner of the turbine room and the space under it is utilized for the transformer equipment. All circuits to the switchboard are arranged so that no switches are on the high-tension side of the transformers. This arrangement as well as the location of the switchboard gallery over the transformers reduced the copper to a minimum and at the same time provided ample room for operation. The switchboard contains fifteen panels and a swing bracket at each end. All wiring between the switchboard and the generator and substation units is housed in metal conduit embedded in the concrete building floors, and the board is thoroughly grounded.

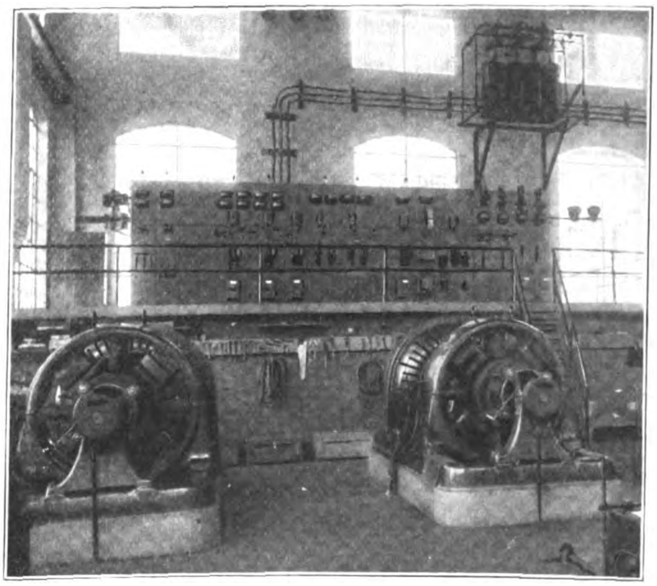

Mesaba Railway—Fuel Deck Over Boiler Room Floor

SUBSTATIONS

At present the substation in the power house and the substation at Chisholm, 20 miles west, are all that are required to operate the line. A transmission line, consisting of three No. 2 copper wires, connects the power station with the Chisholm substation, and current is transmitted at 22,000 volts. Two 400,000-circ. mil d.c. feeders feed both ways from the power house. One connects it with the Chisholm substation and the other extends east to Gilbert. A 300,000-circ. mil feeder is installed between Chisholm and Hibbing, the west terminus of the line.

The substation at Chisholm is operated in conjunction with the passenger and freight station, a single agent serving both. The substation proper is housed in a one-story building constructed of brick and steel. The three-phase transmission line enters this structure by way of a structural-steel bracket and 15-in. tile openings through the building wall. It is supported on the building wall inside the station by insulated pipe brackets, and after passing through choke coils and disconnecting switches this 22,000-volt line is connected to the 200-kva, 22,000-to-600-volt self-cooled transformers by way of oil switches. The transformer set is installed immediately back of the switchboard that occupies the transverse center of the substation building, which is 24 ft. by 44 ft. in plan. The floor space opposite the transformer section is occupied by two 300-kw motor-generator sets, which convert the sixty-cycle a.c. into d.c. at 750 volts. Both interior and exterior views of this substation are shown in the illustrations.


Mesaba Railway—750-kw Turbo-Generators


Mesaba Railway—View of Motor-Generator Sets and Switchboard Gallery

SIGNAL SYSTEM

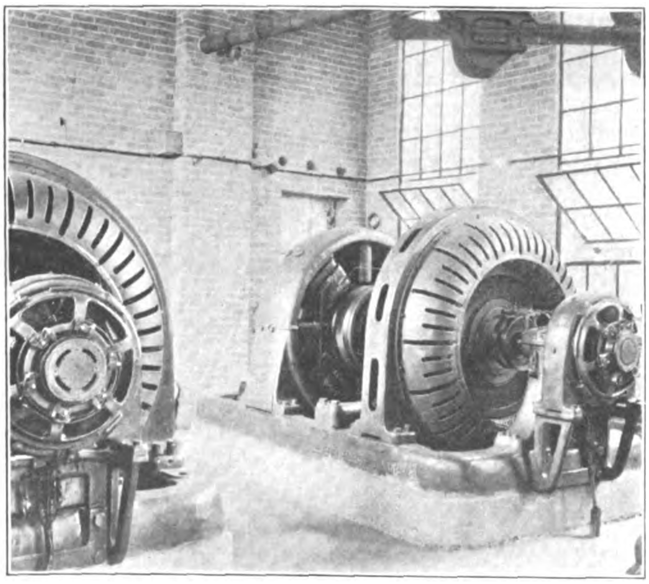
A complete installation of the Simmen system of railway signaling has been installed on this line. The dispatcher set includes a nine-lever board, interlocked and equipped with time and location recording mechanism and record sheets such as have been described in the

Electric Railway Journal. Six telephone dispatcher lines are also connected into the board, and each line is equipped with a bell of a different tone instead of the usual drop.

The third-rail installations on this 35-mile line provide for a block approximately 6 miles in length, with home and distant rails protecting each siding. The third-rail locations were also selected with a view to eliminating difficulties which might arise through drifting snow. The method of installing the third-rails conforms to the standards employed on the Indianapolis & Cincinnati Traction line, as well as the Nashville-Gallatin Interurban line. Certain refinements in the operation of this signal system, however, have been included.

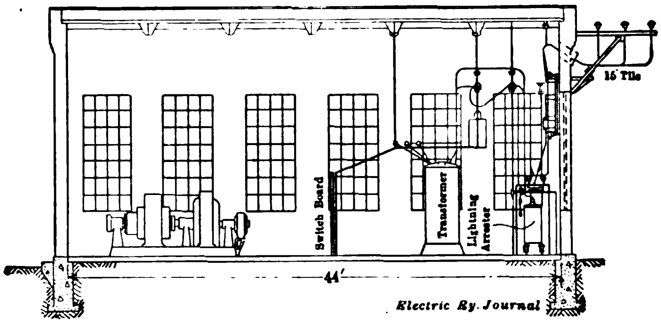
Mesaba Railway—Exterior of Chisholm Substation

Probably the most important of these additions to the system is the directional movement protection, which is essentially as follows: When a west-bound train is about to take possession of the block the circuits are arranged so that an east-bound train receives a red light if it attempts to oppose the west-bound train in the same block. Each block may be set for either an east or west-bound movement, but the moment it is set for one the other is disengaged. This might be accomplished in the usual way—that is, by two separately controlled circuits—but the Simmen system accomplishes the east-bound and west-bound control over a single wire. The principal features of this arrangement include three phases of control. One gives a green light to an east-bound movement by energizing a third-rail positive, another gives a west-bound movement a clear light by energizing the third-rail negative, and a stop indication is given to each by totally de-energizing the rail.



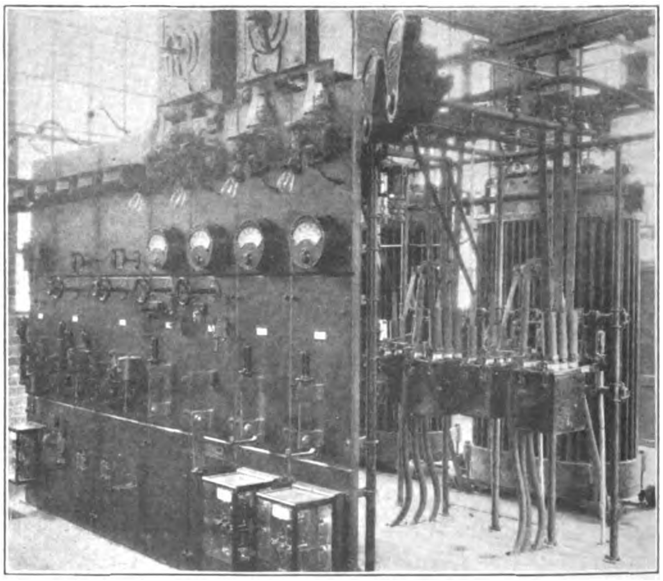
Mesaba Railway—Motor-Generator Sets in Chisholm Substation

In further explanation of this feature, suppose that all east-bound movements require a positive current to produce a green light, then all east-bound trains with a green light must be governed by a positively energized rail. In this example the east-bound movement is protected by making all west-bound movements clear with a negative current. Hence, if a west-bound train passes a positively energized rail, it receives a red indication.



Mesaba Railway—Cross-Section of Chisholm Substation

The operating advantages of this arrangement are that the east-bound train may take a siding, and in case there are two or more sections of the west-bound train, the east-bound train must be in the clear before the west-bound train can receive a proceed signal. If all rails are negatively energized—that is, if they are providing a clearance signal for west-bound trains—the east-bound car is held at that siding until all the sections of the west-bound train have passed, and it cannot leave until the dispatcher changes the levers and positively energizes the rail.



Mesaba Railway—Switchboard and Transformer Section of Chisholm Substation

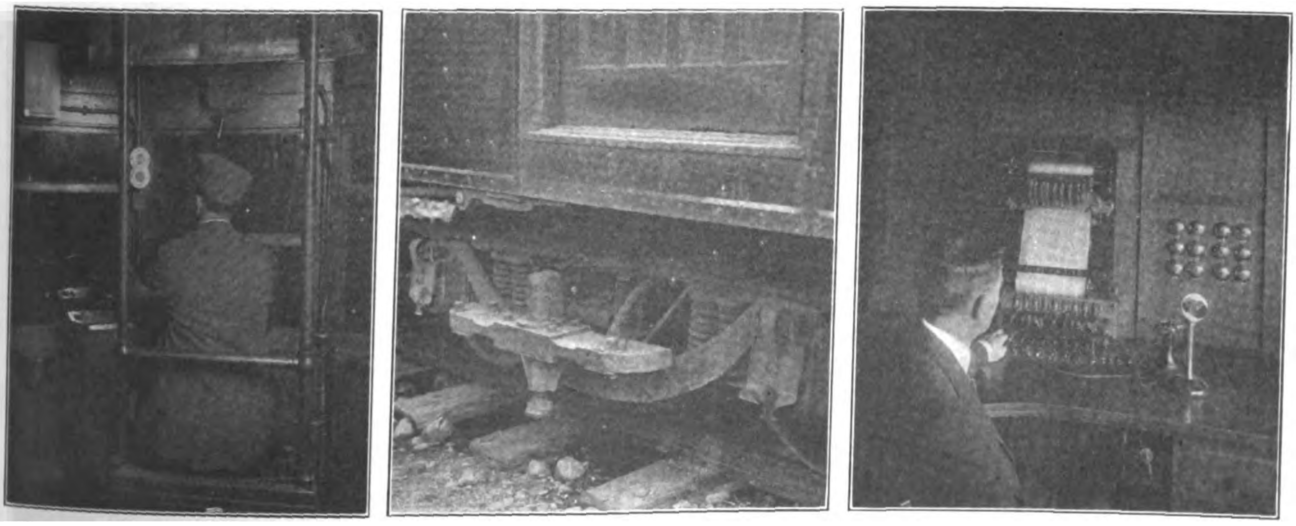
The added cost of this construction over the simple form of control, such as is used on the Toronto & York

Radial Railway, is practically negligible. The principal addition necessary in the installation is the additional batteries in the dispatcher's office. These two batteries are arranged with one positive to ground and the other negative to ground. To obtain the advantage of the directional indications, it is also necessary to change the ordinary relay on the car to a polarized relay and install a directional switch.

In actual practice it has been found that the propulsion current, which is positive to trolley and negative to track, tends to go through the signal circuits. Accordingly, it has been necessary to increase the battery positive to the signal line so as to overcome this shunted propulsion current. It has also been found that the amount of propulsion current flowing over the signal lines increases with the number of defective bonds. Hence a periodical test of the signal circuits provides a close check on the bonding conditions of a line. When the shunted propulsion current becomes excessive it produces a red cab signal, owing to the fact that the signal current is counteracted by leakage of the propulsion current.

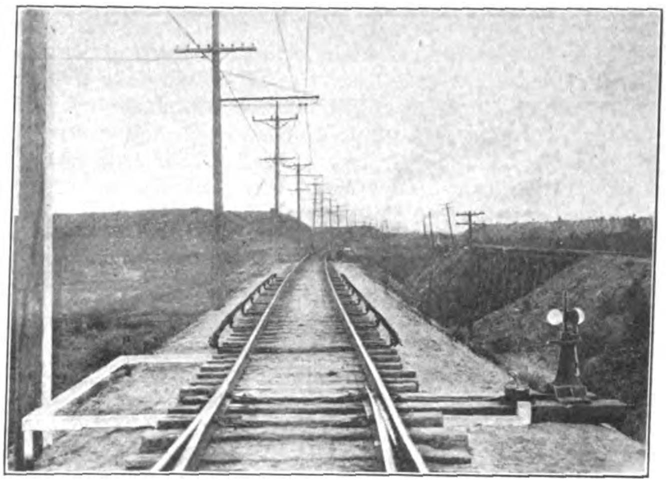
On the Mesaba Railway signal lines a 40-volt signal current was used in one direction, and the propulsion current assists in energizing the signal lines with the proper polarity. In the other direction it was necessary to use 80 volts, as the signal current is decreased by the propulsion current leakage, which is of the opposite polarity. The voltage of the current in arranging this signal system for directional indications depends on the relative location of the power house and the dispatcher's office. No difficulty has been experienced, however, in the operation of the directional indication, and it has now been installed on the lines of the Indianapolis & Cincinnati Traction and of the Nashville-Gallatin Interurban Railway as well as on the Mesaba Railway.

The directional switch provided in the cab of each car in addition to the polarized relay has three positions—one for west-bound movement, one for east-bound movement and a neutral position which entirely disconnects the car batteries. The latter position is used when the car is in the carhouse or is making a long lay-over on a side track. Although the position of the directional switch is under the control of the motorman, it does not depend on the human element. In case the directional switch is not in the proper position, a car cannot receive a green light because the terminal third-rails can be energized only with one polarity, namely, only positive for east-bound and negative for west-bound terminal rails.



Mesaba Railway—Signals in Vestibule of Car—Revolving Contact Shoe—Equipment in Dispatcher's Office

The east-bound and west-bound movement has made possible the use on each car of a single shoe, which makes contact with those third-rails on the right-hand side of the track. The removal of one shoe from the single-end car more than offsets the added cost of the polarized relay. On a double-end car, however, two shoes are required, and also a small four-pole switch. Two poles of this switch connect the shoes, and the other two poles connect either one or the other set of cab signals. If a motorman changes from the front to the rear cab, he cannot get the cab signal permitting him to proceed until this four-pole switch is in the proper position.



Mesaba Railway—View at Center Siding Showing Signal Rails and Switch Box

Open-switch protection is also provided in a simple and inexpensive way. This is done by passing the signal wire through an ordinary switch box before connecting it to the third-rail. In this way, when the switch is open or partly open, the signal current cannot reach the third-rail as the circuits are broken at the switch box.

The passage past a non-energized third-rail produces a red cab signal on the car at the distant rail, which is 2000 ft. away from the home rail on this road. Both trailing and facing open-switch protection are feasible, because, after passing through the switch box, the energy may take a secondary line connecting the home and distant signals on both sides of the point to be protected.

The length of the third-rail as well as the size and quality of the signal wires were adopted only after careful investigation. Heretofore it has been the practice to use a copper-clad wire for signal wire, but the Mesaba Railway employed a No. 10 galvanized-iron wire with glass insulators. This represented a saving in the cost of the signal circuits and the iron wire has been just as satisfactory in the operation of the signal system as the copper-clad wire. The third rails are 70 ft. in length and are made up of two sections riveted together. Recent speed tests have shown that a 25-ft. rail was sufficient in length to give the necessary time element for relay action at a speed of 89 m.p.h. A 70-ft. rail was used merely to provide a factor of safety.

At the Hibbing and Gilbert terminals the track was in paved streets and a third-rail signal installation was not practicable. To meet this condition the signal circuits were extended to the telephone booths at the terminal, where red and green light signals similar to those in the car were installed. These lamps were connected in and operate on the principal signal circuit, which is opened and closed manually. When the motorman or conductor obtains an order from the dispatcher over the telephone he closes the signal circuit and obtains the light indication before starting his run.

ROLLING STOCK

The initial rolling stock equipment for the Mesaba Railway includes five motor passenger cars, five motor combination cars, four trail cars and two express, baggage and freight cars. The general dimensions of the passenger motor cars are as follows: Length over buffers, 47 ft.; length over vestibule, 47 ft. 2 in.; length of car body, 37 ft.; length of main compartment, 25 ft. 7 in.; length of smoking compartment, 11 ft. 5 in.; length of vestibule, 5 ft.; seating capacity, fifty; weight of car body, approximately 26,000 lb. The general dimensions of the express motor cars are as follows: Length over buffers, 46 ft.; length over car body, 43 ft. 4 in.; length inside for freight, 35 ft.; weight of car body, approximately 21,000 lb.; weight complete with trucks, air-brake equipment and motors, approximately 27 tons.

MESABA RAILWAY CO.
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Mesaba Railway—Side View Passenger Motor Car—Interior View.

The most important consideration in the design of the passenger equipment was to provide protection against the extremely cold weather common in this locality. In order to accomplish this end the cars have double side walls sheathed outside with ⅛-in. x 34-in. steel plates, and the windows are provided with removable storm sashes. Owing to the fact that a large percentage of the passengers carried are ore workers in soiled clothing, it was deemed advisable to make interior finish in dark oak and to upholster the seats in rattan.

These cars were designed and built by the Niles Car & Manufacturing Company for local interurban service, medium speed and frequent stops. They are of a composite construction with two 6-in. I-beams reinforced under the platforms with ½-in. x 5-in. steel plates in the center sill and two ⅝-in. x 7¾-in. steel plates in the side sills. The body is thoroughly rodded and trussed and reinforced with steel plates. Each side of the car body at the rear end and the right side at the front end are fitted with 31-in. single-swing doors, triple steps with safety treads and steel trap doors. The car bodies are mounted on Baldwin locomotive trucks, equipped with four GE-201 600-volt interpole motors rated at 50 hp. They are equipped with the GE type-K control and Westinghouse combination automatic and straight air brakes. Other special equipment includes the Peter Smith Heater Company's forced-draft heaters and Ohmer registers. Car illumination is obtained from 145-volt lamps, arranged five in a series and direct-connected to the 750-volt propulsion circuits.

OPERATION

From the beginning of operation an hourly schedule has been maintained over the entire line. In many instances this service has not been adequate, and it was necessary to utilize all the passenger equipment the company had on hand to move the traffic. Most of the extra service takes the form of a two-car train consisting of a motor and trailer. At the present time the largest proportion of passenger traffic is between Virginia and Evelyth. The Mesaba Railway carhouse is especially well located to handle this, as it is just west of Virginia, where a trailer may be added to the car going to Evelyth and may be removed from the car on the return trip. The Egry train order system is used exclusively and all telephone booths and other points at which orders are received from the train dispatcher are equipped with Egry dispatchers.

Owing to the fact that the Mesaba Railway has just begun operation, the freight service has not been thoroughly developed. At present an l.c.l. express business is being handled at rates approximately 30 per cent above standard steam-road freight rates. As the territory served is almost frontier in character, the novelty of it all has not worn off, and the shippers as well as the consumers are just beginning to realize the value of the high quality of express service which the electric line can offer. This business is developing rapidly, however, and undoubtedly will become quite an item in the gross revenue of the company in the near future. As evidence of what may be expected when all classes of traffic have been fully developed, the present gross earnings average 49 cents per car mile.

COMBINATION CARHOUSE AND SHOPS

As mentioned earlier in this article, the carhouse and shops are located just west of Virginia, on a strip of property, 200 ft. in width, paralleling the main track between Virginia and Hibbing. The carhouse proper was a brick, steel, wood and concrete structure, 86 ft x 122 ft. in plan, but since this article was prepared this carhouse and an adjoining two-story office building were destroyed by fire. As originally built, four tracks ran through the carhouse, and two of them passed over a repair pit, 56 ft. in length, situated at one end of the building opposite the repair shop space. The shop and storeroom occupied a 20-ft. aisle on one side of the carhouse, and the former was inclosed with brick partitions. The eight track entrances, four at each end of the carhouse, were provided with rolling steel doors so that the building could be entirely inclosed. Immediately after the fire the company constructed temporary quarters for the cars and, as soon as weather will permit, intends to replace the temporary structure with a permanent carhouse and shops.

Mesaba Railway—General View of Carhouse and Shops Before Destruction by Fire

The Mesaba Railway was built by the present owners, assisted by the Cleveland Construction Company, of Cleveland, Ohio. The former did all the grading, bridging and track laying, and the latter acted as electrical engineer in charge of all electrical design and construction.

MEETING OF AMERICAN ECONOMIC ASSOCIATION

An account was published last week of the opening sessions of the American Economic Association at Minneapolis.

Prof. Karl F. Theodor Rathgen, of the Colonial Institute of Hamburg, Germany, was the first speaker to discuss the paper by Mr. Brooks on "Syndicalism." He disagreed mildly with Dr. Brooks. Syndicalism, he said, was essentially a growth of the Romance nations, partly because in these nations there had been no great trades union organizations. It had very little hold on German workingmen. It was the socialism of the small workshop, not of the large enterprise. He thought that syndicalism would split up, one portion going into trades unions and another would gradually disintegrate because it underestimated the persistent force of society as organized at the present day.

Several other speakers took part in the discussion. One remarked that if syndicalism could only discipline itself it might bring about a tremendous change in the social structure. Another doubted if anything like true syndicalism had ever been experienced in this country. A third gave a brief account of the situation in New Zealand. Still another speaker expressed the hope that the American Federation of Labor would be able to reach the unorganized mass of laborers in this country, which it has not done hitherto. Mr. Eastman, of St. Paul, declared that the movement was serious and was entitled to respect and sympathy. A professor from Ohio State University who had been in England recently praised the effort making there to give college training to labor leaders with the understanding that they were to stay in their own class and help their fellows and not to grow out of it as a result of their education.

THE TRUST QUESTION

Professor Gray, of the University of Minnesota, presided at the closing session of the afternoon of Dec. 30. The principal paper was by Prof. Willard E. Hotchkiss, Chicago, Northwestern University, on "Recent Trust Decisions and Business." In regard to the enforcement of the Sherman law the speaker said it might be a question whether the Attorney-General, with due regard to his oath of office, could in the future safely omit to take cognizance of specific acts of *prima facie* violation when the court had already established the illegality of similar practices. In the main the enforcement of the Sherman law has had, and still has, a patriotic and beneficial purpose. However, the serious need of a definition for "fair competition" was clear. The speaker devoted considerable attention to the efficiency of trusts and concluded that the alleged superior efficiency of combinations had not yet been established.

DISCUSSION

Prof. E. Dana Durand, of the University of Minnesota, advocated an amendment to the Sherman law defining the limitations of fair competition. Railroads were recognized as monopolies, but to regulate monopoly of the manufacturing industry was a far different proposition. Another question to be asked was, If the trusts were dissolved could competition be restored? Professor Durand thought that it could be in the long run. The bringing of a suit for the dissolution of a trust or for violation of the Sherman law should not rest in the discretion of a single individual. There should be a permanent government industrial commission to advise the Attorney-General and the Supreme Court in the matter.

Prof. W. A. Rawles, Indiana University, favored an exhaustive investigation by an interstate industrial commission, the amendment of the patent laws and federal control over industrial capitalization and accounting.

Others who discussed the question were Dr. F. L. McVey, University of North Dakota; Prof. J. E. Le Rossignol, University of Nebraska; Prof. G. E. Putnam, University of Kansas; Prof. M. S. Hildman, Stanford University, and Dr. W. W. Folwell, University of Minnesota.

NEW OFFICERS

At the business sessions of the association Dr. John H. Gray, professor of economics in the University of Minnesota, was elected president of the association, and Prof. A. A. Young, of Cornell University, was elected secretary and treasurer. The next annual meeting will probably be held in Princeton, N. J.

The London County Council has been considering the opportunities for co-ordinating, as far as possible, the various electric systems in London and expanding them on economical lines. The committee that has this matter in hand was granted $14,550 for obtaining expert opinion, and though the experts' report is not expected for some time, it is rumored that the proposals are likely to be of a drastic character.

Rapid Transit Report in Philadelphia

Further Details Concerning Report of A. Merritt Taylor, Director of Department of City Transit, for New Subway and Elevated Lines—Tables Showing Estimated Increase in Gross Revenue, Future Investment, Overhead Percentages, Rate of Return and Time-Saving

The ELECTRIC RAILWAY JOURNAL of Aug. 9, 1913, and of Oct. 4, 1913, contained brief accounts of the two-volume report of A. Merritt Taylor, director of the department of city transit, on the subject of an enlarged subway and elevated system for Philadelphia. Volume I, mentioned in the first of the above-named issues, contained the general recommendations for new rapid transit routes, while Volume II, described in the other issue, was devoted to maps and plans, mostly in colors. The engineering portion of this report was prepared under the supervision of Ford, Bacon & Davis as consulting engineers.

Undoubtedly the most interesting features of the entire report are its completeness and the rapidity with which it was prepared. Director Taylor was appointed by Mayor Blankenburg on May 27, 1912, and with an allowance of one or two months for organization the submission of the report on July 24, 1913, meant that only about one year was required for its completion. During this time, too, Director Taylor devoted a portion of his energy to obtaining the necessary legislation at Harrisburg. Under the all-Philadelphia program for improved transit facilities three bills were necessary—the first a revenue-producing bill, making the personal property tax a county instead of a state tax and thereby raising the borrowing capacity of Philadelphia by $45,000,000; the second a bill authorizing a city expenditure of $40,000,000 to be realized from the sale of bonds and to be restricted to the building of subways, wharves, docks and other permanent improvements, and the third a bill providing that as soon as the people had approved the issuance of the bonds for subway building the city might proceed to make contracts without first waiting for the bonds to be sold. These bills were passed, other details were arranged, and on Nov. 4 the voters of Philadelphia registered their approval of a first bond issue of $1,800,000 to cover the cost of removing sewers on the Broad Street subway and to pay engineering and organization costs, etc.—all in much less time than it has taken for the details of rapid transit construction to be thought of, planned and consummated in other cities.

When the rapidity with which the entire plan has been worked out is considered, the completeness of the report rendered becomes all the more striking. Philadelphia is the first American city that has ever had a careful scientific analysis made of the business possibilities of a proposed rapid transit system. In some cases estimates have been made for various additions as they have been required, or partial estimates for future traffic on one particular line, but this is the first case where the probable traffic, gross receipts, net operating revenue and return on the investment for an entire system have all been calculated on a scientific basis for a definite period of years, with exact allowances made for the future cumulative investment in property and equipment necessitated by the future increase in population and traffic.

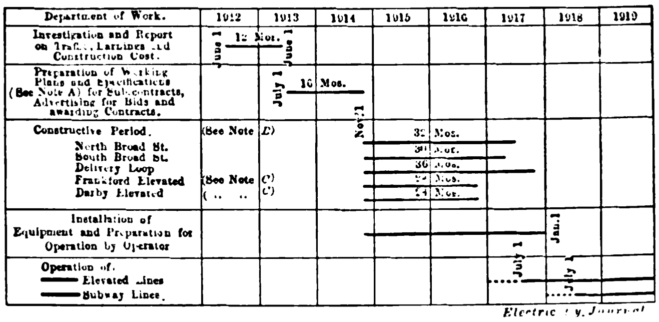
Aside from the exemplary completeness of the report as a whole, however, several concrete methods of traffic analysis used therein deserve a more amplified description than was accorded them in the two issues of this paper previously mentioned.

As stated in those issues, the report recommends for immediate construction a four-track subway in Broad Street from the City Hall northward to Pike Street and a two-track subway southward from the City Hall to League Island, with a central delivery subway loop at Fifteenth, Walnut, Eighth, Arch and Filbert Streets. It also proposed several elevated railway extensions. The total cost of these lines is estimated at $57,587,000, of which $34,682,000 is to be paid by the city and $22,896,000 by the lessee for the equipment of the difficult sections in the business district.

The diagram, reproduced herewith, shows the estimated time for engineering and completion.

ESTIMATED INCOME FOR 1921

From a mass of data systematically compiled the engineers estimated the future traffic from 1918 to 1930. An allowance was made for light traffic during the early years, but for the year ended June 30, 1921, the operating revenue was estimated at $5,705,200 and the operating expenses at $2,729,200, leaving net earnings for the year of $2,976,000. From this amount there were subtracted deductions from income to the extent of $534,100, and a surplus applicable to the return on the investment was ascertained, amounting to $2,441,900, or 4.1 per cent. The rate of return on the investment for the individual new lines was as follows: North Broad Street subway line, 2.9 per cent; South Broad Street subway line, 5 per cent; Frankford elevated line, 8 per cent, and Darby elevated line, 4.4 per cent. The average subway return was 3.2 per cent and the average elevated 6.4 per cent.



Note A—No allowance has been made for delays due to obtaining state and local legislation and the testing of its legality by the courts or delays due to injunctions, determination of routes, station locations, sizes of subways, etc., financing, securing of operating contractor and submitting loan ordinance for public approval. This time assumes no delay will occur in obtaining engineering organization for preparation of these plans owing to requirements of the Civil Serice Commission.

Note B—No allowance has been made for delays caused by delinquencies of contractors, legal or other unforeseen obstructions.

Note C—Estimated time based on connection to present Philadelphia Rapid Transit line.

Philadelphia Report—Diagram Showing Estimate of Minimum Time Required for Engineering and Construction of Subway and Elevated System

In arriving at the above estimated surplus of $2,441,900, the unit costs of operation were determined from the present unit costs on the Market Street line and by comparison with those on subway and elevated systems in other cities. Deductions were then made for taxes to the extent of 0.5 per cent on the entire investment, for reserve funds for contingent operating expenses in the amount of 3 per cent of the total operating expenses and reserve funds for renewals to the extent of 0.3 per cent for subway lines and 0.5 per cent for elevated lines upon the cost of construction and equipment.

FUTURE DEVELOPMENT OF RAPID TRANSIT SYSTEM

With the recommended lines previously mentioned forming the main trunks, extensions or branches, according to the report, should be built later in the outskirts to act as feeders, and the main lines should be supplemented by others until a complete system is formed. The estimated increase of gross revenue on the surface and rapid transit system as recommended and projected for the period from 1920 to 1960 is shown by Table I.

TABLE I—ESTIMATED INCREASE OF GROSS REVENUE ON SURFACE AND RAPID TRANSIT SYSTEM WITH ADEQUATE FACILITIES SUCH AS THOSE RECOMMENDED AND PROJECTED

	Population within city limits	Gross revenue		Increase for ten years
		Amount	Per capita	
1920	1,825,000	$28,105,000	$15.40	$7,921,700
1930	2,108,000	35,836,000	17.00	7,731,000
1940	2,391,000	43,635,750	18.25	7,799,750
1950	2,669,000	50,997,900	19.10	7,342,150
1960	2,936,000	57,986,000	19.75	7,008,100
Total	....	....	....	$37,802,700

The estimates of population for Philadelphia contained in Table I are based on a study of the growth of population in New York, Chicago, Philadelphia and Boston during the last fifty years. Besides New York, Philadelphia is the only one of these cities that shows a steady growth or cumulation as the decade increases; but, unlike New York, its increase indicates a gradually declining tendency. On the basis of population and gross revenue statistics for 1890, 1900 and 1910, the gross revenue per capita was plotted in a curve, showing an increase of 3 per cent per year between 1900 and 1910. The viewpoint was taken, however, that so large a rate of growth is unlikely to continue, and the future revenue per capita at the present fare standards was projected at a decreasing rate of increase, being 1.3 per cent per year from 1913 to 1919. This factor of gross revenue per capita, applied to future estimated population, made possible the approximation of future gross revenue shown in Table I.

Of the increased revenue shown in Table I a portion is required to support additional investment in the surface car system for additional track, cars and equipment, at a ratio of $4 of investment for $1 of increase of revenue. This figure of $4 is obtained by allowing 10 per cent for interest, taxes and depreciation or sinking fund, to be carried by net earnings equaling 40 per cent of the gross revenue. After the revenue necessary to support the additional surface system investment is deducted the remainder is available to support rapid transit lines. In order to determine how much additional investment in rapid transit lines such increased revenue would permit, it is assumed that the operating expenses and taxes will be 50 per cent of the gross revenue, and that the interest and sinking fund, including depreciation at 2 per cent, will amount to 7 per cent on the investment. The application of this 7 per cent to the 50 per cent of gross earnings remaining as net earnings shows that for each dollar of additional revenue approximately $7 of investment would be supported.

From these figures Table II is derived, showing the investment in rapid transit facilities that can be supported.

TABLE II—POSSIBLE FUTURE INVESTMENT IN RAPID TRANSIT LINES

Year available	Total	Necessary to support increased investment in surface system	Remainder available to support increased investment in rapid transit system	Increased investment made possible at seven times increased gross revenue
1920	$7,921,700	$2,190,000	$5,731,700	$40,121,900
1930	7,731,000	1,868,750	5,862,250	40,035,750
1940	7,799,750	1,898,750	5,901,000	41,307,000
1950	7,342,150	1,798,750	5,543,400	38,803,800
1960	7,008,100	1,565,000	5,443,100	38,101,700
Total fifty years	$37,802,700	$9,321,250	$28,481,450	$199,370,150

ESTIMATED COST OF CONSTRUCTION AND EQUIPMENT

As it is manifestly important that the new rapid transit lines be operated in conjunction with the existing surface car lines, which are natural gatherers and distributers of rapid transit traffic; so as to afford the greatest facilities to the greatest number of people, only such estimates for cost of construction and equipment are made in the report as assume the operation of the system in conjunction with the lines of the Philadelphia Rapid Transit Company. The general design of the proposed lines, exclusive of single construction details fixed by route selection, is as follows:

1. Minimum radius of track curves, 165 ft., and maximum ascending grades, 5 per cent.
2. Twelve-foot headroom and 12-ft. track centers for subways.
3. No grade crossings in subways.
4. Steel-frame construction for side walls and roof of subway.
5. Subway floor finished with cement and track laid on short fixed ties without ballast.
6. Solid floor construction for elevated lines.
7. Open cut on South Broad Street line south of Bigler Street.
8. Provision for third-tracking portions of proposed elevated lines.
9. Type of car generally similar to present Market Street subway-elevated car with three wide doors spaced more efficiently.

The cost of construction on the above basis also includes the following percentages for overhead charges: on subway construction, 30 per cent; on elevated construction, 25 per cent, and on equipment on either subway or elevated construction, 20 per cent. These percentages are based on itemized construction costs as shown in Table III.

TABLE III—OVERHEAD PERCENTAGES

	Subways, per cent	Elevated, per cent	Equipment, per cent
Incidentals and contingencies	10	7½	5
Engineering and contingencies	10	7½	5
Organization, administration, legal and financial expenses	3	3	7½
Interest during construction (average)	7	7	2½
Total	30	25	20

The item to cover incidentals and contingencies was adopted after a consideration of the difficulties to be encountered and the uncertain elements included in each class of construction and equipment. The engineering and superintendence percentage, comparing with approximately 7.9 per cent of the amount of the contracts and extra charges on the New York rapid transit system and with approximately 10.5 per cent of the construction cost on the Boston subway, includes the cost of the transit commissioner's report and the cost of maintaining and operating the department of city transit during the period of design and construction. The allowance for the cost of organization, administration, legal and financial expenses compares with 2 per cent of the cost of structures on the New York rapid transit system. The interest during construction was 6.4 per cent in New York and 8 per cent in Boston.

There is also included in the cost of construction the total cost of real estate pertaining to right-of-way and right-of-way easements, estimated at $2,761,000. Credits, however, may be made to the subway investment of $1,920,000 for reserve space for water mains and of $236,000 for excavated material to be used by the city for street filling.

Additional equipment will be needed from year to year with attendant expenditures for substation capacity, electrical distribution system, yards and shops. A subway on Chestnut Street with elevated connection will probably be required by July 1, 1927, costing

$7,226,000 with equipment. Taking into account these additions to investment, the report gives the estimated total cumulative cost of construction and equipment of the recommended system from the beginning of operation of all lines, including interest during construction, as ranging from $57,578,000 in 1919 to $73,393,000 in 1930.

RATE OF RETURN ON INVESTMENT

Rates of return of 3.2 per cent for the average subway and 6.4 per cent for the average elevated line have been mentioned heretofore in connection with the return on the investment that has been recommended for the immediate future. If, however, the additional debits and credits to investment as indicated in the preceding paragraphs be taken into account, the rates of return are somewhat increased for the later years, varying from 4.1 per cent in 1921 to 6 per cent in 1930 and averaging 5.21 per cent.

ECONOMIC VALUE OF PROPOSED SYSTEM

The effect of the development of high-speed transportation upon the taxable value and utility of real estate is shown by the Market Street subway-elevated line, both in West Philadelphia and in the business district along Market Street. From 1900, before the Market Street line was projected, to 1912 the assessed valuation of real estate west of Market Street increased 90.9 per cent as compared with a 127.6 per cent increase east of Market Street, 25.7 per cent on Chestnut Street, 38.7 per cent on Arch Street and 22.3 per cent in the other sections of the city outside the business district.

SURVEY OF PRESENT TRAFFIC

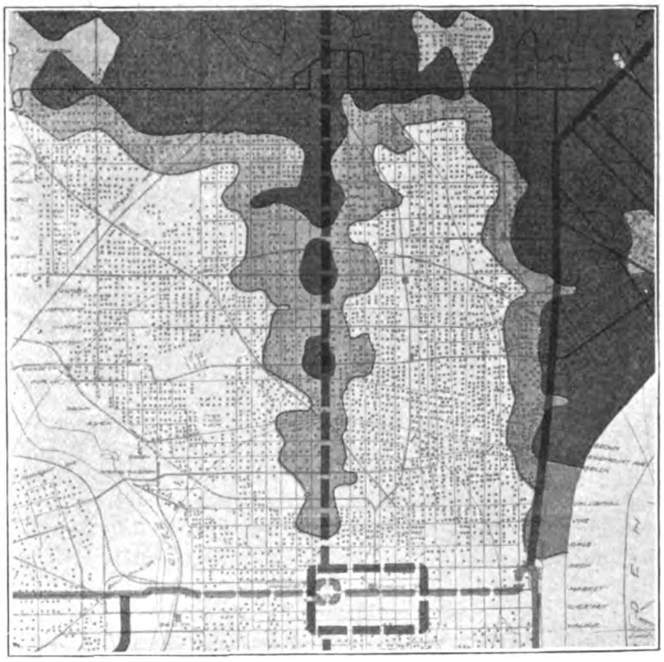
In considering the construction of a rapid transit system it was of vital importance that the volume, origin and destination and channel of flow of each portion of the present traffic movement during each hour of the day be determined accurately and without substantial approximations or assumptions. This was done by means of a traffic survey on the lines of the Philadelphia Rapid Transit Company extending from Oct. 14, 1912, to Nov. 18, 1912, and later on the suburban lines of other companies terminating in the vicinity of Philadelphia. The traffic survey was more complete in scope and detail than any ever before attempted, and its success was made possible largely because the information was obtained for the use of the city and because the co-operation of the public was secured through wide publicity which was given through the courtesy of the newspapers.

In making the survey, Mr. Taylor's own idea was followed out in that each passenger was labeled and records were made of both the beginning and the ending of the ride. Two observers were placed on approximately every fifth car of each line practically during the entire day. The record obtained from each passenger embodied the following information: (a) time of day; (b) route of car; (c) direction; (d) street of entrance; (e) street corner of destination; (f) route on which destination is situated if reached by transfer or exchange tickets; (g) fare presented—whether cash, exchange ticket, transfer or free; (h) transfer or exchange ticket issued, if any.

During the period of the survey a group of lines was under observation each day, excluding Saturdays, Sundays, holidays and other days when abnormal conditions prevailed, the purpose being to obtain information on normal business days. To check the results, the survey was repeated on several lines, and the two records in each case were found to agree closely. The magnitude of this undertaking is apparent when it is considered that about 284,500 passengers were counted, representing a similar number of slips or tickets with the above information recorded thereon, which had to be carefully compiled.

TIME ZONES AND TIME SAVING

The most important factor bearing upon the proposed rapid transit system and causing in large part the growth of population, increase in land values and taxable assessments in the district served is the time saved by the high-speed system over the existing surface systems. In connection with this point the Philadelphia report contains some interesting data and novel maps. In order to determine accurately the extent and influence of this time-saving element, Map No. 24 in Volume II of the report was prepared, showing as of July 1, 1912, the time zones of transit for the present traffic by the shortest possible existing routes outward from the business section on Market Street between Eighth Street and City Hall or on Broad Street between Arch and Walnut Streets. The following constants were used: the average subway-elevated speed, 16 m.p.h.; the average surface car speed, 8 m.p.h., and the average pedestrian speed, 3 m.p.h. A differential of three minutes was allowed for walking up and down the stairs at subway-elevated stations. Using these same constants the investigators prepared Map No. 25, showing the time zones after the construction of all the rapid transit lines recommended for the immediate future.



Philadelphia Report—Portion of Map Showing Estimated Time Saving by Rapid Transit Lines as Compared with Present System

TIME-SAVING CONTOUR MAPS

The most striking and novel map, however, is No. 26, reproduced in part herewith, which is used for the first time and which shows graphically by contour lines at five-minute intervals the time-saving that will be effected by the proposed lines on an equal fare basis as compared with the electric railway system as of July 1, 1912. These time-saving contours were obtained by superimposing Map No. 25 over Map No. 24 and by connecting the intersections made by the time contours or zone boundaries on Map No. 25 with those on Map No. 24 which differ by the same interval. The points of zero time saving or equal time of transit by the present system and by the proposed system were obtained in the same manner.

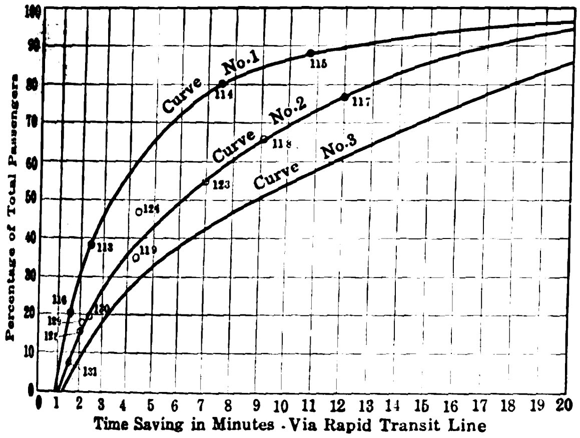
POPULATION BENEFITED

Inasmuch as the distribution of population throughout the city was shown on the time-saving map, it was possible to estimate the number of people that will be convenienced by the proposed facilities. Tributary to the proposed North Broad Street line, approximately 338,000 people, as of 1912, would save time in traveling to and from the central business district; tributary to the South Broad Street line, 122,000 people would save time; tributary to the Frankford line, 298,000 people would save time. The present subway-elevated line in West Philadelphia saves time for approximately 165,000 people, making a grand total, when the four proposed lines are built, of 983,000 persons benefited, or 60 per cent of a total population within the city limits estimated at 1,623,200 in 1912. A large part of the remaining 40 per cent is within the central part of the city and is served more expeditiously by surface lines to the business district. These people will, of course, be benefited in traveling to outlying districts or to other parts of the city.

CASH VALUE OF TIME SAVING

The time saving thus estimated has a distinct economic value. If estimated at an average of 15 cents per hour, the cash value of the time saved by each line of the proposed system would be as shown by Table IV for the traffic as of the fiscal year 1913 and as estimated for 1921.

Curve No. 1—For Traffic Between Delivery District and Sections on Rapid Transit Line
Curve No. 2—For Traffic Between Sections Requiring Extra Transfer by Rapid Transit Line
Curve No. 3—For Traffic Between Sections Requiring Two Extra Transfers by Rapid Transit Line



Electric Ry Journal

Points show actual division of traffic in West Philadelphia, numbers indicating traffic sections. represents traffic sections through which Market Street Elevated line runs. O represents traffic sections reached by surface transfer lines from Market Street Elevated line.

Philadelphia Report—Curves Showing Relation of Passengers Using Rapid Transit Lines to Time Saving

TABLE IV—AMOUNT AND MONEY VALUE OF TIME SAVING BY PROPOSED RAPID TRANSIT LINES COMPARED WITH PRESENT SYSTEM

	Time saving (minutes)		Equivalent money value (at 15 cents per hour)	
Years to June 30	1913	1921	1913	1921
North Broad line	275,377,000	420,600,000	$689,000	$1,052,000
South Broad line	67,381,000	104,000,000	168,000	260,000
Frankford line..	108,467,000	151,000,000	271,000	377,000
Darby line......	48,941,000	100,000,000	122,000	250,000
Total	500,166,000	775,700,000	$1,250,000	$1,939,000
Value capitalized at 5 per cent..	....	....	25,000,000	38,780,000

RAPID TRANSIT TRAFFIC IN PROPORTION TO TIME SAVING

From the traffic survey made in West Philadelphia and a study of the time-saving maps previously mentioned, fixed relations were developed between the time saving in minutes and the proportion of passengers using the high-speed lines in preference to the surface lines. This relation between the division of traffic and time saving is shown in a distinctly novel manner by the curves in the accompanying diagram. The upper curve shows the proportion of passengers from traffic sections along the high-speed line to the delivery district. The middle curve shows the proportion for traffic sections reached by surface transfer lines. The lower curve is estimated for cases where two transfers are involved.

These three time-saving curves were all determined for time saving to the central delivery district. They were used, however, in estimating the probable volume of certain other movements between traffic sections in the areas served by different rapid transit routes, proper allowances being made for inferior delivery and for extra transfers. While the division of local traffic varies, the averages for all such movements are found to follow the middle and lower curves, which indicates that the few stops or points of delivery on the rapid transit line place it at a disadvantage equivalent to that of one transfer. For short distances, however, where the time saving is small, the actual proportions of rapid transit traffic are higher than are indicated by the curves.

SUBWAY VERSUS ELEVATED LINES

In discussing the relative cost of subway and elevated lines, the report states that a subway system with two tracks without equipment will average $1,000,000 per mile of track as compared with about $400,000 per mile of track for an elevated structure with solid floor, or about two and one-half times as much. Travel in subways is less comfortable than on elevated lines, it is stated, and with modern design the objections to the latter are largely eliminated; hence free use of elevated lines has been made in the recommendations embodied in the report.

DESIRABILITY OF OLD-LINE EXPRESS COMPANIES ON ELECTRIC RAILWAYS

Practically all the interurban roads, either those of large mileage in themselves or with interchange relations with other electric lines, have contracts with old-line express companies. Generally the basis of contract is on a guarantee per month or year, with the railway company sharing in a percentage of the gross over and above a fixed amount, and this provides a fixed source of revenue without the assumption of any liability and without requiring additions to the regular traffic organization.

Generally the guarantee is more than the electric railway might expect in the way of net revenue from operating its own express company. The old-line express is handled in the regular express or local passenger cars under the supervision of a messenger furnished by the express company. The way station agent receives a commission for the business he handles for them, and this enables the traction company to employ more competent men without increasing salaries. The fact that very little is required on the part of the railway company, except space in the regular cars and a special service from time to time, which is furnished at an extra charge, makes the guaranteed return practically all net.

On roads where the old-line express company is operating and the electric railway company carries on a dispatch freight business, one does not interfere with the other, and they are not considered competitive. In fact, most of the contracts made between electric railways and old-line companies provide for the operation by the railway of a local interurban express which, if properly handled, represents practically all the business which the railway could obtain if it were operating its own service exclusive of that of the old-line express company.

ELECTRIC RAILWAY REPORTS OF BUREAU OF CENSUS

Preliminary figures of the forthcoming quinquennial report on the electric railways of Maine, Vermont, New Hampshire and West Virginia have been given out by Director W. J. Harris of the Bureau of the Census, Department of Commerce. The statistics relate to the years ended Dec. 31, 1912, and June 30, 1902. The totals include electric light plants operated in connection with electric railways and not separable therefrom, but do not include reports of mixed steam and electric railways or railways under construction during the census year which had not begun operations.

The detailed figures as presented in the accompanying table for Maine show that during the decade 1902-1912 there were substantial gains in the industry. The gross incomes of the sixteen operating companies reported in 1912 show an aggregate gain of $2,022,055, or 128.7 per cent, over 1902. A noticeable feature of operations of the decade 1902 to 1912 is the net income increase of 272.4 per cent, due, possibly, to consolidations, there being a decrease in the number of companies of 15 per cent. Other notable gains were in miles of line, 59.5 per cent, revenue passengers carried, 84.5 per cent, and transfer passengers, 149 per cent.

The figures as presented for Vermont show substantial gains during the decade 1902-1912. The gross income less operating expenses shows an increase of 495.2 per cent, while the number of revenue passengers carried shows an increase of 90.3 per cent and the number of miles of line an increase of only 26.8 per cent during the decade 1902-1912. The power equipment shows an increase of horse-power of 565.1 per cent, chiefly in hydroelectric power. The number of operating companies was the same in 1912 as in 1902.

The figures for New Hampshire show that during the decade 1902-1912 there were substantial advances. The gross income shows a gain of 107 per cent, while the net income increased only 22 per cent. Revenue passengers increased in number 109.4 per cent and the number of persons employed 119.1 per cent. The miles of line increased during the decade 40.2 per cent and the number of companies 15.4 per cent.

The West Virginia figures show that during the ten years ended in 1912 substantial gains were made in the electric railway field in that State. The increase of the twenty operating companies reported in 1912 over 1902 was twelve, or 150 per cent, and their aggregate income shows an increase of $2,483,455 (225.3 per cent), and their net income an increase of $620,288 (338.1 per cent). The miles of track increased 250.72 (179.1 per cent), and the number of revenue passengers carried was 29,750,280 more in 1912 than in 1902, an increase of 137.1 per cent.

COMPARATIVE FINANCIAL AND OPERATING STATISTICS FOR ELECTRIC RAILWAYS OF SEVERAL STATES

	Maine		Vermont		New Hampshire		West Virginia	
	1912	1902	1912	1902	1912	1902	1912	1902
Number of companies	17	20	10	9	15	13	22	8
Operating companies	16	19	9	9	13	7	20	8
Lessor companies	1	1	1	....	2	6	2	....
Miles of line	486.16	304.71	96.65	76.20	217.42	155.03	357.10	133.06
Miles of single track	536.38	331.55	102.85	80.55	246.26	167.65	390.72	140.00
Miles of single track in state (a)	530.49	328.50	120.83	86.05	268.15	174.45	318.21	140.56
Cars, number	794	598	155	105	368	287	521	287
Passenger	519	476	119	80	304	244	457	272
All other	275	122	36	25	64	43	64	15
Electric locomotives	8	....	2	....	2	....	....	....
Persons employed	1,771	1,034	268	190	837	382	1,861	667
Salaried employees	175	65	43	25	68	25	144	46
Wage earners (average number)	(b)1,596	969	(b)225	165	(b)769	357	1,717	621
Power plant equipment:								
Horse-power, total	40,090	13,065	7,655	1,151	4,102	4,015	....	....
Steam and gas engines, including turbines—								
Number	31	25	14	5	8	13	44	34
Horse-power	14,526	9,740	3,000	1,011	1,920	4,015	25,740	12,050
Waterwheels—								
Number	24	23	12	2	2	....	....	....
Horse-power	25,564	3,325	4,655	140	2,182	....	....	....
Kilowatt capacity of dynamos	31,234	9,371	6,744	1,621	2,735	2,513	19,995	7,490
Output of stations, kilowatt hours	54,148,656	25,578,242	6,867,675	1,804,195	5,356,050	5,172,718	59,854,180	11,744,895
Current purchased, kilowatt hours	20,818,159	(c)	2,121,669	(c)	12.198,773	(c)	6.296.842	(c)
Passengers carried	53,184,598	27,506,582	8,761,648	4,561,523	26,651,471	12,234,120	54,802,105	22,183,794
Revenue	47,049,038	25,495,164	8,135,725	4,274.806	23,673,362	11,304,908	51,457,150	21,706,870
Transfer	5,008,992	2,011,418	517,841	286,717	2,708,290	929,212	2,331,733	476,924
Free	1,126,568	(e)	108,082	(c)	269,819	(c)	1,013,222	(c)
Car mileage (passenger, express, freight, etc.)	11,124,224	6,815,671	1,776,244	1.412,528	4,726,181	3,214,879	11,380,865	6,734,171
Condensed income account, operating companies:								
Gross income	(d)$3,593,617	(d)$1,571,562	(e)$631,241	$249,228	(f)$1,250,391	(f)$604,131	$3,585,626	(g)$1,102,171
Operating expenses	2,002,617	1,127,660	345,268	201,179	987,934	478,849	1,825,694	652,862
Gross income less operating expenses	1,591,000	443,902	285,973	48,049	262,457	125,282	1,759,932	449,309
Deductions from income (taxes and fixed charges)	1,193,095	337,050	169,912	45,089	211,831	83,786	956,177	265,842
Net income	397,905	106,852	116,061	2,960	50,626	41,496	803,755	183,467

(a) Excluding track lying outside of state of companies within state and including track in state owned by outside companies.

(b) Number employed Sept. 16, 1912.

(c) Figures not available.

(d) Income from sale of electric current for light or power included in 1912, $789,166, and 1902, $102,318.

(e) Includes income from sale of current for light and power in 1912.

(f) Income from sale of current for light and power included; 1912, $386,598, and 1902, $126,117.

(g) Income from sale of current for light and power included in 1902, $10,625.

On the Paris subways a comparison of the figures of 1912 with those for 1911 shows that there is an increase of 5,339,106 fares for the former year. This is due to the larger number of return and collective tickets sold. First-class tickets decreased by more than 500,000. The receipts of the subway for 1912 were as follows: From return tickets, $3,083,265; first-class, $1,581,315; second-class, $5,733,845; collective tickets, $685; supplementary charges, $58,170; total, $10,457,280.

REPORT OF COMMITTEE ON RAIL, AMERICAN RAILWAY ENGINEERING ASSOCIATION

The October, 1913, *Bulletin* of the American Railway Engineering Association contained a report of the committee on rail, subdivided into two discussions. In one H. B. McFarland, engineer of tests Atchison, Topeka & Santa Fé System, and a member of this committee, discussed the "Influence of Seams or Laminations in Base of Rail on Ductility of the Metal."

Six rails for special investigation were selected from a lot of failed rails that had been sent to the laboratory for test. This lot included rails from different manufacturers, of different section and of different weight. Three weights of rails were investigated—75-lb., 85-lb. and 90-lb. rails. Three different rail sections were investigated—A. S. C. E., A. R. A. and Santa Fé. The rails investigated came from four different manufacturers—Illinois Steel Company, Maryland Steel Company, Colorado Fuel & Iron Company and Lackawanna Steel Company.

In selecting the rails for investigation, no particular regard was given to the manufacturer, as the principal idea was to secure specimens with dissimilar failures in order to determine whether or not seams and laminations such as are found in the base of rails failing with characteristic half-moon base failures and with square and angular breaks could be traced through all rails. All of the rails, with the exception of the 90-lb. rail from the Gary plant of the Illinois Steel Company, were of Bessemer steel. One of the rails, that from the Lackawanna Steel Company, was a titanium rail. The rest of the rails represented a very large percentage of rails now in track service.

A careful study of detailed and average results obtained from this investigation concerning laminations in base of rails leads to certain general conclusions:

1. Rails failing in track may generally be found to contain, upon investigation, numerous black seams in the base.
2. Base seams are not continuous throughout a rail and vary in depth at different intervals.
3. Seams materially decrease tensile properties of the metal in the rail base.
4. Seams decrease strength of rail bases for decreased temperatures.
5. Transverse strength of rail base is decreased about 10 per cent, owing to seams in the base.
6. The seams in the rail base may be periodical, owing to methods of manufacture causing variation in tensile properties at different portions of the rail.

To reduce rail breakage efforts have been made to increase the rail section, when probably the decreased strength of the rail is due more to physical defects contained therein than to the weight of the sections. More attention should be given to the elimination of base seams and the direct production of a rail with a uniform homogeneous structure.

The second discussion on rails was a report on "Seams in Rails as Developed from Cracks in the Ingot," by M. H. Wickhorst, enginer of tests, rail committee. An investigation was made concerning the development of seams in billets and rails from cracks in the surface of the ingot. A cold ingot with a badly cracked surface was taken and its four sides "skinned" off in a planer to show well the condition of the surfaces. The four sides were photographed and photographs were also made at succeeding stages, showing the surfaces of blooms and rails.

The work was done at South Bethlehem, Pa., at the works of the Bethlehem Steel Company, which furnished the facilities and material.

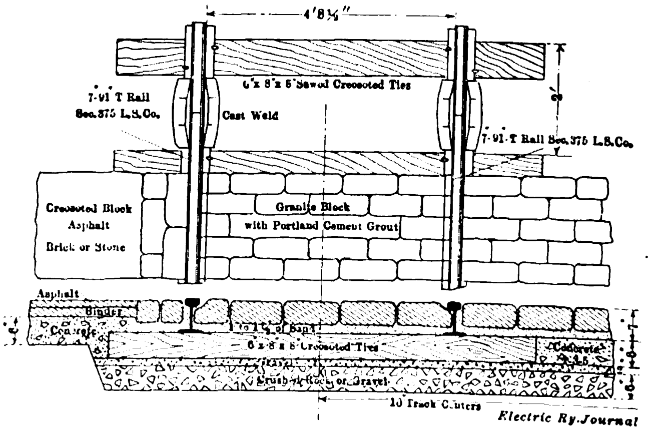
The cracks in the ingot were, in a general way, transverse or obliquely transverse of the ingot. When first bloomed, the cracks on the right and left sides of the ingot as it first entered the blooming rolls opened up or "yawned" open, forming double V's, one inside the other. Further blooming elongated and closed in the cracks, forming them into elongated Y-shaped flaws or clusters of them. Still further rolling finally resulted in long narrow Y-shaped seams in the rail, or clusters of them, generally several feet long, as shown up by pickling in sulphuric acid. The cracks on the top and bottom sides of the ingot as it first entered the rolls did not open up and finally disappeared so far as could be determined by the appearance of the surfaces of the blooms and rails after pickling in sulphuric acid.

The difference in behavior of the cracks on the top and bottom sides in rolling from the behavior of those on the right and left sides suggests the interesting conclusion that the metal ahead of the rolls is compressed, while that between the rolls is pulled. The work indicated that seams resulting from cracks in the ingot will be on the web of the rail if what were the right and left sides of the ingot as it first entered the rolls form the sides of the rail, and that they will be on the top of the head and bottom of the base if these sides of the ingot form the tread and base of the rail.

To sum up, the cracks on the right and left sides of the ingot as it first entered the blooming rolls resulted in seams in the rails, while the cracks on the top and bottom sides of the ingot did not result in seams. Seams may therefore possibly be oriented to appear on the sides of the rail or on the tread and the bottom of the base.

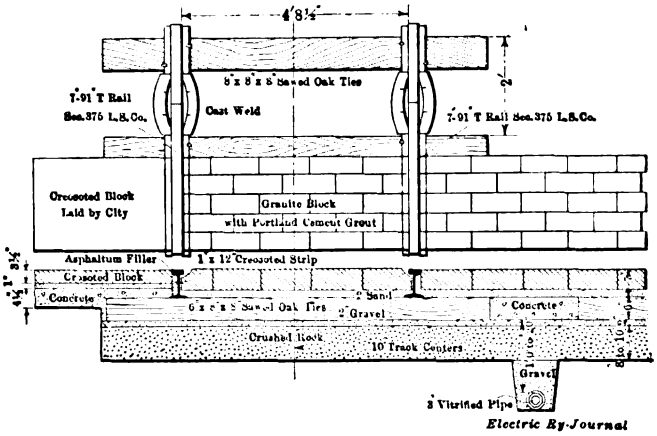
TWIN CITY MAINTENANCE-OF-WAY NOTES

The city of Minneapolis did a great deal of paving during the past summer, mostly with creosoted wood blocks. As a consequence the Twin City Rapid Transit Company has taken the opportunity to relay more track and special work than it would otherwise do. A total of 52 per cent of the total street length in the city is now paved. The railway company has 170 miles of single track within the city limits. Among the items of new equipment bought for this work were a Brown hoist crane car and a second truck-mounted concrete mixer. The mixer is motor-driven, but the car is not.



Cross-Section Track Construction Without Special Drainage

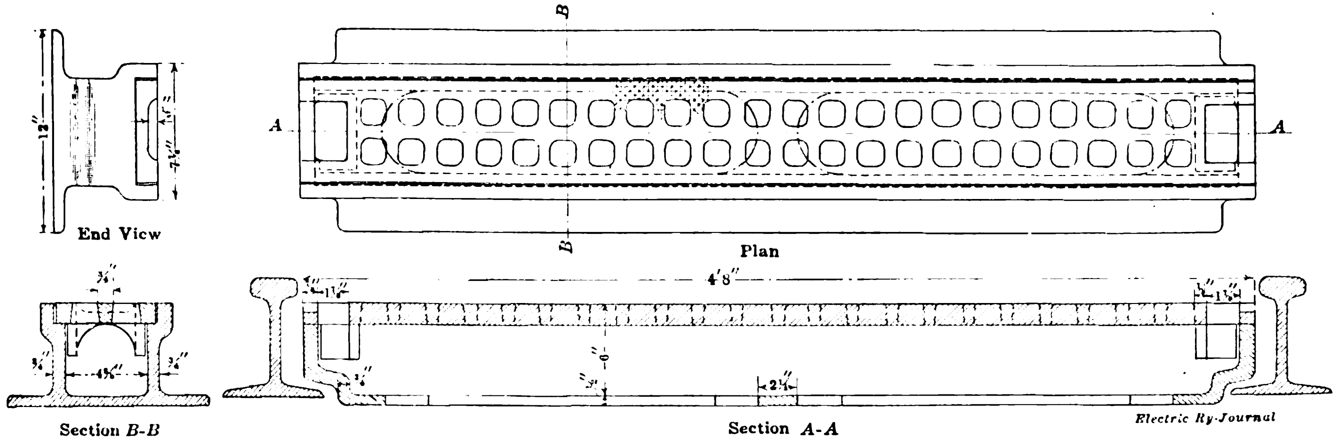
Two forms of track construction were installed last year, one for streets with good natural drainage, the other for track laid on the heavy blue clay soil which is found in some parts of the city. As this clay contains a great deal of water, the track must be artificially drained. Drainage is accomplished by means of a drain tree which slopes from the manhole summits to connections to the city sewers midway between manholes. Cross-sections and plans of these two standard constructions are shown in the accompanying illustrations. The cast-welded joints illustrated are used in the paved streets and Continuous joints elsewhere. The molds for making the cast joints are cast in the company's shops.


4'8½"
8"x 8"x 8' Sawed Oak Ties
7-91" T Rail Sec. 375 L.S. Co.
Cast Weld
7-91" T Rail Sec. 375 L.S. Co.
2'
Creosoted Block Laid by City
Granite Block with Portland Cement Grout
Asphaltum Filler
1"x 12" Creosoted Strip
Creosoted Block
Concrete
2" Sand
6"x 8"x 8' Sawed Oak Ties
2" Gravel
Concrete
Crushed Rock
10' Track Centers
Gravel
8" Vitrified Pipe
Electric Ry. Journal

Cross-Section of Track Construction Equipped with Drainage Tiling

As shown in one of the accompanying drawings, a novel feature of the track construction is the use of cast-iron drip boxes with grating covers which are placed about a block apart. The boxes are mounted on concrete bases and are connected by drain pipe with the city sewers. It is possible to do this as the sewer system in Minneapolis, as well as in St. Paul, is a combined one which takes care of storm water as well as regular sewage.

While the company buys special work from the leading manufacturers, its shop facilities have made possible much home manufacture of built-up crossings, switches, frogs and even of entire track layouts. The 6-in. construction is largely of built-up type, while steel castings are used for the 7-in. pieces. A regular laying-out floor is provided, and on this templates for use in the shop are prepared. Full-size drawings are made for switches and mates. All special work, whether purchased or manufactured, is set up and fitted in a yard provided for the purpose. The same men set the work up in the yard and the street. Thus, mistakes at the location are avoided.

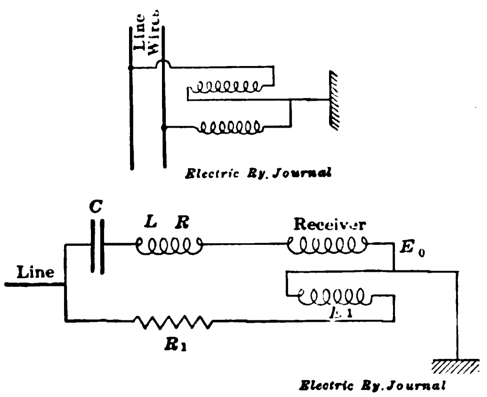

B
A
A
B
End View
Plan
12"
4'8"
Section B-B
Section A-A
Electric Ry. Journal

Plans of Cast-Iron Track Dips

The Santa Fé Electric Tramway Company, Argentine Republic, is said to be interested in extending its lines 12 miles to the city of Esperanza. A concession will be applied for.

AVOIDING TELEPHONE AND TELEGRAPH DISTURBANCES FROM SINGLE-PHASE LINES

G. Girousse, engineer of State telegraphs, France, discusses in the Dec. 6, 1913, issue of *La Lumière Electrique* several methods which are available for reducing or preventing single-phase distribution systems from disturbing telephone and ground-return telegraph circuits. Four remedies are mentioned, namely: using compensating devices, shifting the circuits to pole lines at least 1 mile distant from the high-tension route, placing them underground, and doubling them by adding return wires. All remedies but the first are rejected by M. Girousse as too costly. He states that for telegraph lines very satisfactory results have been obtained with the following inexpensive schemes as first tried in the latter part of 1911 on the 6000-volt, twenty-five cycle Maritime Alps, 10,000-volt, twenty-five-cycle Haute-Vienne and 12,000-volt, twenty-five-cycle Oriental Pyrénées single-phase systems. Since then complete installations have been made for the first two lines named, and equipments for the Oriental, Haute and Basse Pyrénées lines will soon be in place.


Line Wires
Electric Ry. Journal
C
L R
Receiver
E_0
Line
L_1
R_1
Electric Ry. Journal

Methods of Protection from Telephone and Telegraph Disturbances

PROTECTION OF TELEGRAPH CIRCUITS

As shown in the accompanying wiring diagram, use is made of a receiver which has two coils with the same number of turns and connected differentially. One of the coils is in series with a condenser C and a self-inductance L; the other is in series with a resistance R_1. As the telegraphic current is continuous, it does not traverse the former coil, and, consequently, the receiver acts in the normal fashion.

If the two circuits present the same resistance and the same reactance, the disturbing alternating current will divide in two parts alike in amount and phase, and consequently the receiver will not be disturbed. It is clear that these conditions are satisfied theoretically when there is resonance between the capacity C and the self-inductance L for the frequency of the disturbing current, and that R, the resistance of the self-inductance coil, is equal to the resistance R_1. When the conditions are carefully determined in advance, an arrangement of this kind will give good results without necessity for regulation from time to time.

PROTECTION OF TELEPHONE CIRCUITS

Telephone circuits require two important precautions, good insulation and minimum inductance. The insulators should be of the industrial type with large petticoats instead of the present French type with two bells. The petticoat insulators are much easier to maintain, particularly in cleaning, and they cost little more. The insulating points on telephone circuits which leave most to be desired are the underground sections, which until lately have been freely installed at crossings with heavy-current transmission lines. These underground sections, especially at the junctions with aerial lines, constitute the weakest points of a telephone circuit and should be avoided wherever possible. To minimize induction, the number of transpositions must be increased. It would probably suffice to make such transpositions every 125 meters (410 ft.).

M. Girousse states that it is also necessary to take certain precautions at the telegraph offices, for it is useless to insulate the line carefully if the office equipment suffers ground losses. To remove the interurban circuits from the bad influences due to losses either on the lines or the inside equipments, it is best to isolate the circuits by means of transformers. Excellent transformers which insulate against high-tension current are now available.

On some of the existing installations the derangement of lines within the influence of induction from single-phase track circuits has been caused frequently by carbon lightning arresters. The extreme sensitiveness of this arrester is usually a valuable quality, but when its nearness to single-phase circuits causes excessive operation the particles of carbon become detached.

This disintegration causes leakage to ground which cannot be neglected. Therefore it is desirable to replace such apparatus either by horn or vacuum-type lightning arresters. This change will eliminate the destruction of the arresters, but it is still necessary to have a device to avoid shocks. If transformers were used, they would protect the office force, but they would not protect the workmen on the line. In order to eliminate all dangerous high tensions, grounding discharge coils should be installed. These coils should be of the Cailho type which are used for telegraphing on telephonic circuits. This coil, however, as ordinarily made, is not intended to take care of the high-voltage currents induced by single-phase circuits. A modification for the latter purpose known as the Perego coil is the one which has given good results on the telephone circuits of the Oriental Pyrénées lines.

CONCLUSIONS

In conclusion, M. Girousse states that the single-phase lines as usually installed up to the present time offer grave difficulties to telephone and telegraph circuits. It is desirable that these troubles be made negligible. While it is difficult to make these changes on existing lines, the methods described do permit the satisfactory operation of telephone and telegraph circuits at a very small additional expense.

THE NEW TARIFF IN THE ELECTRIC RAILWAY INDUSTRY

The Wilson-Simmons-Underwood tariff bill, which went into effect at midnight Oct. 4, 1913, has been the subject of inquiries from several correspondents of the ELECTRIC RAILWAY JOURNAL, and in answer there is submitted herewith a comparison of the new rates and those of the old Payne-Aldrich tariff law of 1909. The list, of course, includes only such items as are of direct interest in the electric railway field, no attempt being made to cover materials of general use, although the rates on these underwent the largest reductions.

As a whole, a very decided decrease in import duties has taken place, particularly on foodstuffs and fabrics, and the free list has been very largely extended, including in the new law most raw materials as well as books for special purposes, scientific apparatus, most forms of iron and steel, and works of art. The changes in rates on materials generally used by electric railways are shown in the following table:

	Old Rate	New Rate
Axles (not on wheels)	¾c. per lb.	10 per cent
Aluminum, plates, bars or rods	11c. per lb.	3½c. per lb.
Asbestos yarn	25 per cent	20 per cent
Woven in fabrics	40 per cent	20 per cent
Bauxite, crude	$1 per ton	Free
Bearings, ball, or roller	45 per cent	35 per cent
Bolts	1⅛c. per lb.	10 per cent
Ceramics:		
China and porcelain (vitrified)	55 per cent	50 per cent
Other earthy or mineral substances	35 per cent	25 per cent
Calcium carbide	25 per cent	Free
Carbon:		
Brushes	30 per cent	25 per cent
Electrodes	30 per cent	25 per cent
Pots for electric batteries	20 per cent	15 per cent
Chair cane made from rattan or reeds	10 per cent	10 per cent
Chains	45 per cent‡	20 per cent
Cork, bark	8c. per lb.	4c. per lb.
Copper:		
Plates, rods, strips and pipes	2½c. per lb.	5 per cent
Sheathing or yellow metal	2c. per lb.	5 per cent
Chemical compounds	25 per cent	15 per cent
Glass:		
Common window glass	1¾c. per lb.*	1c. per lb.*
Incandescent bulbs	45 per cent	30 per cent
Glue and glue size	2½c. per lb.	1c. per lb.
Iron and steel:		
Plain steel bars and castings	30 per cent§	15 per cent
Boiler or other plates	0.5c. per lb.†	12 per cent
Structural steel	0.4c. per lb.†	10 per cent
Tubes, pipe or flues	30 per cent§	20 per cent
Sheets, galvanized or coated	0.7c. per lb.	15 per cent
Indurated fiber ware	35 per cent	25 per cent
Iron castings	0.8c. per lb.	10 per cent
Leather, rough or for belting	5 per cent	Free
Lead pigments	2½c. per lb.	25 per cent
Manufactures of india rubber or gutta percha	35 per cent	10 per cent
Manufactures of hard rubber	35 per cent	10 per cent
Manufactures of amber asbestos or wax	25 per cent	10 per cent
Machine tools and steam engines	30 per cent	15 per cent
Mica:		
Manufactures of	10c. per lb. plus 20 per cent	30 per cent
Ground	20 per cent	15 per cent
Magnesia, calcined	7c. per lb.	3½c. per lb.
Nails (wire) and staples	0.4c. per lb.*	Free
Oils, mineral and fish	Free	Free
Paints, enamels, colors, stains, frostings, fluxes, etc.	30 per cent	15 per cent
Quicksilver	7c. per lb.	10 per cent
Rails, T, flat and girder	0.175c. per lb.	Free
Railway fishplates or splice bars	0.3c. per lb.	10 per cent
Rope:		
Cables and cordage of manila, etc.	¾c. per lb.	½c. per lb.
Cables and cordage of hemp only	2c. per lb.	1c. per lb.
Wire cables	40 per cent	30 per cent
Screws, wood	5c. per lb.	25 per cent
Steel alloys:		
Titanium, tantalum or tungsten under $200 per ton	25 per cent	15 per cent
Same, but valued at over $200 per ton	20 per cent	15 per cent
Tin, block	Free	Free
Tools, blacksmith and track	1⅜c. per lb.	10 per cent
Varnishes	25 per cent	10 per cent
Wheels for cars, either steel or iron	1¼c. per lb.	20 per cent
Wood:		
Railroad ties	10 per cent	10 per cent
Telephone, trolley, lighting poles	10 per cent	10 per cent
Wires:		
Telegraph, telephone and other wires of metal and rubber	40 per cent‡	15 per cent
Galvanized or coated with metal—add	0.2c. per lb.	No addition
Not otherwise provided for	35 per cent‡	15 per cent
Zinc, block	1⅜c. per lb.	15 per cent

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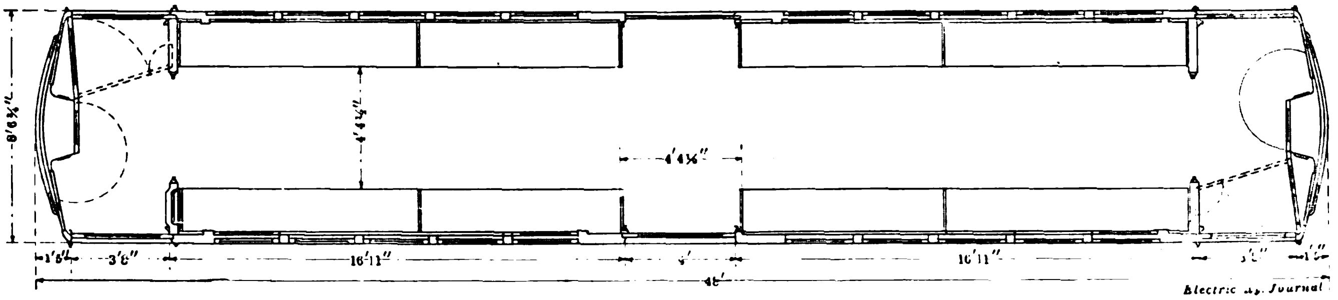
*Varies somewhat according to size. †Varies slightly with value. ‡Minimum. §Approximate.

In some instances the actual rates are variable and in such cases on account of space limitations approximations have been made as shown.

New Steel Cars for Chicago Elevated Railways

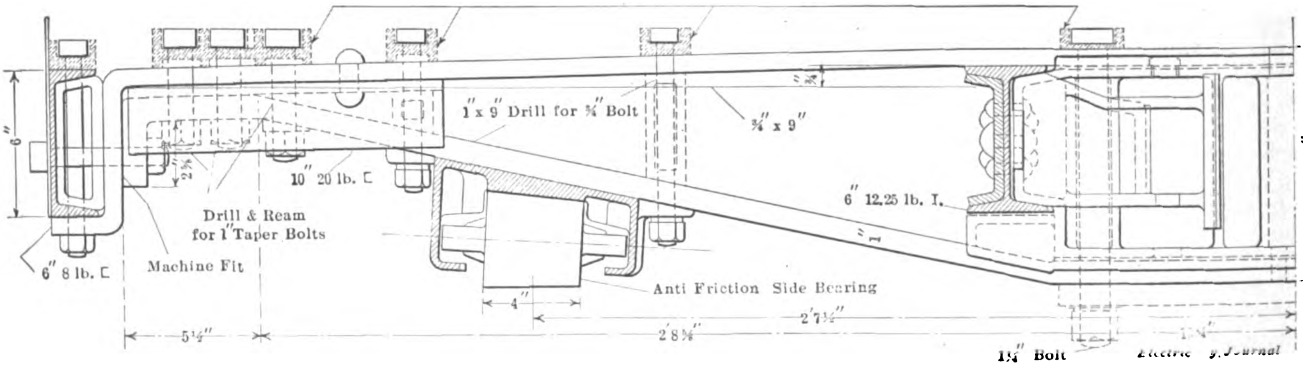
A General Description of One of the 128 All-Steel Cars Recently Ordered for Chicago—The Features Include Fireproof Interior Finish, Special Bolsters and Center Bearings

The Chicago Elevated Railways on Jan. 1, 1914, placed an order for 128 all-steel, arched-roof cars. This is one of the largest contracts for this type of equipment to be closed within the past few years, if not the largest ever placed at one time by an electric railway company. Of the total number ordered, sixty-two will be motor cars and sixty-six trail cars. Before adopting this design samples of the materials and equipment purchased for the new cars were carefully tested by placing them on cars in regular service. The all-steel construction was selected because a fireproof car was desired which, at the same time, would not weigh more than the heaviest cars now used by this company. This design was also considered more economical from a maintenance standpoint, as it was believed that this type of car would give a much longer life than those of composite construction.



Chicago Elevated Car—Floor Plan Showing Arrangement of Seats and Vestibules

For the past four years the growth of the elevated railways has been limited by the capacity of the Union Loop. This had a capacity for 700 cars an hour, and about this number were being looped by the four divisions of the elevated railway system, then owned by as many different companies. About three years ago these were put under a single operating management, following which negotiations for their merger with the surface lines were undertaken by the City Council. In the latter part of 1912 these negotiations were broken off, and in the summer of 1913 the Elevated Railways applied to the City Council for the right to rearrange the loop structure to permit through routing of cars. This request was granted with the result that the capacity of the loop was increased from 700 to 1200 cars per hour.



Chicago Elevated Car—Cross-Sectional Elevation of Body Bolster and Longitudinal Sills

From 1909 to 1913 the passenger traffic had increased but little. Consequently, there was no necessity for additional rolling stock. However, following the inauguration of through routing, which was accompanied by the introduction of universal transfers, the traffic showed an increase of more than 3 per cent in one month. In order to meet the abnormal growth as well as future demands, the new all-steel cars have been purchased.

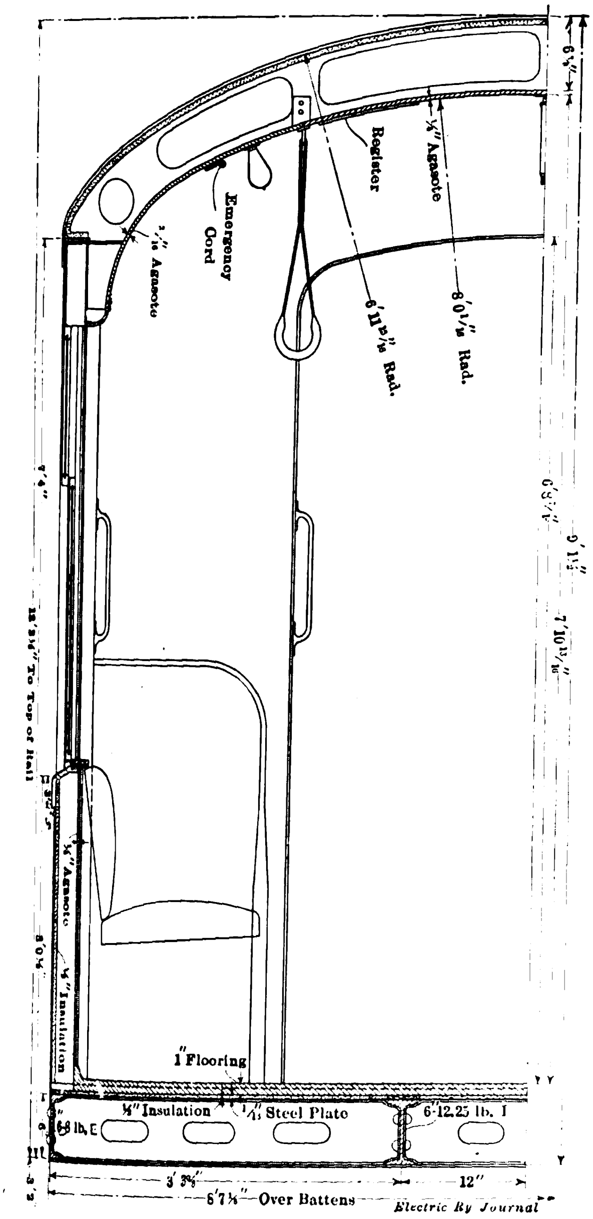
The old type of elevated railway car had only two doors, which were insufficient to expedite boarding and alighting to a point where schedules would not be retarded during the present rush hours. To meet this difficulty, the new cars are equipped with three doors, one at each end of the body and one in the center. Their adoption necessitated the use of longitudinal seats, which, however, permit a larger standing load.

The principal general dimensions of the car body are as follows:

Distance between center of trucks	33 ft. 8 in.
Length of car body on center line over end plates	48 ft. 0 in.
Length of car body over corner posts	37 ft. 10 in.
Extreme width of car over window sills	8 ft. 8 3/16 in.
Width of sliding door opening	3 ft. 8 in.
Height of car from top rail to top of roof	12 ft. 3½ in.

The car body is built throughout with structural steel and pressed-steel shapes and is designed with continuous, structural-steel center sills and plate side girders. The lower members of the side girders form the side sills, and the upper members form the letterboard and deck plate above the windows. The floor and side framing is designed to include cross-bearers which transfer the floor load to the side trusses. Special precaution against the destructive effect of collisions is provided for in the end vestibule framing. The entire car body, exterior and interior, is made fireproof and is thoroughly insulated against extremes of heat and noise, as well as the effect of vibration. In fact, the structural steel is so arranged that no part is exposed to both the outside and inside of the car except the sashes. The underframe is composed of 6-in. channels and I-beams, which form the side sills and end sills and center sills respectively. Hedley anti-climbers are riveted to the end sills.

Another important feature of the underframing included in the design is contained in the body bolsters. These are made of two soft-steel plates with a cast-steel separator in the center. The steel casting in addition to serving as a separator for the top and bottom plates is designed to form a housing for the draft springs by extending it beyond the bolsters toward the end of the car body. The center bearing plates are also of special design and provide for self-lubrication, giving also large contact and wearing areas. The center plates are designed with an oil well surrounding the upper member of the bearing plate which, when filled with oil, permits this member to operate in oil. Each bolster is equipped with a roller side bearing.



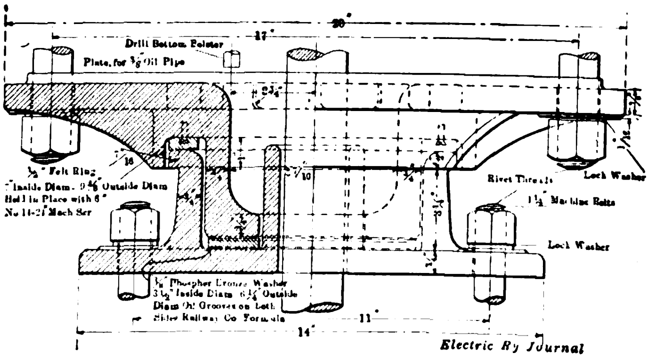
Chicago Elevated Car—Cross-Section of Car Body

The side and end framing of the car body is made up of pressed-steel sections, sheathed on the outside below the windows with 3/32-in. cold-rolled steel plates which are secured to the posts, belt rail, side sills and other parts by rivets. Agasote 3/16 in. in thickness is fastened back of the letter board and between the posts, and ⅛-in. agasote on the sides that face the window posts between the top of the sash and the deck plates. Agasote ¼ in. in thickness extends from the underside of the deck plate to the head lining and from the floor to the windows. In fact, the entire interior finish of the car excepting the arm rests on the windows is supplied in agasote, finished mahogany. The floors are to be of a fireproof, sanitary composition.

At each end of the car are provided vestibules which afford entrance from each side and from the ends. The right-hand corner of each vestibule, on the motor cars, contains a motorman's brake valve, air gage, master controller and other necessary apparatus inclosed in a cab formed by a door hinged to swing approximately 120 deg. This door in one position forms the cab, and in the other it engages with a swinging panel which forms a part of the finished bulkhead.

The body is fitted with six sliding doors, two at each end of the car and two in the center. These doors recede into pockets provided in the car body and are operated with pneumatic apparatus, either from the guard's niche or from the motorman's cab. They are made of pressed steel, suitably insulated, and are 1¼ in. in thickness, being equipped with rubber cushions and weather stripping. The vestibules are fitted with doors at the ends to permit an uninterrupted passage from one car to another.

Twelve windows are provided on each side of the car body, the upper sash being fixed and the lower sash arranged to raise. The sashes are made of bronze and fitted with brass stops and curtain grooves. Both the upper and lower sashes are glazed with 3/16-in. plate glass, set in rubber channels. As mentioned earlier in the article, the car body is provided with four longitudinal seats 16 ft. 4¾ in. in length. These are provided with 2-ft. 6½-in. spring backs built into the car body. Both the back and the seat are upholstered in canvas-lined rattan of small mesh. Twenty-four sanitary hand straps, six on each side of the car ceiling in each end of the car body, are provided for the convenience of standing passengers.



Chicago Elevated Car—Self-Lubricating Center Plates

An electric heating system of the forced-ventilation type, and provided with a thermostat control, will be installed in each car. This system is to be operated in conjunction with eight exhaust ventilators installed in the roof of the car. Each ventilator is provided with register control and the six in the car body will be connected to two continuous operating mechanisms. All electric wires both for the heating system and the lighting circuit are inclosed in metal conduit, provided with junction boxes and other necessary fittings to insulate it thoroughly.

The steel car bodies are mounted on Baldwin locomotive trucks equipped with General Electric field-controlled motors. The motors are operated by Westinghouse multiple-unit control similar to that now in general use on the elevated railways. Other special equipment includes automatic air brakes of the Westinghouse schedule AMR type, arranged for quick recharge and graduated release. The entire order, including the sixty-two motor and sixty-six trail cars, was placed with the Cincinnati Car Company, Cincinnati, Ohio.

JOINT CONFERENCE ON STEEL-WHEEL SPECIFICATIONS

A meeting of the sub-committee on steel wheels, committee on equipment American Electric Railway Engineering Association, was held at the association headquarters, New York, on Tuesday, Jan. 6. Those in attendance were J. P. Barnes, Syracuse, chairman of the sub-committee; W. E. Johnson, Brooklyn, and E. Dietz, Brooklyn, also representing the electric railways; G. Aertsen, Midvale Steel Company; A. A. Stevenson, Standard Steel Works; L. W. Conroy and H. P. Tiemann, both of the Carnegie Steel Company, representing the manufacturers of steel wheels.

The subject of discussion was Appendix B, Section 1, of the 1913 report of the committee on equipment, namely, "Proposed Specifications for Solid-Wrought Carbon-Steel Wheels for Electric Railway Service."

One important point brought out in the discussion was on chemical composition. It was pointed out that the specification applied only to the basic process, and that the silicon content requirement, in particular, worked unnecessary hardship upon the user of the acid process. Arrangement was therefore made to add a chemical composition based on the acid process in which the silicon content of 0.10 to 0.30 per cent will be set at 0.15 to 0.35 per cent with no change in the other constituents except carbon.

There was some discussion as to whether or not the meaning of segregation was modified by the word "injurious" in clause 2, reading: "The ingots from which the blanks are made shall have sufficient discard to insure freedom from injurious pipes and segregation." This was referred to the committee as a whole.

Clause 5 was elaborated to include "necessary identifying records" with complete record of each shipment.

In clause 6 "laminations" was substituted for "flaws." Following this, Mr. Tiemann offered to submit in writing for the consideration of the committee on equipment a number of similar verbal improvements. This offer was accepted.

Clause 7 was modified to eliminate the bracketed words in the following: "or, if specified by the purchaser, wheels may be furnished [with the contour] unmachined." Two sets of tolerances for the choice of the purchaser will also be submitted to the equipment committee. These tolerances will be given in the present tabulated forms, the textual repetitions now in use being omitted as far as possible. The possibility of increasing certain tolerances will also be considered. An eccentricity clause will be added to cover dimensions of the hub more closely than at present; also that the thickness of the wall shall not vary more than 3/8 in. at any one point.

Clause 9, "Branding," is to be modified to include manufacture from one-wheel ingots, and the method of identification and branding may also be changed somewhat. It will be recommended that clause 10 (e) be changed to read that rejection based on tests be reported within ten working days from the receipt of "samples" instead of "wheels." In clause 10 (f) the words "a rehearing" are also to be replaced by the word "reconsideration." Part of clause 10 (g) on wheel replacement was abbreviated to read "that may prove defective in material or workmanship."

The questions of chemical analysis and hardness tests irrespective of composition were considered in connection with mating. It is proposed to add a ladle analysis to clause 4 of the Engineering Association's specification. It was suggested that the association appoint a committee to secure data from the electric railways on wheel life obtained under specified conditions, and then to check these results by securing from the manufacturers all pertinent physical and chemical information as shown by the heat numbers.

As to check analysis, clause 4, it was suggested that "drillings taken from two holes may be analyzed separately or mixed at the discretion of the engineer."

After a discussion on the changes which appeared desirable in the standard car-wheel measurements by means of tapes, gages and templates, the meeting was adjourned.

PLANS FOR AMERICAN ELECTRIC RAILWAY ASSOCIATION DINNER

Further details in reference to the annual dinner of the American Electric Railway Association, which is to be held on the evening of Thursday, Jan. 29, have been made public. As stated previously, the dinner is to be held at the Hotel Waldorf-Astoria in connection with the midyear conference in New York. An interesting program has been arranged. Charles N. Black, president of the American Electric Railway Association, will preside. The speakers will include Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company; Cornell S. Hawley, president of the American Electric Railway Manufacturers' Association, and Henry W. Anderson, vice-president of the Virginia Railway & Power Company, Richmond, Va.

E. B. Burritt, secretary of the association, has sent a letter to members calling attention to the plans. As announced some time ago, the dinner this year is to be in the nature of a pay-as-you-enter" affair. Tickets will be $10 each.

A number of committees of the various associations will hold meetings at the time of the midyear conference. Among the committee meetings announced up to the present time are the following: joint committee on block signals, Jan. 29; committee on way matters, Jan. 28; committee on power distribution, Jan. 28.

COMMITTEE AFFAIRS OF THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION

President J. H. Hanna of the American Electric Railway Engineering Association has announced the following committee on standards: H. H. Adams, chairman; Martin Schreiber, vice-chairman; F. R. Phillips, B. F. Wood, G. W. Palmer, Jr., E. R. Hill, C. S. Kimball, W. H. Roberts, F. B. H. Paine, E. B. Katté, G. H. Pegram and Norman Litchfield.

In connection with the work of the committee on way matters of the American Electric Railway Engineering Association, the following sub-committees have been appointed:

Proper foundation for tracks in paved streets: R. C. Cram, C. H. Clark and E. H. Berry.

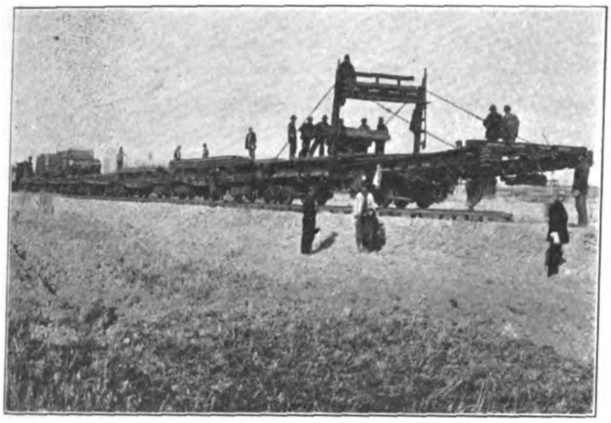
Use of T-rail in paved streets: E. H. Berry, W. F. Graves and J. B. Tinnon.

Pavement for use in connection with girder and high T-rails: H. F. Merker, C. H. Clark and C. S. Kimball.

Alloyed steel rails: G. W. Gennet, Jr., E. P. Roundey and H. F. Merker.

SALT LAKE & UTAH RAILROAD

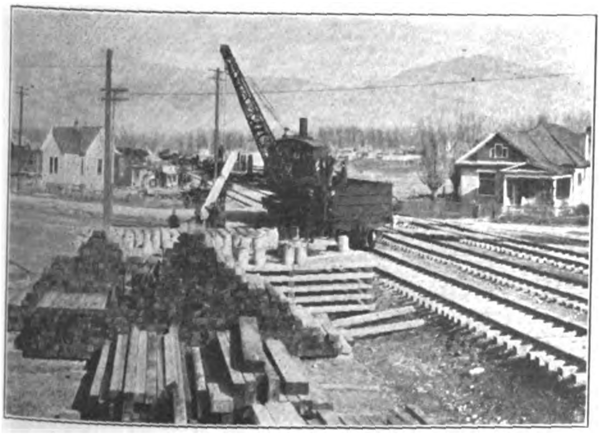
Service between Salt Lake City and Provo, Utah, on the Salt Lake & Utah Railroad will begin the first of the year. The new line is known locally as the "Orem Line," for W. C. Orem and F. M. Orem are its chief promoters. The portion of the new line to be put in service in January is 48 miles long. Present plans provide for an early extension of the line to Payson, 20 miles south of Provo, and ultimately to Nephi, 25 miles south of Payson.



Salt Lake & Utah Railroad—Track-Laying Machine

All of the grading of the right-of-way has been completed to Provo, and track laying by machine is progressing at the rate of a mile a day, using 75-lb. steel with Continuous rail joints and 2880 ties to the mile. The line's heaviest grade is 1½ per cent, made to reach a very thickly populated, intensive fruit-growing tract on Provo Bench, near Provo. The heaviest grade outside this point is 0.8 per cent. The line's sharpest curve is 8 deg.

The line will use catenary construction and 1500-volt direct current. A fifty-year contract for power has been made with the Utah Power & Light Company. Electrification will not be finished until about April 1, 1914, prior to which time gasoline motors will be used. Forty-two-ton cars, manufactured by the Niles Car Company, Niles, Ohio, will be used, and hourly service will be maintained. The electrical equipment is Westinghouse.



Salt Lake & Utah Railroad—Material Yard, Salt Lake City

The Orem line will connect with the Salt Lake & Ogden electric line, known as the "Bamberger Road," at Salt Lake City. Joint terminal facilities have been bought at Salt Lake City by the Salt Lake Terminal Company, a corporation owned equally by the two railroads. The terminal station is in the business center of the city, with entrances on four streets. The Provo terminal is situated close to the business center of that city.

The new railroad reaches a population of 50,000 persons south of Salt Lake City, which has a population of about 110,000. It passes through twenty towns and villages. For more than half its length it traverses thickly settled farming areas that have no railroad facilities at present.

The financing of the line has been completed and all equipment has been ordered. The work has been done rapidly, considering the heavy nature of the construction necessary to maintain the low grades and curves. Work was begun in March, 1913, and only a few miles of track remain to be laid.

COMMUNICATION

PERPETUAL INVENTORIES FOR STOREROOMS

PITTSBURGH RAILWAYS COMPANY
PITTSBURGH, PA., Dec. 30, 1913.

To the Editors:

Concerning the proposed association of purchasing agents discussed in your editorials and in several communications recently, it seems to me that Mr. Ingle, assistant purchasing agent of the Rockford & Interurban Railway Company, has hit the nail squarely on the head when he says that the electric railway purchasing agents and storekeepers should form an association to discuss subjects of interest to them. At any rate, they should become familiar with the various recommended practices of the Railway Storekeepers' Association, to which Mr. Ingle refers. If the perpetual inventory plan, mentioned in your editorial of Dec. 6, is used by any considerable number of electric railway managements it is time that we got together to find out what should be done along such lines. This perpetual inventory plan may have been good enough before we knew any better—I should say about ten years ago—but if it is possible that any considerable number of companies do business on this basis, it is the more reason why some action should be taken on the part of those companies to find out the up-to-date methods of carrying on their business.

The Railway Storekeepers' Association has accomplished wonders in securing from general managers, etc., recognition of the importance of the functions of the stores department. Its proceedings are textbooks on up-to-the-minute management. The Railway Storekeepers' Association would be pleased to receive, as members, representatives of electric railway purchasing and stores departments; in fact, quite a few are members at the present time. It is inconceivable how an association of that kind could be in existence for ten years without having the representatives of electric railways clamoring for admission.

The president of the association has informed the writer that within a few weeks a determined effort will be made on the part of the association to bring into its membership representatives from the electric railways, and it will endeavor to discuss topics of particular interest to them at its next convention.

B. F. YUNGBLUTH, General Storekeeper.

[The "perpetual inventory plan," described in the editorial in our issue of Dec. 6, has recently been introduced into the storerooms of a very large electric railway company in the Central States. It represents one of the steps taken by the efficiency engineering department of the company in its motion time studies.—EDS.]

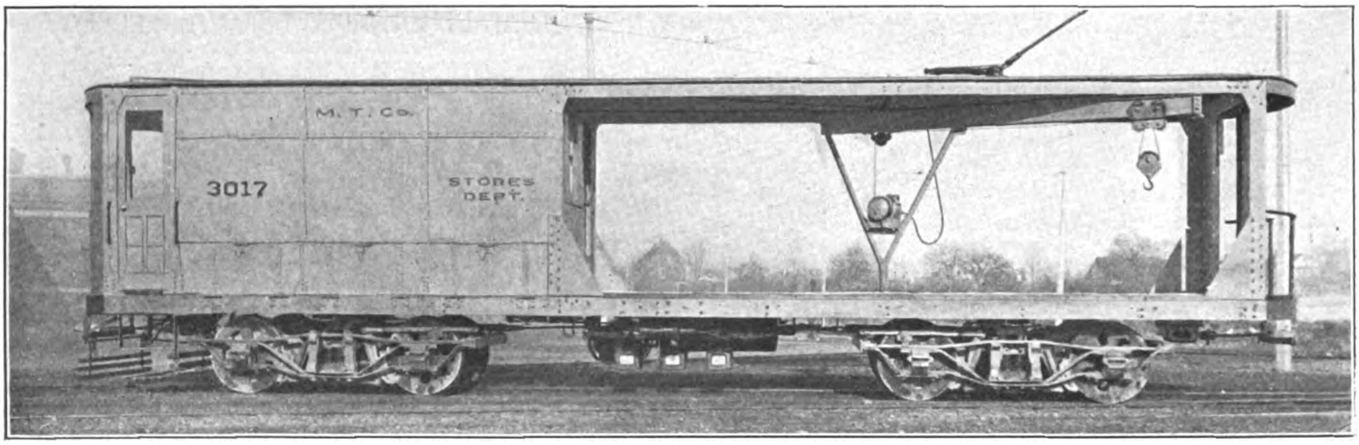
Equipment and Its Maintenance

Short Descriptions of Mechanical and Electrical Practices from Every Department of Electric Railroading

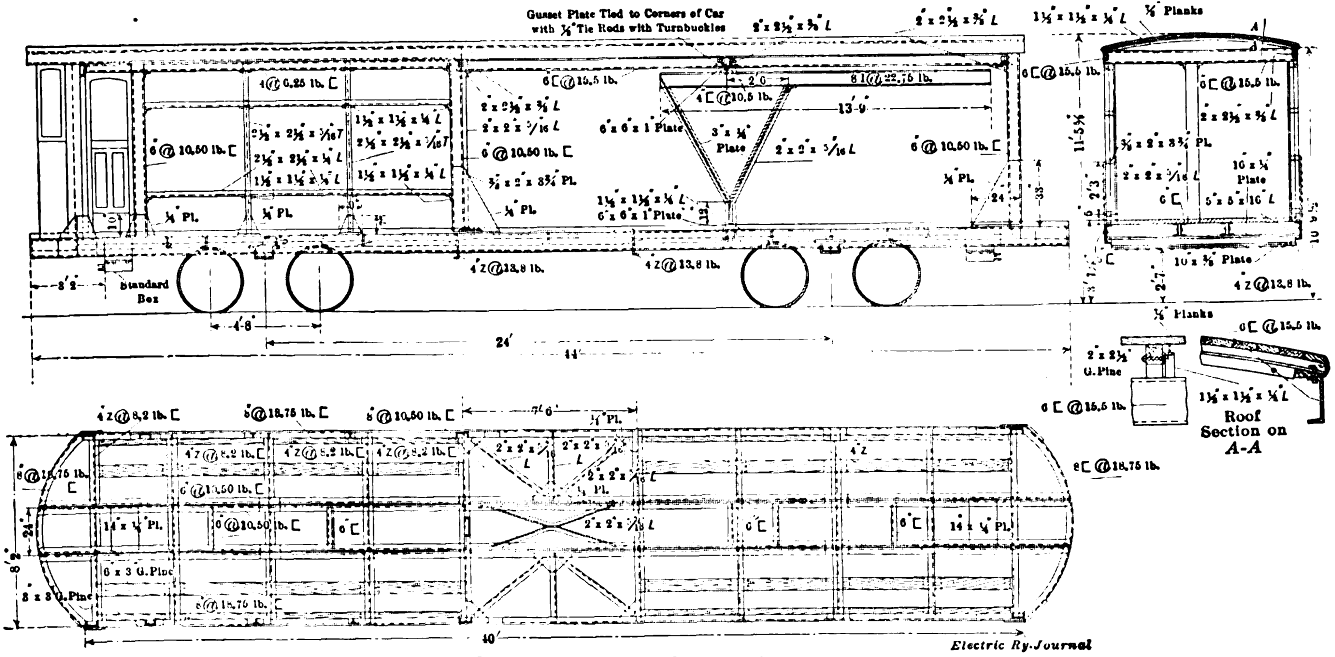
(Contributions from the Men in the Field Are Solicited and Will Be Paid for in Accordance with Our Regular Rates.)

STEEL STORES CAR FOR MONTREAL

The Montreal Street Railway has recently designed and constructed a steel car for handling stores which is provided with more efficient conveniences than is customary in rolling stock for this purpose. Owing to its larger size, better equipment and labor-saving facilities, the new car has replaced three supply cars which were formerly used to handle all stock and scrap between the Youville shops and five carhouses. Its daily run approximates 35 miles. The company feels that the investment of $1,800 for construction of a special body is well worth while when contrasted with the saving which the car effects in power and maintenance.


M. T. Co.
3017
STORES DEPT.

Steel Stores Car of the Montreal Street Railway, Which Has Replaced Three Non-Specialized Cars


Gusset Plate Tied to Corners of Car with ⅜" Tie Rods with Turnbuckles
2" x 2½" x ⅜" L
2" x 2½" x ⅜" L
1½" x 1½" x ⅛" L
⅜" Planks
A
4 @ 6.25 lb. [
6 [@ 15.5 lb.
2" 6"
8 I @ 22.75 lb.
4 [@ 10.5 lb.
13' 9"
2½" x 2½" x ³⁄₁₆ T
2½" x 2½" x ³⁄₁₆ T
2½" x 2½" x ¼" L
1½" x 1½" x ¼" L
1½" x 1½" x ¼" L
1½" x 1½" x ¼" L
2" x 2½" x ⅜" L
2" x 2" x ⁵⁄₁₆ L
6" x 6" x 1 Plate
3" x ⅜" Plate
2" x 2" x ⁵⁄₁₆ L
6" @ 10.50 lb. [
6" @ 10.50 lb. [
6" @ 10.50 lb. [
⅜" x 2" x 8¾" Pl.
¼" Pl.
¼" Pl.
¼" Pl.
¼" Pl.
1½" x 1½" x ¼" L
6" x 6" x 1" Plate
24
33
11' 5⅝"
2' 3"
6
6 [@ 15.5 lb.
4" Z @ 13.8 lb.
4 Z @ 13.8 lb.
8' 2"
Standard Box
4' 8"
24'
44'
6 [@ 15.5 lb.
2" x 2½" x ⅜" L
⅜" x 2" x 8¾" Pl.
2" x 2" x ⁵⁄₁₆ L
16" x ¼" Plate
6" [
5" x 5" x 16" L
10" x ⅜" Plate
4" Z @ 12.8 lb.
2' 7"
3' 7½"
10
⅜" Planks
2" x 2½" G. Pine
6 [@ 15.5 lb.
6 [@ 15.5 lb.
1½" x 1½" x ¼" L
Roof Section on A-A
4" Z @ 8.2 lb. [
8" @ 18.75 lb. [
8" @ 10.50 lb. [
7' 6"
¼" Pl.
4" Z @ 8.2 lb. [
4" Z @ 8.2 lb. [
4" Z @ 8.2 lb. [
2" x 2" x ⁵⁄₁₆ L
2" x 2" x ⁵⁄₁₆ L
2" x 2" x ⁵⁄₁₆ L
¼" Pl.
4" Z
8 [@ 18.75 lb.
8" @ 18.75 lb. [
6" @ 10.50 lb. [
14" x ¼" Pl.
6" @ 10.50 lb. [
6" [
2" x 2" x ⁵⁄₁₆ L
6" [
6" [
14" x ¼" Pl.
24"
8' 8"
6 x 3 G. Pine
8 x 8 G. Pine
8" @ 18.75 lb. [
40'

Electric Ry. Journal

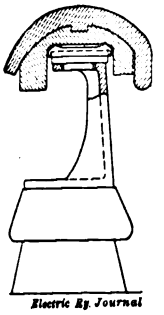
Framing Plan of the Stores Car of Montreal Street Railway

The principal framing members of this car, including the roof, are of standard commercial shapes as shown in the drawing. Part of the car is open to permit room for a crane track, hoist, etc., for handling wheel sets and other heavy parts from either side of the car. Another interesting feature is the use of a double floor in the inclosed section to form a compartment in which armatures can be kept free from injury. The car is built with solid ends to insure increased bulkhead stiffness and to protect the crew.

The car is 44 ft. over all, is operated with four GE-80 motors and K-28 controller and weighs 47,600 lb. It was designed at the Youville shops under the direction of D. E. Blair, superintendent of rolling stock.

PROTECTED THIRD-RAIL

S. G. Redman, Newcastle-on-Tyne, and C. H. Merz, London, who is consulting engineer for the high-tension d.c. Melbourne electrification, have recently devised the protected type of third-rail shown in the accompanying drawing. The principal novelty of this construction is the special form of inverted channel which is designed to serve as the current conductor. This channel is of irregular form, as the non-contacting flange is used to secure more cross-sectional conductivity and to keep the contact-making flange in place. The rectangular base of this channel is supported on a flat insulator, an intermediate bracket and a foundation insulator. The capping of the conductor channel may be of fiber, stoneware or other material keyed into the conductor as indicated.

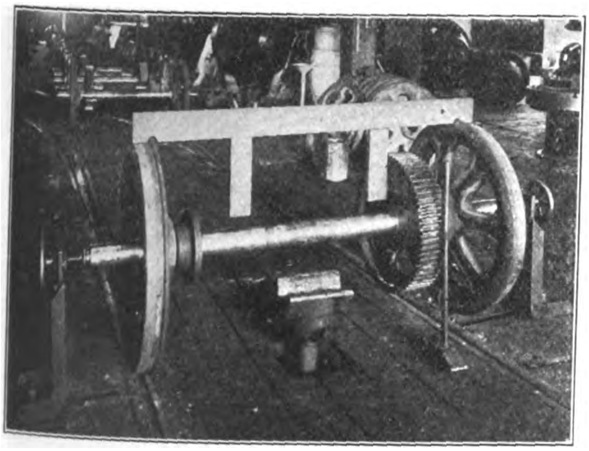


Protected Third-Rail

WHEEL AND GEAR TESTING AT CINCINNATI

In order to be positive that all wheels and gears are true and accurately pressed on the axle before they are placed under trucks, the Cincinnati Traction Company has installed a testing set in its machine shop. This set shows not only that the wheels are true but that they as well as the gears are accurately centered and that the axles are perfectly straight. The outfit employed for this purpose consists of a hydraulic jack to lift the wheels to a pair of adjustable centers arranged beside a track leading from the machine shop. The jack is installed under the floor at the exact center of the track, and the head rises through an opening. The centers are set on concrete foundations on each side of the track in line with the jack.

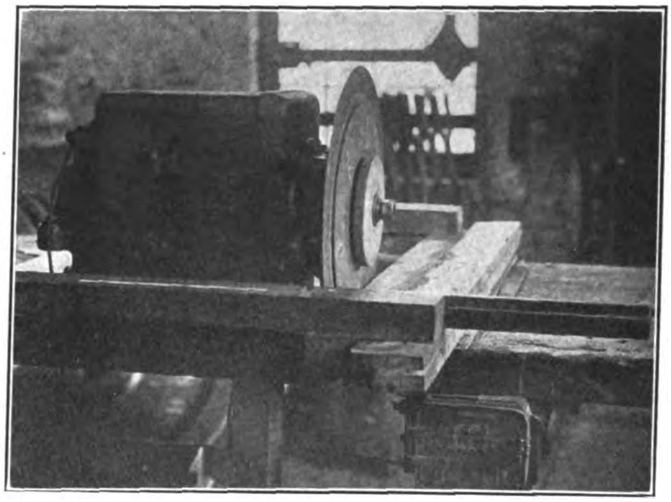
When it is desired to test a pair of wheels they are set so that the axle will engage with the head of the jack, which then raises the wheels until they may be supported on the centers. In this position the centering of the wheels and straightness of the axle are checked by spinning the wheels and noting whether there is variation in the space between any fixed object, usually a sledge handle, and the face of the wheel or gear. This testing set is shown in the illustration above. The wooden templet also shown is employed to check the location of the gear on the axle in relation to the position of the wheels.



Cincinnati Traction Company's Wheel and Axle Testing Sets and Templet

CUTTING CONDUIT AT ALBANY

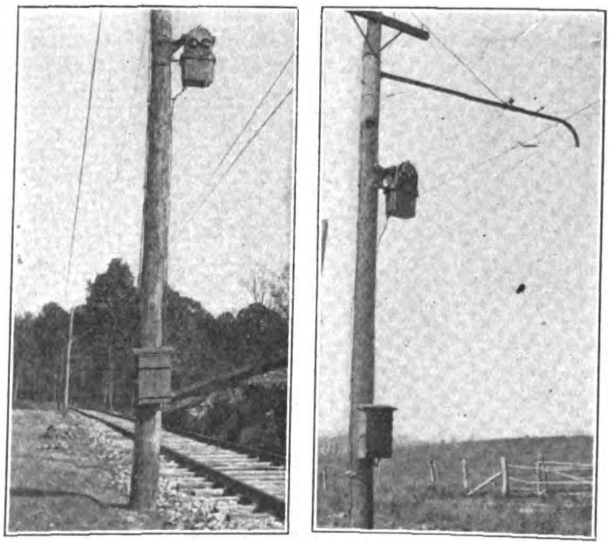
Some time ago the United Traction Company, Albany, N. Y., rigged up the old compressor motor shown in the accompanying halftone to serve for cutting conduit at its several shops from time to time. The compressor was readily adapted for this purpose by mounting on the shaft a disk of dasher iron for cutting the conduit and a plain grindstone for removing the burrs at the edges afterward.



Compressor Carrying Dasher-Iron Disk and Grindstone for Cutting and Smoothing Conduit

SIGNALS ON WASHINGTON & GREAT FALLS RAILWAY

The Washington & Great Falls Railway & Power Company extends from Bethesda, Md., to Great Falls, and it is operated with cars and energy supplied by the Washington Railway & Electric Company. This line was built to develop an extensive tract of land for high-class residential purposes in the environs of Washington. From Wisconsin Avenue and Bradley Lane to Great Falls the distance is 10.2 miles, comprising six blocks of single track. Spring switches and stands are used at the turn-outs which are located at Offutt, Wilson, Kefauver, Bradley and Lynch. About 1000 ft. east of the switch point at Bradley is a stub



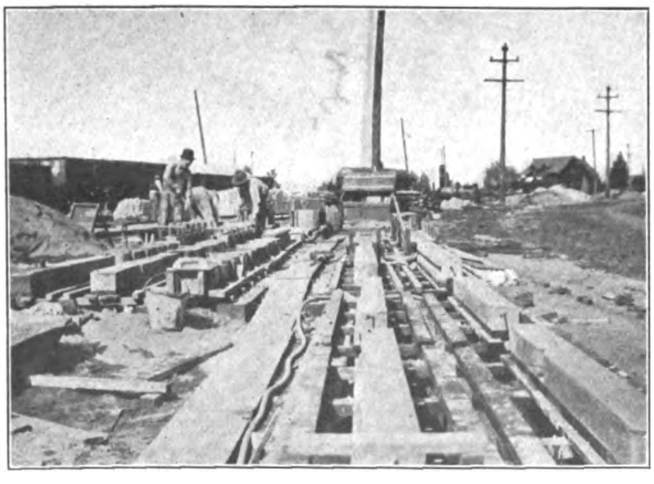
Automatic Signals as Installed on the Washington & Great Falls Railway siding to a quarry, which, however, is only temporary. The line has a maximum grade of 5 per cent and many curves, the longest tangent being ¾ mile. Bracket catenary construction is used almost entirely, this including a No. 0000 grooved trolley suspended from a ⅜-in. Siemens-Martin messenger cable on 30-ft. and 35-ft. chestnut poles. The present transmission potential is 6600 volts but it will be raised to 13,200 volts. The trolley potential is 600 volts.

The time of a trip is forty-three minutes. Cars keep to the main line at sidings except at a meet. Signal protection is afforded by ten Nachod automatic signals, type CD, as illustrated. These signals permit following, while preventing all opposing moves until the block is clear. The principal features of this signal were described in the ELECTRIC RAILWAY JOURNAL for June 22, 1912, page 1083. The signal installation for a block of single track between sidings comprises two signals and four trolley contactors. The signals are located at the switch points whereas the trolley contactors are from one to two spans in advance of the signal. The signals permit any desired safe car movement. A work car, for instance, may shift around the terminals of the block in any manner without disarranging the signals of a regular car in the block. Two No. 12 copper-clad line wires are required for the signals.

PACIFIC ELECTRIC RAILWAY'S CONCRETE SHELTERS

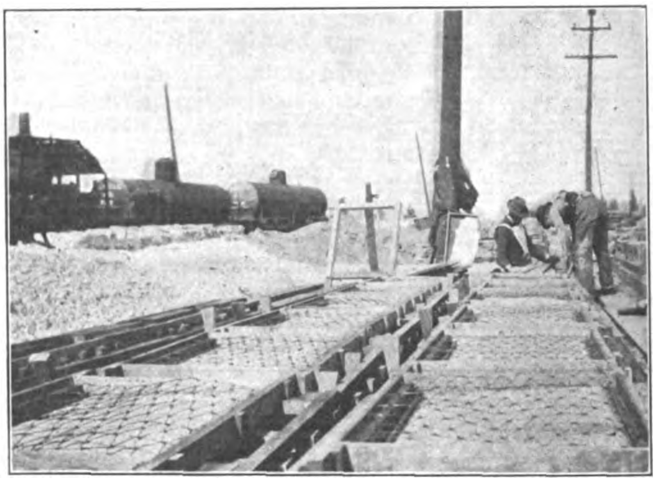
The Pacific Electric Railway, operating in the territory contiguous to Los Angeles, Cal., recently desired to adopt a more permanent type of shelter than the customary wooden building. Since brick was too expensive for buildings of this size, reinforced concrete was suggested. Upon investigation, however, it was found that reinforced concrete structures of the monolithic type would cost too much, but that one constructed according to the unit system might be built within the limit of cost desired. Upon invitation designs and estimates were submitted which were acceptable.

By the unit method, as the name implies, the different structural elements of the building are cast in molds or forms on the ground as separate units. As soon as these have hardened sufficiently they are removed from the forms and placed in a stockyard where they are allowed to season from one to four weeks, after which they are erected much after the manner of structural steel. The connections are made by means of bars projecting into the joint and embedded in a rich concrete grout. The joints are placed at predetermined places made necessary by the structural requirements, and the completed building is a structure not differing in essentials from the monolithic type.



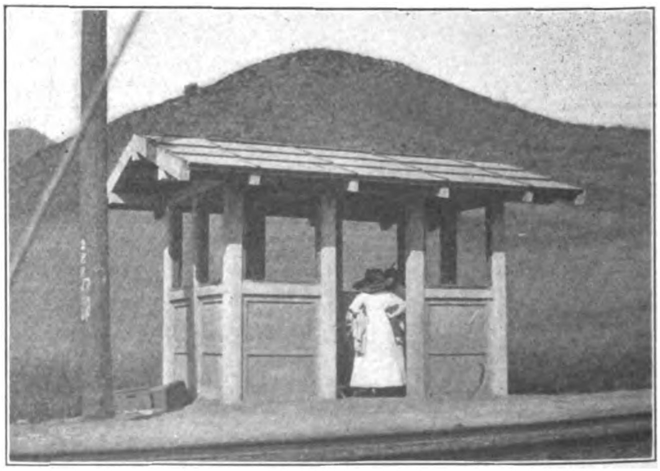
Pacific Electric Shelters—Rafters, Columns and Copings After Removing Forms

While several large electric railway structures have been built in this way, notably the Luzerne Street and Callowhill Street carhouses of the Philadelphia Rapid Transit Company and the Fairview office and carhouse of the Lehigh Valley Transit Company, Allentown, Pa., this is the first instance in which minor structures for electric railways have been tried. The following description and the accompanying photographs should convey a clear idea of the character of these shelters.



Pacific Electric Shelters—Casting Yard, Showing Roof and Wall Slabs with Forms Ready for Pouring

The buildings are 8 ft. 3 in. x 12 ft. outside dimensions, with a clear height of 8 ft. Each building contains 119 units, the weight of which varies from 400 lb. for the columns, which are the heaviest pieces, to about 33 lb. for the lightest pieces. The units can be handled by three or four men and thus require no expensive equipment for their erection. A complete structure contains 4.85 cu. yd. of concrete exclusive of the column footings, which, owing to variation in grades, are cast monolithic, being mixed and placed by hand. All the units are cast at a central casting yard by a force of from three to four four men and are loaded on a car and transported to the building site ready for the erecting gang.

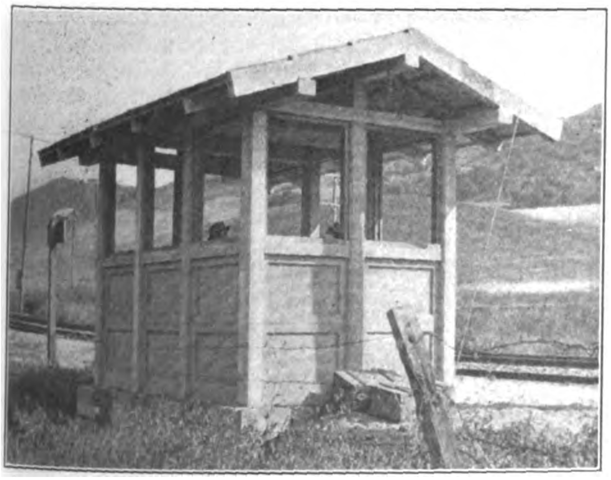


Pacific Electric Shelters—View of Completed Building, Except for Setting of Window Frames and Door

The roof slabs of these stations are 2 ft. 6 in. x 2 ft. 2 in. in size and weigh 190 lb. each. They were cast with a 1½-in. overlap, which, with the red coloring that was used in the finish, gave the appearance of a tile roof. No waterproofing was used in the concrete for the roof. It consists simply of a rich mixture, well worked and hard troweled to a smooth finish, giving a water-tight roof with no other covering. The slabs are reinforced with American Steel & Wire Company's standard wire mesh.

The tops of the wall slabs which form the exterior of the station are troweled to a smooth, straight surface, which is brushed afterward to remove the trowel glaze from the surface. The undersides of the slabs are left as they come from the forms, as they are smooth enough to give a good finish to the building interior. All columns, girders and lintels have one side troweled and brushed and the other three sides left as they came from the forms, the forms being so constructed that no seams show in the finished concrete. These units were reinforced with wire mesh and small deformed bars.

The erection of these shelters after the monolithic footings were in place was carried on about as follows: The columns were set in sockets provided for them and grouted in place. Then the wall slabs and sills which fit in slots in the columns were set in place and grouted. Next, the lintels were set and grouted, followed by the girders and finally the roof slabs, and all were carefully grouted with a rich concrete. All units were connected and held by projecting steel bars or dowels which, on being grouted, provided a perfectly rigid connection. The completion of the shelter included placing the unit benches and laying the floors. The units were all very carefully marked before they were removed from the forms, so as to make the erection simple. The marking conformed to that shown on the erecting plan. Under ordinary conditions it was found that one of these buildings could be completed in from four to six days and that the cost did not exceed that of a wooden building of the same type by more than 12 or 15 per cent. No arrangements were made for heating these stations as the California climate made this unnecessary; but this, of course, could be done very simply and conveniently by installing some standard type of electric heaters under the benches.



Pacific Electric Shelters—Rear and End View of Completed Building Showing Column Footings

In the accompanying illustrations it will be seen that the shelters are simple, permanent structures, very attractive to the eye. In fact, the Pacific Electric Railway is so well pleased with this type of building that it has been made standard, and the company will construct about 200 of them along its lines. The Van Sant-Houghton Company, of San Francisco, designed these shelters for the Pacific Electric Railway as Western representative of the Unit Construction Company, St. Louis, Mo., the patentee of the method of construction.

RECENT TRACK WORK OF THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

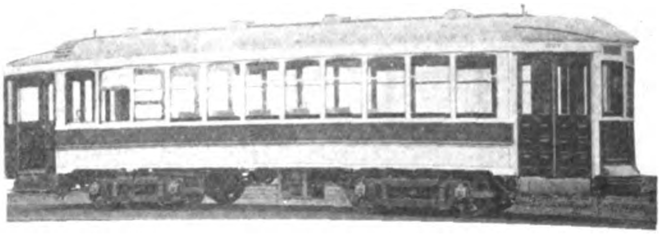
During 1913 the United Railways & Electric Company's way department was very busy owing to the extensive paving operations of the city of Baltimore. As a result 17 miles of single track were overhauled, although only 6½ miles actually required reconstruction. In addition to this work the company reconstructed in the course of ordinary maintenance 3 miles of single track and, on account of the operations of the State Roads Commission, ¾ mile of single track—making a total of 20¾ miles of single track overhauled during 1913 up to Dec. 1. The only extension of any consequence made during the year was on Monument Street, between Washington Street and Patterson Park Avenue, involving 0.33 mile of single track.

A noteworthy feature of the company's track construction is the continued use of either gravel or broken-stone ballast, which, under Baltimore conditions, has so far proved to be entirely satisfactory. It is worthy of mention that the standard riveted and welded thermit joint described in the ELECTRIC RAILWAY JOURNAL, Dec. 21, 1912, has not had a single failure since its adoption.

During the year 1913 the Lorain Steel Company electrically welded 2983 joints on old 9-in. girder tracks. The company's experience with this joint was identical with that elsewhere, namely, that, while it makes a very satisfactory joint and serves to prolong the life of old rails, it has about 1 per cent of failures owing to breaks during the first year after application.

ARCH-ROOF CARS WITHOUT BODY DOORS FOR HARRISBURG RAILWAYS

The Harrisburg Railways Company has lately received from The J. G. Brill Company seven arch-roof cars. This design, as illustrated, is an example of the strong tendency, even in Northern climates, toward the omission of body-end doors. The cars are 47 ft. 1 in. over the vestibules, 30 ft. 8 in. over the body, 8 ft. 5½ in. wide over all and 7 ft. 10⅞ in. wide over the sills. The vestibule doors open at right angles to and beyond the car-body line as illustrated. The height from the sill to the trolley base is 8 ft. 9⅞ in. The underframe is of steel, the body of wood and the headlining of agasote. Bronze is used for the interior trim. The bodies are mounted on No. 27 M.C.B.-1 trucks carrying four Westinghouse 101-B-2 motors. These cars are also furnished with the car builders' exhaust ventilators, Hedley anti-climbers, Peacock handbrakes, National air brakes, Consolidated heaters and the General Electric Company's arc headlights. The seating capacity is forty-four.

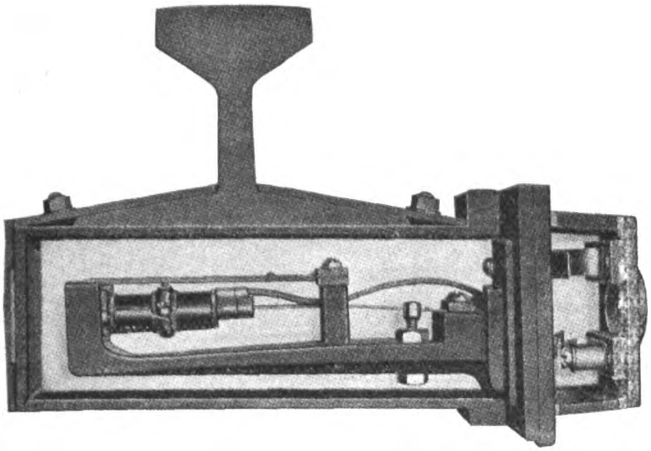


Arch-Roof Pay-Within Car with Exhaust-Type Ventilators for the Harrisburg Railways

IMPROVED HIGHWAY CROSSING SIGNAL CONTROL

In the issue of this paper for Dec. 21, 1912, an account was published of the highway crossing signal system made by the Protective Signal Manufacturing Company, of Denver, Col. Since that time a number of these signals have been installed by electric and steam railways. The system consists of a signal bell, operated by battery or trolley current and controlled by oscillators attached to the running rails. When desired, an illuminated crossing sign may be use in connection with the bell.

The most novel feature of this highway crossing signal system is the oscillator, in which a change has been made since the original type was illustrated in this journal, the oscillator being arranged to work on a closed instead of an open circuit. Briefly described, the present oscillator is a contact-opening device, which is clamped to the under side of the track rail and operated by the motion of the rail caused by the passage over it of the train or car. On single track an oscillator is placed at either side of the crossing to be protected, the distance from the crossing being governed by the speed of the traffic. The movement of a car over either of the end oscillators opens the circuit, drops a relay and starts the bell ringing. The bell-operating mechanism has a timer in connection with it so that it will stop ringing after any predetermined period, unless it has been stopped by the train passing an oscillator. Where movements from side tracks are to be protected against, additional oscillators are placed in the branch tracks leading toward the crossing where the bell is located.



Section of Oscillator

The oscillator itself is a simple, rugged contacting device inclosed in a waterproof iron casing, so arranged that it may be fastened mechanically, in a rigid way, to the base of the running rail. All of the binding posts and connections are coated to prevent corrosion, and the contacts are made from iridium platinum. The essential electrical parts within the case, such as the vibrator and its connections, are thoroughly insulated from the casing and from the conduit, which forms a waterproof lead for the wires carrying the control to the near-by pole line.

These oscillators, the manufacturer states, have shown through severe service tests that they will withstand the shocks of the heaviest high-speed trains and yet are sensitive to the movement of lighter electric railway cars. One of the important features is their simplicity, both mechanically and electrically.

This system of highway crossing protection requires no bond wires, no track circuits and no insulated joints. Therefore it does not interfere with existing signal systems and operates on a separate and distinct circuit, which, if desired, can be entirely free from the trolley circuit.

The manufacturer states that by the introduction of a small motor these oscillators can be used to control the operation of automatic signals, the current supply being obtained from the power line. Some of the many uses which this oscillator is now fulfilling, in addition to the control of this company's highway crossing bell, are those of the control of annunciators, tower indicators, time relays, electric horns and similar protective indications.

CONCENTRATION OF ENERGY PRODUCTION IN CHICAGO

Practically all the energy requirements of the surface and elevated railway companies of Chicago are now supplied by the Commonwealth Edison Company. Recently three of the old elevated railway generating stations have been taken over by the central-station company—the Fullerton Avenue station of the Northwestern Elevated Railroad Company, the Loomis Street station of the Metropolitan West Side Elevated Railway Company and the Fortieth Street station of the South Side Elevated Railroad Company. The station-operating forces of the elevated-railway companies have been incorporated into the operating department of the Commonwealth Edison Company. It is probable that eventually all of the railway generating stations will be shut down, although some of them, notably the South Side company's station, have an excellent record of economy. Five railway substations also have been taken over by the substation department of the Commonwealth company.

The highest total-output maximum of the Commonwealth Edison Company up to Nov. 1, 1913, was 257,830 kw. This occurred on Oct. 31, 1913. The highest peak of last winter was 232,950 kw on Dec. 11, 1912. It is estimated that this winter's total-output maximum will be about 300,000 kw. The highest twenty-four-hour kilowatt-hour output up to Nov. 1 of last year was 3,365,900 kw-hr. and was recorded on Oct. 30, 1913. It is probable that the maximum day's output for this winter will be 3,700,000 kw-hr. or more.

The number of employees on the pay roll of the Commonwealth Edison Company on Nov. 6, 1913, was 4713. This large number is accounted for not only by the additions from the railway companies but by the large amount of construction work that the company is carrying on at present.

THE STREET RAILWAY AND COMMERCIAL GEOGRAPHY

In connection with the study of commercial geography in schools in Boston and its vicinity, the Bay State Street Railway Company supplies folders and maps free of charge to educational institutions, and thereby encourages interest in trolley facilities over a wide area. Recently the general passenger agent of the company addressed a letter to the superintendents of schools in upward of 200 cities and towns served by the company's 940 miles of line, inclosing a map of eastern Massachusetts, southern New Hampshire and eastern Rhode Island and offering to furnish such maps upon request for instruction purposes. About 2000 maps have thus far been sent to schools, and the company also supplies the maps tinned at each end for wall hanging. Among the responses received was a letter from the superintendent of the immigrant department of the Fall River (Mass.) Y. M. C. A., which stated that the company's maps are being successfully used in thirteen schools for foreigners in this representative mill city.

News of Electric Railways

Seven Additional Subway Construction Contracts Awarded

On Dec. 31, 1913, the Public Service Commission for the First District of New York executed seven new construction contracts for as many different sections of the dual system of rapid transit. It also awarded the construction contract for Section No. 6 of the Seventh Avenue subway in Manhattan to the Rapid Transit Subway Construction Company, the lowest bidder, for $2,292,943. This section lies in Seventh Avenue between Thirtieth and Forty-second Streets. The total of the seven contracts executed was $11,106,038, bringing the total amount of contracts awarded to date to about $91,000,000. This is more than half of the money which the city is pledged to contribute toward the cost of construction of the new system. The contracts executed were as follows:

Section No. 2 of Route No. 39, which is the greater part of the New Utrecht Avenue elevated railroad in Brooklyn; Post & McCord, Inc.	$1,672,190
Section No. 1-A of Routes Nos. 19 and 22, which is that part of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway between 147th Street and Whitlock Avenue; Rodgers & Hagerty	2,253,159
Section No. 1 of Route No. 16, which is that part of the Jerome Avenue branch of the Lexington Avenue subway (elevated construction) between 157th Street and 182d Street; Oscar Daniels Company	1,077,978
Section No. 3 of Routes Nos. 4 and 38, which is that part of the Seventh Avenue subway in Manhattan running under Varick Street and Seventh Avenue extension from Beach to Commerce Street; Degnon Contracting Company	2,185,063
Section No. 5 of Routes Nos. 4 and 38, which is that part of the Seventh Avenue subway in Manhattan running under Seventh Avenue from Sixteenth to Thirtieth Street; Canavan Brothers Company	2,401,306
Section No. 2 of Route No. 18, which is that part of the White Plains Road extension of the existing subway (elevated construction) running over White Plains Road from Burke Avenue to 241st Street; Alfred P. Roth	958,484
Route No. 50, which is the extension of the Steinway tunnel from its present terminus in Queens Borough to the Queensboro Bridge Plaza (subway and elevated construction); Degnon Contracting Company	557,856
Total	$11,106,038

The Public Service Commission for the First District has received several protests from magazine publishers against the approval of a renewal contract between the Interborough Rapid Transit Company and Artemus Ward, of Ward & Gow, for the advertising and news-stand privileges on the existing subway and elevated lines in Manhattan and the Bronx. The old contract expired on Dec. 31, 1913, and the commission was informed that the Interborough Company intended to renew it for a period of fifteen years. The Autosales Gum & Chocolate Company, Ulysses D. Eddy president, wrote to the commission that it was prepared to enter into such a contract upon much more advantageous terms to the city and to the Interborough Company than the terms proposed in the renewal contract, and it asked for a hearing before the commission takes action. Other publishers criticise the practice of the company under the old contract of making an extra charge to magazine publishers for the display of their publications on the subway and elevated news stands.

Mayor Hocken of Toronto Re-elected

Mayor Hocken of Toronto, Ont., who favors the purchase of the property of the Toronto Railway and the Toronto Electric Light Company by the city, was on Jan. 1, 1914, re-elected Mayor. F. G. McBrien, aged twenty-six, Mr. Hocken's opponent, ran on the platform "A vote for Hocken is a vote for the Mackenzie deal." The people also returned a board of control which will support the Mayor. Corporation Counsel Geary of Toronto announced on Jan. 3 that the work of drafting the agreement for the purchase of the property of the Toronto Railway and Toronto Electric Light Company had so far progressed that he would be able to submit it to the other side probably by Jan. 15.

Corporation Counsel Geary on Jan. 3 notified Works Commissioner Harris of the passage by the ratepayers of the by-law to raise $89,393 for the purchase of the portion of the Mimico division of the Toronto & York Radial Railway from Sunnyside to a point west of the Humber bridge. Two plans are under consideration, one to permit the Toronto & York Radial Railway to continue to operate the line temporarily and the other to operate a civic car line.

On Dec. 23 the City Council of Toronto by a vote of twelve to ten refused to ratify a motion passed by the Board of Control to the effect that all negotiations for the purchase of the property of the Toronto Railway and the Toronto Electric Light Company should be ended, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913. Alderman Wanless offered a motion that the negotiations to clean up the franchises be continued, that an effort be made to have the purchase price reduced, that a vote be taken on Jan. 1, 1915, and that all the franchises of the Toronto Railway in and out of the city be included in the agreement of purchase. A vote was not taken. Mayor Hocken wrote on Dec. 24 to the Toronto Board of Trade, the Canadian Manufacturers' Association, the Trades and Labor Council and the University of Toronto asking that these bodies appoint each a representative to form a commission with a view of sifting all the evidence in the traction situation and seeking to evolve a solution of the problem out of the several schemes proposed. The Mayor suggested that Sir William Meredith, Chief Justice of Ontario, be asked to act as chairman of the commission, which has been done.

Chief Justice Meredith has written Mayor Hocken that he will be glad to act as chairman of the proposed commission to investigate Toronto's transportation problems and to report on the various schemes that have been advanced. Mayor Hocken has also received replies from the Board of Trade and the Canadian Manufacturers' Association.

Akron Franchise Before Council Again

Earnest efforts have been made to frame a franchise ordinance at Akron, Ohio, which will be satisfactory to both the city officials and the Northern Ohio Traction & Light Company. The City Council has held a number of meetings to consider various phases of the ordinance which was outlined in the ELECTRIC RAILWAY JOURNAL some time ago, with the result that numerous changes have been made in it both as to wording and meaning. Officers of the company say that the grant now presents a wide departure from the points agreed upon between the company and the committee of the Chamber of Commerce in the beginning and that it will be impossible to accept it in its present form.

The clause of the ordinance relating to service has, perhaps, been the greatest stumbling block. Certain members of Council have insisted that it be very rigid. In the latest draft the company is subject to a fine of $50 a day for the violation of any requirement made by the Council and the burden of proof as to the reasonableness of the requirement is placed upon the company. As now amended the ordinance provides that the company shall build 1 mile of track for each 2000 increase in population. This is a reduction of 3000 from the original figures and would greatly increase the new construction work. An attempt has also been made to provide that the city may name a buyer for the property at the end of ten years, instead of fifteen, as originally stipulated. The company objects to the requirement that all single-truck cars be retired from service within two years. It insists that the term should be ten years. The clause relating to cars will allow the city at any time to order improvements in cars or the purchase of new cars. The company has withdrawn proposition No. 2 to the effect that it will undertake to make the additions which the city seeks to require without an extension of franchise.

The principal features of the ordinance before the Council before it was amended were summarized in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, page 1251.

Attempt to Break Terre Haute Agreement

It is charged that attempts are being made to induce the employees of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., to abrogate their agreement with the company of Nov. 11, 1913, under which the Public Service Commission of Indiana is named as an arbitration board to settle any grievances not settled between the employees and the company. Early in December 80 per cent of the employees met and appointed a "grievance committee" to represent them whenever any matters might arise to be taken up with officials of the company, and the men expressed themselves as being desirous of maintaining their relations with the company in this manner. Organizers from outside succeeded, however, in enrolling a few men and forming a local of the Amalgamated Association. Representatives of this local then presented to the company a set of so-called "grievances" providing for an arbitration board and covering many classes of employees not in service in the Terre Haute division.

The company declined to receive these grievances on the ground that more than 80 per cent of the employees had previously delivered to the company a signed statement to the effect that they had no grievances to present at that time and asking the protection of the company and the public from labor agitators who sought to intimidate them into violating their contract with the company, to which Governor Ralston was a party. The company further stated that it could not consider the appointment of any arbitration board other than the Public Service Commission, as specified in the agreement of Nov. 11, and suggested that the grievances in proper form be filed with the commission. This was done later.

The work of trying to create dissatisfaction among the employees continued during December, and plans were made by the organizers to call a strike about Jan. 4.

On Jan. 3 the Fidelity Trust Company, Philadelphia, Pa., filed a suit in the federal court for the district of Indiana, at Indianapolis, asking for a restraining order and temporary injunction against the officials of the State Federation of Labor, United Mine Workers of America, Central Labor Union of Terre Haute, the local officers of the Amalgamated Association and the outside organizers to prevent them from calling a strike or interrupting the operation of the lines of the Terre Haute division. The petition of the Fidelity Trust Company shows the conditions existing between the company and its employees, and represents that the payment of the interest on bonds of the company under the mortgage of which the Fidelity Trust Company is trustee would be imperiled by the failure of the company to operate its cars and conduct its light, power and steam-heating business from which it derives its revenue. Writs were at once issued by the federal court and served by a United States marshal on each of the labor leaders, with notice to appear on Jan. 7 and file answer Jan. 23 to the complaint. This action evidently changed the plans of the labor men in regard to calling the strike at the mass meeting of Jan. 4, and there has been no interference with the operation of the lines of the Terre Haute division of the system.

Recommendations of the New Jersey Commissioners

The report of the Board of Public Utility Commissioners of New Jersey for the year 1913 contains a number of suggestions for future legislation. The board urgently recommends the prompt enactment of laws giving it additional authority to control the issuance of securities by public utility corporations. The three supplementary acts urged in this respect are outlined as follows:

"1. Legislation specifically empowering the commission to require proof when approval of proposed securities issues is asked that there has been an adequate attempt on the part of the petitioners to ascertain and to obtain the highest price at which such securities may be sold; and in default of satisfactory proof thereof to impose as a condition of granting such approval the advertising for sealed competitive bids for such securities, accompanied by certified checks guaranteeing the responsibility of the bidders.

"2. An act amending the present law under which the board's approval of the purpose of proposed security issues is made a prerequisite to such approval, whereby said clause shall be defined by a prescribed rule indicating in general terms in what respect the purpose of the issue may be scrutinized by the board with a view to approval or disapproval thereof.

"3. An act making void all security issues by public utilities whether put out by way of sale or by way of pledge or hypothecation, and making such unauthorized issue a misdemeanor unless the prior approval of the board has been granted."

Three other recommendations for supplementary legislation were also made by the board, these relating to the procedure in the elimination of grade crossings and limitation of the bonded debts that may be incurred by railroads and prescribing more precisely the terms under which public utilities may lease or be leased. These recommendations as outlined by the board are as follows:

"1. The establishment of specific procedure in cases involving the elimination of grade crossings, determining with greater precision who are parties to such proceedings and permitting parties other than public utilities and municipalities directly affected to be served with notice of the hearing by advertisement in the newspapers, and imposing upon the petitioners the duty of furnishing a general plan of elimination sufficient to determine the feasibility of said elimination and of approximating the cost thereof.

"2. An amendment to the general railroad act, and in particular of Section 70 thereof, whereby the limitations to be imposed upon the bonded debt that may be incurred by a railroad company incorporated in this State, or by a foreign corporation as regards its property situate in this State, may be made uniform, whether said company is operated independently or under lease, or by virtue of merger or consolidation with another railroad company.

"3. Legislation prescribing more precisely the terms under which railroad companies or other public utilities may lease or be leased to railroads or other public utilities, such legislation to fix the maximum term of the lease and to make mandatory the requirement that the property of the lessor company shall be at all times capable of identification either physically or by the fixing of the value thereof upon the books of said lessor company and lessee company respectively."

Reference is also made in the report to the Supreme Court decision in the Phillipsburg horse car case in which the board's order permitting the company to change the gage of its tracks was upheld. The importance of this decision was in the fact that the order of the board was upheld, notwithstanding that it was in conflict with a local ordinance granting a franchise to the railroad.

The Indianapolis Arbitration

On Dec. 29 the Indianapolis Traction & Terminal Company resumed the presentation of its testimony in the hearing before the Public Service Commission of Indiana regarding the matter of wages and working conditions of employees of the company. A number of motormen and conductors testified as to conditions before the strike of Nov. 1, stating that they had not known of any feeling of dissatisfaction among the men. They described how the mobs threatened them and pulled some of them off the cars. The local managers of the Western Union Telegraph Company and Postal Telegraph-Cable Company produced copies of a number of telegrams sent by J. J. Thorpe and other labor leaders and organizers prior to and during the strike. The commission ruled that as an arbitration board it had no power to require the production of the telegrams, but that as the Public Service Commission of Indiana it did possess such power, and that it was as the Public Service Commission that the commission had issued subpoenas for the managers to produce the telegrams at the hearing.

The majority of the witnesses, both old employees and men on the extra list, indicated to the commission that the graduated scale of wages would be preferable to the flat rate. The commission asked local officers of the union to produce a statement giving the total number of members of the local union, and just how much it costs to maintain this local a year. Chairman Duncan stated that all this money must come from the street railway because the men pay their dues out of their wages, and the commission wished to ascertain just what additional burden membership in the association imposed on the men.

Governor Ralston testified on Dec. 31 as to how he and Ethelbert Stewart, a representative of the Department of Labor, acted as intermediaries in the settlement of the strike. The Governor told of a form of agreement submitted by the union men and transmitted by him to the company. The company objected to one line of this form of agreement because it involved recognition of the union. Testifying in regard to the first form of grievances presented by the employees after the settlement agreement was signed, Governor Ralston said that Ethelbert Stewart objected to this form when shown to him and said that it did not in any way comply with the original agreement and that it represented "Thorpeism" and he would so tell Mr. Thorpe. On account of a death in the family of Chairman Duncan, the commission adjourned to Jan. 5.

On Dec. 5 James P. Tretton, assistant superintendent of the company, presented a mass of technical data regarding the operation of cars, schedules, etc. John J. Mahoney, superintendent, testified that there has been a deterioration in discipline among the men since the strike and that accidents have been more frequent. Mr. Mahoney told the commission that the company did not object to proper arbitration of grievances of the employees or men who were discharged, and that the men have always had the right to take their cases to the highest officials of the company. Figures were introduced showing that receipts of the city property have fallen off since the strike; that the earnings of the company for the forty days preceding the strike were $4,833 more than for the corresponding period of 1912, while for the forty days since Nov. 8, the day on which the strike ended, the receipts have been $15,376 less than for the same period of 1912. The company's average daily earnings for the forty days subsequent to Nov. 8, 1913, were $7,695 as against an average of $8,080 for the same period of 1912. For the forty days prior to Nov. 1, 1913, the average daily earnings were $8,269 as against an average of $8,148 for the corresponding period of 1912.

The following statement was submitted by the company, showing the amount of wages paid annually by the company to employees of the various departments, the totals under the present demands of the employees, the amount of increase and the per cent of increase:

	Present wages per annum	Maximum asked per annum	Increase entailed	Per cent increase demanded
Motormen and conductors.	$510,287	$732,907	$221,620	43.65
Shop employees	176,460	293,798	117,926	66.82
Carhouse employees	55,491	106,133	50,641	91.26
Power station employees..	32,291	50,749	18,458	57.16
Track department	293,294	476,766	183,472	62.55
Totals	$1,067,825	$1,660,355	$592,529	55.49

Charts were also handed to the commission showing the actual distribution of total earnings, adding to actual revenue from each passenger an arbitrary proportion of earnings from other sources. The figures shown for the year 1912 were as follows:

	Cents
Maintenance of way and structures	0.004372
Maintenance of equipment	0.003184
Power	0.005471
Conducting transportation	0.009281
Injuries, damage and insurance	0.001708
Administration expenses	0.002517
Taxes	0.003029
Fixed charges	0.013548
Sinking funds	0.001322
Balance for construction, dividends, etc	0.001813
Total	0.046245

Statements were also filed with the commission showing how the bonds of the Indianapolis Street Railway and bond and stock issues of the Indianapolis Traction & Terminal Company were applied to the construction of terminal buildings and stations, power station machinery, cars and equipments, new track construction, etc., and the proportion of stock and bonds issued as part consideration for the purchase of the property, franchise and assets of the Citizens' Street Railroad, which was taken over by the Indianapolis Street Railway. A statement showing the number of cars purchased under car trust certificates was also filed with the commission, giving the amount of such certificates still outstanding.

Otto Frenzel, president of the Merchants' National Bank, Indianapolis, appeared as the last witness for the company, giving his views as to the business outlook for the next three years, which is the length of time the decision of the commission will be binding upon the company and its employees. Mr. Franzel said in part:

"In my judgment it is not the proper time now to expand. A general curtailment in industrial and commercial lines has been going on for the last twelve months. The financial conditions of the country were such that this had to be done in order to avoid serious disturbances and possibly a panic. This has resulted in many men being let out of employment. It makes no difference what conditions come up to make the future look brighter, they cannot be brought to bear on general conditions so as to justify going ahead full tilt as in the past."

Counsel for the employees submitted a statement showing that the local union had 1270 members on Jan. 1, 1914, and that the annual receipts from dues from this membership would be $15,240, of which half would go to the international organization and half to the local. The president of the local receives a salary of $1,320 a year, financial secretary $1,320 a year, recording secretary $192 a year, twenty delegates to the Central Labor Union $120 a year, five dues collectors $210 a year, hall and office rent $456, telephone $18, light, stationery and stamps (estimated) $84, and monthly buttons $185 a year.

Amendments to Kansas City Ordinance Considered

One of the important developments of the week ended Jan. 3, 1914, in connection with the consideration of the new franchise ordinance of the Metropolitan Street Railway, Kansas City, was a proposal to use Convention Hall as an interurban passenger station. The suggestion was informal, but was approved by Frank Hagerman, attorney for the receivers for the company. Convention Hall is located at Thirteenth and Central Streets and would be available for a depot with a few changes. Most of the sessions of the Council committee hearing amendments to the ordinance were spirited. Mayor Jost charged Alderman Edwards with attempting to "load" the ordinance with so many amendments that the receivers for the company would be forced to decline the grant. The following amendments were accepted and held for further consideration:

Preserving in the contract an agreement to build the Woodland and Prospect Avenue crosstown lines as assents for them were secured during the life of the existing franchise.

Including the surrender of all existing franchises held by the companies connected with the Metropolitan Street Railway.

Excluding franchise value from the capital value.

Third man to arbitrate technical questions when the board of control disagree, he to be disinterested, experienced and competent to pass on such questions to be arbitrated.

The board of control to furnish proper equipment without unnecessary delay.

Alderman Hoffman's amendment providing for six tickets for a quarter or twenty-five for $1 is pending. The receivers stated, however, that such a provision would mean bankruptcy for the company.

On Jan. 6 a letter was read from R. J. Dunham, one of the receivers for the company, asking that the committee cease consideration of the ordinance and leave the disposition of the property to the bondholders and creditors. Mr. Dunham asserted that the committee had not dealt fairly or sincerely with the receivers in its work, and he made his request in view of that fact. Alderman Edwards, who has held out for six tickets for 25 cents since the committee has been in session, suggested that before adjourning the committee report the ordinance back to the Council unfavorably. Though Alderman Hoffman seconded this motion, the adjournment was made without voting on it. The letter from Mr. Dunham was addressed to Forrest A. Brown, chairman of the joint committee, and read as follows:

"It has been apparent for some time that certain members of your committee are not in sympathy with Mayor Jost and his policies, and that they are determined to 'play politics' against him upon every feature of the pending proposition for the people to vote for or against a settlement of the street railway problem. The purpose seems to be to offer every conceivable and impossible amendment, not to better the proposed contract, but to belittle the efforts of the Mayor and in the end prevent the people from voting upon the proposition. It was at first hoped there was some mistake about the purpose. The last few meetings, however, have demonstrated that the matter is being deliberately precipitated into a political contest over an effort to settle a vexatious problem upon non-political and business grounds.

"In view of the foregoing situation, speaking for myself in the absence of my associate, Mr. Harvey, and subject to his approval, I think there is nothing to do but to ask you to withdraw your further consideration of the ordinance, leaving the disposition of the property to the bondholders and creditors. Vast interests are in jeopardy and enormous sums of money must be raised to put the property in shape to meet the demands of the public. The contract must be approved by a high court, the Public Service Commission and the people at large. To permit the franchise to be made a football in politics upon the eve of a city election is not only unfair to those to whom it is to be submitted, but makes ludicrous every effort made by the receivers in good faith to adjust the matter upon broad principles."

Committee on Interurban Lines at New Orleans.—The Association of Commerce of New Orleans, La., has announced the appointment of a special committee of seven to investigate the question of interurban development in its relation to New Orleans.

Missouri Road to Install Block Signals.—J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., appeared before the Missouri Public Utilities Commission recently to urge the commission to permit the company to issue securities of a par value of $125,000 to provide funds to install a block signal system on the road.

Portland, Eugene & Eastern Railway to Begin Operations in January.—Officials of the Portland, Eugene & Eastern Railway, a subsidiary of the Southern Pacific Company, have announced that the electrification of the line between Portland and McMinnville will be completed in January and that electric trains will then be placed in operation. McMinnville is located 30 miles north of Dallas, Ore., and ultimately the Portland, Eugene & Eastern Railway will electrify the entire line from Portland as far south as Eugene.

Hearing on Signals Before Missouri Commission.—Signal officials of steam and electric roads operating in Missouri met at Jefferson City recently for the purpose of discussing methods of installing and operating signals for the protection of life and property. The meeting was held at the call of the Missouri Public Utilities Commission, which is expected to issue orders covering this phase of the service shortly. Tentative orders were recently issued, but will not become permanent until an announcement to that effect is made.

Progress with Electrification of London & Port Stanley Railway.—The city of London, Ont., has concluded an agreement with the Père Marquette Railway by which that company will continue the arrangement whereby the Michigan Central Railroad enters London as a tenant of the Père Marquette Railway until the electrification of the London & Port Stanley Railway is completed. The commission which has been appointed to take charge of the London & Port Stanley Railway is making every effort to get the work of electrification under way, and it is expected that the city will be ready to operate the road with electricity by September, 1914.

Installing Signals Between Seattle and Tacoma.—The material has all been ordered and some of the preliminary work has been done on the work of setting up the signals to be used in the Puget Sound Electric Railway Company's new block signal system between Seattle and Tacoma, Wash. The signals are to commence from the Tacoma end at Puyallup Avenue, in the East End of Tacoma, and will stop at the Meadows Race Course, in Seattle. The signals will cover the 28¾ miles of interurban line between the two cities. The signals are being furnished by the General Railway Signal Company, Rochester, N. Y. They are of the automatic three-position type and will be placed about 1½ miles apart.

Open Subway Suggested for Philadelphia.—Plans for an open subway in the South Broad Street boulevard, below the Plaza, and to extend to League Island Park, have been submitted to the art jury by A. Merritt Taylor, transit director of Philadelphia. The plans are for an open subway which will cost approximately $950,000 less than a covered subway. Mr. Taylor urges the necessity of the immediate adoption of the suggestions as the contract has been awarded for the completion of the boulevard, and its construction under present specifications will interfere with the plans for the subway. Bridges will span the subway at street crossings, the embankments will be planted with shrubs and ornamental trees, and iron railings and balustrades will guard its approach.

Annual Report of Boston Transit Commission.—The nineteenth annual report of the Boston (Mass.) Transit Commission has been made public. It consists of the usual data as to the cost of subways built in Boston since the organization of the board in 1894, a discussion of recent progress in subway construction, engineering studies and reports. Under the supervision of the commission $22,213,860 has been expended and of this $2,062,733 represents the cost of the Boylston Street subway to June 30, 1913. This line is reported as 75 per cent completed between the western portal and Arlington Street. The commission is to report to the next Legislature upon the choice of a terminal, Park Street and Post Office Square being under consideration. Steady progress has been made upon the extension of the Cambridge subway connection toward the South Station, the structure being now under construction as far east from Park Street as Arch Street. The Bowdoin Square extension of the East Boston tunnel is also well along. Many engineering data are included in the report of Edmund S. Davis, chief engineer. This report is incorporated in the volume, together with various appendices containing compilations of legislation, bids and other matter related to the commission's activities.

PROGRAMS OF ASSOCIATION MEETINGS

Southwestern Electrical & Gas Association

Through a mistake in printing the circular of Nov. 17, announcing the place and date of the 1914 convention of the Southwestern Electrical & Gas Association, the dates were given as May 22, 23, 24 and 25. This was an error. The convention will be held at Galveston, Tex., on May 20, 21, 22 and 23, 1914.

American Wood Preservers' Association

The tenth annual convention of the American Wood Preservers' Association will be held at the St. Charles Hotel, New Orleans, La., Jan. 20, 21 and 22, 1914. The session on the morning of Jan. 20 will be given over to the address of welcome, the presentation of the president's address and the report of the secretary-treasurer. At the session on the afternoon of Jan. 20 the report of the standing committee on preservatives will be presented by the chairman, E. F. Bateman, and the entire session will be devoted to the subject of preservatives. At the morning session on Jan. 21 the subject "Wood Block Pavement" will be considered, while in the afternoon the subject "Ties, Timbers, Piling and Cross Arms" will be considered. Plant operation and miscellaneous subjects will be considered at the forenoon session on Jan. 22. G. B. Shipley, chairman, will present at this session the report of the standing committee on plant operation and Lambert T. Ericson, assistant superintendent of the Port Reading creosoting plant, will read a paper "Mechanical Handling of Railroad Cross Ties and Timbers at Timber Preservation Plants."

Financial and Corporate

Stock and Money Markets

Jan. 7, 1914.

Nearly all the important issues traded in on the New York Stock Exchange made gains to-day. Among the exceptions were Union Pacific and Baltimore & Ohio, there being considerable uncertainty as to the effect of the distribution of Baltimore & Ohio stock by the Union Pacific. In the last half of the forenoon price movements were narrow and without much importance. There was a generally firm tone to the trading during the last hour. Rates in the money market to-day were: Call, 2@3 per cent; sixty days to six months, 4½@4¾ per cent.

In the Philadelphia market local utility issues were the strongest features at the opening. Union Traction advanced to 45⅛.

Specialties were the feature of the stock market in Chicago to-day. The volume of business was fair, but prices were irregular.

Except for a drop of a point in American Telephone, the losses were confined to small fractions in Boston.

The market in Baltimore was strong to-day and trading was fairly active. The sales of stock totaled 468 shares and the sales of bonds $59,700, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 30	Jan. 7
American Brake Shoe & Foundry (com.)	90	90
American Brake Shoe & Foundry (pref.)	127	127
American Cities Company (com.)	36	36
American Cities Company (pref.)	61	60¼
American Light & Traction Company (com.)	335	337
American Light & Traction Company (pref.)	106	106
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (com.)	42	38½
Aurora, Elgin & Chicago Railroad (pref.)	83	83
Boston Elevated Railway	85½	87⅝
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	58	*58
Boston & Worcester Electric Companies (com.)	*6½	*6½
Boston & Worcester Electric Companies (pref.)	36½	36½
Brooklyn Rapid Transit Company	87⅞	88
Capital Traction Company, Washington	111	112¾
Chicago City Railway	160	160
Chicago Elevated Railways (com.)	25	25
Chicago Elevated Railways (pref.)	75	75
Chicago Railways, ptcptg., ctf. 1	90	91
Chicago Railways, ptcptg., ctf., 2	28	27¾
Chicago Railways, ptcptg., ctf. 3	7	6
Chicago Railways, ptcptg., ctf. 4	1¾	2
Cincinnati Street Railway	102	102
Cleveland Railway	103½	104¾
Cleveland, Southwestern & Columbus Ry. (com.)	*5½	5
Cleveland, Southwestern & Columbus Ry. (pref.)	30	26
Columbus Railway & Light Company	18	18
Columbus Railway (com.)	59¼	47
Columbus Railway (pref.)	88	76
Denver & Northern Railway	*80	70
Detroit United Railways	80	a80
General Electric Company	138¾	140¾
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	84	84
Interborough Metropolitan Company (com.)	14¾	15
Interborough Metropolitan Company (pref.)	60	61
International Traction Company (com.)	*30	30
International Traction Company (pref.)	*90	90
Kansas City Railway & Light Company (com.)	*20	15
Kansas City Railway & Light Company (pref.)	*30	30
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	*24	*24
Manhattan Railway	125	125
Massachusetts Electric Companies (com.)	13	11
Massachusetts Electric Companies (pref.)	63½	64
Milwaukee Electric Ry. & Light Co. (pref.)	*95	95
Norfolk Railway & Light Company	*24¾	24¾
North American Company	67	67
Northern Ohio Light & Traction Co. (com.)	58	60
Northern Ohio Light & Traction Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	40⅞	39
Philadelphia Company, Pittsburgh (pref.)	40	40
Philadelphia Rapid Transit Company	18½	18¾
Portland Railway, Light & Power Company	53	48
Public Service Corporation	107	109
Third Avenue Railway, New York	41⅝	43½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	106	104¾
Union Traction Company of Indiana (com.)	*11½	11½
Union Traction Company of Indiana (1st pref.)	*80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	25	25
United Rys. Inv. Company (com.)	21¼	20
United Rys. Inv. Company (pref.)	39	39
Virginia Railway & Power Company (com.)	50	50
Virginia Railway & Power Company (pref.)	98	95
Washington Ry. & Electric Company (com.)	85½	85¾
Washington Ry. & Electric Company (pref.)	87	87
West End Street Railway, Boston (com.)	69	69
West End Street Railway, Boston (pref.)	90	87
Westinghouse Elec. & Mfg. Company	65½	66
Westinghouse Elec. & Mfg. Co. (1st pref.)	116¼	116¼

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*Last sale. a Asked.

ANNUAL REPORT

British Columbia Electric Railway Company, Ltd.

The revenue and expenditure statement of the British Columbia Electric Railway Company, Ltd., for the fiscal year ended June 30, 1913, is as follows:

Gross income	£542,489
Registration fees, etc.	421
Total income	£542,910
Renewals, maintenance	£140,654
Directors' fees and percentage in accordance with articles of association	8,733
Office rent and salaries, printing and stationery, advertising, general, legal, traveling, audit and agency expenses	8,900
Trustees' fees	837
Capital amortization fund	2,361
Total	£161,486
Net income	£381,424
Interest:	
On 4½ per cent first mortgage debentures	£10,039
On 4½ per cent (Vancouver Power) debentures	4,625
On 4¼ per cent perpetual consolidated debenture stock	110,518
Total	£125,182
Surplus for period	£256,242
Brought forward from last year	7,732
Surplus as per balance sheet	£263,974

Michael Urwin, secretary of the company, in his annual report to the stockholders in London on Dec. 19, 1913, said in part:

"For the twelve months to June 30, 1913, the gross receipts show an increase of $1,035,869, or over 17 per cent, and the net earnings, including income from investments and subsidiary companies, show an increase of $77,552, or 4 per cent, over the preceding year, but the surplus over the amount required to pay interest and dividends has fallen from £67,670 to £28,242.

"There has been added to the reserve fund £67,544, representing the premiums or amount by which the price paid into the company's treasury exceeded the par value of £1,320,000 new share capital issued during the year, less expenses thereon, and after deducting the expenses and discount on an issue of £750,000 4¼ per cent debenture stock issued in January last. The reserve fund will now amount to £553,000.

"The growth of the company is indicated by an increase of 72.07 miles of single track in operation during the year and an increase of 148 in the total number of cars of all kinds. The number of passengers carried during the year was 71,973,822, an increase for the year of 9,819,656. The number of lamps in use at June 30, 1913, was 920,916, an increase for the year of 185,490.

"The dam and other works at Lake Coquitlam, which have been under construction for three years, were completed in July last. The company now has an available reserve of over 57,000,000 kw-hr. of electrical energy. The new power house at Lake Buntzen has been completed, and the first of the three additional units to be installed therein is now in operation. A satisfactory contract has been entered into with the Western Canada Power Company, under which the company agrees to purchase a gradually increasing amount of power during the next twenty years. The extension of the Jordan River hydroelectric power installation has been proceeded with during the year that has just closed.

To secure the necessary water storage to supply the additional units a permanent reinforced concrete dam of the Ambursen type has been completed. By the completion of this dam the total maximum available water storage is increased to 927,900,000 cu. ft., equivalent to a reserve of approximately 14,500,000 kw-hr. of electrical energy. The installation of the auxiliary steam plant at Brentwood Bay, 12 miles from Victoria, has been completed and has a present capacity of 6000 hp. In June last the new Saanich suburban line was formally opened for traffic. This line, approximately 23 miles in length, runs through the center of the Saanich peninsula and opens a very fertile tract of country which up to the present time has always been without satisfactory railway connection with the city of Victoria."

Corporate Financing During 1913

In an article published in the Jan. 2 issue of the *Wall Street Journal* it is stated that a careful revision of the figures of corporate financing in the United States during the past two years discloses the fact that the year 1913 was not $90,000,000 behind 1912 in the total of new issues sold. The aggregate originally shown for 1912 included some issues—notably $170,000,000 Interborough Rapid Transit bonds—which were underwritten in that year but none of which was actually sold until 1913. Revision of the 1912 figures to eliminate all securities not marketed during that year brings the total down to $1,779,482,520, which compares with an amount of approximately $1,690,282,000 in 1913.

In view of the unsettled conditions that prevailed in the investment market in the past year, this total of $90,000,000 below 1912 is remarkable. To do that much financing in a year like 1913, however, short-term notes had to be used to a much greater extent than in previous years. Over $200,000,000 fewer bonds were sold last year than in 1912 and nearly $300,000,000 less than in 1911; while $123,000,000 more notes were disposed of than in 1912 and $236,000,000 more than in 1911. Last year $194,000,000 less stock was sold than in 1911. The following table shows the change from bonds to notes in the past two years and also the decline in the use of stocks as a corporate financing medium:

	1913	1912	1911
Stocks	$423,481,210	$431,524,720	$617,787,450
Bonds	650,417,600	855,127,280	948,586,000
Notes	616,383,500	492,830,520	379,659,000
Total	$1,690,282,310	$1,779,482,520	$1,946,032,450

The increase in note issues in 1913 was largely due to the fact that railroads financed nearly half of their requirements by that method. The following figures show the changes in the forms of securities used by the different groups of companies:

	1913	1912
Railroads		
Stocks	$234,157,600	$130,100,000
Bonds	303,777,600	323,329,000
Notes	420,701,000	279,389,000
Public Utilities		
Stocks	68,218,850	100,236,720
Bonds	280,595,000	358,427,280
Notes	104,732,500	159,469,520
Industrials		
Stocks	121,109,760	201,188,000
Bonds	66,045,000	173,371,000
Notes	90,950,000	53,972,000
Total	$1,690,282,310	$1,799,482,520

Railroads secured more than half the money on new security issues in 1913, in comparison with less than half the preceding year. The division of new securities among the different classes of companies during the past two years was as follows:

Railroad issues, $958,636,200 in 1913 and $732,818,000 in 1912; public utility issues, $453,546,350 in 1913 and $618,123,520 in 1912; industrial issues, $278,099,760 in 1913 and $428,531,000 in 1912.

The important public utility issues in the electric railway field durng 1913 were as follows:

(1) Bonds.—Interstate Railways, $3,832,000; South Carolina Light, Power & Railways, $3,000,000; Toledo Traction, Light & Power Company, $5,822,000; Chicago Railways, $8,000,000; Los Angeles Railway, $3,000,000; New York State Railways, $2,748,000; Philadelphia Rapid Transit Company, $4.500.000; New Orleans Railway & Light Company, $4,000.000; Interborough Rapid Transit Company, $50.000.000, and Pacific Gas & Electric Company, $5,000,000.

(2) Stocks.—Boston Elevated Railway, $4,000,000; Cleveland Electric Railway, $3,600,000; United Light & Railways Company, $2,000,000; National Properties Company, $1,649,000; Public Service Company of Northern Illinois, $2,000,000; Central Arkansas Railway & Light Company, $1,500,000, and Northern Ohio Traction & Light Company, $2,640,000.

(3) Notes.—Massachusetts Electric Companies, $3,100,000; Cities Service Companies, $5,090,000; Middle West Utilities Company, $3,500,000; Public Service Company of Northern Illinois, $2,500,000; Birmingham-Tuscaloosa Railway & Utilities Company, $3,500,000, and Interborough-Metropolitan Company, $1,500,000.

J. P. Morgan & Company Resign from Directorates

Announcements have been made of the resignations of members of the firm of J. P. Morgan & Company from the directorates of a number of organizations in which the firm has been interested. J. P. Morgan retires as a director from eighteen companies, including the New York Central & Hudson River Railroad, the New York, New Haven & Hartford Railroad, the New York, Westchester & Boston Railway, the Millbrook Company and the Rhode Island Company. The other members of the firm, Charles Steele, H. P. Davison, W. H. Porter and Thomas W. Lamont, have also given up some of their directorships. In the statement given out to the press Mr. Morgan says: "An apparent change in public sentiment in regard to directorships seems now to warrant us in seeking to resign from some of these connections. Indeed, it may be, in view of change of sentiment upon this subject, that we shall be in a better position to serve such properties and their security holders if we are not directors. We have already resigned from several companies and we expect from time to time to withdraw from other boards upon which we feel there is no special obligation to remain."

Bay State Street Railway, Boston, Mass.—A semi-annual dividend of 3 per cent was paid on Dec. 31 on the $20,517,200 of common stock of the Bay State Street Railway, practically all of which is owned by the Massachusetts Electric Companies. This dividend compares with 2½ per cent on June 30, 1913, 3 per cent on Dec. 31 and 2 per cent on June 26, 1912, and 3 per cent on Dec. 30, 1911.

Bristol & Plainville Tramway, Bristol, Conn.—New officers have been elected as follows for the Bristol & Plainville Tramway, control of which has passed to Richter & Company, Hartford, Conn., as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, page 1208: Charles H. Tenney, chairman of the board; A. B. Tenney, president; D. Edgar Manson, vice-president; Morris L. Tiffany, secretary and treasurer; Charles H. Tenney, Springfield; A. B. Tenney, Boston; John T. Trumbull, Plainville; Rolin J. Plumb, Terryville; Robert F. Briggs, Waterbury; Noble E. Pierce, Bristol, and W. H. Putnam and Ferdinand Richter, Hartford, directors.

California Railway & Power Company, San Francisco. Cal.—The Bankers' Trust Company, agent, has drawn by lot for redemption 1000 shares of the prior preference stock of the California Railway & Power Company. Notices will be mailed to stockholders owning shares so drawn for redemption.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—The Cape Girardeau-Jackson Interurban Railway has asked the Public Service Commission of Missouri for permission to dispose of the line in Cape Girardeau to the Light & Development Company, St. Louis, the transaction involving a transfer of $300,000 of stock.

Cleveland (Ohio) Railway.—The directors of the Cleveland Railway have authorized a 10 per cent increase in the capital stock, or $2,164,000. The matter is now to go before the stockholders and the State Utilities Commission for approval. Stockholders are to be permitted to subscribe for the new stock at the rate of one share for ten now held. They will have the privilege of paying half the subscription on April 1 and half on July 1, or all on April 1. The right to subscribe goes to holders of record of March 1. The money to be obtained from the stock is to be used for improvements that have been approved by the city authorities.

Columbus Railway & Light Company, Columbus, Ohio.—At the annual meeting of the stockholders of the Columbus Railway & Light Company, on Jan. 5, 1914, owners of practically 75 per cent of the stock voted to dispose of the operating contracts and assets to the new Columbus Railway, Power & Light Company. This step cancels the lease between the Columbus Railway & Light Company and the Columbus Traction Company. The lease of the Columbus Railway property is also assigned to the new corporation, as well as that of the Columbus Edison Company. The stockholders of the Columbus Railway & Light Company are to receive $3,000,000 of the common stock of the new company after the payment of an assessment of

20 per cent on the present $5,000,000 of stock outstanding. The refusal of the stockholders of the Columbus Light, Heat & Power Company to allow the cancellation of the lease will necessitate the continuance of the old company in existence. The plans for the consolidation of the companies were reviewed in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, page 1352.

East St. Louis & Suburban Company, East St. Louis, Ill.—Francis Brothers & Company, St. Louis, are offering at 95 and interest to yield over 7 per cent a small lot of the new convertible 6 per cent gold bonds of the East St. Louis & Suburban Company, dated Jan. 1, 1914, due Jan. 1, 1919, par $1000, $500 and $100. These bonds are convertible at any time prior to July 1, 1918, into an equal amount of 6 per cent cumulative preferred stock, with 33 1/3 per cent in common stock in addition.

Erie & Central Pennsylvania Railway, Titusville, Pa.—On Dec. 8 the property of the Erie & Central Pennsylvania Railway was sold at foreclosure sale at the instance of the Franklin Trust Company, trustee, to W. N. Bonynge, New York, for $56,000. A new company, known as the Titusville & Cambridge Railway, with a capital stock of $1,000,000 and no bond issue, has been organized to take over the railway, which has at present about 1 mile constructed. It is reported that it is the intention of the new owners to complete the line under construction between Titusville and Cambridge Springs. The original plan calls for an electric railway line to connect Erie with Titusville by means of Cambridge Springs and to continue southward to Oil City and Punxsutawney.

Goldsboro (N. C.) Traction Company.—The Goldsboro Traction Company has been sold at foreclosure sale by R. W. Winston, Jr., to the Mercantile Trust & Deposit Company, Baltimore. Since this foreclosure sale the railway property has been re-sold by the Mercantile Trust & Deposit Company to interests who intend to take it over and run it, but at the present time no definite information is available in regard to this second sale.

Hershey (Pa.) Transit Company.—The Lebanon & Campbellstown Street Railway and the Hummelstown & Campbellstown Street Railway have merged into the Hershey Transit Company; capital, $75,000. The directors are M. S. Hershey, president, Hershey; W. H. Lebkicker, Lancaster; S. C. Stecher, Hummelstown, and J. B. Leitheiser and John E. Snyder, Hershey.

Idaho Railway, Light & Power Company, Boise, Idaho.—Judge Dietrich in the United District Court at Boise on Dec. 23, upon application by the Westinghouse Electric & Manufacturing Company as creditor to the extent of about $40,000, placed the property of the Idaho Railway, Light & Power Company in the hands of General Manager O. G. F. Markhus as receiver. The receiver will take direct charge of all the company's power properties, which include the Swan Falls power plant and the transmission lines, and the distributing plants at Nampa, Caldwell, Middletown, Star and Eagle. The company's traction properties, including the local street-car system and the interurban lines between Boise, Nampa and Caldwell, will be operated through the Idaho Traction Company as lessee. Thus the traction properties are not directly affected by the receivership, although it is stated that they may be included later.

Interborough Rapid Transit Company, New York, N. Y.—The full allotment of Interborough Rapid Transit Company first mortgage 5 per cent bonds, amounting to $78,000,000 for the first year, have been taken by J. P. Morgan & Company, the head of a syndicate which is to underwrite the $170,000,000 of bonds necessary to provide funds to complete the subway and elevated construction and improvement program in New York. Of the total bonds sold by the company about $16,000,000 were utilized in paying off $15,000,000 of notes; about $35,000,000 to retire $33,000,000 of old bonds, and the balance for actual construction work. During each of the next two years the firm agrees to take $30,000,000 of the bonds and in the fourth year $32,000,000, which will absorb the entire $170,000,000.

Ithaca (N. Y.) Street Railway.—The foreclosure sale of the Ithaca Street Railway, which, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, was set for Dec. 2, 1913, has been postponed until Jan. 13, 1914. The sale of the New York, Auburn & Lansing Railroad, in accordance with a reorganization plan submitted to the Columbia & Knickerbocker Trust Company, was to have taken place at the same time as the foreclosure sale of the Ithaca Street Railway, but the exact date of sale of the former road has not been set.

Joliet & Southern Traction Company, Joliet, Ill.—The sale of the property of the Joliet & Southern Traction Company, set for Jan. 28, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 20, 1913, will take place instead on Feb. 11 at Geneva, the county seat of Kane County. Several dates of sale have been mentioned, but this date has been set by the court itself.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Application has been made by The Milwaukee Electric Railway & Light Company to the Wisconsin Railroad Commission for permission to issue $3,500,000 of 4½ per cent refunding and extension mortgage twenty-five-year bonds. These bonds are to be deposited as additional security under the general and refunding mortgage 5's of 1911, as from time to time the general and refunding bonds may be issued, the collateral bonds being issuable at the rate of only $1,000,000 yearly.

New York, New Haven & Hartford Railroad, New Haven, Conn.—In connection with the recent conferences between Attorney-General McReynolds and Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford, for a readjustment of the New York, New Haven & Hartford Railroad without litigation, the railroad on Jan. 6 filed with the Interstate Commerce Commission a petition that it be allowed to continue the operation of its present steamship lines. The Interstate Commerce Commission is drawn into the New Haven readjustment because under the Panama Canal act it has jurisdiction to determine whether a joint rail and water service "is of advantage to the convenience and commerce of the people." The New Haven petition recites that its rail and water service throughout New England is of public benefit. It is understood that the main point of difference between the Department of Justice and the railroad is over ownership of the electric railways now controlled by the New Haven railroad. It is said that the Department of Justice may pass up to the Interstate Commerce Commission the two correlated questions of the New Haven's ownership and control of the steamship lines and the electric railways.

Northern Ohio Traction & Light Company, Akron, Ohio.—With the view of providing for floating debt incurred for improvements, the Northern Ohio Traction & Light Company recently sold to Borton & Borton, Cleveland, an additional $210,000 of 6 per cent cumulative preferred stock, subject to the approval of the Ohio Public Utilities Commission. This leaves available of the original $3,000,000 issue only $150,000, which is held for double tracking. It is announced that the shareholders will vote on Jan. 24 on increasing the authorized limit of the preferred shares to $5,000.000 for the purpose of financing further additions, extensions, etc., from time to time required. It will be provided that no additional preferred stock shall be sold except when the annual net earnings applicable to dividends are equal to three times the preferred dividends on the preferred outstanding and that about to be issued. At the meeting on Jan. 24 the stockholders will also be asked to approve the action of the directors in providing payment of the federal income tax on the various bond issues of the company. The official circular also states that the stockholders will vote on acquiring the title to the property and rights of the Northern Ohio Power Company, which owns a power plant at Cuyahoga Falls.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—The Omaha & Council Bluffs Street Railway on May 1 will redeem the $1,846,000 of outstanding bonds of the Omaha Street Railway by an issue of $2,000,000 of first consolidated 5's due Jan. 1, 1928. This new issue has been purchased by A. B. Leach & Company, New York, N. Y., and is being offered at 97 and interest.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—The property of the Pekin & Petersburg Interurban Railway has been sold by the master in chancery to Walter E. Lautz, representing the bondholders.

Rhode Island Company, Providence, R. I.—According to the report of the Rhode Island Company for the year ended June 30, 1913, filed with the State Board of Public Utilities, the company paid into the treasury of the New York, New Haven & Hartford Railroad for the year ended June 30, 1913, dividends of 6 per cent, amounting to $581,130 on the $9,685,500 of outstanding stock. The dividend record of the company follows: June 30, 1909, 5 per cent; 1910 and 1911, 6 per cent; in 1912, 3 per cent. The surplus of the company for the year ended June 30, 1913, was $88,920, while the accumulated surplus at the close of the year was $1,129,528.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—On Dec. 12 the San Francisco-Oakland Terminal Railways paid the six months' interest at the rate of 7 per cent per annum on $2,500,000 of 6 per cent ten months' gold notes of the Oakland Railways due June 12, 1913. The *San Francisco Chronicle* states: "Although the notes bear only 6 per cent the interest was paid at the rate of 7 per cent in consideration of the forbearance of the holders, who did not press the collection of the principal at maturity."

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The stock control of the Sheboygan Railway & Electric Company was recently transferred to local capitalists headed by Peter Reiss and John Reiss. Ernest Gonzenbach, president and general manager, and W. O. Morgan, vice-president, have resigned, and Peter Reiss has been elected president of the company.

Stone & Webster, Boston, Mass.—Stone & Webster have issued a sixteen-page pamphlet describing the securities of the following companies managed by the Stone & Webster Management Association, which they offer and recommend at this time, subject to previous sale and change in price: Connecticut Power Company, Dallas Electric Company, Eastern Texas Electric Company, Galveston-Houston Electric Company, Mississippi River Power Company, Northern Texas Electric Company, Public Service Investment Company, Puget Sound Traction, Light & Power Company, Railway & Light Securities Company, Sierra Pacific Electric Company and Tampa Electric Company. The circular is introduced with a complete list of the properties under the management of the Stone & Webster organization.

West End Street Railway, Boston, Mass.—A bill in equity was filed in the United States District Court in Boston on Dec. 31 by Amy Curtis, of Pau, France, as the owner of thirty-five shares of preferred and fifty shares of common stock of the West End Street Railway, against that company and the Boston Elevated Railway, with the view of preventing the sale of the former to the latter under an Act of the Legislature in 1911. The suit makes numerous allegations against the validity of this legislation. It is further charged that the legislative act, sanctioning the merger of the Boston Elevated Railway with the West End Street Railway on expiration of its lease in 1922, is illegal, unconstitutional and void. Following a formal vote last year approving the merger, a suit was brought by a bondholder. The decision was adverse to the complainant.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Bay State Street Railway, Boston, Mass., 3 per cent, common.

London (Can.) Street Railway, 3 per cent.

Metropolitan West Side Elevated Railway Company, Chicago, Ill., quarterly, 1¼ per cent, preferred; 1 2/10 per cent, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

South Side Elevated Railroad, Chicago, Ill., quarterly, 1¾ per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Nov., '13	$76,365	*$73,271	$3,094	$15,344	†$12,250
1 " " '12	72,621	*72,217	408	11,723	†11,315
5 " " '13	465,957	*379,174	86,255	75,358	10,897
5 " " '12	443,058	*385,418	57,640	62,537	†4,897
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Nov., '13	$645,252	*$550,349	$94,903	$88,371	$6,532
1 " " '12	608,315	*442,332	165,983	86,498	79,485
5 " " '13	3,760,009	*2,640,578	1,119,430	448,779	670,651
5 " " '12	3,476,689	*2,287,038	1,189,650	432,903	756,747
GRAND RAPIDS (MICH.) RAILWAY					
1m., Nov., '13	$100,791	*65,421	$35,370	$11,787	$23,583
1 " " '12	100,776	*58,883	41,893	14,363	27,530
12 " " '13	1,279,595	*790,569	489,026	168,463	320,563
12 " " '12	1,235,219	*694,788	540,431	175,530	364,901
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.					
1m., Nov., '13	$191,199	*$57,262	$133,937	$71,339	$62,598
1 " " '12	184,852	*53,803	131,049	45,282	85,767
12 " " '13	1,764,998	*740,281	1,024,717	578,144	446,573
12 " " '12	1,526,777	*650,079	876,697	502,255	374,442
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE					
1m., Nov., '13	$51,794	$34,835	$16,959	$15,338	$1,621
1 " " '12	47,844	31,211	16,633	14,400	2,233
12 " " '13	672,493	422,884	249,609	178,637	70,972
12 " " '12	615,746	387,669	228,077	173,121	54,956
MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.					
1m., Nov., '13	$83,639	$32,295	$51,345	$25,782	$25,563
1 " " '12	70,715	25,995	44,720	24,768	19,952
12 " " '13	872,471	312,446	560,025	271,874	288,151
12 " " '12	776,165	306,335	469,831	236,324	233,507
NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.					
1m., Oct., '13	$594,640	$304,425	$290,215	$207,436	$82,779
1 " " '12	569,524	282,800	286,724	188,720	98,004
10 " " '13	5,677,294	2,681,247	2,681,247	2,030,350	650,897
10 " " '12	5,448,504	2,841,839	2,606,665	1,855,450	751,215
NEW YORK (N. Y.) RAILWAYS					
1m., Oct., '13	$1,302,080	$761,366	$540,714	$367,787	$172,927
1 " " '12	1,293,180	761,732	531,348	371,702	159,546
4 " " '13	4,961,204	2,972,060	1,989,144	1,483,913	505,231
4 " " '12	4,878,954	2,901,104	1,977,850	1,498,850	479,000
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Nov., '13	$24,344	*$16,926	$7,419	$7,626	†$207
1 " " '12	24,729	*25,530	802	7,105	†7,907
5 " " '13	185,514	*131,835	53,679	38,367	15,312
5 " " '12	181,103	*150,493	30,611	34,917	†4,306
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Nov., '13	$36,658	*$54,336	$17,679	$9,576	†$27,255
1 " " '12	28,605	*43,214	14,609	13,992	†28,601
5 " " '13	186,918	*248,301	61,383	46,664	†108,047
5 " " '12	121,110	*234,686	113,575	59,958	†173,533
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Oct., '13	$26,434	*$17,047	$9,388	$7,593	$1,795
1 " " '12	24,643	*16,389	8,253	7,438	815
12 " " '13	293,812	*194,748	99,064	89,270	9,794
12 " " '12	283,399	*188,299	95,100	85,857	9,243
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO					
1m., Nov., '13	$251,260	*$151,014	$100,246	$43,517	$56,729
1 " " '12	233,971	*133,957	100,015	43,662	56,353
12 " " '13	2,979,608	*1,817,448	1,162,161	536,967	625,134
12 " " '12	2,638,427	*1,578,557	1,059,871	529,417	530,454
RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., Nov., '13	$413,312	*$319,898	$93,415	$109,223	†$15,808
1 " " '12	410,844	*280,875	129,968	102,056	27,912
5 " " '13	2,470,001	*1,693,502	776,499	530,879	245,620
5 " " '12	2,416,980	*1,491,550	925,429	510,279	415,150
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.					
1m., Nov., '13	$110,092	*$59,878	$50,214	$20,231	$29,983
1 " " '12	100,787	*54,495	46,292	19,710	26,582
12 " " '13	1,245,949	*709,251	536,698	240,881	295,817
12 " " '12	1,170,366	*667,616	502,750	236,058	266,692
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Nov., '13	$751,113	$374,947	$376,166	$148,325	$227,841
1 " " '12	700,676	347,885	352,791	153,575	199,216
11 " " '13	8,085,035	4,086,321	3,998,715	1,619,764	2,378,951
11 " " '12	7,485,814	3,796,657	3,689,156	1,581,366	2,107,790

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*Includes taxes.
†Deficit.

Traffic and Transportation

Hearing on Brockton & Plymouth Fares and Service

The Massachusetts Public Service Commission recently gave a hearing at its offices in Boston upon fares and service conditions on the Brockton & Plymouth Street Railway, the petitioners being represented by H. B. Davis, a citizen of Plymouth, and the company by Thomas Hunt, of Gaston, Snow & Saltonstall, Boston. The petitioner requested the restoration of a more frequent car service between the Hotel Pilgrim, and Kingston carhouse and requested the board to examine the financial condition of the road with special reference to the continuance of the existing 6-cent fare unit.

Howard F. Eaton, local manager of the company, stated that under the present schedule cars are operated on two-hour intervals between the Hotel Pilgrim and Cliff Street, Plymouth, the previous service being rendered on a half-hourly basis. The petitioners object to the reduction in service, although under the present schedule hourly cars are operated as far from the center of Plymouth as Cliff Street, which is 0.8 mile from the Hotel Pilgrim. The witness stated that the territory between Cliff Street and the hotel is practically unoccupied during the winter, with the exception of possibly half a dozen houses adjacent to the track. Under the new schedule running time between the hotel and the Kingston carhouse has been reduced from 58 to 45 minutes, the distance being 8 miles. The new schedule calls for five cars, the old timetable demanding six. The inauguration of the new schedule saves the road about $11 per day in platform expenses. Chairman McLeod stated at this point that no great amount of evidence is necessary to convince the board that the change in schedule as effected is not desirable, and that the giving of service every two hours cannot be regarded as the rendering of service under modern conditions in a community like Plymouth, unless the company can show that absolute compulsion or financial conditions have rendered that kind of service necessary.

A. S. Pratt, of Boston, district manager for the Stone & Webster Management Association, then took the stand. He stated that the changes in the schedule were made for economical reasons and that the estimated saving in five months' operation is $2,789. Between Plymouth and Kingston the time has been cut about eight minutes. Traffic counts showed an average of 3.4 passengers on the trips which were eliminated. Mr. Pratt stated that the company pays Stone & Webster about $5,500 per year for its management. The capitalization of the road consists of $260,000 net of bonds outstanding, $110,000 of preferred stock and $295,000 in common stock. The preferred stock was issued through the prestige of Stone & Webster to assist the company in caring for a floating debt of about $150,000. The company has never paid a dividend upon its common stock, and it has been unable to meet proper depreciation charges by about $100,000.

The company's operating costs rose as follows between the years ended Sept. 30, 1909, and Sept. 30, 1913: ratio of total expenses to gross earnings, 70 to 72.6 per cent; ratio of maintenance cost to gross earnings, 16.3 to 18.5 per cent; total expenses per car mile, 18.2 cents to 18.9 cents; wages of platform per car hour, 45.4 cents to 52.3 cents; wages of platform men and car-service expenses per car mile, 4.79 cents to 5.40 cents; maintenance of rolling stock per car mile, 2.21 cents to 2.72 cents. The average revenue per passenger mile is about 1.5 cents. A comparison of the road's receipts for five years under a 5-cent fare unit and for the same period under a 6-cent fare showed average yearly earnings of $103,340 under the former and $111.583 under the latter. During the summer months of the last period about half the passengers obtained a 5-cent fare by the purchase of park tickets. Mr. Pratt stated that the money saved by the new schedule is to be devoted to the purchase of new trucks and to re-wiring of cars at about $100 each. The road earns $5,400 a mile, and to be reasonably prosperous it should earn at least $6,400. The witness described in detail the managerial methods of Stone & Webster, emphasizing the benefits of centralized operation and incidentally pointing out that the average saving to companies under Stone & Webster management through centralized purchasing upon future delivery contracts in force Dec. 2 was 16.6 per cent over and above what the companies would have been obliged to pay if they were not able to participate in these contracts. At the close of the hearing Chairman McLeod stated that the board would probably require some modification in the present schedules leading toward a more frequent service.

The Public Service Commission has issued orders refusing to require the Bay State Street Railway to grant transfer privileges resulting in a 5-cent fare between all parts of Brockton and Whitman or to establish a 5-cent fare between Lynnfield and Central Square, Lynn. In the former case the board points out that the territory receives electric railway service at as low rates as any other portion of the State where similar conditions obtain, and in the latter decision the commission states that it appears that the company is obliged to operate the line at a loss on account of sparse traffic and that the institution of a 5-cent fare would result in a maximum ride of 12.24 miles at that rate.

Baltimore Company Adopts Pension System

On the recommendation of William A. House, president, the United Railways & Electric Company, Baltimore, Md., has adopted a pension plan for the benefit of its employees. The entire expense of the plan is to be borne by the company. All employees other than those on a salary are entitled to the pensions, subject to the following provisions:

"Those who have attained the age of seventy years, whether incapacitated or not.

"Any employee sixty-five to sixty-nine years of age who has become incapacitated.

"Any employee who has not reached the age of sixty-five, but who has been in continuous service for at least thirty years and who has become incapacitated, may be retired with the amount of pension as fixed in paragraphs 'c' or 'd' below.

"Any employee after twenty years of continuous service, if physically or mentally disabled in the company's service."

Pension allowances are divided into four groups as follows:

"(a) If in continuous service twenty years and less than twenty-five years, 30 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(b) If in continuous service twenty-five years and less than thirty years, 35 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(c) If in continuous service thirty years and less than thirty-five years, 40 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(d) If in continuous service thirty-five years or more, 50 per cent of the average monthly wage received during the ten years immediately preceding retirement."

Texas Traction Company's Christmas Letter to Employees

J. F. Strickland, president of the Texas Traction Company and Southern Traction Company, Dallas, Tex., in continuance of his policy of *esprit de corps*, sent each of his employees the following Christmas letter, handsomely bound:

"During the past year we have not only operated the Texas Traction Company but we have completed a line to serve our neighbors in the South.

"The increased patronage extended to us over the Texas Traction Company's lines, and the manner in which we have been received in the South, assures us that we have the co-operation of those who become our patrons. We have constructed these railways for the purpose of serving our neighbors, and we want to serve them better than they have been served before. We want to give first consideration to their safety, and after considering 'safety first,' we want our patrons to be our guests. As our system increases in size and a greater number of people place themselves in our care, the organization becomes more dependent upon us.

Corporate Financing During 1913

In an article published in the Jan. 2 issue of the *Wall Street Journal* it is stated that a careful revision of the figures of corporate financing in the United States during the past two years discloses the fact that the year 1913 was not $90,000,000 behind 1912 in the total of new issues sold. The aggregate originally shown for 1912 included some issues—notably $170,000,000 Interborough Rapid Transit bonds—which were underwritten in that year but none of which was actually sold until 1913. Revision of the 1912 figures to eliminate all securities not marketed during that year brings the total down to $1,779,482,520, which compares with an amount of approximately $1,690,282,000 in 1913.

In view of the unsettled conditions that prevailed in the investment market in the past year, this total of $90,000,000 below 1912 is remarkable. To do that much financing in a year like 1913, however, short-term notes had to be used to a much greater extent than in previous years. Over $200,000,000 fewer bonds were sold last year than in 1912 and nearly $300,000,000 less than in 1911; while $123,000,000 more notes were disposed of than in 1912 and $236,000,000 more than in 1911. Last year $194,000,000 less stock was sold than in 1911. The following table shows the change from bonds to notes in the past two years and also the decline in the use of stocks as a corporate financing medium:

	1913	1912	1911
Stocks	$423,481,210	$431,524,720	$617,787,450
Bonds	650,417,600	855,127,280	948,586,000
Notes	616,383,500	492,830,520	379,659,000
Total	$1,690,282,310	$1,779,482,520	$1,946,032,450

The increase in note issues in 1913 was largely due to the fact that railroads financed nearly half of their requirements by that method. The following figures show the changes in the forms of securities used by the different groups of companies:

	1913	1912
Railroads		
Stocks	$234,157,600	$130,100,000
Bonds	303,777,600	323,329,000
Notes	420,701,000	279,389,000
Public Utilities		
Stocks	68,218,850	100,236,720
Bonds	280,595,000	358,427,280
Notes	104,732,500	159,469,520
Industrials		
Stocks	121,109,760	201,188,000
Bonds	66,045,000	173,371,000
Notes	90,950,000	53,972,000
Total	$1,690,282,310	$1,799,482,520

Railroads secured more than half the money on new security issues in 1913, in comparison with less than half the preceding year. The division of new securities among the different classes of companies during the past two years was as follows:

Railroad issues, $958,636,200 in 1913 and $732,818,000 in 1912; public utility issues, $453,546,350 in 1913 and $618,123,520 in 1912; industrial issues, $278,099,760 in 1913 and $428,531,000 in 1912.

The important public utility issues in the electric railway field durng 1913 were as follows:

(1) Bonds.—Interstate Railways, $3,832,000; South Carolina Light, Power & Railways, $3,000,000; Toledo Traction, Light & Power Company, $5,822,000; Chicago Railways, $8,000,000; Los Angeles Railway, $3,000,000; New York State Railways, $2,748,000; Philadelphia Rapid Transit Company, $4,500,000; New Orleans Railway & Light Company, $4,000,000; Interborough Rapid Transit Company, $50,000,000, and Pacific Gas & Electric Company, $5,000,000.

(2) Stocks.—Boston Elevated Railway, $4,000,000; Cleveland Electric Railway, $3,600,000; United Light & Railways Company, $2,000,000; National Properties Company, $1,649,000; Public Service Company of Northern Illinois, $2,000,000; Central Arkansas Railway & Light Company, $1,500,000, and Northern Ohio Traction & Light Company, $2,640,000.

(3) Notes.—Massachusetts Electric Companies, $3,100,000; Cities Service Companies, $5,090,000; Middle West Utilities Company, $3,500,000; Public Service Company of Northern Illinois, $2,500,000; Birmingham-Tuscaloosa Railway & Utilities Company, $3,500,000, and Interborough-Metropolitan Company, $1,500,000.

J. P. Morgan & Company Resign from Directorates

Announcements have been made of the resignations of members of the firm of J. P. Morgan & Company from the directorates of a number of organizations in which the firm has been interested. J. P. Morgan retires as a director from eighteen companies, including the New York Central & Hudson River Railroad, the New York, New Haven & Hartford Railroad, the New York, Westchester & Boston Railway, the Millbrook Company and the Rhode Island Company. The other members of the firm, Charles Steele, H. P. Davison, W. H. Porter and Thomas W. Lamont, have also given up some of their directorships. In the statement given out to the press Mr. Morgan says: "An apparent change in public sentiment in regard to directorships seems now to warrant us in seeking to resign from some of these connections. Indeed, it may be, in view of change of sentiment upon this subject, that we shall be in a better position to serve such properties and their security holders if we are not directors. We have already resigned from several companies and we expect from time to time to withdraw from other boards upon which we feel there is no special obligation to remain."

Bay State Street Railway, Boston, Mass.—A semi-annual dividend of 3 per cent was paid on Dec. 31 on the $20,517,200 of common stock of the Bay State Street Railway, practically all of which is owned by the Massachusetts Electric Companies. This dividend compares with 2½ per cent on June 30, 1913, 3 per cent on Dec. 31 and 2 per cent on June 26, 1912, and 3 per cent on Dec. 30, 1911.

Bristol & Plainville Tramway, Bristol, Conn.—New officers have been elected as follows for the Bristol & Plainville Tramway, control of which has passed to Richter & Company, Hartford, Conn., as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, page 1208: Charles H. Tenney, chairman of the board; A. B. Tenney, president; D. Edgar Manson, vice-president; Morris L. Tiffany, secretary and treasurer; Charles H. Tenney, Springfield; A. B. Tenney, Boston; John T. Trumbull, Plainville; Rolin J. Plumb, Terryville; Robert F. Briggs, Waterbury; Noble E. Pierce, Bristol, and W. H. Putnam and Ferdinand Richter, Hartford, directors.

California Railway & Power Company, San Francisco, Cal.—The Bankers' Trust Company, agent, has drawn by lot for redemption 1000 shares of the prior preference stock of the California Railway & Power Company. Notices will be mailed to stockholders owning shares so drawn for redemption.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—The Cape Girardeau-Jackson Interurban Railway has asked the Public Service Commission of Missouri for permission to dispose of the line in Cape Girardeau to the Light & Development Company, St. Louis, the transaction involving a transfer of $300,000 of stock.

Cleveland (Ohio) Railway.—The directors of the Cleveland Railway have authorized a 10 per cent increase in the capital stock, or $2,164,000. The matter is now to go before the stockholders and the State Utilities Commission for approval. Stockholders are to be permitted to subscribe for the new stock at the rate of one share for ten now held. They will have the privilege of paying half the subscription on April 1 and half on July 1, or all on April 1. The right to subscribe goes to holders of record of March 1. The money to be obtained from the stock is to be used for improvements that have been approved by the city authorities.

Columbus Railway & Light Company, Columbus, Ohio.—At the annual meeting of the stockholders of the Columbus Railway & Light Company, on Jan. 5, 1914, owners of practically 75 per cent of the stock voted to dispose of the operating contracts and assets to the new Columbus Railway, Power & Light Company. This step cancels the lease between the Columbus Railway & Light Company and the Columbus Traction Company. The lease of the Columbus Railway property is also assigned to the new corporation, as well as that of the Columbus Edison Company. The stockholders of the Columbus Railway & Light Company are to receive $3,000,000 of the common stock of the new company after the payment of an assessment of

20 per cent on the present $5,000,000 of stock outstanding. The refusal of the stockholders of the Columbus Light, Heat & Power Company to allow the cancellation of the lease will necessitate the continuance of the old company in existence. The plans for the consolidation of the companies were reviewed in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, page 1352.

East St. Louis & Suburban Company, East St. Louis, Ill.—Francis Brothers & Company, St. Louis, are offering at 95 and interest to yield over 7 per cent a small lot of the new convertible 6 per cent gold bonds of the East St. Louis & Suburban Company, dated Jan. 1, 1914, due Jan. 1, 1919, par $1000, $500 and $100. These bonds are convertible at any time prior to July 1, 1918, into an equal amount of 6 per cent cumulative preferred stock, with 33 1/3 per cent in common stock in addition.

Erie & Central Pennsylvania Railway, Titusville, Pa.—On Dec. 8 the property of the Erie & Central Pennsylvania Railway was sold at foreclosure sale at the instance of the Franklin Trust Company, trustee, to W. N. Bonynge, New York, for $56,000. A new company, known as the Titusville & Cambridge Railway, with a capital stock of $1,000,000 and no bond issue, has been organized to take over the railway, which has at present about 1 mile constructed. It is reported that it is the intention of the new owners to complete the line under construction between Titusville and Cambridge Springs. The original plan calls for an electric railway line to connect Erie with Titusville by means of Cambridge Springs and to continue southward to Oil City and Punxsutawney.

Goldsboro (N. C.) Traction Company.—The Goldsboro Traction Company has been sold at foreclosure sale by R. W. Winston, Jr., to the Mercantile Trust & Deposit Company, Baltimore. Since this foreclosure sale the railway property has been re-sold by the Mercantile Trust & Deposit Company to interests who intend to take it over and run it, but at the present time no definite information is available in regard to this second sale.

Hershey (Pa.) Transit Company.—The Lebanon & Campbellstown Street Railway and the Hummelstown & Campbellstown Street Railway have merged into the Hershey Transit Company; capital, $75,000. The directors are M. S. Hershey, president, Hershey; W. H. Lebkicker, Lancaster; S. C. Stecher, Hummelstown, and J. B. Leitheiser and John E. Snyder, Hershey.

Idaho Railway, Light & Power Company, Boise, Idaho.—Judge Dietrich in the United District Court at Boise on Dec. 23, upon application by the Westinghouse Electric & Manufacturing Company as creditor to the extent of about $40,000, placed the property of the Idaho Railway, Light & Power Company in the hands of General Manager O. G. F. Markhus as receiver. The receiver will take direct charge of all the company's power properties, which include the Swan Falls power plant and the transmission lines, and the distributing plants at Nampa, Caldwell, Middletown, Star and Eagle. The company's traction properties, including the local street-car system and the interurban lines between Boise, Nampa and Caldwell, will be operated through the Idaho Traction Company as lessee. Thus the traction properties are not directly affected by the receivership, although it is stated that they may be included later.

Interborough Rapid Transit Company, New York, N. Y.—The full allotment of Interborough Rapid Transit Company first mortgage 5 per cent bonds, amounting to $78,000,000 for the first year, have been taken by J. P. Morgan & Company, the head of a syndicate which is to underwrite the $170,000,000 of bonds necessary to provide funds to complete the subway and elevated construction and improvement program in New York. Of the total bonds sold by the company about $16,000,000 were utilized in paying off $15,000,000 of notes; about $35,000,000 to retire $33,000,000 of old bonds, and the balance for actual construction work. During each of the next two years the firm agrees to take $30,000,000 of the bonds and in the fourth year $32,000,000, which will absorb the entire $170,000,000.

Ithaca (N. Y.) Street Railway.—The foreclosure sale of the Ithaca Street Railway, which, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, was set for Dec. 2, 1913, has been postponed until Jan. 13, 1914. The sale of the New York, Auburn & Lansing Railroad, in accordance with a reorganization plan submitted to the Columbia & Knickerbocker Trust Company, was to have taken place at the same time as the foreclosure sale of the Ithaca Street Railway, but the exact date of sale of the former road has not been set.

Joliet & Southern Traction Company, Joliet, Ill.—The sale of the property of the Joliet & Southern Traction Company, set for Jan. 28, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 20, 1913, will take place instead on Feb. 11 at Geneva, the county seat of Kane County. Several dates of sale have been mentioned, but this date has been set by the court itself.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Application has been made by The Milwaukee Electric Railway & Light Company to the Wisconsin Railroad Commission for permission to issue $3,500,000 of 4½ per cent refunding and extension mortgage twenty-five-year bonds. These bonds are to be deposited as additional security under the general and refunding mortgage 5's of 1911, as from time to time the general and refunding bonds may be issued, the collateral bonds being issuable at the rate of only $1,000,000 yearly.

New York, New Haven & Hartford Railroad, New Haven, Conn.—In connection with the recent conferences between Attorney-General McReynolds and Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford, for a readjustment of the New York, New Haven & Hartford Railroad without litigation. the railroad on Jan. 6 filed with the Interstate Commerce Commission a petition that it be allowed to continue the operation of its present steamship lines. The Interstate Commerce Commission is drawn into the New Haven readjustment because under the Panama Canal act it has jurisdiction to determine whether a joint rail and water service "is of advantage to the convenience and commerce of the people." The New Haven petition recites that its rail and water service throughout New England is of public benefit. It is understood that the main point of difference between the Department of Justice and the railroad is over ownership of the electric railways now controlled by the New Haven railroad. It is said that the Department of Justice may pass up to the Interstate Commerce Commission the two correlated questions of the New Haven's ownership and control of the steamship lines and the electric railways.

Northern Ohio Traction & Light Company, Akron, Ohio.—With the view of providing for floating debt incurred for improvements, the Northern Ohio Traction & Light Company recently sold to Borton & Borton, Cleveland, an additional $210,000 of 6 per cent cumulative preferred stock, subject to the approval of the Ohio Public Utilities Commission. This leaves available of the original $3,000,000 issue only $150,000, which is held for double tracking. It is announced that the shareholders will vote on Jan. 24 on increasing the authorized limit of the preferred shares to $5,000,000 for the purpose of financing further additions, extensions, etc., from time to time required. It will be provided that no additional preferred stock shall be sold except when the annual net earnings applicable to dividends are equal to three times the preferred dividends on the preferred outstanding and that about to be issued. At the meeting on Jan. 24 the stockholders will also be asked to approve the action of the directors in providing payment of the federal income tax on the various bond issues of the company. The official circular also states that the stockholders will vote on acquiring the title to the property and rights of the Northern Ohio Power Company, which owns a power plant at Cuyahoga Falls.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—The Omaha & Council Bluffs Street Railway on May 1 will redeem the $1,846,000 of outstanding bonds of the Omaha Street Railway by an issue of $2,000,000 of first consolidated 5's due Jan. 1, 1928. This new issue has been purchased by A. B. Leach & Company, New York, N. Y., and is being offered at 97 and interest.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—The property of the Pekin & Petersburg Interurban Railway has been sold by the master in chancery to Walter E. Lautz, representing the bondholders.

Rhode Island Company, Providence, R. I.—According to the report of the Rhode Island Company for the year ended June 30, 1913, filed with the State Board of Public Utilities, the company paid into the treasury of the New York, New Haven & Hartford Railroad for the year ended June 30, 1913, dividends of 6 per cent, amounting to $581,130 on the $9,685,500 of outstanding stock. The dividend record of the company follows: June 30, 1909, 5 per cent; 1910 and 1911, 6 per cent; in 1912, 3 per cent. The surplus of the company for the year ended June 30, 1913, was $88,920, while the accumulated surplus at the close of the year was $1,129,528.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—On Dec. 12 the San Francisco-Oakland Terminal Railways paid the six months' interest at the rate of 7 per cent per annum on $2,500,000 of 6 per cent ten months' gold notes of the Oakland Railways due June 12, 1913. The *San Francisco Chronicle* states: "Although the notes bear only 6 per cent the interest was paid at the rate of 7 per cent in consideration of the forbearance of the holders, who did not press the collection of the principal at maturity."

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The stock control of the Sheboygan Railway & Electric Company was recently transferred to local capitalists headed by Peter Reiss and John Reiss. Ernest Gonzenbach, president and general manager, and W. O. Morgan, vice-president, have resigned, and Peter Reiss has been elected president of the company.

Stone & Webster, Boston, Mass.—Stone & Webster have issued a sixteen-page pamphlet describing the securities of the following companies managed by the Stone & Webster Management Association, which they offer and recommend at this time, subject to previous sale and change in price: Connecticut Power Company, Dallas Electric Company, Eastern Texas Electric Company, Galveston-Houston Electric Company, Mississippi River Power Company, Northern Texas Electric Company, Public Service Investment Company, Puget Sound Traction, Light & Power Company, Railway & Light Securities Company, Sierra Pacific Electric Company and Tampa Electric Company. The circular is introduced with a complete list of the properties under the management of the Stone & Webster organization.

West End Street Railway, Boston, Mass.—A bill in equity was filed in the United States District Court in Boston on Dec. 31 by Amy Curtis, of Pau, France, as the owner of thirty-five shares of preferred and fifty shares of common stock of the West End Street Railway, against that company and the Boston Elevated Railway, with the view of preventing the sale of the former to the latter under an Act of the Legislature in 1911. The suit makes numerous allegations against the validity of this legislation. It is further charged that the legislative act, sanctioning the merger of the Boston Elevated Railway with the West End Street Railway on expiration of its lease in 1922, is illegal, unconstitutional and void. Following a formal vote last year approving the merger, a suit was brought by a bondholder. The decision was adverse to the complainant.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Bay State Street Railway, Boston, Mass., 3 per cent, common.

London (Can.) Street Railway, 3 per cent.

Metropolitan West Side Elevated Railway Company, Chicago, Ill., quarterly, 1¼ per cent, preferred; 1 2/10 per cent, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

South Side Elevated Railroad, Chicago, Ill., quarterly, 1¾ per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.					
1m., Nov., '13	$76,365	*$73,271	$3,094	$15,344	†$12,250
1 " " '12	72,621	*72,217	408	11,723	†11,315
5 " " '13	465,957	*379,174	86,255	75,358	10,897
5 " " '12	443,058	*385,418	57,640	62,537	†4,897
CONNECTICUT COMPANY, NEW HAVEN, CONN.					
1m., Nov., '13	$645,252	*$550,349	$94,903	$88,371	$6,532
1 " " '12	608,315	*442,332	165,983	86,498	79,485
5 " " '13	3,760,009	*2,640,578	1,119,430	448,779	670,651
5 " " '12	3,476,689	*2,287,038	1,189,650	432,902	756,747
GRAND RAPIDS (MICH.) RAILWAY					
1m., Nov., '13	$100,791	*65,421	$35,370	$11,787	$23,583
1 " " '12	100,776	*58,883	41,893	14,363	27,530
12 " " '13	1,279,595	*790,569	489,026	168,463	320,563
12 " " '12	1,235,219	*694,788	540,431	175,530	364,901
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.					
1m., Nov., '13	$191,199	*$57,262	$133,937	$71,339	$62,598
1 " " '12	184,852	*53,803	131,049	45,282	85,767
12 " " '13	1,764,998	*740,281	1,024,717	578,144	446,573
12 " " '12	1,526,777	*650,079	876,697	502,255	374,442
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE					
1m., Nov., '13	$51,794	$34,835	$16,959	$15,338	$1,621
1 " " '12	47,844	31,211	16,633	14,400	2,233
12 " " '13	672,493	422,884	249,609	178,637	70,972
12 " " '12	615,746	387,669	228,077	173,121	54,956
MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.					
1m., Nov., '13	$83,639	$32,295	$51,345	$25,782	$25,563
1 " " '12	70,715	25,995	44,720	24,768	19,952
12 " " '13	872,471	312,446	560,025	271,874	288,151
12 " " '12	776,165	306,335	469,831	236,324	233,507
NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.					
1m., Oct., '13	$594,640	$304,425	$290,215	$207,436	$82,779
1 " " '12	569,524	282,800	286,724	188,720	98,004
10 " " '13	5,677,294	2,681,247	2,681,247	2,030,350	650,897
10 " " '12	5,448,504	2,841,839	2,606,665	1,855,450	751,215
NEW YORK (N. Y.) RAILWAYS					
1m., Oct., '13	$1,302,080	$761,366	$540,714	$367,787	$172,927
1 " " '12	1,293,180	761,732	531,348	371,702	159,546
4 " " '13	4,961,204	2,972,060	1,989,144	1,483,913	505,231
4 " " '12	4,878,954	2,901,104	1,977,850	1,498,850	479,000
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.					
1m., Nov., '13	$24,344	*$16,926	$7,419	$7,626	†$207
1 " " '12	24,729	*25,530	802	7,105	†7,907
5 " " '13	185,514	*131,835	53,679	38,367	15,312
5 " " '12	181,103	*150,493	30,611	34,917	†4,306
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.					
1m., Nov., '13	$36,658	*$54,336	$17,679	$9,576	†$27,255
1 " " '12	28,605	*43,214	14,609	13,992	†28,601
5 " " '13	186,918	*248,301	61,383	46,664	†108,047
5 " " '12	121,110	*234,686	113,575	59,958	†173,533
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Oct., '13	$26,434	*$17,047	$9,388	$7,593	$1,795
1 " " '12	24,643	*16,389	8,253	7,438	815
12 " " '13	293,812	*194,748	99,064	89,270	9,794
12 " " '12	283,399	*188,299	95,100	85,857	9,243
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO					
1m., Nov., '13	$251,260	*$151,014	$100,246	$43,517	$56,729
1 " " '12	233,971	*133,957	100,015	43,662	56,353
12 " " '13	2,979,608	*1,817,448	1,162,161	536,967	625,134
12 " " '12	2,638,427	*1,578,557	1,059,871	529,417	530,454
RHODE ISLAND COMPANY, PROVIDENCE, R. I.					
1m., Nov., '13	$413,312	*$319,898	$93,415	$109,223	†$15,808
1 " " '12	410,844	*280,875	129,968	102,056	27,912
5 " " '13	2,470,001	*1,693,502	776,499	530,879	245,620
5 " " '12	2,416,980	*1,491,550	925,429	510,279	415,150
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.					
1m., Nov., '13	$110,092	*$59,878	$50,214	$20,231	$29,983
1 " " '12	100,787	*54,495	46,292	19,710	26,582
12 " " '13	1,245,949	*709,251	536,698	240,881	295,817
12 " " '12	1,170,366	*667,616	502,750	236,058	266,692
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Nov., '13	$751,113	$374,947	$376,166	$148,325	$227,841
1 " " '12	700,676	347,885	352,791	153,575	199,216
11 " " '13	8,085,035	4,086,321	3,998,715	1,619,764	2,378,951
11 " " '12	7,485,814	3,796,657	3,689,156	1,581,366	2,107,790

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*Includes taxes.
†Deficit.

Traffic and Transportation

Hearing on Brockton & Plymouth Fares and Service

The Massachusetts Public Service Commission recently gave a hearing at its offices in Boston upon fares and service conditions on the Brockton & Plymouth Street Railway, the petitioners being represented by H. B. Davis, a citizen of Plymouth, and the company by Thomas Hunt, of Gaston, Snow & Saltonstall, Boston. The petitioner requested the restoration of a more frequent car service between the Hotel Pilgrim, and Kingston carhouse and requested the board to examine the financial condition of the road with special reference to the continuance of the existing 6-cent fare unit.

Howard F. Eaton, local manager of the company, stated that under the present schedule cars are operated on two-hour intervals between the Hotel Pilgrim and Cliff Street, Plymouth, the previous service being rendered on a half-hourly basis. The petitioners object to the reduction in service, although under the present schedule hourly cars are operated as far from the center of Plymouth as Cliff Street, which is 0.8 mile from the Hotel Pilgrim. The witness stated that the territory between Cliff Street and the hotel is practically unoccupied during the winter, with the exception of possibly half a dozen houses adjacent to the track. Under the new schedule running time between the hotel and the Kingston carhouse has been reduced from 58 to 45 minutes, the distance being 8 miles. The new schedule calls for five cars, the old timetable demanding six. The inauguration of the new schedule saves the road about $11 per day in platform expenses. Chairman McLeod stated at this point that no great amount of evidence is necessary to convince the board that the change in schedule as effected is not desirable, and that the giving of service every two hours cannot be regarded as the rendering of service under modern conditions in a community like Plymouth, unless the company can show that absolute compulsion or financial conditions have rendered that kind of service necessary.

A. S. Pratt, of Boston, district manager for the Stone & Webster Management Association, then took the stand. He stated that the changes in the schedule were made for economical reasons and that the estimated saving in five months' operation is $2,789. Between Plymouth and Kingston the time has been cut about eight minutes. Traffic counts showed an average of 3.4 passengers on the trips which were eliminated. Mr. Pratt stated that the company pays Stone & Webster about $5,500 per year for its management. The capitalization of the road consists of $260,000 net of bonds outstanding, $110,000 of preferred stock and $295,000 in common stock. The preferred stock was issued through the prestige of Stone & Webster to assist the company in caring for a floating debt of about $150,000. The company has never paid a dividend upon its common stock, and it has been unable to meet proper depreciation charges by about $100,000.

The company's operating costs rose as follows between the years ended Sept. 30, 1909, and Sept. 30, 1913: ratio of total expenses to gross earnings, 70 to 72.6 per cent; ratio of maintenance cost to gross earnings, 16.3 to 18.5 per cent; total expenses per car mile, 18.2 cents to 18.9 cents; wages of platform per car hour, 45.4 cents to 52.3 cents; wages of platform men and car-service expenses per car mile, 4.79 cents to 5.40 cents; maintenance of rolling stock per car mile, 2.21 cents to 2.72 cents. The average revenue per passenger mile is about 1.5 cents. A comparison of the road's receipts for five years under a 5-cent fare unit and for the same period under a 6-cent fare showed average yearly earnings of $103,340 under the former and $111.583 under the latter. During the summer months of the last period about half the passengers obtained a 5-cent fare by the purchase of park tickets. Mr. Pratt stated that the money saved by the new schedule is to be devoted to the purchase of new trucks and to re-wiring of cars at about $100 each. The road earns $5,400 a mile, and to be reasonably prosperous it should earn at least $6,400. The witness described in detail the managerial methods of Stone & Webster, emphasizing the benefits of centralized operation and incidentally pointing out that the average saving to companies under Stone & Webster management through centralized purchasing upon future delivery contracts in force Dec. 2 was 16.6 per cent over and above what the companies would have been obliged to pay if they were not able to participate in these contracts. At the close of the hearing Chairman McLeod stated that the board would probably require some modification in the present schedules leading toward a more frequent service.

The Public Service Commission has issued orders refusing to require the Bay State Street Railway to grant transfer privileges resulting in a 5-cent fare between all parts of Brockton and Whitman or to establish a 5-cent fare between Lynnfield and Central Square, Lynn. In the former case the board points out that the territory receives electric railway service at as low rates as any other portion of the State where similar conditions obtain, and in the latter decision the commission states that it appears that the company is obliged to operate the line at a loss on account of sparse traffic and that the institution of a 5-cent fare would result in a maximum ride of 12.24 miles at that rate.

Baltimore Company Adopts Pension System

On the recommendation of William A. House, president, the United Railways & Electric Company, Baltimore, Md., has adopted a pension plan for the benefit of its employees. The entire expense of the plan is to be borne by the company. All employees other than those on a salary are entitled to the pensions, subject to the following provisions:

"Those who have attained the age of seventy years, whether incapacitated or not.

"Any employee sixty-five to sixty-nine years of age who has become incapacitated.

"Any employee who has not reached the age of sixty-five, but who has been in continuous service for at least thirty years and who has become incapacitated, may be retired with the amount of pension as fixed in paragraphs 'c' or 'd' below.

"Any employee after twenty years of continuous service, if physically or mentally disabled in the company's service."

Pension allowances are divided into four groups as follows:

"(a) If in continuous service twenty years and less than twenty-five years, 30 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(b) If in continuous service twenty-five years and less than thirty years, 35 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(c) If in continuous service thirty years and less than thirty-five years, 40 per cent of the average monthly wage received during the ten years immediately preceding retirement.

"(d) If in continuous service thirty-five years or more, 50 per cent of the average monthly wage received during the ten years immediately preceding retirement."

Texas Traction Company's Christmas Letter to Employees

J. F. Strickland, president of the Texas Traction Company and Southern Traction Company, Dallas, Tex., in continuance of his policy of *esprit de corps*, sent each of his employees the following Christmas letter, handsomely bound:

"During the past year we have not only operated the Texas Traction Company but we have completed a line to serve our neighbors in the South.

"The increased patronage extended to us over the Texas Traction Company's lines, and the manner in which we have been received in the South, assures us that we have the co-operation of those who become our patrons. We have constructed these railways for the purpose of serving our neighbors, and we want to serve them better than they have been served before. We want to give first consideration to their safety, and after considering 'safety first,' we want our patrons to be our guests. As our system increases in size and a greater number of people place themselves in our care, the organization becomes more dependent upon us.

"I believe in the fellowship of men. When one of our men extends an extra amount of consideration to the aged, the infirm, or the woman with children and bundles beyond her ability to manage, I do not believe that he is doing it because he is paid for it, but because he is a man and ready to assist in carrying the burdens of others.

"When Texas was young the driver of the stagecoach knew his patrons, could call them by their first names and give them the best he had because he knew they were 'his folks.' Under present conditions it is not possible for us to know all our patrons so intimately, but they are 'our folks,' and the human service which money cannot buy is the service which causes our patrons to feel that they have received something which makes them glad that they have met us.

"A few days ago I overheard a gentleman remark that our trainmen were a very superior lot of men who treated the passengers as though they were members of their own families. I did not know the gentleman, so could not grasp him by the hand and thank him for his remark; but I felt that I had received my Christmas present, for the trainmen are the part of our family through which our guests, the public, receive the impressions on which they base their opinions regarding our entire family.

"Gentlemen, I cannot meet each of you personally to extend a Christmas greeting and godspeed for the New Year, so I am taking this means of grasping your hand and thanking you for your loyal co-operation during the past year. May Christmas Day bring added happiness to you, and may the new year continue to add happiness and prosperity for you and yours."

New Year's Greeting to New York Employees

T. P. Shonts, president of the Interborough Rapid Transit Company and the New York Railways, New York, N. Y., addressed the following communication to the employees of these companies on Jan. 1, 1914:

"Were it possible I should like to shake hands with each employee of the New York Railways on this the first day of the new year and extend to each, on behalf of directors, fellow officials and myself, not only our hearty congratulations and best wishes for the incoming year but our sincere appreciation of loyalty and co-operation in the operation of these properties during the past year; but as it is impossible to deliver this greeting in person, I wish to convey the same sentiments by means of this message to each fellow employee.

"Along with these sentiments there is one request which I would make of all employees, and that is that during 1914 they keep constantly in mind that one of the most important policies of the company is clearly and fully expressed in the words 'safety first.'

"The transportation business as an occupation is and always will be more or less hazardous, and I desire to remind each employee that he owes to himself, to his family, to his fellow employees and to the public the duty of doing at all times all that he can to make his employment and the operation of cars and trains as safe as possible. If this thought is kept constantly in mind, it is certain to result in greater safety to all."

Christmas Entertainment and Profit Sharing in Washington

More than 2000 children of the employees of the Washington Railway & Electric Company, Washington, D. C., gathered at the National Theater on Dec. 30 to participate in the thirteenth annual Christmas entertainment given by the company. There were doll babies for the girls, sleighs and skates for the boys, games for both boys and girls. Every child received a present. However, the part of the show which attracted most attention was the baby contest, a new feature of the Christmas entertainment. Ninety babies were entered. The children were carried to the theater in special cars, and tickets were furnished them for their return, it being impracticable to run specials for the return trip, owing to the heavy traffic in the late afternoon. Clarence P. King, president of the company, opened the festivities with a short address.

The sum of $30,081 was paid out on Jan. 2 by the company to its employees, the payment being the men's share under the company's profit-sharing plan of the profits for 1913. Employees to the number of 830 participated in the profit-sharing, the list including conductors, motormen, depot clerks, starters and other classes of employees. The checks, each representing one man's share of the 1913 profits, were accompanied by a personal letter from Mr. King. The profit-sharing plan was originated by Mr. King and was put in operation a year ago, when the sum of $19,123 was distributed among the employees. In explaining the profit-sharing plan Mr. King said: "The profit-sharing plan was founded on the experience of the year 1911, when 26 per cent of the car earnings (less 4 per cent District of Columbia tax) was paid out for trainmen's wages, accidents and damages, the company agreeing that should the 26 per cent amount to more than the said wages, accidents and damages for 1912 the surplus should constitute a profit-sharing fund and be distributed in cash at the end of the year. Under this plan each one-year man received Jan. 2, 1913, a check for $28.72. To-day it gives to the same man $42.53."

Through Service Between Buffalo and Rochester.—Through service between Buffalo and Rochester is to be established on Jan. 12, 1914, according to announcement by the International Railway, Buffalo, N. Y. A traffic agreement has been made between the International Railway and the Buffalo, Lockport & Rochester Railway.

New Ruling in Regard to Dogs on Detroit Cars.—Because of annoyances to which passengers have been subjected the Detroit (Mich.) United Railway has announced that after Feb. 1 no dogs except lapdogs will be permitted on limited cars, and dogs will be permitted only on the rear platforms of local cars.

Sunday Operation Authorized in London.—A by-law to authorize the operation of street cars in London, Ont., on Sundays was carried on Jan. 1 by more than two to one, despite the vigorous opposition of the Lord's Day Alliance and other religious bodies. The by-law will be ratified by the Council and the service will probably be inaugurated by the London Street Railway on the first Sunday in February.

Poem About Last Cable in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., is distributing copies of the poem, "Tribute to the Twelfth Street Cable Line," written by Walter P. Neff following the closing of the cable in Kansas City on Oct. 12. The poem was printed in the Kansas City *Daily Drovers' Telegram* and several thousand copies were reproduced by the officers of the Metropolitan Street Railway.

Warning Lights in Toronto.—The Toronto (Ont.) Railway has installed red and green lights at all intersections on its street railway system. The approaching car faces the green light. On through lines there are two of these lights. They tend to prevent the over-running of switches and indicate the corners to automobile drivers. The civic authorities have followed this up by painting the lower part of the globes of all the street lamps blue, thus giving a signal to all the automobile drivers that they are nearing a corner.

Safety Primer for Kansas Schools.—A safety primer for use in the public schools of Kansas probably will be adopted by the state textbook commission. It will include all of the warnings issued by electric and steam roads regarding the proper way to get on and off cars, danger of crossing the street behind a car and other points which have been embraced in the "safety first" movement of the past few years. The primers will be furnished free of charge to the children, according to present plans, and will be used in the lower grades chiefly.

Change in Fare at East St. Louis.—A circular issued by the East St. Louis & Suburban Company, East St. Louis, Ill., announces that the collection points between Collinsville and Edwardsville will be School House, Bucks and Cottonwood. This will increase the fare from Maryville to Edwardsville 5 cents. The circular explains that present zones for collection are in violation to the public utility act in that there is a discrimination in favor of passengers riding from Maryville to Edwardsville. The distance from the Y at Collinsville to Maryville is 3.91 miles; from Maryville to Court House in Edwardsville, 6.79 miles.

Detroit Accident Record for Year.—Announcement is made by the Detroit (Mich.) United Railway that of some 310,000,000 passengers carried last year on its city and interurban lines only two passengers lost their lives in collisions. Of forty-one so-called "street car" deaths in Detroit twenty-five were directly due to lack of care on the part of the victims themselves. Of the remaining sixteen fatalities, the report says, many of them cannot be listed as "unavoidable" because the exercise of precautions would have avoided them. The company is pointing to the number of avoidable accidents as a lesson to the public in the present "safety first" campaign.

Illinois Utilities Commission Enforces Anti-Pass Law.—The Public Utilities Commission of Illinois has interpreted a clause in the new public utilities law relating to issuing free transportation to the effect that it was intended that only police and firemen in uniform should be permitted to ride free and then only within the corporate limits of the city. In conformance with this interpretation the Chicago Elevated Railways served notice on the city of Chicago that the city employees' tickets must be redeemed at 5 cents instead of 4 cents per ticket as formerly has been the rule. The surface railways and the Illinois Central Railroad also served similar notice on the city that they propose to conform to the commission's interpretation of the anti-pass law.

Portland's Progress.—W. T. Buchanan, of the Portland Railway, Light & Power Company, Portland, Ore., contributed an interesting article, "Portland's City Transportation and Electrical Energy," to the Portland *Spectator* recently. In concluding the article Mr. Buchanan said: "Portland stands well to the forefront in its transportation facilities and in its supply of electrical energy. It is listed among the cities of the country where these two conditions for the operation of business are involved as standing well up in the front ranks, and all doubt as to Portland's ability to handle passenger traffic or the necessary power to run the factory has been wiped out through the foresight of the owners of the Portland Railway, Light & Power Company."

Transporting Letter Carriers in Seattle.—Following a conference recently between Postmaster Edgar Battle and officials of the Puget Sound Traction, Light & Power Company, Seattle, Wash., an agreement was reached whereby the order of the company requiring all employees of the post office to pay car fare will not be enforced until March 1. Under the old system the government paid for transportation at the rate of $50 annually for carriers on duty whose territory was more than 1 mile from the central office. Believing it to be impossible to make a flat rate in the future whereby under a $50 pro rata all post office employees could ride indiscriminately, the company notified the government some time ago that a change in the system must be made.

Handling Convention Crowd in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., received many compliments for the way in which it handled the recent Student Volunteer Convention. About 5000 college men, most of whom were unacquainted with the car routes, attended the convention. The company issued instructions to car crews to exercise special courtesy and stationed a number of guides at various points in the city. The guides were provided with cards, upon which they wrote information for the students in regard to transfers, the correct cars to use, etc. The information bureaus were maintained during the entire week of the convention. Many of the students were from foreign countries. Many Canadian dimes were offered to the company, while one student proffered Chinese money.

Accidents in New York.—According to the report of the National Highways Protective Society twenty-five persons were killed by automobiles in New York City in December. This makes a total of 302 killed by automobiles in New York City in 1913, of which number 149 were children. In 1912 the number killed was 221, of whom 103 were children. The number of automobile fatalities in December was five more than in the corresponding month of 1912, but thirteen less than November, 1913. Six persons were killed in December by the electric railways in New York City as against thirteen a year ago, making a total of 106 such fatalities as compared with 134 for 1912. In the State of New York, outside of this city, in December, nine persons were killed by automobiles, ten by electric railways and three by wagons. This makes a total for the year of 150 deaths by automobiles on the highways, seventy-nine by electric railway and thirty-two by wagons, as compared with 127 by automobiles, seventy-nine by electric railways and twenty-eight by wagons for 1912.

Municipal Railway Superintendent on Discipline.—The treatment of employees as men eager to "make good," quick to respond to sympathy and with a keen sense of justice was the keynote of an address on "The Welfare of Employees," by S. Doughty, superintendent of the Regina (Sask.) Municipal Railway, before the Engineering Society of Regina. Mr. Doughty said that the highest efficiency was possible only when the employee took a personal interest in his work. This could be obtained when the employer showed his men that he considered their welfare as well as the profits of the business. He cited the recreation room opened in Regina about a year ago and called attention to the care which the management directed toward the welfare of the men. Although a car mileage of 691,281 had been made, the amount paid out by the company in damages was only $84. Mr. Doughty recommended the adoption of the merit system and the rule that no man should be discharged without a thorough investigation of all the phases of the complaint against him.

Route Guide in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has issued a route guide to its street car lines. The guide is in the form of a booklet 2½ in. wide by 4 in. high, and contains 104 pages. The booklet is introduced with the statement that it is issued by the company for free distribution to the public, a list of the places being given where the guide can be obtained. The index affords, perhaps, the best idea of the scope of the subjects which the publication covers. The subjects follow: bureau of information, car sign system, chartered car rates, fare limits—suburban lines, index to routes, house-numbering plan, how to obtain copies of this guide book, how to reach points of interest, lost articles, pairing of streets, rates of fare, telephone numbers, Willow Grove Park. The routes in Philadelphia are all numbered and the destination of cars is indicated by signs giving the route number displayed on the cars. This is probably the most elaborate example in the United States of a route number guide published by an electric railway.

Buttons and Service Marks in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., issued an order recently eliminating brass buttons on uniforms. The order affects all of the 1800 carmen employed. The change, it was announced, was for the benefit of employees. Some of the conductors and motormen could afford only one suit of clothes or had their service hours so arranged that they could not change to citizen's clothes between runs. The brass buttons will be replaced with the ordinary black ones, and the men will not be conspicuous when attired in their uniforms off duty. Each employee heretofore has been decorated with ten buttons, which were the property of the company. In addition the order embraces the use of stars. Heretofore employees have received one star for every five years of service. In the future employees who have served more than five years and less than ten will be decorated with one star. When ten years is reached the star will be replaced by a gold button, which bears the number of years served. The button is somewhat like a lodge pin, is attached to the lapel of the coat and can be removed easily.

Safety Exhibit in Brooklyn.—At the monthly meeting of the Brooklyn committee of public safety, held on Jan. 3, 1913, it was announced that T. S. Williams, president of the Brooklyn Rapid Transit Company, had offered a special contribution of $1,000 to serve as a basis for the organization of a safety exhibit in Brooklyn. The primary impulse toward the proposed Brooklyn exhibition was the interest shown by the public in the exhibit of the Brooklyn committee of public safety and the Brooklyn Rapid Transit Company at the recent International Exposition of Safety and Sanitation devices at the Grand Central Palace, Manhattan, referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, page 1321. This initial Brooklyn safety exhibition will not be competitive in the sense that awards, diplomas or medals will be given to the different exhibitors, but will be arranged for the purpose of giving the people of Brooklyn, and especially the school children, a clearer idea of the work of the committee of public safety, and furthermore to afford the industrial interests of Brooklyn an opportunity to show to the public the work they are doing in their own plants to protect the lives and limbs of their own workers.

Decreased Accidents in Detroit.—Under the caption "Decreased Accidents," *Electric Railway Service*, which is published in the interest of the Detroit (Mich.) United Railway, says in part in the issue for Jan. 2, 1914: "It is very clear to the operating department of the Detroit United Railway that the near-side stop by street cars is one of the best moves ever made in the interests of 'safety first.' Police Commissioner Gillespie, who advocated the measure, and the Common Council that passed it deserve much credit. The near-side stop has effected a marked decrease in the number of accidents and particularly in the number of severe accidents. One marked improvement as a result of the near-side stop has been to make automobile drivers more careful. They are expecting to meet people coming from cross streets to catch the cars and hence are not crossing the streets with the old time speed when approaching street cars. And the beauty of the near-side stop is that it is in harmony with the operation of the traffic squad, which must continue to grow as the city grows. You obey the traffic signal and stop before you cross—not afterward. The near-side stop is a big factor in the 'safety first' of everybody."

Miraculous Escape of Child Struck by Car.—One of the local papers at Chickasha, Okla., describes in part as follows the miraculous escape without injury on Dec. 28, 1913, of a three-year-old boy who ran in front of a car of the Chickasha (Okla.) Street Railway: "The car struck the baby and he went down in front between the rails. He was rolled over and over beneath the car, but luckily always between the rails. He was picked up, lying on his left side with his head almost touching the east rail. His knees were doubled up in front of him, his arms folded and his entire posture was much as if he were asleep in his own bed at home. The child was taken into a neighboring house, where a hasty examination was made. Later he was taken home, where physicians attended him. Nothing but a scalp wound and a spot on the back of the head where a small section of the skin had been rubbed off could be found. The little fellow passed a comfortable night and no complications are expected." W. H. Wadsworth, superintendent of the Chickasha Street Railway, says that the car which struck the child was equipped with a Diamond single truck and GE-1000 motors. The greatest clearance possible as measured by Mr. Wadsworth was 5½ in. On Dec. 31 the child was apparently none the worse for his experience.

Helping the Farmer Market His Produce.—Believing that the development of interurban traffic involves careful and painstaking study of peculiar trade conditions which may affect the business, the Louisville & Interurban Railroad, Louisville, Ky., has been carrying on a campaign for business from the truck gardeners in the surrounding territory with interesting results. R. H. Wyatt, general freight and passenger agent of the company, found that Jefferson County growers, whose production of onions, potatoes and cabbage is one of the largest in the United States, insisted on hauling their goods to Louisville and delivering them in person to the commission houses, getting their money before turning over the produce. Personal investigation by the officers of the interurban company demonstrated that the farmer lost much valuable time in hauling and developed the fact that the farmers distrust the commission men and refuse to ship the goods on consignment. Mr. Wyatt has suggested the organization of an association of truck growers and the establishment by the association of its own commission house in Louisville, where an officer of the organization would handle the produce. The farmers are preparing to carry the idea out. Mr. Wyatt believes that when this is done the work which the company has been carrying on will be evidenced in a large increase in inbound traffic over the Louisville & Interurban Railroad.

Personal Mention

Mr. A. B. Tenney has been elected president of the Bristol & Plainville Tramway, Bristol, Conn., to succeed Mr. Miles Lewis Peck.

Mr. B. F. Wood, formerly an assistant engineer of the Pennsylvania Railroad, has been appointed chief engineer of the United Gas & Electric Engineering Corporation, New York, N. Y.

Mr. C. H. Tenney, of C. H. Tenney & Company, Boston, Mass., has been elected chairman of the board of directors of the Bristol & Plainville Tramway, Bristol, Conn., a newly created position with the company.

Mr. H. H. Vreeland, who was president of the Metropolitan Street Railway, New York, N. Y., which has been succeeded by the New York Railways, has been elected chairman of the board of the Royal Typewriter Company.

Mr. Orville F. Berry, who was chairman of the Illinois Railroad & Warehouse Commission, which has been succeeded by the Illinois Public Utilities Commission, has been appointed a special examiner with the Interstate Commerce Commission.

Mr. D. A. Hegarty has resigned as manager of the railway and electrical departments of the New Orleans Railway & Light Company, New Orleans, La. Mr. Hegarty has been connected with the company since July, 1911. Before that he was vice-president, general manager, treasurer and director of the Little Rock Railway & Electric Company, Little Rock, Ark. Mr. Hegarty has been connected with electric railway work since the pioneer days and for a number of years was stationed in New York as manager of the Railways Company General.

Mr. Thomas M. Jenkins, former general manager of the East St. Louis & Suburban Railway, East St. Louis, Ill., has been appointed general manager of the St. Louis & O'Fallon Coal Company, which was acquired recently by the Busch interests. Mr. Jenkins will serve as general manager of the mines and also will supervise the transportation of coal to St. Louis on the St. Louis & O'Fallon Railroad and the Manufacturers' Railway, St. Louis. Mr. Jenkins was also formerly connected with the Albany (N. Y.) Railway, now the United Traction Company, and was general manager of the Cincinnati, Newport & Covington Railway, Cincinnati, Ohio, and vice-president and general manager of the Danville Light, Power & Traction Company, Danville, Ky.

Mr. Ernest Gonzenbach has resigned as president and general manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis., following the sale of the controlling interest in the company to local interests in Sheboygan. Mr. Gonzenbach intends for the present to devote himself to the further development of a fruit and dairy farm on which he has lived for several years and on which he has been raising fine fruits and pure-bred dairy stock. He took charge of the property at Sheboygan on Jan. 1, 1905, as general manager. Later on he was elected treasurer of the company and subsequently vice-president, treasurer and general manager. He was finally elected president and general manager. He has been completely responsible for the management and operation of the company since that time. Mr. Gonzenbach was pleasantly surprised on New Year's Day by a call from a committee of employees who presented him with a solid silver table service. Mr. Gonzenbach acknowledged this gift in a card of appreciation which he addressed to each of the employees, stating that the success which he attained with the property was in great part due to the loyalty of the men who served under him. Mr. Gonzenbach is Swiss by birth and education, but came to this country immediately after leaving school. After an electrical experience in power house work in Chicago he completed the Thomson-Houston expert course at Lynn, Mass. In 1895, as electrical engineer in St. Johnsbury, Vt., he constructed several electric light and transmission plants in that vicinity. In 1898 he entered the employ of the Westinghouse Electric & Manufacturing Company, and in 1900 became electrical engineer of the Albany & Hudson Railroad, one of the early third-rail roads. Subsequently he accepted a similar position with the Aurora, Elgin & Chicago Railroad, then under construction, after which he was engaged for two years as consulting engineer, principally in the construction of the Youngstown & Southern Railway. In 1909 Mr. Gonzenbach was elected president of the Wisconsin Electrical Association.

Mr. Slaughter W. Huff, who, as announced in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, will be elected vice-president of the Brooklyn (N. Y. Rapid Transit Company and other companies in the Brooklyn Rapid Transit System to succeed Mr. J. F. Calderwood, was born in Virginia and was graduated from the electrical engineering course at Cornell University. He entered the electric railway field when it was practically in its infancy. His first experience was obtained in the shops of the Union Railway, Richmond, Va., at the time that Mr. Frank Sprague turned over his work to the local company. Subsequently Mr. Huff became general manager of the Raleigh (N. C.) Street Railway. He has been associated in various capacities with the Baxter Electric Railway & Power Company, Baltimore; United Railway & Electric Company, Baltimore; United Railroads of San Francisco and the Virginia Passenger & Power Company, Richmond, Va. He resigned as general manager of the last-named company in 1908 to become president of the Coney Island & Brooklyn Railroad, the controlling interest in the stock of which is now to be taken over by the Coney Island & Gravesend Railway, a subsidiary of the Brooklyn Rapid Transit Company. As president of the Coney Island & Brooklyn Railroad Mr. Huff had charge of a property with some 50 miles of track, reaching the principal points of Brooklyn and doing a large business to Coney Island in the summer. He became identified with the Coney Island & Brooklyn Railroad following a change in ownership and during his connection with the property the system has been very largely reconstructed and modernized. The property with which Mr. Huff now becomes connected constitutes a system of about 600 miles of surface single track and 71¼ miles of elevated single track, while the extensive subway system under the dual plan now under construction will add very considerably to this mileage.

S. W. Huff

OBITUARY

George Hendrie, the general manager of the first street railway to be built in Detroit, Mich., is dead. Mr. Hendrie was connected with street railway development in that city from 1864 to 1891.

W. E. Davidson, secretary of the Pearson Mexican corporations having head offices in Toronto, Ont., which include the Mexican Light & Power Company, Mexican Tramways and the Mexican Northwestern Railway, died on Dec. 25 on a steamer in the Gulf of Mexico.

Bernard Corrigan, who was president of the Metropolitan Street Railway, Kansas City, Mo., from 1902 to 1911, died of heart disease in that city on Jan. 6, after a few hours' illness. Mr. Corrigan was born in Canada in 1847 and settled in Kansas City in 1868 with his two brothers. The Corrigans entered the contracting field, and in 1875 Bernard Corrigan and one of the brothers acquired the old mule car system of Kansas City with the exception of the Westport line. This was owned by the late Nehemiah Holmes, father of Mr. Walter Holmes and Mr. Conway F. Holmes. In 1886 Mr. Corrigan and his brothers equipped the line which they had taken over with the cable and later sold the property to the Metropolitan Street Railway. The brothers then turned their attention to steam railroad construction work. Mr. Corrigan again re-entered the railway field in 1902, when he was elected president of the Kansas City Railway & Light Company, which holds all of the stock of the Metropolitan Street Railway and the Kansas City Electric Light Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported

RECENT INCORPORATIONS

***San Francisco Peninsula Railway, San Francisco, Cal.**—Application for a charter has been made by this company in California to build a 100-mile electric railway, some of it double-track, from San Francisco to Monterey via Watsonville.

***Illinois County Railroad, Centralia, Ill.**—Application for a charter has been made by this company in Illinois to build an electric or steam interurban railway to connect Irvington, Salem, Centralia, Central City, Junction City, Sandoval and Odin. Capital stock, $300,000. Incorporators: G. E. Ellis, R. A. Warner, E. E. Fyke, H. M. Warner and F. L. Pfeiffer, all of Centralia.

***Rochester & Hillsboro Railroad, Taylorville, Ill.**—Application for a charter has been made by this company to build an electric railway from Springfield to Hillsboro with a branch from Rochester to Taylorville. Capital stock, $100,000. Incorporators: Frank M. McGowan, Nathaniel J. Hamilton, A. Barker, M. D. Barker and Jesse H. Thomas, all of Springfield.

Madisonville-Nortonville Light, Power & Traction Company, Madisonville, Ky.—Incorporated in Delaware to build a 12-mile electric railway between Madisonville, Earlington, Mortons Gap, Barnsley and Nortonville in Kentucky. James Breathitt, Jr., Hopkinsville, is interested. [E. R. J., Jan. 3, '13.]

***Northwestern Electric Railway, Columbia, S. C.**—Incorporated in South Carolina to build an electric railway between Easley, S. C., and Augusta, Ga. Capital stock, $100,000.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Chartered in Texas to build an electric railway between Fort Worth and Denton. Capital stock, $500,000. Incorporators: E. E. Baldridge, N. Harding, George T. Reynolds and B. O. Smith, all of Fort Worth. [E. R. J., Dec. 20, '13.]

FRANCHISES

Dixon, Cal.—The Sacramento Valley West Side Electric Railway has received a fifty-year franchise from the Council on First Street in Dixon. This 160-mile line will extend through the west side of the Sacramento Valley. C. L. Donohoe, Willows, president. [E. R. J., Jan. 3, '14.]

Dixon, Cal.—The Northern Electric Railway, Chico, has received a fifty-year franchise from the Council on First Street, Dixon, provided the State Railroad Commission will allow the crossing of the Southern Pacific Railroad tracks in the north part of Dixon to be made at grade.

East St. Louis, Ill.—The East St. Louis Railway has received a twenty-year franchise from the Council on Natalie Avenue and Twenty-fifth Street to Jones Park in East St. Louis.

Galesburg, Ill.—The Rock Island Southern Railroad has received a franchise from the Council on South Kellogg Street from Berrien Street to Main Street in Galesburg.

Nowata, Kan.—The Union Traction Company has asked the Council for a franchise in Nowata.

Topeka, Kan.—The Topeka Railway has asked the Council for a franchise to extend its line from Washburn College to Seabrook.

Madisonville, Ky.—The Madisonville-Nortonville Light, Power & Traction Company has asked the Council for a franchise in Madisonville. James Breathitt, Jr., Hopkinsville, is interested. [E. R. J., Jan. 3, '13.]

West Monroe, La.—The North Louisiana Electric Railway has received a franchise from the Council in West Monroe. Negotiations are under way between this company and the City Council to have this railway enter Shreveport via the new bridge. This 120-mile line will connect Shreveport and Monroe via Homer, Minden, Ruston and West Monroe. A. B. Blevins, Shreveport, president. [E. R. J., Dec. 27, '13.]

Cape Girardeau, Mo.—The Cape Girardeau-Jackson Interurban Railway has asked the Public Service Commission for permission to build an interurban line between Cape Girardeau and Jackson, a distance of 5½ miles.

Middletown, Ohio.—The Dayton, Middletown & Cincinnati Railway has received a franchise from the Council in Middletown. E. H. McKnight, general manager. [E. R. J., Nov. 22, '13.]

Galt, Ont.—A by-law will be submitted on Jan. 15 authorizing the renewal of the franchise of the Galt, Preston & Hespeler Railway for twenty-five years with power to make certain extensions and improvements of its lines in Galt.

Portland, Ore.—George F. Heusner, Portland, who recently received a franchise to build an electric railway from Kenton to the West Side business district of Portland, has signed the acceptance of the franchise, which compels him to begin work within sixty days. [E. R. J., Dec. 6, '13.]

Oswego, Ore.—The Portland, Eugene & Eastern Railway has received a franchise from the Council in Oswego.

Bentleyville, Pa.—The Monongahela, Ellsworth & Washington Street Railway has received from the Council an extension of time on its franchise to complete its line in Bentleyville. James Bryant, Pittsburgh, engineer. [E. R. J., Sept. 6, '13.]

Chattanooga, Tenn.—The Chattanooga Traction Company has received a franchise from the Council in Chattanooga.

Tacoma, Wash.—Following the defeat of the $87,000 bond issue at a recent election, the City Council has introduced an ordinance for its first reading which announces an intention to build a tideflats electric line by the creation of a $35,000 fund. It has not yet been decided whether the line will be operated by the city or by the Puget Sound Electric Railway. The intention of the Council is to build this line at once.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—During the year it is planned to build about 1½ miles of new track in Little Rock.

Clear Lake Railroad, Lakeport, Cal.—During the year 23½ miles of new track will be built.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Final arrangements have been made by this company and the City Council for the extension on Washington Street to San Pablo Avenue in front of the new city hall in Oakland. The city will call for bids for the construction of the track and the traction company will supply the necessary connections at the terminals. When completed the tracks will be leased to the company.

San Diego, (Cal.) Electric Railway.—A 2½-mile double-track line will be laid through City Park during 1914.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Permission has been asked by this company to begin the construction of its line between Rio Vista and Red Bluff at a point in Solano County where the Oakland, Antioch & Eastern Railway crosses the proposed line and to build north from there through Dixon and Davis to Woodland, 31 miles. C. L. Donohoe, Willows, president. [E. R. J., Dec. 20, '13.]

Tampa (Fla.) Electric Company.—From 1 to 3 miles of new track will be laid in Tampa during this year.

Idaho Falls (Idaho) Electric Railway.—This company has received a certificate of public convenience and necessity from the Public Utilities Commission at Boise to build 34 miles of interurban lines out of Idaho Falls in two directions in the vicinity of Idaho Falls. James L. Milner, Idaho Falls, president. [E. R. J., Dec. 20, '13.]

Alton, Granite & St. Louis Traction Company, Alton, Ill.—A 1-mile extension of the city line in Alton will be built during the year.

Peoria, Galesburg & Western Railroad, Galesburg, Ill.—This company has filed with the recorder of Knox County a mortgage for $1,500,000 in favor of the Fort Dearborn Trust & Savings Bank, of Chicago, to secure a bond issue for the construction of the line to connect Peoria and Galesburg. William T. Irwin, Peoria, is interested. [E. R. J., May 31, '13.]

Iowa City (Ia.) Electric Railway.—From 1¾ to 2 miles of new track will be built in Iowa City during 1914.

Independence, Neodesha & Topeka Traction Company, Independence, Kan.—Work has been begun on the construction of a 17-mile section of this line between Independence and Neodesha. Robert P. Woods, Kansas City, engineer. [E. R. J., Nov. 15, '13.]

***Kansas City, Kan.**—E. G. Havens and G. C. Broudt, Kansas City, plan to build an electric railway between Kansas City and Topeka, via Lawrence. Most of the right-of-way has been donated. The present plans for the route are to parallel the Atchison, Topeka & Santa Fé Railway from Kansas City to Lawrence, where it will cross the Kansas River and run parallel with the Union Pacific Railroad tracks to Topeka.

Kansas Central Traction Company, Topeka, Kan.—Right-of-way has been secured and work has been begun on this 60-mile line to connect Coffeyville and Columbia via Edna, Altamont, Oswego, Hallowell and Sherwin. Philip Strack, Parsons, president. [E. R. J., Dec. 27, '13.]

Topeka (Kan.) Railway.—The West Eighth Street line extending to Summit Street, the city limits of Topeka, has been placed in operation. The line will soon be extended to Gage Park.

***New Orleans & Mobile Interurban Railway, New Orleans, La.**—Plans are being considered to build an electric railway to connect New Orleans and Mobile via Bayou, St. Louis, Pass Christian and Gulfport.

***Quebec Railway, Presque Isle, Maine.**—This company has received permission from the Railroad Commissioners to build a 100-mile electric railway through Aroostook County from Washburn westward to Wade and Portage Lake, thence to the Province of Quebec across the Allagash at the foot of Long Lake on a bridge 25 ft. high. From the Allagash it is to extend northwest to the St. John River and at Township 12, Range 15, it will cross on a 40-ft. trestle. Preliminary arrangements are being made and it is planned to begin construction in the spring. No names are yet given of those interested in the project.

Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich.—About 3 miles of new track will be laid during the year.

Electric Short Line Railroad, Minneapolis, Minn.—The 15-mile section of the line between Minneapolis and Long Lake has been completed and during the month the bridge over the Great Northern tracks at Long Lake will be completed and then 27 miles of new track will be placed in operation.

Minneapolis & Northern Railway, Minneapolis, Minn.—About 15 miles of new track will be laid during 1914 between Minneapolis and St. Joseph.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—The proposed extension of this company's line from Olathe to Ottawa will be built by a company to be incorporated as the Southwestern Electric Railway, according to present plans. W. B. Strang will apply for a charter for the new company in the near future.

United Railways, St. Louis, Mo.—This company is asked to consider plans to extend its Taylor line north to Broadway and its Grand Avenue line north to Broadway in St. Louis.

Springfield & Western Railroad, Springfield, Mo.—Preliminary surveys have been made from Mount Vernon west to Joplin via Stotts City, Clarkson, Sarcoxie and Duenweg. The total distance, including a 9-mile branch from Jenkins Creek to Carthage, is 54 miles.

***Billings, Mont.**—Surveys for a 68-mile electric railway to the mouth of the Big Horn Canyon have been made by the Big Horn Canyon Power & Irrigation Company in preparation for building a large dam.

Jamestown & Buffalo Street Railway, Buffalo, N. Y.—Surveys have been completed and part of the right-of-way secured to build this line to connect Falconer, Lavant, Poland, Kennedy, Ellington, Clear Creek, Leon, South Dayton, Fair Plain, Wesley, Persia, Gowanda, Collins, Lawtons, North Collins, Eden Center, Eden Valley, Water Valley, Hamburg and Buffalo. Among those interested are J. B. Anderson, Ellington; R. G. Crandall, Kennedy; F. E. Bard and Clarence G. Mead, Gowanda, and Frank N. Rowe, South Dayton. [E. R. J., Nov. 29, '13.]

New York State Railways, Rochester, N. Y.—Among the improvements planned by this company during the year will be to double-track the Euclid Avenue section of the Dudley-East Genesee line and to relay 8 miles of track.

Cape Breton Electric Company, Sydney, N. S.—Plans are being considered to extend this line into New Waterford.

Dayton, Middletown & Cincinnati Railway, Middletown, Ohio.—Surveys have been completed by this company for its line to connect Dayton and Cincinnati via Middletown. E. H. McKnight, Middletown, general manager. [E. R. J., Nov. 22, '13.]

Toledo Railway & Light Company, Toledo, Ohio.—During 1914 about 10 miles of track will be relaid in Toledo.

Ottawa & Morrisburg Electric Railway, Ottawa, Ont.—Work has been postponed until the spring on this line to connect Ottawa and Morrisburg. J. G. Kilt, Citizens' Building, Ottawa, president. [E. R. J., Sept. 13, '13.]

***Penetanguishene, Ont.**—The City Council of Penetanguishene is considering plans to build an electric railway to connect with the Canadian Pacific Railroad at Port McNicoll and has asked the Hydro-Electric Power Commission for plans and specifications.

Forest Hill Electric Railway, Toronto, Ont.—Plans are being made to begin work on this line in the spring. The first section to be constructed will be from the city limits of Toronto along Forest Hill Road to Eglinton Avenue and along Eglinton Avenue west. [E. R. J., Nov. 8, '13.]

Wayne County Traction Company, Honesdale, Pa.—The directors of this company have voted to extend this line from the city limits of Honesdale to Tanner's Falls, a distance of 6 miles.

Shippensburg, Newburg & Western Railway, Shippensburg, Pa.—Levi Weast has been appointed receiver for this company. An appraisement of the company's property will soon be made and it will be sold at public auction. This was a projected 13-mile line to connect Shippensburg, Middlespring, Newburg, McKenney and Roxbury. [E. R. J., Sept. 27, '13.]

Sioux Falls (S. D.) Traction System.—During 1914 this company will build 1 mile of new track in Sioux Falls.

Maryville-Knoxville Interurban Railway, Knoxville, Tenn.—The contract to build 12 miles of this railway between Knoxville and Maryville has been awarded to R. B. Oliver, Knoxville. Work will be begun at once. Morton Butler, Chicago, Ill., president. [E. R. J., Dec. 20, '13.]

Tennessee & Kentucky Railroad, Nashville, Tenn.—An application for a charter amendment has been made by this company to permit a change in the proposed route. The company was recently incorporated to build an electric line to Russellville, Ky., via Goodlettsville, Tenn., and now it is proposed to make Franklin, Ky., the terminus in place of Russellville. [E. R. J., Aug. 30, '13.]

Nashville Railway & Light Company, Nashville, Tenn.—This company has amended its charter so as to extend several of its lines in Nashville.

Texas Traction Company, Dallas, Tex.—Plans are being made to double-track and extend some of the lines in Denison.

El Paso (Tex.) Electric Railway.—Improvements which will entail an expenditure of $500,000 will be made by this company in the near future on its lines in El Paso.

***Meridian, Tex.**—The Meridian Chamber of Commerce and the Young Men's Business League of Waco are considering plans to build an interurban electric railway between Waco and Cleburne via China Springs, Valley Mills, Clifton, Meridian, Walnut Springs and Glenrose, a distance of 25 miles. Meridian proposes to provide right-of-way and a cash bonus. J. J. Powers, Waco, is interested.

Utah Light & Railway Company, Salt Lake City, Utah.—The 13-mile extension between Salt Lake City and Centerville has been placed in operation.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—During 1914 about 4 miles of new track will be laid between Eau Claire and Altoona.

Wisconsin Southern Railway, Fond du Lac, Wis.—This company will build 23 miles of new track during the year.

SHOPS AND BUILDINGS

Pacific Great Eastern Railway, Victoria, B. C.—Following the inauguration of the electric railway service in the north shore section of this company's lines on Jan. 1, the company has distributed material to build five new passenger stations which will be established along the line.

Rock Island Southern Railroad, Monmouth, Ill.—Plans are being made to build a new passenger station on Main Street in Galesburg.

Louisville & Interurban Railroad, Louisville, Ky.—This company has completed the construction of additional tracks at its freight terminals at Brook Street and Green Street in Louisville, giving it a capacity of twenty additional cars. It has also secured a permit to build a shed to cover the additional trackage and has acquired adjoining land for the purpose of constructing a new freight-handling station to be used exclusively for handling in-bound freight.

Worcester (Mass.) Consolidated Street Railway.—This company is asked to consider plans to build a new depot at Lincoln Square in West Boylston.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Plans are being made to build a new carhouse in West Federal Street on the site of the present building owned by the company in Lowellville. Additional land has been acquired and the entire lot will be used for the new structure.

Oregon Electric Railway, Portland, Ore.—Arrangements have been completed to begin construction at once on a new passenger station in Independence.

Seattle (Wash.) Electric Company.—A temporary depot will be built by this company on Third Street between Stewart Street and Virginia Street in Seattle.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—Plans are under way to build a new substation near the corner of First Street and E Street in San Bernardino. The cost is estimated to be about $15,000.

Morris County Traction Company, Morristown, N. J.—This company plans to build soon a new power plant in Morristown. The cost is estimated to be about $250,000.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is placing orders for a boiler room extension and other minor improvements in its Lowellville power plant. The company expects to purchase three 600-hp boilers, stokers, coal bunkers and miscellaneous boiler room equipment, also transformers and motor set.

Galt, Preston & Hespeler Railway, Ltd., Galt, Ont.—New transformers and a new rotary converter which will approximately double the present power capacity are being installed at the company's power plant in Galt.

Cleburne (Tex.) Street Railway.—Plans are being considered to build a new power plant in Cleburne.

El Paso (Tex.) Electric Railway.—Plans are being made to build additions to the power plant in El Paso.

Salt Lake & Utah Railway, Salt Lake City, Utah.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for six 250-kw, 750-volt d. c., three-phase, sixty-cycle, 1200-r. p. m., a. c. self-starting rotaries mounted on a common bedplate for operation in series at 1500 volts d. c.; six 150-kva, 44,000 to rotary voltage, single-phase, sixty-cycle O. I. S. C. transformers with triple secondaries, to operate any two or three rotaries at one time, and two switchboards for the above consisting of seven panels each.

Utah Light & Railway Company, Salt Lake City, Utah.—The new substation at Centerville has been placed in operation.

Manitowoc & Northern Traction Company, Manitowoc, Wis.—Plans are being considered to increase the equipment at this company's power house at Little Manitowoc in the spring. A new 110-ft. smokestack is being built at this power plant.

Manufactures and Supplies

ROLLING STOCK

Louisville (Ky.) Railway expects to build additional center-entrance trail cars this year.

Lackawanna & Wyoming Valley Railroad, Scranton, Pa., expects to purchase fifteen 100,000-lb. capacity self-cleaning coal cars.

Central Illinois Public Service Company, Mattoon, Ill., expects to purchase one double-truck, single-end interurban passenger car.

Portland (Me.) Railroad, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 29 as having ordered ten passenger cars from the Wason Manufacturing Company, has specified the following details for this equipment:

Seating capacity	44
Bolster centers, length,	18 ft. 8 in.
Length of body	30 ft. 8 in.
Length over vestibule,	41 ft. 8 in.
Width over sills	8 ft. ½ in.
Width over posts at belt,	8 ft. 1⅝ in.
Height, sill to trolley base	9 ft. 5 in.
Height from top of rail to sills	31½ in.
Body	composite
Interior	mahogany
Underframe	metal
Air brakes	G. E.
Bolsters, body,	wrought iron and steel
Brakeshoe	Brill
Bumpers,	Hedley anti-climber
Car trimmings	bronze
Center bearings	Brill
Couplers	Brill radial
Curtain fixtures	National
Curtain material	Pantasote
Destination signs	Hunter
Fenders or wheelgaurds,	Brill
Gongs	Dedenda
Hand brakes	Peacock
Journal boxes	Brill
Motors	G. E.
Push button signal	Consol.
Registers	Sterling-Meaker
Roofs	arched
Sanders	Kilbourn
Sash fixtures	tandem
Seats, style	Brill Winner
Seating material	rattan
Side Bearings	Brill
Springs	Brill
Step treads	Am. Mason
Trucks	Brill 51-E-1
Ventilators	Globe
Wheels	Griffin F. C. S.

TRADE NOTES

John A. Roebling's Sons Company, Trenton, N. J., has issued a New Year's circular letter to commemorate its seventy-fifth anniversary.

Philadelphia Toboggan Company, Germantown, Philadelphia, Pa., has issued a catalog describing its various types of carrousels, for use in amusement parks reached by electric railways.

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip with ventilators fifty of the new cars which are being built for the Montreal Tramways by the Ottawa Car Manufacturing Company.

American Abrasive Metal Company, New York, N. Y., at the first International Exposition of Safety and Sanitation held recently in New York, was awarded a gold medal diploma for its Feralun safety treads for anti-slip surfaces.

Steel City Electric Company, Pittsburgh, Pa., has appointed the George A. Schardt Company, Empire Building, Pittsburgh, Pa., as its sales representative in the territory comprising Pennsylvania west of Altoona and the State of West Virginia.

R. D. Nuttall Company, Pittsburgh, Pa., has appointed W. A. Allen, formerly with the Carnegie Steel Company, as commercial engineer. This company reports that a prominent road operating in the hills of western Pennsylvania has in service one of its untreated normal cast-steel gears that has made 583,000 miles and is said to be good for at least 100,000 miles more.

International Engineering Corporation, Ltd., of Toronto, has been organized with main offices at 49 Exchange Place, New York, N. Y. The officers of this new organization are: President, J. W. Burke; vice-president, T. C. Gillespie; secretary, H. P. Du Bois; treasurer, H. M. Lloyd. Contracts have already been taken for the extension and electrification of the Quito (Ecuador) Tramways.

Lord Manufacturing Company, Brooklyn, N. Y., announces the resignation of W. R. Garton, its vice-president and general manager. Mr. Garton has been active in the electrical field for many years. He began in the construction and operation of telephone, electric light and railway properties and has given much time to the supply and manufacturing business. His temporary address will be 851 East Nineteenth Street, Brooklyn, N. Y.

ADVERTISING LITERATURE

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder entitled "The Management of Men" in connection with its fare registers.

B. G. Marshall has issued a reprint from the *Architect and Engineer* entitled "What Makes Iron Rust," which points out the chemical conditions in impurities of iron and steel products which tend to invite electrolysis and consequent corrosion.

H. M. Byllesby & Company, New York, N. Y., engineers, have issued a card describing the extent of their engineering interests. This company is retained permanently in a consulting and supervising capacity by thirty-five electric, gas, street railway, telephone and water works properties operating throughout the United States.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Circular No. 1104, describing its complete line of portable meters. Another catalog, issued in conjunction with the Baldwin Locomotive Company, describes the construction details of electric mine locomotives, including controllers, circuit-breakers, trolleys and gathering reels. These mine locomotives are manufactured in four different types, as follows: traction wheel gathering locomotives, tandem, three-motor gear and side-rod locomotives.

Illinois Appoints Public Service Commission

The five members of the new State Public Service Utilities Commission of Illinois have been appointed by Governor Dunne. James E. Quan, of Chicago, the chairman, is a personal friend of the Governor and has been engaged in the wholesale grocery business. His present appointment is his first public office. He is a Democrat. Richard Yates, of Springfield, lawyer, is fifty-three years old and was Governor of Illinois from 1901 to 1905. He is a Republican. Frank H. Funk, of Bloomington, was formerly State Senator. He was the Progressive party candidate for Governor in 1912. Walter A. Shaw, of Chicago, is a civil engineer and a member of the Western Society of Engineers and the American Waterworks Association. He has been a member of the Rivers and Lakes Commission of the State and has been president of the American Engineering & Construction Company of Chicago. Mr. Shaw obtained his college degree as civil engineer from Valparaiso University. He has done engineering work in connection with sewerage in Chicago and Louisville. He is a Democrat. Owen P. Thompson, of Jacksonville, is a lawyer and resigned as presiding justice of the Fourth Appellate District of the State to accept appointment as a member of the board. He is a Democrat.

The commission will have headquarters in Springfield, but will also have an office in Chicago and will divide its time between the two cities. The first complaint received was from the city of Springfield, which seeks a reduction in the gas rate from $1 to 80 cents per 1000 cu. ft.

No Bids Received to Construct Chicago's Municipal Subway

Proposals to construct, equip and operate rapid transit subways in the city of Chicago were advertised to be received up to Jan. 5, 1914. On the date the bids were to be opened none had been received. In fact, the only communication on the subject obtained by the Harbor and Subway Commission was an offer to bid on the municipal subways by an English construction company. This failure of the subway system recommended by Mayor Harrison to attract private capital gave new impetus to the movement for a limited subway for the use of surface lines as recommended by Bion J. Arnold.

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

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PLANS FOR THE MIDYEAR MEETING Plans for the midyear conference of the American Electric Railway Association are well toward completion and promise good results for member companies and the industry as a whole. Some friends of the association regard the midyear conference as the most effective of its functions. If not entitled to that rank, it is at least an invaluable extension of the work which strengthens and emphasizes the accomplishments of the annual meetings. The committee has selected subjects of leading importance that have not been worn threadbare by long-continued discussion and yet are of practical as well as of economic concern. The association is greatly to be congratulated on the acceptance of its invitation to speak by a State commissioner who has been so active in the development of regulative policies as has Mr. Erickson of Wisconsin. The companies have not brought themselves immediately or easily to accept regulation. They have much to learn from commissioners in regard to the policies and laws which must be enforced. The commissioners also have something to learn from the companies in regard to the real problems which hamper their operations and growth in these days. But the companies and the commissioners need to co-operate if the public is to receive the service to which it is entitled.

A STUDY IN ELECTROLYSIS ELIMINATION The report of the test on a system of insulated negative feeders which is published elsewhere is a worthy sequel to the remarkably clear discussion on methods of mitigating electrolysis presented in our issue of Jan. 3. The authors, Messrs. Rosa, McCollum and Logan, are eminently qualified for an expression of opinion in the matter not only through professional experience but because they are in the unique position of having no axe to grind notwithstanding the wall of conflicting interests which has in the past usually obscured the essential features of the problem. In consequence their championship in general of the insulated negative feeder system must be viewed with respect, and, indeed, the results of their test show beyond doubt that, under the conditions existing at the substation in question, this system is infinitely superior to any yet proposed. It may be that at old substations or power plants where considerable uninsulated copper already exists, possibly in unknown locations, the insulated feeder system might not show such advantages. However, where a new substation is being built it seems certain that the latter system may be made practically to eliminate electrolysis damage at a cost which is, at least, not prohibitive. Apparently, its one objectionable feature, that of having a considerable difference in potential between the negative bus and the track outside of the station, involves no real difficulties aside from the fact that it is rather a startling novelty.

MR. SAGUE'S CRITICISM OF COMMISSIONS Mr. Sague, of the New York Public Service Commission, Second District, made a constructive criticism of regulating commissions at the meeting at the Stevens Institute of Technology which is reported elsewhere in this issue. Mr. Sague thinks that there are far too many laws, too many orders and too little patient study of corporations. He attributes the lack of success which has often attended the work of commissions to failure to develop along these lines and to a tendency to substitute court methods for informed study and investigation. Mr. Sague is competent to pass this criticism. He was appointed to the commission by Governor Hughes in 1907. He entered office when the country was watching with keen interest to see what New York would accomplish under its strong law and the guidance of its reform Governor. The commission developed until it was one of the strongest in the country, though the appointments of subsequent Governors deprived it of this standing. Its work has been effective in many ways, and some of its greatest accomplishments have been carried out in informal hearing or negotiation, not loudly advertised. Mr. Sague's well-founded criticisms are just as appropriate for the entire legislative situation as for regulating commissions. Laws and orders have come down in a flood. Almost all the commissions and legislatures swelled the volume. It is a fair conclusion to say that if there had been fewer laws and orders there would have been a more salutary treatment of corporation affairs and troubles. The present need of the corporations is that business may have time to rest and grow strong. A long spell of relief from laws and orders will help to restore normal conditions.

PHILANTHROPIC DONATIONS BY RECEIVERS

An interesting illustration of the breadth of view that may be adopted by a federal court in dealing with the expenditure of a public utility under receivership is shown by the recent action of Judge Hook in the United States Circuit Court at Kansas City. Upon the petition of sixty-four taxpayers and patrons of the street railway system in Kansas City he authorized the receivers of the old Metropolitan Street Railway to make a contribution, not to exceed $1,000, for the Seventh International Student Volunteer Convention. Charitable contributions by public utility corporations have heretofore been permitted under even the most stringent commission laws when they represented the exercise of benevolence for services rendered to the community as a whole. The value of such expenditures is undeniable from the standpoint of the public weal and the increased popularity accruing to the donating corporation, and when the company is under the control of the stockholders they, through the board of directors, are in general free to make outlays for charity and will receive legal sanction for so doing if the donations are really for the public benefit and do not involve any particular discriminations. When a public utility corporation has been taken out of the hands of the stockholders, however, and placed under receivership for the bondholders, the situation is changed. The property now is in the hands of the court and the receivers for operation and management, but it does not belong to them; it is held in trust for specific purposes for which they are accountable to the bondholders. For this reason the discretion in regard to philanthropic expenditures which is recognized in the case of managing officers chosen by the owners of a corporation is, we believe, rightfully limited in the case of receivers holding trust funds or operating a property in trust. No matter how much a philanthropic enterprise may meet with their personal sympathy and approval, they have no legal or moral right to dispense the property of others in support of it for purely charitable reasons. Of course, in the case of a great emergency or calamity, when it is reasonably certain that the entire body of bondholders would approve a disposition of a portion of their property for charitable purposes, an exception might be allowed.

When this question of charity, however, is viewed by the receiver from a business viewpoint, paradoxical as that may seem, a different condition arises. For instance, the petitioners mentioned above showed that the convention in Kansas City would mean an influx of about 8000 delegates and an increase of approximately $20,000 in street railway receipts from non-resident patrons. In view of this the expenditure of $1,000 was viewed by the court as one consistent with sound business policy. It may be repugnant to some thus to commercialize this contribution to the Student Volunteer movement, but this one fact must be remembered: Receivers are not free agents. They are authorized to conserve the assets of a property, liquidate the liabilities and use all legitimate means to advance the business of the road, and only when a philanthropic expenditure will aid in so doing are they justified in expending any funds intrusted to them. Whether the receivers shall trust to their own business judgment to settle this point, or whether, as in this recent case, it shall be put up to the court, is another question, but inasmuch as the court must finally review and pass on the accounting of the receivers, it is not unwise policy to settle the question of business expediency before the expenditure is actually made.

PLANNING SHOP AREAS

When a company wishes to enlarge its car maintenance facilities or to create an entirely new layout it is customary to study the practices of other railways, more especially by comparing the areas used for specific purposes. Unless, however, the conditions at each installation are fully understood, this method may lead to very erroneous conclusions. For instance, since most large city systems are consolidations, the shops taken over are rarely best adapted for the conditions created by the merger. Two, three or even four buildings may be on hand, all designed as self-contained shops. The consolidation usually means the abandonment of some buildings and the reconstruction of others, but even then the net result is likely to differ greatly from what it would be if the whole car maintenance system could be laid out anew. Another very important variation in shop areas arises from differences in maintenance policy. Where the carhouses are in charge of the transportation department there is a natural tendency to keep the cars in service longer than the mechanical department considers desirable, particularly when there is a heavy demand for cars. Again, the older carhouses were not generally equipped for anything but ordinary inspection and lubrication, but many carhouses of recent years embody one bay for a variety of replacement work. A crane or even a jib hoist in such a bay permits the interchange of wheel sets, the exchange of motors, etc. Hence on a system with such carhouses the truck and other overhauling sections of the main shop are much smaller than if the car stations were merely inspection centers.

One great advantage of the maintenance carhouse policy is that the main shops may be placed in some most favorable layout far from the center of the town because dead mileage is negligible when every car comes in but once every 50,000 miles. Since the areas required for each branch of car maintenance may vary so greatly, it would possibly prove better to calculate car shop requirements by first determining appropriate inspection and overhaul mileages for each class of equipment, based on the practices of the best systems as modified by home environment. Then, for any given number of cars, it should be easy to determine, for instance, how large the paint shop must be to bring the cars in for the normal period of ten to fourteen days. Further, the area of this particular shop would be influenced also by the adoption of some time-saving process like electric drying. On the same principle, truck shop areas could be reduced to a minimum by such means as car-transporting cranes and a large reserve stock of trucks and electrical equipment. In the shop of one company with such reserves, overhauled cars never stay in for more than twenty-four hours except for painting or special damage to car body. Finally, it should be observed that where intermittent manufacturing is carried on the amount of space set aside for such work is often too large to make manufacture an attractive proposition unless cheapness of land is a big factor in keeping down the overhead charges. The foregoing points are only a few of those which affect the question of shop area, but they will suffice to show that the space requirements should be studied along scientific lines rather than to follow heedlessly the practice of others.

ECONOMIES IN PERMANENT WATERWAYS

In the early days of electric interurban railway construction, and, in fact, on a few of the electric lines built at the present time, openings for waterways under the track, as well as highway and other overhead crossings, are provided with temporary structures. This probably was a wise policy in the past inasmuch as the earning power of projected lines was a questionable quantity. To-day, however, the construction of electric interurban railways has reached a point where it is possible to predetermine with a certain degree of accuracy the probable earnings of a line built between any two points. With figures of this kind it is possible also to determine how much may be spent for track and roadway without affecting the property as a paying investment. No doubt, this ability to anticipate probable revenue partly accounts for the more permanent character of construction used on most of the interurban roads built within the past few years. On the other hand, these predetermined limits on other lines also explain the cheaper type of construction employed by them. In either event, however, after a property has been in operation sufficiently long to show that it is a permanency, no economical reason can be offered satisfactorily to explain the continuance of temporary structures in the track after those originally installed have reached the end of their physical life. Nevertheless, many electric roads are making little or no effort to replace these structures with permanent ones. The only reason which can be advanced is that they have been so busily engaged in increasing efficiency in other departments that they have not taken time to analyze carefully the savings possible in the replacement of temporary structures with permanent ones.

By temporary structures we mean wooden trestles and bridges of various types, the life of which approximates seven to ten years. At the close of this physical life period a company must either replace all the timber in the structure or a large portion of it. The cost of rebuilding under traffic is high; in fact, careful checks show that it is about twice the first cost of a structure. If a considerable section of an electric road was constructed during any one year, so that the periods for the time renewals in a considerable part of the temporary structures fall at about the same time or during the same year, the task of maintaining the structures in operating condition until the renewals can be made is almost impossible. That is to say, it will be found almost impracticable to employ a force of men sufficient in size to make all the renewals at the time they are required and dangerous conditions may arise before temporary repairs can be made.

On the other hand, if the temporary structures were replaced gradually with concrete arches or steel and concrete arches, their maintenance would be practically eliminated, and in time all structures would be replaced with permanent ones without unduly reducing the net during any one year. At the same time the new permanent structures would provide clear waterways which would not gorge with drift and floating ice during flood periods, and the cost of clearing these passageways would be released for further permanent improvements.

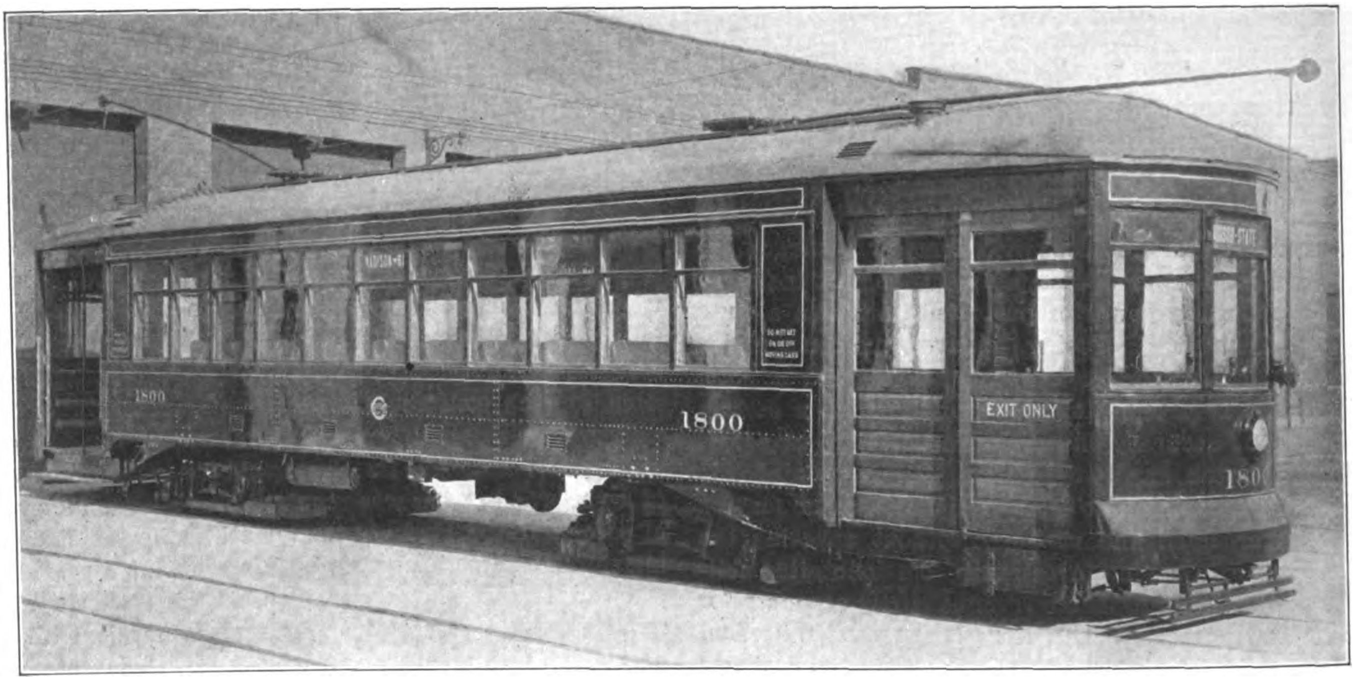
No doubt, the temporary structure serves its purpose in more ways than in keeping down the first cost when there is an element of doubt as to a road's earning power, because it permits a more careful study of waterway requirements. If it were not possible for the construction engineer to compare any waterway with another structure spanning the same watercourse near by, its size would be more or less of a guess as to what was required plus a large factor of safety. But a study of the quantity of water flowing through these temporary openings during a period of several years should permit a careful analysis of requirements, and certainly during the physical life period the maximum stream flow condition is apt to arise.

Other factors affecting the life of temporary structures include fire hazard, which results not only in the loss of the structure but in serious interruptions to traffic as well. A few electric interurban roads built within the past two or three years have adopted creosoted timber for trestles in place of the ordinary seasoned timber, and there is no doubt that a longer life will be obtained from structures built in this manner. Increased fire hazard enters as a factor in the employment of this type of material in waterways, however, and it does not appear to be seriously considered. In the hot summer months during a first few years of service of a creosoted timber structure the volatile quality of the creosote oil makes it highly inflammable. In the end, too, the creosoted timber trestle is only temporary and must be replaced. While first cost is a consideration in all betterments, ultimate economy in operation will never be attained if it is permitted to control all operating expenditures.

The 1913 Motor Cars of the Chicago Railways

A Description of Some of the Principal Features Entering Into the Construction of These New Arched-Roof, Light-Weight, Low-Step, Double-End Cars, Which Are Now Being Delivered for Service

The first of the 200 low-step, double-end, arched-roof motor cars are now being added to the rolling stock of the Chicago Railways Company. A description of the general arrangement and some of the design details was contained in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 9, 1913, on page 230, but other interesting features have been added to these new cars during the process of construction which should be of general interest. A careful check of all the weights of material entering into the construction of the new two-motor car shows that a reduction in weight of more than 10,000 lb. has been made over the 1911 arched-roof four-motor car. This was done despite the fact that the new cars are 3 ft. 5 in. longer than the 1911 type, being 48 ft. 5 in. as against 45 ft. over-all length.



New Chicago Railways Car—General Side View

During the construction of these cars in the Chicago Railways' shops, every item entering into them was carefully weighed and the results from an average of ten cars appear on page 114.

The underframes for the 100 cars built by the railway company, the fifty built by the Southern Car Company and the fifty built by the American Car Company were furnished by the American Bridge Company's Chicago plant. The designing of these underframes was made as simple as practicable, consistent with the desired strength, to reduce the cost of fabrication to a minimum. As noted in the previous description, the underframe is of the side-girder type, with the girder plates forming the outside sheathing of the car body. One feature of the design in the underframing differing from former cars is the method of fastening the knee braces to the side girders. These braces are formed of reinforced channels swung from the bulkhead cross-sills and bolted to the bottom of the side girders. In the former designs the knee braces were riveted to the inside of the side girders. This threw the rivets in shear and at the same time did not readily permit adjustment for sagging in the vestibule. Bolts are used in attaching the knee braces to the underside of the side girders so they may be readily adjusted in case the vestibules do sag, it being necessary to loosen the bolts and insert shims.

BODY CONSTRUCTION

Careful consideration was given to the design of the body to obtain wide aisles and wide seats, particularly at the passengers' hip line. The aisle width in the finished car is 25 in. between end seat plates, but further effective aisle width was obtained by offsetting the seat backs 2 in. While quite a study was being made to obtain the wide aisle, the mechanical department did not lose sight of wide, comfortable seats. These are 36½ in. over all, and this length was obtained by making the sides of the car as compact as possible, especially to permit of a wide car at the seated passengers' hip line. To accomplish this the inside finish is set back of the post line, thus reducing the thickness of the sides of the car body to 1 7/16 in. and at the same time adding effective width to the seats. While the over-all thickness in the sides is of a minimum dimension, this did not hinder it being arranged for complete ventilation. Openings at the side sills and posts permit free circulation of air around these members to the window sill, thus removing conditions conducive to early destruction of the members by decay. This arrangement made it necessary to weatherproof ventilated areas in the car sides with heavy felt paper.

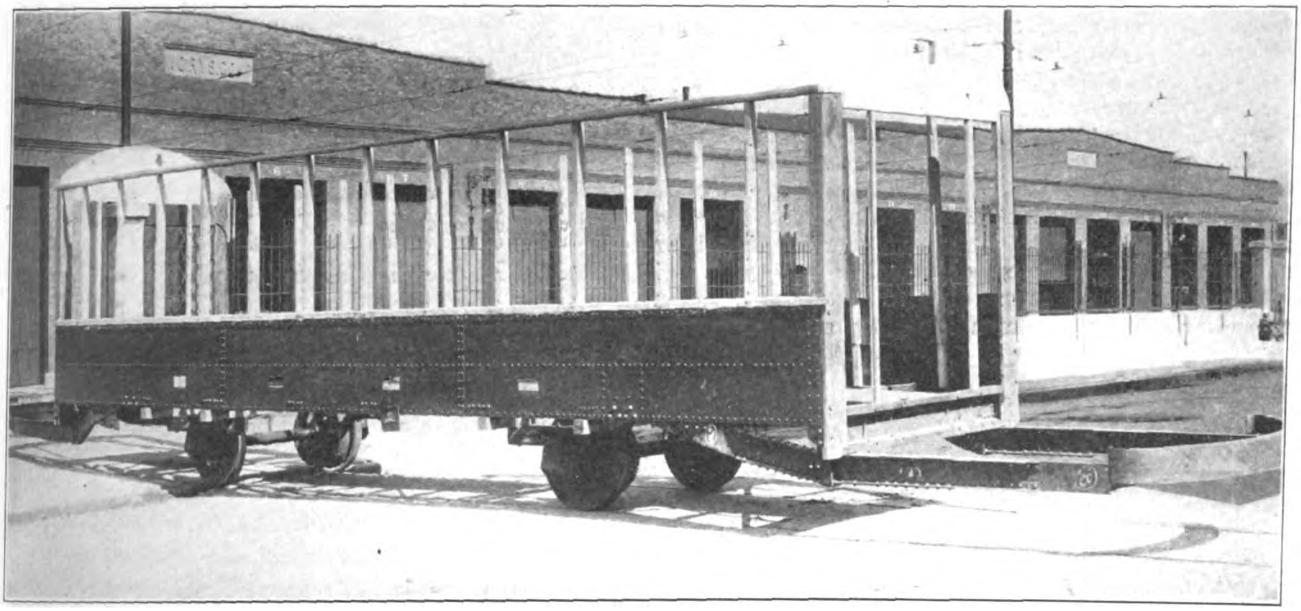
The car floor construction is also quite unusual, but this is another result of the careful study of the weight question. The car floor is built of a single thickness of ⅞-in. matched flooring under the seats, and that in the aisle is doubled in thickness by wooden floor mats. The single floor is insulated with a heavy two-ply felt paper, cleated up with light wooden strips. Over this paper a heavy coat of paint has been applied to increase its waterproof qualities and provide extra insulation.

Other construction features in the car body include a careful study of the installation of the auxiliary equipment on the underside of the car floor. The location of each item was selected after a careful estimate of the moments so that the complete installation would balance around the longitudinal and transverse axes of the body. The small deflecting gutter over the entrance and exit doors was formed by setting a strip of poplar in a heavy coat of white lead on top of the canvas roofing. Usually this gutter is formed of metal set on the canvas. The wooden strip, however, has been found just as effective and much cheaper.

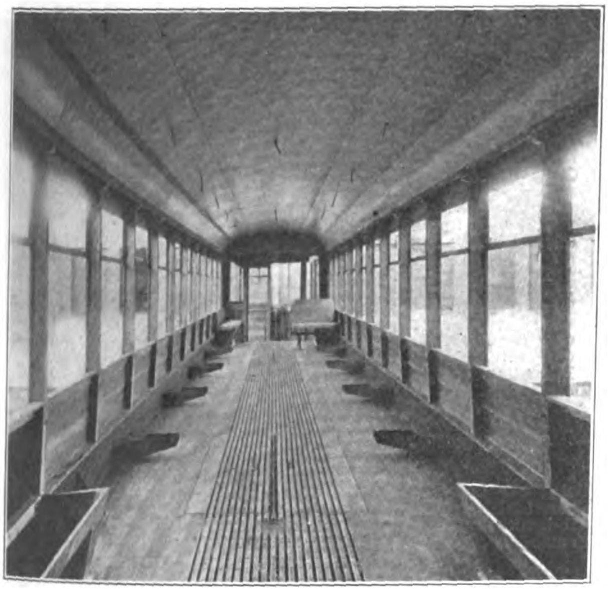
During the period these cars were under construction in the Chicago Railways' shops it was desirable that the bodies should be made portable, and at the same time the weight had to be kept down to a point where it was possible to move them by hand. To meet this requirement, the bodies were mounted upon temporary trucks composed of old wheels mounted in a wooden frame.

Low steps in double-end cars require a very careful study of every item affecting their height if the minimum is obtained. This was especially true of the Chicago Railways cars which have a total height at the center of the car floor of 37 in. above the rail. The height of the first step above the rail is 13 in. and that to the platform is 11 in. A 10½-in. riser at the threshold plate and a 2½-in. ramp from the bulkhead to a point in the floor over the bolsters, a distance of 5 ft., makes up this total height. The slight pitch of the ramp is scarcely noticeable to passengers entering or leaving the car. To obtain this over-all dimension, it was also necessary for the mechanical department to avail itself of the minimum over-all dimensions in the design of the trucks, motors and bolsters. By the use of a 32-in. driving wheel instead of a 34-in. wheel which has been standard on the Chicago Railways, an additional reduction of 1 in. in height was obtained.

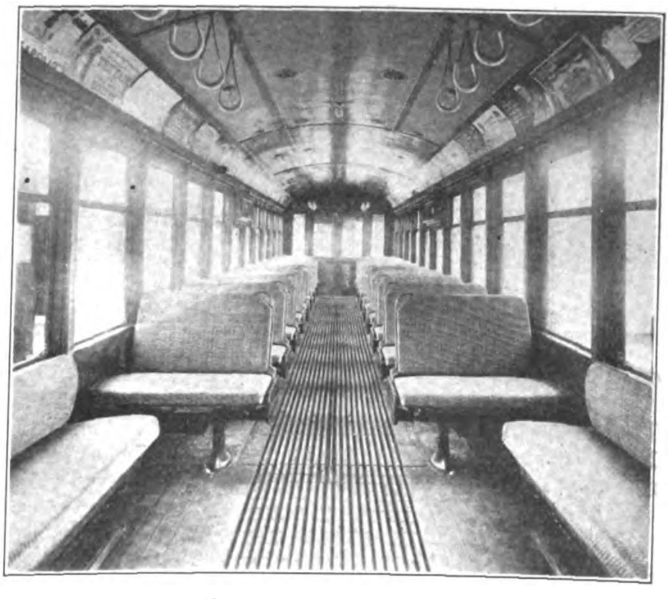
The trucks are of the Brill 39-E type designed with an improved brake rigging and a new feature in the arrangement of the springs. Small coil springs, which are set between the half elliptic and the spring plank, materially add to ease in riding. With the light loads, the small coil spring is in action, but as the load increases it is compressed into a pocket casting, which in



New Chicago Railways Car—Side View of Framing on Temporary Shop Trucks



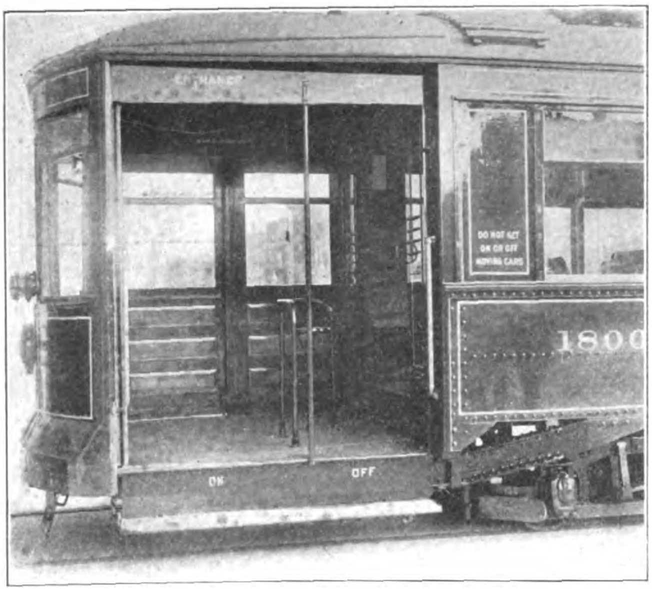
New Chicago Railways Car—Interior, Showing Air Ducts



New Chicago Railways Car—Interior of Completed Car turn transmits the total load to the half elliptic. These trucks are also equipped with McCord journal boxes cast with hardened wear pieces in the sides of the box. Renewal wear pieces are riveted to the sides of the journal box yokes in the truck side frames.

A new type of Westinghouse field control, 534 Y-1 motor was purchased for these two-motor cars. It has a less over-all height than the older types and consequently provides better clearance between the motor housing and the rail. The minimum clearance point, however, is at the gear case which is 3½ in. above the top of the rail. This motor was adopted not only because it gave proper clearance but as a result of a careful study of its adaptability to the service requirements. Before it was definitely selected sample motors from each of the manufacturers were installed on regular cars to determine just how they would meet actual operating conditions. From the data obtained in these tests the mechanical department was able to determine the exact requirements necessary to make the new two-motor equipment meet the same service conditions as the former four-motor equipment.

The field-control feature enabled the motor designers to meet all the requirements, as it permits high speed on the last controller points, which under Chicago operating conditions reaches a maximum of 25 m.p.h. The gear ratio used in conjunction with these motors is 15-69 three-pitch. The motor equipment was tested not only for ordinary service conditions but was tried on the heavy grades approaching the tunnels under the Chicago River. These grades vary from 9 to 11 per cent, and tests of the two-motor equipment for starting and stopping on these heavy grades demonstrated that it was adequate from a tractive standpoint.



New Chicago Railways Car—Rear Platform

SAFETY APPLIANCES

Another interesting feature in the construction of these new cars is the practical application of safety-first principles in their design. A number of new departures in the design of the air-brake equipment were included to accomplish this end. They are the National Brake & Electric Company's A-6 type, a new design with an 18-cu. ft. capacity compressor, and other features in line with modern light-weight car construction. One of the innovations used in connection with this air-brake equipment is an emergency valve which makes it possible for the motorman to get an emergency application at the brake valve, the air being taken directly from the reservoir. At the same time the brakes are applied sand is automatically deposited through air sanders. In addition to these conductors' valves are placed in each vestibule so that an emergency air application may be made by him if necessary.

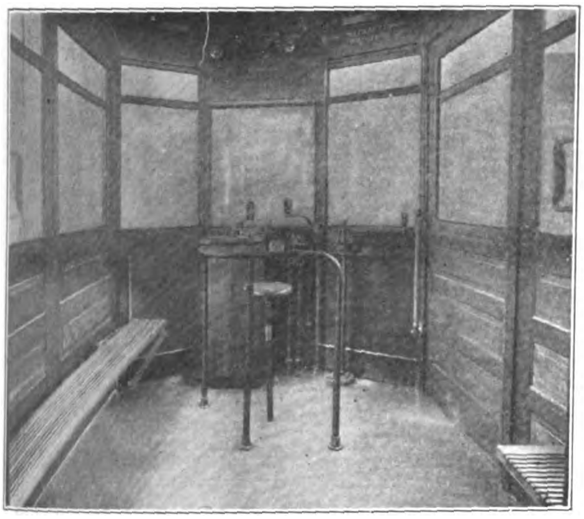
TABLE SHOWING WEIGHT ANALYSIS OF 1913 CLOSED MOTOR CARS OF CHICAGO RAILWAYS COMPANY; FIGURES REPRESENT AVERAGES FOR TEN CARS

	Pounds		Per Cent	
Steel Underframe:				
Body portion	3,360		9.5	
Platform portion	1,290		3.6	
Total		4,650		13.1
Car Body:				
Floor sills and flooring	1,169		3.3	
Side frames, including corner posts, top plates, window guards, curtains, etc.	2,034		5.8	
Bulkhead structures	501		1.4	
Bulkhead doors, including tracks, rollers, etc.	239		0.7	
Roof, trolley boards, head lining, etc.	1,230		3.5	
Total		5,173		14.7
Vestibules:				
Platform sills, crown pieces and flooring	727		2.1	
Posts, framing and dashers	1,209		3.4	
Hoods	284		0.8	
Doors, door and step operating mechanism, steps and platform seats	946		2.7	
Total		3,166		9.0
Car Apparatus and Fittings:				
Body seats	1,634		4.6	
Hand brakes, including rigging	359		1.1	
Destination signs and boxes	110		0.3	
Ventilating motor, fan, ducts and louvers	243		0.7	
Drawbars, hooks, drawhead, etc.	153		0.4	
Register mechanism	71		0.2	
Fenders and fender gates	276		0.8	
Heaters, buzzers, trolley bases. poles, lights, wiring, etc	1,139		3.2	
Conduit	216		0.6	
Miscellaneous (trolley catchers, bells, ropes, gongs, etc.)	79		0.2	
Total		4,280		12.1
Electrical Equipment:				
Motor wiring	148		0.4	
Conduit	271		0.8	
Controllers and resistances	776		2.2	
Motors (two), including pinions	4,825		13.6	
Gear cases	185		0.5	
Total		6,205		17.5
Air-brake equipment, including foundation brake rigging and piping	1,712		4.8	
Total		1,712		4.8
Trucks:				
Truck frames, axles, wheels and boxes	9,316		26.4	
Gears	475		1.3	
Guards	46		0.1	
Miscellaneous parts	335		1.0	
Total		10,172		28.8
Grand total	35,358	35,358	100	100
SUMMARY				
Total car body		17,269		48.9
Electrical equipment		6,020		17.0
Air-brake equipment		1,712		4.8
Trucks		10,357		29.3
Total weight		35,358		100

A number of safety appliances were also incorporated in the foundation brake apparatus under the car body. One of these includes the pull-rods and the tie-rods, which have been boxed over at their connections to the brake levers. In case the pin connections break, the air-brake apparatus is left operative, as the loop or boxed-over end of the rod holds it in position. In order to fix the position of the pull-rods and tie-rods on the brake levers, however, bolts are inserted in the lever on each side of the point of connection. These are so spaced as not to interfere with the normal operation of these rods and levers, but in case of a pin connection failure the rods are held approximately in their proper position on the levers. As a precaution against a broken pull-rod, stops have been placed on the foundation brake lever carrier, against which the released lever catches, thus permitting the unbroken pull-rod to be operative. Along this same line the fuse boxes which are installed on each side of the car under the sills have "Safety First" stenciled in white on the covers. This is to remind the motorman that he must be sure of the position of his circuit-breaker or trolley before renewing the fuse.

Following the standard Chicago practice, a single sliding door is provided on the exit side of the front platform, unlike former designs, but it is connected to the step, which raises when the door is in the closed position. Another departure from former standards was brought about by the careful study of weights and their reduction. The sliding door does not recede into a pocket, but the partition forming it has been removed and the exposed door slides along the side of the vestibule. A two-piece folding door is provided on the opposite side of the platform, and this opens and folds against the controller. It differs from the design used in the older types of cars, which were four-piece. The installation of a long slatted seat, so placed and connected that when the door is in the closed position the step is raised, also represents a departure. One end of this seat is hinged to the front of the vestibule, and when it is raised to clear the doors it actuates levers which lower the steps.

The conductor and motorman's rail is about the same as those on the platforms of the older cars. It is shown in one of the illustrations. The center leg of the rail is equipped with a bayonet lock in the bottom casting. This locks the rail into the floor socket when it is in position and it may be unlocked by raising a sleeve set on the leg just below the rail. The other two legs are made with partial flanges at the base so that they will hook into slots in the sides of the floor sockets when the rail is in position. In order to engage the locks, it is necessary to tilt the rail to insert the two outside legs, which when raised to a vertical position are held rigid by the bayonet lock on the center leg. The hand-brake staff is set close against the front of the vestibule, and the handle is designed so it can be fastened against the vestibule to give more platform space.



New Chicago Railways Car—Front Platform

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The purpose of the test was twofold—first, to demonstrate the effectiveness of the insulated return feeder system as a means of mitigating electrolysis troubles, and, second, to determine the relative cost of securing good conditions from the standpoint of electrolysis as compared with the cost of securing the same conditions under the ordinary methods with uninsulated negative feeders. Therefore it was necessary to carry on the tests under two conditions, namely, to install a system of negative feeders complete, and in such a way that they could be converted into the insulated or uninsulated feeder systems at will. This could readily be accomplished by simply tying the busbar to the tracks near the power house for the uninsulated system and removing such ties and inserting suitable resistance taps for the insulated system. It is true that in both cases the feeders themselves were insulated from the tracks between the point at which they were tied into the tracks and the busbar, but since the feeders were at the same potential as the tracks at both ends, the potential gradients on the feeders were, of course, the same as the potential gradients of the tracks which they paralleled, and hence electrical conditions were the same as they would have been if the feeders had been substantially uninsulated and the relative electrolysis conditions and costs were identical.

The station selected for this experimental investigation was the new Ann Avenue substation located at the corner of Mississippi and Ann Avenues. The rated capacity of this station is 4000 kw at the present time, and the peak load (average for one hour) was at the time the tests were made about 7540 amp. The average load for twenty-four hours was 3500 amp, giving a load factor of about 46 per cent. It will therefore be seen that conditions at this station as regards size and character of the load are fairly representative of average conditions in a moderate-sized city substation. The track network in the district fed by the station is shown in Figs. 1 and 2. These show that only one single track passes immediately by the station and another single track passes along the street one block to the east. This is, therefore, an unfavorable location in respect to returning the current to the station, because the cross-section of rails approaching the station is unusually small. On this account a relatively large amount of copper would have had to be installed whether the insulated or uninsulated system was used, and therefore the cost per kilowatt capacity of returning current to this station would be expected to be considerably higher than the average. This fact makes the test of the system a more severe one from the economy standpoint, although it has no appreciable bearing on the effectiveness of the system in reducing electrolysis troubles.

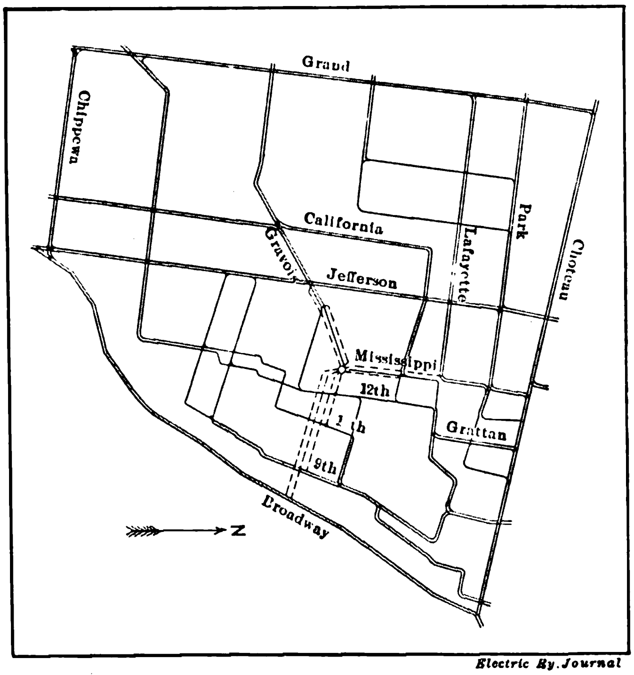

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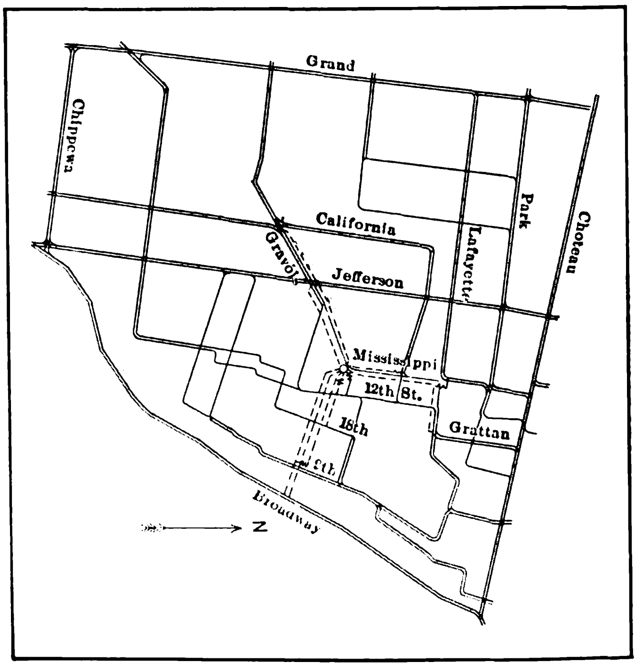
Fig. 1—Electrolysis Test—Original Arrangement of Uninsulated Negative Feeders



Electric Ry. Journal

Fig. 2—Electrolysis Test—Final Arrangement with Insulated Negative Feeders

At the time arrangements were made for the proposed tests a considerable amount of negative copper was already in place, and in designing the proposed insulated feeder system this copper was allowed to remain. Extensions were made where necessary and the current distribution was adjusted by means of resistance taps. The area of the feeders is not therefore just as it would have been if a new insulated feeder system had been installed throughout, and this also tends to make the cost run somewhat higher than would otherwise have been the case. The original feeder layout designed by the engineers of the United Railways Company for the negative return is shown in Fig. 1, and the system as finally completed for the insulated feeder layout is shown in Fig. 2.

An examination of these shows that changes were made in three cases. In one case a feeder of 1,000,000-circ. mil cross-section had been designed to run from the negative bus eastward along Ann Avenue and tied to the tracks at both Eighteenth Street and Ann Avenue and Twelfth Street and Ann Avenue. The change made here was merely to remove the tie at Eighteenth Street and Ann Avenue and install a pair of No. 0000 cables running directly from the tracks at Eighteenth Street and Ann Avenue to busbar, thus giving two separate feeders to those two points instead of one common feeder. The length of each of these No. 0000 feeders was about 700 ft. A second change will be noted on Gravois Avenue, the original feeder layout contemplated running one feeder of 1,000,000 circ. mils to Victor and Gravois, and another to Jefferson and Gravois. The feeder at Jefferson and Gravois was allowed to remain as originally installed, but the feeder running to Victor and Gravois was cut loose from the tracks at this point and extended to California and Gravois, a distance of about 2300 ft. The third extension was in one of the feeders running north on Mississippi Avenue. The original plan contemplated running two 1,000,000-circ. mil cables north on Mississippi Avenue to Geyer Avenue. One of these feeders was left at that point, but the other was cut loose from the tracks and extended north on Mississippi Avenue to Lafayette, and thence east along Lafayette to Grattan, a total distance of about 2400 ft. The total weight of copper added in the three places was therefore about 15,090 lb.

The original plan called for the installation, in addition to the above-mentioned feeders, of a 1,000,000-circ. mil cable running east on Ann Avenue to Ninth Street, a distance of 2800 ft., and two 1,000,000-circ. mil feeders running east from the power house along Ann Avenue to Broadway, a distance of 7400 ft. The total weight of copper under the original plan would therefore have been 65,630 lb., all of it in 1,000,000-circ. mil cables, while in the system as actually completed there were 80,720 lb. of copper, all of which was of 1,000,000-circ. mil cross-section except the two short No. 0000 feeders running to Eighteenth Street and Ann Avenue. The excess cost of the actual system over that of the original system was about $3,770, figuring the cost at 25 cents per pound installed. All of the additional feeders were installed overhead, except the two No. 0000 cables, which were in fiber conduit.

ELECTRICAL OBSERVATIONS

In designing these extensions the object was to reduce the potential gradient in the rail return at all points of the system to an average value not exceeding 1 volt per 1000 ft. for one hour at peak load, which at 46 per cent load factor would correspond to an average of about 0.46 volt per 1000 ft. during the twenty-four-hour period. In making the tests the system was first arranged as an uninsulated feeder system by tying the tracks at Mississippi and Ann Avenues and Eighteenth Street and Ann Avenue as directly to the busbar as the connecting cables would permit, and a complete electrical survey was made to determine the electrical conditions existing in the negative return and pipe systems. These measurements include the following:

(1) *Rail gradient measurements.* These for convenience comprise measurements, with a millivoltmeter, of the drop of potential on a fixed length of 4 ft. of rail, the measurements on all the rails on any particular street being taken at each point.

(2) *Current flow in pipes, including both gas and water mains.* For this purpose excavations were made at a number of points, and rubber-covered leads were fastened to the pipes 4 ft. apart, the leads being brought underground to a service box located inside the curb. These points were for the most part located within ½ mile of the station. Measurements at these points permit the calculation of the actual value of the current flow in the pipes at those points. In addition to these, potential measurements were made between adjacent fire plugs at a number of outlying points considerably beyond the termini of the feeders. While these do not permit the calculation of the actual current flow in those localities, the measurements taken under the insulated and uninsulated systems gave values proportional to the current flow under the two conditions and thus afford means of determining the relative current flow in the two cases.

(3) *Potential difference measurements between pipes and rails.* These measurements were taken throughout a large part of the area affected by the station, including a considerable portion of the region where the pipes were negative to rails, in order that any tendency of the insulated feeder system to extend the positive area could be determined.

(4) *Over-all potential measurements.* These measurements were made between a point on the rails adjoining the power house and a number of remote points near the extreme limits of the feeding districts. These measurements were made with the co-operation of the Kinloch Telephone Company, which connected the telephone wires to the points at which potential measurements were desired, so that all the measurements could be made at the telephone exchange.

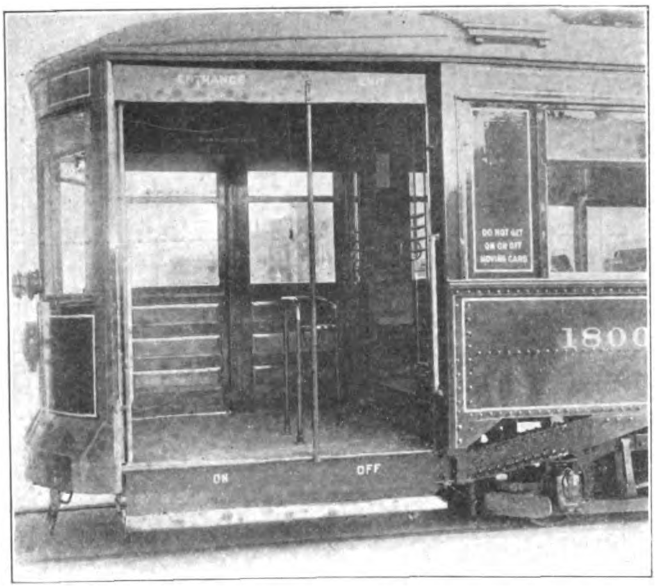
(5) *Current in the various feeders.* These data were taken in order to determine the correctness of the current distribution and the economy with which the copper was being worked in the different parts of the system.

After all of the above measurements were completed the system was then converted into an insulated feeder system as mentioned above, and the same measurements repeated at the same points. In taking the electrical measurements at any one point the readings were taken every fifteen seconds for a period varying from five minutes to fifteen minutes according to local conditions, and the average of all these readings was taken as the reading at that particular time of day. Since readings at different points were necessarily taken at different hours of the day, when the station load differed, the readings as observed are not directly comparable, and in order to get a basis on which the readings under different conditions could be directly compared it was found most satisfactory to reduce all the readings to the average twenty-four-hour values. This was done by multiplying the average observed reading at any point by the ratio of the station load at that particular time of day to the twenty-four-hour average station load. It is this reduced twenty-four-hour average value that is recorded in the tables in each instance. Careful study of a large amount of test data shows that this affords a very satisfactory basis of comparison.

In converting to the insulated feeder system the dif-turn transmits the total load to the half elliptic. These trucks are also equipped with McCord journal boxes cast with hardened wear pieces in the sides of the box. Renewal wear pieces are riveted to the sides of the journal box yokes in the truck side frames.

A new type of Westinghouse field control, 534 Y-1 motor was purchased for these two-motor cars. It has a less over-all height than the older types and consequently provides better clearance between the motor housing and the rail. The minimum clearance point, however, is at the gear case which is 3½ in. above the top of the rail. This motor was adopted not only because it gave proper clearance but as a result of a careful study of its adaptability to the service requirements. Before it was definitely selected sample motors from each of the manufacturers were installed on regular cars to determine just how they would meet actual operating conditions. From the data obtained in these tests the mechanical department was able to determine the exact requirements necessary to make the new two-motor equipment meet the same service conditions as the former four-motor equipment.

The field-control feature enabled the motor designers to meet all the requirements, as it permits high speed on the last controller points, which under Chicago operating conditions reaches a maximum of 25 m.p.h. The gear ratio used in conjunction with these motors is 15-69 three-pitch. The motor equipment was tested not only for ordinary service conditions but was tried on the heavy grades approaching the tunnels under the Chicago River. These grades vary from 9 to 11 per cent, and tests of the two-motor equipment for starting and stopping on these heavy grades demonstrated that it was adequate from a tractive standpoint.



New Chicago Railways Car—Rear Platform

SAFETY APPLIANCES

Another interesting feature in the construction of these new cars is the practical application of safety-first principles in their design. A number of new departures in the design of the air-brake equipment were included to accomplish this end. They are the National Brake & Electric Company's A-6 type, a new design with an 18-cu. ft. capacity compressor, and other features in line with modern light-weight car construction. One of the innovations used in connection with this air-brake equipment is an emergency valve which makes it possible for the motorman to get an emergency application at the brake valve, the air being taken directly from the reservoir. At the same time the brakes are applied sand is automatically deposited through air sanders. In addition to these conductors' valves are placed in each vestibule so that an emergency air application may be made by him if necessary.

A number of safety appliances were also incorporated in the foundation brake apparatus under the car body. One of these includes the pull-rods and the tie-rods, which have been boxed over at their connections to the brake levers. In case the pin connections break, the air-brake apparatus is left operative, as the loop or boxed-over end of the rod holds it in position. In order to fix the position of the pull-rods and tie-rods on the brake levers, however, bolts are inserted in the lever on each side of the point of connection. These are so spaced as not to interfere with the normal operation of these rods and levers, but in case of a pin connection failure the rods are held approximately in their proper position on the levers. As a precaution against a broken pull-rod, stops have been placed on the foundation brake lever carrier, against which the released lever catches, thus permitting the unbroken pull-rod to be operative. Along this same line the fuse boxes which are installed on each side of the car under the sills have "Safety First" stenciled in white on the covers. This is to

TABLE SHOWING WEIGHT ANALYSIS OF 1913 CLOSED MOTOR CARS OF CHICAGO RAILWAYS COMPANY; FIGURES REPRESENT AVERAGES FOR TEN CARS

	Pounds		Per Cent	
Steel Underframe:				
Body portion	3,360		9.5	
Platform portion	1,290		3.6	
Total		4,650		13.1
Car Body:				
Floor sills and flooring	1,169		3.3	
Side frames, including corner posts, top plates, window guards, curtains, etc.	2,034		5.8	
Bulkhead structures	501		1.4	
Bulkhead doors, including tracks, rollers, etc.	239		0.7	
Roof, trolley boards, head lining, etc.	1,230		3.5	
Total		5,173		14.7
Vestibules:				
Platform sills, crown pieces and flooring	727		2.1	
Posts, framing and dashers	1,209		3.4	
Hoods	284		0.8	
Doors, door and step operating mechanism, steps and platform seats	946		2.7	
Total		3,166		9.0
Car Apparatus and Fittings:				
Body seats	1,634		4.6	
Hand brakes, including rigging	359		1.1	
Destination signs and boxes	110		0.3	
Ventilating motor, fan, ducts and louvers	243		0.7	
Drawbars, hooks, drawhead, etc	153		0.4	
Register mechanism	71		0.2	
Fenders and fender gates	276		0.8	
Heaters, buzzers, trolley bases. poles, lights, wiring, etc	1,139		3.2	
Conduit	216		0.6	
Miscellaneous (trolley catchers, bells, ropes, gongs, etc.)	79		0.2	
Total		4,280		12.1
Electrical Equipment:				
Motor wiring	148		0.4	
Conduit	271		0.8	
Controllers and resistances	776		2.2	
Motors (two), including pinions	4,825		13.6	
Gear cases	185		0.5	
Total		6,205		17.5
Air-brake equipment, including foundation brake rigging and piping	1,712		4.8	
Total		1,712		4.8
Trucks:				
Truck frames, axles, wheels and boxes	9,316		26.4	
Gears	475		1.3	
Guards	46		0.1	
Miscellaneous parts	335		1.0	
Total		10,172		28.8
Grand total	35,358	35,358	100	100

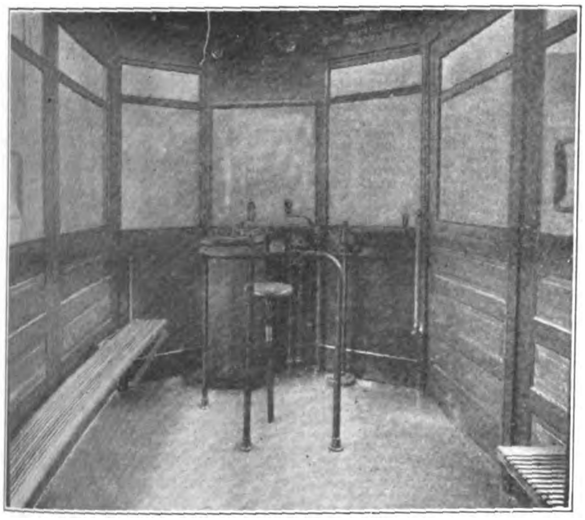
SUMMARY

	Pounds	Per Cent
Total car body	17,269	48.9
Electrical equipment	6,020	17.0
Air-brake equipment	1,712	4.8
Trucks	10,357	29.3
Total weight	35,358	100

remind the motorman that he must be sure of the position of his circuit-breaker or trolley before renewing the fuse.

Following the standard Chicago practice, a single sliding door is provided on the exit side of the front platform, unlike former designs, but it is connected to the step, which raises when the door is in the closed position. Another departure from former standards was brought about by the careful study of weights and their reduction. The sliding door does not recede into a pocket, but the partition forming it has been removed and the exposed door slides along the side of the vestibule. A two-piece folding door is provided on the opposite side of the platform, and this opens and folds against the controller. It differs from the design used in the older types of cars, which were four-piece. The installation of a long slatted seat, so placed and connected that when the door is in the closed position the step is raised, also represents a departure. One end of this seat is hinged to the front of the vestibule, and when it is raised to clear the doors it actuates levers which lower the steps.

The conductor and motorman's rail is about the same as those on the platforms of the older cars. It is shown in one of the illustrations. The center leg of the rail is equipped with a bayonet lock in the bottom casting. This locks the rail into the floor socket when it is in position and it may be unlocked by raising a sleeve set on the leg just below the rail. The other two legs are made with partial flanges at the base so that they will hook into slots in the sides of the floor sockets when the rail is in position. In order to engage the locks, it is necessary to tilt the rail to insert the two outside legs, which when raised to a vertical position are held rigid by the bayonet lock on the center leg. The hand-brake staff is set close against the front of the vestibule, and the handle is designed so it can be fastened against the vestibule to give more platform space.



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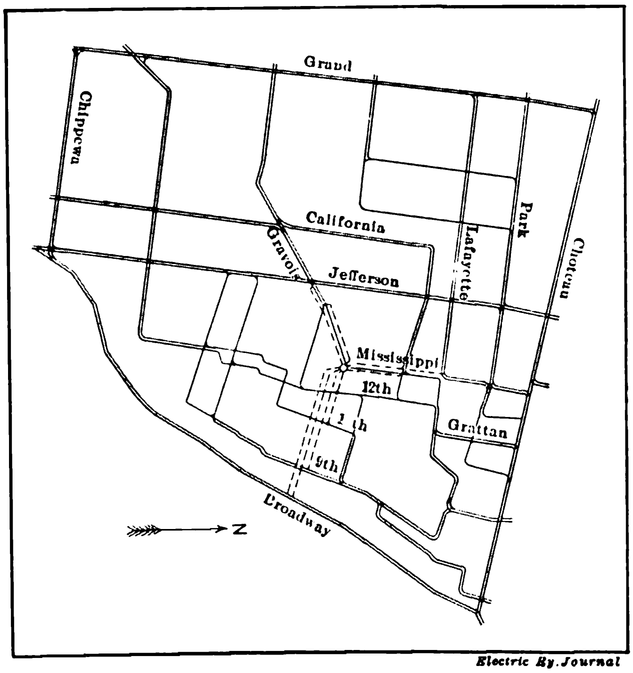

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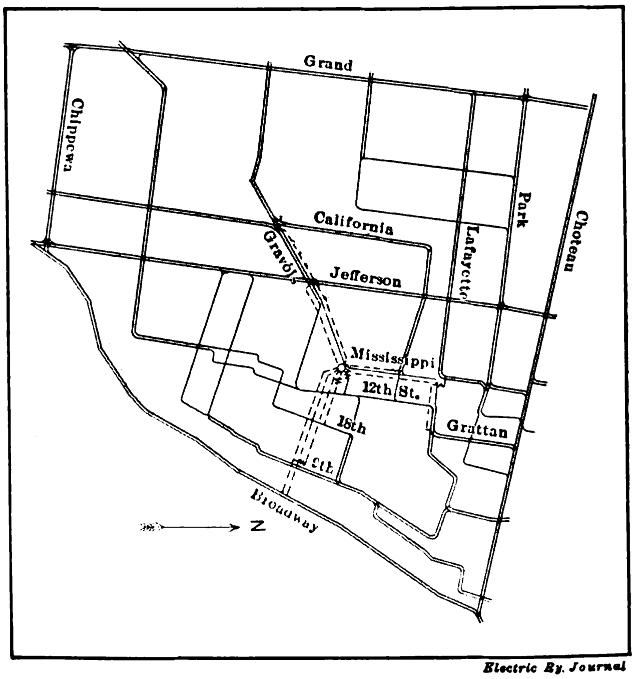

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Fig. 2—Electrolysis Test—Final Arrangement with Insulated Negative Feeders

At the time arrangements were made for the proposed tests a considerable amount of negative copper was already in place, and in designing the proposed insulated feeder system this copper was allowed to remain. Extensions were made where necessary and the current distribution was adjusted by means of resistance taps. The area of the feeders is not therefore just as it would have been if a new insulated feeder system had been installed throughout, and this also tends to make the cost run somewhat higher than would otherwise have been the case. The original feeder layout designed by the engineers of the United Railways Company for the negative return is shown in Fig. 1, and the system as finally completed for the insulated feeder layout is shown in Fig. 2.

An examination of these shows that changes were made in three cases. In one case a feeder of 1,000,000-circ. mil cross-section had been designed to run from the negative bus eastward along Ann Avenue and tied to the tracks at both Eighteenth Street and Ann Avenue and Twelfth Street and Ann Avenue. The change made here was merely to remove the tie at Eighteenth Street and Ann Avenue and install a pair of No. 0000 cables running directly from the tracks at Eighteenth Street and Ann Avenue to busbar, thus giving two separate feeders to those two points instead of one common feeder. The length of each of these No. 0000 feeders was about 700 ft. A second change will be noted on Gravois Avenue, the original feeder layout contemplated running one feeder of 1,000,000 circ. mils to Victor and Gravois, and another to Jefferson and Gravois. The feeder at Jefferson and Gravois was allowed to remain as originally installed, but the feeder running to Victor and Gravois was cut loose from the tracks at this point and extended to California and Gravois, a distance of about 2300 ft. The third extension was in one of the feeders running north on Mississippi Avenue. The original plan contemplated running two 1,000,000-circ. mil cables north on Mississippi Avenue to Geyer Avenue. One of these feeders was left at that point, but the other was cut loose from the tracks and extended north on Mississippi Avenue to Lafayette, and thence east along Lafayette to Grattan, a total distance of about 2400 ft. The total weight of copper added in the three places was therefore about 15,090 lb.

The original plan called for the installation, in addition to the above-mentioned feeders, of a 1,000,000-circ. mil cable running east on Ann Avenue to Ninth Street, a distance of 2800 ft., and two 1,000,000-circ. mil feeders running east from the power house along Ann Avenue to Broadway, a distance of 7400 ft. The total weight of copper under the original plan would therefore have been 65,630 lb., all of it in 1,000,000-circ. mil cables, while in the system as actually completed there were 80,720 lb. of copper, all of which was of 1,000,000-circ. mil cross-section except the two short No. 0000 feeders running to Eighteenth Street and Ann Avenue. The excess cost of the actual system over that of the original system was about $3,770, figuring the cost at 25 cents per pound installed. All of the additional feeders were installed overhead, except the two No. 0000 cables, which were in fiber conduit.

ELECTRICAL OBSERVATIONS

In designing these extensions the object was to reduce the potential gradient in the rail return at all points of the system to an average value not exceeding 1 volt per 1000 ft. for one hour at peak load, which at 46 per cent load factor would correspond to an average of about 0.46 volt per 1000 ft. during the twenty-four-hour period. In making the tests the system was first arranged as an uninsulated feeder system by tying the tracks at Mississippi and Ann Avenues and Eighteenth Street and Ann Avenue as directly to the busbar as the connecting cables would permit, and a complete electrical survey was made to determine the electrical conditions existing in the negative return and pipe systems. These measurements include the following:

(1) *Rail gradient measurements.* These for convenience comprise measurements, with a millivoltmeter, of the drop of potential on a fixed length of 4 ft. of rail, the measurements on all the rails on any particular street being taken at each point.

(2) *Current flow in pipes, including both gas and water mains.* For this purpose excavations were made at a number of points, and rubber-covered leads were fastened to the pipes 4 ft. apart, the leads being brought underground to a service box located inside the curb. These points were for the most part located within ½ mile of the station. Measurements at these points permit the calculation of the actual value of the current flow in the pipes at those points. In addition to these, potential measurements were made between adjacent fire plugs at a number of outlying points considerably beyond the termini of the feeders. While these do not permit the calculation of the actual current flow in those localities, the measurements taken under the insulated and uninsulated systems gave values proportional to the current flow under the two conditions and thus afford means of determining the relative current flow in the two cases.

(3) *Potential difference measurements between pipes and rails.* These measurements were taken throughout a large part of the area affected by the station, including a considerable portion of the region where the pipes were negative to rails, in order that any tendency of the insulated feeder system to extend the positive area could be determined.

(4) *Over-all potential measurements.* These measurements were made between a point on the rails adjoining the power house and a number of remote points near the extreme limits of the feeding districts. These measurements were made with the co-operation of the Kinloch Telephone Company, which connected the telephone wires to the points at which potential measurements were desired, so that all the measurements could be made at the telephone exchange.

(5) *Current in the various feeders.* These data were taken in order to determine the correctness of the current distribution and the economy with which the copper was being worked in the different parts of the system.

After all of the above measurements were completed the system was then converted into an insulated feeder system as mentioned above, and the same measurements repeated at the same points. In taking the electrical measurements at any one point the readings were taken every fifteen seconds for a period varying from five minutes to fifteen minutes according to local conditions, and the average of all these readings was taken as the reading at that particular time of day. Since readings at different points were necessarily taken at different hours of the day, when the station load differed, the readings as observed are not directly comparable, and in order to get a basis on which the readings under different conditions could be directly compared it was found most satisfactory to reduce all the readings to the average twenty-four-hour values. This was done by multiplying the average observed reading at any point by the ratio of the station load at that particular time of day to the twenty-four-hour average station load. It is this reduced twenty-four-hour average value that is recorded in the tables in each instance. Careful study of a large amount of test data shows that this affords a very satisfactory basis of comparison.

In converting to the insulated feeder system the different extensions outlined in detail above were installed and the feeders were adjusted for approximately equal drop by the insertion of suitable resistances where necessary. The number and location of these resistance taps are shown in Fig. 2, which gives the final layout of insulated feeders. It will be seen here that there are three resistance taps at the substation in the cables running to the tracks at Mississippi and Ann, Eighteenth and Ann and Twelfth and Ann Avenues. There is also a resistance in the feeder running north on Mississippi Avenue to Mississippi and Geyer, the resistance being at the outer end of the feeder. The feeder running north on Mississippi Avenue to Lafayette is connected to the tracks at Lafayette and Mississippi through a resistance tap designed to give about 4 volts drop at peak load. There is also a resistance tap at Ann Avenue and Ninth Street. This is not, however, in series with any feeder, but is connected between the feeder that is tied in at Ninth Street to the two feeders which run on to Broadway. It therefore affords a certain measure of paralleling between these two feeders.

A comparison of the measurements taken under the insulated and uninsulated feeder systems shows clearly the relative danger from electrolysis under the two systems. While the amount of copper in the feeder systems under these two series of tests is not the same in each case, the difference was not great enough to produce any marked change in electrolysis conditions under the uninsulated feeder system. This was shown in advance by careful calculations and was borne out by experimental data determined later, so that, although some copper was added for the insulated feeder system such copper, because of its outlying location, would have exerted practically no influence when used in connection with the insulated system. The relative results show substantially the changes due to conversion from an uninsulated to an insulated system with the same amount of copper.

RAIL GRADIENTS

In determining the rail gradients, measurements were taken on a fixed length of 4 ft. of rail. The points for measurement were selected so as to give the maximum gradients that existed in each case. This meant that gradient measurements were taken on all sides of a point at which a negative cable was tapped to the tracks under both the insulated and uninsulated feeder system. It is obvious that at more remote points the gradient would tend to become less than the values recorded at these places, except under very special conditions, which did not exist in this installation. The location of the points at which potential gradient measurements were taken, and also the values obtained, are shown in Table I. By comparing the figures point by point in the columns showing average gradients under each system we get the effect produced by the change from uninsulated to insulated feeders. An examination of these columns shows that in many places the gradients have been greatly reduced, this being particularly true in the region near the power house where the gradients were rather high under the uninsulated system. In one case only has there been an increase and this is at Broadway and Ann Avenue, where considerably more current was taken off under the uninsulated system than under the insulated system. It will be noted that there is but one point with a potential gradient greater than 1 volt per 1000 ft. under the insulated feeder system, whereas the average of all points is but 0.47 volt. Since the station load factor is about 46 per cent, this means that the average potential gradient at peak load is almost exactly 1 volt, and most of the readings will not vary much from this mean value. Under the uninsulated feeder system, however, there are a considerable number of readings which run above 1 volt average, the highest being 2.89 volts per 1000 ft., which corresponds to a peak load value of about 6.2 volts per 1000 ft. The average for all points under the uninsulated feeder system is 0.91 volt for the twenty-four-hour period, which corresponds to a mean value of 2 volts during peak load. These figures show that the installation of the insulated return feeder system has substantially fulfilled the conditions that it was designed to accomplish in the way of potential gradients, in that the mean value at peak load does not exceed the calculated value of 1 volt per 1000 ft.

TABLE I—RAIL GRADIENTS

	Uninsulated Feeders		Insulated Feeders	
Location	Direction of Flow	Gradient, Volts, per 1000 Ft.	Direction of Flow	Gradient, Volts, per 1000 Ft.
Grattan north of Lafayette	..	...	S	0.47
Lafayette east of Grattan	..	...	W	0.15
Lafayette west of Grattan	..	...	W	0.34
Lafayette east of Mississippi	W	1.90	W	0.59
Lafayette west of Mississippi	E	1.66	E	0.48
Mississippi north of Lafayette	S	0.90	S	0.72
Mississippi south of Lafayette	S	1.87	S	0.75
Mississippi south of Geyer	S	2.89	S	0.57
Geyer east of Mississippi	W	0.91	W	0.29
Geyer west of Mississippi	E	1.17	W	0.60
Mississippi south of Ann	N	1.35	N	0.21
Gravois south of Victor	N	1.77	W	0.17
Victor east of Gravois	E	0.29	..	...
Gravois west of Jefferson	E	1.69	E	0.03
Jefferson north of Gravois	E	0.69	S	0.68
Jefferson south of Gravois	N	0.72	N	0.22
Gravois west of California	..	...	E	0.59
California north of Gravois	..	...	S	0.33
California south of Gravois	..	...	N	0.15
Broadway north of Ann	S	0.59	S	0.71
Broadway south of Ann	N	0.35	N	0.90
Ninth north of Ann	S	0.69	S	1.20
Ninth south of Ann	N	1.43	N	0.39
Twelfth north of Ann	S	0.33	S	0.25
Twelfth south of Ann	N	0.80	N	0.30
Eighteenth north of Ann	S	0.94	S	0.80
Eighteenth south of Ann	N	0.75	N	0.43
Average		0.91		0.47

While it is important that rail gradients should be kept low, this figure is only of indirect importance, since low gradients in general mean small leakage and consequently reduced current flow on the pipes. Of even greater importance, however, than low gradient is the direction of the gradient. Under the uninsulated feeder system this gradient is necessarily continuous from the outlying districts clear into the power house; whereas under the insulated feeder system the current can, if desired, be made to flow from all directions toward the points of tap of the insulated feeders to the rails, and since these points are distributed through a considerable portion of the feeding area, the direction of current flow in the rails can be frequently reversed, so that the gradient in any one direction will extend over only a comparatively short distance, and hence large differences of potential between different points in the earth cannot be set up. It will be evident, therefore, that the improvement in electrolysis conditions caused by the installation of insulated feeders will, in general, be much greater than the ratio of reduction of the rail gradient. This is borne out in a very marked manner by the data given below.

CURRENT FLOW IN PIPES

One of the best criteria for determining the relative amount of damage from electrolysis under different conditions of track return is afforded by determining the relative current flow in the pipes. Since, as in the present case, where there were no metallic connections to pipes, all the current flow carried by the pipes must ultimately be discharged into the earth, the total amount of electrolysis will be approximately proportional to the current flow on the pipes. Table II shows the current flow as measured at a number of points under the insulated and uninsulated feeder systems. The currents in all cases were calculated from measurements of millivolt drop on a 4-ft. length of pipe, the resistance of the pipe being determined from the size and kind of pipe and known constants as determined from numerous laboratory tests. This method of determining current in the pipes, while not strictly accurate, because of variations in the kind and weight of the pipes, has nevertheless been shown to be sufficiently accurate for most practical purposes when used with care.

Referring to Table II, the first column, headed "Location," gives the points at which current measurements were made; the second column, headed "Size of Pipe," gives in inches the diameter of the pipe on which the current was measured, and in each case this figure is followed by the letter W or G, indicating whether the pipe was gas or water main. The third column, headed K, gives the factor by which the millivolt reading must be multiplied to give current flow in the pipe. In the fourth and fifth columns, under "Amps," the calculated current flow average for the twenty-four-hour period is given for the two systems.

TABLE II—CURRENT FLOW IN GAS AND WATER PIPES WITH PIPES NOT DRAINED

Location	Size of Pipe, In.		K	Uninsulated System, Amp.	Insulated System, Amp.
Russell west of Thirteenth	30	W	54.0	46.80	3.78
Russell west of Mississippi	6	W	5.2	0.606	0.00
Ann west of Twelfth	4	G	3.5	0.16	0.17
Ann west of Eighteenth	6	W	5.2	3.24	1.86
Ann east of Mississippi	4	G	3.5	6.93	2.16
Ann east of McNair	6	W	5.2	2.35	0.05
Ann east of McNair	4	G	3.5	0.175	0.035
Gravois west of Eighteenth	6	W	5.2	11.80	1.63
Gravois west of Shenandoah	4	G	3.5	0.08	0.03
Shenandoah west of Thirteenth	20	W	31.5	9.42	0.62
Shenandoah east of McNair	20	W	31.5	43.10	12.50
Lynch west of Indiana	6	G	5.2	0.15	0.11
Eighteenth north of Shenandoah	6	W	5.2	6.97	3.62
Eighteenth north of Victor	20	W	31.5	23.40	7.48
Lemp north of Victor	6	G	5.2	0.11	0.05
Mississippi south of Lafayette	6	G	5.2	0.06	0.03
Mississippi south of Allen	20	W	31.5	1.40	1.70
Mississippi south of Russell	20	W	31.5	56.40	19.30
Mississippi south of Ann	20	W	31.5	19.60	3.06
Salena north of Shenandoah	20	W	31.5	40.20	7.02
Salena north of Victor	6	W	5.2	2.74	0.26
Total				275.7	48.41

It will be seen from these figures that the total current flow at all observation points under the uninsulated feeder system was 275.7 amp, whereas the corresponding figure under the insulated feeder system was 48.4 amp, which gives an average ratio of reduction at all points of 5.7 to 1. This represents the average reduction in the rate of electrolytic corrosion throughout the system as indicated by these measurements. As an actual fact, in some localities, particularly near the power station, the reduction will be greater than this, whereas in the more remote districts it will be correspondingly less, but these figures may be taken as a fair indication of the general improvement that is effected by the insulation of the feeders.

While no attempt was made in the present investigation to install a scientific pipe drainage system, it was deemed worth while to tie in the pipes temporarily at points near the station in order to determine the effect of such tying in on the general magnitude of current flow in the pipes, and particularly the relative increase of current produced by such tying in under the insulated and uninsulated feeder systems. For this purpose temporary ties between the pipes at Mississippi and Ann Avenues and the busbar were installed, and likewise a direct tie between the pipes and tracks at Twelfth Street and Ann Avenue was installed. Measurements of current flow at the same places as shown in Table II were made with the pipes thus tied in and with the feeders insulated and uninsulated from the negative bus.

The results of these measurements are shown in Table III. Here the columns have the same significance as in Table II. It will be seen by comparing these figures with those of Table II that there has in general been a marked increase in current flow in the pipes, and this is particularly true in the case of the uninsulated system. The sum of all the currents at different points of measurement is 847.4 amp for the uninsulated system and 86.1 amp under the insulated system, showing that under these conditions of tying in the current flow in the uninsulated system is on the average about ten times as great as is the case under the insulated feeder system.

TABLE III—CURRENT FLOW IN GAS AND WATER PIPES WITH PIPES DRAINED

Location	Size of Pipe, In.		K	Uninsulated System, Amp	Insulated System, Amp
Russell west of Thirteenth	30	W	54.0	108.00	5.02
Russell west of Mississippi	6	W	5.2	4.90	0.716
Ann west of Twelfth	4	G	3.5	0.24	0.32
Ann west of Eighteenth	6	W	5.2	5.04	3.15
Ann east of Mississippi	4	G	3.5	9.20	6.20
Ann east of McNair	6	W	5.2	4.79	0.05
Ann east of McNair	4	G	3.5	0.346	0.35
Gravois west of Eighteenth	6	W	5.2	21.60	1.98
Gravois west of Shenandoah	4	G	3.5	0.30	0.08
Shenandoah west of Thirteenth	20	W	31.5	9.00	2.12
Shenandoah east of McNair	20	W	31.5	83.00	20.60
Lynch west of Indiana	6	G	5.2	0.11	0.11
Eighteenth north of Shenandoah	6	W	5.2	9.26	3.37
Eighteenth north of Victor	20	W	31.5	42.80	2.57
Lemp north of Victor	6	G	5.2	0.10	0.05
Mississippi south of Lafayette	6	G	5.2	0.11	0.05
Mississippi south of Allen	20	W	31.5	8.17	1.20
Mississippi south of Russell	20	W	31.5	301.00	22.20
Mississippi south of Ann	20	W	31.5	105.40	6.94
Salena north of Shenandoah	20	W	31.5	128.40	10.23
Salena north of Victor	6	W	5.2	2.55	0.11
Total				847.43	86.11

It will also be observed by comparing the totals of Table II with those of Table III that the tying in of the pipes with the uninsulated feeder system causes an increase in the current flow in the ratio of about 3.7 to 1, whereas under the insulated feeder system the increase in current due to tying the pipes in is increased only in the ratio of 1.78 to 1. This shows that the tying in of the pipes has a much smaller tendency to increase the current flow in the case of insulated feeders than it has in the case of uninsulated feeders. The total current flow with the pipes tied in under the insulated feeder system is only 86.1 amp, whereas the current flow under the uninsulated system with the pipes not tied in is 275.7 amp, which means that draining the pipes at these two points under the insulated feeder system results in only three-tenths as much current flowing in the pipes as the flow in the pipes without such drainage under the uninsulated feeder system.

These various ratios are summarized in Table IV and show in a very striking manner the marked reduction in current flow that in every case accompanies the insulated feeder system.

The figures of Table III show the current flow in the pipes in the region within approximately ¼-mile radius of the power station. It was deemed advisable also to determine the relative current flow under the different conditions at points more remote from the power house, and for this purpose, in order to avoid the labor of additional excavations, potential measurements were made between adjacent fire hydrants at suitable places, the relative potential differences under the insulated and uninsulated systems being taken as the relative current flow in the two cases. Under each feeder system also these measurements were taken with the pipes drained at the two points mentioned above near the station, and also with the pipes not drained, so as to show the tendency, if any existed, of pipe drainage to increase current flow in the pipes at very remote points. These data are given in Table V. In this table are shown the voltage drops between hydrants and under both the insulated and uninsulated feeder systems. Under each system are shown also the voltage drops with the pipes drained and not drained. Under pipe drainage the difference in voltage drop is more marked, the ratio of the sums of the voltage drops being here only 0.362. With the insulated feeder systems the ratio of voltage drop or total current flow with the pipes drained is 1.22. With the uninsulated feeder system the ratio is 1.56, indicating that even in these more remote points the current flow shows a marked increase when the pipes are tied in, but that this increase is much less marked in the case of the insulated feeder system than it is in the case of the uninsulated feeder system. The last ratio given in the summary of Table V also shows that at these outlying points the current flow in the pipes under the insulated feeder system combined with pipe drainage at the points near the power house is but little over half of the current flow without pipe drainage under uninsulated feeder systems.

TABLE IV—SUMMARY OF CURRENT FLOW IN PIPES

	Total Current, Amp
Uninsulated system, pipes drained	847.43
Uninsulated system, pipes undrained	275.70
Insulated system, pipes drained	86.11
Insulated system, pipes undrained	48.41

Current-Flow Ratios

	Pipes Not Drained	Pipes Drained
$\frac{\text{Insulated feeders}}{\text{Uninsulated feeders}}$	$\frac{48.41}{275.70} = 0.176$	$\frac{86.11}{847.43} = 0.1016$

	Insulated Feeders	Uninsulated Feeders
$\frac{\text{Pipes drained}}{\text{Pipes undrained}}$	$\frac{86.11}{48.41} = 1.78$	$\frac{847.43}{275.70} = 3.07$
$\frac{\text{Insulated feeders, drained pipes}}{\text{Uninsulated feeders, undrained pipes}}$		$\frac{86.11}{275.70} = 0.31$

TABLE V—POTENTIAL DIFFERENCES BETWEEN FIRE PLUGS

Location On	Location From	Location To	Uninsulated Feeders: Pipes Not Drained	Uninsulated Feeders: Pipes Drained	Insulated Feeders: Pipes Not Drained	Insulated Feeders: Pipes Drained
Mississippi	Kennett	Lafayette	0.685	0.908	0.420	0.588
Mississippi	Allen	Geyer	0.211	0.425	0.150	0.137
Gravois	Sidney	Victor	0.646	0.735	0.229	0.260
Ann	Menard	Eleventh	0.320	0.624	0.159	0.208
Ann	Jefferson	Indiana	0.132	0.308	0.060	0.023
Shenandoah	Indiana	Missouri	0.394	0.648	0.159	0.219
McNair	Lynch	Sidney	0.156	0.335	0.001	0.007
Total voltage-drop			2.544	3.983	1.178	1.442

POTENTIAL DIFFERENCE RATIOS

	Pipes Not Drained	Pipes Drained
$\frac{\text{With insulated feeders}}{\text{With uninsulated feeders}}$	$\frac{1.178}{2.544} = 0.463$	$\frac{1.442}{3.983} = 0.362$

	Uninsulated Feeders	Insulated Feeders
$\frac{\text{With pipes drained}}{\text{With pipes not drained}}$	$\frac{3.983}{2.544} = 1.56$	$\frac{1.442}{1.178} = 1.224$
$\frac{\text{Insulated feeders with drained pipes}}{\text{Uninsulated feeders with undrained pipes}}$		$\frac{1.442}{2.544} = 0.566$

The results as presented, while they do not show conditions that would exist under an ideal pipe drainage system, indicate, nevertheless, the tendencies which exist and demonstrate that conditions in regard to current flow in the pipes are invariably much better under the insulated feeder system than under the uninsulated system.

One point of special interest in connection with the data on current flow in the pipes should be mentioned here. By reference to Tables II and III it will be noted that those points marked W in the second column, indicating water mains, show in general a much higher current flow than the points marked G, which indicate gas mains. The reason for this is that the gas mains in this vicinity have a considerable number of cement joints, and this undoubtedly is responsible for the comparatively low current flow. It is probable that those points which show almost no current flow are sections which contain cement joints, whereas those points that show small yet appreciable current flow are the older lead-jointed sections, since both kinds are known to exist in this territory.

POTENTIAL DIFFERENCES BETWEEN PIPES AND RAILS

Another criterion for determining the relative danger to pipes under different conditions is the potential differences between pipes and rails. Measurements were therefore made between fire hydrants and rails at a considerable number of points under both the insulated and uninsulated systems, and the results are given in Table VI. An examination of these data reveals that for the most part there has been a marked reduction in potential difference, particularly in the region near the power house where such potential differences were originally high. In order to facilitate the interpretation of these data they have been divided into three groups with subheads A, B and C. The data for all points in which original potential differences were greater than 1 volt are placed in group A; all those in which the pipes were positive but less than 1 volt are placed in group B, and all those points in which the pipes were originally negative but have become somewhat positive under the insulated feeder system are placed in group C.

TABLE VI—POTENTIAL DIFFERENCE BETWEEN PIPES AND RAILS

Group A—Potentials Originally More than 1 Volt

Location	Potential Difference: Uninsulated System	Potential Difference: Insulated System
Twelfth and Russell	1.80	0.70
Eighteenth and Geyer	1.38	0.29
Eighteenth and Allen	2.02	0.67
Eighteenth and Russell	3.00	0.24
Eighteenth and Ann	2.15	0.08
Eighteenth and Shenandoah	2.02	0.70
Eighteenth and Victor	1.69	0.55
Mississippi and Geyer	2.14	0.86
Mississippi and Allen	3.45	0.37
Mississippi and Russell	4.22	0.17
Mississippi and Gravois	3.60	0.16
Gravois and McNair	3.20	−0.84
Gravois and Victor	1.13	0.53
McNair and Geyer	1.91	0.15
Jefferson and Ann	1.47	−0.14
Average	2.35	0.22

Group B—Potentials Originally Less than 1 Volt

Location	Potential Difference: Uninsulated System	Potential Difference: Insulated System
Ninth and Lafayette	0.62	0.02
Twelfth and Shenandoah	0.56	0.59
Grattan and Lafayette	0.25	0.30
Eighteenth and Lafayette	0.38	0.05
Eighteenth and Sidney	0.69	0.25
Mississippi and Lafayette	0.62	0.37
Lemp and Victor	0.71	0.35
McNair and Victor	0.94	0.52
Salena and Victor	0.71	0.40
Jefferson and Lafayette	0.22	−0.01
Jefferson and Geyer	0.59	−0.04
Jefferson and Gravois	0.77	0.77
Jefferson and Pestalozzi	0.39	0.32
Average	0.573	0.30

Group C—Potentials Originally Negative

Location	Potential Difference: Uninsulated System	Potential Difference: Insulated System
Broadway and Victor	−0.70	+0.48
Broadway and Russell	−0.01	+0.80
Ninth and Russell	−0.23	+0.80
Ninth and Victor	−0.33	+0.62
Eleventh and Park	−0.37	+0.33
Grattan and Park	−0.51	+0.35
California and Geyer	−0.66	+0.29
California and Gravois	−0.33	+0.84
Average	−0.39	+0.35

On examination of group A, which includes the points of high original potential and therefore covers the area in which the original danger is greatest and the need for improvement most urgent, we find that there has been a very large reduction of potential differences between pipes and rails. In two cases, notably at Gravois and McNair and at Jefferson and Ann Avenues, where the pipes were originally strongly positive to rails, they have become very slightly negative, and in all the other points in this group a marked reduction is apparent. The average potential difference at all points under the uninsulated system was 2.35 volts, whereas under the insulated feeder system this average was only 0.22 volt, giving a mean ratio of reduction of 10.8 to 1.

Referring to group B, where the original potential differences were less than 1 volt, we find there is still a very considerable reduction. The average for all of these points is 0.573 volt, whereas the average for the corresponding points under the insulated feeder system is 0.30 volt, giving a ratio of reduction of 1.91 to 1. Even here, in the intermediate region, where the danger was comparatively small under the original conditions, there has still been a considerable improvement, the average value of 0.30 volt being so small as not to involve any considerable danger to the pipes.

In group C we find that eight points which were originally negative have become more or less positive. This is to be expected in general because of the tendency to form positive areas in the region near the points where the negative feeders are tied to the track. At these eight points there existed originally a mean value of potential difference of — 0.39 volt, whereas under the insulated feeder system this has been converted into a mean value of + 0.35 volt. In the more remote districts the potential differences were negative under both insulated and uninsulated systems and are therefore of no consequence here.

These data show that under the insulated feeder system the reduction of danger is greatest at those points where there is greatest need for improvement, and the foregoing figures indicate very clearly that in the present instance the potential differences have been reduced to so low a value as to make the pipes comparatively safe. They also show that, while the installation of a negative feeder system does tend to increase somewhat the area of the positive zone, this tendency is so slight as to lead to no serious consequences. One of the principal objections against the installation of insulated negative feeders that have been urged by some engineers has been that it creates a large number of positive areas covering a much greater territory than is the case with the ordinary uninsulated system. While it is, of course, true that there is a tendency for the insulated feeder system to extend the positive area, and this is clearly indicated by the foregoing data, these data nevertheless show that comparatively few new positive points have been created, and that where they have appeared the potential differences are so low as not to give rise to any serious corrosion of the pipes under ordinary conditions. The figures show conclusively that this objection to the insulated negative feeder system is not valid, at least in the present case, whereas the reduction of the potential differences in the regions where the conditions were originally bad is so great as completely to overshadow the effects of the slight tendency to broaden the positive zone.

All of the foregoing potential difference measurements were taken between water pipes and rails because of the greater convenience of making such measurements, since measurements could be taken between fire hydrants and tracks. In order to determine whether or not the potential differences between gas pipes and the tracks differed materially from the corresponding voltages between water pipes and rails, a considerable number of measurements were taken between water and gas mains at accessible places. These measurements are given in Table VII, which shows the generally low potential differences between water and gas mains.

OVER-ALL POTENTIALS

Still another important factor in determining the probability of current being taken up by the pipes is the maximum potential differences occurring between the tracks near the station and remote points in the track network. Accordingly a considerable number of such measurements were taken under both the insulated and the uninsulated feeder system. These data are shown in Table VIII. The figures are in accord with all of the other data presented above, and they confirm the conclusion that a very marked improvement has accompanied the conversion of the system from uninsulated to insulated feeders.

TABLE VII—POTENTIAL DIFFERENCE BETWEEN WATER MAINS AND GAS PIPES

Location	Uninsulated Feeders, 24-Hour Average Voltage
Eighteenth and Geyer	0.00
Eighteenth and Allen	0.05
Eighteenth and Russell	0.05
Eighteenth and Shenandoah	0.27
Eighteenth and Victor	0.17
Lemp and Shenandoah	0.02
Lemp and Victor	0.16
Mississippi and Geyer	0.09
Mississippi and Allen	0.16
Mississippi and Russell	0.44
Mississippi and Gravois	0.56
Salena and Victor	0.21
Gravois and Shenandoah	— 0.12
Gravois and Victor	0.22
McNair and Geyer	0.02
McNair and Allen	0.04
McNair and Russell	— 0.09
McNair and Ann	0.06
Missouri and Ann	0.07
Average	0.138

An examination of the preceding data on current flow in the pipes, potential differences between pipes and rails and over-all potential differences shows that under the insulated negative feeder system these values range from one-fifth to one-tenth of the corresponding values which prevail under the uninsulated feeder system. These ratios represent approximately the difference in electrolysis damage that would result in the two cases. The all-important conclusion to be drawn from the foregoing test is that, regardless of what local conditions may be as to the rate of corrosion, the rate of damage under the insulated feeder system will be reduced to a fraction of what it would be with substantially the same amount of copper used as uninsulated feeders in parallel with the tracks.

TABLE VIII—OVER-ALL POTENTIAL DIFFERENCES

Location	Distance, Thousands of Feet	Uninsulated Feeders		Insulated Feeders	
		Volts	Volts per 1000 ft.	Volts	Volts per 1000 ft.
Broadway and Chouteau	6.9	11.5	1.7	2.7	0.39
Broadway and Park	5.5	11.0	2.0	3.0	0.55
Broadway and Victor	2.5	11.3	4.5	0.3	0.12
Broadway and Arsenal	4.6	11.1	2.4	0.3	0.07
Ninth and Park	4.7	10.1	2.2	1.6	0.34
Ninth and Victor	2.9	10.2	3.5	—0.2	—0.07
Ninth and Pestalozzi	3.7	10.1	2.7	0.1	0.03
Twelfth and Chouteau	5.1	11.3	2.2	3.3	0.65
Twelfth and Park	4.0	9.3	2.3	2.6	0.65
Twelfth and Sidney	2.0	6.3	3.2	—0.1	—0.05
Eighteenth and Chouteau	4.6	11.3	2.5	2.7	0.59
Eighteenth and Park	3.4	8.3	2.4	2.5	0.74
Lemp and Arsenal	3.8	6.9	1.8	0.7	0.18
Jefferson and Park	4.1	11.3	2.8	2.8	0.68
Jefferson and Geyer	2.6	11.0	4.2	0.8	0.31
Jefferson and Arsenal	4.0	8.1	2.0	0.5	0.13
Jefferson and Cherokee	5.8	10.2	1.8	0.0	0.00
California and Chouteau	5.9	10.7	1.8	3.6	0.61
California and Shenandoah	3.4	10.0	2.9	1.2	0.35
California and Gravois	4.0	10.3	2.6	0.8	0.20
Compton and Arsenal	4.6	12.5	2.7	3.6	0.58
Grand and Arsenal	7.8	15.3	2.0	5.1	0.65
Average		10.4	2.6	1.7	0.35

In case experience should show that an appreciable amount of electrolysis still occurred under the insulated feeder system as now installed we should not recommend pipe drainage in the present instance to take care of this residual trouble, primarily because of the large number of insulating joints in the gas mains. We think it would be much more effective to take care of any residual trouble that may exist by some slight extension of the insulated negative feeder system. As for lead-covered cables, it is probable that a certain amount of drainage will always be necessary for their adequate protection, but a much smaller amount of current will need to be drawn from them under the insulated feeder system than under an uninsulated system.

COSTS OF INSULATION

In Table IX is given a detailed statement of the amount of copper in each of the insulated negative feeders as now installed, together with their location whether overhead or underground and the estimated cost of installation. In calculating this cost we have assumed that the cost of installing overhead feeders is uniformly $750 per 1000 ft. of 1,000,000-circ. mil cable, including the cost of copper and installation charges. For underground construction the figure of $1,400 per 1000 ft. of 1,000,000-circ. mil cable has been used. These figures will, of course, vary somewhat according to conditions, but they represent fair average values. It will be seen from an examination of Table IX that the total cost of the negative feeders installed for this station is $25,920, the rated capacity of the station 4000 kw, giving a cost of $6.48 per kilowatt of rated capacity as the cost for the negative feeder system. Based on the same unit cost, however, we find that the cost of the original uninsulated feeder system amounted to $22,150, so that the extra cost properly chargeable against the insulated feeder system in this case is the difference between these, or $3,770. In addition to the cost of copper we must also consider the value of the energy lost in the negative return.

TABLE IX—APPROXIMATE COST OF INSULATED FEEDERS

Ann Avenue Substation

Location on Feeder Terminal	Length, Feet	Size in 1,000,000 Circ. Mil.	Character	Total Cost Installed
Lafayette and Grattan...	3600	1	Overhead	$2,700
Mississippi and Geyer...	1300	1	Overhead	975
Gravois and Jefferson....	2300	1	Overhead	1,725
Gravois and California...	3900	1	Overhead	2,925
Ann and Broadway......	3900	2	Underground	10,920
Ann and Ninth..........	2900	1	Underground	4,060
Ann and Twelfth........	1450	1	Underground	2,030
Ann and Eighteenth.....	720	.42	Underground	590
Total				$25,920
Rated capacity of station............................				4000 kw
Cost per kilowatt..................................				$6.48

On an examination of the data given above on the over-all potential measurements in the negative return, we find that under the uninsulated negative feeder system the mean voltage drop on the negative side was 12.2 volts, while under the insulated negative feeder system, with the present amount of copper, this negative drop is increased to 18.9 volts. The net increase in negative drop has therefore been 6.7 volts. The twenty-four-hour average current for this station is 3500 amp, and multiplying this by the increase in voltage drop we find a net increase of power loss on the negative return of 23.4 kw. Multiplying this by 8760, the number of hours in a year, we get a total of 204,980 kw-hr. per year, which, at 1 cent per kw-hr., has a value of practically $2,050. The excess cost of installing the insulated feeder system over the uninsulated system was found to be $3,770, and, figuring the annual cost, including interest, depreciation, taxes, etc., at 10 per cent, this amounts to $377, which added to the $2,050 representing the value of energy losses gives a total annual cost of $2,427 which is chargeable against the insulated system as it now stands. It should be emphasized, however, that this increase in cost is not a necessary increase and results only from the plan that was followed of keeping the initial investment as low as possible until the experimental tests could be made.

It should be pointed out that the amount of copper now in the feeder system is such as would give a maximum economy for a station output of about 3000 kw, whereas the actual maximum output of the station is about 4500 kw, or 50 per cent in excess of that for maximum economy. In order to get the most economical negative return system, therefore, we should increase the cross-section of the present feeders by approximately 50 per cent on the average, and this would require a total increase in installation cost of approximately 50 per cent, or $12,960, which added to the excess cost of the present system over the uninsulated system as given above—namely, $3,770—gives a total increased installation cost properly chargeable to the insulated feeder system of $16,730, and 10 per cent annual charge on this gives an annual cost on the feeder installation of $1,673. At the same time, since the cross-section to the feeders would be increased about 50 per cent, the drop in the negative return would be reduced to two-thirds of its present value of 18.9 volts, giving a negative drop of 12.6 volts. This is substantially the same as the drop under the uninsulated system, so that there would be no appreciable change in the energy losses. Consequently the above annual charge of $1,673 on the installation cost represents the only actual annual cost properly chargeable against the insulated feeder system.

It will be seen that the addition of $12,960 worth of copper to the present insulated feeder system would save $2,050 per year in energy losses, or about 16 per cent on the investment. It is apparent, therefore, that it would be very desirable from an economic standpoint to make this increase in negative copper. In point of fact, it would probably be desirable to add even more than this amount of copper, since by so doing the saving in energy loss would, up to a certain point, almost balance the increased annual cost of the installation and thus the total annual cost would be but slightly increased. At the same time a large reserve capacity for future growth would be had in the negative feeder system.

It is also very instructive to make a comparison on the relative cost of the two systems based on identical voltage conditions in the track return. Under the insulated feeder system the average gradient in the tracks has been reduced to 0.46 volt per 1000 ft., and if this same condition is to prevail under the uninsulated feeder system it will be necessary to have the same current distribution in the track. Consequently we must run feeders to the same point and take off the same number of amperes from the tracks at each point, and since feeders will be in parallel with the tracks we must further give the feeders sufficient cross-section, so that they will carry this current back to the busbar with an average potential gradient not exceeding 0.46 volt. In order to determine the amount of copper required to produce the same conditions under an uninsulated system as we have under the insulated system, it is only necessary to determine the average current carried by each feeder under the present insulated system and to calculate the amount of copper that will be required in that feeder to carry the same current with an average gradient of 0.46 volt. Calculation of this sort has been made and the data are given in Table X.

This shows that for the same voltage conditions it would require eleven and two-tenths times as much copper for the insulated feeder system as is required in the present uninsulated system. Since the cost of the present system is $25,920, the cost of the uninsulated system using the same unit cost would be eleven and two-tenths times as great, giving a total of $290,304, which is $264,384 in excess of the total cost of the present insulated feeder system, and, figuring as before 10 per cent as the annual cost on the copper installed, we get $26,438 per year as the excess annual charge on the investment in uninsulated feeders. If such a system were installed, however, it can be shown that it would reduce the potential drop in the negative return to about 3 volts. This would be a reduction of 16 volts below that which prevails at the present time, which corresponds to an annual saving in energy of

490,560 kw-hr., worth $4,905 at 1 cent per kw-hr. Deducting this from the annual charge of the copper, we get a net annual charge on the uninsulated feeder system of $21,533 in excess of the annual charge on the present system.

Of course, it does not follow that if the uninsulated system were to be installed the location of the feeders would be just the same as here assumed, but the assumption is nevertheless approximately true, and the estimated costs are of the correct order of magnitude. They show the impossibility from an economic standpoint of securing with the uninsulated feeder system approximately the same voltage conditions as can be obtained with a system of insulated feeders.

TABLE X—RELATIVE COST OF INSULATED AND UNINSULATED FEEDERS FOR THE SAME VOLTAGE CONDITIONS

Feeder	Present Amount of Copper (Thousand Feet of Million Circ. Mil. Cable), Insulated System	Average Current, Amp.	Amount of Copper Required for Average Gradient of 0.46 Volt per 1000 Ft., Uninsulated System
Lafayette, between Mississippi and Grattan	1.30	166	4.73
Mississippi, between Ann and Lafayette...	2.30	512	25.90
Gravois, between Mississippi and Jefferson	2.30	701	35.46
Gravois, between Mississippi and California	3.90	448	38.43
Ann, between Mississippi and Broadway..	7.80	1200	102.96
Ann, between Mississippi and Ninth......	2.90	586	37,40
Ann, between Mississippi and Twelfth....	1.45	162	5.17
Ann, between Mississippi and Eighteenth.	0.30	272	1.79
Totals	22.25	...	251.86

Ratio of copper required: $\frac{\text{Uninsulated system}}{\text{insulated system}} = \frac{251.86}{22.25} = 11.2$

When the advantages from both the electrolysis and economic standpoints are fully weighed, it seems rather surprising that insulated feeder systems have not been more widely used in the past, and we are confident that when the advantages are fully appreciated such systems will be adopted as the standard of practice, to the practical exclusion of uninsulated feeders, except in special cases where the load is so light that neither electrolysis conditions nor economic considerations require additional conductivity over that furnished by the tracks themselves.

In conclusion, the writers desire to express their appreciation of the co-operation extended to them by the officials of the United Railways Company, the Laclede Gas Company, the city Water Department, and both the Southwestern Telephone Company and the Kinloch Telephone Company, all of whom did everything possible to assist us in our work. In particular we wish to commend the generous attitude of the officials of the United Railways Company, who willingly incurred considerable expense in connection with the installation of the feeder system in order that the experiments might be carried out under satisfactory conditions.

ELECTRIC RAILWAY REPORTS OF BUREAU OF CENSUS

Preliminary figures of the forthcoming quinquennial report on the electric railways of the District of Columbia, Delaware and Maryland have been given out by Director W. J. Harris of the Bureau of the Census, Department of Commerce. The statistics relate to the years ended Dec. 31, 1912, and June 30, 1902. The totals include electric-light plants operated in connection with electric railways and not separable therefrom, but do not include reports of mixed steam and electric railroads or railways under construction during the census year which had not begun operations.

The detailed figures as presented in the accompanying table for the District of Columbia show that during the decade 1902-1912 there were general gains in the industry. The decrease of the seven operating companies reported in 1912 from 1902 was one, or 12.5 per cent. The track mileage was increased 42.29 (32.3 per cent), and the number of revenue passengers carried was 47,937,297 more in 1912 than in 1902, an increase of 72.5 per cent.

CONDENSED INCOME STATEMENT OF OPERATING COMPANIES FOR DELAWARE, DISTRICT OF COLUMBIA, AND MARYLAND

	1912	1902	Per cent. of increase, 1902-1912
Number of operating companies	25	21	19.0
Gross income*	$17,318,667	$8,393,872	106.3
Operating expenses	8,718,499	4,231,128	106.1
Gross income less operating expenses	8,600,168	4,162,744	106.6
Deductions from income (taxes and fixed charges).	6,031,007	3,314,632	82.0
Net income	2,569,161	848,112	202.9

*Income from sale of current for light and power included: 1912, $622,393, and 1902, $67,795.

The figures as presented for Delaware show substantial gains during the decade 1902-1912. The increase of the four operating companies reported in 1912 over 1902 was one, or 33.3 per cent.

The Maryland figures show that during the ten years ended in 1912 there were substantial gains in the electric railway field in that State. The increase of the fourteen operating companies reported in 1912 over 1902 was four, or 40 per cent.

In order to avoid disclosing the financial statistics of individual companies, the figures for Delaware, the District of Columbia and Maryland have been combined in one table, reproduced herewith.

COMPARATIVE OPERATING STATISTICS FOR ELECTRIC RAILWAYS IN DISTRICT OF COLUMBIA, DELAWARE AND MARYLAND

	District of Columbia		Delaware		Maryland	
	1912	1902	1912	1902	1912	1902
Number of companies	7	8	8	3	17	12
Operating	7	8	4	3	14	10
Lessor	......	......	4	......	3	2
Miles of line	112.27	82.68	74.37	71.55	418.58	258.78
Miles of single track	214.23	161.97	90.37	85.61	694.56	437.84
Miles of single track in state	(a)188.46	(a)146.17	(d)110.37	(d)85.61	(e)721.79	(e)455.44
Cars, number	1,454	1,010	200	163	2,186	1,589
Passenger	1,353	977	183	151	1,892	1,487
All other	101	33	17	12	294	102
Persons employed	2,663	(b)	600	251	5,290	(b)
Salaried employees	224	(b)	78	15	490	(b)
Wage earners (average number)	(c)2,439	(b)	(c)522	236	(c)4,800	(b)
Power plant equipment:						
Steam and gas engines, including turbines—						
Number	14	22	20	18	38	47
Horse-power	23,366	11,050	20,250	5,725	71,075	27,400
Kilowatt capacity of dynamos	15,850	7,852	13,200	3,408	48,330	18,505
Output of station, kw-hr.	75,970,354	23,391,015	22,428,459	7,730,899	13,129,229	42,811,678
Current purchased, kw-hr	8,921,124	(b)	83,801	(b)	121,221,045	(b)
Passengers carried	153,887,045	90,203,941	21,881,379	11,440,702	259,978,572	135,625,650
Revenue	114,099,618	66,162,321	18,023,562	9,956,559	186,828,016	99,989,552
Transfer	39,078,631	24,041,620	3,498,863	1,484,143	69,914,407	35,636,098
Free	708,796	(b)	358,954	(b)	3,236,149	(b)
Car mileage (passenger, express, freight, etc.)	18,558,418	16,139,141	3,967,217	3,006,798	34,438,526	24,832,662

(a) Excluding track lying outside of District of companies within District and including track in District owned by outside companies.
(b) Figures not available.
(c) Number employed Sept. 16, 1912.
(d) Including track in state owned by outside companies.
(e) Excluding track lying outside of state of companies within state and including track in state owned by outside companies.

Factors Determining a Reasonable Charge for Public Utility Service*

BY PROF. M. E. COOLEY, DEAN OF ENGINEERING DEPARTMENT, UNIVERSITY OF MICHIGAN

The principal cause of the difference of opinion between the public and the public service corporation, as I have come to see it, lies in the failure of the public to comprehend all of the elements of cost entering into the construction of a public utility plant. Not only that, but a failure also to understand all of the elements of expense which must be incurred in operating the property and maintaining its integrity, once the plant has been built and the business established. The corporation itself is only beginning to understand some of these things. Its officers intrusted with the management of the property have been obliged to make the best of things, striving on the one hand to earn the dividends called for by the stockholders and on the other to maintain the property so as to give satisfactory service. Without in any way excusing the corporation from its sins of the past, or of the present where they still exist, the trouble is now understood by the corporation, partly at least; and it must be conceded, I think, that just at present the fault lies more with the public than with the corporation.

Assume, for instance, that you are one of a number of men brought together to consider the building of a public utility property. Naturally you will all want to know whether the project is feasible. This will always involve preliminary investigations, the sounding of public sentiment to know to what extent the proposed service would be demanded, what concessions would have to be obtained in the matter of property consents and the conditions under which a franchise could be obtained. If these inquiries have resulted favorably, the next step would be to employ engineers to look over the field and make preliminary estimates of cost and determine upon the feasibility of the project.

All of this preliminary investigation has involved expense which must be borne by some one. It may run from 0.2 to 0.5 per cent of the cost of the proposed property. In case of failure to go further it would fall upon the individuals taking part in the investigation. They have gambled and lost. But should the future promise be great enough to interest capital mildly, let us say, then the bankers might be induced to gamble a bit and, should they get sufficient odds in the way of discount on bonds and blocks of capital stock depending for their value on future earnings, they might be induced to come in.

If, finally, the preliminary work has resulted in the determination to proceed, there comes the organization of the company, the employment of legal counsel to draw up the necessary papers, the procuring of the franchises, the obtaining of the necessary property consents, the securing of the right-of-way by purchase or otherwise, the employment of engineers to make the final surveys and prepare the plans and specifications, the bidding and award of contracts. The actual work of construction then begins.

It is at this point that the public conceives the cost of the property to begin, and for the reason that the average citizen, skilled as he may be in the work of his own pursuit, has little or no knowledge of the skill required in another's pursuit. First of all, let this average citizen be educated to understand the requirements which must be met if he is to be furnished with these necessities of our modern civilization. The average citizen is fair-minded and asks for only the square deal.

There is, however, another type of citizen who, however much explaining there may be, persists in seeing things his own way. He may be self-appointed guardian of the people's interest, sincere enough and honest enough, but too often his zeal results in confusion of understanding, if not perniciousness. Another type belongs to the political class. He sees gain in one form or another, if he can keep alive the troubles between the public and the public service corporation.

NEWSPAPERS CAN RENDER SERVICE

There is no greater service to be rendered the people of our country to-day than that which could be rendered by the newspapers if they would but go at this matter with the idea of acquainting their readers with the facts on both sides. I mean that they should not treat the quarrels between the public and public service corporations as items of news merely, but detail men on their staffs to make a study of the questions involved. Such a work by our newspapers would not only add to the sum total of our happiness but promote the prosperity and welfare of the communities which they serve. I sometimes wonder why the proprietors of newspapers do not see that their own business is in the nature of a public utility, morally, at least.

The plans and specifications of a utility plant having been completed, proposals for its construction are invited. The contractor figures the cost of every item as nearly as possible, adding various percentages to cover contingencies. Happily there no longer is any question of allowing the necessary percentages to cover contingencies, insurance, contractors' profits, engineering and superintendence.

In amount the contingency percentages, varying on the different things from 2 to 20 per cent and upward, may be assumed to average not less than 10 per cent. One-half is usually applied directly to the items themselves, the other half as a percentage on the total cost of all the items. Insurance varies from 0.5 to 1 per cent. The contractor's profit should be estimated at not less than 10 per cent. Engineering and superintendence, like contingencies, varies with the different items from 2 to 10 per cent and over, an average being, say, 5 per cent. One-half is applied directly to the items themselves, the other half as a percentage on the total cost of all the items, including contingencies and contractors' profits. If the insurance has not been included with the contractor's costs, it should follow after engineering and superintendence, and may then be combined with taxes in a percentage varying from 0.5 to 1.5 per cent. In the application of these percentages only the general engineering percentage should be applied to land the cost of which embraces its own particular expenses of acquiring, including damages, deeds of transfer and the like.

Another method in vogue is to place all building operations in the hands of an engineering firm which makes all surveys, prepares the plans and specifications and superintends the work from start to finish, making a charge therefor of 10 per cent on the actual cost of the work.

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*Abstract of an address before the Western Society of Engineers, Chicago, Ill., on Jan. 7, 1914.

Taxes during the construction period are an item usually overlooked by the public. The item of taxes is, in an appraisal, frequently combined with insurance, the amount varying from 0.5 to 1.5 per cent.

The item of organization, administration and legal expenses usually follows insurance and taxes and precedes interest during construction. It is usually expressed as a percentage varying from 2.5 to 5 per cent, being applied to the sum of all preceding costs, including lands.

As to a promoter's profit, the propriety may possibly be decided by considering to what extent one would be willing to contribute to a project, independent of its construction cost, to procure its establishment. Obviously no percentage could be given for promoter's profits, but appraisals in which the costs of promotion have been ascertainable indicate that a proper charge may be as much as 2 per cent. Its allowance must depend on circumstances, and if included in a separate item, must be excluded from administration costs.

Interest during the period of construction is an important item often overlooked in the past. The rate of interest is applied to one-half the total cost, or one-half the rate is applied to the total cost. A rate of 6 per cent per annum is usually assumed.

In large properties, street and steam railways particularly, the offices, furniture and fixtures are frequently items of considerable expense.

Certain necessary stores and supplies must be provided ready for use in emergencies before the property can be put into operation. The interest on this investment becomes a proper charge against earnings. The amount is usually an average taken from the books.

A working capital is as necessary an expense as any other in the production of a public utility property.

OPERATING EXPENSES

With a working capital to hand, the property has been put into operation. It begins to earn, but a considerable time must elapse ordinarily before the earnings from operation suffice to meet all of the expenditures. During this period of insufficient earnings money must be borrowed to make up deficits; not only that, but interest must be paid on this borrowed money until the time that the earnings suffice to meet all expenses. This accumulated deficit constitutes what may be termed the cost of procuring a going concern; in other words, the cost of establishing the business. It is a difficult element of cost to determine satisfactorily, in the absence of well-kept accounts, starting with the property itself.

These deficits are real costs, and necessary if the utility is to be had at all. The utility being a necessity, it must be supported by the public the same as any other necessity. This cost, if incorporated in the interest-bearing capital, becomes less of a burden against earnings than if carried as a floating debt.

DEPRECIATION

In the very nature of the property, it is impossible after it is once started to have present in it the full 100 per cent represented by all new elements. It can, however, be maintained in some condition less than 100 per cent, and it is usual and necessary to maintain it at a point which will enable the most satisfactory service to be rendered with the smallest expense consistent with satisfactory service. This point may be anywhere between 80 and 90 per cent, depending on the kind of property.

It is commonly believed by the public that a utility property should not be permitted to earn on more than the so-called present value of its physical elements, that is, their cost new, less depreciation, say 80 per cent of the cost new or less. The property which by means of a proper depreciation fund can be maintained at some definite percentage which enables it to render satisfactory service has cost 100 per cent. That is, the 80 per cent property cannot be had at all without expending the 100 per cent. Thus, in order to have an 80 per cent physical condition, we must have a capital charge of 100 per cent.

SINKING FUND

If, however, it be insisted that only that percentage of the total cost which is represented by the maintained condition of the property can bear an interest return, the loss of capital and interest thus incurred must be provided for out of earnings in another way, namely, by a sinking fund.

In the case of a limited franchise under which the utility company must cease operations and close up its business at the end of a definite period, the company must earn enough during its life to pay back whatever part of the principal has to be sacrificed, as well as the interest on the principal, in addition to maintaining and operating the plant satisfactorily during the franchise life.

DISCOUNTS ON SECURITIES

No bond house will even consider financing a public service corporation without a bond discount. I refer particularly to utilities built and operated under a limited franchise. It will have to be a good property to secure better than 15 per cent discount. It is an excellent property which commands as low as 10 per cent discount. The best discount I have ever come across in my own investigations is 8 per cent. This does not apply to municipalities, however, at least not to the same extent.

It will surprise everyone not familiar with the cost of building public utility plants to learn that the so-called overhead charges are in the aggregate a large percentage of the costs of labor and the material things entering into their construction. Omitting preliminary costs of investigation as to the feasibility of the project, general contractors' profits, cost of promotion and promoter's profits, interest on floating debt and cost of establishing the business and assuming that the individual contingencies of construction, special engineering charges and contractor's profits are embraced in the cost of physical property, the total percentage may vary from 12 to 25 per cent, and if these inside percentages be added to the outside, or general, percentages, the total percentage may vary from 30 to 60 per cent.

It is to be regretted that engineers and others who have had experience in building properties and valuing them afterward have not done more toward disseminating knowledge of the actual conditions found in such work. We should then be much further along toward the mutual understanding which must exist before the public and the public service corporation can get together on common ground. But engineers have many times hesitated to use the larger percentages, fearing to be accused of favoring the corporation. They have preferred instead to secure the equivalent of them by using larger units of costs, or have used the smaller percentages, influenced by the feeling, unconsciously perhaps, that, all things considered, the results were fair enough. In combining the judicial with the engineering function, they have unwittingly only obscured the issue. All too frequently engineers have felt obliged to exert themselves to the utmost in favor of their client, leaving the interests of the other side to be fought for with equal solicitude by an opposing engineer. Thus they have become advocates. This, in my opinion, is not the best way to handle these momentous problems. It would be far better in these troublesome times to throw open the blinds and let in all the light, our motto being, *Verites vincat.*

The Engineer's Part in Regulation of Public Utilities

Report of a Discussion at the Stevens Institute of Technology Which Urged Responsible and Active Participation by Engineers as Members of Commissions—The Commission Viewpoint Is Presented by Mr. Sague, of New York

A discussion on the "Engineer's Part in the Regulation of Public Utilities" was held at the Stevens Institute of Technology, Hoboken, N. J., on Jan. 9. Those who took part in the discussion were Dr. Alexander C. Humphreys, president of the institute; James E. Sague, member of the New York Public Service Commission, Second District; John W. Lieb, Jr., vice-president New York Edison Company; Newcomb Carlton, vice-president Western Union Telegraph Company, and George Gibbs, consulting engineer Pennsylvania Railroad. The remarks of Messrs. Humphreys, Sague and Gibbs follow in abstract form:

REMARKS OF DR. HUMPHREYS

If those of us who are or have been directly concerned in the management of public utilities sometimes give expression to the indignation which we experience at the tendency of the public to reckon us all as public enemies and at the injustice of some of the decisions rendered against us by the commissions and courts, then by many we are charged with being reactionaries. On the other hand, if we passively submit to unjust accusations and confiscatory decisions, we confirm in those who are responsible therefor the opinion that we have no adequate defense.

The way which is most effective in meeting the criticisms of to-day is to show the public that there is nothing to conceal, that we are conducting our business honestly, that we can give the maximum of service for a given rate of charge only by securing the confidence and good-will of the public and its representatives, and that we shall do all in our power honestly to gain that good-will and co-operation. Thus, openly we should do our utmost to educate public opinion to the belief that the interests of buyer and seller are common and that we and our stockholders are also of the "people."

While making every possible effort along these lines, we should not submit meekly to the domination of those who are ignorant and sometimes vindictive and those who regard property as not to be protected under the law unless the property is theirs. Here we have to remember that the daily and other journals do not propose to ignore us and our activities. That being the case, let us give their representatives the facts rather than leave them at liberty to write from partial or misleading information supplemented by the imaginings and inventions of the trouble makers. I confess I am here recommending a course which has many difficulties in its way. One prominent difficulty is that some of those high in authority in our government to-day say openly that men who are financially interested in a question are thus disqualified as advisers therein. And yet, in a few cities of the United States the course I have so inadequately outlined has been employed successfully, and the utilities which have been so fortunate as to be managed in this spirit have gained the support and co-operation of the public.

I am aware that my position with regard to the control of public utilities by public service commissions may be misunderstood. By some I am supposed to be opposed *in toto* to all such control, and this because I have been forced to oppose the action of certain commissions in certain cases and because I am opposed to giving these commissions unlimited power. My personal relations with the members of our public service commissions have generally been most pleasant. As a rule I have been treated with respect, and I can claim that I have taken advantage of every opportunity to be helpful to the commissions and I have not infrequently been thanked therefor. But I have had experiences which have been nothing short of disgusting and disheartening.

Particularly I hold that a commission or any other one government authority should not be placed in office to exercise the three functions of government which, according to our bill of rights, should be kept separate and distinct from each other—namely, the legislative, the executive and the judicial. If we are to permit this condition to continue, let us cease to claim that our form of government is of the people, for the people and by the people.

Because there should be some measure of such control it by no means follows that national and state commissions should therefore have a free hand in the management of these properties. Those responsible to the owners must be permitted to manage the properties if efficiency and economy are to be obtained and maintained.

I am in favor of a proper measure of control and regulation, so much as will tend to insure to the public efficient and economical service and respectful attention to legitimate complaints and demands, together with a just and discriminating control over return on investment. Certainly the public utilities should not be held to any cast-iron rule as to "fair return" when what would be a fair return in one case would be wholly inadequate in another case. Nor should the public utilities when, as a last resort, they appeal for protection to the United States Supreme Court find that the protection there accorded to them is only that of relief from actual confiscation. If it is replied that this is all that lies within the power of this court, then I say that this is an insufficient protection from injustice, and other means of relief must be found.

In a country like ours we cannot blind our eyes to the facts as to how appointments to office are too often obtained. They are part of the spoils of party victory and control. Those of us who have come into close contact with these commissions know that too often the men appointed are not qualified to exercise the great power placed in their hands. The honest men among them recognize this and apply themselves diligently to fit themselves for the responsibilities for which they were not fitted when they assume office: In too many cases this process might be likened to a surgeon, or a would-be surgeon, getting his first training by operating upon the body of some unfortunate victim. If he is permitted to operate on a sufficient number of subjects, maiming and killing as he goes, he may finally acquire skill to carry through an operation with a minimum risk to the poor patient. It goes without saying that there are men on these commissions who are well equipped to meet their grave responsibilities.

Many of the questions which these commissions are called upon to determine require for their solution the highest engineering training and experience. And yet it is the exception when an engineer is appointed as a commissioner. The engineering profession is most often represented not by membership on the board but by employment by the board, and so with no vote. Frequently the engineers so employed as subordinates to the commissioners are not qualified for an authoritative position in any of the companies over which they thus receive, indirectly it is true, a large measure of authority. I hold that on every one of these commissions the engineering profession should be adequately represented in the persons of men educated in the science of engineering and later trained in the hard school of experience, these men to be voting commissioners. Whether the commissioner is engineer, lawyer, accountant or business man, he should be broadly trained and he should have had experience in the exercise of administrative functions.

The engineers as a class are themselves in part to blame for not taking a more active part in the administrative side of life and for not deliberately and advisedly equipping themselves for administrative responsibilities. By no means do I suggest that there are not a sufficient number of engineers in the country, specifically and broadly trained, to do their full share on the commissions of the country; but they should be selected with regard to their breadth of training quite as much as to their special training. May I not take advantage of this opportunity to suggest that the same rule should be applied in the selection from the ranks of other professions, and particularly that of the law? The tendency has been to have lawyers largely in the majority in the membership of these commissions. I see no reason why a board composed, say, of five broadly trained engineers, with a competent lawyer to advise them, should not be able to render quite as efficient service as five well-equipped lawyers as commissioners with one competent engineer to advise them. If we must confine the membership of a commission to a single profession, then the commission of five broadly trained engineers with competent legal assistants on the staff would give far better results than, on the average, have so far been obtained.

The best results, I believe, would be obtained by selecting the majority of commissioners from the profession of law and engineering, no commissioner to be selected unless he has working experience and has been successful under the test of that experience. This would exclude the man who has spent his life on the development of fine-spun theories, and if applied to those now in office, I fear, would create not a few vacancies.

As a general proposition, the great corporations which by some are thought to be a menace to the country have not won their successes by financial legerdemain. In some cases manipulation of finances has had an influence, though not always detrimentally. Great problems were to be solved, physical and financial, and they were solved only by the patient, persistent, determined prosecution of plans boldly conceived by promoters and generally carried through temporary failures to final success by the united efforts of bankers, men of affairs, engineers and others, not forgetting the small investor. These pioneer labors have been for the benefit of the country as a whole, and therefore it ill becomes the representatives of the people to-day to deny to these pioneers and their successors a rightful participation in the fruits of these hardly won successes.

With regard to the public utilities, the legislation and regulation which in the final analysis will stand the test of time and will accord justice to the producer and the consumer must take full account of the inherent physical and financial limitations within which these properties are forced to operate. To this end men technically trained in all branches of public utility construction and operation must have their full share in the formulation of the regulatory laws and the administration and enforcement of these laws.

REMARKS OF COMMISSIONER SAGUE

James E. Sague, member New York Public Service Commission, Second District, said in part:

To my mind there are far too many laws passed, too many orders and too little of patient study by experts of the finances, general conditions and service of the corporations which are supposed to be under control. Such study with proper publicity in doubtful cases would, I think, go far to remedy bad conditions which have grown up in the past and much farther to prevent the development of such conditions in the future. I think the lack of success which has often attended the work of regulating commissions is due to failure to develop along these lines and a tendency to substitute instead the methods of the court for those of informed study and investigation.

If we look back over the period of perhaps twenty-five years since the original Interstate Commerce Commission law was framed, we will see, however, that there has been great progress at least along two lines: first, in complete publicity of all railroad rates and consequent elimination of rebates and discrimination, and, second, in the publicity of railroad accounts and the reporting of the results of these accounts on the same basis, so that they can be properly compared and analyzed. The success of the Interstate commission along these lines has been astonishing and would be a full justification for the creation and maintenance of the commission if nothing else had been accomplished, although we know that much more has been done in the settlement of controversies between shippers and the railroads. This example has been followed by most of the state commissions. As a result the balance sheets and income accounts are beginning to tell the truth. We all know that few balance sheets have told the truth in the past and that the item "cost of property" has usually only represented the amount necessary to balance the liabilities and surplus and often bore no close relation to the amount of money invested. It is also well known that some companies have shown a tendency to capitalize replacements regardless of the fact that the result is the padding of the income account. It is curious that many of the accounting examinations of the commissions have resulted in improving the company's standing in rate cases, while at the same time the necessity of increased conservation in the payment of dividends has been indicated.

In other respects, however, the work of the average commission, as compared to that of the best, leaves much to be desired. Too much time is taken in the investigation of minor complaints, and in the effort to obey the directions implied by the word "reasonable" too much delay in decisions often ensues. Accidents should, of course, be investigated even with the utmost desire to be fair. It is the most serious condition which the railroads have to meet, and public excitement and the tense situation thereby created are apt to result in biased reports, in the desire to hurry investigations unduly and in the making of orders affecting some elements of operation without proper consideration of other elements which may be fully as important.

For instance, the demand for steel cars due to recent accidents appears to be almost universal and a number of bills have been framed and in some cases recommended by commissions looking to the final replacement of all wooden cars now in service. No proper consideration is given in such proposals to the enormous cost involved or to the increased average weight of the new equipment. The cost of conducting passenger transportation is constantly increasing, owing largely to the greater weight of cars and the consequent increase in weight and power of locomotives. No exact figures are at hand, but I am inclined to think that during my experience with railroad affairs the average weight of through trains for passenger carriage has increased almost 40 per cent. The weights upon locomotive driving wheels have increased in equal proportion with consequent increase in strain upon track and structures.

As a result of this the conditions of strain on the tracks of our railroads have grown to an amount for which there is no precedent. Over 3000 rails per year break in the State of New York alone when the conditions are favorable. When they are unfavorable because of a severe winter, the breakages exceed 5000 rails. Upon the divisions of some railroads carrying heavy traffic so many breakages occur in the coldest weather as to be a serious source of delay to trains. Of course, protection is given by the electric track circuit and the signal system which engineers have developed to provide safety against this and other conditions so that the situation is not especially alarming. It, however, indicates the need of careful engineering investigation before weights are farther increased or expenditures made in ways that will give no adequate net return in safety.

I may be much behind the times in this matter, but it seems clear to me that progress in the installation of steel cars is rapid enough without legislation and that proposals to force all wooden cars out of service are extravagant and unnecessary and will result eventually in increased cost and diminished service to the public. Other things are needed more than steel cars and the money available for improvements is limited. Of course, increase in safety to travel is to be striven for constantly, but we may pay too great a price for it, especially when safety in one direction may mean danger in another. In many sections there is need for local increased passenger service, and yet I recently heard a commissioner of one of the Western States say that he believed the time would come when legislation would, in the interests of safety, prevent the building of any but double-track railroads. He evidently did not consider that such laws would prohibit the construction of thousands of miles of light feeder lines all over the country.

One result to be hoped for from the systematic inspection of railroad lines is that when accidents occur commissions will be willing to bear their fair part of the responsibility and refrain from sweeping blame directed against operating officers for defects and conditions which should be detected by adequate state inspection. Commissions should do all in their power to stop the demand for indictment of railroad officers in connection with accidents. As a matter of fact, indictments of this kind never amount to anything. There is reason to think that they are sometimes sought by prosecuting officers with full understanding that no tangible result will be reached.

MR. GIBBS ON ORGANIZATION OF COMMISSIONS

George Gibbs, consulting engineer Pennsylvania Railroad, said that an engineer in the position of business manager or commissioner on a public utility board soon, on account of his multifarious duties, got out of touch with the details of professional progress, and unless he was willing to delegate the investigation of engineering matters to subordinates who were specialists, his decision must rest upon general knowledge, which was not always a true guide. The matter of proper commission organization was fundamentally one of selecting faithful men of sound judgment and organizing ability, previous specialized training being a matter of less importance. Another consideration of very great importance in commission organization was that of the proper term of office. If the selection of commissioners was of the character mentioned, a long office tenure would undoubtedly work to the great advantage of the community.

The internal organization should include a permanent engineering staff headed by a chief engineer of eminence in his profession and the retention of outside engineering consultants specializing in the various lines of engineering advice needed and called in as occasion required. This organization presupposed that the commission would be willing to accept the advice of its staff.

Mr. Gibbs added that the commissions had very important and useful functions to perform and were becoming increasingly solicitous of performing their duties well. The railroads believed in thorough and impartial investigation of matters affecting the public interest and were co-operating with the commissions. Staff engineers of commissions were frequently more highly paid men than the commissioners themselves. The added honor of holding the title of "commissioner" was, of course, attractive, but was not essential to the dignity of the engineering profession, nor would the field opened up by the employment of a few engineer commissioners add materially to the opportunities of men of that profession in securing positions of high honor and remuneration.

EXECUTIVE COMMITTEE REPORT OF GERMAN STREET & INTERURBAN ASSOCIATION

The following particulars are taken from the report made by the executive committee of the German Street & Interurban Railway Association upon the work of that organization for the years 1912 and 1913. The association had as of Aug. 1, 1913, 152 street railway members, operating 207 properties with a total of 2698 miles. The non-member systems of Germany comprised only forty-three systems with the very small total of 105 miles. These figures do not include Germany's 6169 miles of narrow-gage railways. In all, 96 per cent of the street railway mileage and 78 per cent of the narrow-gage mileage are represented in the association, an increase of 8.2 per cent and 5.8 per cent respectively over two years ago.

The study of rail corrugation received a temporary check owing to a misunderstanding with Dr. Puppe, who had published in a metallurgical journal, without permission, the results of the rolling mill tests which he was to have transmitted to the association as its investigator. The committee points out, furthermore, that the association does not agree with the conclusions reached by Dr. Puppe. It is making arrangements to continue the investigation through others and will also try to secure the co-operation of the Prussian State Railways. The usual co-operative buying arrangements have been made with the rail and carbon lamp manufacturers, but no contract has yet been made for the similar purchase of metallic-filament lamps owing to the developing state of the art.

Among the new subjects which have been suggested to the association members for study is that of fare boxes and automatic ticket-printing machines. This subject has been assigned to Director Stahl of the Düsseldorf Street Railways for report at the next meeting.

ELECTRIFICATION TO DATE

BY E. P. BURCH, CONSULTING ENGINEER, MINNEAPOLIS, MINN.

An engineer's review of railroad electrification work is necessarily incomplete, yet certain prominent facts are impressed on the mind by his practice, observation, inspection trips, analysis of engineering records, and by operating data and financial statements.

Many of the impressions received in 1913 were gloomy headliners. First came the report of the committee on heavy electric traction of the New York Railroad Club, the introduction to which was to the effect that there had been no steam railroad electrification during the year 1912 because none was needed. Second, James J. Hill, whose company has had some experience in steam railroad electrification on a 4-mile section of the road through the Cascade tunnel, has been repeatedly quoted to the effect that the great capacity of the Mallet locomotive has set back railroad electrification for at least a decade. Third, came President Baer of the Reading Railroad, who, being asked for some real improvement in the suburban service furnished by his company, replied: "There will be no electrification while I live. Electrification has been a failure wherever tried." And recently the Southern Pacific Company, which has electrified its suburban service from Oakland harbor to and through the streets of Alameda and Berkeley, reported to the California Railroad Commission that electrification had been unsuccessful from all financial viewpoints. Finally, the steam locomotive representatives have spread broadcast the fact that fire-brick furnace arches, superheaters and mechanical stokers now provide an improved unit which is quite smokeless, is more efficient, and has ample capacity for the modern ten-car passenger train and the heaviest freight train.

Then, too, 1913 was a lean year. The railroads lived from hand to mouth; they did not get sufficient revenue to compensate them for the increased cost of coal, labor, supplies, etc., and therefore they did not develop new work which could well be put off. It is therefore the more wonderful that so much was done in railroad electrification, all over the civilized world, in 1913.

Evidently the Mallet locomotive is not always satisfactory, because some roads which have a large number of these are making up electrification programs. Evidently the directors of some of the railroads do not believe that Mr. Hill is right. Evidently the Pennsylvania Railroad, in deciding to electrify its suburban and main-line services near Philadelphia in 1914, was not influenced by Mr. Baer or by the wretched financial showing of the Southern Pacific Company on its Oakland suburban electrification.

From a review of several technical papers and from other sources, the accompanying tables have been made up to show the present status of the principal railroad electrifications. They represent the actual development and speak for themselves.

A list of the ten principal electric sections of main-line railroads in ordinary freight switching and passenger service, as of January, 1914, is shown in Table I.

A list of the ten principal electric sections of main-line railroads in passenger service only, or for terminal service only, as of January, 1914, is given in Table II.

A list of the ten principal electrified tunnel sections of steam roads includes the Baltimore, Hoosac, Sarnia, Detroit, Cascade, Mersey, Hamburg, Mount Cenis, Simplon and Lötschberg. A list of the ten principal electrified switching yards, not tabulated, shows an increased use of electric locomotives.

A list of the ten principal steam roads in which electrification is to be completed in 1914 and 1915, and which with one exception will use electric locomotives for main-line traffic, is given in Table III.

TABLE I—PRINCIPAL MAIN-LINE ELECTRIFICATIONS IN SERVICE

Name of Railroad	Miles of Road	Miles of Track	No. of Locomotive	Explanation, or Name of Division
New York, New Haven & Hartford	88	500	100	New York to New Haven and switching yards.
Spokane & Inland Empire	168	187	12	Main line; excludes local lines.
Butte, Anaconda & Pacific	27	90	17	Largely mine switching.
French Southern	165	205	16	Partly equipped.
Baden State	10	31	34	Basel-Säckingen.
Prussian State	19	50	13	Dessau-Bitterfeld.
Italian State	104	156	84	Valtellina, Giovi and Savonna lines.
St. Pölten-Mariazell	63	68	14	
Rätische Mountain	46	48	11	
Bernese Alps	52	55	16	Lötschberg line.

TABLE II—PRINCIPAL TERMINAL OR PASSENGER SERVICE ELECTRIFICATIONS IN SERVICE

Name of Railroad	Miles of Road	Miles of Track	No. of Locomotive	Explanation, or Name of Division
New York Central	50	240	47	Terminal service; no freight service.
Pennsylvania	15	72	35	Terminal service; no freight service.
Long Island	100	250	0	Motor-car trains only.
West Jersey & Seashore	75	150	0	Motor-car trains only.
New York, Westchester & Boston	19	63	0	Motor-car trains only.
Southern Pacific	50	100	0	Motor-car trains only, largely on Oakland streets.
Metropolitan Railway, London	35	70	20	Main-line and suburban trains.
London, Brighton & South Coast	60	160	0	Motor-car trains only.
Paris-Orleans	14	46	11	Main-line and suburban trains.
Hamburg-Ohlsdorf	17	41	0	Motor-car trains only.

TABLE III—MAIN-LINE ELECTRIFICATIONS TO BE COMPLETED IN 1914 AND 1915

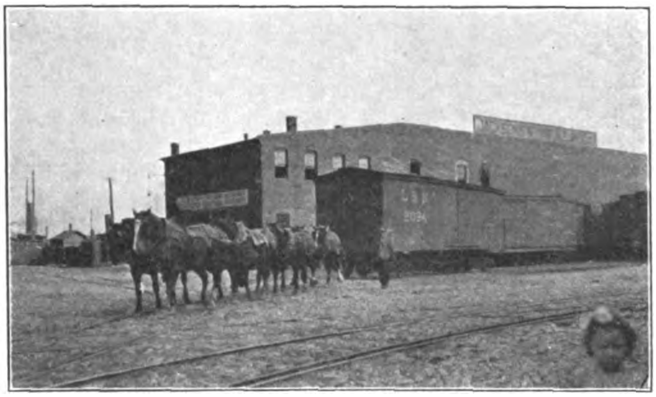
Name of Railroad	Miles of Road	Miles of Track	No. of Locomotive	Notes or Explanation.
Norfolk & Western	30	85	25	Bluefield-Vivian division.
Pennsylvania	20	90	0	Philadelphia suburban.
Canadian Pacific	30	43	4	Rossland-Castlegar grades.
Chicago, Milwaukee & Puget Sound	113	168	14	Rocky Mountain division.
North Eastern, England	18	44	10	Freight service.
Swiss Federal	93	100	20	Chiasso-Lucerne section of St. Gotthard division.
Swedish State	80	93	13	Kiruna-Riksgränsen division.
Prussian State	81	124	44	Lauban-Königszelt division.
Italian State	32	60	16	Milan-Lecco division.
Vienna-Pressburg	42	50	8	Main-line service.

In 1914 old suburban steam roads will be electrified for the heaviest motor-car service at London, Paris and Melbourne. Electric locomotives are to be added in 1914 to the existing equipment of the New York Central and on the New Haven roads; also on the electrically operated State railroads of France, Germany, Switzerland and Italy.

The developed electric engine is now competing with the modern superheated steam engine and is offered on its merits as an economic factor in railroad transportation, to facilitate the haulage of heavy and dense traffic and to reduce the expenses of operation.

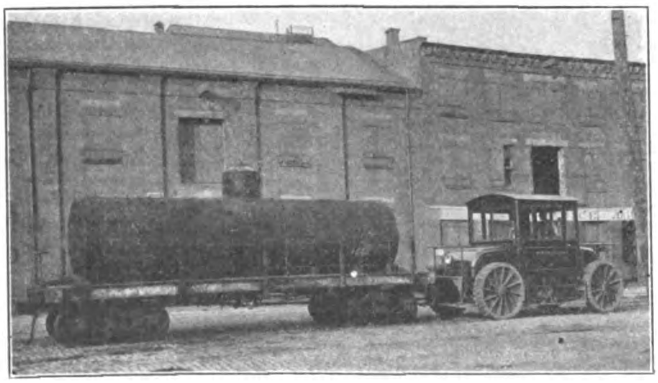
ELECTRIC TRACTOR FOR SWITCHING SERVICES IN CITY STREETS

An unusual electric tractor for switching service on city streets was described in the ELECTRIC RAILWAY JOURNAL for April 26, 1913, page 768. The machine was placed in service last winter in Jersey City by the Pennsylvania Railroad, and records of its operation have now been given out by T. V. Buckwalter in a paper read on Jan. 6 before the Society of Automobile Engineers.



Moving Cars in City Streets by String Teams of Horses

The tractor was built in the Altoona shops of the Pennsylvania Railroad and was completed Jan. 14, 1913. After the selection of a chauffeur, practice service within the limited confines of the Jersey City freight yard was maintained until Feb. 4, when the machine was placed in regular service. The average daily service by months is shown in the first table accompanying this article.



Moving Cars by Electric Tractor Which Replaces String Teams

The costs of maintenance and operation are given in the second table. These are based upon the average results of the seven months' service in the Jersey City yards.

TABLE I—AVERAGE DAILY PERFORMANCE OF ELECTRIC TRACTOR BY MONTHS

	Months, 1913							
	Feb.	Mar.	Apr.	May	June	July	Aug.	Avg.
Hours on charge	8.2	7.3	7.9	7.27	6.7	6.0	5.5	6.98
Hours in service	8.5	8.5	9.5	8.45	8.6	7.7	6.7	8.28
Discharge in ampere-hours	616	508	518	510	494	410	344	486
Miles run	12.1	12.6	13.7	14.8	13.1	14.4	10.3	13.0
Number of cars handled, in	14.8	15.3	15.7	17.0	15.7	14.4	11.4	14.9
Number of cars handled, out	14.8	15.0	16.5	17.0	15.9	14.4	11.4	15.0
Total	29.6	30.3	32.2	34.1	31.6	28.7	22.8	29.9
Total weight, tons	992	1032	1100	1118	1057	962	763	1003
Number of internal movements	19.5	19.4	20.9	17.3	14.0	13.6	14.3	17.0

These two tables indicate that the machine has handled a total of 4935 cars in the seven months from February to August, inclusive, at a cost of $4,627, including all capital, maintenance and operating charges.

TABLE II—DETAILED COST OF OPERATION FOR SEVEN MONTHS

Repairs	$1,816
Supplies	42
Lubrication	17
Chauffeur labor	961
Current	674
Total cost of maintenance and operation, seven months.	$3,510
Interest at 6 per cent on $13,400, seven months	476
Depreciation on $13,400 (less tires and battery, $4,200 = $9,200), at 5 per cent, seven months	268
Depreciation on battery, $3,200, at 20 per cent for seven months	373
Total charges for seven months	$4,627
Total charges if horses had been used (4935 cars, at $1.86)	9,179
Saving by electric tractor, seven months	$4,552
Saving over investment by electric tractor	58.5 per cent
Saving including investment, 58.5 + 6 per cent	64.5 per cent
Cost of service per car ($4,627 ÷ 4935)	$0.938
Cost of service per ton ($4,627 ÷ 165,524)	$0.028
Average number of cars per mile	2.4
Cost of service per ton-mile ($0.028 × 2.4)	$0.067
Total number of cars handled (4935 + 2788)	7723
Number tons handled per hour	121
Cost of service by electric tractor per working day	$27.87
Cost of service by team per working day	$55.29

The cost of handling this number of cars by horses would have been $9,179, thus indicating a saving by use of the electric tractor of $4,551, or 64.5 per cent on the investment of $13,400.

CINCINNATI COLLEGE STUDENTS IN ELECTRIC RAILWAY SHOPS

For about two years the Cincinnati Traction Company has been employing, with marked success, about thirty co-operative students in its shops and carhouses. These young men are students at the University of Cincinnati who are taking five-year courses in mechanical or electrical engineering, and they are required to spend one-half of their time in actual work and the other half with their studies. The school term is eleven months, and the students are divided into two groups that alternate in shifts of two weeks each at the shop work.

Work is given to each student in the shops according to his ability, but all must start with drill press and vise work. From this they are advanced to laying out templets, in which work they are very accurate. In the beginning the students are paid 15 cents per hour, and as they become more expert and are advanced it is possible for them to make as much as 28½ cents per hour. In the carhouses the students do the truck and motor repair work, and in all cases they have been found to be very proficient. This is probably due to the fact that they are very much interested in their work. In so far as the company has been able to ascertain there has been little or no jealousy on the part of the old employees where these have not been replaced by the students because of inefficiency. On the other hand, the men who continue in the service are spurred to a more strenuous effort to meet this high-class competition.

Business Prospects for 1914

Expressions of Opinion from Representative Manufacturers as to Business Outlook in the Electric Railway Field During the Coming Year

In the issue of the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, statistics were presented showing the general trend of the electric railway industry during 1913. It has been deemed advisable to supplement these statistics for the past year with expressions of opinion from prominent manufacturers of electric railway apparatus as to the business prospects for the coming year and the effect which important changes in the business or technical improvements in apparatus made during the past year will have on business in 1914. Accordingly letters were sent out to the entire field, and the following replies have been chosen as best expressing the generally prevailing optimism:

THE O. M. EDWARDS COMPANY, SYRACUSE, N. Y.: "We are inclined to be very optimistic regarding the business outlook for 1914. Our factory is running full time, and our unfilled orders and prospective business show no indication of a 'lean year'."

CLEVELAND ARMATURE WORKS, CLEVELAND, OHIO: "Our business is not a very good barometer for trade conditions, for it is almost exclusively that of repairing electrical machinery. It is somewhat in the position of a grocery store. People must eat; likewise electrical machinery must have repairs. The outlook for 1914, however, is very encouraging. In fact, we find at this time that we are rushed with orders for repair parts for electrical machinery."

FEDERAL MOTOR TRUCK COMPANY, DETROIT, MICH.: "There is no question in our mind that 1914 will be by far the best year since the organization of this company. The adoption of motor trucks is simply a step toward economy and efficiency, which works in excellently with the present tendency toward cutting the cost in every way possible. This is particularly true as regards street railways, inasmuch as experience shows there is absolutely no question concerning the economy of federal trucks in the departments in which they are used by these companies."

GRIP NUT COMPANY, CHICAGO, ILL.: "Better times are coming. If there is one thing that can be depended upon more than another, it is that history will repeat itself. The fact that we have a slight period of depression only makes our demands of the immediate future that much more acute. The fact is that the railroads are secretly placing orders with car builders, and as cities are growing rapidly and street cars are wearing out we must have a general increase in business. The fact that it has not occurred during the past year makes it more certain that it will come now."

THE HOLLAND TROLLEY SUPPLY COMPANY, CLEVELAND, OHIO: "From the orders received up to this date the outlook for 1914 is good and we are sure that when we come to the close of the year our optimism will be verified by the results. The basic position of this country is sound. Stocks of merchandise in all lines of business are low. Railways cannot serve the public unless they keep up their equipment, and although they may not be buying just at present, conditions will oblige them to do so at an early day. There is no reason that we can see for the pessimism exhibited by some bankers and stockbrokers."

THE ELECTRIC RAILWAY IMPROVEMENT COMPANY, CLEVELAND, OHIO: "The business situation as far as the Electric Railway Improvement Company is concerned is very good. During the past year this company has placed twenty-four cars on various roads in the United States and Canada, representing a total mileage of 4618 miles, and there is considerable new business in sight for the year 1914. Taking everything into consideration, there should be a marked improvement in all lines of business, beginning with Feb. 1. The intervening month of January will be quiet, owing to the taking of inventories, the compiling of statements and the annual meetings of corporations. The present year should be the banner year of all since 1907."

THE WHEEL TRUING BRAKE SHOE COMPANY, DETROIT, MICH.: "As far as the business outlook for 1914 concerns us it is very good. We have noted that during periods of business depression in the railroad field there is a considerable demand for wheel truing brakeshoes, which we believe results from a desire on the part of the consumer to get the last mile of service out of his wheels. As to improvements or changes in our product—we try to adapt ourselves to various changes in conditions, such as the increased braking power made necessary by increased weight and speed of cars, which has led to a heavier and stronger shoe. Variation in material and texture of wheels must be met with certain changes in composition, temper, etc., of the abrasive material in the shoe."

THE VALENTINE-CLARK COMPANY, MINNEAPOLIS, MINN.: "The demand for cedar for telegraph pole purposes for the year 1914 will undoubtedly exceed the actual business secured in the year of 1913. Almost every engineering company or operating company has considerable work in contemplation to be carried out when money matters are adjusted. What is worrying the cedar telegraph pole producer is the weather conditions in Michigan, Wisconsin, Minnesota and the West. Up to this writing we have had no winter whatsoever, no snow and very little water with which to make ice roads. This means curtailed production and a higher range of prices than has existed for some time. We do not look for any great demand or increase in sales until after March 1, but after that business will be better than it has been for some time."

MORE-JONES BRASS & METAL COMPANY, ST. LOUIS, MO.: "The prospects for 1914 appear good to us. Orders are being placed more freely than in November and December, 1913. It is our opinion that trade will be quite fair the first six months, and that the volume will then show a steady increase, resulting very probably in another era of general prosperity for the whole country. The disturbances of 1913 are largely over. The passing of the currency bill supplies a long-felt want, the good effects of which will become more apparent as time goes on. The new tariff bill affected some lines adversely, but it is in process of adjustment and will no doubt work out satisfactorily. If now the railroads obtain a 5 per cent increase in freight rates, it will be hard to gage accurately the favorable results that will accrue to the entire business community."

WALTER A. ZELNICKER SUPPLY COMPANY, ST. LOUIS, MO.: "We do not expect 1914 to be a boom year but look forward to a steadily increasing volume of substantial business. We base our opinion upon the facts that for the last several years purchases of materials of all sorts have been on a hand-to-mouth basis, that outlays for maintenance have been made only when absolutely necessary, and that such extensions as were built were absolutely certain to show immediate and large returns. We feel that there must be an increased amount of buying to cover replacements that are absolutely necessary and that suburban residence districts are going to demand extensions of urban lines. Sooner or later, too, suburban and steam lines must make extensions that are certain to show good returns on the investment, and under the law of averages that time cannot be far away."

NAUGLE POLE & TIE COMPANY, CHICAGO, ILL.: "December was an exceptionally good month with our company. We heard so much depressing talk that we naturally thought we would do a poor business ourselves, but when we came to take off our monthly trial balance we found the month's trade unusually good. We actually shipped more cars of poles in December, 1913, than we did in December, 1912. Inquiries, however, are much lighter now than they were thirty days ago, although there are a number of big inquiries awaiting the result of our recent money legislation. There are two or three propositions in the electric railway field that are about ready to be taken up again, after some delay, and it looks as if there would be a considerable amount of this work done the coming year. In fact, the outlook for the year is bright, although now we do not see any immediate results."

THE NATIONAL LOCK WASHER COMPANY, NEWARK, N. J.: "Our ideas regarding business conditions for 1914 are predicated on the consideration which the steam railroads will have from the Interstate Commerce Commission, particularly the present request of the Eastern railways for an advance of 5 per cent in their freight rates. We are constantly aiming to improve the efficiency of our lock washers, curtain and window fixtures, not only the articles themselves, but the method of manufacturing, and have no doubt that we will obtain our share of whatever business is offered during 1914. We strongly believe, however, that business will not start forward with any sustained impetus until the very high wages now paid practically all classes of workmen are brought down to a fair level, and that workmen as a class must realize that they must give a fair day's work for a fair day's wage."

R. D. NUTTALL COMPANY, PITTSBURGH, PA.: "As manufacturers of gears, pinions and trolleys for electric traction works, we are pleased to say that the prospects for improved business during the coming year are unusually bright and we are more than hopeful that we shall show an increase over the 1913 business. Orders on hand, business in prospect and the number of legitimate inquiries being received all indicate a healthy condition of affairs in this line of work. There is a widespread interest in high-grade materials which is certain to develop more or less business in the near future. During the past year we have developed a new design of gear for street railway work. We have also experimented largely with chrome vanadium and other special steels in our efforts to meet the ever increasing demand for better products. The older methods of heat treatment and the apparatus used in heat-treating work have been improved so that almost absolutely uniform results are obtainable, which was out of the question a short time ago."

ELECTRIC SERVICE SUPPLIES COMPANY, PHILADELPHIA, PA.: "We believe that as business quieted down very perceptibly during the final three months of 1913, it is not likely to reach normal proportions much before the middle of this year. Unquestionably there is evidence since the first of the year of a considerable increase in orders and a very decided increase in inquiries. It is hoped that the Interstate Commerce Commission will grant the increase in freight rates asked for by the railroads. This, with the settlement of the currency question, should rapidly bring the business volume up to normal. In our own business the recently added lines of manufacture are showing such a substantial growth that we expect a greater proportionate increase than will probably occur in the general business of the country. We are preparing now for an 80 per cent addition to our present plant and will begin building in the early spring. All in all we are much more optimistic on the business situation than we were in the latter part of the year just closed."

RAILWAY TRACK-WORK COMPANY, PHILADELPHIA, PA.: "We feel very optimistic in regard to the prospects for the sale of our grinding machines during the present year. During the past year our sales far exceeded our greatest expectations; yet we believe that the practice of rail grinding is in its infancy and will broaden rapidly. At the recent A. E. R. M. A. convention in Atlantic City we interviewed electric railway representatives from all over the country and the increased interest in rail grinding expressed by these men far exceeded our expectations. Indeed, interest was shown by many of the very small roads which we thought would not feel justified in purchasing high-class grinders. We have added many important features to our reciprocating track grinder, tending to produce a machine which will withstand very severe usage in the hands of the common class of labor needed for its operation and to reduce the cost of up-keep without affecting the excellent quality of work turned out by the machine."

THE NICHOLS-LINTERN COMPANY, CLEVELAND, OHIO: "The growing demand throughout the country for transportation and the conscientious work of the electric railway fraternity for better equipment and safer methods indicate a prosperous year for material manufacturers and dealers. Orders now on our books are above the average of last year, and we look into the future with confidence. We find a growing demand for complete equipments of sanders and are now furnishing more equipment completely assembled, with hoppers, traps and all accessories, than at any time in our experience. Our ventilators, both roof and deck sash, have been improved during the past year, and the demand is very satisfactory. Our special selector switch for use in connection with high wattage car lighting lamps is growing in favor. We are placing on the market a special dry-cell battery for the operation of continuous signal lights, etc. It can be used as a substitute for storage batteries and ordinary dry cells and is designed to be connected direct to a high voltage line. We are also placing on the market the Lintern tail-light and indicating signal, a device that indicates the operation of the controller of a car to the operator of a following car and to the driving public."

PREPAYMENT CAR SALES COMPANY, NEW YORK, N. Y.: "It being conceded that the prepayment principle has been exceedingly beneficial to the various traction roads as evidenced by its widespread adoption, in our opinion the year 1914 should show a considerable expansion in the street car building industry and consequently in the business of the Prepayment Car Sales Company. The center-entrance prepayment car, especially the low-level stepless type, has been well tried out and proved very satisfactory for city service. For end-entrance cars it is generally agreed that those having inclosed platforms with mechanically operated outward folding doors and folding steps are the best, safest and most economical. Indeed, this latter type of car, with a fare box, seems to be about the 'last word' in car design, and many roads are using this type for interurban and zone fare work. Statistics show that 5514 new cars were built in 1913. Having regard to the growth of the population and actual requirements of the various roads, we believe that 1914 will show a substantial increase in this figure, as many of the smaller roads throughout the country are considering the conversion of their old type of cars to the more economical and more profitable prepayment type."

INTERNATIONAL REGISTER COMPANY, CHICAGO, ILL.: "We expect a record-breaking year, partly owing to conditions peculiar to our business. Our fare register business has held its own notwithstanding radical changes in the methods of fare collection, for fare registers are used more extensively than formerly for tickets and transfers and also for cash fares in connection with fare boxes. Our new coin registers and fare boxes, the output of which was limited last year to several large orders, we shall now endeavor to introduce generally. With hundreds of prepayment cars in use not yet provided with money-counting fare boxes and with our machines now thoroughly standardized, we look for a year of good business and steady growth. We expect to put out soon a coin register capable of taking tickets, for which there is considerable demand."

STANDARD MOTOR TRUCK COMPANY, PITTSBURGH, PA.: "As builders of trucks for electric railway service, we are firmly convinced that the decrease of 8 per cent in the number of cars purchased in 1913 as compared to 1912, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, is very slight in comparison with previous presidential years. We confidently expect the year 1914 to be as good as any of our previous years in the truck business, as general conditions seem to be gradually getting back to normal. We did slightly less business during 1913 than in 1912, but in a large measure this was due to the fact that we advanced our selling prices. During the past year we made a number of changes in the manufacture of our motor trucks, such as improving the designs and making the trucks of stronger construction yet lighter in weight, as is evidenced by our pressed frame channel type of truck. Electric railways in the past have equipped their roads with very heavy cars and trucks, which are expensive to operate as well as to maintain. The present trend is toward lighter equipment. In many instances, cars now being ordered are from 30 per cent to 40 per cent lighter than formerly, as is evidenced by the trail cars now operating in Pittsburgh. Some of these were equipped with smaller motors, yet they are able to maintain the same schedule as heavier cars with larger motors."

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.: "The indications point to an early resumption of normal business. Even at the present time our orders for electric car equipment are fairly satisfactory, and approximately four months' output is now booked. During the past few weeks, also, the number of inquiries has largely increased. The damages caused by the floods in the great interurban districts have been largely overcome, and many purchases delayed by the destructive action of the elements last spring should be made during the coming year. The tariff and currency questions have been definitely settled, and a reasonably early decision as to freight rates seems probable. Constructive adjustments, therefore, should now take the place of lingering uncertainty. Initial contracts for the electrification of mountain grades have opened a new field for the electric locomotive, and, with the beginning of two new terminal electrifications, seem to foretell a wider activity in heavy electric railroading. Large numbers of equipments with simple forms of train control, such as type HL, were sold during the past year as well as many field control motors. The reliable operation which these have given and the economies which they have effected lead us to look for increasing adoption of such devices. These conditions seem to predict a satisfactory volume of business during the coming year."

THE TOOL STEEL GEAR & PINION COMPANY, CINCINNATI, OHIO: "We have already the renewal of our largest 1913 contracts, together with a number of new contracts for large properties, and we believe that our business for 1914 will be much larger than for any of the previous years. There is a decided tendency to increase the horse power of motors and the weight and speed of cars, and this of course works very strongly in favor of better gears. Moreover, a number of companies are adopting the maximum traction truck with only two motors instead of four, which, of course, doubles the work that the gearing must do. The fact that many cities are now using trailers in the rush hours also adds another feature demanding high-grade gearing. So acute is this situation becoming that in many cases our gears and pinions have been specified during the past year on new motors, this applying to a considerable extent in the case of companies that have been ordering equipment in the United States and in the case of several large electrifications in England. We have just completed the erection of a new shop several times as large as our old building and have purchased a considerable amount of new machinery. Our capacity in the new location will be at least 50 per cent greater, and we shall have much more convenient methods of handling, which will not only increase our output but also add to the quality of our product."

UNITED STATES ELECTRIC SIGNAL COMPANY, WEST NEWTON, MASS.: "At the opening of 1914 all indications are pointing toward a continuance for a time of the slacking-off tendency which has existed in electric railway construction and improvement for months past as well as in most other lines of business. The cause does not appear to be a falling off in the actual business done by the electric railways so much as the difficulty of financing new projects or increasing the capital accounts. This condition is perhaps brought about as much by the state of the public mind as by actualities and is but temporary. Undoubtedly as soon as the country becomes adjusted to the new conditions confidence will be restored and ample funds will be seeking investment. The particular classes of material manufactured by this company are such that its business will not be as seriously affected as will some other lines, because in times of retrenchment like the present the necessity of machines and devices the installation of which makes operation more economical is more evident. Another reason peculiar to this company's business is the impetus lately imparted by 'safety first' campaigns throughout the railway world. While estimates for the present should be conservative, we are looking forward very optimistically to the near future. By the taking over of the business of the American Automatic Switch Company, formerly of New York, late in 1913, the scope of our business has been considerably enlarged. The material now offered railways comprises not only automatic block signals for all purposes but also automatic track switches, interlocking, tower and curb controls, derails and crossing protections."

DIAMOND STATE FIBRE COMPANY, ELSMERE, DEL.: "It is difficult for us to give an intelligent expression of opinion as to prospects for business with electric railways during the coming year. This company manufactures vulcanized fiber in sheets, rods and tubes, used principally for insulating purposes but also used very extensively in many mechanical lines into which the question of insulating properties does not enter. All electric railways use more or less vulcanized fiber; but many of them do not carry a stock, and, as a matter of fact, do not purchase direct from the manufacturer but from local dealers. Vulcanized fiber could be used advantageously in many places where inferior and sometimes more costly materials are now used. Many concerns are using fiber which really know very little about its actual merits; and, in our opinion, an educational campaign would help them to solve satisfactorily problems that rise and convince them that fiber should be more generally used."

DOSSERT & COMPANY, NEW YORK, N. Y.: "We have just closed the most successful year in the history of our company and look forward with confidence to a continuing steady growth in the volume of our business in 1914. We believe there is basis for the hope that public sentiment toward the larger business interests of the country will take on an aspect during the year that will make for returning confidence on the part of investors, so that capital needed for expansion of transportation facilities, manufactures and trade will be available in greater volume and at lower rates of interest. As regards changes or technical improvements in our product during the past year, the most important are the adaptation of our connectors for the wiring of sectionalizing cases and other apparatus in the latest block signaling system and in junction boxes on the lighting systems of all-steel cars, and for the connections for switch gear, busbar equipment and generating, converting and transforming apparatus in the power and substations."

THE OHIO BRASS COMPANY, MANSFIELD, OHIO: "Business, as a whole, is showing improvements already, and we confidently expect a good year. In 1913 we received the largest business in our history, despite a lull during the last two months of the year. We are going ahead with very active sales and advertising plans for this year and have made a number of improvements in our line and added a number of new devices, which we believe will help toward greater sales. Briefly outlined, the additions and improvements to our line of railway materials are as follows: four new types of catenary hangers and several new schemes of catenary construction; a new design of round-top railway hanger and two others for mine work; a pressed-steel trolley clamp; a new flexible trolley ear; the adaptation of our patented extruded metal runner piece on metropolitan strain plates and other overhead devices; a new type C trolley wire splicer, which permits installation without bending wire; a new line of live adjustable cross-overs with cammed tips that have proved so popular on our Type D frogs; a new lighting regulator for regulating lighting circuits in cars, and an automatic electric air and car coupler. We have made several improvements affecting a number of our materials, among them being the substitution of steel for all of our coupler body castings, the increase in the sizes of set screws on various devices, etc. In our porcelain business we have added a considerable number of devices to our line of hardware to be used in connection with suspension insulators. We also have designed a new porcelain strain insulator and are developing many new types of efficient wall and roof bushings for extremely high working voltages."

GOLDSCHMIDT THERMIT COMPANY, NEW YORK, N. Y.: "The prospect for business in the street railway field, in our opinion, seems to be particularly good for the coming year, especially in regard to rail welding and the sale of appliances used in connection therewith. While the late fall and winter months usually constitute a dull season for us in rail welding, such has not been the case this year. Our welding gangs have been busily engaged in the Southern States and on the Pacific Coast, where the climatic conditions permit of welding rails the year round. There is a growing demand among the street railway companies for a better and more permanent rail joint than can be obtained by any mechanical means. Much pressure, too, is being exerted on street railway companies everywhere by municipal and other authorities for the installation of effective bonding systems so as to minimize stray currents and thereby reduce the possibility of damage by electrolysis. The installation of the fully welded rail joint seems to be the only sure means of attaining these ends. In regard to important changes in our process, the perfection of our new insert method of welding probably represents the most important technical improvement, as it permits of welding rails together throughout their entire section but without in any way affecting the composition or wearing quality of the metal in the head of the rail. To make this possible many improvements were necessary in our equipment. Probably the most interesting of these was the making of our only large tool—the rail grinder—in the form of a one-man machine."

OHMER FARE REGISTER COMPANY, DAYTON, OHIO: "The more or less intermittent operation of the business pendulum during the past two years has undoubtedly been adjusted to more uniform action since the tariff and currency bills have been disposed of, and business confidence will naturally follow. We have already received an unusual number of contracts for registers for so early in the year, and prospects for new business during 1914 are very flattering, not because of any anticipated increase in rolling stock but for three other distinct reasons. In the first place, the men who operate railways are appreciating the value of the Ohmer system; they know, by experience, that it is vastly better to operate with a system which obliges the conductor to turn in all he collects than with one which permits him to turn in only an amount equal to the amount registered. Secondly, practical experience with fare boxes has demonstrated more than ever the necessity of using in railway cars a detail recording register. The third reason for favorable projects lies in the fact that our new totalizing register for city service and our automatic fare-counting boxes are fully developed and our facilities for filling orders promptly have been improved. We have worked a full force all winter and are now adding extra men to the regular number of employees."

WAGES ON BRITISH AND AMERICAN RAILWAYS

The Bureau of Railway News and Statistics has recently compiled some comparative figures of the wages paid British and American railroad employees.

DAILY RATE AWARDED BRITISH EMPLOYEES COMPARED WITH 1912 AVERAGE PER MAN IN THE UNITED STATES

	Great Britain		United States
	Minimum	Maximum	Average
Enginemen	$1.15	$2.18	$5.02
Firemen	0.73	1.46	3.03
Conductors	0.77	1.42	4.29
Trainmen	0.63	1.42	3.02

The bureau says: "According to latest determinations, $1.86 daily was the average earnings for engineers, $1.11 for firemen and $1.26 for passenger guards in Great Britain.

"It is from the graduated scale, however, that one best appreciates the slow, laborious ascent which marks the British railway servant's rise in the wage scale. Beginning at the set minimum, his advance almost universally is at the rate of 1 shilling (24 cents) per week annually toward the maximum of the grade."

Plans for the Midyear Conference

Arrangements of the American Electric Railway Association and Manufacturers' Association for the Meeting and Dinner to Be Held in New York on Jan. 29 and 30—Many Committee Meetings Called

The fifth midyear conference of the American Electric Railway Association is to be held at the headquarters of the association in New York on Jan. 29 and 30, and full arrangements are being made for a successful gathering. At the same time meetings of a number of committees of the various associations will be held. While full announcement has not yet been made concerning the committees that will meet at this time, it is expected that a number will take advantage of the opportunity to combine attendance at the conference and banquet with the work of planning committee reports for the 1914 convention.

The idea of the midyear conference has been carried out from year to year with increasing attendance and success. It has provided a different kind of meeting from what has been found practicable at the annual gathering in October. It was designed originally to appeal especially to the executives of companies, and while there has been no definite departure from this plan, the program has been of such a nature as to appeal also to all who are interested in the larger problems of the industry. No other events of similar interest conflict with attendance at the midyear conference as at the time of the annual meeting, when various reports and papers are presented before the different associations, while other attractions are provided in the exhibits and informal conferences, all of which combine to attract attention.

Supplementing the information published in last week's issue in reference to the speakers at the annual dinner to be held at the Hotel Waldorf-Astoria on Jan. 29, Secretary Burritt of the association has issued an announcement in regard to the subject and speakers for the conference to be held on Jan. 30. This announcement appears below. It is expected that a further announcement in reference to the programs will be made by the association before the time of the meeting.

DATE OF THE BANQUET

The midyear dinner is to be held in the grand ballroom at the Waldorf-Astoria Hotel at 7 o'clock on Thursday evening, Jan. 29. Tables will seat eight guests. H. G. McConnaughy, secretary and treasurer of the Manufacturers' Association, in his letter regarding the dinner, says that application blanks for tickets must reach his office at 165 Broadway, New York, not later than Jan. 26, in order that names and seating arrangements can be printed.

The dinner committee is composed of C. Loomis Allen (chairman), T. S. Williams, Frank Hedley, L. S. Storrs, George J. Roberts, W. L. Conwell, C. R. Ellicott, B. A. Hegeman, Edwin H. Baker and H. G. McConnaughy.

CIRCULAR LETTERS BY SECRETARY BURRITT

Two circular letters outlining the subjects selected for consideration at the midyear conference have been sent out by E. B. Burritt, secretary of the association. The first of these, which is dated Jan. 10, 1914, and which is addressed to the executives of all member companies, is in part as follows:

"The dates of the annual midyear conference are Jan. 29, 30 and 31. The meeting of the American Association (the conference proper) will be held on Friday, Jan. 30. In its scope and in the importance of the subjects to be considered this meeting ranks above any yet held by the association. The endeavor of the committee on subjects is to bring about a thorough discussion of certain vital topics, such discussion to be inaugurated by authorities.

"These subjects are: 'The Economic Aspects of Regulation Compared with Profit-Sharing with Municipalities'; 'The Effect of Rate of Fare on Riding Habit'; 'Inherent Hazards of the Electric Railway Industry,' and 'Present-Day Influence of Labor on Legislation.' Although it is not possible at this time to announce all of the speakers, the quality of the program is indicated by the fact that among them are the Hon. Halford Erickson, of the Railroad Commission of Wisconsin, and F. W. Hild, general manager Portland Railway, Light & Power Company.

"In addition to the addresses mentioned, the conference will consider the most important report of the joint committee on the joint use of poles, a subject of the greatest importance to every railway as combining features relating both to public policy and to economies of operation.

"As has been customary, the meetings of many of the committees of all affiliated associations will be held during the period of the conference, and on the evening of Thursday, Jan. 29, at the Waldorf-Astoria, will be held the annual banquet of the association, this time under the joint direction of a committee from the American and Manufacturers' associations. The speakers at the banquet are men of prominence and will handle subjects vital to electric railways, and there is every reason to believe that this affair will not only be one of the most enjoyable but also one of the most profitable functions which the association has yet held.

"The attendance of all possible delegates from your company is urged, and it is especially desirable that the men of authority and influence in your company's affairs be in attendance. The subjects to be considered are those closely connected with the policy of your organization, and the attendant discussion should have the weight of authority possible only when participated in by the leading men of the industry.

"Inclosed is a registration card, and it is requested that this be filled out with the names of those expecting to attend the conference and returned as early as possible.

"In again urging upon you the desirability of having in attendance as large and representative a delegation from your company as possible, the secretary is actuated by the belief that the welfare not only of the association but also of the industry is greatly forwarded by the success of these meetings, both in their direct effects upon the interests of the member companies and in the impression created upon the public.

"Please fill out and return registration card now."

The second letter, dated Jan. 13, is addressed to the members of the American Association. It covers briefly the plans for the midyear conference as given above, and states that during the three days meetings of many of the committees of all associations will be held. The individual members are especially urged to be present not only because of the direct value of participation, but also because a large attendance will show that the electric railway men of the country are acting as a unit in the movement to secure better conditions for the industry. It is the opinion of those in charge of the meeting that this cannot fail to have a wholesome effect upon the public in general.

Convention of Wisconsin Electrical Association

The Sixth Annual Meeting Was Held in Milwaukee Jan. 15-16 and an Account of the Proceedings of the First Day's Sessions Are Published, Including an Abstract of the President's Address, Which Reviewed Conditions During the Past Year in the State of Wisconsin

The sixth annual convention of the Wisconsin Electrical Association was held at the Hotel Pfister, Milwaukee, Jan. 15-16. President W. H. Winslow, of Superior, Wis., presided at the first session, fifty members being in attendance. Following registration, roll call and the reading of the minutes of the previous convention, the president presented his annual address, which was in part as follows:

ANNUAL PRESIDENTIAL ADDRESS BY WILLIAM H. WINSLOW

Judging from the somewhat scanty figures which it has been possible to obtain, the operations of the electric light and power utilities of the State for the last fiscal year show a considerable improvement over the year ended June 30, 1912, gross earnings having increased upward of $1,000,000 and gross income more than $400,000, as compared with increase in the same items of less than $500,000 and $50,000, respectively, for the earlier period.

As, however, most of the increase in gross income is attributable to the comparatively few "Class A" plants, it is apparent that there are a very large number of companies in the State that are making little or no real progress.

While it is true that it is difficult largely to increase sales in small communities of very slow growth, it is also true that wonders have been accomplished under such conditions, and that in every town in the State there are latent possibilities which it should be one of the chief functions of this association to assist in developing.

From the equally meager figures which are available covering the electric railway operations in the State for the year ended June 30, 1913, it is very difficult to draw any very cheerful or reassuring conclusions. Total gross earnings increased less than $60,000, while gross income actually decreased well over $250,000. It is possible that when the detailed figures are available it may be found that increased depreciation appropriations in part account for this discouraging showing, but it seems more probable that the constantly rising cost of supplies, wages and taxes is mainly responsible. With rates of fare largely limited to the 5-cent piece, whose exchange value in terms of wages and material has been shrinking year after year, and with none of the manifold ways of increasing business open to the light and power companies, it would seem that the street railway companies have a very difficult problem on their hands. Some method of charging by which compensation will be received for the constantly increasing distances to which people are being carried seems inevitable, if the companies are to continue properly serving the people, as otherwise funds needed for extensions will not be procurable.

SESSION OF THE LEGISLATURE

A large part of the activities of your association and the major portion of its expenses during the past year have been in connection with the protracted session of the Legislature, which lasted from January until August. It may seem strange that such should be the case, when the association neither seeks any special favors nor attempts to defeat any reasonable regulative measures, but here are the facts:

During the last session there were 2100 bills and resolutions introduced, or an average of about eleven for each week day from Jan. 8 to Aug. 9. Among them were a very considerable number affecting our interests, most of which fell into one or the other of the following classes: first, bills based on the real or supposed needs of some particular town or city, and framed without any regard to the possible effect on the State at large, and, second, bills which, drawn in more or less complete ignorance of utility operations, would, if enacted, have produced results entirely different from those expected by their authors.

In addition to such bills, nearly every session has one or more important and frequently complicated bills, with which we are concerned only in seeing that they are made workable and fair. To cope properly with this situation, your advisory committee employed a firm of Madison attorneys, who examined all bills as fast as introduced, kept our secretary advised of all measures of interest to us and of all hearings on such measures, and appeared for us before committees. In addition to this, we were represented at numerous important hearings by officers and attorneys of member companies. Most of the work of arranging for these hearings—at many of which he appeared—fell on our secretary, and the thanks of the association are due him for the ungrudging way in which he sacrificed what should have been his leisure hours. It is, I think, true that the committees of the Legislature, and the Railroad and Tax Commissions as well, at whose hearings our association has been represented, have found the practical suggestions made by our members helpful and valuable and animated by a spirit of fairness and justice.

CO-OPERATION OF ASSOCIATIONS

To some extent, at least, the work outlined above is of value to the other utilities of the State, and it is probably true that were they acting in concert with us, a very slight additional expenditure would protect the interests of all.

At the last meeting of the Wisconsin Gas Association its executive committee was authorized to co-operate with us on legislative and other matters of common interest, and I would recommend that a committee be appointed at this meeting to confer with it on the subject and also to consider whether or not a consolidation of the two associations or the formation of a general utility association would be practicable anl desirable. It would seem that the combining of the electric light, power and railway, the gas and the water utilities of the State in one strong organization might possess very great advantages.

UTILITIES AND STOCK AND BOND LAWS

Sufficient time has now elapsed since the passage of the original public utility and stock and bond laws to permit of forming a reasoned judgment on their results and tendencies.

As regards established utilities, their effect has, I believe, been, on the whole, beneficial—both from the standpoint of the public and that of the utilities. Certainly the belief that excessive profits were being received by public service companies must have been dissipated, as it is doubtful if in a single case returns have been disclosed more than equal to the minimum which a bank, factory or trading concern must earn in order to be called successful.

It has been said of these laws that they have taken the utilities of the State out of the field of speculation. As regards existing companies, this is perhaps both true and proper. Applied to new enterprises, however, it would be more nearly correct to say that they have made their financing difficult or impossible, and it is to this phase of the situation that it is desired to call particular attention. No laws can make hazardous enterprises (and all new ventures are more or less so) anything but speculative, and it is becoming apparent that the laws in question are stifling development and will continue to do so unless modified. This is a matter of fully as much importance to the people of the State at large as it is to the utilities; possibly even more so, for, while capital can find other outlets, the loss to the State resulting from arrested enterprise is positive and unescapable.

The plain facts of the matter are that in most cases money cannot be obtained from new ventures in the utility field, either by the sale of capital stock at par or by the sale of bonds, or any combination of the two. That this is so is due to a number of conditions peculiar to quasi-public businesses—among them the very large initial investment needed and small early returns received and the fact that increases in investment are governed, not by the desires or convenience of their owners, but by the demands of the public. What is required is that to speculatively inclined investors, who alone are attracted to such enterprises, there be offered both a first lien on the property and a share in the profits over a mere interest return, when—and if—such profits are earned. This was formerly accomplished by the issuance of bonus stock, and very many people who were formerly violently opposed to such issues now realize that they were an economic necessity and entirely different from "watered stock" properly so-called. While bonus stock issues were economically sound and, within proper limits, in the public interest, rather than the reverse, they were open to the objection that they did not clearly show that their value was based on earning power only. For this reason they cannot be—and possibly should not be—revived.

How, then, can the deadlock which appears to exist be broken? Apparently, only by legalizing the issuance of stock without par value, or profit-sharing certificates, as they are sometimes called, such as are now permitted by the laws of several of the states. Not only would such issues facilitate the financing of new enterprises, but they would make possible the consolidation of many small and necessarily inefficient plants, with great resulting advantage to the community served. The head of one of the large companies that has combined scores of plants in other states has stated that were issues of profit-sharing stock without par value permitted in Wisconsin, his concern would enter the State and, through the well known economies resulting from the substitution of a few large plants for many small ones, be enabled in many cases largely to reduce present rates.

While this is a matter that does not directly affect most existing utilities, we are all vitally interested in the progress and development of the State, and should, I believe, do what we can to further such an amendment of the stock and bond law as will relieve the present situation.

CONVENTION PROCEEDINGS

The next order of business was the report of the secretary-treasurer, which showed the association to be in excellent financial condition. Following this President Winslow directed attention to the request of the Wisconsin Railroad Commission accounting department in the form of a letter recently sent out for information concerning the policies of different public utilities as to extensions, billing discounts and collections. H. G. D. Nutting, of the Clement C. Smith properties, Milwaukee, led the discussion and after this he read his paper entitled "A Practical Accounting System for Small Central Stations." This was a description of methods and forms and their practical application. Continuing the program after a brief discussion of the foregoing paper, J. B. Sanborn, attorney, of Madison, Wis., read a paper reviewing the new laws affecting public utilities.

The afternoon session opened with the final report of the committee on train dispatching, of which E. W. Hammett, superintendent Sheboygan Railway, was chairman. This committee recommended the standard code of interurban rules, a telephone system and written train orders. Owing to the wide divergence of opinion expressed by different members as to the necessity for adopting written train orders on all interurban lines regardless of speed or size, the report of the committee was not approved. J. P. Pulliam, general manager Eastern Wisconsin Railway; Ernest Gonzenbach, president Sheboygan Railway; R. B. Stearns, vice-president Milwaukee Electric Railway, and Dean Treat, of Green Bay, Wis., took part in the discussion of this subject.

C. M. Larson, chief engineer Wisconsin Railroad Commission, presented a paper entitled "Street Railway Traffic Surveys in Relation to Railway Operation, Management and Regulation." This will appear in a later issue of the ELECTRIC RAILWAY JOURNAL. The paper developed considerable discussion, much of which was complimentary to the work that the commission has done. Mr. Stearns stated that the paper should be recognized as a distinct contribution to the business. The commission had devoted much time and study to railway operating conditions, and consequently it had been enabled to promulgate principles of fairness which enabled the railway managers to cope with local prejudices. Each community had imposed restrictions on its local railway company both as regards service and fares. Unequal haul for the same fare was demanded and this was advantageous neither to the public nor the companies. As a result many of these restrictions had become vicious and wholly inconsistent with traffic demands. As an example, before the coming of the commission it had been almost impossible to short-loop cars. The patience exercised by the commission in its study of these difficulties had resulted in solutions which aided both the public and the railway companies. It had formulated definite standards as regards service which were applicable to any property.

Continuing, Mr. Stearns said that there was some question as to the necessity of providing more seats for passengers during the off peak hours, but it was a problem that would ultimately solve itself. Traffic delays would affect the extra per cent of seats furnished as well as local weather conditions. In closing he described the new system of fare collection which would become effective on The Milwaukee Electric Railway & Light Company's suburban and interurban lines on Jan. 18. He also summed up his discussion with the statement that service regulation was largely dependent on the riding habits of the people and that each situation required a special study. With regard to the Wisconsin Railroad Commission he said that regulation along the lines advanced by it were sound, sane and proper, and should be accepted by the railway companies and public alike.

C. M. Rosecrantz, general counsel Milwaukee Electric Railway, continued the discussion of Mr. Larson's paper by stating he had had considerable experience in trying to solve the street railway difficulties prior to the coming of the commission. To argue for a service commensurate with traffic demands which would be profitable to the railway company was of no avail. But the commission, as a disinterested body, had overcome this local prejudice to the extent that its decisions were acceptable both to the companies and to the public. In concluding Mr. Rosecrantz suggested that the commission should also consider speed regulation. Ordinances in many cities limited speeds so that the railway companies had to break the law continually to meet public demands for rapid transportation. M. C. Ewing, general manager Wausau Street Railway, closed the discussion by stating that electric railway construction had practically been at a standstill for the past few years. This condition was largely due to too much local regulation. In fact, at the present time street railways were among the poorest paying investments. The managers were as capable as those engaged in other enterprises, but were so over-regulated that they could not make their properties a paying investment. Much money had been expended unjustly in settlement of claims and through other unfair burdens such as paying for paving and sprinkling the streets. The street railways had also been assessed for heavy taxes. Practically every electric line that was built increased the value of the abutting property, in some cases even to an amount where the increase would pay the whole cost of building the railway line. But the company did not share in this increase, neither was it benefited by the paving. On the other hand, it was taxed just as high as the property owner and in addition had to maintain the pavement within the track allowance.

Thursday's sessions closed with the report of the committee on revision of electric service rules by the chairman, F. A. Vaughn, consulting engineer, of Milwaukee, and the report of the committee on co-operative advertising and publicity by Chairman G. B. Wheeler, general manager Chippewa Valley Railway.

MESSAGES OF THE GOVERNORS

The only states in which regular legislative sessions are held this year are Kentucky, Maryland, Massachusetts, Mississippi, New Jersey, New York, North Dakota, Rhode Island, South Carolina and Virginia. While most of the sessions in these states began early in January, the regular sessions in New Jersey and Virginia did not begin until Jan. 14 and Jan. 13 respectively. The message of Governor Martin H. Glynn of New York dealt almost entirely with the question of state finance. Extracts from the messages of the Governors of Rhode Island, New Jersey, Maryland and Massachusetts follow:

GOVERNOR ARAM J. POTHIER OF RHODE ISLAND

"The 2018 establishments in the State which filed acceptances of the workmen's compensation act with the commissioner of industrial statistics during the first twelve months of its enforcement gave protection in the form of assured compensation, in case of death or accident, to more than 140,000 wage earners.

"There are three matters in connection with this law which are deserving of serious consideration on the part of the General Assembly. The first is that of the immediate reporting of all accidents to the commissioner of industrial statistics upon uniform blanks, not too burdensome in character, in order that a careful study may be made of the causes of the same, which may be productive of results beneficial to employer and employee alike. It is found that those employing the greatest number of wage earners are in favor of such a plan, by reason of the fact that it may lead to the adoption of methods which will lessen the liability to accident, the resultant loss of time to employers and both suffering and wages to employees. I recommend the passage of a law giving the commissioner of industrial statistics authority to require employers of labor to report all accidents within three days of their occurrence, upon uniform blanks to be furnished by the State.

"I believe that the commissioner of industrial statistics should have authority not only to study and report upon the results of the workmen's compensation act in Rhode Island but also to follow up the law with regard to its strict enforcement. At the present time there is absolutely no one who has authority to advise either employers or employees in regard to the provisions of the act or to see that they are properly lived up to. Rhode Island is acknowledged to have one of the best workmen's compensation laws in force in the twenty-two states which have adopted such acts to date, and its enforcement in a proper manner is as important as was its enactment."

ACTING-GOVERNOR LEON R. TAYLOR OF NEW JERSEY

"The members of the Legislature are undoubtedly awake to the responsibility which the people have, by their suffrage, cast upon them. They demand that progress be continued, that progressive legislation be not retarded or forgotten. They look to you for the accomplishment of good government and expect a continuance of the new order of things that has been begun. Governor Fielder in his inaugural address to you will call your attention to the things that he believes will require your attention."

GOVERNOR PHILLIPS LEE GOLDSBOROUGH OF MARYLAND

"For several years it has been distinctly felt that Maryland should follow the lead of many of our sister states and place upon her statute books a law that would provide compensation to the workmen injured in the course of their employment and at the same time not bear unjustly upon the employer. That this was not impossible has been generally believed for some time. At your last session there were numerous bills introduced and considered. One of them passed, but because it did not seem to suit our conditions has proved ineffectual. In order that the matter might be carefully considered as an independent subject, I appointed a commission, composed of gentlemen of high standing and ability, who have given the State a rare order of service. The report of their considerations will be sent you. When the bill which they have prepared shall have been introduced it will be made the subject of a special communication on my part."

GOVERNOR DAVID I. WALSH OF MASSACHUSETTS

"Certain corporation taxes now collected by the commonwealth are distributed to various municipalities in accordance with the ownership of stock of such corporations by the residents of such municipalities, namely, the taxes paid by railroad, telephone and trust companies. It is suggested that a law be enacted to provide that the franchise taxes paid by railroads, telephone companies and trust companies shall all be retained by the commonwealth, as they are state-wide companies. The result of such changes as are here suggested would increase the revenue of the commonwealth by about $1,600,000 and cause a corresponding reduction of the state tax.

"The workmen's compensation act has now passed the experimental stage in operation and has demonstrated the wisdom of its enactment. I recommend the following amendments to the act:

"First—That compensation paid under the act be increased from half wages to 65 per cent of the average weekly wage of the injured employee, the minimum and maximum payments to remain as at present.

"Second—That payments to dependents in fatal injury cases be extended to cover a period of five hundred weeks from the date of the injury, the maximum payment not to exceed $4,000.

"Third—That payments on account of partial incapacity be extended to cover a period of five hundred weeks from the date of injury.

"Fourth—That in the payment of compensation by a lump sum the Industrial Accident Board may receive the power to fix the sum to be paid, so that the matter of agreement as to payment of compensation by a lump sum shall not be a matter of bargaining between the employee and the insurer.

"Fifth—That the act may be amended so that it may be given extraterritorial effect by express legislative intent.

"Sixth—That the Industrial Accident Board have the power to require the payment of bills for medical, surgical and hospital attendance beyond the first two weeks after the injury in cases in which in its judgment such attendance is required.

"Seventh—That compensation and payments be so readjusted that a youth who loses an arm or suffers a serious impairment of like nature shall receive such compensation as shall enable him to provide for his future by receiving a training in a self-sustaining occupation.

"Eighth—That the board shall have the same power to fix rates and the same supervision over liability insurance companies as the Public Service Commission now has over the railroads of the State, and that the board have the necessary power to obtain all information required by it from such insurance companies.

"I believe that paid boards should be reduced in number wherever possible. The work of such paid boards as the Boston Transit Commission, the Directors of the Port of Boston, the Board of Labor and Industry, the Public Service Commission and the Industrial Accident Commission could be performed with increased efficiency by three members, and a substantial saving made in salaries to the taxpayers of the State.

"The Public Service Commission should be reorganized by making its membership three instead of five. With one exception the salaries received by the members of this commission are the largest paid to the members of commissions in the commonwealth. For years the duties of this same commission were performed by three members at a much reduced salary. The recommendation for five members was based upon the assumption that all public service regulation should be performed by this commission, but the law as finally enacted left an important part of such regulation with another commission.

"An increase of $200,000 has been added to the fixed expenses of the State by the change in the law last year placing the expenses of the Public Service Commissions on the State. One year ago the expense of the Railroad Commission, when borne by the corporations, was $80,000. This year the State will not only pay this sum, but an increase of over $120,000 has been asked for because of reorganization and changes in this department. I am decidedly of the opinion that the method formerly pursued by which the railroads and telephone and telegraph companies paid the expense of their regulation was sound, and I urge that the provisions of law by which the cost was assessed upon the companies be restored to the statute books.

"There is no spirit of confiscation in Massachusetts. The owners of the securities of public utility corporations may rely on being permitted to draw a full and fair return upon all capital honestly and prudently invested in the public service. But so long as our public utilities are privately owned that private ownership must assume and bear the responsibility of management and also pay the penalty for mismanagement. The commonwealth may and does regulate, both for the benefit of the ratepayer and to some degree for the benefit of the investor; but regulation is not management, and the main responsibility for the soundness of the investment rests and must continue to rest upon the management chosen by the stockholders.

"Before the New York, New Haven & Hartford Railroad can acquire the right to purchase those street railways in the western part of the State mentioned in the so-called trolley merger act passed last year, it must satisfy the Public Service Commission that it is financially able to carry out the provisions of that act. If the Public Service Commission decides that the financial condition of the railroad will not warrant undertaking the cost of carrying out the provisions of the act, the right which is given to the railroad under the act is lost to it. Other action may then be considered to provide transportation facilities for the western towns I shall await the action of the Public Service Commissioner before making any recommendation in this matter."

TEAM WORK AND TRACK MAINTENANCE DISCUSSED AT MEETING OF PUBLIC SERVICE A.E.R.A. SECTION

The regular monthly meeting of the Public Service Company section of the American Electric Railway Association was held at the Public Service Building, Newark, N. J., on Thursday evening, Jan. 15, at 8:15. Eighty-five members of the section were present. The meeting was devoted to an address on team work by J. M. Wakeman, general manager Society for Electrical Development, Inc., and to a paper on maintaining the way by P. F. McGuire, cadet engineer of the company.

Mr. Wakeman pointed out the value of team work and its absolute necessity in the case of a public service company, the many opportunities afforded of co-operating with the public itself, the greater efficiency given to the service when everyone in the company's employ co-operates, the way in which such co-operation is recognized and responded to by the public and the valuable asset that such team work must be to the company. He also commended the section idea and referred to the good work which had been done throughout the country by similar branches of the National Electric Light Association.

The paper of Mr. McGuire was illustrated by some fifty-two stereopticon views. He said that one of the first most important steps in the line of economy, after the type and details of construction had been selected, was to standardize materials and designs. The enormous increase in the weight and size of electric cars, together with the much shorter headway, now called for heavier construction with creosoted treatment to prevent decay of ties, the use of stone ballast, concrete paving foundations and much better paving, so that the total cost of modern track was approximately twice as great as that of old track. Mr. McGuire illustrated the progress of track design from the construction used as early as 1716, consisting of a flat piece of iron spiked to a longitudinal stringer, to the latest and numerous forms of girder rails. He also described briefly the bessemer, titanium, manganese and other special rail processes and compositions. Following this, Mr. McGuire showed the different kinds of mechanical and welded rail joints. The next series of views presented various forms of cars and equipment for track construction such as stone crushers, steam rollers, rail-handling cars, rail benders and grinders, steel dump cars, cranes, sand-drying outfits, etc. In conclusion, he described the organization of the company's 856 miles of track into five divisions and the methods of inspection and accounting.

After a discussion, the meeting was adjourned.

Louisville Center-Entrance Car

This Is a Center-Entrance Trail Car with 28-in. Wheels, Center Well and 14-in. Entrance Step—The Estimated Weight Is 28,000 Lb.

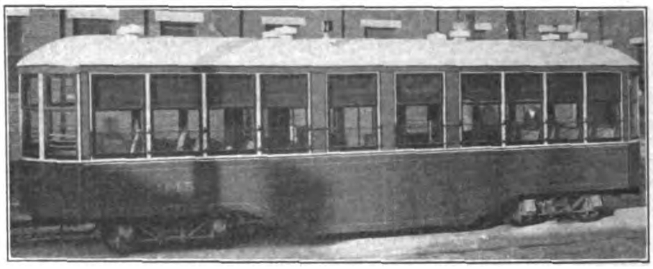
The Louisville (Ky.) Railway Company has recently completed ten arch-roof, low-step, center-entrance trail cars. These are the first cars of this type to be used in Louisville, and their introduction also inaugurates trail-car operation on the lines of this railway. The rapid increase in congestion in the downtown district of Louisville during rush hours made trailer operation advisable, and if the success of these new cars is demonstrated, others will be added to the service.

In general appearance and arrangement these single-end trailers resemble the center-entrance, double-end motor cars built by the Brooklyn Rapid Transit System during 1912 and 1913. They are much shorter, however, as they are only 36 ft. 4 in. over all in length. They seat forty-two passengers. The low step was made possible by the use of a shallow, all-steel underframe with 28-in.-diameter wheels, an entrance well 15½ in. below the car-body floor and a 2½-in. main-floor ramp.

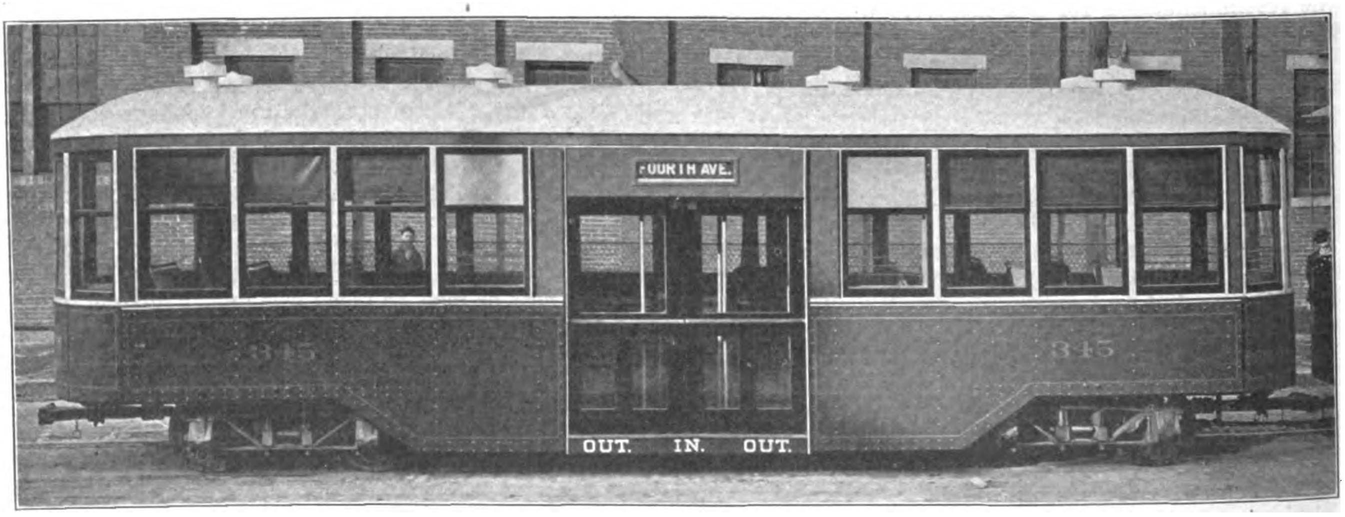
The general dimensions of these center-entrance cars are as follows:

Length over all	36 ft. 4 in.
Extreme width	8 ft. 3½ in.
Truck centers	22 ft. 0 in.
Truck wheelbase	4 ft. 6 in.
Diameter of wheels	28 in.
Height top of rail to top of roof	11 ft. 2 in.
Seating capacity	42
Width of entrance	6 ft. 6 in.
Height first step	14 in.
Estimated weight	21,000 lb.

The underframe is of structural-steel angles, plates and channels, with the side sills on both the entrance and blind side of the car formed of 5-in. x 3-in. x 5/16-in. angles. These side sills are made continuous from end post to end post, at which points they are spliced to 4½-in. x 3-in. x 5/16-in. angles, which form the buffers. These angle-iron side sills are reinforced around the entrance opening by the 5/16-in. side sheathing, which is made continuous from the end post to the entrance and is carried around the door opening and is reinforced with structural-steel angles. The entrance well is formed by offsetting the angle side sill on the entrance side of the car and by extending the sheet-steel side sheathing below the side sill on the blind side. The 4-in. I-beam cross sills in the well are supported on a 5-in. x 2-in. x 5/16-in. angle riveted to the lower edge of the steel sheathing on the blind side and to the side sill on the entrance side of the car. The 2½-in. ramp of the car-body floor extends from the truck centers to the edges of the entrance well.



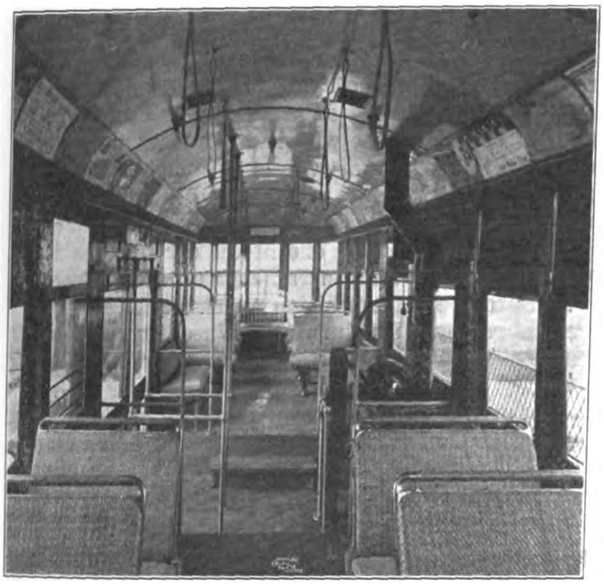
Louisville Center-Entrance Trail Car—View of Blind Side



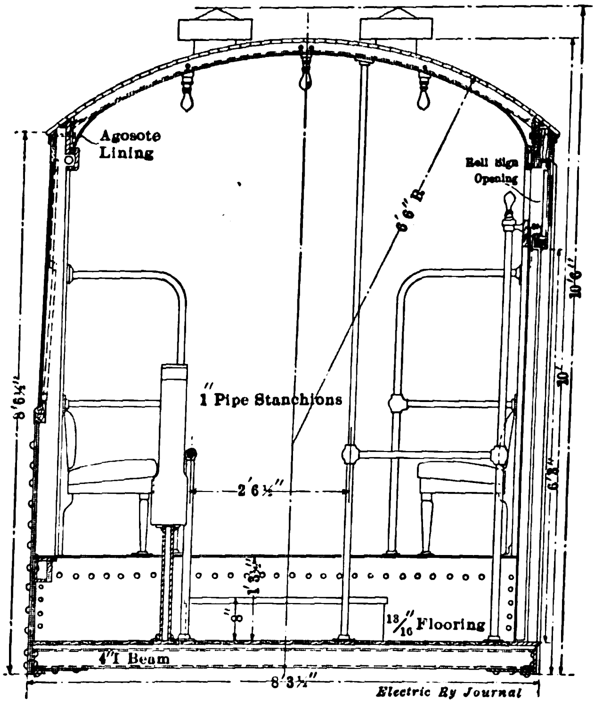
Louisville Center-Entrance Trail Car—View of Entrance

Two sliding doors, 3 ft. 3 in. wide, are provided at one side of the well. This space is divided by pipe rails into three aisles. Of these, the center one is 29 in. wide and forms the entrance aisle, and two side aisles, each 24 in. in width, serve as exits from each end of the car body. People who board the car pass forward through the center aisle to the conductor's stand opposite the center-entrance where they deposit the fare in a box. Then they may move to either end of the car body by ascending one 8-in. and one 7½-in. step to reach the main-floor level. Should it be necessary for a passenger to wait for change or for any other reason, he may step from the center aisle in the well into a pocket at the left of the conductor's stand. The conductor's space is cut off on each side of the well by a pipe rail, which also serves as a guide to passengers as they enter or leave the car body. The uprights in these pipe rails are made high enough to serve as stanchions or grab handles for passengers ascending or descending the steps of the well. In a similar way, the pipe rails which separate the entrance aisle from the two exit aisles are extended to fastenings above the door and to the roof of the car so that they also serve as stanchions. The space on the right side of the conductor's stand is occupied by a forced-draft, hot-air heater of the Peter Smith Heater Company.

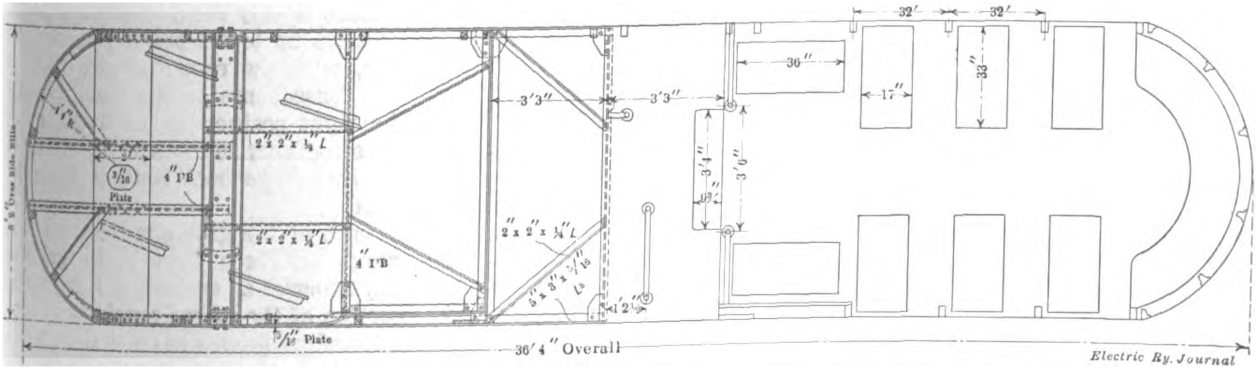
Each section of the car body is equipped with six 33-in. walkover cross seats, two 36-in. longitudinal seats in the corners adjoining the entrance well and a semi-circular built-in wooden seat in the end of the car body. Hand rails on the seat backs as well as numerous hand straps on each side of the aisle provide for a full standing load during rush hours. Car illumination is provided by tungsten lamps installed in two rows and centered approximately over each row of seats. The entrance and exit well has additional light from a lamp in the center of the car ceiling and two lamps which project from the car side over the inner side of the entrance doors and behind the route sign. This arrangement avoids special construction for sign lamps. Ventilation is obtained through eight Globe type ventilators with adjustable registers set in the ceiling of the car body. The sliding doors, which are operated by air, are controlled from the stand of the conductor. This door-operating mechanism is of the company's own design, and its air is obtained by a connection to the train line. A through train-line connection is furnished between the motor and trail car, and air-brake operation on the latter is by way of two brake cylinders, one installed on each side of the entrance well.



Louisville Center-Entrance Trail Car—Interior View



Louisville Center-Entrance Trail Car—Section



Louisville Center-Entrance Trail Car—Half Plan of Seating Arrangement and Half Plan of Framing

Other special equipment included in the construction of these center-entrance cars is as follows: axles, Standard Steel Works; bolsters, St. Louis Car Company; couplers, Tomlinson automatic; curtain fixtures, Curtain Supply Company; destination signs, Keystone; seats, Hale & Kilburn Manufacturing Company, and 101-E trailer trucks, St. Louis Car Company.

CAMP ORGANIZATION IN CONSTRUCTION WORK.

During the construction of the Stevens Creek Development, a new hydroelectric project about 8 miles from Augusta, Ga., about 800 men were employed, who, with their families, made a total population to provide for of about 1200 people. Bunkhouses were furnished for unmarried laborers, and houses having from one to five rooms were built and rented to the married men from $2 to $12 per month. Four permanent houses were built on each job for the future use of the power house operators and were used during construction by the superintendents and engineers. Boarding houses, a butcher shop, bake shop, refrigerating and ice plant and commissary were built. Pure filtered water and sewerage systems were provided, as well as a hospital, fully equipped, with a resident physician always in attendance. As the Stevens Creek camp was only about 2 miles from the intake of the Augusta water works, additional precautions had to be taken to safeguard Augusta. For this reason incinerators were provided, and a filter bed was used to purify wash water from the sewerage system. The wisdom of these precautions was proved by the remarkable freedom from sickness in the camp. Malaria had been very prevalent in the vicinity, but because of methods similar to those found effective at Panama no trouble was experienced except for the first few months, before the camp site could be properly cleaned up.

Equipment and Its Maintenance

Short Descriptions of Mechanical and Electrical Practices from Every Department of Electric Railroading

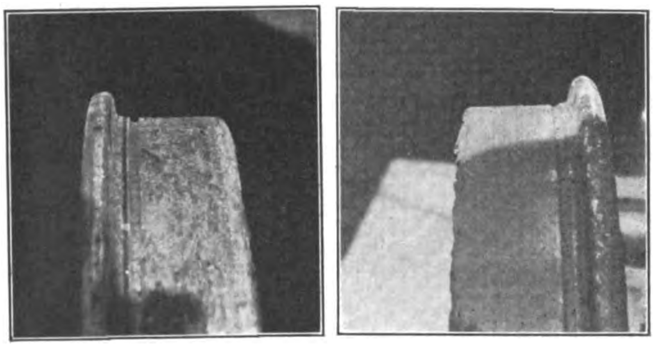
(Contributions from the Men in the Field Are Solicited and Will Be Paid for in Accordance with Our Regular Rates.)

STEEL WHEEL MAINTENANCE IN THE TWIN CITIES

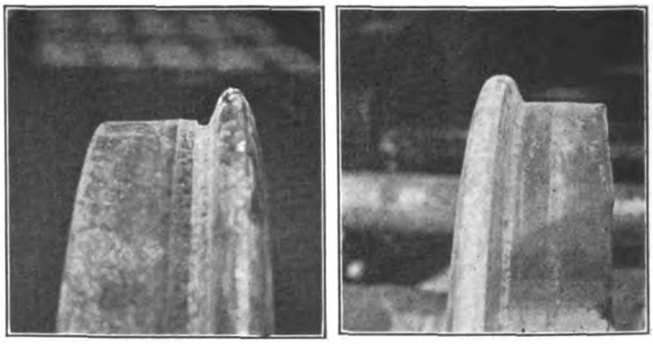
About two years ago the mechanical department of the Twin City Rapid Transit Company, Minneapolis, Minn., decided that much time could be saved and the average life of steel wheels greatly prolonged if the company discontinued the practice of turning new flanges on wheels which came into the shop with one thick and one thin flange. The records indicated that by far the larger portion of wheels were worn in this manner, the difference in the thickness of the flanges being due to crowding. In a few instances this character of wear was increased by variations in the hardness of the wheels or the brakeshoes or both, but as a general rule it was caused by track special work.

In order to be positive that there was no variation in the diameter of new wheels and no eccentricity in the centering on the axle the company taped and ground the wheels sufficiently to remove any inaccuracies. After considering the problem and the effect of its solution on operation, it then decided that each pair of wheels removed for re-turning which had one thick and one thin flange should be treated as follows: Each pair of wheels is taped and sufficient metal is turned from both the flange and tread of the larger wheel, which as a rule is the one with the thick flange, to mate it roughly with the wheel of smaller diameter. At times it is necessary also to turn slightly the outside of the tread of the thin-flanged wheel to true it. Then a groove ¼ in. wide by ⅛ in. deep is turned in the tread of the thin-flanged wheel, at the point where the throat of the renewed flange should begin to form. After the treads of both wheels have been rough-mated in the foregoing manner, they are set in the wheel grinder where the treads are brought accurately to the same diameter. This grinding process is continued until the treads are perfectly polished and true, except at the groove in the thin-flanged wheel, which may or may not be removed, depending on the depth of grinding necessary to true the wheels.

When wheels treated by the new process are replaced in the truck they are reversed from their original position and made trailing wheels if they were leading, or vice versa. No effort, however, is made to replace the wheels under the same car from which they were removed. This makes it possible to conform to the rule of reversing the wheels at all times, but as a general rule, if a pair of wheels is brought into the shop as No. 1 wheels, they are replaced in service as No. 2 wheels. In some instances the trucks are turned and placed at the opposite end of the car from which they were removed. This interchange of trucks restores the wheels to the same position under the car as they were before removal for turning. Wheel removals for thin flanges after receiving the foregoing treatment are rare.



Figs. 1 and 2—Twin City Wheels—No. 1 Wheel Before and After Grinding



Figs. 3 and 4—Twin City Wheels—No. 2 Wheel Before and After Grinding

In further explanation of the ¼-in. by ⅛-in. groove turned in the tread of the wheel with a thin flange, it might be stated that this groove has no effect on wheel-wear in service. The size and the location of the groove serves only as a guide to the workman doing the grinding as it defines the tread width. The existence of the groove also makes it easy for a workman to bring the grinding tool close up to the proper place for the root of the flange, with the result that the tread is ground true. In consequence wheels readily adjust themselves to the right position on the track, and at least the immediate tendency to continue the cutting of the flanges after they have been restored in service has been eliminated.

Although the depth of the groove in the tread is ⅛ in. after the wheel has been turned, the grinding process practically removes all evidence of it from most wheels. That portion of the groove remaining on some wheels after the grinding process has been found not to affect the wear in any way. This is probably due to the fact that it is turned at a point on the tread—namely, the throat of the flange—which under ordinary conditions does not come in contact with the rail or, at least, does not come in contact with it until the wheel has been in service for some time.

At first there was considerable apprehension as to the effect of the grooves in operation. Records show, however, that they have not been responsible for derailments, either at switches or curves. Records from Jan. 1, 1912, to Oct. 1, 1913, for 760 cars at the beginning of the period—and this number was increased to 835 at the close of the period—showed a total of 975 calls for the wrecker on all the lines of the Twin City Rapid Transit. This total necessarily included everything, such as fires, obstructions, broken vehicles, etc. Out of the 975 calls, however, only six were on account of defective wheels. Three of these were broken steel wheels, one a broken cast-chilled wheel, one a loose wheel on an axle, and one was on account of a broken flange. All six of these calls for the wrecker due to wheel trouble occurred during the winter months. Consequently, it was quite evident that the new method of turning steel wheels had in no way injuriously affected car operation.

In practice the new method of turning steel wheels has worked out well and has resulted in a very material reduction in the cost of labor in the wheel shop. It has also decreased the number of wheels used, as only the high places are turned off the treads, after which they are ground only a sufficient amount to make them true and mated. Hence the useful mileage has been increased by the reduction in the quantity of metal removed in turning. At the present time 835 cars are equipped with steel wheels, and the maintenance of these requires only two men to operate the wheel grinders and one man for the lathe. Although this company operates all its cars single-end, it is believed that the same results would be obtained if cars were operated double-end.

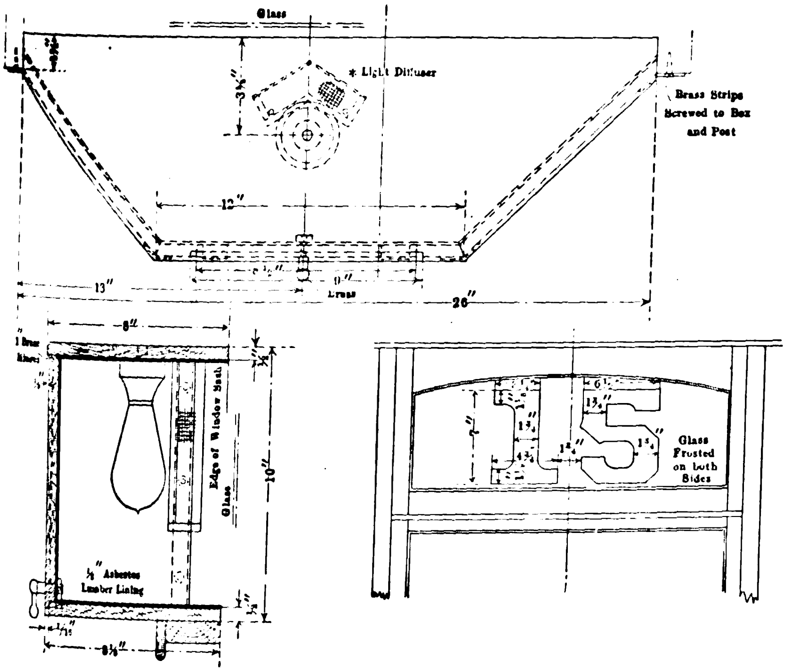
In the accompanying illustrations, Fig. 1 shows a wheel with a thin flange and the tread slightly high near the base of the flange. This wheel has been placed in the lathe and the ¼-in. x ⅛-in. groove turned in the tread at the point where it is desired that the new flange shall begin to form. Fig. 2 is the same wheel after it has been ground. Fig. 4 is a good illustration of first-class work done by the grinder. The groove has been practically obliterated, leaving the flange approximately normal. Fig. 3 is an example of a wheel on which the groove has been turned and a part of the tread removed. After this wheel is ground, the flange will be of the proper shape and thickness and the tread normal. The diameter of this wheel will be reduced very little, and the cost of grooving and grinding will be quite small. The examples shown in the illustrations were not photographed especially for this article but are representative of the steel wheels picked from lots going through the shops.

ALBANY TRUCKS LENGTHENED TO STOP NOSING—OTHER IMPROVEMENTS

The United Traction Company, Albany, N. Y., has been operating for some years a number of Brill trucks of 4-ft. 6-in. wheelbase. On account of this short length these trucks gave much trouble when used for the high-speed service between Albany and Troy. In fact, the nosing was sometimes so severe as to throw passengers off their feet. This bad feature has now been removed by lengthening the trucks to a wheelbase of 5 ft. by the oxy-acetylene welding of metal at an intermediate point in the frames. The favorable results from this change confirm the company's belief that for high-speed service the wheelbase of a truck should not be less than the gage of the track. The cost of lengthening a pair of trucks and of adding new steel bolsters of cored type was about $200.

The Albany company buys all axles in the rough and turns them up at home. It is now changing from an axle diameter, gear seat and wheel seat of 4 in. to an axle of 4½-in. diameter, gear seat of 5½ in. and a wheel seat of 5-7/16 in. The former axles were oil-treated, but the new ones are of Carnegie hammered steel. Scrapped axles are cut down to armature shafts. All brake rigging is now furnished with case-hardened bushings made by the Bemis Car & Truck Company, Springfield, Mass. Manganese steel has also proved very satisfactory in journal boxes, hangers and similar parts.

BALTIMORE ROUTE NUMBER SIGN BOX


Glass
Light Diffuser
3⅛″
Brass Strips Screwed to Box and Post
12″
9″
13″
Brass
26″
8″
Edge of Window Sash
Glass
10″
½″ Asbestos Lumber Lining
8½″
7″
1¾″
6½″
1¾″
Glass Frosted on both Sides

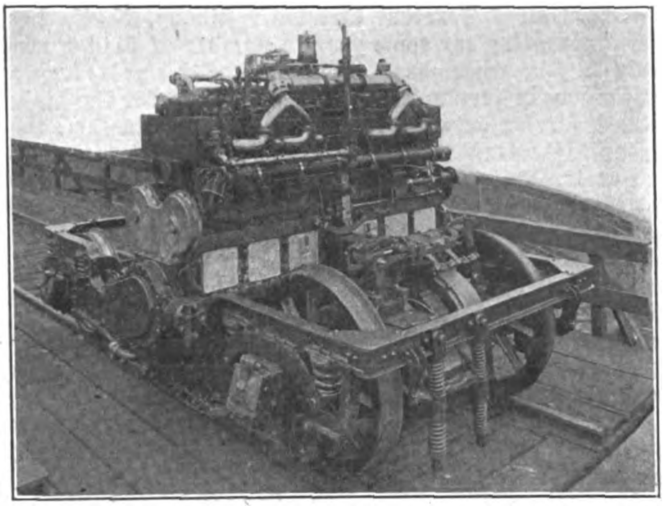
Construction Details of Baltimore Route Sign Box

It has long been the custom on European street railways to indicate the car routes by numbers or letters which are large enough to be read at a distance of several hundred feet. Car signs of this type have recently been adopted by several American electric railways but with important betterments in their illumination for night service. Among the latter companies is the United Railways & Electric Company of Baltimore, which is now installing such signs over the middle sash of the vestibule in addition to its Hunter illuminated destination signs which are carried in the sides and ends of the monitor deck. The use of a route number is a natural evolution from the Baltimore system of numbering cars on given routes by hundreds. Thus, if a car is numbered 401 the corresponding route number is marked 4. The route number is 7 in. high and is painted on ground glass. It is illuminated by means of a lamp which is placed in a wooden box lined with asbestos lumber. A most effective distribution of light is obtained by using the diffuser of fine wire mesh which is shown in the drawing of the sign box. The route number sign has been welcomed by the Baltimore public, especially on streets where more than one route is operated.

The government of the Province of San Luis in Argentina proposes a tramway in Villa Mercedes.

GASOLINE CARS FOR SUNSET-CENTRAL SYSTEM

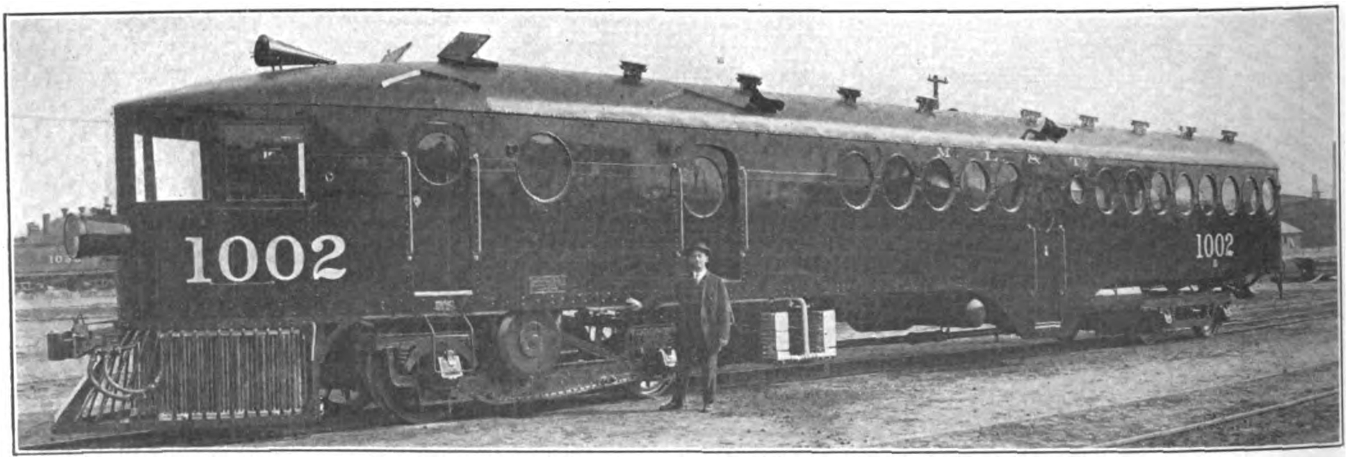
New model McKeen gasoline motor cars of type "C" as shown have lately been built for the Sunset-Central system, which includes the Morgan's Louisiana & Texas, Galveston, Harrisburg & San Antonio and Houston & Texas Central Railroads of Louisiana and Texas. While the latest motor truck maintains the builder's standard motor car principles, the new design is the result of nine years' experience of some fifty railroads using this equipment. The efficiency of drive, 96 per cent, is the same as the earlier cars, but upkeep and maintenance are materially reduced. The value of even the first designs is shown by the fact that a seven-year old car recently covered more than 5000 miles in one month and earned $117 per day at a total operating charge of 14 cents per mile.


Improved Motor Truck of Gasoline Car

Among the features of the new power truck are: integral steel casting side frames; M. C. B. wheels and axles; driving box which can be removed without dropping the wheels; inclosure of machinery and all moving parts in oil-tight, dustproof and foolproof housings; automatic continuous lubrication of crank shaft, cam shafts, bearing rods, air pump, water pump, etc.; water-jacketing of manifold pipes so that the gases are heated and equally distributed to the different cylinders; more accessible location of throttle and spark levers; increased water space around the valves and cylinder heads to permit overloading the engine; tungsten-steel valves to avoid distortion and to operate, even if red hot; increased number of friction elements in multiple-disk clutch to give more positive action and greater efficiency, and use of the stronger herringbone gear instead of the ordinary involute spur gear.

One of the most interesting novelties is the auxiliary hand oiler between the cylinder units whereby the motorman can oil the crank and rod bearings in five seconds, thus facilitating journal oiling in starting on a cold morning. Furthermore, in case of hot journals, the emergency oil can be applied through this lubricator without obliging the motorman to leave his seat.

Altogether the life of the new power truck has been greatly increased, and 50 per cent reduction in repairs is confidently expected. The time between shoppings will hereafter be controlled almost entirely by the wear of the driving tires. The general specifications of the Sunset-Central cars are as follows: engine, 200 hp, six cylinder, air-starting and reversible; weight of car in working order, 78,000 lb.; length between pulling faces of couplers, 72 ft. 3¾ in.; length over end sills, 70 ft.; length of engine compartment, 13 ft. 8 in.; length of baggage compartment, 8 ft. 6 in.; length of smoking compartment, 16 ft. 4⅛ in.; length of passenger compartment, 28 ft. ⅞ in.; width inside, 9 ft. 4¾ in.; width over side sills, 9 ft. 8 in.; width over sheathing, 9 ft. 8¼ in.; width over all, 10 ft. 2¾ in.; height, top of rail to top of car (light), 11 ft. 9 3-16 in.; height, floor to ceiling at center of car, 7 ft. 5⅝ in.; seating capacity, passenger compartment, fifty-four, smoking compartment, twenty-nine, total, eighty-three.



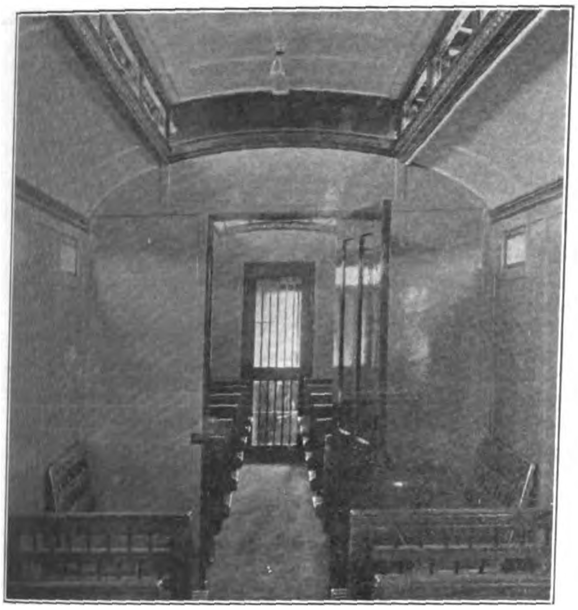
Latest Type of Gasoline Motor Car for Service on Louisiana and Texas Lines

FARE BOXES FOR INTERURBAN SERVICE

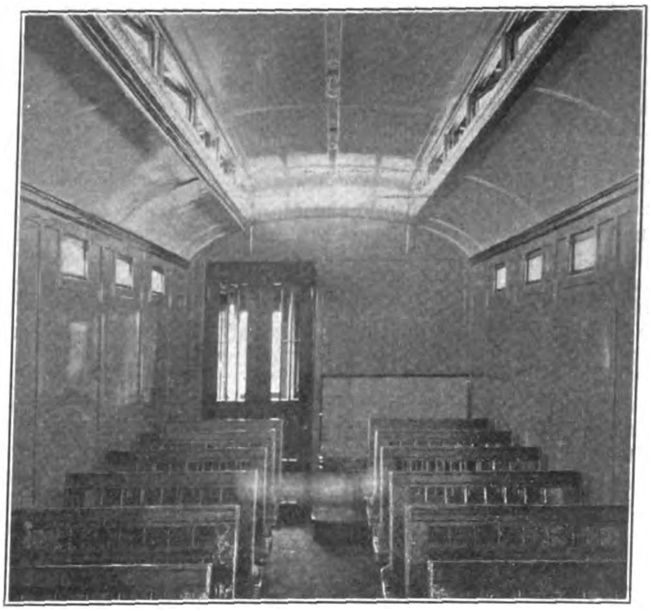
The Stark Electric Railway, Alliance, Ohio, has introduced a novel method of fare collection on several of its interurban cars. One Cleveland fare box is installed on the rear platform and another on the front platform. When a passenger enters the car at the rear he drops his ticket or fare into the box. The conductor hands him a cash slip punched from that station to the destination station. When he leaves the car he deposits this slip in the box at the front end of the car, which is watched by the motorman. If the passenger rides beyond the point for which his slip is punched, the motorman makes him pay for the extra length of ride. The company has this system in operation between four stations out of Alliance. These stations are designated respectively as 1, 2, 3 and 4 in large figures on the cash slip, so that the motorman can tell at a glance whether the passenger leaving the car at, say, Station 4, has really paid his fare to that station.

PRISON CAR BUILT BY THE MONTREAL TRAMWAYS

The Montreal Tramways Company has recently completed for the Province of Quebec a fifty-four passenger car for transportation of prisoners twice a day between Montreal and the new prison at Bordeaux, 7 miles distant. The car is 48 ft. 4 in. long over all and 34 ft. 8 in. over the seating compartments. The body is divided into two compartments for the purpose of separating convicted from accused persons. The front platform is provided with a cab for the motorman, while the rear platform is arranged as a compartment for the prison officials who may be required to accompany the prisoners. The guard's place is in front of this compartment on a seat which is elevated 6 in. to afford a better view of the prisoners.

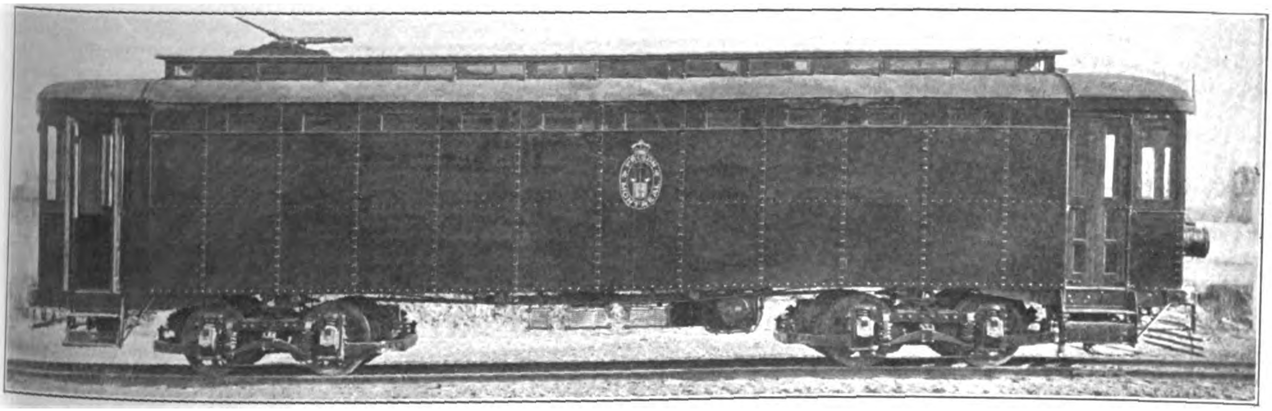


Montreal Prison Car—Interior of Car, Showing Part of Both Compartments



Montreal Prison Car—View Showing Elevated Seat for the Guard

The floor framing of this car has 7-in. side sills, but owing to the character of service each side is composed of No. 16 sheet steel which is carried from the lower line of the side sill to a height of 6 ft. 1 in. These sheathings are attached to 2-in. x 3-in. wooden posts, and as each side is riveted in one piece, the side girders thus formed carry a large part of the car stresses. The windows, of course, are placed above the line of vision. They number ten per side and are of solid sash construction, 13 in. x 4½ in. in size. Ventilation is obtained from the monitor roof and forced draft at the floor line from a Peter Smith heater. The electrical equipment comprises four Westinghouse 533-T-4 motors and one K-35-G controller. The car is run directly into the prison yard over a Y which will also be available for the delivery of fuel and other supplies.



Montreal Prison Car—View Showing Sheathed Sides, with Ventilating Louvers and the Usual Form of Monitor Roof

The Montreal Tramways Company is probably the first in America to build a car of this kind. A reference to the prison cars built by the Grosse Berliner Strassenbahn (Great Berlin Street Railway) was published in the ELECTRIC RAILWAY JOURNAL for Oct. 7, 1907, page 753. This method of conveying prisoners is cheaper than the use of the ordinary patrol wagons, and furthermore the inmates are saved a great deal of needless humiliation. The adoption of the trolley-car service by the Montreal penal authorities is in harmony with the many humane features of the Bordeaux institution. This structure is a splendid example of a modern light, sanitary prison with such features as electrically controlled locks and electric lights and push-buttons in every cell.

The Washington Water Power Company, Spokane, Wash., operates a suburban high-speed line between Spokane and Medicine Lake and Cheney, the latter places lying respectively 16 and 19 miles out of Spokane, and upon this line it did not have an accident during 1913.

News of Electric Railways

New Haven Segregation Agreement

An agreement was reached on Jan. 10, 1914, between the Department of Justice at Washington and the officers of the New York, New Haven & Hartford Railroad in regard to the readjustment of the company so that the company will meet the requirements of the Sherman law as interpreted by Attorney-General McReynolds. The New York, New Haven & Hartford Railroad, in addition to the cancellation of the Boston & Albany agreement, which becomes effective on Feb. 1, will dispose of its holdings in the Boston & Maine Railroad, various electric railways, the Merchants & Miners' Transportation Company, the Eastern Steamship Corporation and the Maine Steamship Company, under a plan the details of which will be worked out as promptly as possible with representatives of the Department of Justice by Chairman Howard Elliott and Messrs. Moorfield Storey, of Boston, and Walker D. Hines, of New York, special counsel of the board of directors. Concerning other steamer lines, application has been made, under the Panama Canal act, to the Interstate Commerce Commission, and their disposition will be determined by that body. Until the plans are worked out and put into effect the management and operation of the properties will be continued as at present. The conference at which the agreement was reached was between the Attorney-General, Assistant Attorney-General Jesse C. Adkins, Frank M. Swacker and T. W. Gregory, special assistants to the Attorney-General, representing the Department of Justice, and Howard Elliott, Arthur T. Hadley and L. S. Storrs, representing the New York, New Haven & Hartford Railroad.

In a supplemental statement made public from Mr. Elliott's headquarters it was said:

"The new New Haven management, while it could not agree fully with all of the views of the Department of Justice, nevertheless felt that in the interest of a peaceful solution of the New England railroad situation it was wise to yield and to work in full harmony with the department in bringing about an adjustment. While that is going on the New Haven management hopes that all interested, whether owners, employees or patrons of the road, will co-operate in every reasonable manner to maintain the integrity and welfare of all the properties.

"There is, of course, a very large amount of detail to be considered in reaching a final conclusion as to the method of segregating the properties. This work will be undertaken in a fair spirit by the Department of Justice and the New Haven company. As the Interstate Commerce Commission well said in its opinion about the New England's situation, 'what is needed, first of all, to improve the railroad situation in New England is rest and an opportunity for constructive work.'

"Pending the adjustment of the details with the government and while new financial plans are being completed, improvements of all kinds will necessarily be postponed and no money will be spent except such as is absolutely necessary for safety."

Akron Company on Proposed Franchise Settlement

The Northern Ohio Traction & Light Company, Akron, Ohio, has issued a statement giving the reasons why the company cannot accept the proposed new franchise in Akron. the amendments to which were noted in the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914, page 93. The company contends that the amendments to the franchise ordinance as proposed by the Council are too burdensome to warrant their approval and that a short-term franchise, with seven tickets for a quarter, would make it impossible for the company to sell bonds for the construction of extensions. In the statement which it issued dealing with the matter the company said:

"The company had endeavored to be fair and yield every point which could be yielded without wholly unreasonable sacrifice of the interests of its bondholders. Following the original basis of settlement agreed to by all parties in October, when Solicitor Taylor and Mr. du Pont were instructed to prepare an ordinance based on this agreement, the company made still further concessions as in the progress of the matter additional demands were made.

"The point to which new demands were carried on the part of some of the city officials appeared, however, to know no stopping place. With each council meeting and each conference more and more burdensome amendments were presented. The City Solicitor and the City Council have added so many new and burdensome amendments that the company could not accept the ordinance as it was finally proposed to pass it. None of these recent amendments was submitted to the company. A conference to see what could be done concerning them was proposed and directors of the company came to Akron with a view to having such a meeting with the City Solicitor and the Council, but received information that the ordinance must be passed as it then stood or not at all. When this word was received by the company the definite statement was made that the ordinance as then pending could not be accepted by the company and that the Cuyahoga River water rights agreement would, therefore, not stand as it had been made a part of the terms of settlement.

"The company has acted in good faith throughout. When property owners' consents for extensions were declared necessary it immediately obtained them. When a referendum on the whole matter was suggested the company favored that also. In short, the company tried to meet the city officials more than half way, and it is sorry that its efforts to adjust the situation on a basis of more complete satisfaction to the public have been unsuccessful."

Indianapolis Arbitration Case Concluded

The Indianapolis Traction & Terminal Company having completed the presentation of its evidence in the arbitration hearings on the grievances of employees now before the Public Service Commission of Indiana, the commission allowed two days for the attorneys representing the company and those representing the employees to close their arguments. Frank S. Roby stated in opening for the employees on Jan. 7 that the twenty-three grievances submitted by the employees are divided into two groups, one having to do with the relations between the company and its employees and the other relating to wages and hours of labor. In his contention for recognition of the union he argued that as the officials of the company represent a large number of stockholders in making contracts for the benefit of the company and its stockholders the men should be recognized as an organized body to make contracts with the company for their benefit. He contended that when the company entered into the agreement with a committee of employees to submit grievances to the Public Service Commission for arbitration it recognized the organization of the men, in the same way that the men recognized the existence of the company when they signed the agreement. He argued against the sliding scale of wages. Mr. Roby claimed that employees are entitled to a living wage whether or not the employer is making any money.

S. C. Esarey, in continuing the case for the employees, made a brief argument from a sociological standpoint. He stated that sociologists contend that no family should be required to live on less than $1,000 a year, but that 50 per cent of the men in this country earn less than $500 a year. He considered it would be right to increase the fare in Indianapolis if necessary to grant the increase in wages.

W. H. Latta, for the company, read from an Illinois court decision that the right of a man to sell his labor at a price satisfactory to himself and the right of an employer to employ labor at a price satisfactory to himself are constitutional and legal rights which cannot be interfered with by any one. He contended that the law of supply and demand should control. He said:

"A given wage may enable a thrifty man to live well and accumulate money and property, as shown by some of the witnesses in this case, while another man less thrifty might be in poverty all his life on the same wage. This is a condition that cannot be controlled."

He showed that employees of the street railway receive the highest beginning wage that is paid for unskilled labor in the city. He stated that the evidence shows that the company has ten times as many applicants for employment as it has places and that 20 cents an hour must therefore be a living wage, otherwise men would not be applying for the positions in such large numbers. Referring to the demand that extra men receive not less than $1.50 a day, Mr. Latta showed from a list of earnings that every extra man that worked earned more than $45 a month. He explained that the company has sixty-one tripper and short runs daily, which meant that the company must have not less than sixty-one extra crews on hand at all times. When the company granted the men an increase of 1 cent an hour last June it would have amounted to $3 a month if the men had worked steadily, but when they received the increase they lay off and their actual increase averaged only $1.30 a month. Mr. Latta read the wage scale of the company, commencing with 20 cents the first year and increasing to 25 cents the fifth year, and insisted that there should not be any increase in the beginning rate of wage in Indianapolis. He stated that the cost of living in Indianapolis had increased perhaps 6 or 7 per cent in the last five years, and that the "beginning" rate of wage of the employees had been increased 11 per cent and the maximum rate of wage approximately 20 per cent. Mr. Latta said that the attorneys for the employees had failed in their attempt to show that the company was overcapitalized.

Mr. Latta also read statutes bearing on the value of intangible property and quoted from an Indiana statute to show that "the value of property results from the use to which it is put." He argued that the value of the terminal building and stations at Indianapolis is not in the bricks and iron and mortar but in the fact that a number of operating contracts with many interurban lines have been entered into which bring in a great network of traffic. Mr. Latta showed charts to the commission which explained how the income of the company was derived, showing that the company has a large income from investments, outside of the operation of the street cars of the city system. Mr. Latta contended that the motormen and conductors are not entitled to participate in earnings from realty investments and revenues produced from additional sources than the operation of the cars in the street railway system.

Mr. Latta averred that the company does not in any way concede that any other men than the car service men are parties to the hearing, and that the contract of Nov. 7 related to car service men only. In discussing the conditions of work of the employees, Mr. Latta stated that the arrangement of the schedules and runs are the result of twenty years' growth of the company in Indianapolis. In taking up the matter of recognition of the union, Mr. Latta argued that the contract of Nov. 7 expressly stipulated that the existing arbitration should be effective for three years, and that this contract cannot be modified by any contract with the union which would allow of further arbitration of future difficulties with individual men, as called for in one of the grievances. He said that the commission may stipulate the method of settling individual grievances for the next three years, but that the commission has not the power to compel the company to enter into a contract with the union. Chairman Duncan here remarked that this had been his idea of the situation.

Mr. Latta then recounted the details of the attacks on the men during the strike, to prove that many of the employees were satisfied, and, referring to evidence presented in the case, stated that only eleven employees were shown to have been members of the Amalgamated Association at the time the strike was called. Mr. Latta argued that the company, under these conditions, should not be compelled to enter into a contract with the union. He said: "The evidence shows that when the city government was paralyzed, when the county government was paralyzed, when the streets were littered with débris from these cars, this company stood firm on the ground that it would not enter into a contract with those men. The company had no hesitation in meeting its own employees, but it would not meet these organizers who came here only to stir up friction, to dictate and to create riot and trouble. This strike would not have amounted to a picayune except for the riot and intimidation effected here."

In closing his argument Mr. Latta asked the Public Service Commission to append to its findings in the case the reasons, rules and premises on which it bases its decision.

Mr. Clawson closed the argument for the employees in the afternoon, confining his remarks to reading extracts from conservation speeches made by former Vice-president Fairbanks, former President Taft and President Wilson; to personal attacks on the principal stockholders of the company, and to a dramatic plea in behalf of the "working classes." Mr. Clawson failed to produce the figures requested by the commission to verify the claims of the labor attorneys that the company was overcapitalized.

The evidence taken during the hearings comprises about 5000 typewritten pages, not including tabulated statements and charts, and it will probably require about thirty days for the commission to make its findings in the case.

Rochester Company Answers Petition of City for Order Reducing Fares

The New York State Railways has filed with the Public Service Commission of the Second District of New York its answer to the petition of Mayor Edgerton of Rochester that the company be ordered to reduce its fare in Rochester to 3 cents between the hours of 5 a. m. and 8.45 a. m. and 4.30 p. m. and 6.30 p. m. on week days; that it restore University and Lyell cars to Main Street, except during rush hours, and that it discontinue the use of its State Street carhouse except for housing cars to be used in emergency. The company contends that compliance with Mayor Edgerton's request for 3-cent fares during rush hours on its Rochester lines would be to discriminate against its patrons in Syracuse and Utica; that it is by reason of the larger income that it receives from its Syracuse and Utica properties that it is able to pay dividends of 6 per cent on its preferred stock and 5 per cent on its common stock, which it holds to be a fair return to its stockholders; that an obligatory 3-cent fare would amount to confiscation of private property without due process of law, and that the company cannot legally segregate Rochester earnings from its earnings in other cities, since the company must manage its lines as one property.

The company says that 3-cent fares in Rochester would react against the sale of the $5,000,000 of bonds recently authorized by the Public Service Commission to make possible new and better equipment and which it has been unable to sell at the price fixed by the commission. It contends that the proper maintenance and upkeep of the property, its ability to make needed additions and improvements and purchase new equipment are of more importance and benefit to the city than reduction in fare.

The allegation that the New York State Railways expended about $16,000,000 to purchase the Sodus Bay and the Rochester & Eastern roads, the company contends, is misleading, because the latter company has become the owner of properties in Syracuse, Utica and Schenectady, and all its stock issues have been made under the authority of the Public Service Commission.

It is stated that the allegation that $1,200,000 was paid out in dividends by the New York State Railways from its Rochester revenues during the year is not in accordance with facts, and that is revenues are derived largely from its Syracuse and Utica properties; in fact, that these revenues are not only greater than those derived from the Rochester city lines, but from those and the revenues of the Sodus Bay, the Rochester & Eastern, the Sea Breeze and the Charlotte lines combined. Prior to the transfer of the Rochester Railway to the New York State Railways, a majority of the stock of the Rochester Railway Company was owned by the Rochester Railway & Light Company. The latter pledged such stock as part security for its bond issue falling due in 1954, and the mortgage for that bond issue contains an agreement that the Rochester Railway shall not incur any indebtedness of any kind except for current expenses. The only way the company can raise money under the agreement is by increasing its capital stock, and of this the Railway & Light Company must take its proportionate share under the mortgage and deposit it to secure the mortgage.

The enactment of the Public Service Commission's law forbade such additional stock issues. This, it is said, left the directors without any means of raising funds to meet increased current expenses and other obligations. It is alleged that the Rochester Railway is the only property of the New York State Railways that is hampered by such restrictions. This was why the merger of the Rochester, Syracuse, Utica and other properties into the New York State Railways was made.

It is alleged that it is impossible to segregate and set aside Rochester earnings and revenues and consider them separate and apart from the company's earnings and obligations elsewhere. Such a thing would be illegal and could not be considered because the company must manage its lines as one property. The company returns answer that it has paid 6 per cent upon its preferred and 5 per cent upon its common stock, which it considers a fair return. To load it beyond its means "is unjust, illegal and unwarranted."

Subway Proposed to Relieve Congestion at Public Square, Cleveland

It is said that Mayor Newton D. Baker and the new board of control of Cleveland, Ohio, are preparing an ordinance providing for an issue of $2,000,000 of bonds to secure funds to construct a subway between the Public Square and the new bridge across the Cuyahoga River and between the west end of the bridge and West Twenty-eighth Street and between Detroit Avenue and West Twenty-fifth Street. The last would provide a connection for the Detroit Avenue and Boulevard lines with the tracks that are to cross the bridge. Mr. Baker, Street Railway Commissioner Witt, City Engineer Hoffman and County Surveyor Stichcomb conferred on Jan. 9 in regard to the matter. Engineer Hoffman presented estimates showing that a four-track subway, with terminal loops under the Public Square, can be built within the estimate of $1,600,000 made by Commissioner Witt. This provides only for the subway between the Public Square and the bridge. The remaining $400,000 will take care of the portion of the line at the west end of the bridge. It is probable that the question of issuing the bonds will be submitted to a vote of the people on March 3. Mr. Witt stated that if the people authorize the issue and the subway and terminals are built the Cleveland Railway will rent the improvements for an amount equal to the interest on the bonds. He feels that the improvement will relieve congestion at Public Square and at the junction of the West Side lines on West Twenty-fifth Street.

Mr. Witt has announced that the seating capacity of the Superior Avenue line will be increased 65 per cent by the addition of trail cars, but that the headway will be reduced from three to five minutes. If the plan proves satisfactory he intends to introduce trailers on all lines with the exception of Euclid Avenue, which, he says, has too many branches to make it successful. The conductors and motormen contend that the operation of the trail cars will cause some of them to lose their places.

Fare Readjustment Ordered on Milwaukee Suburban Lines

The Railroad Commission of Wisconsin has ordered a readjustment of the fares of the Milwaukee Light, Heat & Traction company, which handles the suburban and interurban business of The Milwaukee Electric Railway & Light Company. The order provides that the fare everywhere beyond the one-fare limits in cities shall be 2 cents a mile. The distance from Milwaukee to South Milwaukee is 7 miles, and this distance has been divided into seven 1-mile zones. The distance to Tippecanoe is 2 miles, and this has been divided into two 1-mile zones. The principal reduction is in the fare to Wauwatosa, which has been 9 or 10 cents—a ticket or a nickel to the one-fare limit and a nickel for the remainder of the distance. The distance between the one-fare limit and the Milwaukee road depot in Wauwatosa has been made a 1-mile zone and it will cost 2 cents to ride across it. Thus the reduction in the fare amounts to 3 cents. The fare to West Allis is cut also, it being possible to ride from the one-fare limits to Seventy-seventh Avenue and Summit for 2 cents. The commission recommends that the single-fare limits be extended to Sixty-second Avenue on the Burnham Street line, and also that a single fare be charged within the limits of the city of West Allis. From Milwaukee to Hampton Avenue in North Milwaukee the fare will be 6 cents. The Whitefish Bay cash fare is reduced from 10 cents to 9 cents and the Wanderers' Rest cemetery cash fare is reduced in the same manner. The commission says in part:

"In selling any product it is customary to employ a standard unit of measurement. Similarly, in selling transportation to persons the adopted standard unit of measurement is the passenger mile—one passenger carried 1 mile. Although steam lines in general have adhered to this standard, the electric interurban systems in many cases have used the so-called 5-cent zone system of rates. This system is merely an extension of the flat 5-cent city fare and has no scientific basis for suburban or interurban operation. The resulting inequalities which exist under this system of rates may well be illustrated by measuring the different fares charged by the unit of measurement—the passenger mile. No better examples can be cited than exist upon the respondent companies' suburban and interurban systems.

"It is deemed that a basis rate of 2 cents per passenger mile upon a cash basis, with a flat fare for the terminal and subterminals, will best meet the interurban requirements. That such a rate is not a departure in electric railway operation is shown by conditions in Wisconsin and other states. A gradual change is taking place from the old 5-cent zone basis to some form of mileage basis. It has been the contention that the basic rate in this case should be placed upon a cost-of-service basis. Computations in the matter of the city of Milwaukee vs. The Milwaukee Electric Railway & Light Company show that the rate of return upon the total interurban physical property amounted to 3.10 per cent in 1908, 3.05 per cent in 1909, 1.81 per cent in 1910 and 2.35 per cent in 1911. Similar computations for 1912 show the per cent return to approximate 1.6 per cent.

"These facts indicate that when 7.5 per cent is considered a fair return, the rates of return as quoted for the past five years have fallen considerably below an adequate return. To bring the revenues to the point where they would yield such a return for 1912, for instance, it would be necessary —assuming no decrease in traffic, which is very unlikely— to establish the basic rate at about 2.75 cents per passenger mile. When the conditions prevailing on the interurban system are considered as indicated by the passenger density per car mile, increasing only from 2.09 in 1908 to 2.13 in 1913, it seems best to place the rate at a lower figure than the cost of service would demand so as to encourage the passenger density with this lower rate to increase sufficiently the revenues to the point where they will bring an adequate return above all expenses. It should also be stated that a rate of 2.75 cents per passenger mile would result in a large number of increases upon the entire system, while a rate of 2 cents, although increasing certain low rates, reduces a considerable number and thus equalizes the conditions on a more satisfactory basis."

James D. Mortimer, president of the company, is quoted as follows:

"The opinion of the commission contains no detailed analysis of the probable effects of the change in suburban and interurban fares. I am unable at this time to make any accurate estimate of the effect on the company's revenues, and the financial aspect of this new commission order can only be determined by trial. A superficial examination of the order indicates a provision for the sale of coupon mileage books and for the temporary use of special commutation tickets good to the center of South Milwaukee.

"The coupon mileage provided for in the order is to consist of books containing 300 miles and selling for $5.40, or 1.8 cents per mile. Coupon mileage, it is expected, will be used by some of the riders who make frequent use of the interurban lines. It is not expected to be used by suburban riders, as only in the extreme case can any saving be effected thereby. While the normal fare between Milwaukee and South Milwaukee has been increased, the effect is in part offset by the temporary sale of coupon books containing twenty rides and selling for $2.50.

"The rearrangement in the method of computing fares will not in any way affect the transfer privileges now accorded interurban passengers desiring to ride on local cars in Milwaukee and Racine. While all the elements underlying the scheme of fares ordered by the commission have been successfully utilized for years, the combination in the present form and the use of a 2-cent suburban fare zone has, so far as I recall, not heretofore been undertaken. The working out in practice of this fare scheme will, no doubt, be watched with interest by the public and by the electric railway operators throughout the country, and upon demonstration as a desirable system of fares will probably be adopted as a solution of many of the vexatious problems now confronting electric railways throughout the country."

Report on Los Angeles Railway Corporation

The report on the Los Angeles (Cal.) Railway Corporation prepared jointly by Consulting Engineer George A. Damon, who is associated with Bion J. Arnold, Chicago, and C. K. Mohler, chief engineer of the railway department of the city, was submitted to the City Council by the Board of Public Works on Jan. 8 and has been referred by the Council to its public utilities committee. A recapitulation of the report contains the following:

"Compared with other American cities, the local mileage in Los Angeles is liberal for the area covered and the population served. Past earnings have not been sufficient to take care of a large allowance for depreciation and nothing for amortization. The rides per capita are very high, averaging nearly a ride per inhabitant per day, a record exceeded only by San Francisco, where the income per capita is $18.35, as compared with $16.20 in Los Angeles.

"The present interest charges of 5 per cent on the original bonded debt of $20,000,000 and 5 per cent on the actual cost of extensions financed through the City Railway's account is a 'reasonable return upon the actual present physical value' of the system, but is not sufficient to compensate for hazard and enterprise in creating the property. An annual dividend of 2 per cent on $20,000,000, or $400,000 yearly, is a reasonable reward for hazard and enterprise, and should be allowed as long as present uncertain conditions continue. An additional dividend of a larger amount than $400,000 annually is not justified by present net earnings. The payment of a dividend of $800,000 out of the current year's earnings was made possible only by anticipating net earnings—by using the depreciation reserve fund, or by borrowing money.

"The present 5-cent fare, if continued during the coming year under present operating conditions and with a normal increase in earnings, will produce a surplus over and above the amount sufficient for interest charges and reasonable dividends. The control of this surplus should be in the hands of a public regulating body, which should decide upon the disposition of this part of the surplus net earnings for any or all of the following purposes: better service, extensions, renewals, amortization or fare reduction.

"In anticipating future developments it is safe to conclude that earnings will increase at a remarkable rate; that the percentage of earnings required for operating expenses should gradually decrease and that the ratio of investment to earnings should also be reduced—thus making the burden of fixed charges relatively lighter.

"The present management of the Los Angeles Railway Corporation is working under the following disadvantages: The franchise fabric is a patchwork; many franchises expire before the bonds covering the investment are due in 1940. This $20,000,000 first mortgage bond issue, covering a greater portion of the property, is a closed mortgage and does not allow for the issue of any additional bonds to take care of improvements and betterments on the property covered by the mortgage. Extensions are made by a subsidiary company and the securities of this company are protected only by the piecemeal extensions and additional equipment, resulting in a limited market for these betterment bonds. Under present circumstances it is necessary for H. E. Huntington to buy these bonds personally.

"On the other hand, the city is working under disadvantages. There is no comprehensive franchise policy; there are numerous legal tangles in present franchise grants which may involve the city in expensive litigation before it can secure back again full control of its own streets. If the city attempts to reduce fares at the present time a controversy is inevitable, as the company claims it has eminent legal advice that present franchises intrench them securely upon a 5-cent fare basis."

The general contract ordinance proposed in the report to be substituted for the present franchises is outlined as follows:

"A contract ordinance between the city and the local surface railway company should attain the following objects: The very best possible service at the lowest cost of operation, maintenance and depreciation; the protection of the actual present value of the property, plus the actual money invested in future extensions and betterments; the complete maintenance, periodic renewals and constantly increasing efficiency of the system; extensions and additions slightly in advance of actual need; one city, one fare, universal transfers, through routes and publicity of records; public supervision, which will include the regulation of the surplus earnings so as to better the service and reduce the fares; public control over plans for additional construction and equipment, regulation of contracts, rates and transfers and control of capitalization, accounts and transfer of power; right of the city to purchase the property at reasonable intervals and at a fair price, which is not to include any franchise value."

Municipal Ownership Approved in Nelson.—A by-law has been passed at Nelson, B. C., authorizing the city to purchase 40,000 of the 75,000 shares of stock of the Nelson (B. C.) Street Railway, Ltd.

Trial Train Over the Portland, Eugene & Eastern Railway.—The first trial train was operated over the electrified Portland, Eugene & Eastern Railway on Jan. 5, 1914, between Beaverton and Gaston.

Consolidation of Pennsylvania Associations.—The Keystone Railway Club and the Pennsylvania Street Railway Association have been consolidated under the authority of the joint executive and consolidation committees.

Order Prescribing Air Brakes for Hamilton Cars.—The Ontario Municipal & Railway Board has decided that the cars of the Hamilton (Ont.) Street Railway of the heavier type must be equipped with air brakes inside of six months.

Boston Arbitration Award.—On Jan. 16, 1914, the Boston (Mass.) Elevated Railway Arbitration Board granted a substantial wage increase to the employees. The particulars will be published in the ELECTRIC RAILWAY JOURNAL of Jan. 24.

Members of Chicago Harbor & Subway Commission Resign.—E. T. Shankland, J. J. Reynolds and John Ericson, members of the Harbor & Subway Commission of Chicago, and their secretary, W. J. Shanks, have sent their resignation from this commission to the Mayor.

Bond Issue for Car Line Rejected in Tacoma.—The citizens of Tacoma, Wash., by a vote of 4352 to 3233, have rejected the plan to authorize an issue of $87,000 of bonds by the city to provide funds to construct an electric railway across the tideflats manufacturing district.

Toronto Purchase Agreement Drafted.—The agreement under which it is proposed that the city of Toronto will purchase the property of the Toronto (Ont.) Railway has been completed by the corporation counsel of the city and it is to be sent to Sir William MacKenzie for ratification.

Power from City Plant for "Owl" Cars.—Hardy Croom, general manager of the Jacksonville (Fla.) Traction Company, has taken up with the authorities of the city the question of purchasing power from the municipal lighting plant between 11 p. m. and 5 a. m. daily for operating the company's "owl" service.

Municipal Ownership Vote in Superior.—The City Commission of Superior, Wis., has decided to submit to the voters of that city at the election to be held in April the question of the advisability of the city condemning the property of the Duluth-Superior Traction Company in Superior. The idea is to have the city take over and operate the property under a law passed by the last Legislature.

New York Franchise Forfeiture Cases.—The forfeiture of a large number of unused street railway franchises in New York City and the removal of the rails are involved in judgments which have just been entered by Attorney-General Carmody. This announcement was made at the office of the Attorney-General on Jan. 10, 1914, as the culmination of a series of litigations extending over two years. All the franchises in question are controlled by the New York Railways, formerly the Metropolitan Street Railway.

Rules Regarding Interlocking Plants in Missouri.—The Missouri State Public Utilities Commission recently adopted rules governing the construction, maintenance and operation of interlocking plants by electric railways and steam railroads. The code was effective Jan. 1 and is similar to those in force in Illinois, Indiana, Wisconsin and other States. Companies using such plants are required to report four times a year. Prior to the construction or reconstruction of any interlocking plant a station map and profile showing all grades and tracks must be filed with the commission.

Portland's Public Utilities.—Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., contributed an article on the activities of the company to the *Morning Oregonian* of Jan. 1, 1914. He said that the present management has been in control of the company for seven years and that during that time $24,000,000 has been expended for improvements and betterments. For the year 1913 about $1,500,000 was expended by the company for improvements. The article was accompanied by several half-tone illustrations showing important phases of the new work.

Suspension of Franchise Negotiations in Kansas City.—Following the suspension of activities by the committee of the Council appointed to consider the new franchise for the Metropolitan Street Railway, Kansas City, Mo., considerable speculation has taken place as to the next move. Newspapers which opposed the proposed franchise are nonplused over the sudden change of tactics by the receivers and most of the papers are maintaining a discreet silence. Labor organizers have arrived in Kansas City with the avowed intention of unionizing the employees of the company. These men, according to their announcement, are prepared to remain in Kansas City until May.

Mr. Huff in Charge of Public Relations.—Among the duties which S. W. Huff will assume as vice-president of the Brooklyn (N. Y.) Rapid Transit System will be the direction of the bureau of complaints, which was conducted by John F. Calderwood, formerly vice-president and general manager. All complaints and suggestions from the public addressed to the Brooklyn Rapid Transit Company will receive Mr. Huff's personal attention. Mr. Huff has established his office on the first floor of the main office of the company at Montague and Clinton Streets, Brooklyn, and will receive personally, so far as possible, those who desire to call at the offices of the company in regard to complaints and kindred matters.

Circular Regarding M. C. B. Convention Exhibits.—The Railway Supply Manufacturers' Association, through J. D. Conway, its secretary-treasurer, issued under date of Jan. 10, 1914, official circular No. 1 inviting manufacturers of and dealers in railroad supplies to exhibit at the annual convention of the association to be held in conjunction with the convention of the Master Car Builders' Association on June 10, 11 and 12, 1914, and the American Railway Master Mechanics' Association at Young's Million Dollar Pier, Atlantic City. Details of the arrangements for the exhibits, applications for space, hotel rates, etc., are included with the circular. Mr. Conway may be addressed at 630 Oliver Building, Pittsburgh, Pa.

Berkshire Mountain Line Denied.—The Massachusetts Public Service Commission has disapproved the petition of the Berkshire Street Railway for authority to extend its line to a point near the summit of Mount Greylock at an estimated cost of $1,100,000. The board states in its finding that the proposed line would be patronized only a short time yearly and largely by pleasure seekers; that depreciation would be excessive; that interest charges would amount to $55,000 per year, and that to secure an adequate return such high fares would be necessitated as would prohibit the general use of the line by the public. The commission advises the construction of other not less profitable lines of larger usefulness in case the company is in the position to make such investment.

Engineering Departments of Harvard and M. I. T. to Combine.—The engineering departments of Harvard University and the Massachusetts Institute of Technology are to be combined as the result of an agreement reached on Jan. 9. The combined departments of mechanical engineering, electrical engineering, civil and sanitary engineering and mining engineering and metallurgy are to be conducted in the new Technology buildings now being built in Cambridge. Harvard is to discontinue its schools of applied science in these departments. The president of the Institute of Technology is to be the executive head of the co-operative work, and the faculty will consist of the faculty of the Institute, enlarged by the addition of Harvard professors of the departments involved.

Capital Expenditures of Detroit System—The Detroit (Mich.) United Railway reports the following expenditures charged to capital account for the eleven months ended Nov. 30: Detroit United Railway, $1,310,746; Rapid Railway, $67,433; Detroit, Monroe & Toledo Short Line Railway, $257,392; Detroit, Jackson & Chicago Railway, $115,784; Sandwich, Windsor & Amherstburg Railway, $143,393; total, $1,894,750. It was expected that the expenditures for December would bring the grand total for the year up to $2,225,000. In the matter of new cars and car equipment approximately $700,000 was spent. In the matter of real estate and private right-of-way approximately $200,000 was spent. These are all of course in addition to the regular expenditures for maintenance.

New York Commission Refuses to Order Extension.—The Public Service Commission for the First District of New York, by a vote of three to two, has refused to order the New York & Queens County Railway, Long Island City, to extend its tracks on Astoria or Flushing Avenue from Ehret Avenue to Jackson Avenue in Queens. Commissioner J. Sergeant Cram, who held the hearings to inquire into the situation, submitted an opinion recommending that an order for the extension should be made, in accordance with the requirements of the company's franchise. Commissioner Cram held that the population on either side of the route was sufficient to warrant construction and operation. Commissioner Eustis said that no company should be required to construct a route until the street is in proper condition for it.

Report Against Removal of Elevated Line in Boston.—The Boston Transit Commission has filed with the Senate the result of its investigation of the resolve by the Legislature of 1913 requesting an investigation as to the removal of the elevated structure on Washington Street and Main Street and an extension of the Washington Street tunnel to Dudley Street and the construction of a subway from City Square to Sullivan Square. The commission finds that to substitute subways for elevated within the points specified would involve very large expense, estimated as approximately $13,232,500. This would not increase transit facilities and would have to be assumed by the city. The report continues: "While the commission fully appreciates the disadvantages of elevated structures on public streets, the fact must be recognized that they are in many cases the only practicable means of securing rapid transit facilities. It cannot be too clearly borne in mind that the project contemplated involves no additional transit facilities but simply contemplates a large expenditure to do away with the overhead structure."

Mayor Seymour of Tacoma on Municipal Ownership.—On his return to Tacoma, Wash., from the East Mayor Seymour, of that city, was quoted in part as follows in regard to the possibility of municipal ownership of the lines of the Tacoma Railway & Power Company, which are under the management of Stone & Webster: "Mr. Stone said they would sell the entire property. He did not state the terms under which the sale would be made, but he said all the company asked was a fair adjustment. I asked the advice of Mayor Baker of Cleveland in regard to the city taking over the property, and he thought it would be a splendid idea. I believe Mr. du Pont, Cleveland, would make a fair appraisal of the whole property. We could certainly control the situation if we owned the entire system, but there is the danger of political influence. I do not know of any man in public life in Tacoma capable of handling the management of the Tacoma system. I am not in favor of the city taking over the entire system because I do not believe we are ready for it at this time. It would probably take two years after we had decided to buy the system before the complete appraisal had been made and the system was ready to turn over to the city."

Further Appropriation for Subway in Chicago.—The finance committee of the Chicago City Council, in preparing the annual appropriation bill for 1914, made an allowance of $2,000,000 from the city's traction fund, which is accumulated out of the payments made to the city by the surface railways, for the construction of subways to be used by the surface railways or elevated railways, or both. At the meeting of the finance committee the Mayor referred again to the advisability of doing away with the loop structure, over which the elevated roads operate in the downtown district, and announced his intention to bring suit to compel the companies to remove the structure. A suit of this kind was begun some time ago by Corporation Counsel Sexton but was abandoned at the time Attorney Hoyne for the State filed quo warranto proceedings against the Chicago Elevated Railways. The finance committee made no allowance from the traction fund for the maintenance of the Harbor & Subway Commission, the members of which have all resigned. William R. Willcox, formerly chairman of the Public Service Commission of the First District of New York, has been mentioned as a possible adviser in connection with subway matters in Chicago.

Special Report on Boston Transit Matters.—The Boston Transit Commission sent a special report to the Legislature on Jan. 9 upon several transit matters referred to it by the last General Court. The commission was ordered to estimate the cost of a tunnel under Boston Harbor between the city proper and Chelsea, and it suggests two routes, each of which is about 2.5 miles in length. The estimated cost of either tunnel is approximately $6,700,000, including $700,000 in land damages. The board volunteers the suggestion that with the completion of the extension of the East Boston tunnel from Court Street to Bowdoin Square and beyond opportunity will be afforded for a large increase in the traffic facilities between Boston, East Boston and Chelsea. The extension will probably be placed in service in 1915 and a valuable feature will be a loop at Bowdoin Square which will supersede the present inconvenient stub-end terminal at Court Street. By the East Boston tunnel the same points in Chelsea will be reached as would be covered by the proposed tunnels. The commission disapproves the building of a station in the Washington Street tunnel at Bennett Street, Boston. The proposed station would be built on a 4 per cent grade. It would cost upward of $500,000. The location is near the present Boylston Street station, and an additional stop at this point would injure the rapid transit program for which the tunnel was created. The board states that a physical connection between the Dorchester tunnel and the South Station is being planned in the station designs made by the engineers of the commission.

Committees of the National Association of Railway Commissioners.—The names of the members of the valuation committees of the National Association of Railway Commissioners follow: Committee No. 1—Fred J. MacLeod, Massachusetts; E. C. Niles, New Hampshire; Milo R. Maltbie, New York. Committee No. 2—R. Hudson Burr, Florida; Charles M. Candler, Georgia; E. W. Doty, Ohio. Committee No. 3—O. F. Berry, Illinois; L. T. Hemens, Michigan; Halford Erickson, Wisconsin. Committee No. 4—W. D. Williams, Texas; J. M. Atkinson, Missouri; George A. Henshaw, Oklahoma. Committee No. 5—John M. Eshleman, California; H. F. Bartine, Nevada; Clyde B. Aitchison, Oregon. The resolution provided for an executive committee which was elected by the three members of the district committees. Its members include Mr. Atkinson of Missouri, Mr. Berry of Illinois, Mr. Candler of Georgia, Mr. Eshleman of California and Mr. Maltbie of New York. The entire committee elected as its chairman Mr. Erickson of Wisconsin and as its secretary Mr. Doty of Ohio. The work of the committee was perfected in Chicago on Dec. 10, 1913. On Dec. 17, 1913, at a meeting of the executive committee of the valuation committee Mr. Maltbie was selected as chairman of the executive committee. The executive committee of the National association appointed by Laurence B. Finn, Frankfort, Ky., president of the National association, is as follows: Robert R. Prentis, Richmond, Va.; Charles F. Staples, St. Paul, Minn.; Martin S. Decker, Albany, N. Y.; O. H. Hughes, Columbus, Ohio, and W. M. Daniels, Trenton, N. J.

Financial and Corporate

Stock and Money Markets

Jan. 14, 1914.

All through the trading in the early forenoon on the New York Stock Exchange to-day the price movements were irregular and business was almost entirely of a professional character. During the last half of the forenoon the trading was very quiet. A better tone was shown in the afternoon trading, but there was little increase in the volume of business. Railroad and other bonds were strong. Rates in the money market to-day were: Call, 2@2½ per cent; sixty days, 3½@4 per cent; ninety days, 3¾@4 per cent; five and six months, 4@4¼ per cent.

The local market in Philadelphia ended strong and active. In the early trading Union Traction sold at 46¼, while Philadelphia Rapid Transit was offered at 19¾.

A strong tone characterized the stock market in Chicago to-day. Bonds generally were unchanged.

At Boston to-day the trading was quiet and prices steady. At the close the market was firm and considerably more active.

Business was fairly active on the Stock Exchange in Baltimore to-day.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 7	Jan. 14
American Brake Shoe & Foundry (com.)	90	89
American Brake Shoe & Foundry (pref.)	127	128½
American Cities Company (com.)	36	36
American Cities Company (pref.)	60¼	61⅞
American Light & Traction Company (com.)	337	336
American Light & Traction Company (pref.)	106	107
American Railways Company	38	38
Aurora, Elgin & Chicago Railroad (com.)	38½	37½
Aurora, Elgin & Chicago Railroad (pref.)	83	80
Boston Elevated Railway	87⅝	90
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*58	*58
Boston & Worcester Electric Companies (com.)	*6½	*6½
Boston & Worcester Electric Companies (pref.)	36½	37
Brooklyn Rapid Transit Company	88	89⅝
Capital Traction Company, Washington	112¾	112
Chicago City Railway	160	160
Chicago Elevated Railways (com.)	25	25
Chicago Elevated Railways (pref.)	75	75
Chicago Railways, ptrptg., ctf. 1	91	*91
Chicago Railways, ptcptg., ctf. 2	27¾	30
Chicago Railways, ptcptg., ctf. 3	6	6
Chicago Railways, ptrptg., ctf. 4	2	2
Cincinnati Street Railway	102	102½
Cleveland Railway	104¾	105¼
Cleveland, Southwestern & Columbus Ry. (com.)	5	5
Cleveland, Southwestern & Columbus Ry. (pref.)	26	26
Columbus Railway & Light Company	18	18
Columbus Railway (com.)	47	50
Columbus Railway (pref.)	76	77½
Denver & Northern Railway	70	70
Detroit United Railways	a80	80
General Electric Company	140¾	144½
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	84	83
Interborough Metropolitan Company (com.)	15	15⅝
Interborough Metropolitan Company (pref.)	61	62
International Traction Company (com.)	30	30
International Traction Company (pref.)	90	90
Kansas City Railway & Light Company (com.)	15	15
Kansas City Railway & Light Company (pref.)	30	30
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	*24	*24
Manhattan Railway	125	125
Massachusetts Electric Companies (com.)	11	12½
Massachusetts Electric Companies (pref.)	64	64
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	24¾	24¾
North American Company	67	70
Northern Ohio Light & Traction Co. (com.)	60	57
Northern Ohio Light & Traction Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	39	41
Philadelphia Company, Pittsburgh (pref.)	40	41
Philadelphia Rapid Transit Company	18¾	19⅞
Portland Railway, Light & Power Company	48	48
Public Service Corporation	109	107
Third Avenue Railway, New York	43½	45½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	104¾	105½
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	25	25
United Rys. Inv. Company (com.)	20	20
United Rys. Inv. Company (pref.)	39	39
Virginia Railway & Power Company (com.)	50	50
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	85¾	88½
Washington Ry. & Electric Company (pref.)	87	88½
West End Street Railway, Boston (com.)	69	71
West End Street Railway, Boston (pref.)	87	89
Westinghouse Elec. & Mfg. Company	66	67½
Westinghouse Elec. & Mfg. Co. (1st pref.)	116¼	116

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* Last sale. a Asked.

ANNUAL REPORTS

Southern Pacific Company

The gross receipts of the Southern Pacific Company, San Francisco, Cal., in respect to its leased lines, and of the proprietary companies in respect to lines not leased, after excluding all offsetting transactions, were $142,774,705 for the year ended June 30, 1913, which figure compares with $131,525,071 for the year preceding. The operating expenses for 1913 were $98,566,696, an increase over 1912 of $6,454,413, giving a net operating income for 1913 of $44,208,009, an increase of $4,795,121 over 1912. The total other income in 1913 was $11,742,172, giving a total income of $55,950,191. After deducting from this amount $29,082,374 for fixed and other charges, there was left a surplus for the period of $26,867,807, representing 9.85 per cent on the outstanding capital stock of the Southern Pacific Company. The dividends paid during the year amounted to $16,369,932, leaving a surplus of $10,506,875, an increase over the preceding year of $5,264,909.

During the past ten years there has been an increase of only 16.61 per cent in the mileage of track operated, but taxes have increased $3,586,745, or 169.9 per cent. On June 30, 1913, the Southern Pacific Company had made the following advances against which no securities had been issued: for the construction and acquisition of new lines, including electric lines, $82,866,981; for rolling stock and floating equipment $41,037,205, and for lands and other properties, $7,318,802, or a total of $131,222,989. During the year the electric passenger equipment owned by the Southern Pacific Company was increased through the addition of ten electric motors.

Receipts and Disbursements of Electric Transportation Proprietary Companies of Southern Pacific Company for Year Ended June 30, 1913

	Total	Pacific Electric Railway	Fresno Traction and Fresno City Railway Combined	Stockton Electric Railroad	Visalia Electric Railroad	San José Railroads	Peninsular Railways	Portland, Eugene & Eastern Railway
Receipts:								
Gross operating income	$10,753,486	$9,399,079	$212,454	$191,489	$75,506	$366,952	$280,319	$227,686
Other income	257,762	*203,614	1,766	551	150	11,029	37,445	3,206
Total receipts	$11,011,248	$9,602,693	$214,220	$192,040	$75,656	$377,981	$317,764	$230,892
Disbursements:								
Operating expenses ...	$7,379,321	$6,365,519	$146,039	$110,510	$72,709	$251,188	$225,636	$207,719
Taxes	447,647	377,908	9,068	8,555	3,179	14,908	14,014	20,014
Hire of equipment.....	6,701	....	....	....	....	....	....	6,701
Interest on funded debt	2,740,500	2,528,353	45,180	....	....	141,967	25,000	....
Interest on open accounts	398,953	....	11,584	28,379	78,675	....	181,655	98,660
Sinking fund contributions	152,417	128,667	11,250	....	....	12,500	....	....
Other charges	150,734	131,041	4,830	....	89	2,512	10,241	2,019
Total disbursements.	$11,276,273	$9,531,488	$227,951	$147,444	$154,652	$423,075	$456,546	$335,113
Surplus	....	*71,204	....	44,596	....	....	....	....
Deficit	265,025	....	13,731	....	78,996	45,094	138,782	104,221
Total road miles........	776.78	560.54	16.88	7.29	34.23	27.55	64.44	‡65.85
Average miles of railway operated during year..	751.35	550.22	17.14	6.39	33.41	27.55	54.14	‡62.50

*Does not include interest, amounting to $155,232, accrued during the year on advances to the Pacific Electric Land Company.
‡Includes 29.42 miles of steam lines.

The expenditures for additions and betterments during the year amounted to $8,131,617. Of this amount $8,060,398 was charged to the capital accounts of the various proprietary companies. The percentage of operating expenses to the gross operating income was 26.76 per cent in 1913, compared with 25.26 per cent in 1912, for maintenance, and 36.25 in 1913, compared with 37.26 per cent in 1912, for operation.

During 1913 much attention was paid by the Southern Pacific Company to the "safety first" movement and, according to statistics presented in the annual report, the number of employees killed decreased from forty-two in 1912 to nine in 1913, and the total killed per 1,000,000 locomotive miles decreased from 0.772 in 1912 to 0.156 in 1913. Since 1910 no passenger has lost his life in a Southern Pacific train accident, and during this time 162,514,509 passengers were carried. At the recent International Safety and Sanitation Exposition, held in New York, the Southern Pacific Company obtained the E. H. Harriman memorial gold medal for "making the best record in accident prevention and industrial hygiene affecting the public and its own personnel" during the year ended June 30, 1913.

Julius Kruttschnitt, chairman of the executive committee, makes the following remarks regarding the subjects of public relations and unified action on the part of the shareholders of the company:

"The management has labored energetically to conciliate the people of the communities traversed by the company's lines. As far as possible the officers of the company have attended commercial and other public gatherings, with a view to learning their needs and opinions, in order to improve the service and promote harmonious relations between the company and its patrons. The management is pleased to report the evidence of better feeling toward the company in these communities than has ever before existed.

"The officers of the company are too few in number to exert much influence on public opinion, and a large part of their time and energy which should be devoted to that end and to promoting safer and more efficient management is consumed in appearing before commissions, to protect the company's revenues, and before legislative bodies, to argue against ill-advised and damaging laws. The present is an age of regulatory legislation, and the stockholders should endeavor to defend their own interests by opposing unwise legislation adversely affecting their company and by correcting erroneous impressions current with the public. The ownership of the property is vested at the present time in over 23,000 stockholders, who could and should prove a potent protective force. A pathetic acquiescence on their part in the assaults of the demagogue and of the well-intentioned though unenlightened and irrational reformer tends toward but one result, while concerted effort will do much to repel the attacks and mold public opinion."

The accompanying table shows the total mileage, average mileage operated and a condensed statement of receipts and disbursements for the various proprietary electric railways of the Southern Pacific Company.

Siemens & Halske Works

The Siemens & Halske Works, Berlin, Germany, have recently issued a report covering their business for the fiscal year ended July 31, 1913. The net profits of $5,835,350 permitted a stock dividend of 10 per cent, or $2,250,000. Of the remainder $625,000 was assigned to reserve, $375,000 for employees' bonuses and $125,000 for employees' welfare work. The German shops alone built 138,000 pieces of apparatus having a total rating of 2,991,772 kw. Attention is called to the great field of development still open to nation-wide transmission systems. The foreign business of the company is reported as prosperous, one of the most important orders being a 100,000-volt transmission system betweeen Tocopilla and Chuquicamata, Chile, which will cost about $3,000,000. The largest turbine built during the year was of 21,500-kva capacity, the largest transformer of 23,500-kva capacity and the highest voltage transformer 110,000 volts at 10,000-kva capacity.

New Haven $67,000,000 Convertible Bond Issue Annulled

The Massachusetts Supreme Court on Jan. 9 decided that when the Public Service Commission promulgated an order giving its consent to the issue by the New York, New Haven & Hartford Railroad Company of $67,700,000 of convertible debenture bonds it went beyond its authority. The court therefore annulled the order.

The opinion of the court, which was unanimous, said in part:

"The approval by the commission of an issue of stock must relate to the present and not to a remote future. The price at which the public interest may require that stock may be issued during a period of ten years beginning five years hence is impossible of ascertainment now. But the approval of convertible debentures with the right to take stock at par in payment during that period involves fixing a price of the stock during the like period. An order entered now that stock be issued at par during that period of time can afford no security that the corporation will get an adequate return for its stock, or that rates and charges fixed upon such a capitalization will be fair, or that the rights of other stockholders will be guarded properly.

"No request has been made for the approval of an issue of bonds without the convertible-into-stock feature. Hence the only matter to be considered upon this aspect of the case is whether approval of an issue of convertible debentures such as is set out in the order of the commission is within its legal power."

Howard Elliott, chairman of the New Haven system, says of the decision:

"The company has not been unmindful of the fact that the decision of the Supreme Court might be adverse, and it has been making preparations for taking care of its finances in such event. As none of the short-term notes mature before the middle of May, there is abundant opportunity for the company to make the necessary arrangements."

On Jan. 10 the Public Service Commission issued the following statement defending its authorization of the bond issue:

"The commission recognized that it was a matter of doubt whether it could legally authorize an issue of bonds containing a provision for subsequent conversion into stock at par. There were so many reasons of sound public policy why the company at that particular time should have the opportunity of financing itself that it seemed to the commission that an issue of securities otherwise lawful and in the public interest should not be disapproved on account of the convertible feature of the bonds unless it was absolutely clear that this feature was illegal.

"The Public Service Commission is an administrative body, dealing principally with questions of policy, the statute having set the court over the commission to correct any excess of its lawful powers."

H. H. Porter on the Needs of the Springfield Properties

H. Hobart Porter of Sanderson & Porter, New York, N. Y., who took over the properties of the New England Investment & Security Company, Springfield, Mass., some time ago, in discussing the situation with respect to these properties with a representative of the ELECTRIC RAILWAY JOURNAL said that the members of the firm, particularly E. N. Sanderson and Francis Blossom, were making a careful study of the situation in order to determine what course it was desirable to pursue in matters of finance and operation. They found the properties to be in good condition and able to pay their way, but they are in a peculiar situation now that they have been divorced from the New Haven railroad.

As Sanderson & Porter analyze the situation, the electric railway system needs a yearly addition of capital to make the improvements and extensions required. This would amount to many hundreds of thousands of dollars a year and could not be supplied from surplus earnings even if it were good public policy to permit the earnings to be used in that way. If the capital were increased annually the growth of the service should carry the increased charges. Mr. Porter has faith in the growth of the section. In specifying the needs for the capital outlay, he said that the Springfield system particularly needed additional carhouse space and adequate repair shops, both of which would cost considerable money. It is the fact now, he said, that cars cannot be cleaned as often as they should be because there is not enough carhouse space to accommodate them. The need of repair shops for the system has long been felt by the management, and plans had been made for carrying out these improvements before the properties were taken over. Mr. Porter said that the Springfield and Worcester companies were well equipped with rolling stock, but that there was need for the construction of certain extensions.

Reports of Electric Railways in Connecticut

The reports of electric railways in Connecticut to the Public Utilities Commission of that State show that on June 30, 1913, their total assets amounted to $95,340,195, an increase in round numbers of $3,000,000 over the preceding year. There has been an increase of operating revenues of $664,970 and an increase of operating expenses of $432,332. The total number of fare passengers reported by all roads during the year, with the exception of the Rhode Island Company, was 185,588,980. In addition to this number there were 34,430,849 transfer passengers, or a total of 220,019,829 fare passengers. These figures show an increase over the preceding year of 10,154,861 more fare passengers and 1,659,770 more transfer passengers, and a total increase of fare passengers carried of 11,814,631. The total average fare revenue from each passenger on lines charging a 5-cent fare, not including transfer passengers, was $0.0485; including such transfer passengers it was $0.0435. There were fourteen companies in Connecticut which made returns for the year to the commission.

American Railways, Philadelphia, Pa.—Stockholders of the American Railways, who hold $1,485,000 of Johnstown Passenger Railway collateral trust 5 per cent bonds, due 1930, have received the privilege until Jan. 15, 1914, of exchanging the bonds for the new first and refunding mortgage 5 per cent bonds of the Johnstown Traction Company, at 102½ and interest for the present bonds and payment at 95 and interest for the new issue.

Binghamton (N. Y.) Railway.—At a meeting of the Binghamton Railway on Jan. 12, officers and directors were elected as follows: G. Tracy Rogers, president; George E. Green and George Dunn, vice-presidents; Elmer M. White, treasurer; R. W. Day, W. L. Connell, G. Tracy Rogers, A. J. Parsons, George H. Barlow, William H. Hecox and Thomas J. Keenan, directors. H. Tracy Rogers will continue as superintendent and W. D. Decker as assistant superintendent. Elmer M. White succeeds H. Carl Hardie as treasurer, while R. W. Day, general manager, and W. L. Connell, treasurer of the Scranton & Binghamton Railway, were elected directors of the Binghamton Railway to succeed T. B. Crary and Frank B. Newell.

Boston (Mass.) Elevated Railway.—The West End Street Railway has petitioned the Public Service Commission of Massachusetts for the approval of an issue of $2,000,000 of its negotiable bonds to provide for the payment of $2,000,000 of its bonds coming due on March 1, 1914.

Chicago (Ill.) City Railway.—It is understood that the syndicate which in 1910 bought most of the $18,000,000 of capital stock of the Chicago City Railway at $200 a share will be dissolved on Jan. 31. This syndicate is distinct from the one dissolved on Feb. 1, 1912, which underwrote the $22,000,000 of collateral bonds of the Chicago City & Connecting Railways.

Columbus Railway, Power & Light Company, Columbus, Ohio.—At a meeting held on Jan. 8 stockholders of the Columbus Railway Company voted to merge with the Columbus Railway, Power & Light Company, the stockholders agreeing to accept $3,500,000 of preferred stock, series B, of the Columbus Railway, Power & Light Company, and $3,500,000 of common stock. S. C. McMeen, president of the Columbus Railway & Light Company, said that the new company will probably show net earnings of $500,000 on stock the first year. D. M. Massie, F. R. Huntington, A. D. Heffner, William C. Willard, Herbert E. Bradley, E. R. Sharp, L. P. Mathews, E. W. Strong and Angus W. Dun were chosen directors.

Conestoga Traction Company, Lancaster, Pa.—A proposition to increase the capital stock of the Conestoga Traction Company from $4,000,000 to $5,000,000 was recently approved by the stockholders.

Danbury & Harlem Traction Company, Danbury, Conn.—Henry A. Hitner's Sons Company, Philadelphia, Pa., has purchased the entire railroad and power plant of the Danbury & Harlem Traction Company. The intention of the syndicate which started to build the road was to complete an electric railway from Danbury, Conn., to New York. The first portion under construction was about 16 miles, and of this 7 miles was completed when litigation stopped the work, and it was not again resumed. It is very likely that the purchaser will dismantle the entire road.

Dayton (Ohio) Street Railway.—The number of directors of the Dayton Street Railway has been reduced from ten to nine. Albert Emanuel is the retiring director, whose place will not be filled. He also retires as secretary of the company, in which capacity he is succeeded by P. A. Worman.

Interurban Railway & Terminal Company, Cincinnati, Ohio.—The management of the property of the Interurban Railway & Terminal Company has been taken over by the Warren Bicknell Company, Cleveland, Ohio, operating managers. F. H. Talbot has resigned as general superintendent and purchasing agent of the Interurban Railway & Terminal Company and M. Ackerman has been appointed general superintendent and local manager.

Evanston (Ill.) Railway.—An open mortgage has been filed with the Merchants' Loan & Trust Company of Chicago as trustee of the Evanston Railway to secure bonds issuable at the discretion of the board of not over 6 per cent interest to provide for a complete rehabilitation of the system during 1914. The bonds are dated Dec. 1, 1913, due Aug. 1, 1933, par $100, $500 and $1,000. An amount of $150,000 of these bonds has already been issued. The Evanston Railway is the company that has finally succeeded to the property of the former County Traction Company in Evanston. The Evanston Traction Company was first incorporated in August, 1913, to purchase the property of the County Traction Company in Evanston and it obtained a twenty-year franchise. For certain legal reasons the franchise was, with the consent of the City Council, transmitted to the Evanston Railway, which was incorporated with the same capital and the same directors and officers as the Evanston Traction Company. The officers of the Evanston Railway are: Clement C. Smith, president; R. E. Belknap, vice-president; C. F. Speed, vice-president and general manager; J. J. Lewis, treasurer; George Allison, secretary, and L. A. Gilbert, superintendent. A certificate was filed in Illinois on Dec. 30 increasing the stock of the Evanston Railway from $100,000 to $500,000. It is stated that the Evanston Traction Company has changed its name to the Allison Company.

Galveston (Tex.) Electric Company.—Lee, Higginson & Company, Boston, Mass., are offering for sale first mortgage 5 per cent bonds of 1905 of the Galveston Electric Company, due May 1, 1940, and callable at 110 and interest. There is an authorized issue of $2,500,000 of these bonds, of which $1,413,000 are outstanding, $61,000 have been retired by a sinking fund and $1,026,000 are reserved for future additions.

Harrisburg (Pa.) Railways.—A certificate was filed on Jan. 6 showing an increase in the funded debt of the Harrisburg Railways from $3,000,000 to $3,169,000.

Hudson Companies, New York, N. Y.—Russel S. Carter, G. E. Cabot, M. B. Metcalf, T. H. Newberry and A. S. Wing have been elected directors of the Hudson Companies to succeed A. A. Tingley, P. G. Bartlett, G. B. Schley, K. B. Conger and W. H. Barnum, resigned. It has been voted to increase the membership of the board from twelve to thirteen, and another director will be elected. The Hudson Companies controls the Hudson & Manhattan Railroad through ownership of the securities of that company.

International Traction Company, Buffalo, N. Y.—Ten second mortgage sinking fund gold bonds, dated July 1, 1896, of the Buffalo & Niagara Falls Electric Railway were paid on Jan. 1, at 105 and interest, at the office of the Bankers' Trust Company, New York, N. Y.

Johnstown (Pa.) Traction Company.—Bioren & Company, Philadelphia, and Newburger, Henderson & Loeb, New York and Philadelphia, are offering at 95 and interest, free of the State tax in Pennsylvania, the unsold portion of the new issue of $2,000,000 of first refunding mortgage 5 per cent gold bonds of the Johnstown Traction Company. These bonds are dated Dec. 31, 1913, and due July 1, 1943, but redeemable on any interest date at 102 and interest—par values $500 and $1,000.

Joliet & Southern Traction Company, Joliet, Ill.—At the foreclosure sale of the Joliet & Southern Traction Company set for Feb. 11, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 10, the property will be sold in parcels in pursuance of decrees entered in the Circuit Courts of Kane County, Ill., on Sept. 12 and Dec. 20, 1913, in the consolidated foreclosure suits under the mortgage of the former Joliet, Plainfield & Aurora Railroad, dated 1903, covering the line from Aurora to Joliet, and the mortgage of the Joliet & Southern Traction Company, dated 1907, covering the line from and through Joliet to Chicago Heights, and also the terminal property in Joliet. This terminal property is required to bring not less than $91,400, and is to be sold separately and also jointly with the property under each one of the mortgages.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—The Public Service Commission of Massachusetts has approved the issue of 450 shares of common stock and 6650 shares of preferred stock at $100 a share by the Massachusetts Northeastern Street Railway. The 4150 shares of preferred stock are to be issued in exchange for mortgage bonds of the Hudson, Pelham & Salem, Haverhill, Plaistow, & Newton, Lowell & Pelham and Seabrook & Hampton Beach Street railway companies. Other proceeds are to be used in paying floating indebtedness and in meeting the cost of additions and improvements.

New Orleans Railway & Light Company, New Orleans, La.—Seven first mortgage 6 per cent power house bonds, dated July 1, 1897, of the New Orleans Traction Company have been called for payment on July 1 at 105 and interest at the Fidelity Trust Company, Louisville, Ky.

New York & North Shore Traction Company, Roslyn, N. Y.—The Public Service Commission of the First District of New York has authorized the New York & North Shore Traction Company to issue additional capital stock to the amount of $81,850, the proceeds to be used in paying for work already done in Queens County.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—On March 3 the stockholders of the Oakland, Antioch & Eastern Railway will vote on increasing the funded debt of the company from $5,000,000 to $5,700,000 by the creation of $700,000 of collateral notes or bonds secured by pledging some of the bonds heretofore issued.

Public Service Corporation of New Jersey, Newark, N. J.—The Public Service Corporation of New Jersey has filed a certificate with the Secretary of State showing that it has issued $2,000,000 of 5 per cent general mortgage sinking fund gold bonds. The bonds were sold at 87½. The Public Service Railway has certified that it has issued $620,000 bonds at 99½. Claiming that it has been subject to double taxation under the federal corporation tax act, the Public Service Corporation of New Jersey has started suits against H. C. H. Herald, collector of internal revenue, to compel the refunding of $99,169. The recovery of the money is asked on the ground that it was improperly collected from both the Public Service Corporation and its subsidiary companies. Similar suits for the recovery of $16,782 have been started against Isaac Moffit, collector of internal revenue at Camden.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—On Jan. 5, 1914, the directors of the Sheboygan Railway & Electric Company held a meeting to fill the vacancies resulting through the sale of the property, the controlling interest in which was purchased by Peter Reiss, Jacob Reiss and John P. Reiss. The following officers were elected: Peter Reiss, president; John P. Reiss, vice-president; Edward Hammett, general manager. Vacancies in the board of directors were filled by the election of Peter Reiss, John P. Reiss and William A. Reiss.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—A. B. Leach & Company, New York, N. Y., are offering for sale first mortgage 5 per cent sinking fund gold bonds dated 1912 and due May 1, 1937, of the South Carolina Light, Power & Railways Company. There is an authorized issue of $5,000,000 of these bonds, of which $3,000,000 are now outstanding.

Southern Illinois Railway & Power Company, Harrisburg, Ill.—The Southern Illinois Railway & Power Company has filed a trust deed to secure $2,500,000 of 5 per cent bonds with the Fort Dearborn Trust & Savings Bank, Chicago, Ill., as trustee. The bonds are to be used in the construction of an interurban railway between Harrisburg, Ill., and Marion, Johnston City and Brenton.

Tampa (Fla.) Electric Company.—At the annual meeting of the stockholders of the Tampa Electric Company held on Jan. 5, 1914, the plan to increase the capital stock of the company from $2,244,000 to $2,618,000 was approved. The additional $374,000 of stock will be offered to stockholders for subscription at par in the ratio of one share for every six present shares.

Topeka (Kan.) Railway.—E. H. Rollins & Sons, Boston, Mass., are offering $24,000 of Topeka Railway first mortgage 5 per cent gold bonds dated Dec. 31, 1904, due Jan. 1, 1930, and callable on Jan. 1, 1915, or on any interest date thereafter at 105 and interest. These bonds are supported by a sinking fund which is required to redeem $15,000 of the bonds annually on Jan. 1, at 105 and interest.

Twin State Gas & Electric Company, Dover, N. H.—A. H. Bickmore & Company, New York, N. Y., recently offered at 97.22 per cent three-year 6 per cent convertible gold notes dated Oct. 1, 1913, of the Twin State Gas & Electric Company. These bonds are secured by deposit with the Union Trust Company, New York, N. Y., as trustee, of $600,000 first and refunding mortgage 5 per cent bonds. The total authorized issue is $1,000,000, of which $500,000 is reserved for future issue—par $100, $500 and $1,000.

Underground Electric Railways, Ltd., London, Eng.—The London stock exchange has listed £76,000 of 4½ per cent bonds of 1933 of the Underground Electric Railways. This makes the total amount of this issue of bonds listed to date £1,806,000. There have also been listed 36,357 ordinary £10 shares fully paid of the London Electric Railway. Of this company there are already listed £3,173,670 of 4 per cent preferred shares and £4,191,106 of 4 per cent debenture stock.

United Gas & Electric Engineering Corporation, New York, N. Y.—The United Gas & Electric Engineering Corporation has been formed under the laws of New York, with an authorized capital stock of $100,000, all of which has been purchased for cash, at par value, by the United Gas & Electric Corporation. The new corporation is organized to carry on a general consulting and contracting engineering business in all branches and will render such service as may be required by the subsidiary companies of the United Gas & Electric Corporation and the American Cities Company. The new corporation will also engage in the purchase of equipment, supplies and material of all kinds, and has taken over the entire business of the purchasing department of the United Gas & Electric Corporation and all of its contracts and obligations outstanding. The officers of the new corporation are: George Bullock, president; S. J. Dill, vice-president; J. S. Pevear, vice-president; B. F. Wood, chief engineer; Henry Morgan, secretary; H. J. Pritchard, treasurer; H. N. McConnell, commercial manager; F. G. Robinson, purchasing agent. The directors are George Bullock, S. R. Bertron, R. E. Griscom, J. S. Jenks, Jr., and John Gribbel.

United Railroads, San Francisco, Cal.—E. H. Rollins & Sons, Boston, Mass., are offering for sale $193,000 of first mortgage 6 per cent gold bonds of the United Railroads. These bonds are dated Jan. 1, 1883, due Jan. 1, 1913, extended to Dec. 15, 1915, and callable at 101½ and accrued interest on any interest date. Being of an original closed mortgage of $3,000,000, of which $1,800,000 were extended as above, they are secured by an absolute first mortgage on 36.3 miles of electric street railway in the heart of San Francisco.

York (Pa.) Railways.—The stockholders of the York Railways have authorized an issue of $500,000 of one-year 5 per cent notes. The notes will be dated Feb. 2, 1914, and will be secured by the pledge of $667,000 of first mortgage bonds of the company.

Dividends Declared

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent, preferred.

New Orleans (La.) City Railroad, $2.50, preferred; $1 common.

Ottawa (Ont.) Electric Railway, quarterly, 3 per cent; bonus, 3 per cent.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred; $2, common.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Rio de Janeiro Tramway Light & Power Company, Toronto, Ont., quarterly, 1¼ per cent.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

United Traction Company, Pittsburgh, Pa., 2½ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, MAINE

Perior	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '13	$25,797	$22,136	$3,662	$661	$3,000
1 " " '12	22,756	22,475	282	466	184

CLEVELAND, PAINESVILLE & EASTERN, WILLOUGHBY, OHIO

1m., Nov., '13	$30,188	*$18,016	$12,171	$10,483	$1,688
1 " " '12	30,862	*17,026	13,836	9,994	3,843
11 " " '13	392,398	*212,250	180,148	114,683	65,465
11 " " '12	370,526	*207,707	162,818	109,222	53,596

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

1m., Nov., '13	$98,490	*$68,708	$29,782	$32,059	†$2,277
1 " " '12	100,446	*59,617	40,829	31,746	9,083
11 " " '13	1,149,871	*696,580	453,292	348,843	104,449
11 " " '12	1,086,456	*633,965	452,491	341,047	111,444

DETROIT (MICH.), UNITED RAILWAY

1m., Nov., '13	$997,696	$705,295	$292,401	$172,369	$120,032
1 " " '12	1,003,816	647,363	356,453	175,901	180,512
11 " " '13	11,959,112	7,978,959	3,980,163	1,973,513	2,012,650
11 " " '12	10,866,929	7,044,613	3,822,315	1,945,832	1,876,483

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

1m., Nov., '13	$50,599	*$30,024	$20,575	$12,542	$8,033
1 " " '12	47,488	*28,287	19,201	12,542	6,659
12 " " '13	575,426	*346,055	229,371	150,500	78,871
12 " " '12	528,126	*312,742	215,384	153,134	62,250

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.

1m., Nov., '13	$105,942	$69,336	$36,606	$35,087	$1,519
1 " " '12	104,790	60,867	43,923	35,083	8,840
11 " " '13	1,299,534	770,322	529,212	386,412	142,800
11 " " '12	1,213,814	691,236	522,578	384,584	137,994

NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.

1m., Nov., '13	$607,588	$293,839	$313,749	$207,827	$105,922
1 " " '12	587,776	281,379	306,397	188,610	117,787
11 " " '13	6,284,881	3,289,886	2,994,995	2,238,177	756,819
11 " " '12	6,036,279	3,123,218	2,913,061	2,044,060	869,001

NEW YORK (N. Y.), RAILWAYS

1m., Nov., '13	$1,175,107	$715,879	$459,228	$371,683	$87,545
1 " " '12	1,119,342	714,627	484,715	376,046	108,669
11 " " '13	6,136,310	3,687,371	2,448,371	1,855,596	592,775
11 " " '12	6,078,296	3,615,732	2,462,564	1,874,896	587,668

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Nov., '13	$265,097	*$184,001	$81,095	$49,373	$31,723
1 " " '12	239,141	*145,324	93,817	43,388	50,430
11 " " '13	2,989,155	*1,829,359	1,159,797	511,533	648,264
11 " " '12	2,736,157	*1,551,988	1,184,168	481,563	702,606

*Includes taxes.
†Deficit.

Traffic and Transportation

A Word from the Brooklyn Rapid Transit Company to Its Patrons

The Brooklyn (N. Y.) Rapid Transit Company has reprinted and is distributing in its cars an advertisement which appeared in the Brooklyn daily papers of Dec. 31, headed "Brooklyn Rapid Transit Monopoly—Has the Process of Consolidation Hurt or Helped Brooklyn Transportation?" The company says that the first important movement toward the consolidation of railroads in Brooklyn began in 1893. It advanced materially in 1899 and was substantially completed early in 1913. The company has tabulated the fares between Park Row, Manhattan, and the principal outlying districts of the borough of Brooklyn and compared the fares in effect in 1893 with those in effect in 1913. The fares in 1893 to the points mentioned varied from 8 cents to 25 cents, whereas there is now a universal 5-cent fare to all of the places mentioned except to Coney Island, where the fare is 10 cents with a commutation fare of 5 cents during certain hours. The fare to Coney Island in 1893 was 25 cents. Perhaps the greatest flat reduction in fare has been from 21 cents between Manhattan and Jamaica in 1893 to 5 cents in 1913. The company emphasizes the fact that every one of the reductions in fare which it notes was made voluntarily by the company. Under the heading "Vast Growth of Free Transfers" comparisons are made between 1893, 1899, 1903 and 1913. The statement is made that in 1893 practically no transfers were issued. In 1899 the companies comprised in the Brooklyn Rapid Transit System issued 41,893,744 transfers, in 1903 69,411,386 transfers, and in 1913 151,316,687 transfers. The car mileage operated for each 100,000 of population in 1893 was 3,500,000, whereas in 1913 it was 4,100,000. In the meantime car capacity has increased more than 200 per cent on the surface lines and nearly 30 per cent on the elevated lines. In 1893 the longest distance passengers were carried by surface car for a 5-cent fare without change of cars was 6 miles, whereas in 1913 the distance was 10 miles. The average receipts per passenger declined from 4.87 cents in 1893 to 3.74 cents in 1913, a reduction of approximately 30 per cent. The fixed charges per passenger carried declined from 0.93 cent in 1893 to 0.86 cent in 1913. This is a reduction of a little more than 7 per cent in spite of the additional expenditure of more than $55,000,000 for improvements and facilities. The taxes of the company to city, state and nation increased from $406,603 in 1893 to $1,750,083 in 1913, or approximately 330 per cent. The company concluded the advertisement as follows:

"Consolidation in Brooklyn's transportation history has undoubtedly been followed by reduced fares, better service, improved facilities and higher wages.

"It has been accomplished without increasing the burden of fixed charges. The principal acquisitions of new properties in 1899 were accomplished by an actual decrease of about $20,000,000 in net capitalization and of more than $600,000 a year in interest charges.

"Notwithstanding the expenditure of more than $55,000,000, after consolidation, in additions and improvements, the portion of each fare which goes to fixed interest or rent for acquired lines is 7 per cent less than it was before consolidation.

"Railroad consolidation has saved the people of Brooklyn many millions.

"The successful working out of the problem of consolidation described in the above comparisons has supplied the credit and standing which have, in the year now ended, enabled the Brooklyn Rapid Transit Company to participate with the city in the largest development of municipal rapid transit known to history—have enabled this company not alone to pledge the contribution of $60,000,000 of new capital, but to admit the city for forty-nine years to equal share in the growth of a great part of the system which conservative financing and careful administration have now, after many years, made profitable.

"When our part of the dual system is completed—with its still longer hauls for a nickel and its quicker and more comfortable service—then will come a crowning achievement to twenty years of effort for better transit, made possible only by unified control and management. Then combination will be harnessed to co-operation. This ought to be a strong and effective team.

"We are conscious of our shortcomings and of our failure fully to satisfy all our patrons—that, possibly, would be a goal unattainable. We may not be doing quite all we can. For such imperfect conditions as we are responsible we invite public and private criticism, and for such as we are not responsible for and are powerless to help without the co-operation of the city and our patrons we ask that co-operation.

"But we do say with pride that in no city has a unification of transportation facilities been accomplished more successfully than in Brooklyn—measured by the test of public service, by reduction in fares, by greater economy and efficiency in operation, by larger wages and more comfortable conditions for employees, and by conservative and honest financing.

"If this be monopoly, has it hurt or helped Brooklyn?"

Bay State Service Orders

The Public Service Commission of Massachusetts has issued a finding in which the petition of the Board of Aldermen of Fall River for improved waiting-room facilities is suspended prior to the installation of additional trackage in City Hall Square. The order states that the changes in track layout now under discussion between the city authorities and the Bay State Street Railway are likely to cause the removal of the present waiting room. Ample accommodations with sanitary conveniences are suggested by the board for installation by the company.

The commission has refused to require the company to grant all-day free transfer privileges at Merrimac Square, Lowell, to passengers to and from Collinsville. A 5-cent fare between Collinsville and the center of Lowell is now in force at all hours, and free transfers are granted workingmen at night and morning in Merrimac Square. The board finds that on the Collinsville line the limits of the 5-cent fare during normal hours of the day extend from Merrimac Square to Lake View Park, Dracut, a distance of 5.21 miles, and that a longer ride for a 5-cent fare is given upon this line than upon any other line diverging from Merrimac Square. The board says:

"If the request of the petitioners should be granted, the commission could not, without discrimination, refuse a similar modification and extension of fare limits in a number of other communities adjacent to Lowell. Such a disturbance in the existing fare situation in and around Lowell would result in a substantial impairment of the company's revenue which the commission does not feel warranted in recommending at this time in view of the financial condition of the company and the necessity of further expenditures for the improvement of the roadbed and equipment upon various portions of the company's lines in order to enable them to furnish more satisfactory service and accommodations."

The board has denied the petition of the selectmen of Stoughton for the establishment of a 5-cent fare on the company's line between Stoughton and Center Street, Brockton. The regular fare is 10 cents, with free transfer privileges at the latter point. A commutation ticket covering the same transportation and good at all hours of the day is also issued at the rate of 7 1-7 cents per ride. The distance from Stoughton Center to Brockton Center is about 6 miles. Upon the commutation fare above mentioned free transfers are given which enable passengers to ride a maximum distance of about 12 miles upon a single ticket. In compliance with an order of the Board of Railroad Commissioners issued in 1901, a 5-cent fare for the benefit of workingmen was established for morning and evening service between Stoughton and Center Street, Brockton, without transfer facilities. The board is of the opinion that the existing rates of fare, in view of the conditions in the case, and in comparison with other street railway fares in the State, are not unreasonable, and therefore makes no recommendation in favor of the petitioners. Regarding complaints of irregularity of service and inadequate accommodations on this line, the board points out that upon its recommendation an express service has been installed which tends to separate the local and the through traffic and affords better facilities for residents of Stoughton.

Increase in Traffic on Long Island.—Reports compiled by Long Island Railroad indicate that the number of commuters living on Long Island has increased more than 56 per cent during the last three years. Last year 215,419 sixty-trip monthly commutation tickets were sold as against 157,937 in 1910. The present population of Long Island is approximately 2,500,000, or about 25 per cent of the total population of New York State.

Massachusetts Trolley Freight Orders.—The Public Service Commission of Massachusetts has issued orders granting the Boston Elevated Railway and the Bay State Street Railway the right to transport express matter in Everett. These orders will enable a comprehensive service to be established throughout eastern Massachusetts as both companies now hold freight-carrying franchises for practically the entire territory occupied by their lines.

Finding Upon Medford Express Service.—The Massachusetts Public Service Commission has disapproved the establishment of an express passenger service between the Sullivan Square elevated terminal, Boston, and Medford Square as desired by petitioners residing in Winchester. The board points out that the existing express car facilities between Sullivan Square and Winter Hill, Somerville, as maintained in the rush hours by the Boston Elevated Railway, have improved transit conditions on the line in question and that the extension of express car operation to Medford Square would upset the balance which should be preserved between the interests of local and through passengers.

Concession to Suburban Residents at Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has filed with the Missouri Public Service Commission an agreement to establish the same service on the Fairmount park line in winter as in summer, and will begin the service Jan. 25. The fare will be 5 cents. Fairmount residents have in the past transferred at the park station, paying another fare. They contended that there should be through service at all times, and the company has acceded to the request, though probably at a loss during the winter months, when the park is closed. The company has also arranged to install service between Argentine, in Kansas City, Kan., and the stockyards, without transfers.

Stop Question Before Detroit Council.—The ordinance committee of the Council of Detroit has taken under advisement the proposal advanced by members of the Council to return to the far-side stop. At a hearing on Jan. 13 officials of the Detroit (Mich.) United Railway presented their reasons for favoring the near-side stop, which has been in effect since last June. They contend that the present stop makes for safer operation. Police Commissioner Gillespie, at whose instance the near-side stop was applied to Detroit, presented statistics which show a decrease in street accidents since the adoption of the near-side stop. None of the aldermen who have urged a return to the old stop was present. The present stop will probably be maintained.

"Safety First" Ideas Advanced in Timetable.—In the timetable of the New Midland Power & Traction Company, New Midland, Ohio, for December, 1913, is incorporated not only the time of the trains arriving at and leaving from the union depot at Cambridge, but lessons on "safety first" and the traffic rules of Cambridge. The company has experienced considerable trouble lately on account of careless driving and vehicles on the wrong side of the street, and one or two slight accidents have resulted. Owing to the large demand for the timetable it proved a very desirable advertising medium for the merchants and afforded the company an opportunity to attract the attention of drivers, children and other people to the "safety first" idea.

Transfer Hearing in Brooklyn.—On Jan. 9 a hearing was held before the Public Service Commission for the First District of New York in regard to the proposal of the Brooklyn Rapid Transit Company to install a universal system of transfers on its lines in Brooklyn. Mr. Chamberlain, attorney for the commission, reported that the inspectors of the commission would require two weeks' additional time to complete the work of mapping out the proposed system, and the hearing was therefore adjourned for two weeks until Jan. 23, when it will come up before the whole commission. According to the reports of inspectors of the Public Service Commission, the Brooklyn Rapid Transit Company has consented to a complete interchange of transfers with the recently merged Coney Island & Brooklyn Railroad.

Lynn-Salem Fare Reduction Denied.—The Massachusetts Public Service Commission has denied the petition of the committee on transportation of the City Council of Salem for the establishment of a 5-cent fare between Salem and Lynn on the Bay State Street Railway. The petitioners claimed that the predecessors of the company promised reduced fares to Lynn and Boston as a result of the granting of a franchise for the construction of the present Highland Avenue line, and that the Bay State Street Railway is morally bound to observe such promises. The board points out that no reference to any such engagement on the part of the company appears in the grant of the location or in contemporaneous newspaper articles, and that no reason exists for reversing the adverse decision of the board upon this issue in 1909.

Operation of New York Road Ordered Suspended.—The Public Service Commission for the First District of New York has ordered the Manhattan & Queens Traction Corporation to suspend operations of its electric railway across the Queensboro Bridge and to Grand Street, Newtown, until the cars shall be placed in safe operating condition. The engineers of the commission reported the cars as unsafe to operate. The company operated eighteen cars, and the engineers' objections applied to seventeen of them. The order was to take effect at midnight on Jan. 9, but at the request of the company was extended until midnight on Jan. 11 on the condition that the commission would station an inspector on the line and that after midnight on Jan. 9 the company should not put in operation any car which was not approved by such inspector. The company has borrowed five cars and repaired three of its own and on Jan. 15 was operating with this equipment. It has new equipment under order.

Steam and Electric Traffic Interchange on the Coast.—The passenger department of the Southern Pacific Company announces that in order to take care of the traffic between Palo Alto, Los Altos and Los Gatos it has arranged with the Peninsular Railway, San José, Cal., for the interchange of traffic at Palo Alto and Los Gatos. The Peninsular Railway will make close connections at Palo Alto with as many steam-line trains to and from San Francisco, and in addition passengers will have the advantage of the other trains operating over the Peninsular Railway, their tickets being good on all the Peninsular Railway electric trains. The running time of the electric trains between Palo Alto and Los Gatos, utilizing the new line recently completed between Monte Vista and Congress Junction, will be approximately the same as that of the steam line. The Peninsular Railway serves the same communities as the steam line, the tracks of the two companies being parallel for a considerable distance.

Contribution to Convention Authorized by Court.—In the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914, page 103, mention was made of the Student Volunteer Convention held recently in Kansas City, Mo., and to the methods adopted by the Metropolitan Street Railway for handling the 5000 men in attendance at the convention, nearly all of whom were strangers in Kansas City. An interesting development in connection with the convention was the order made by Federal Judge William C. Hook authorizing the receivers of the Metropolitan Street Railway to contribute $1,000 toward the expense budget fund collected by a committee of the convention. J. W. S. Peters, attorney, petitioned Judge Hook to make the order. In his opinion Judge Hook made it plain that the company is not a philanthropic institution. The judge said he would have refused the $1,000 on the first request, but when the attorney had foresight enough to point out that the company would profit in fares paid by the delegates, he said he felt justified in authorizing the contribution.

Revision of Percentages for Suburban Traffic in Vancouver.—A report has been presented by the city auditors of Vancouver, B. C., to the Vancouver City Council on the system of fixing percentages paid by the British Columbia Electric Railway to the city for suburban traffic. The auditors found that the percentages due the city, as reported by the company, on traffic within the old city limits and on traffic within the annexed districts, where nothing was paid for the use of streets, were correct, but objected to the system of calculating percentages for traffic on various lines beyond these areas. As a result of a conference with the city auditors, the officers of the company have agreed that the percentage in future shall be based on tests made every six months of the traffic on the several lines affected. Another question involved was in regard to settlers' tickets. During September, 1913, 243,240 of these tickets were used. The officers of the company declined to withdraw from their position that no percentage was due on this traffic, but expressed a willingness to pay $1,200 a year on this account. The arrangement in both cases will extend from Jan. 1, 1914, to the expiration of the franchise in the city in 1919.

Interurban Development at Indianapolis.—In an article reviewing the effect that the construction of interurban railways has had on the development of Indianapolis, published in the Indianapolis *Star* of Dec. 31, 1913, these significant statements were made: "Interesting statistics were compiled last year showing just what the interurban railways have meant to Indianapolis. The statistics disclosed that the increase in trading population has been more than 6,000,000 persons, or 1700 per cent, from 1900, when the first interurban line entered the city, until the beginning of 1913. The population of Indianapolis in 1900 was 169,000 and in 1912 it had increased to 267,000. The trading population in Indianapolis was represented in 1900 by 377,761 visitors, or an average of 1035 a day. In 1912 this number had increased to 6,431,714, or an average of 17,573 a day. Out of the 17,573 passengers carried by the interurbans every day, one is theoretically counted twice, thus leaving one-half the total, or approximately 9000, to represent the average daily number of visitors. It is believed that final statistics will reveal that the record of 130,000 tons of freight handled in 1912 will be beaten by the 1913 records. Out of Indianapolis there are four long trunk lines, one running 130 miles to Goshen, with two limited trains in either direction each day; one 130 miles to Fort Wayne, with ten limited trains each way daily; one 117 miles to Louisville, with six limited trains each way daily, and one 110 miles to Dayton, with six limited trains each way daily. There are more than 2000 miles of interurban track in Indiana connecting with the Indianapolis Traction Terminal Station, Indianapolis."

The Denver Storm.—Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to the efforts made by the Denver (Col.) City Tramway to combat the severe snowstorm of last December. The *Tramway Bulletin*, published in the interest of the employees of the company, contains in the issue for December, 1913, some very interesting facts in regard to the severity of the storm and the efforts of the company to maintain service. Snow began falling between 3 a. m. and 4 a. m. on Dec. 1, and stopped on Dec. 5 between 11 a. m. and 12 noon. There was, however, a short interval on Dec. 2 when snow ceased to fall. The total snowfall was 47.6 in. The storm was the worst in the history of the city, and on Dec. 4 the company was routed in its efforts to keep the lines open and the first complete tie-up in the history of the company occurred. Denver suffered a heavier precipitation than any other place on the eastern slope of the mountains. The *Bulletin* says: "Friday morning, shortly after midnight, there was a lull in the storm. An army of laborers was rushed out and snow flew for four blocks, but the storm began again with renewed fury and the men were forced to stop. In short order drifts had effaced what had been done. At 7 o'clock Friday morning, although the snow was still falling, a huge army of laborers started out on Fifteenth Street, the main artery of the system, and that night a 'jigger' service was started from the Central loop to Eighth and Broadway. Saturday morning, Dec. 6, J. A. Beeler, vice-president and general manager, ordered out a number of horse-drawn plows for breaking up the solid ice that held fast the rails. The result was that, in addition to the work that each division superintendent and track foreman had accomplished, Sixteenth Street, the 'in' track on Broadway to Fifth and both tracks on Colfax Avenue had been broken up and opened and regular service restored, as well as on Stout Street and the Berkeley line. In other words, the main arteries of the system were in service."

Personal Mention

Mr. C. F. Foley, recently appointed to the Kansas Public Utilities Commission, has been elected chairman of that body.

Mr. J. H. Humpe, formerly general manager of the Lincoln (Neb.) Traction Company, has been elected secretary of the company.

Mr. P. A. Worman has been elected secretary of the Dayton (Ohio) Street Railway to succeed Mr. Albert Emanuel.

Mr. F. H. Talbot has resigned as general superintendent and purchasing agent of the Interurban Railway & Terminal Company, Cincinnati, Ohio.

Mr. C. E. Carson has been appointed superintendent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., vice Mr. F. K. Shuff, assigned to other duties.

Mr. W. H. Ferguson has been elected president of the Lincoln (Neb.) Traction Company to succeed Mr. W. E. Sharp, who has been elected chairman of the board of directors.

Mr. S. W. C. Jones has been elected secretary and treasurer of the Danbury & Bethel Street Railway, Danbury, Conn., to succeed Mr. M. H. Griffing, who has also retired as a director of the company.

Mr. W. E. Sharp, who has been president of the Lincoln (Neb.) Traction Company for four years, has been elected chairman of the board of directors and chairman of the executive committee of the company.

Mr. W. W. Stephens has been made superintendent of employment of the Metropolitan Street Railway, Kansas City, Mo., and has been succeeded as chief timekeeper in the accounting department by Mr. B. W. Boright.

Mr. J. H. Harvey, formerly superintendent of employment of the Metropolitan Street Railway, Kansas City, Mo., has been placed in charge of the Forty-eighth and Harrison division of the company, vice Mr. D. L. Fennell, who has been made secretary to the general manager.

Mr. L. T. Ebbson, for five years supervisor of rolling stock for the Metropolitan Street Railway, Kansas City, Mo., has tendered his resignation to become connected with the Lincoln (Neb.) Traction Company as master mechanic. Mr. Ebbson was formerly connected with the Chicago (Ill.) Railways.

Mr. Eugene Hight has been appointed electrical engineer of the Illinois Traction System, Peoria, Ill., his duties embracing all properties. Mr. Hight has been in the operating engineering department of the company nearly three years. He was graduated from the University of Illinois and took a post-graduate course at that institution.

Mr. M. Ackerman, who has been general manager and purchasing agent of the Springfield & Xenia Railway, Springfield, Ohio, has been appointed general superintendent and local manager of the Interurban Railway & Terminal Company, Cincinnati, Ohio, the management of which property has been taken over by the Warren Bicknell Company, Cleveland.

Mr. C. W. Clark has resigned as superintendent, electrical engineer and purchasing agent of the Marion, Bluffton & Eastern Traction Company and the Bluffton, Geneva & Celina Traction Company, Bluffton, Ind., with which he has been connected since July 15, 1906. Mr. Clark will take charge of the Bluffton Electric Light & Water Works as general manager. He has been connected with interurban railway and electric light work since February, 1901.

Mr. Daniel L. Fennell, formerly superintendent of the Forty-eighth and Harrison division of the Metropolitan Street Railway, Kansas City, Mo., one of the most important of the road, has been made secretary to Mr. James E. Gibson, general manager. The office is a new one with the company. Mr. Fennell, in his new position, will have charge of much detail work which has heretofore been cared for by Mr. Gibson. The secretary will take care of advertising, complaints, information for other electric roads, relations with the American Electric Railway Association and traffic for special occasions.

Mr. Elmer M. White has just accepted the office of treasurer of the Binghamton (N. Y.) Railway. Mr. White has had long experience in electric railway work and for many years was secretary of the Street Railway Accountants' Association of America, the predecessor of the American Electric Railway Accountants' Association. His last connection with an electric railway was as auditor of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y. He resigned this office in June, 1912, to become auditor of the Americana Company, publisher of the Americana Encyclopedia, a position which he is now resigning to re-enter railway service.

Mr. A. D. Mackie has been elected vice-president and general manager of the Springfield (Ill.) Consolidated Railway and the Springfield Gas & Electric Company and a director of the companies to succeed Mr. A. D. Furlong, whose appointment as general manager of the Saginaw-Bay City Railway and election as vice-president of the Saginaw & Flint Railway, Saginaw, Mich., was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914. Mr. Mackie has been connected with Hodenpyl, Hardy & Company, New York, N. Y., for the last two years as general sales manager of their gas and electric properties in Michigan, Indiana, Ohio and Illinois. Previous to that he was for eight years superintendent of new business for the Springfield and Peoria (Ill.) gas properties, and for ten years previous to that he was connected with the gas light companies in Detroit and Grand Rapids, Mich. This is Mr. Mackie's first direct connection with the railway end of the properties.

Mr. L. G. Rudd has been appointed superintendent of the East Lyme and Saybrook divisions of the Shore Line Electric Railway, with headquarters at Saybrook Junction, Conn. Mr. Rudd began his railroad career when he was twenty-three years old as a conductor on the New London (Conn.) Street Railway. He was with the company in that capacity for a period of seven years and was then made assistant superintendent, in which position he served for two years. He left the New London Street Railway in 1905 to become connected with the New London & East Lyme Street Railway as a conductor and express messenger, in which work he became familiar with multiple-unit operation. He was appointed superintendent of the East Lyme division of the New London & East Lyme Street Railway on May 1, 1908. On Dec. 15, 1913, he was appointed superintendent of the East Lyme and Saybrook divisions of the Shore Line Electric Railway, Norwich, Conn., leases the New London & East Lyme Street Railway.

Mr. George H. Harris has resigned as superintendent of the railway department of the Birmingham Railway, Light & Power Company, Birmingham, Ala., effective on Feb. 1. Mr. Harris is a graduate in civil engineering and was connected with the engineering departments of the Chattanooga, Rome & Columbia Railway; Briarfield, Blockton & Birmingham Railway; Southern Railway; Alabama, Georgia & Florida Railroad, and the Georgia, Midland & Gulf Railroad. He left the employ of the last-named company in 1890 to superintend the conversion of the Birmingham system from mule power to electricity. At the completion of the reconstruction he became master mechanic, in which capacity he served until about 1902, when the office of superintendent of traffic was created. Mr. Harris was chosen to fill that position and continued as superintendent of traffic until 1904, when he was appointed manager of the railway department of the company. His title was subsequently changed to superintendent of the railway department. Mr. Harris is a director of the Merchants' Savings Bank & Trust Company, Birmingham.

OBITUARY

H. L. Metcalf, who had been connected with the Pacific Electric Railway, Los Angeles, Cal., died at his home in South Pasadena on Dec. 24, 1913.

George F. Reed, whose appointment as manager of the Springfield (Mass.) Street Railway to succeed Mr. E. J. Dickson was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, died suddenly at his home in Springfield on Jan. 10. Mr. Reed was born in Cummington, Mass., on May 10, 1867. He entered the employ of the Springfield Street Railway in February, 1882, as a clerk.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) denotes a project not previously reported.

RECENT INCORPORATIONS

Kansas City Southwestern Electric Railway, Kansas City, Kan.—Application for a charter has been made by this company in Kansas to build an electric line between Olathe and Ottawa. W. B. Strang, incorporator. [E. R. J., Jan. 3, '14.]

***Gulf & Bay Railway, Stackhouse, N. C.**—Chartered in North Carolina to build a 10-mile electric or steam railway between Belva and Carmen. Capital stock, $10,000 to $50,000. Incorporators: A. G. Betts, D. M. Harshburger and B. Starbuck, Stackhouse, N. C.; W. N. Garrett, Hot Springs; Robert C. Lieb, Walnut, and W. B. Barnhisel, Dufur, Ore.

***Erie & Northern Ontario Railway, Bridgeburg, Ont.**—Application for a charter will be made by this company to the Dominion Parliament to build an electric railway from Port Maitland, on Lake Erie, to Smithville. Another line from Port Maitland to Port Colborne is also contemplated.

***Sewickley & Edgeworth Railway, Pittsburgh, Pa.**—Chartered in Pennsylvania to build a 2-mile electric railway in Allegheny County. Capital stock, $12,000. Incorporators: William Walker, Lee, president; Henry Oliver, W. F. Lloyd, W. B. Carson and S. L. Tone, Pittsburgh.

***Kentucky, Rockcastle & Cumberland Railway, Cressmont, W. Va.**—Incorporated in Kentucky to build an electric or steam railway. Capital stock, $200,000. Incorporators: Paul W. Scott, H. T. Lovett, R. B. Williams, H. H. Hannon, H. K. Eutsler, C. M. Brown and M. P. Wiswell.

FRANCHISES

Tuscaloosa, Ala.—The Birmingham-Tuscaloosa Railroad & Utilities Corporation has received a six months' extension of time on its franchise in which to complete its line in Tuscaloosa. This is part of a plan to build a 55-mile railway between Birmingham, Tuscaloosa and Bessemer. [E. R. J., Sept. 27, '13.]

Little Rock, Ark.—The Little Rock Railway & Electric Company has received a franchise from the Council in Little Rock.

Little Rock, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has received a franchise from the Council in Little Rock.

Clovis, Cal.—The Fresno & Clovis Interurban Railway has received a franchise from the Council on Fifth Street from the east city limits to the west city limits in Clovis. This 24-mile line will connect Fresno, Clovis and Academy. F. S. Granger, Clovis, president. [E. R. J., Dec. 27, '13.]

East St. Louis, Ill.—The East St. Louis Railway has asked the Council for a franchise on Main Street from Broadway to Missouri Avenue in East St. Louis.

***Hagerstown, Md.**—Henry A. Bester, Jr., and Clarence Keedy, representing the Washington County Traction Company, have received a franchise from the County Commissioners over 2 miles of county roads from the eastern limits of Hagerstown to Security.

Preston, Ont.—The Galt, Preston & Hespeler Railway has received a twenty-five-year franchise from the Council in Preston.

St. Thomas, Ont.—The London & Lake Erie Railway & Transportation Company has received permission to build an extension on Wellington Street in St. Thomas. Permission was also given the company to run the city's line on Wellington Street from Forest Avenue to connect with this extension.

Centralia, Wash.—The Washington-Oregon Corporation has received two franchises from the Lewis County Commissioners for several extensions in Centralia.

TRACK AND ROADWAY

Birmingham (Ala.) Interurban Railway.—Surveys have been completed between Hale Springs and Birmingham, 9 miles. This 14-mile line will connect Birmingham, Hale

Springs and the coal mines. Daniel P. Hale, Birmingham, is interested. [E. R. J., Nov. 8, '13.]

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company plans to spend $1,300,000 for reconstruction and improvements of its lines during the year. The two extensions already planned are from Vinesville to Corey and from the Boyles line to Balsito.

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—About 2 miles of new track will be built between Gadsden, Ala., and Noccalula Falls during the year.

North Alabama Traction Company, New Decatur, Ala.—About 2 miles of concrete paving will be laid along this company's line in New Decatur during 1914.

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.—Grading on 8 miles of this line has been completed and contracts for ties and rails are being awarded. This is part of a plan to build a 10-mile line from Lacombe to Gull Lake and thence to Rimbey, a total distance of 30 miles. J. C. Gibson, Toronto, is interested. Gasoline-electric cars will be operated. [E. R. J., Feb. 15, '13.]

Nelson (B. C.) Street Railway.—Plans are being considered for the betterment of existing lines and for the construction of several extensions in Nelson during the year.

British Columbia Electric Railway, Vancouver, B. C.—The new extension of the Hastings Street east line to the foot of Capitol Hill in North Burnaby has been placed in operation. A contract has been awarded by this company to R. Shields, Vancouver, B. C., to build an interlocking control tower, electrically controlled, at the crossing of the Esquimalt & Nanaimo Railway, on the Esquimalt Road, Victoria, B. C.

***Bakersfield, Cal.**—W. P. Early, Petaluma, and A. D. Bowen, San Francisco, are considering plans to build an electric line from Bakersfield to San Luis Obispo. Surveys will soon be made.

Geary Street Municipal Railway, San Francisco, Cal.—Contracts for materials for the construction and equipment of the new lines to be built by the city this year in San Francisco were awarded recently by the Board of Public Works as follows: the United States Steel Products Company, the contract for steel rails, rail joints, fastenings and rail spikes; the Payne Bolt Works, the contract for steel tie rods and nuts; the Eccles & Smith Company, the contract for tie plates, brace plates and rail braces, and the Caspar Lumber Company, redwood cross ties.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Permission has been received by this company from the State Railroad Commission to construct the first unit of its line from Dixon south to a connection with the Oakland, Antioch & Eastern Railroad, a distance of 12½ miles. H. W. Manor, vice-president. [E. R. J., Jan. 10, '14.]

Baltimore & Washington Transit Company, Washington, D. C.—An extension at Takoma Park is being planned by this company.

Washington Railway & Electric Company, Washington, D. C.—It is planned to build 2.94 miles of new track in Washington during the year.

Milton, Fla.—H. S. Laird and associates are considering plans to build an electric railway in Milton and from Milton to Bagdad. [E. R. J., Sept. 27, '13.]

Covington & Oxford Street Railway, Covington, Ga.—A 3-mile extension will be built and the company's present lines in Covington will be relaid with 56-lb. rails during the year.

Valdosta (Ga.) Street Railway.—This company has awarded a contract to the West Construction Company, Chattanooga, Tenn., to rebuild its line on Patterson Street in Valdosta with 7-ft., 70-lb. rails.

Danville, Crescent & Kankakee Traction Company, Danville, Ill.—Right-of-way is being secured and plans are being made to begin construction in the spring on this line to connect Danville, Crescent City and Kankakee. John P. Pallissard, Watseka, Ill., is interested. [E. R. J., June 14, '13.]

***Johnson City, Ill.**—C. E. McClintock, Johnson City, is interested in a plan to organize a company to build an electric railway from New Orient Mine west of West Frankfort to Old Frankfort.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being considered for an extension to Morton Lake.

Charles City & Western Railway, Charles City, Ia.—Work will be begun early in the spring on the electrification of this line from Charles City to Marble Rock, 13 miles. It is planned to connect this railway with the Chicago Great Western Railroad.

North Louisiana Electric Railway, Shreveport, La.—For several months negotiations have been under way for the issue of $3,500,000 worth of bonds by this company, which plans to build a line between Shreveport and Monroe via Ruston and Minden. It was announced recently by A. B. Blevins, promoter of the project, that the preliminaries for the underwriting of the bonds are completed and that construction will be begun in the spring. The surveys have been completed and the right-of-way secured for the entire line. [E. R. J., Jan. 10, '13.]

United Railways & Electric Company, Baltimore, Md.—Work has been begun on the Callow Avenue extension in Baltimore.

Washington County Traction Company, Hagerstown, Md.—Plans are being made to build a 2-mile electric railway from Hagerstown to Security. Power will be secured from the Hagerstown & Frederick Electric Railway Company's power house at Security. Henry A. Bester, Jr., and Clarence Keedy are interested. The promoters state that this new company will be entirely independent of the Hagerstown & Frederick Electric Railway.

Moncton Tramways, Electric & Gas Company, Moncton, N. B.—During the year between 6 and 8 miles of new track will be laid between Moncton, Sunny Brae and Louisville.

Public Service Railway, Newark, N. J.—This company is asked to extend its First Street line from the present terminus at North Avenue and Madison Avenue to the end of North Avenue in Elizabeth.

***Cloudcroft, N. M.**—J. M. Poss, Cloudcroft, and associates are considering plans to build an electric line between Cloudcroft and Artesia.

New York, Westchester & Boston Railway, New York, N. Y.—About 8.4 miles of new track will be built between Larchmont Junction, New Rochelle and Port Chester during the year.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—Plans are being made to ask the Public Service Commission for authority to proceed with the extension between Seneca Falls, Cayuga and Auburn. The company will soon ask for franchises in the towns of Seneca Falls, Cayuga and Aurelius. Arrangements for a re-survey of the route from Seneca Falls to Bridgeport, across the lake, and from Cayuga to Auburn are under consideration.

Dan River Railway, King, N. C.—Plans are being considered to build a 30-mile line from King to Asbury. Gas-electric cars will be operated for passenger traffic and steam for freight. H. Miller, Clements, N. C., is interested. [E. R. J., Jan. 3, '13.]

Okmulgee (Okla.) Interurban Railway.—A 10-mile line will be built between Okmulgee and Henryetta during the year.

Sapulpa & Interurban Railway, Sapulpa, Okla.—About 1 mile of new track will be built during the year in Sapulpa.

Berlin & Northern Railway, Berlin, Ont.—An extension from the company's present line at Bridgeport into the country will be built during the year.

Berlin & Waterloo Street Railway, Berlin, Ont.—About 3600 ft. of double track, concrete foundation and new steel, on the line from Wellington Street to Union Street in Berlin has been laid. It is proposed to build about ½ mile of concrete foundation on the line from King Street to the Grand Trunk Railway station in the spring. The work will be done by the City Council.

Guelph (Ont.) Radial Railway.—The city of Guelph has voted money to provide for extensions to this municipally owned railway in Guelph.

Hamilton (Ont.) Street Railway.—It is planned to build 4.5 miles of new double track during the year.

***London, Ont.**—As a result of two resolutions passed at the last session of the Middlesex County Council, the Hydro-Electric Power Commission of Ontario will be petitioned to conduct surveys and supply estimates of cost of construction on two electric radial lines within the county. One proposed line is from London to Stratford via St. Marys, and the other is from London to Grand Bend.

Ottawa (Ont.) Electric Railway.—The ratepayers of Eastview, Ont., will vote on a by-law providing for the extension of this line into Eastview and for granting a bonus of $25,000 therefor.

Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.—Work will be begun in the spring on the Ottawa-Morrisburg section of this railway. It is stated that a private right-of-way will be secured in Ottawa. [E. R. J., Sept. 20, '13.]

Toronto & Eastern Railway, Toronto, Ont.—It is reported that grading has been completed and track-laying well advanced on the line from Bowmanville to Pickering via Whitby. It is expected to have this line ready for operation early in the spring.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—Plans are under construction to rebuild about 1 mile of the Windsor-Amherstburg line, eliminating several of the curves.

Berwick & Nescopeck Street Railway, Berwick, Pa.—A 2-mile extension will be built from Berwick to West Berwick and North Berwick during the year.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—An 8-mile extension between Millville and Bloomsburg will be built during the year.

Corry & Columbus Street Railway, Corry, Pa.—About 6 miles of new track will be laid between Columbus, Pa., and Clymer, N. Y., during the year.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—Grading has been begun on the section of this line between Hopeland and Schaefferstown. Track has been laid 6 miles beyond Lebanon.

***Sewickley & Edgeworth Railway, Pittsburgh, Pa.**—This company, the incorporation of which is given elsewhere in this issue, plans to build an electric railway to connect the Coraopolis terminal of the Pittsburgh Railways with the electric line at Leetsdale, thus establishing a continuous electric line between Pittsburgh and all important points in Ohio and Indiana. Henry Oliver, Pittsburgh, is interested.

Hull (Que.) Electric Company.—The double-track extension from Rivermead to the Jockey Club, at Connaught Park, has been placed in operation.

Montreal & Southern Counties Railway, Montreal, Que.—The bonding and other work on the roadbed on the extension from Marieville to St. Césaire, 9 miles, has been completed. Construction will continue all winter on the bridge across the Yamaska River, east of St. Césaire, which it is expected to have completed in the spring.

Northwestern Electric Railway, Easley, S. C.—Plans are being made to build a 150-mile electric railway from Easley to Augusta via Anderson, Abbeville, McCormick and Edgefield. Capital stock authorized, $100,000 to $2,000,000. Incorporators: James E. Leach and W. C. Smith, Easley; A. S. Farmer and J. H. Anderson, Anderson; S. J. Wakefield and A. M. Erwin, Antreville; W. P. Calhoun and O. P. Bright, Edgefield, and W. N. Graydon, Abbeville, S. C. [E. R. J., Jan. 10, '13.]

Jackson Railway & Light Company, Jackson, Tenn.—About 2 miles of new track will be built in Jackson during the year.

Memphis (Tenn.) Street Railway.—Work has been begun on Third Street for a loop line via Poplar Avenue to Front Street in Memphis.

Tennessee & Kentucky Railroad, Nashville, Tenn.—This company has changed its name to the Tennessee & Kentucky Interurban Railroad. The capital stock has been increased from $10,000 to $15,000. It is planned to build a line from Nashville to Goodlettsville, thence to Cross Plains, Orlinda and Lamont to Adairsville. The charter also granted permission to operate a branch line from the most feasible point along the route to Springfield, Tenn., and Franklin, Ky. [E. R. J., Jan. 10, '14.]

Salt Lake & Ogden Railway, Salt Lake City, Utah.—During the next few weeks this company will award contracts to build 3 miles of additional double track, 1 mile of paved track and miscellaneous trackage to reach the new city terminal and new freight yards in Salt Lake City.

Blaine-Lynden Electric Railway, Blaine, Wash.—Right-of-way is being secured for this line between Blaine and Lynden. John J. Pinckney is interested. [E. R. J., Jan. 3, '14.]

Washington-Oregon Corporation, Vancouver, Wash.—Plans are being considered by this company for two extensions from a point on the present line of the company ½ mile south of Centralia. One will extend west to connect with a line down Washington Avenue and the other north from the same point on Grand Avenue to connect with a proposed line on Gold Street in Centralia. These two lines will connect with the lines of the Puget Sound & Willapa Harbor Railway now being built through Centralia.

Appalachian Power Company, Bluefield, W. Va.—During the next four months this company will award contracts to build about ½ mile of new track.

SHOPS AND BUILDINGS

Tampa (Fla.) Electric Company.—The new office building at Tampa Street and Cass Street in Tampa has been completed.

Bay State Street Railway, Boston, Mass.—A new carhouse is being built on Bridge Street in Salem. The structure will be 300 x 200 ft. and of brick and concrete construction, and will have eleven tracks extending the length of the building.

Dover, Somerset & Rochester Street Railway, Dover, N. H.—This company is asked to consider plans to build a new depot at Sawyer Bridge in Dover.

Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.—Preliminary arrangements are being made to build a new passenger station on Talbot Road, Maidstone, Ont.

Salt Lake & Utah Railway, Salt Lake City, Utah.—It has been decided to spend $100,000 on the construction of joint carhouses for the use of this company and the Salt Lake & Ogden Railway in Salt Lake City.

POWER HOUSES AND SUBSTATIONS

New York, New Haven & Hartford Railroad, Stamford, Conn.—It is reported that this company plans to build a new transfoming plant in Bridgeport and use power generated at its Cos Cob plant to supplement the power generated locally in Bridgeport for the operation of the Bridgeport lines of the Connecticut Company, which it controls.

Bay State Street Railway, Boston, Mass.—An addition is being built to the power plant on Mason Street in Salem to house a turbine which will double the capacity of the plant.

Water, Light & Transit Company, Carrollton, Mo.—An order has been placed by this company with the Allis-Chalmers Company for one 375-kw turbine unit with condenser, one 200-kw belted generator, one 200-hp synchronous motor and an eight-panel switchboard. It expects to purchase soon steam pipe, valves, separators and traps.

Halifax (N. S.) Electric Tramway.—It is reported that a 500-kw motor generator set and other equipment for the company's generating plant is being installed in the power house at Halifax, N. S., by the Canadian General Electric Company.

Hull (Que.) Electric Company.—This company has orderd two 800-kw transformers for its plant at Deschenes, Que., from the Canadian General Electric Company.

Moose Jaw (Sask.) Electric Railway.—This company has recently added a 500-hp Mirrless-Diesel engine and generating plant to its power house in Moose Jaw and has just placed another order for an exactly similar unit.

Austin (Tex.) Street Railway.—This company has purchased a geared turbine unit of 750-kw capacity to be installed in the power house in Austin.

Manufactures and Supplies

ROLLING STOCK

Columbus Street Railway & Light Company, Columbus, Ind., has installed five new cars.

Houston (Tex.) Electric Company expects to purchase ten new double-truck cars during 1914.

Toledo Railways & Light Company, Toledo, Ohio, is rebuilding a number of its interurban and city cars.

Charleston-Isle of Palms Traction Company, Charleston, S. C., expects to purchase additional passenger cars.

Conestoga Traction Company, Lancaster, Pa., has ordered two 28-ft. pay-within car bodies and one 33-ft. 4-in. car body from the Cincinnati Car Company.

Port Arthur (Ont.) Electric Railway has ordered one 21-ft., single-truck, semi-convertible, pay-as-you-enter car body from the Ottawa Car Manufacturing Company.

British Columbia Electric Railway, Vancouver, B. C., has received four single-end, double-truck city cars, with Westinghouse 101-B2 equipment and Westinghouse straight air brakes, from the Preston Car & Coach Company.

Geary Street Municipal Railway, San Francisco, Cal., has ordered 100 car bodies from the Jewett Car Company, to be equipped with Baldwin trucks, Westinghouse motor equipment and Westinghouse air-brake equipment.

Saskatoon (Sask.) Municipal Railway has received six double-end, double-truck, pay-as-you-enter city cars, mounted on standard trucks, with Westinghouse 101-B2 equipment and Westinghouse straight air brakes, from the Preston Car & Coach Company.

Binghamton (N. Y.) Railway has recently had constructed by the Jones Car Company, Troy, N. Y., a new sample car fashioned after the cars of the Third Avenue Railway, New York, N. Y. This is a semi-convertible car with cross-seats, and it is probable that a number of cars of this type will be ordered by the company in the near future.

Illinois Traction System, Peoria, Ill., has ordered thirty-five 50-ton hopper bottom coal cars from Haskell & Barker and one interurban car from the St. Louis Car Company to replace one recently burned which had just been placed in service. The Decatur shops of this road have just completed building six large all-steel locomotives, similar to those built by them about three years ago.

Guelph (Ont.) Radial Railway has ordered two 46-ft., double-end semi-convertible, pay-as-you-enter cars from the Preston Car & Coach Company, equipped as follows: Nichols-Lintern sanders, Providence fenders, Peter Smith electric forced-air heating, Hunter illuminated signs, Westinghouse 101-B2 quadruple motor equipment and straight-air brakes. These cars are to be delivered in March.

TRADE NOTES

Galena Signal Oil Company, Franklin, Pa., held its annual meeting recently, at which J. C. Sibley and H. M. Tilford resigned as directors, leaving two vacancies on the board.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed John R. McCune a director succeeding James S. Kuhn, and Paul D. Cravath succeeding the late A. N. Brady. One vacancy exists, caused by the resignation of T. W. Lamont of J. P. Morgan & Company.

H. M. Byllesby & Company, Chicago, Ill., have appointed George F. Maddock as manager of their examinations and reports department. Mr. Maddock, who succeeds Mr. Harold Almert, resigned, effective Jan. 1, 1914, has been the engineering representative of this company on the Pacific coast for a number of years, residing at Berkeley, Cal.

Charles N. Wood Company, Boston, Mass., has installed twenty trolley contact signals on the Bangor Railway & Electric Company, Bangor, Me. This item corrects a typographical error in a statistical column of block signal installations, which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, and which erroneously stated the installation to include only twelve signals.

William B. Scaife & Sons Company, Pittsburgh, Pa., manufacturer of the We-fu-go and Scaife systems of water purification, reports that its patent No. 775,901 has just been upheld, with the exception of one claim, by the Court of Appeals of the Sixth Circuit Court, sitting at Cincinnati. The principal feature of this patent is a continuous-flow water-purifying system having the overflow sand filters in multiple.

Universal Safety Tread Company, Boston, Mass., received an order to equip with safety treads the 100 cars which were recently ordered by the Chicago City Railway. The American Abrasive Metals Company received an order for Feralun treads for the platform only on the folding door side of these cars. The above item is a correction of a previous correcting trade note which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, and which, owing to a misunderstanding, did not include the Universal Safety Tread Company in the order.

Laconia Car Company, Boston, Mass., has appointed Peter M. Kling assistant to the president. Mr. Kling will make his headquarters at the works at Laconia, N. H. He was formerly vice-president and general manager of the St. Louis Car Company for a number of years, and then acted in the same capacity with the John Stephenson Company until that company was sold to The J. G. Brill Company. He then went with the Pressed Steel Car Company where he was for several years manager of its passenger car department, which he organized, and in this position he had charge of the building of all steel passenger cars. For the past year he has been connected with the Brooklyn Rapid Transit Company.

Buckeye Engine Company, Salem, Ohio, has inaugurated a novel bonding system in connection with the sale of its product. When a salesman has a customer for a complete power unit or a Buckeye-mobile of a given size for belted or direct-connected service, before he settles the contract, an analysis is made of the calorific value of the fuel to be used. As a result of over a year's continuous test under various conditions with various grades of fuel, the company has considered it safe to make a guarantee of a normal specified amount of fuel per brake-horse-power, per indicated horse-power or per kilowatt. A guarantee, therefore, is embodied in the contract with regard to the fuel consumption, and the contract is returned to the general office of the company for approval. If it is acceptable to the company, the Fidelity & Casualty Company of New York is then asked to issue to the customer a $10,000 bond containing a forfeiture and bonus clause. The bond calls for a forfeiture of $1,000 for every 1/10 lb. of coal required per indicated horse-power per hour in excess of the guarantee, provided that in no case the amount of the forfeiture shall exceed the purchase price. For the sake of legality, an opposing condition is made fixing a bonus so that the purchaser must pay to the company in addition to the purchase price $100 for every 1/10 lb. of coal per indicated horse-power per hour required less than that called for by the guarantee. If there is a forfeiture or bonus allowance to be made, it is deducted from or added to the original purchase price, and the terms of payment specified in the contract then prevail. The question of satisfying the guarantee is decided by a witness test. The machine is tested under steam at the regular working pressure at the plant of the Buckeye Engine Company in Salem in the presence of the purchaser or his accredited representative within — days from the company's notice that the unit is ready for testing. No charge is made to the customer for the expense of the test. The contract provides that this demonstration shall constitute the purchaser's acceptance of the unit with respect to the economy statement if the results are within 5 per cent of the guarantee contained in the contract.

ADVERTISING LITERATURE

Edward J. Hunt, Newark, N. J., has issued a catalog describing his transformer oil driers and purifiers. A photograph is shown of a 20-gal.-per-minute press. One passage of oil through this press is sufficient to raise the dielectric strength of oil to a value of 50,000 volts or 60,000 volts. The catalog also describes 50,000-volt oil-testing transformer sets, rated sixty cycles, 2 kva, 100-200 volts low tension, 50,000 volts high tension, with variable resistance, circuit breaker, oil-testing gap, pilot lamps, main switch and voltmeter for reading the high-tension voltage direct.

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IS THERE "NO ALTERNATIVE"?

"The strike was complete and the company had no alternative." This was the explanation of the speedy and unconditional surrender of the Delaware & Hudson Railroad last week when its engineers, firemen and trainmen quit work in a body because the company refused to reinstate two discharged employees. The explanation was given by the member of the federal Board of Mediation and Conciliation who had brought about a settlement by the simple expedient of inducing the railroad, which was not turning a wheel, to accede to the demand of the various organizations which had completely tied up the road. Something might be said about the ineffectiveness of the federal law in this case and about the conditions which induce a railroad to re-employ an engineer and a conductor believed to be incompetent and careless and who had been several times disciplined before they were discharged for hauling a derailed car 3½ miles. But these reflections are too familiar to call for reiteration. It is advisable, however, to consider whether there is no alternative to surrender to any demand that may be made by organized labor. Otherwise the legal title to the property owned by the stockholders will prove to be about all that they can claim to possess in it. If this condition is to be avoided, it is safe to say that the time to look for relief is before, not after, a road has been put out of business.

VICE-PRESIDENT FOR LABOR

The only hope is that of preparation for, and provision against, such a complete tie-up as that considered above. Strike history shows that a railroad, whether steam or electric, seldom knows beforehand of, and is always surprised by, a complete strike on its lines. The reason for this surprise is a combination of unbelief in organized labor's power and lack of information as to what is going on among the men, and is due to absence of close touch with them. We have officials in charge of finance, engineering, operation and traffic, but there is rarely found an official especially charged with responsibility for labor matters. Yet nothing is more vital than the maintenance of good relations with labor, when possible, or preparedness for trouble if it must come. Almost always the official who handles labor relations does so as an incident to other duties that take all of his time and thought. It is not difficult to imagine what would happen to a road that gave no regular attention to operation until movement stopped, or to traffic until business disappeared, or to financing until there was default upon its paper. But in respect to labor matters this policy, which seems preposterous when applied to other departments, is the one commonly found in force. Under such conditions there is no alternative but to surrender when trouble comes, but the condition can be changed by as close attention to labor relations as is given to other, though no more important, factors in successful railroad management.

RAILWAY AND LIGHTING CONDITIONS

In the model presidential address made by William H. Winslow, of Superior, Wis., at the recent Milwaukee convention of the Wisconsin Electrical Association the speaker gave some significant figures showing the relative advancement of a few of the electric lighting and power and the electric railway utilities of the State. The statistics available were scanty, but Mr. Winslow concluded that the operations of the former for the last fiscal year showed a considerable improvement over the year ended June 30, 1912, gross income having increased more than $400,000 in 1913 as compared with an increase of $50,000 in 1912. But in the electric railway field in Wisconsin Mr. Winslow found it difficult to draw any cheerful or reassuring conclusions. The figures available show that gross income for 1913 actually decreased over $250,000 compared with 1912. Increased depreciation appropriations may account in part for this discouraging showing, but it is probable that the constantly increasing cost of supplies, wages and taxes is mainly responsible, the rate of fare being largely limited to the 5-cent piece. Mr. Winslow points out that the exchange value of the nickel in terms of wages and material has been shrinking year by year, and he makes the interesting comment that "with none of the manifold ways of increasing business open to the light and power companies it would seem that the street railway companies have a very difficult problem on their hands." His conclusions, which apply to other states quite as well as to Wisconsin, are that some method of charging by which compensation will be based on length of passenger haul seems inevitable if the companies are to continue to serve the people properly. The danger of injustice due to the rigidity of the 5-cent fare has been long recognized, but the fact, as mentioned, that the electric railway companies have none of the manifold ways of increasing business open to the electric lighting and power companies has not been so often pointed out. By an interesting coincidence we are able to report this week, also from Wisconsin, the establishment of a system of zone fares in the suburban territory tributary to the city of Milwaukee, a plan which may offer suggestions for other properties.

PUBLIC RELATIONS: HOW TO BETTER THEM

There is no doubt that public relations constitute the paramount problem in the electric railway industry. This thought was suggested by President Black of the association in an article in our issue of Jan. 3, and the same sentiment was expressed by practically all of the other contributors to that issue among the bankers and active railway managers. As each is a leader in the industry, their combined testimony is deserving of the greatest weight. It is easy to understand the importance of the subject in the minds of those who are giving serious thought to the problems of electric railway properties because it threatens the integrity of railway capital values and the stability of the return thereon. Its solution is the most important work before the association, and if that body and the member companies and all the forces of the industry working together cannot change these conditions, nothing can.

The primary responsibility for this work necessarily falls upon the committee on public relations of the association, but all electric railway companies, whether they are members of the association or not, and all who are interested in the industry must share this responsibility if effective work is to be accomplished. To help in attracting interest and support to the work of this year's committee some of the topics which could be taken up to advantage by it during the coming year will be mentioned.

We believe that the association, through its public policy committee, ought to express its disapproval of limited franchises. These franchises are iniquitous in several ways. When a limited franchise expires it is a signal and invitation to confiscation. Long before the end of the franchise period is in sight the company is harassed by the fear that it may not get a renewal on terms that will protect it. Its security holders are alarmed, its credit is weakened. It is the target for every kind of political attack. The only kind of a limited franchise which a company ought to accept is one that provides a long enough time and a high enough fare to retire the capital investment at the end of the period and to permit a reasonable rate of return during the franchise, or else there should be some definite provision by which the immovable property of the company will be taken over by the city at a fair valuation. Otherwise a situation will be developed which experience has made familiar to all of us —a company with its investments sunk and a hostile city declaring that the property of a company which has no franchise is worth only scrap value. The association, through its committee on public relations, ought to contend for forms of franchise that are perpetual or indeterminate and leave no room for confiscation of property. It ought to make a report pointing out the fair advantages to the public as well as to the company of franchises that recognize the property as a going one, built to serve the public permanently. It ought to do all that it can to take the franchise out of politics. The elimination of the short-term limited franchise will be a long step toward securing that desirable end.

Another important step is definitely and clearly to define what is meant by capital value and to show that it consists of the fair cost of bringing the property to its present state, including the fair costs of development sunk in the project. Many companies are seriously concerned about the protection of their capital value. They not only wish to protect the holders of their present stock and bonds, but they owe it to the holders of securities to be issued in the future to see that the full value received is put into the property in legitimate investment which can be accounted for at any time. The committee should recommend a method for determining capital value that will afford the fairest means of protection to securities and also one that will not fail to take into account the fair point of view of the public.

The committee should also take up the question of a reasonable rate of return. In doing so it ought to direct attention to the different elements of security and hazards involved in the railway business. One of the arguments of the opponents of the railways is that the railways are greatly helped by public franchises; in other words, that they get the right to do business from the public and that the public then has to do business with them. The point should be made that this does not impair in any way the right of the company to earn a reasonable return upon its investment, that a street railway which did not use the streets is inconceivable, that such a service is necessary to the prosperity of every community, and that the owners of the railway property are just as much entitled to a fair return on their investment as if they had engaged in any other commercial enterprise. Moreover, the rate of return in the electric railway must not only care for present investment but must be large enough to invite continually the investment of fresh capital in order that the service may be properly enlarged.

The committee should also declare definitely in favor of good regulation and should help to secure it. We believe that, rightly directed, regulation will protect the companies as well as the public. The sooner this fact is realized the better it will be for everybody concerned.

Finally, another and perhaps the most important work of the committee is that of promoting real publicity. This is a matter upon which practically all railway managers agree in theory, but upon which nearly all of them disagree in practice. Few companies give real publicity to their affairs. The number that do so is increasing, but the committee ought to outline a policy in this respect that will commend itself so strongly to member companies that many will do what few do now. To agree on the wisdom of publicity is not enough. To admit that the policies of the past have been wrong is a step in the right direction. To establish a publicity department and to run it on strong independent lines under the charge of a man in sympathy with the best of the acceptable policies of the times will do much for every company. This policy of publicity should not be confined purely to the service of the companies. It should include a policy of adequate publication in regard to accounts. Too many financial statements of electric railway companies now are absolutely unfathomable, even to the expert accountant, to say nothing of the ordinary layman. It would seem as if the complicated relationship of holding companies found one of its chief purposes in the obscuring of the actual financial conditions of the controlled and controlling corporations. The published reports should include not only clear statements of the assets and liabilities of each company, the interrelationships of the companies and an adequate account of the receipts and expenditures for the period under consideration, but in its published return the company should make a careful separation of its disbursements for current expenses and those for permanent improvements.

The possibilities for useful work along these and parallel lines are so great as almost to be without limit. We have not mentioned the subject of municipal ownership, service rendered, relations with employees or the best methods of educating the public by a broad system of publicity, the latter to be taken up by the association itself in a comprehensive and effective way, but these should also form a necessary part of the program and should be vigorously followed.

THE BOSTON ARBITRATION AWARD

Elsewhere in this issue are printed the essential features of the award of the arbitration board in the Boston Elevated labor controversy. The finding is one of the most elaborate that have ever been made public, and it is of interest not only on account of the fact that nearly three-score of occupations are involved in its jurisdiction but because of the thorough discussion of principles with which the report is replete. The final decision which the board reached, to the effect that the men have made out a case as to their right to increased pay, will impose a heavy burden upon the company's finances. But it has been accepted in good faith by the management, and there is not the slightest doubt that every possible effort will be made so to conduct the affairs of the road that the present return to the stockholders may be preserved, the compensation of the employees cheerfully rendered, and the existing high quality of service sustained.

It has been estimated in financial circles that the increases granted will cost the company at least $500,000 a year when they become fully operative, but fortunately the board has spread this burden over about sixteen months, so that the company is not at once obliged to meet the extreme peak of wages award. No doubt the natural increase in traffic from year to year will help somewhat in meeting the new requirements, and the agreement of Dec. 20, 1913, with the employees' organization regarding the liberal interpretation of the "nine-hours-in-eleven" law will at least preserve the company from insupportable costs in that branch of its service. The employees can do a great deal, if they will, to safeguard the future of the concern from which they derive their living by striving to give the best possible service in a spirit of co-operation, by doing their utmost to avoid accidents and by refraining from unreasonable demands upon the management. Public sentiment supported them in their efforts to form their local organization, and it is clearly "up to" the members of the union to demonstrate that the award of increased pay and easier working conditions generally only stimulates each individual to do his best and to give his employer full measure, pressed down and running over, in return for the good things which he has obtained.

The conclusions of the board are obviously open to critical study, and there is room for a good deal of argument upon these. The most striking pronouncement is that the law of supply and demand has only an indirect influence on the wages which the company should pay for labor and that the financial condition of the company has none at all. The rate should be determined by a comparison with those paid elsewhere for the same service, plus such allowances as arbitrators think are warranted by local conditions. This is a large question, one likely to be heard of again in this country before the limits of moral and business responsibility of employers are settled once and for all, if, indeed, this can ever be accomplished. But, taking the board's opinions as set down in this particular case, it is cause for gratification that the company's status has so clearly been set forth and that the extreme peril of further present demands upon it in the way of subways built only at enormous cost has been sounded to the public.

There is no mincing matters in the statement of the board that a continuance of the policy of overloading the company with the fixed charges of additional rapid transit lines will send it to the poorhouse; that the company needs a recuperative period or some relief in the way of lightened burdens before it is asked to become responsible for another subway or elevated extension, and that if the community wishes to have million after million of dollars spent almost continuously in order to bring about rapid transit between the heart of the city and its suburbs and also wishes to restrict the fare to 5 cents, it must co-operate by lightening the rentals for the subways, especially during the earlier years of their use, and perhaps at the same time demanding less tribute in the form of direct taxes than an amount equal to the return to the stockholders who are invited to play an essential part in supplying the money, and practically the whole part so far as the risk of the enterprise is concerned. Clearly the community has duties to perform as well as the company and its men, and upon the public relations of the road within the next few years, its ability to maintain the highest standards of operating economy consistent with good service and the willingness of its employees to put their shoulders to the wheel depends in no small measure the success of the Boston transportation system, which is unique in its scope, historic in its adaptability to new conditions and eminent among the public utilities of America.

The Pittsburgh & Butler Street Railway

This High-Speed Interurban Line Has Recently Been Changed Over from Single-Phase to 1200-Volt Direct Current—A Description of the New Equipment Is Given Together with Some General Results of the Change

The Pittsburgh & Butler Street Railway has now been operating for several months as a high-voltage, direct-current road, and the accompanying description of the new equipment should be of interest as this is the fifth single-phase interurban road in the United States to substitute 1200 volts d.c. for the single-phase system. The road affords an unusually good opportunity for a comparison of the relative merits of the two methods of propulsion as it has had five and one-half years of single-phase operation.* With the new 1200-volt direct-current apparatus the same car bodies are used, and the new motors are of the same nominal rating as the former ones. Power is supplied from the same power plant, and for the first four months of operation the same schedule was run.

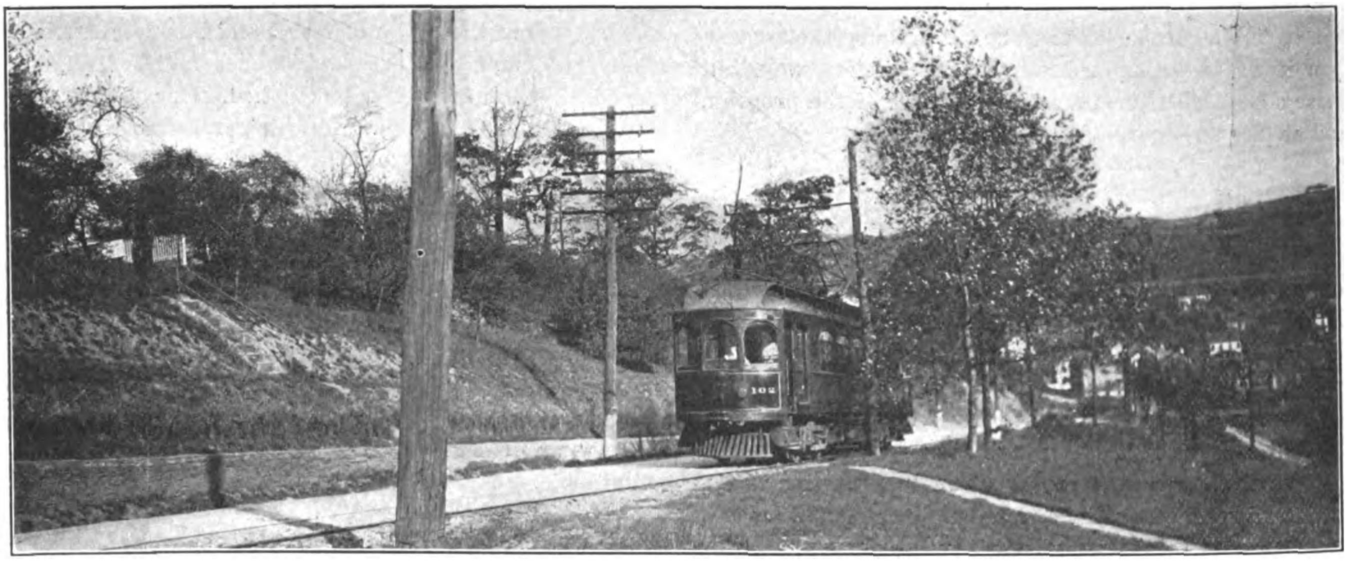
Under these conditions, according to Charles C. Tennis, vice-president Pittsburgh & Butler Street Railway, a reduction in power consumption per car mile of not less than 15 per cent has been shown by a comparison of power-house records for the months of August, 1913, and August, 1912. In addition, the mechanical and electrical force at the carhouse has been reduced 54 per cent compared with that employed a year ago, this figure being, of course, exclusive of car washers, etc.

The total length of road now operating on 1200 volts is about 28 miles. For a distance of 6 miles, from Etna to the Pittsburgh terminal, the cars operate on the 600-volt trolley over the tracks of the Pittsburgh Railways. At the Butler end of the line the substation of the Butler Passenger Railway, an affiliated company, is utilized to supply current to 4¾ miles of track. There were two reasons for equipping this part of the line for 600 volts instead of 1200 volts. In the first place, the Butler substation has more than double the capacity necessary for the local system, and the additional load materially improves the load factor. Furthermore, it is proposed to extend the local service soon to the suburban district just outside of the city.

The track gage is 5 ft. 2½ in., conforming to that of the Pittsburgh Railways. The road for a greater part of the way passes through a hilly country, making operation especially severe on account of the extra power requirements and the unusually heavy duty on the equipment. There are three grades averaging from 7 per cent to 9 per cent, while frequent lesser grades range from 3 per cent to 5½ per cent. A grade of 9 per cent is encountered near Etna, and at a point about 5 miles north of the Gibson substation near Bryant the south-bound cars ascend a 6 per cent grade with an 8-deg. curve. The road from Etna to Butler is single track throughout, and, with the exception of short stretches through the larger towns, is over a private right-of-way.

The old timetable, which was in operation up to Dec. 1, 1913, calls for three classes of service, namely, first, dispatch, making about five interurban stops; second, limited, averaging twenty-five interurban stops, the cars of these two classes running from Butler to the Pittsburgh terminal; third, local service, running between Butler and Etna and averaging about thirty-five stops. On the new schedule the running time of the "dispatch" service, which has been re-named "the flyer," was cut ten minutes compared with the old schedule; that is, from one hour and forty minutes to one hour and thirty minutes between Pittsburgh and Butler. The schedule of the "local," making all stops, was reduced five minutes. There are now but two classes of service, the "flyer," making three interurban stops, and the "local," making all stops, averaging about thirty, and all cars run from Butler to the Pittsburgh terminal. In the limited service a high-speed schedule is maintained, the 33 miles from Etna to Butler being made in fifty-five minutes including stops. Speeds as high as 48 m.p.h. are common, with a maximum of 60 m.p.h. on favorable grades.

Besides the regular passenger traffic, a large express and freight business has been developed and is handled by a regular express car and in express compartments



Pittsburgh & Butler Street Railway—1200-Volt Car Ascending 9 Per Cent Grade Near Etna

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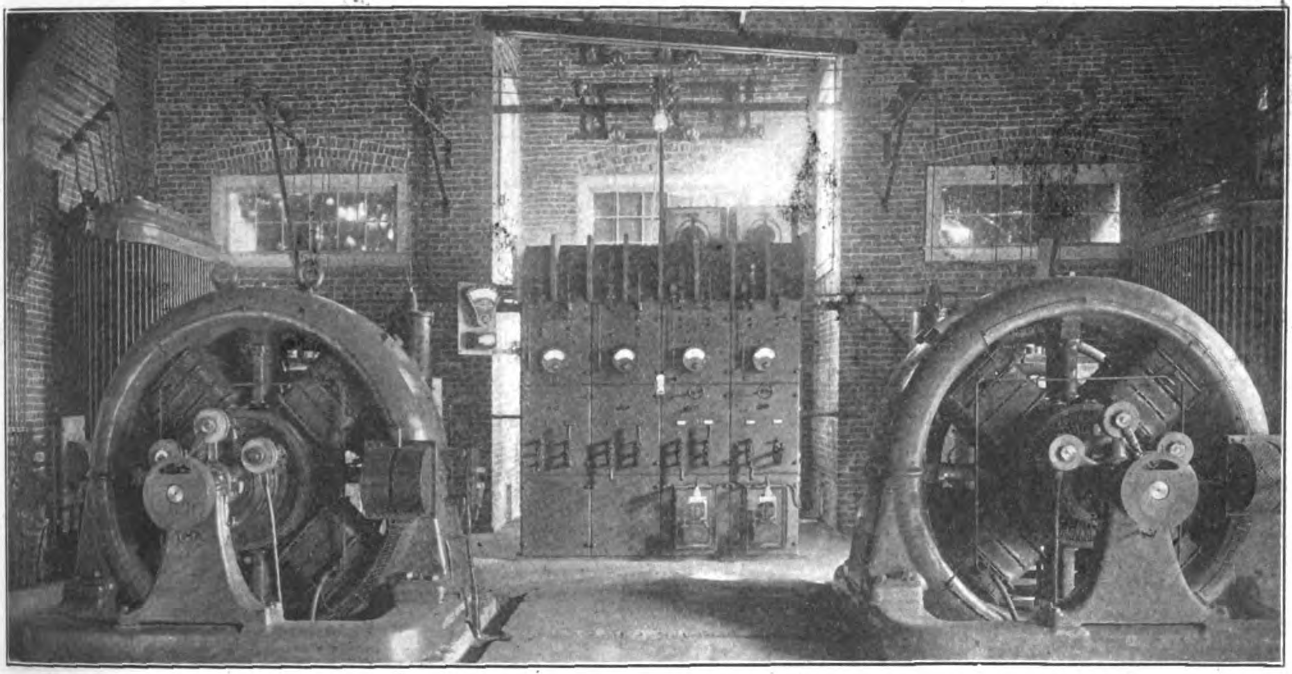
*ELECTRIC RAILWAY JOURNAL, Aug. 10 and Aug. 17, 1907.

on the passenger cars. An additional express car and three gondola cars will shortly be placed in operation to take care of the rapidly increasing business.

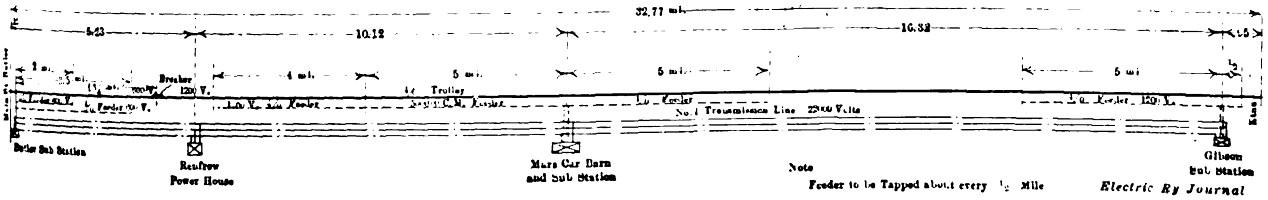
GENERAL SCHEME OF ELECTRIFICATION

Electric power is generated at the power house at Renfrew, 5¼ miles from the Butler terminal, is transmitted to two rotary converter substations at 22,000 volts and there is transformed to direct current at 1200 volts.

The power house at Renfrew, which was originally used to supply single-phase current to the trolley through transformer substations, has been easily adapted to supply three-phase current to the rotary substations. This power station contains one 1500-kva and two 750-kva horizontal steam-turbine units connected to deliver three-phase, twenty-five-cycle, 6600-volt current. By a rearrangement of the single-phase transformers this current is now stepped up to 22,000 volts, three-phase, for transmission. Besides supplying the 1200-volt substations at Mars and Gibson, alternating current is also transmitted to the 600-volt substation of the Butler Passenger Railway at Butler. The same three-phase lines provide power for the lighting circuits in that city and for towns along the line.



Pittsburgh & Butler Street Railway—Interior of Substation at Mars



Pittsburgh & Butler Street Railway—Feeder Layout

These circuits consume an average of approximately 20,000 kw-hr. per month.

SUBSTATIONS

There are two substations containing identical equipment, one at Mars, adjoining the carhouse, and one at Gibson, near the city of Etna. The accompanying diagram shows the location of these substations together with feeder and transmission lines. A transmission line made up of three No. 4 copper wires extends the entire length of the system, the original single-phase line having been utilized by the addition of a third wire. The 1200-volt circuit also has been reinforced by additional feeders, as shown, and the rail bonding was, of course, renewed throughout.

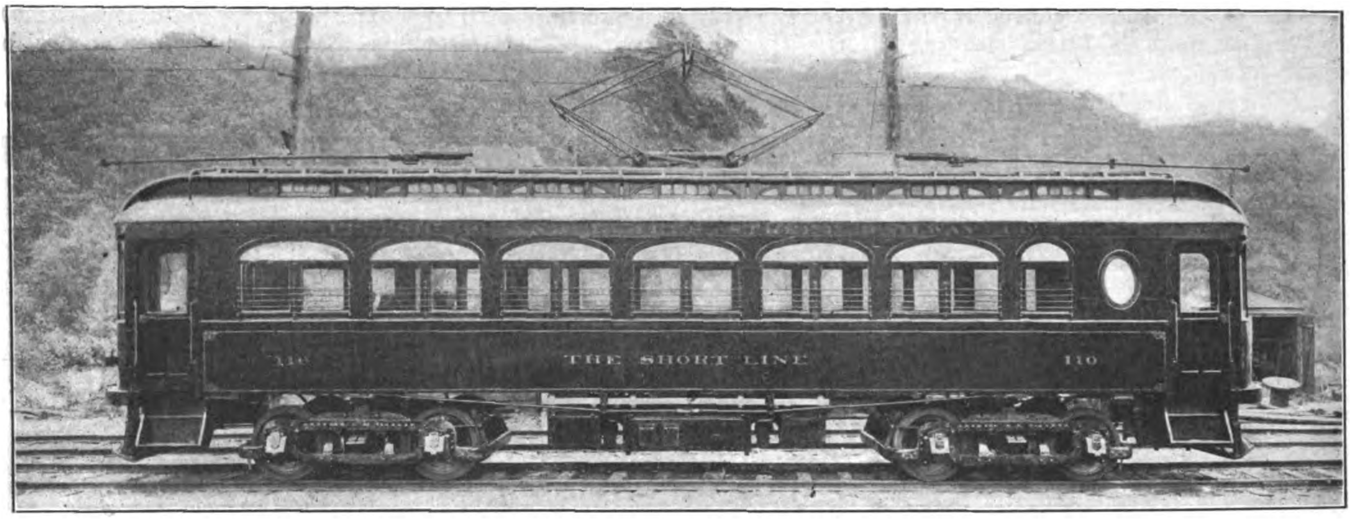
The substation and carhouse at Mars are approximately 17 miles from Etna and 16 miles from Butler. The distance to the Renfrew power house is about 10 miles. The two equipments in each substation are in exact duplicate, each consisting of a 300-kva, twenty-five-cycle, 1200-volt synchronous converter, a 300-kva, three-phase, oil-cooled transformer and the necessary switchboard with feeder and starting panels. The incoming 22,000-volt circuits are protected by a four-tank aluminum lightning arrester. These lines are also provided with choke coils and disconnecting switches. On the high-voltage side of each transformer are three single-pole, 22,000-volt, 300-amp automatic oil switches, installed in brick cells and hand-operated by means of switch levers mounted on a slate panel.

The transformers are Y-connected, with 740-volt secondaries. Four 2½ per cent taps are provided in the primary side, thus allowing adjustment between 19,800 volts and 22,000 volts. A one-half-voltage tap is provided on the secondary side for starting purposes. These transformers are of the standard railway type with high inherent reactance.

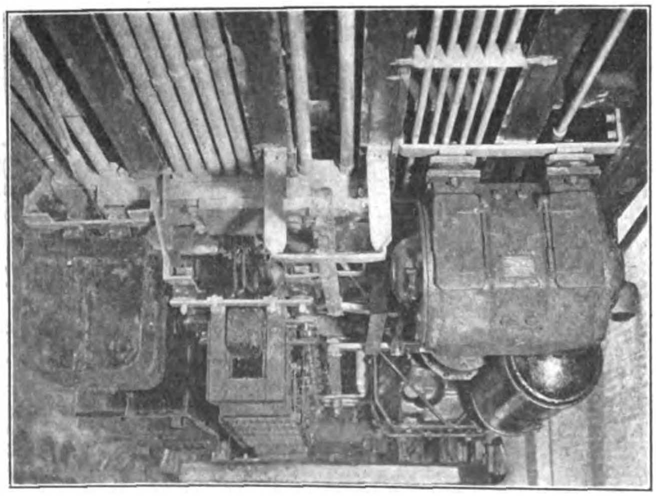
The synchronous converters are rated at 300 kw, 750 r.p.m., 1200 volts, and are provided with the usual end-play, speed-limit and brush-raising devices. These machines are capable of handling 50 per cent overload for two hours and three times normal load momentarily. A separate switch panel is used for starting from the alternating-current side. The d.c. switchboard consists of four standard 1200-volt panels, including a synchronous converter panel for each machine and two feeder panels. A standard 1200-volt d.c. aluminum lightning arrester is provided for each of the outgoing feeders. One machine is sufficient to handle the entire load except for a few hours in the morning when the first cars are leaving the carhouse. The proper taps are used on the primary side of the transformer to give 1300 volts on the d.c. side of the rotary converter.

The Gibson substation is 1 mile from the end of the line at Etna and contains exactly the same equipment as the Mars substation.

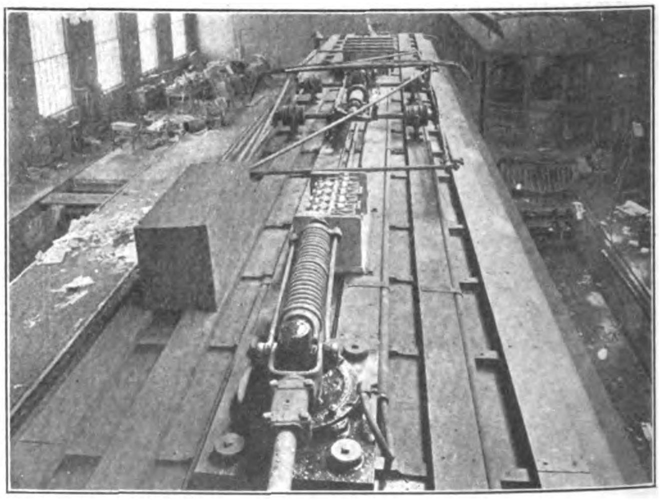
As mentioned before, at the Butler end of the road for a distance of 4¾ miles the trolley is fed from the 600-volt substation of the Butler Passenger Railway Company. The present equipment of the substation includes two 500-kw synchronous converters, which is ample provision for the maximum load requirements of both systems.



Pittsburgh & Butler Street Railway—View of Standard Motor Car Showing Pantograph and Trolley Poles



Pittsburgh & Butler Street Railway—View from Pit Showing Arrangement of 1200-Volt Equipment Under the Car



Pittsburgh & Butler Street Railway—Car Roof, Showing Trolleys, Pantograph and 1200-Volt Aluminum Cell Arrester with Cover Removed

ROLLING STOCK

Eleven of the thirteen original single-phase car equipments have been replaced by 1200-volt d.c. apparatus. These cars include ten combination passenger and baggage cars and one express car. The passenger cars have passenger and smoking compartments and all but two are provided with a baggage compartment for light freight and package express. The total seating capacity is fifty-two passengers, and the estimated weight of the car with average seated load is 37 tons. This is a reduction of 6 tons from the weight of the same car equipped for single-phase operation. This reduction was made possible by the elimination of the transformer and duplicate a.c.-d.c. control, and a reduction of 1500 lb. in the weight of each motor.

The principal dimensions and weights of these cars are shown in the following table:

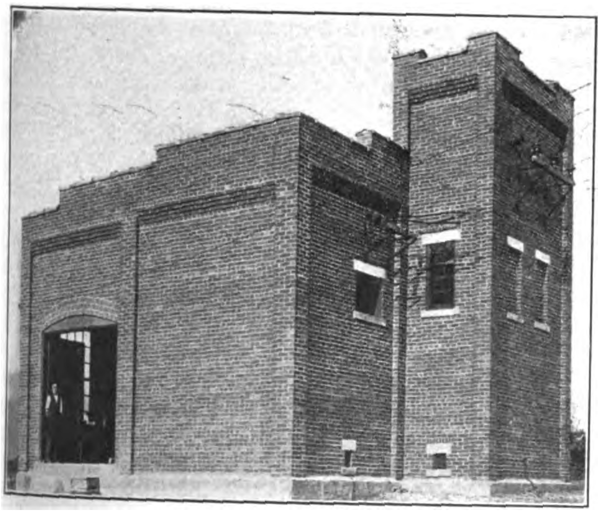
Length over all	51 ft. 3 in.
Width over all	8 ft. 1½ in.
Height from track to roof	13 ft. 6 in.
Distance between truck centers	27 ft. 6 in.
Wheelbase of truck	6 ft. 8 in.
Weight of car body	30,000 lb.
Weight of trucks	17,000 lb.
Weight of electrical equipment	22,000 lb.
Brakes and compressors	1,800 lb.
Average passenger load	4,000 lb.
Total weight	74,800 lb.

The electrical equipments of these cars are identical with the exception of the gear reduction on the express-car motors. The four GE-225 motors used on each car are of the internally ventilated, commutating-pole type, rated at 100 hp on 600 volts. The gear reduction on the passenger cars is 59:19 and on the express car 61:17. The control equipment is of the Sprague-General Electric type M, non-automatic, and is arranged to give full speed on both 600-volt and 1200-volt trolleys. The master controllers are of the C-74 type fitted with a dead-man's handle and pilot and emergency valves for emergency braking. These controllers also provide means for increasing the free running speed of the motors by shunting the field. A normal running speed of from 46 to 48 m.p.h. on level track can thus be obtained.

The control circuits, lights and air compressors are operated from a dynamotor when running on the 1200-volt trolley. In re-equipping the cars, General Electric straight air brakes were installed with air compressors having a displacement of 25 cu. ft. of free air per minute. An aluminum-cell lightning arrester with electrolyte for summer and winter service is installed in a suitable box on the roof of each car.

There are nine lighting circuits, each wired for five lamps in series. These lamps and the arc headlight are all controlled by a three-point switch in the motorman's cab. In place of a headlight resistance the incandescent circuits are thrown in series with the arc lamp. Each car carries a standard No. 8 U. S. wheel trolley at each end and also a sliding pantograph for collection of current from the catenary construction used on the private right-of-way.

The installation of the apparatus on the cars is an unusually good example of car equipment, and several features deserve special mention. All wiring is in conduit, and every conduit is a straight pipe, which simplifies the pulling in of wires and cables. Special cast-iron outlet boxes are suspended directly over the resistance grids, and the grids themselves are carefully insulated to prevent damage from snow. The motor leads are also well protected from injury by use of cast-iron terminal boxes on the car and special wooden terminal blocks on the motor case. Each lead is covered with rubber hose armored with brass wire, and the outlet box is placed near the center of the bolster to obtain maximum flexibility. Hangers and boxes, and in fact all accessories, are interchangeable on all cars.



Pittsburgh & Butler Street Railway—Gibson Substation

Among the changes made in the cars to adapt them to direct-current operation the roof covering was changed. With the single-phase equipment a grounded copper sheathing was used on the car roof to ground a broken trolley wire. For direct-current operation the cars are covered with canvas, and the trolley deck running the entire length of the car is insulated for 1200 volts.

OPERATION

The alterations and the work of re-equipping the cars was done in the carhouse at Mars under the supervision of John Christensen, master mechanic, who also designed many of the devices used on these cars. Sufficient trackage is available for housing all of the equipments. The cars in the carhouse are operated from a 1200-volt trolley, which formerly carried 6600 volts a.c.

The change from 6600 volts single-phase to 1200 volts d.c. was accomplished without interruption to traffic. After the first two cars had been equipped for 1200 volts, the system was changed over from Mars to Butler, passengers being transferred to the single-phase cars at Mars. On Aug. 1, 1913, direct current was thrown on the entire system, and four additional cars were put in service on the regular schedule. Since the inauguration of the 1200-volt service no trouble of any kind has developed in the operation of the electrical equipment.

The reconstruction of this road has been supervised by James Bryan, consulting engineer, Pittsburgh, who is known locally as the father of the 1200-volt system. Three other roads have been equipped with 1200 volts under his direction, namely, the Pittsburgh, Harmony, Butler & Newcastle; the Indianapolis & Louisville, and the Southern Cambria Railway.

ANNUAL MEETING OF WESTERN RED CEDAR ASSOCIATION

The regular annual meeting of the Western Red Cedar Association was held in Spokane on Monday, Jan. 12, 1914. President H. C. Culver opened the meeting with his annual address, which was in part as follows:

"During the first half of the year poles, posts and piling moved freely at fair prices. A general recession of trade during the latter half of the year has taken place, and to-day the industry is in a very unsatisfactory state. Your president believes, however, that soon a more healthy condition of affairs will prevail.

"Stocks are not too large and are fairly well assorted. It is expected that the output during the present winter will be greatly restricted. Owing to lack of snow thus far practically no stock has been hauled out. In addition, owing to the poor market in the latter part of the year, the usual preparations for cedar production were not undertaken. Another factor tending toward curtailment is the lack of activity by the sawmill companies, which annually produce considerable cedar they find mixed in with their saw timber.

"It is understood that cedar dealers in Michigan, Wisconsin and Minnesota are suffering from somewhat similar climatic conditions; therefore the general outlook at this time would indicate a smaller output than for several preceding years.

"That we may bear in mind the extensive use of poles for conveying electricity, let me remind you that in the United States there are more than 800,000 miles of pole lines, there being in service to-day over 32,000,000 poles. The annual renewal requirements are more than 4,000,000, and of these large totals it is claimed that more than 65 per cent are cedar."

After a short discussion, the committee on the Forest Products Exposition was instructed to take up with the National Electric Light Association the matter of having specifications for Western red cedar poles adopted by that association. At the present time the National Electric Light Association has specifications covering yellow-pine poles, Eastern white-cedar and chestnut poles, but has none covering the Western red cedar. It is the belief of the association that the Western red-cedar poles are far superior to any of the other three now covered by the specifications of the National Electric Light Association, and it is therefore hoped that during the year 1914 specifications will be adopted by the National Electric Light Association for the Western poles.

Report of Arbitration Board on Boston Elevated Railway

An Abstract of the Findings in the Controversy Regarding Wages, Hours of Work and Conditions of Labor in Which the Considerations Affecting the Decisions of the Board Are Set Forth in Detail

An exhaustive report was handed down on Jan. 15 by the arbitration board sitting in the Boston Elevated wage and hours of labor investigation, which has been in progress during the past six months. The finding of the board, which is effective until May 1, 1916, increases the wages of blue-uniformed men, shop employees and others by from 5 per cent to 6 per cent, distributed over a three-year period, and in the proceedings now closed there have been presented to the board a larger number of questions for decision than were ever brought up in any street railway arbitration in this country or perhaps in any other industry. Hearings were held on fifty-six days, and the record before the board comprised 5238 pages of evidence and argument, besides 202 exhibits. In the proceedings the bulk of the evidence introduced related directly to car service labor conditions, although attention was given to the conditions of employment prevailing in power houses, substations, shops, carhouses and other branches of the company's activity. The arbitration board consisted of James J. Storrow, chairman; James L. Richards, representing the company, and James H. Vahey, representing Division 589 of the Amalgamated Association. A résumé of the report is given below.

On Dec. 20, 1913, an agreement was signed by the company and the union upon hours of labor for blue-uniformed men. Part of it was printed in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, page 1254, and in effect it gives the company a reasonable latitude in the making up of its schedules without suffering the extreme burdens of the "nine-hours-in-eleven" law which was passed by the Massachusetts Legislature in 1913.

GENERAL QUESTION OF WAGES

The finding of the board affects nearly all of the company's 9474 employees, over 7000 of whom are members of the union. The board places the burden of proof upon the men that increased wages are necessary. Upon the evidence submitted, the board cannot find that, upon the whole, the work of blue-uniformed men is to-day more arduous than it was in 1897. It feels that vestibuled platforms, seats for motormen, the collection of fares at subway stations and use of more efficient equipment, including prepayment cars, very nearly offset the factors pointed out by the men as tending to increase the difficulties of their work, such as the introduction of larger cars, operation of faster schedules, increased traffic on cars and highways, shorter layovers and more rules and general orders. The shortening of hours and the reduction in their outside limit throw the balance on the side of the company.

The board is of the opinion that wages in other occupations are not very helpful in determining what the wages of blue-uniformed men should be, but that outside wages have more bearing in the case of shop men. Many of the mechanics and other employees of the company, however, are not obliged to have the same all-around knowledge of their trade that is required of journeymen in the building trades. The company's work is largely repetitive. It appears that an inexperienced man in the company's shops can pick up the knowledge needed in a much shorter time than in the one to three years' apprenticeship required in outside trades. Again, most of the company's employees are given continuous work throughout the entire year. The board does not think that the wages paid city employees constitutes a determining factor in the inquiry.

However, the wage rates of the other Massachusetts street railways have a direct and vital bearing upon the question of wages in Boston. In numerous and important respects the wages paid blue-uniformed men by the Bay State Street Railway, Worcester Consolidated Street Railway and Springfield Street Railway are higher than in Boston. The Boston surface motorman or conductor has to work fifteen years before reaching the maximum wage—a much longer period than upon any other street railway of the State, although the first-year rate is higher in Boston than on any other road in the State except that at Springfield. The board is of the opinion that the wages of blue-uniformed men in Boston ought to be higher than in the smaller Massachusetts cities. There are some routes in Boston where the traffic conditions are no more difficult than on the main street of Springfield or Worcester, but on the average a higher degree of skill and judgment is required in Boston, the cost of living also being somewhat higher.

COST OF LIVING

The board finds that the cost of living has increased about 24 per cent since 1897. Between 1903 and 1913 the cost of living increased 14 per cent, about 8 per cent being between 1908 and 1913. Advances in wages since 1897 offset, so far as they go, the increase in the cost of living and have been taken into consideration by the board, although there is no evidence regarding the adequacy of the wages paid in 1897. Another consideration the board has had in mind is that the cost of living probably does determine in large degree the wages of the man receiving the smallest pay, but that as one rises in the scale of wages one obviously departs from the mere cost of living, and, instead of paying a man a wage determined by the necessary cost of living, one begins to take into account skill, ability, judgment, knowledge and other factors. If a company needs in its employ a man having these qualities, it must pay for them. These qualities have a value, and the man is paid accordingly. Then the employee so paid for these qualities proceeds, as is the custom with all sensible men, to live upon a scale which is in accord with his income; but the scale of living is not the cost of living, and it is confusing to treat these two things as being the same. This consideration has inclined the board in dealing with the wage question to place greater emphasis upon the increase in the cost of living when considering wages at or near the minimum.

Evidence seems to show that the company can secure plenty of men at the present wage scale under ordinary conditions, but that it cannot hold them in its employ. There were 5034 blue-uniformed men in the service Aug. 1, 1913. Under normal conditions the company is losing every year about 40 per cent of these, renewing its entire car-operating force on the average once in two and one-half years. The board maintains that it is the duty of the company to operate its cars with experienced men and points out that, even if the company can succeed in maintaining at its full quota such a rapidly shifting organization, it does not furnish the public with the protection to which it is entitled. This is shown to be no formal consideration by the accident record of the past five years as filed with the Public Service Commission, there having been 3149 accidents in 1909 as compared with 4847 in 1913, the total fatalities being thirty-seven and fifty-seven respectively and the grand total for the five-year period being 207 fatalities and 17,580 accidents resulting only in injury.

FINANCIAL CONDITION OF THE COMPANY

The company urged with great earnestness that it has not the available income out of which to pay an increase or certainly any substantial increase in wages. For the fiscal year ended June 30, 1913, the company's gross income was $16,968,328 and its operating expenses were $11,135,581, its net earnings being $5,832,747. Fixed charges totaled $5,132,124, leaving a net divisible income of $700,622. Dividends of 6 per cent on the capital stock totaled $1,197,000, leaving a deficit of $496,377. The fiscal year 1912 showed a deficit of $491,632 after the payment of a 6 per cent dividend. Neither of these years would have shown a deficit after the payment of dividends except for the expenses incident to the strike of 1912. The board is convinced that the company has not artificially kept down its surplus during its existence by any undue or excessive charges against income to meet depreciation of the property of the West End or Elevated companies. The total surpluses of the years 1898 to 1911, inclusive, are $1,214,903, the total deficits of the last two years being $988,009.

The company stated in the hearings that its interest charges during the present year would be increased by $80,000 and its dividends by $235,764, and that in the near future the burdens imposed by the construction of the Dorchester subway, Boylston Street subway and East Boston tunnel extension will require added rentals amounting to $675,000 per year upon an increased investment of $15,000,000. New capital to the amount of $6,300,000 will be needed by the company to complete the elevated extension from Sullivan Square to Everett and to purchase additional equipment and supplies, and also $900,000 of new capital per annum is required for necessary additions to the property of the West End Street Railway. It was also stated that the cash and available resources of the company on Sept. 1, 1913, totaled $5,936,800, and, as the stock is selling below par, the company is at or near the end of the new capital it can raise except so far as new expenditures can be incurred for the West End company.

The union contended that the company has not been managed with due regard to efficiency and economy, that the increase in fixed charges will be spread over several years and must be cared for by increasing traffic; that legal expenses and salaries were excessive, and that the building of the Cambridge subway was carried on under a wasteful and extravagant contract. The union also claimed that the recent strike cost the company $2,000,000 and that it was an unnecessary waste of its resources, being forced upon the men, according to the union officials, by the policy of the company in undertaking to prevent the men from organizing their union. The board concedes the right of the men to engage in collective bargaining by organization and by recourse to the strike method if conditions are not reasonably satisfactory and no redress can be obtained. But it points out that a strike is much to be regretted is not lightly to be undertaken and is to be unquestionably condemned if unnecessarily ordered. No benefit can be seen, however, in reopening the question whether the strike of 1912 could have been avoided, but the board states that it has no doubt that its cost was at least $1,500,000 and perhaps more—a loss which the company could ill afford to stand.

SALARIES AND LEGAL EXPENSES

In the case of the company's officers and legal advisers there is no testimony to explain their daily duties, and still less any testimony to show with what ability their duties are performed. The arbitration agreement does not ask the board to determine the compensation of the company's officers, and the absence of adequate evidence makes it impossible for the board to pass justly or accurately upon the salary schedule. Managing expenses have increased 54 per cent since 1899 and passenger revenue 72 per cent, or from $182,441 to $280,265 in the former case and from $9,449,928 to $16,289,919 in the latter. In other words, managing expense has grown less rapidly than receipts.

CAMBRIDGE SUBWAY CONTRACT

The board reaches the conclusion, with Mr. Richards dissenting, that the contract for the construction of the Cambridge subway was unwarranted. The work was not divided into sections, as in the Boston subway construction, nor was the construction advertised for bids, the entire job being turned over to a single contracting company, to be built upon a basis of cost plus a 10 per cent bonus.

CONCLUSION OF BOARD ON FINANCIAL CONDITION OF COMPANY

The board states that burdens have been thrown upon the company faster than the increase in traffic justifies. In addition to the rapidly growing item for rentals of subways now built and building, the public exacts as a charge upon its earnings, ahead of dividends, interest, wages and everything else, an annual sum in taxes which in 1913 amounted to $1,128,021. This is substantially equal to the amount paid in dividends. A glance at the rapidly increasing capitalization of the company, which has gone on at a rate out of all proportion to the increase in gross earnings, indicates plainly enough that the company is being rapidly overloaded by excessive capital expenses and rentals for capital expenses incurred by the city in the construction of tunnels and subways. In 1897 the company was obliged to earn a return upon an investment of $25,291,913, compared with an investment of $105,684,146 in 1913. During this period the gross earnings increased 94.6 per cent and the capital investment 317.86 per cent. The board states that this policy, if continued, is going to send the company to the poorhouse, and it is also going to render it incapable of obtaining each year the additional capital which it must have in order to supply the transportation service needed by the community. To-day the stock is selling below par, and under the provisions of the Massachusetts law that capital stock must always equal the amount of bonded indebtedness the company has the right to sell only $4,236,800 more bonds. Then, unless the stock rises again to par or above, it will begin to lack funds. It will not tend to better traffic conditions but will lead to almost irretrievable injury if this process of overloading the company is not stopped, so as to give the gross earnings a chance to catch up with capitalization.

POSITION OF STOCKHOLDERS

The board states that if it is true that the metropolitan community of Greater Boston is loading upon the company burdens which it cannot bear the community is not only unwise in its own interest but is committing an act of rank injustice toward the company's shareholders, many of whom are dependent women and children.

It is a great and general public advantage for any community to have a system of rapid transit which will enable its workers to escape from the crowded and congested districts at the close of the day and in a few minutes reach a home in the suburbs. If the community wishes to have millions of dollars spent to bring this about and also wishes, as is probably wise, to restrict the fare to 5 cents, it must co-operate with the company undertaking the task by lightening the rentals for the subways, especially during the early years of their use. Perhaps at the same time the community should demand from the company less tribute in the form of direct taxes than an amount equal to the return to the stockholders, as the latter are invited to play an essential part in supplying the money and to play practically the whole part, so far as the risk of the enterprise is concerned.

FINANCIAL CONDITION OF COMPANY IMMATERIAL

The union contended that all evidence of the financial condition of the company is immaterial, as it claimed that the obligation of the company to pay adequate wages does not depend upon its financial condition, but that, on the contrary, even if the company is unable to pay its rentals and the interest on its outstanding bonds, the receiver would still be obliged to pay the men adequate wages. The board says: "We attach great weight to this argument, made on behalf of the men, that if the Elevated company is to furnish all the improvements demanded by the community they ought not to come out of the pockets of the men, that the men are entitled to fair and adequate wages so long as they are employed, and that it is for others to decide whether the company is to be gradually bankrupted, whether the passengers are to pay more, or whether the community as a whole is to come to the rescue of the situation. We think the argument of the men on this point should prevail. We have not thought it right, therefore, to permit the plight, or alleged plight, of the company to affect our findings materially, except that every sensible man knows that in the modern complex and interrelated life, if you insist upon the exact 100 per cent of justice to one man your supply of justice may run short, and that the next man—or in this case it may be widow—will receive no justice at all, but, instead, a notice in the morning mail saying that her income has been stopped. We go so far in assenting to the men's argument on this point that we would agree that if the company was to be operated by a receiver the receiver ought to pay the wages to which the men are entitled."

HOURS OF CAR SERVICE MEN

The board has considered that the company has shortened the working hours of many employees since 1897, doubtless in accordance with the wishes of its men. But even after from eight years to twelve years' service an ideal run, as regarded by most of the men, begins at 5 a. m. and ends at 5 p. m., or else begins at noon and ends at midnight. Under the agreement of Dec. 20 these most desirable runs would be shortened an hour as to their outside limit. Such hours are by no means average hours, and under the new agreement relating to the nine-hours-in-eleven law only 40 per cent of the regular schedule runs will enable the men to finish a day's work of nine hours within eleven outside hours. Twenty per cent of the regular schedule runs can be finished inside of eleven and one-half hours. Then a very large body of the men, amounting to 40 per cent of the whole, may receive runs as provided in the agreement, which make their outside time from twelve hours to sixteen hours. In the opinion of the board, a spread of sixteen hours constitutes an almost intolerable hardship, and any excess over twelve hours is considered a severe hardship.

CONCLUSION OF BOARD REGARDING WAGES

Speaking broadly, the majority of the board's opinion is that the men have made out a case establishing their right to an increase in pay. It feels that the wages of blue-uniformed men have been relatively lower than the wages in other departments, and that they have not in the past been proportionally increased. It rules that the new wage scales for all employees other than blue-uniformed men shall take effect in their entirety as of May 1, 1913; that the wage scales for blue-uniformed men shall become effective in part from the above date, in part from May 1, 1914, and the balance on May 1, 1915. Members of the union are to be paid accumulated back wages by March 1, 1914. The so-called "gold award" of the company and "stripe money" are abolished. Details of the award for blue-uniformed men are printed on the opposite page.

Under the operation of the graduated wage scale placed in service in 1903, blue-uniformed men receive six different rates of wages, the purpose being to encourage men to remain in the service. About 17 per cent of the men receive the maximum pay, which is accorded after sixteen years' work. In the opinion of the board the graduated scale has failed as a device to retain experienced men, the failure being not one of principle but of application. Five years is sufficient time, in the board's opinion, for a man to attain the point of maximum efficiency, and it has fixed its award on this basis.

MISCELLANEOUS WAGE MATTERS

The union demanded a seven-hour guaranteed minimum workday for extra men. The board awards that to all extra blue-uniformed men, who report for work under call but are not assigned work to the extent of six and three-tenths hours, there shall be paid not less than six and three-tenths hours' pay, provided they remain on duty so long as required, but not to exceed fourteen hours. The same minimum wage guaranty is awarded to collectors and porters. The union asked that no more trips be required as a day's work on Sundays and holidays than on week days, but the board rules that since the traffic conditions permit higher speed on such days with safety, the public interest warrants faster transit and that the diminished responsibilities to car service employees resulting from the decrease in ordinary street traffic offsets the added number of trips. No interference with Sunday and holiday schedules is therefore made by the board.

Another request of the union was that a minimum of $3 should be paid for six hours' work or less on night cars, all excess to be at the regular rates. The present rates for day and night work are the same. The board considers that night work falls with substantial evenness on all blue-uniformed men in a term of about five years and that it is proper that most of it should come to the newer men on account of greater safety of night operation through less congested streets, and also because the older men are entitled to the most desirable work. The board awards the regular rates for regular night work. An increase of 25 per cent is awarded above the regular rate for special cars run between midnight and 5 a. m. Motormen called for snow duty are to be paid the regular rates while waiting for cars and 45 cents per hour when working. The present rate is 40 cents. The board rules that instructors shall be paid 2.5 cents per hour above their regular rate while instructing, the present rate being 1.2 cents per hour in addition to regular pay, whether instructing or not. The board awards that all employees shall be paid special compensation for time required by the company in making out accident reports, not to exceed 10 cents per report.

The new schedule of platform wages is shown in Table I. The years indicated commence on May 1 in each case. Layoffs not exceeding thirty minutes are to be paid for at regular rates.

TABLE I—SCHEDULE OF RATES IN CENTS PER HOUR AWARDED BY THE BOSTON ELEVATED RAILWAY ARBITRATION BOARD

Surface Lines—Motormen and Conductors

Year of Service	Present	Award		
		1913-4	1914-5	1915-6
First	25.6	26.25 26.50	26.5 26.75	26.75 27
Second	26.2	27.25	27.75	28.25
Third	26.8	28	28.75	29
Fourth	26.8	28.5	29.25	29.5
Fifth	26.8	29	29.75	30.5
Sixth-tenth	27.5	30.5	31.25	32
Eleventh-fifteenth	28.2	....	....	....
Sixteenth and thereafter	28.9	....	....	....

Rapid Transit Lines—Motormen

Year of Service	Present	Award		
		1913-4	1914-5	1915-6
First	26.2	28.25	29.25	30.25
Second	27.8	29	30	31
Third	29.6	30.25	30.75	31.75
Fourth	29.6	30.5	31.5	32.5
Fifth	29.6	31.25	32.25	33.25
Sixth-tenth	30.3	32	33	34
Eleventh-fifteenth	30.9	....	....	....
Sixteenth and thereafter	31.7	....	....	....

Rapid Transit Lines—Guards

Year of Service	Present	Award		
		1913-4	1914-5	1915-6
First	23.9	24.75	25	25.5
Second	24.5	25.25	26	26.5
Third	25.2	25.75	26.5	27
Fourth	25.2	26.25	27	27.5
Fifth	25.2	26.5	27.5	28
Sixth-tenth	25.8	27	28	28.5
Eleventh-fifteenth	26.5	....	....	....
Sixteenth and thereafter	27.3	....	....	....

Rapid Transit Lines—Brakemen

Year of Service	Present	Award		
		1913-4	1914-5	1915-6
First	21.2	21.5	21.75	22
Second	21.7	22.25	22.25	22.5
Third	22.4	23	23	23.25
Fourth	22.4	23.25	23.5	23.75
Fifth	22.4	23.75	24	24.25
Sixth-tenth	23	24.25	24.5	24.75
Eleventh-fifteenth	23.7	....	....	....
Sixteenth and thereafter	24.5	....	....	....

Rapid Transit Lines—Gatemen

Year of Service	Present	Award		
		1913-4	1914-5	1915-6
First	16.7	17.5	18	18.50
Second	17.3	18.50	19	19.50
Third	17.9	19	19.50	20
Fourth	17.9	19.25	19.75	20.25
Fifth	17.9	19.50	20	20.50
Sixth-tenth	18.6	20	20.50	21
Eleventh-fifteenth	19.3	....	....	....
Sixteenth and thereafter	20	....	....	....

EMPLOYEES OTHER THAN BLUE-UNIFORM

For every conductor and motorman on a car there are two other men in the company's employ, the total number of occupations investigated being fifty-nine. The board has endeavored to avoid discrimination between different crafts, feeling that the relative wages of carpenters, blacksmiths and painters have become adjusted with relation to one another by time, and that to disregard such differentials might work injustice. The award reduces the blacksmith classifications to six and includes many other reductions of this character in other crafts.

The board considers that it has no authority over the hours of employees engaged in power maintenance, the wire and conduit department, structural iron workers and painters, or the Albany Street yard crew, but rules that fifty-one hours shall constitute a week's work in the rapid transit and surface car shops at Sullivan Square, Guild Street, Eliot Square, Albany and Bartlett Streets; but this ruling does not apply to carhouse work. The union asked for forty-eight hours.

The abolition of piece work was an issue. The total amount caried on is very limited, and it has been discontinued in the brass foundry and in car wiring. In view of the evidence which seems to indicate that the employees on piece work are getting more than 50 per cent addition to their wages when working by the piece compared with what they can earn when working by the day, the board does not think it wise to abolish the limited amount of this class of work being carried on in the company's shops.

The board rules that overtime shall be compensated at 150 per cent of the regular rate except in the case of blue-uniformed employees. The hours of labor in the road and track department are reduced to fifty-six per week, the former figure being fifty-nine and the union's request fifty-three. A few exceptions are cared for by increased compensation in the detailed awards of wages. In the case of night special or irregular work 75 per cent of the number of hours constituting a day's work are to be the maximum required, and these are to be paid for on the full day's basis.

FREE TRANSPORTATION TO EMPLOYEES

The union asked for free transportation to all its members in the active service of the company on the ground that this practice prevails elsewhere. In the opinion of the board, employees when engaged in company business should be carried free or have their fares refunded, but the board says: "Free transportation really constitutes additional wage, and the wage, if given in this form, is unequally distributed among the employees, for it is worth little to an employee who is so situated that he walks between his home and his work and is worth considerable to an employee who lives so for away from his work that he must ride. . . . The board is not disposed to take away, and does not take away, such free transportation as the road has already accorded its employees, but feels that it cannot grant the additional transportation asked for by the union."

ADDITIONAL COMPENSATION OF BLUE-UNIFORMED MEN

In the agreement of Dec. 20, 1913, the principle was recognized that men having runs with an outside limit exceeding twelve hours are entitled to additional compensation, as fixed by the board. The award of 25 per cent of the employees' regular hourly rate for the first excess hour or fraction thereof and 50 per cent for the second excess hour or fraction, the latter rate being maintained for any further excess. Thus an employee having a run of nine hours with thirteen hours' outside limit and a rate of 27 cents would be paid $2.16 for eight hours' work and 33.75 cents for the ninth hour, totaling $2.49.

In the computation of fractional hours the board rules that in general the company shall give the blue-uniformed man the benefit of the quarter-hour into which his work extends, regardless of whether the full fifteen minutes is worked or not. In the case of runs of eight hours or more platform time but less than eight and one-half hours and of runs not exceeding twelve hours outside time, with platform time between nine and one-half and ten hours, the full half-hour is to be figured. The board further awards as to time for making up work and for work at the end of the day that conductors and motormen on surface lines be allowed the actual time they are required to report before the scheduled leaving time of their cars, either for the first run of the day or after reliefs in excess of one, and shall be allowed ten minutes in the case of conductors and five minutes in the case of motormen on surface lines for work at the end of the day, and such allowed time is to be computed at regular rates. The same rate is to be paid for work after reliefs in excess of one.

In case of extra runs having more than fourteen hours' outside time, additional compensation is to be paid at the rate of 25 per cent of the regular rate for the first hour or fraction and 50 per cent for the second hour or fraction. Thus, an employee having a run of nine hours, with an outside limit of fifteen and one-half hours and a rate of 27 cents per hour, will be paid $2.025 for seven and one-half hours at 27 cents, 33.75 cents for one hour at 33.75 cents, and 20.25 cents for one-half hour at 40.5 cents, a total of $2.565.

DISSENTING VIEWS OF ARBITRATOR RICHARDS

Arbitrator James L. Richards, for the company, records his dissent from that portion of the report providing for an unconditional advance in wages. He states: "I believe that the public and the stockholders should have equal consideration with the employees, and that any such substantial increase of wages as is provided for by the award should, under the conditions which exist, be made conditional upon the adoption of some plan of co-operation which would give the employees an interest in the future prosperity of the business similar to that of partners. I likewise do not agree with that portion of the award which questions the wisdom of the manner in which the Cambridge subway was built or its ownership by the company."

AGREEMENT OF BOSTON ELEVATED WITH AMALGAMATED ASSOCIATION

The agreement of Dec. 20, referred to by the arbitration board, a contract between the Boston Elevated Railway Company and the Amalgamated Association, is given in condensed form below. This is supplementary to the agreement covering the matter of hours of labor printed in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, page 1254.

This agreement is, of course, not a part of the report of the board of arbitration, but was, instead, entered into by the railway company and the employees directly without reference to the issues pending before that board.

The agreement provides full procedure for employees in taking up grievances which have not been adjusted with their superior officers, secures the men freedom from discrimination on account of their membership in the union, sets forth the general relations between the company and the officers of the employees' organization, and provides for many matters of detail bearing upon working conditions in the car service.

The company agrees to suspend or discharge employees refusing to pay dues to the union without written notice of the desire to terminate membership and to reinstate employees found not guilty of sufficient cause to warrant suspension or discharge. Provision is made for leave of absence on the business of the association, with return to full rating. Any member of the association taking other employment during leave of absence is to be considered as having terminated his service with the company. Employees may be removed from their present places only for unsatisfactory service or lack of work. Uniforms may be purchased in the open market when meeting the company's specifications and inspection. Seniority is to prevail so far as practicable in all departments and shops, men laid off receiving opportunities to return prior to hiring outsiders, one week's notice being allowed. Except temporarily, no man is to be hired at a higher rate of pay than men already working in any department, unless it can be shown that no one in the department can do the work required. Seniority in promotions is to be practised whenever the oldest man can qualify.

Any employee assigned to a position where the work required differs as to quality and kind from his previous occupation is required to serve a probationary period of thirty days, returning to his previous grade of pay if he fails to qualify. Official positions are not included in these regulations. Each time an employee is hired or leaves the service the company agrees to post a seniority list. Except in emergency work lasting not over a week, employees called upon to perform duties of higher grades are to receive the pay of such grades while working in them. Where an employee may be called upon temporarily to perform work in a lower paid class, no change in his rate of pay is to be made, unless the work is intermittent, involving laying off, when the employee is to receive the pay for the class of work performed.

Seats are to be provided for motormen on all cars where possible. In the selection of runs seniority is to prevail. The association is to have the right to take up the rating of men on the rapid transit lines, but the rest are to be rated as at the time of the signing of the agreement. A general selection of runs is to occur at each rating station whenever the company deems necessary, but at least three times a year, if requested by the association, on or within fifteen days of Jan. 1, May 1 and Sept. 1 respectively. All tables are to be posted two days before the picking time and at least four days allowed in which to pick runs. The time for picking runs is to close twenty-four hours before the timetable goes into effect. Emergency runs may be assigned for a period of seven days. When men are promoted to official positions, in no case are their runs to be held open longer than thirty days. This applies to men off duty for any cause except illness. In case of illness, if there be no immediate prospect of a man's return at the end of thirty days, his run is to be advertised to be bid for by men below on the seniority list operating on the same line. Men returning after illness are to be restored to their old runs.

The present system of division and rating station seniority is to continue, existing ratings being retained in transfers. Loaning of men from one division to another in emergencies is not considered a transfer. The assignments of extra men are to be shown on the bulletin board before 5 p. m., and extra men not listed for work are not to be required to report except in emergencies. Applications for snow work are to be made before Oct. 15, yearly, seniority being practised so far as possible in the awards. All surface car motormen and conductors are liable to perform snow or emergency work. In no case is a man to be required to do more than six consecutive hours of snow work without a meal. Guards while breaking in as motormen on the rapid transit lines are to be paid at the regular guards' rates. All surface car motormen and conductors who have already broken in on equipment now operated by the company are to be paid regular rates while learning to operate different equipment, if they have been in the service six months or more. The present practice of reversing the extra list on Sunday is to be discontinued. Men having six-day runs and no Sunday run, if ordered to report, are to take their position on Sundays at the foot of the extra list. Any blue-uniformed man is to be given, if he so desires, at least one day off in fifteen. So far as practicable, employees doing court work are to receive full compensation.

The transmission line from the new Stevens Creek hydroelectric plant to Augusta, Ga., is approximately 7 miles long, with galvanized steel towers, designed for two circuits, with three wires on each side, the height to the lowest cross-arm being 50 ft. The tower spacing is approximately ten per mile. At one crossing over a lake special towers are provided, 80 ft. high for the span of 860 ft. In the city of Augusta, along the canal, latticed steel poles, spaced 200 ft. apart, are used. The wire for the power circuits is No. 0 seventeen-strand, medium hard-drawn copper, and the ground wire is 5/16-in. seven-strand, copper-clad cable, having 30 per cent conductivity. A telephone circuit is run on the towers, 10 ft. below the lowest power wires, and is transposed at every tower, all instruments being protected by transformers. The power circuits have one complete transportation between the power house and the substation, hung on suspension-type insulators.

Convention of Wisconsin Electrical Association

A Report of the Proceedings at the Concluding Sessions of This Association, an Account of the First Day's Proceedings Having Been Published in Last Week's Issue—The Papers of Special Interest to Electric Railways Which Were Presented Before the Convention Are Published in Abstract

The annual convention of the Wisconsin Electrical Association, which was held in Milwaukee, Jan. 15 and 16, was reported in part in the ELECTRIC RAILWAY JOURNAL of last week, and an account of the proceedings at the concluding sessions, together with abstracts of the papers of special interest to electric railways, is presented in the following paragraphs, including the address of C. M. Larson. The discussion on this was published in last week's issue, page 137.

The Friday morning session of the association opened with a report of the committee on overhead inspection, of which F. C. Way, vice-president Milwaukee Electric Railway, was chairman. This committee's report urged the necessity of employing designs, material and workmanship of first quality in overhead construction. It also recommended that all employees should report defects, and that overhead lines should be inspected at regular intervals. While the length and character of the overhead lines would govern the inspection intervals, the committee recommended the following general practice: Overhead lines carrying 7500 volts or over should be inspected every three months, lines carrying 1000 volts to 7500 volts should be inspected every six months, and lines carrying less than 1000 volts should be inspected once a year. Blanks should be provided for the use of inspectors so that their reports can be made a part of the company's permanent records.

In the discussion of this subject, W. E. Haseltine, Ripon; F. A. Vaughn, Milwaukee; P. H. Korst, Janesville; President Winslow and others took part. It was the consensus of opinion that each company not only should inspect its lines at regular intervals but should keep permanent records of such inspections so that they would be available to prove in a court of law the condition of the line at any time. It was stated that at the present time the Industrial Commission of Wisconsin was at work on standard electrical work, but it did not contemplate line inspection. It was therefore recommended that the association develop its own rules for overhead inspections and submit them to the commission for adoption. The report of this committee was received as representing progress, and its membership was continued.

A paper entitled "Voltage Regulation, Its Necessity and How Accomplished," by G. G. Post, electrical engineer The Milwaukee Electric Railway & Light Company, was presented following the discussion of the foregoing committee's report. This paper contained descriptions of the latest types of voltage regulation apparatus, and accounts of their operation and application to the small central stations. Following a brief discussion of this paper on voltage regulation, Prof. S. E. Doane, chief engineer National Electric Lamp Association, read a paper entitled "High-Efficiency Incandescent Lamps and Their Central Station Application." In a few preliminary remarks Professor Doane gave some valuable information on European methods of furnishing current to small consumers at a low cost. He also exhibited one of the new ½-watt Mazda lamps. A description of the lamp was given in the paper, which also contained a prediction of the ultimate effect of the lamp on the central stations.

The Friday afternoon session of the association was devoted to subjects largely of interest to street railway operators. Owing to the illness of Halford Erickson, member of the Wisconsin Railroad Commission, Madison, his paper, entitled "Some Problems of Public Utility Accounting and Rate Making," was read by F. W. Doolittle, special investigator for the commission. Following the presentation of this paper, President Winslow brought out the fact that but very few companies carried a depreciation fund. Some had reserve funds used for this purpose, but the usual shortage in net required that the managers use all the extra funds they could obtain to keep up the property. President Winslow predicted that ultimately the utilities would be called upon to produce some evidence of a depreciation fund, which, according to Mr. Erickson's recommendation, should contain one item made up of depreciation and maintenance expenditures.

Continuing the discussion, M. C. Ewing, general manager Wausau Street Railway, emphasized Mr. Erickson's theory of making rates as well as its relation to public opinion. He suggested that reprints of the paper be made and distributed to all the public utilities in the State, they in turn to give as much publicity to its contents as possible. Upon motion, the executive committee was instructed to have this and such other papers as it considered of sufficient importance printed and distributed to the member companies.

Following the report of the membership committee by Chairman M. A. Gurney, A. A. Gray, *Electrical Review* Publishing Company, Chicago, in the unavoidable absence of J. M. Wakeman, manager of the Society for Electrical Development, addressed the association urging its members to become members of the Society for Electrical Development.

The report of the nominating committee put in nomination P. H. Korst, general manager Janesville Electric Company, for president of the association; M. C. Ewing, general manager Wausau Street Railroad, Wausau, for vice-president; W. L. Hazeltine, Ripon, for second vice-president, and B. F. Lyons, Beloit, for third vice-president. George Allison, comptroller Clement C. Smith properties, was re-elected secretary and treasurer. The report of the nominating committee was adopted, and the secretary was instructed to cast a unanimous vote for the new officers.

George B. Wheeler, general manager Chippewa Valley Railway, Light & Power Company, Eau Claire, chairman of the committee on the president's address, recommended for the association's thoughtful consideration the appointment of a committee on associations to confer with the Wisconsin Gas Association in the matter of co-operation on legislative and other matters of common interest. This committee should be instructed also to consider whether or not a consolidation of the Gas Association and the Electrical Association into a general utility association would not be practicable and desirable. Chairman Wheeler's committee also recommended that a committee be appointed to investigate what had been done by utility companies in the way of rural extensions. The report of the committee on the president's address was adopted, and the president of the association was instructed to appoint the two committees as recommended.

MAINTENANCE COST OF OLD AND NEW MOTORS

Edward Taylor, General Electric Company, then followed with a paper on "Comparative Cost of Maintenance of Electrical Railway Car Equipment." Mr. Taylor pointed out that it would be fitting at this time to include an accurate, detailed statement showing the comparative cost of modern equipment against some of the older types, say on twenty to thirty roads, but this result was practically unattainable because most roads did not segregate the costs of individual types of motors. However, the few figures already accumulated proved that the higher maintenance cost of the older motors warranted their replacement by modern designs on an investment basis. Mr. Taylor then submitted the table on motor maintenance costs printed below.

This table showed that the saving of the GE-80 over the GE-1000 motor is 0.07163 cent per motor mile, assuming 40,000 motor miles per year, thus giving a saving of $28.65 per motor. Carrying the comparison still farther, the GE-216 motor saved in cost of maintenance over the GE-1000 $51.75 per year per motor. Now the GE-216 is not, strictly speaking, a modern motor. He estimated that a modern motor would have a maintenance cost of 0.006 cent per motor mile, or $2.40 per year per motor. The GE-1000 motor showed a cost of 0.15847 cent per motor mile, or $63.38 per motor per year. If $2.40, or the cost of yearly maintenance of a modern motor, was taken from the latter figure the annual saving would be $60.98.

COMPARATIVE COST OF MOTOR MAINTENANCE, AVERAGE OF FOUR OPERATING COMPANIES

Types of motors operated	GE-1000	GE-52	GE-67	GE-80	GE-216
Number of motors of each type	686	148	1390	720	1028
Number of armature defects, per year	1733	172	2967	1045	227
Number of armature defects per motor, per year	2.52	1.16	2.13	1.45	0.22
Average number of miles made per motor, per year	29,444	36,941	31,454	41,350	36,839
Average motor miles made per armature defect	11,656	31,780	1,473	28,490	164,569
Cost of repairs to electrical equipment, per motor mile	0.23169	0.21774	0.16372	0.12699	0.04252
Cost of repairs to motors only, per motor mile	0.14179	0.13326	0.10019	0.07772	0.02602
Cost of inspection to electrical equipment, per motor mile	0.04170	0.03919	0.02947	0.02281	0.00766
Cost of inspection to motors only, per motor mile	0.01668	0.01567	0.01179	0.00912	0.00306
Total cost of repairs and inspection to electrical equipment, per motor mile	0.27339	0.25693	0.19319	0.14980	0.05018
Total cost of repairs and inspection to motors only, per year per motor	$46.65	$55.01	$35.22	$35.91	$10.56
Total cost of repairs and inspection to motors only, per motor mile	0.15847	0.14893	0.11198	0.08684	0.02908

Note: The foregoing figures are in cents and fractions, except annual cost, as noted.

The modern equipment was lower in weight per rated horse-power than motors of the older types. Thus a GE-80 four-motor equipment of 160 rated horse-power per car had a total weight of 11,200 lb., whereas the later GE-200 four-motor equipment of the same rating would weigh 8800 lb.

It would, therefore be ultra-conservative to take 4 per cent as the reduction in weight by using the new equipments.

Assuming 0.14 kw-hr. per ton mile for the energy input, a 30-ton car would take 4.2 kw-hr. per car mile. With energy at 1.5 cents per kw-hr. at the car, the cost was 6.3 cents per car mile. The yearly cost at 100 miles per day for 360 days would be $2,268. On the basis of 4 per cent weight reduction, modern equipment would save $90.72 per equipment, or $22.68 per motor per year. The total amount saved by the adoption of the modern motor would be the sum of $60.98, due to lower maintenance, plus $22.68 on account of less energy input, or $83.66.

The cost of the new motor at $400 less the scrap value of the old motor at $40 left the new investment at $360 per motor. The interest and depreciation taken at 6 and 8 per cent respectively made a total fixed charge of 14 per cent, or $50.40 per year. If, from the total amount saved by lower maintenance and less energy of the modern equipment, the fixed charges were deducted, the final saving over all expenses would be $33.26 per motor per year, or on a four-motor equipment $133.64. Furthermore, up-to-date equipment would mean an incomparably better and more reliable service.

After urging that operators of old motors should keep records which would permit them to determine what savings new equipment could bring, Mr. Taylor discussed recent improvements in motor design, particularly those made in ventilation, commutation and field control. He also mentioned the use of wooden covers and individual blow-out coils in the new controllers.

MAINTENANCE OF ELECTRICAL EQUIPMENT

The next speaker was Clarence Renshaw, railway engineering department Westinghouse Electric & Manufacturing Company, who read a paper entitled "Modern Versus Old-Type Maintenance of Car Electrical Equipments." Mr. Renshaw compared repair and maintenance practice as the difference between winding up an eight-day clock every ninth day and every seventh day. Ten years ago it was the usual custom on electric railways to make hurried repairs on cars after they had broken down. Experience had shown, however, that it was much easier to replace a loose band before it comes off than to put in a new set of coils afterward. In one case where all but two cars on a system had been grounded because of slush and water it was found that the unimpaired motors had had a coat of insulating paint when lately in the shop for worn armature bearings. This experience showed that it paid to bake and dip armature and field coils at every overhauling.

Reliable operation meant the maximum earning power of a car. If such a car costs $6,000, interest, taxes and depreciation on it would usually amount to at least $600 per annum. Hence thirty days spent in the shop would cost $50 for these items alone. The loss of revenue would be much greater, however, as it would usually approximate $15 to $20 a day. It should not cost more than $200 a year to maintain the electrical equipment of a car, and even if this figure was increased 10 per cent to 20 per cent the total charge would be small in comparison with the interest charges and loss of revenue due to poor maintenance. When an old armature is damaged it might seem cheaper to repair it with only one or two new coils instead of completely rewinding it at, say, a cost of $20; but in a month or two the partly repaired armature was likely to get into trouble again, whereas the completely repaired armature would serve for years.

Another trouble of old-time maintenance was to examine and repair only the parts reported defective, but since a large part of the expense was merely for bringing the car into the shop it was wiser to put all of the equipment in first-class shape before sending it out again. Insufficient testing facilities were also a drawback which could be readily avoided because a.c. lighting was now available almost everywhere for short-circuit tests.

Shop conditions as to labor also had an important bearing. Good work must not be expected in a dirty and cold building without ample facilities. Reliable operation and economical maintenance, furthermore, could be secured only with intelligent men. By providing reasonable physical accommodations the railway could enlist a spirit of loyalty and enthusiasm. Economy in the use of materials would be fostered by posting the prices of the material used, and care in inspection could be often secured by showing the percentage of inspection failures. Railway shop records had proved of the greatest value in promoting the improvement of equipment by the manufacturer.

Mr. Renshaw did not believe that home manufacture of coils and other parts was good economy. In one case a large company had discontinued such manufacture because it found that careful attention to storeroom conditions readily compensated for the convenience and quick production of home manufacture. Again, the makers of railway equipment were now offering better service than ever before in supplying, in addition to complete spare parts, the same tapes, cloths, bearing metal, solders, paints, varnishes and other items which had been used in the original construction. New materials were also being brought out. One of the latest was arc cement by means of which arc barriers in controllers and switch groups may be repaired when burned through instead of being scrapped.

EXHIBIT AND BANQUET

In order that the members of the association might be advised of the work being done by the Standards Laboratory of the University of Wisconsin, working in conjunction with the electrical engineering division of the Railroad Commission of Wisconsin, exhibits of the various types of testing equipment and account forms were displayed. These exhibits gave evidence of the remarkable progress that had been made during the past year in the construction and operation of testing equipment. In connection with the exhibits the latest improved methods of testing meters, etc., were explained by representatives of the university and the Railroad Commission.

On the evening of Thursday, Jan. 15, the members of the association gave a theater party and informal banquet. At the latter function Ernest Gonzenbach, formerly president Sheboygan Railway & Electric Company, acted as tosatmaster, and C. E. Searles, of the Allis-Chalmers Company; S. A. Hobson, of the McGraw Publishing Company; C. F. Axford, Green Bay; P. T. Bowler; George Allison, secretary and treasurer of the association; L. E. Gould, business manager ELECTRIC RAILWAY JOURNAL, and George E. Wheeler, general manager Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., made brief addresses.

STREET RAILWAY TRAFFIC SURVEYS IN RELATION TO RAILWAY OPERATION, MANAGEMENT AND REGULATION

BY C. M. LARSON, CHIEF ENGINEER WISCONSIN RAILROAD COMMISSION

In general the type of traffic data required by the manager to assist him in the management of his properties is identical with the data required by the operating department and by the regulating body, whether commission or city council. The manager desires to obtain at all times as large a net income as possible from the system. This, of course, involves the highest possible gross earnings coupled with the lowest possible operating expenses. The responsibility of managing the property to conform to the public needs and requirements is always present, and the manager must meet all complaints relating to service and rates.

The commodity for sale by a street railway company is transportation. If the manager is to be sure that a maximum amount of this commodity is being disposed of, he must know how much business may be expected of each community and satisfy himself that the service supplied at all points within the zone of operation is such as to meet the demand for transportation in a reasonable and satisfactory manner. This involves a knowledge of the type of residents in each community, of their places of employment and of their riding habits in general. He must know that each community is receiving a fair treatment as compared with all other communities. If his operating ratio is high or low, he must know the reason for this condition. His financial statements will show what the condition is, but they leave the manager quite helpless as to what department is causing the condition or where the trouble lies and how it may be remedied.

DUTIES OF RAILWAY OPERATING DEPARTMENT

Upon the operating department falls the duty of preparing schedules to meet the demands of traffic with all its seasonal, daily and hourly variations. It is also the duty of this department to deliver the passengers to their destinations at the smallest expense consistent with reasonable service requirements. To this end it is necessary to know just how many cars should be operated to meet these requirements and just how to place them most advantageously. Furthermore, the zone of operation of each car must be so determined that there is a minimum of dead car mileage, especially at the ends of the lines. The people are served better and at lower cost if the equipment is operated only where and when needed, and unless the operating department is familiar with every detail relating to traffic conditions on each part of each line, it certainly cannot operate the cars at a high percentage of efficiency. Casual observations by employees are useful but hardly sufficient for the purpose.

DUTIES OF PUBLIC REGULATING BODIES

Upon the regulating body of to-day falls the duty of requiring that the service shall at all times be reasonably adequate and satisfactory for the community's requirements. This sentence alone conveys to such regulating body powers that are extremely broad and far-reaching. It means that schedules shall be made and operated in such a manner that each individual and each community shall receive just and fair treatment in the matter of service. It means that there shall be no discrimination between individuals or communities, but that the needs of each shall be considered from a perfectly unbiased point of view. It also places upon the regulating body the task of protecting the company's interests as well as those of the community, for in no other way can the service be kept adequate at all times.

There are fundamental defects in the principle of regulation of street railway service by a municipal council. Each member of the council is personally interested in obtaining certain results. No matter how honestly he may try to eliminate all such interests from consideration in his actions on service matters, he is but human, and furthermore he is the representative of a certain community whose special interests he is expected to enhance. He cannot ignore these interests. Again, he is not an expert in street railway operation or management. No matter how much he may desire to be consistent in his actions, the fact remains that he is necessarily ignorant of many of the principles involved. Even if experts be employed to advise the council, there still remains the condition recognized as fundamentally unjust the world over, namely, a judiciary body whose members are necessarily interested in the results of the decision.

Regulation also involves the reasonableness of speed of cars and of giving consideration to users of the public streets as well as patrons of the street railway. Reasonable facilities must be maintained for boarding, transferring, etc., and proper provision made for the comfort and safety of the passengers.

CHANGES IN OPERATING CONDITIONS AND PUBLIC ATTITUDE

It will be urged that everybody knows the duties of the manager and of the operating department, and that nothing unusual has been presented. This is true. It is not the purpose of this paper to point out to street railway men what their duties are, but let us see if it may not be possible to obtain results in management and operation which will justify the application of principles or processes not heretofore considered.

Let us trace the history of the operation of an imaginary street railway system in one of the larger cities of this country. Years ago a simple street car schedule was sufficient to meet the not too exacting needs of public travel. A schedule providing a certain time interval between cars for the day with a few additional cars for the rush-hour service was considered sufficient for all purposes. The demands of business were not then so exacting. People had more leisure. Street cars operated by power were such an improvement over previous modes of travel that the service supplied by the management was accepted and patronized without question. As time passed and it was found that the business was remunerative the man with political or personal influence soon made his appearance and through persuasion or similar means sought to obtain favor in service or rates to certain communities or localities in which he had interests. At first investigation of the company's condition convinced the management that these favors could be granted without serious financial results, but during the next few years these cases multiplied until the schedules and rates on certain lines were more the result of outside influence than of common sense and bore no semblance of consistency when compared with other lines. Furthermore, as certain lines were favored, others had to suffer to a corresponding extent in order that the ledger might show a balance on the right side, for such methods of operation very soon swept away all reserve. Naturally complaints soon began coming in of the crowded condition of the cars on some lines during certain periods of the day. To increase the service still more would further deplete the financial reserve, and besides inspection of operating statistics showed that already more cars were being operated by the company than appeared to be warranted by the operating income. Why should people be complaining about the service when so many cars were being operated in comparison with the number of persons desiring to ride on them?

Sometimes the manager even pointed out to those making complaints that his cars were operating at a loss during a large part of the time. He had no control over the actions of his patrons, and if they chose to ride all at one time and not make use of the service as he supplied it, how was he to be blamed for the inconvenience they might suffer?

Something had to be done, however, and often additional service would be supplied though the result was financial loss. Already agitation for some kind of regulation that would compel the company to render better service was beginning to be felt. This agitation became more and more pronounced as years went by.

The American public began to awaken to a need for saving time. "Time is money" became the slogan, and of course the street railway company was immediately called upon to assist in conserving the public bank account by reducing the waste in time. Demands for better service became more and more insistent and were soon coupled with demands for lower rates. Step by step the public came to accept the theory that public utilities, including street railways, are to be considered as servants of the public, and as such should be required to give reasonable and adequate service at the lowest rates consistent with such service. The various stages of development which have resulted in this general attitude need not be discussed here. It is a well-known condition, widespread at the present time. It is sanctioned by legislatures and courts and must be recognized in any study of the subject of service. Attempts to evade this issue are likely to result simply in more and more drastic legislation until regulation satisfactory to the public is obtained or until the utilities become public property.

Now to revert to the example of a street railway above mentioned. The manager at present finds himself surrounded by conditions as above described. He is confronted with the public demands on one side and a growing deficiency in his finances on the other side, a condition that is certain to result disastrously unless some relief is obtained. The old-time methods of old-fashioned physicians are not adapted to modern treatment of diseases, especially of modern diseases. The trouble with the street railway is that it is still suffering from an old complaint which old methods could not entirely cure, and to complicate the case an entirely new disease has now attacked it and new methods of diagnosis and treatment must be employed.

SCIENTIFIC METHODS

Fortunately parallel with the development of exacting demands relating to service and rates has been the development of scientific methods of management in many lines of endeavor. Public utilities have been well to the front in this development along with other industries now recognized as private, as distinguished from the quasi-public industries of which the street railway is a member. The latter, however, has hardly kept pace with other utilities in the development of scientific methods. The man who stated that the railroads of the United States were wasting a million dollars a day may or may not have stated a fact, but he echoed a sentiment broadcast throughout the country for conservation of energy and elimination of wasteful methods. No longer may the losses incident to the too generous treatment of one locality be shifted upon another community not so able to protect itself. No longer may the public be burdened with losses resulting from the ignorance of managers or operators, or from the application of old-time methods that have no place in modern industry.

The modern manager has at his disposal the means of obtaining exact data relating to traffic conditions and service requirements for every part of each line under his control. If he so desires, these may be plotted into charts that will show at a glance to any intelligent person just how one particular community fares compared with any other. These charts show him just where the operating department is wasting the company's money and why certain lines are operated at a loss when people are constantly demanding better service. By reference to them he discovers that his patrons are not so unreasonable as he had supposed. True, he finds from his operating report that he has operated 2000 car miles a day over this line, that considering the revenue and expense of operation there is no profit in operating this line, but upon a closer inspection of the chart he finds that a very large percentage of the cars have been running at a time of the day when nobody needs them or cares particularly whether they are operating or not. Simultaneously he discovers that during a correspondingly long period of the day a great many more persons were desiring to ride than he has been providing for. He observes that a uniform schedule has been operated all day with additional cars during the rush periods, while as a matter of fact more than twice as many people ride in the afternoon as in the forenoon. He also discovers that a very small proportion of his patrons live within a mile or two of the end of the line while his cars have all invariably gone entirely to the end to make the turn, with a consequent large number of car miles operated to little useful purpose. His charts also show him that often there are relatively long periods when no service whatever is supplied, when interruptions have occurred. He may have been informed of this by the operating department, but its real significance is only shown when plotted in this form.

MAKING THE DIAGNOSIS

When a person is seriously ill the physician often discovers the causes to be relatively trivial matters which the uninitiated would not in any way associate with the disease.

It is the opinion of the writer that many of the real causes for complaint of street car service are the lack of attention on the part of the officers or employees of the operating companies to seemingly unimportant details which would represent little or no cost to the company or effort on the part of the employees, but which are doubly trying on the public. Most of the patrons are business men and recognize the practical limitations to perfect service, but, being business men and good business men, they also recognize the lack of business judgment displayed in not trying to please the public when it costs little or nothing to do so. They know that it costs money to run additional cars and they know that it costs money to keep track and equipment always in good condition; but they are equally certain that it does not cost the company anything to extend certain courtesies which they have a right to expect and which are invariably extended to the patrons of their own business who can transfer their patronage if they so desire. A person does not resent riding in a well-filled car so much if he feels that the company is honestly striving to make him as comfortable as possible and is always willing to listen to reasonable suggestions.

Rule No. 55 of the American Electric Railway Association reads as follows:

"*Information to proper persons only:* Motorman or conductor must not under any circumstances give any information whatever concerning any accident, delay, blockade or mishap to any person except to a properly authorized representative of the company."

The committee of this association which is revising the old rules recommended that the following sentence be added:

"Conductor may when necessary advise passengers as to general cause and probable duration of a blockade."

This additional sentence was voted down by the convention at Atlantic City in October, 1913. If there is any reason for such action other than careless disregard of public interests and convenience or a premeditated desire to annoy patrons who have no choice but to take what they get, I have yet to hear it. On many occasions when the employees know that a blockade will last for a considerable time, if they would tell the patrons the facts it would save a great deal of annoyance and loss of time. This is simply a sample of rules and practices which operating companies direct or permit their employees to follow which have no other result than to convince the public that their interests receive small consideration at the hands of the street car company.

Most of these minor items are of such a nature that it is quite impossible to bring them to the attention of the proper regulating authorities, and their accumulation finally engenders in the mind of the public a feeling that the street railway company has something coming to it. A blow is therefore struck at the only vulnerable spots, namely, service or rates or both.

But to return to the subject in hand. Enough has been said to convey an idea of what is necessary in the way of an investigation to determine what is wrong in the case in question. If the system is of considerable size, a traffic study department should be established under the direction either of the manager or the operating officer. If the system is small, this officer may himself have direct charge of the details of the work provided he is thoroughly familiar with the nature and scope of the investigation to be made. This department should not be a spasmodic affair, dependent for its existence upon a shortage of work in some other department. It should be permanent and should be prepared to supply to the manager or operating department reliable information of traffic conditions for any season, day or hour and upon any point of every line.

There are, of course, more ways than one in which data of this kind may be collected, and the method best adapted will readily suggest itself to each company, but in whatever way this is done its collection should be under the direction of the head of the traffic study department in order that results may be consistent and trustworthy. Checks of accuracy should often be made and the men who take the data should receive thorough instructions in the methods which are best calculated to insure accurate results. It is usually desirable to record all data in bound pocket field books, though printed cards may be substituted if desired.

CHARACTERISTICS OF EACH LINE

It is common knowledge that ordinarily there is a certain point on each line near the beginning of the discharged area where the number of passengers on the cars is usually a maximum. This point is approximately the same for travel in both directions and should be determined quite accurately as this is the point at which future observations will be made which will determine the number of cars necessary for operation of the line during both the rush and the non-rush periods.

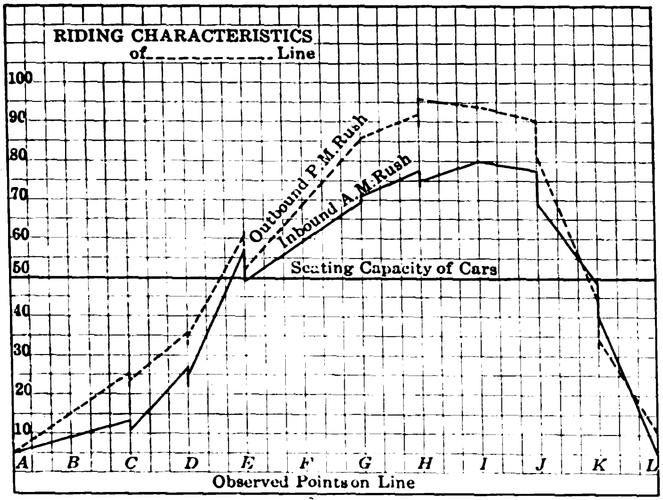
Other critical and important points along the line are those where the number of passengers is so small as to justify the termination of part of the service at these points. In collecting these data a count of all passengers on all or a large proportion of the cars on the line should be made at predetermined points at intervals of a few blocks. A count at every block would be preferable in some respects, but this would require the presence of a man in addition to the conductor, while if the count is made only at intervals of several blocks, the conductor can usually do this in addition to his other duties, except perhaps on heavy lines or during the busiest periods of the day. The count should cover a long enough period to obtain normal results with twenty-four hours as the minimum.

The figures thus obtained can be tabulated or plotted as shown on the accompanying Fig. 1. This plate shows the typical curve for the heaviest period in the morning and the same for the evening. On this plate is drawn a horizontal line showing the average seating capacity of the cars, and it will be noted that with a complete set of such charts it is a simple matter to determine the point of maximum load and the points at which part of the service might be terminated. This latter determination cannot, of course, be made upon a study of the chart alone. A general knowledge of the riding habits of the residents in the neighborhood together with a careful study of transfers and transfer points must be coupled with the predetermined standards of service before such a point is finally established.

By use of the data thus collected it is also possible to obtain a fairly accurate estimate of the average distance passengers are hauled for a single fare.

MAXIMUM TRAFFIC RECORDS

Having determined the point on the line where traffic is heaviest, accurate counts should be made covering a period of several days to insure normal results. For this purpose it is desirable to station trained checkers at the point in question with instructions to collect the following information for each car in both directions, the data for each direction being kept separately, preferably on opposite pages of a notebook: (a) route on which the car is operating, (b) destination, (c) origin when possible, (d) run number when possible, (e) car number, (f) arriving or leaving time, (g) total number of passengers, (h) such other information as is desirable.

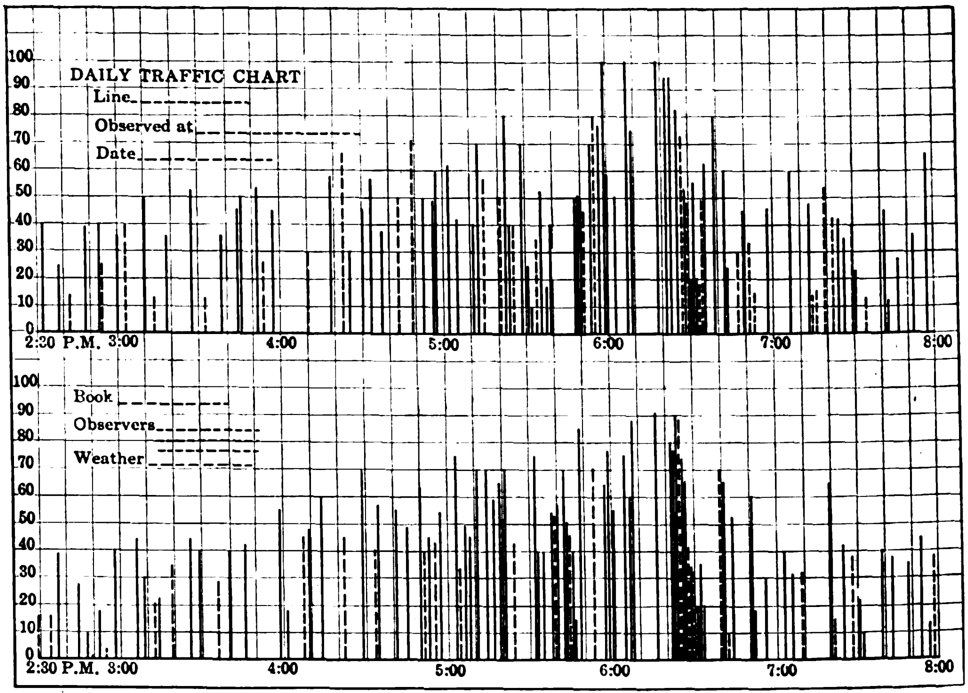


Electric Ry. Journal

Fig. 1—Variations in Traffic Density at Several Points on a Line

The field book should be ruled in columns with proper headings, and in case the cars come too often to permit of collecting all the data only such as is positively necessary should be required; but in no case should a car be permitted to pass without a note to that effect even though no data are taken.

It has been found that if the checker is familiar with the seating capacity of all types of cars he readily becomes efficient in estimating the total number of passengers, basing his estimate on the relation between the vacant seats and those occupied, or upon the total number standing added to the seating capacity, after satisfying himself that all seats are occupied. Usually two checkers can cover one point for the entire day, but in cases of very heavy traffic assistance is needed during the rush periods. The data thus collected should be turned in for tabulating or plotting at the end of each day if possible, and any irregularities in schedule should be followed up and causes noted.



Electric Ry. Journal

Fig. 2—Intervals Between Cars of Different Routes as Represented by Full and Broken Lines, and Variations in Their Loads

Weather conditions are important and should always be noted for all parts of the day, and note should always be made of any abnormal occasion such as ball games, park music, etc., which might affect the normal riding characteristics.

Having obtained the data from the checkers, this information may either be tabulated or plotted in the form of a curve or chart with all necessary notation to insure a true record of all pertinent facts. While to the engineer the latter method is usually desirable, others may prefer that the results be put in tabular form. These results may either be plotted by single days or the average of the total number of days observed may be included. In plotting each day's results it is desirable to represent the number of passengers on each car by a vertical line drawn from a base and to space these lines to represent the time interval between cars. Cars bound for different destinations, or originating at different places, may be represented by different types of lines as desired. Such a chart is shown on the accompanying Fig. 2 and represents part of the actual observations for two days on one of the lines in Milwaukee. In plotting the average results obtained over a number of days it is necessary to average the number of passengers by short periods, preferably of fifteen minutes, and to represent the average number of passengers per period by a horizontal line extending across the space allowed for each period. Such a chart is shown on the accompanying Fig. 3. which is the average for several days on the same line as is shown on Fig. 2. Upon this same chart can then be plotted the average number of seats furnished by the operating company during the corresponding period, and, if desired, the number of seats required according to any predetermined standard can also be plotted on this same chart. Here, then, will be a complete record of the traffic, the service rendered, the service required and such other miscellaneous data as bear on the case. Obviously this record is applicable to conditions for a certain season only. Such a record is necessary for week days, for Saturdays and for Sundays, as well as for other seasons of the year when the traffic is not of the same magnitude. There are, of course, variations in the traffic due to temporary weather conditions. These can usually be determined by general observations and the necessary steps taken for the required variations in the service.

Similar observations should be made at such points along the line as may be determined by circumstances. The principal purpose of these latter observations would be to furnish a basis for turning of cars which it is not necessary to operate the entire length of the line. The plotting of the data will be made in the same way as described for the point of maximum riding.

STANDING BY PREFERENCE

Standing by preference may refer to two different sets of riders. Certain persons may prefer to stand in a car the seats of which are all taken rather than wait for a possible seat in a car following. There are also certain persons who prefer to stand even though seats are available, provided they are permitted to ride in either the front or the rear vestibule. The proportion of last-described passengers is quite large on certain types of equipment, especially if smoking is permitted in the vestibules and prohibited in the body of the car. As this preference may have a bearing on the amount of equipment necessary for satisfactory service, it is essential that checks be made. This can be done by careful count of persons standing when part of the seats are vacant, observing at the same time the total number of passengers riding, for the purpose of obtaining a percentage. The number of seats in the car must also be recorded as the ratio of persons standing is affected to some extent by the number of seats vacant. Recent observations have shown that for cars with cross seats the ratio increases quite suddenly when about 50 per cent of the seats have been taken; that is, when there is an average of one person on a seat which normally is large enough for two. It is highly important that a complete description of equipment, company rules, etc., which in any way affect this habit of standing must accompany any data of this sort, for it is obviously useless, for instance, to expect to find persons standing by preference on a closed car on which smoking is prohibited and where passengers are never permitted on the front platform and only on the rear platform when the body of the car is so full that no more can enter.

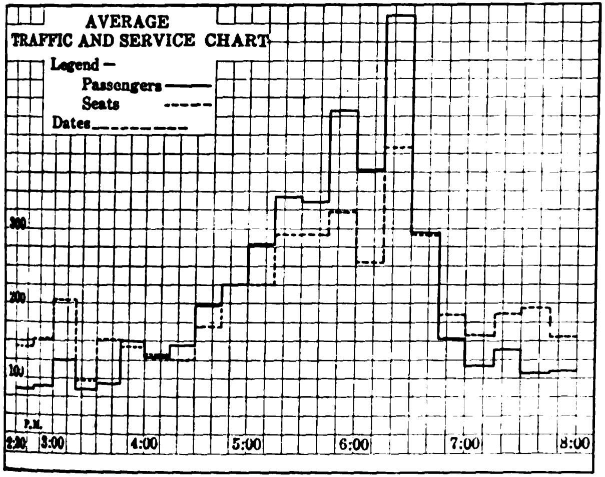


Fig. 3—Relation Between Passenger Travel and Seating Capacity Throughout the Day

USES FOR TRAFFIC DATA

It is not necessary here to go again into detail as to uses to which these data may be put. Too many schedules have been made in the past on anything but scientific bases. As stated above, the results demanded of the present-day manager will no longer permit him to operate his railway by rule of thumb. The public is an interested party on one side and the manager, representing the interests of his stock and bond owners, is the interested party on the other side. Both must be recognized, and in order that full justice may be done to all, and that modern conceptions of the necessity of using all known means for the avoidance of waste and loss may rèceive due consideration, modern and scientific methods should be used to determine what is fair as between the parties directly interested, and what most nearly conforms to modern ideas of true economy. With the data collected and tabulated or plotted in serviceable form the manager or operating officer will at all times know whether or not he is doing justice to the position he holds. He will so regulate the service that there need be no appeal to a regulating body with the consequent long and expensive investigation, and if such appeal should be made he is in excellent position to present the facts and reduce the investigation by a corresponding amount.

As a sample of a schedule made up to give service as required and still avoid dead car mileage the following table shows the variations in headway on the Court Street line in the borough of Brooklyn, New York City, as taken from the testimony of George L. Fowler before the Railroad Commission of Wisconsin, May 6, 1912:

Time	Headway, Minutes
5:00 to 5:36 a.m.	7.2
5:36 to 5:48 a.m.	6.0
5:48 to 6:00 a.m.	4.0
6:00 to 6:18 a.m.	3.0
6:18 to 6:52 a.m.	2.0
6:52 to 9:00 a.m.	1.6
9:00 to 9:12 a.m.	3.0
9:12 a.m. to 3:26 p.m.	4.0
3:26 to 4:00 p.m.	3.0
4:00 to 4:30 p.m.	2.0
4:30 to 6.12 p.m.	1.6
6:12 to 6:26 p.m.	2.0
6:26 to 7:00 p.m.	3.0
7:00 to 8:00 p.m.	3.2
8:00 to 11.00 p.m.	6.0
11:00 p.m. to 12:50 a.m.	15.0
12:50 to 1:08 a.m.	18.0
1:08 to 4:28 a.m.	20.0
4:28 to 5:00 a.m.	16.0

TESTING FOR SEAMS IN A HYDROELECTRIC PLANT FOUNDATION

As a preliminary to foundation work in a new hydroelectric project near Augusta, Ga., test holes were drilled to determine the character of the granite ledge on which the dam was to be built. To determine the extent of seams in the rock dye was forced in under pressure, the color showing wherever there was a flaw in the stone. This method proved very satisfactory in that the character of the ledge was known in advance, and this prevented unnecessary drilling and excavation. The tests disclosed the presence of several dangerous, smooth, horizontal seams, to which it was necessary to excavate the ledge in order to prevent possible uplift and sliding of the dam. These test holes, as well as any other holes where necessary, were grouted under 100-lb. air pressure before construction commenced. In addition, to prevent possible sliding, trenches were cut in the ledge. It is believed that by these methods a very secure foundation was obtained at a minimum cost.

Stockholders of the Bahia Tramway, Light & Power Company, Bahia, Brazil, have received a circular announcing that the municipality has no immediate prospect of raising funds to carry out the terms of the offer made last June for the purchase of the company, which was approved by the holders of the debentures. A provisional contract has been entered into between the directors of the company and the municipality, providing for an issue of external gold bonds, the proceeds to be applied to the payment of the amount due the debenture holders under the previous contract.

Papers Read Before the American Wood Preservers' Association

The Annual Meeting of the American Wood Preservers' Association Was Held in New Orleans Jan. 20, 21 and 22 —Abstracts Are Presented of Papers of Interest to Electric Railways

STUDIES OF EXPERIMENTAL TIES

J. H. Waterman, superintendent of timber preservation Chicago, Burlington & Quincy Railroad, read a paper entitled "Some Facts Which I Have Gathered from Observation and Inspection of Experimental Ties." Four years' observation of 26,000 ties on his system treated with various processes still did not permit him to state which of the methods was best. The treatment must be such that it would keep the tie sound just as long as it was fit mechanically. In 1900 550 red oak ties treated with zinc chloride had been placed on a 12-deg. curve of the Deadwood line near Mystic, S. D., and no tie failures occurred on it until after twelve years' service. Eighteen were taken out during 1912 on account of rot and three were taken out for laboratory tests. He had no doubt that 80 per cent of the ties would give more than fifteen years' service. Equally good results had been obtained with pine ties laid on 14 miles of track between Sydney, Neb., and Petz, Col., in a very dry climate. All ties had been treated at the company's plant with ½ lb. of zinc chloride per cubic foot. Only the ties on curves were protected with tie plates. On 10 miles of track between Concord and Jacksonville, Ill., 35,000 red oak ties treated with zinc chloride had been placed between Nov. 15, 1903, and Feb. 5, 1904. Of these ties 21,000 were still in service, more than 90 per cent giving nine years' life and 60 per cent ten years' life. Many of the ties which had been taken out were not decayed but were simply worn out mechanically because they had not been plated when laid. Mr. Waterman did not assert that the zinc-chloride treatment was the only good one but said that it had proved very satisfactory to his company. He believed that it was a crime to use inferior wood without treatment of some kind.

SPECIFICATIONS FOR WOOD PRESERVATION

E. L. Powell, vice-president American Creosote Works, described "Treatment of Piling and Timber According to Conditions of Use and Exposure." He believed that wood preservation specifications should be drawn up in closer co-operation with the wood-preserving company than was now the case. The wood preserver should control treating methods at least to the extent of seeing that no material was treated under improper specifications and that the conditions under which the material was to be used had due thought. It was dangerous for engineers to follow printed specifications which in most cases had been drawn up for different climatic conditions.

YALE FOREST SCHOOL

Samuel J. Record, assistant professor of forest products Yale University, described the work of its forest school. At this time there were 170 technical men in the United States Forest Service who had received their training at Yale. The school conducts field work not only on its own land in New Haven but in a number of forests owned by others throughout the country. The field work at New Haven is conducted on the lands of the New Haven Water Company, which comprise 9000 acres. Part of this property has been under management by the school since 1900, so that good illustrations of what forestry will accomplish are already available. As indicating the wide variety of conditions under which the students obtain their training, Professor Record said that the class of 1913 had its final field instruction on the lands of the Southern Lumber Company, Warren, Ark. The work was divided as follows: classroom, 658 hours; laboratory, 354 hours, and field work, 1238 hours. The school did not undertake to train the men specifically for the wood-preserving industry but did give consideration to this subject so that its graduates would have entire sympathy with its objects.

CREOSOTED WOOD-BLOCK PAVEMENTS

R. S. Manley, president Creosoted Wood Block Paving Company, New Orleans, La., discussed "The Construction of Creosoted Wood Block Pavement." The objection to the stickiness of bituminous filler in warm weather was groundless because the proper filler had the consistency of rubber and could be taken and bent in the fingers without soiling them.

THE PROTECTION OF TIES FROM MECHANICAL DESTRUCTION

Howard F. Weiss, director Forest Products Laboratory, presented a paper on "Protection of Ties from Mechanical Destruction." Many varieties of wood and metal plates had been advocated to protect ties. Wooden plates were rather extensively used abroad, but so far American tests had not been satisfactory. Wooden plates offered little or no reinforcement to spikes when these were subjected to a lateral thrust; consequently the spikes were more likely to bend and rail spreading was more likely to occur. In some tests where wooden plates were attached to the ties they actually became embedded in them. If the tie was slotted so that the plate could be inserted with its upper surface level with the top of the tie, many of the objections would be overcome, but this treatment increased the cost of preparing ties for service and also weakened them. Metal plates could be classed as of the pronged or ribbed type and flat. The chief disadvantages of the former was its tendency to gouge into the wood and at times to destroy it completely. Thus, the untreated interior of the tie was exposed to the weather, and decay was readily admitted. Flat plates did not have this objection but were troublesome at times in that they became loose and rattled under the rail. Furthermore, they simply rested upon the tie and offered no reinforcement to the tie against lateral thrusts. One point which had been overlooked was that the size of the plate should be dependent upon the kind of tie with which it is used. The plate should have sufficient surface area so that the crushing action of the rail would be distributed as widely as possible, and it should have sufficient thickness to prevent buckling. That track was best laid which made each tie carry its proportionate share of a passing load.

The Forest Products Laboratory had made more than 2000 tests on about seventy species of timber to determine their resistance to crushing when the force was applied at right angles to the ground. The tests made with green wood showed that variations of 20 per cent in the strength of some species of wood were not uncommon. The tests also showed that except in the cases of ties treated with crude oil the preservative process had little effect on the strength of the timber, assuming, of course, that the ties were not injured by excessive heating or other causes during treating.

While the cut spike was still the most used, the screw spike was growing in popularity. In many tests made at Purdue University, some of which were conducted by the Forest Service, it was found that screw spikes had from one and seven-tenths to three and four-fifths times the strength of common cut spikes against pull, and from one and one-fifth to two and two-fifths times the lateral resistance of the common spike. In round numbers, one screw spike was about as efficient as two cut spikes in holding the rail to the tie. Screw spikes, of course, did not injure the fibers of the wood the way that cut spikes did. The large number of ties cut from several woods like loblolly pine had encouraged some roads to experiment with dowels made of creosoted red oak and screwed into the tie. The spike was then driven or screwed into this hardwood dowel. This method insured a very firm grasp of the rail to the tie. Should the spike become loose, the worn hardwood dowel could be unscrewed from the tie and a new one inserted. This method was expensive and also tended to weaken the tie if the ballast was not kept in very good condition. However, the practical tests had yielded very satisfactory results.

The adzing and boring of ties were features of comparatively recent origin in this country. As most cross-ties now in use were hewn, the problem of securing a uniform bearing of the rail or tie-plate on the tie was of great importance. Unfortunately common practice consisted in adzing such ties after they had been treated. This removed a preserved layer of wood at the very point where its protection was most needed. For best results it was absolutely essential to have the rail or tie-plate bear uniformly on the tie, and unless the ties were adzed, this result was rarely accomplished. Adzing, therefore, was strongly recommended, particularly on hewn ties. The proper time to adze was before the ties were treated, and not after. Another feature, in too little use at present, was the boring of ties for the installation of spikes. When screw spikes were used it was absolutely essential to bore a hole for their insertion. If this hole was bored after the tie was treated, the unprotected interior was exposed to decay. Boring should preferably be done before the ties were treated. Even with the ordinary cut spike such boring was of direct value. Mr. Weiss submitted a table showing that spikes driven into a hole ⅜ in. in diameter had a greater holding power than spikes driven into the untreated red oak tie not bored; thus, an ordinary 9/16-in. square spike driven without boring had a resistance to pull of 7613 lb., while a smaller spike pointed on four sides driven in a bored hole ⅜ in. in diameter had a resistance to pull of 8178 lb. This proved that when a spike was driven into a bored tie the fibers were not crushed as much as when no boring had been made.

FUTURE TIE MATERIAL IN THE UNITED STATES

H. H. Gibson, editor *Hardwood Record*, Chicago, offered a paper entitled "Future Tie Material in the United States." He said that even if the demand for new tracks was ignored the call for ties for repair work would continue and must be met. Seven cross-ties were used for maintenance for every one that went into new lines. Of the 126,155,000 ties bought by steam and electric roads in 1911 only 11,041,324, or 8.2 per cent, went into new construction. In round numbers, 125,000,000 cross-ties were needed yearly. This was equivalent to 4,000,000,000 board feet, and ties cost the railroads approximately $15 per 1000 ft. B.M. Practically the entire quantity was cut from nine or ten kinds of wood, chiefly oak, pine, Douglas fir, cedar, chestnut, cypress, tamarack, hemlock and redwood. Specifications sent out by the principal railroads listed seventy-eight varieties of wood as acceptable for ties, but many of these were simply subdivisions of the oaks and pines. The forests of the United States contained more than 500 species of wood, but by far the greater number of them were unfit for tie service. Of the present cutting for ties, one-half was oak and about one-half of the remainder was pine. Both white oak and Southern yellow pine, the chief sources of ties, were being cut faster than they could be renewed. Much Northern white cedar remained, but its growth did not half make good the cut, and any increased demand would quickly bear results in lessened supply. The same fact held for hemlock and tamarack. Chestnut was a substantial tie material, but was now passing through a crisis on account of the blight. Douglas fir, Western yellow pine and redwood were not available for most roads because the wood was needed for other purposes, and the cost of hauling it 2000 to 3000 miles would be prohibitive. Railroads must find ties nearer home if possible. While it would be many a year before railroads would be unable to get some kind of ties if they were willing and able to pay the price, the time was not far off when the manner of providing ties would need radical revision. This revision had already begun. Its basic principle did not consist so much in searching for new woods as in treating with preservatives the old woods to make them last longer. The suggestion to use the semi-tropical hardwoods of southern Texas and Florida had been honestly made but gave no consideration to the fact that ties piled along the Rio Grande or on the southern coast of Florida are a long distance from the places where they are needed. Furthermore, all of the semi-tropical woods from Key Largo, Fla., to Devils River, Tex., would hardly make enough cross-ties to last the railroads of this country one year.

Some of the country's leading railroads had anticipated tie shortage some years ago and had undertaken to plant trees and grow the necessary timber. The move was commendable and deserved better success than attended it. In the first place, not enough planting was done to make a drop in the bucket, even if all the trees had prospered. However, in the East the planted locust was eaten up by beetles, and the chestnut was threatened or attacked by blight. In the South the catalpa was a fizzle, and the eucalyptus plantations on the Pacific slope were still in the experimental state. The reasonable thing to do was to treat all cross-ties with preservatives to make them last longer. By doing this the demand could be cut down nearly one-half. Preservative treatment had been tried and had proved satisfactory. In 1912 the United States had 112 treating plants, of which twenty-two were operated by steam railroads. In 1911 31,141,231 cross-ties were treated in the United States. Of this number 11,606,392 were Southern pine, 9,433,002 oak, 3,628,706 Douglas fir, 1,789,026 Western pine and 1,182,095 gum. A practically worthless tie wood like gum, beech, elm, white pine, sycamore and hickory made good ties after being passed through the preserving tanks. In this direction lay the hope of the situation, because ties could be made of timbers heretofore regarded as scarcely worth cutting. Very soft woods, like buckeye, aspen and white pine could be used for ties if plates were added to prevent rapid wear. Viewed in this light, the situation was not particularly discouraging because a practically clean sweep could be made of all ties in a tract, provided they were of suitable size. Some of the species which held out promise as sources of ties because they grew rapidly, reproduced readily, took preservative treatment easily and had extensive ranges were loblolly pine in the South and white pine in the North, willow oak in the South and red oak in the North and the cottonwood and willow in the South and Middle West. These were not the only woods but they were important. In the far West the tie problem was not serious, but nevertheless preservative treatment was as essential there as in the East. It might be safely predicted that before many years few untreated ties would be laid anywhere in this country.

METHODS OF KEEPING TIE RECORDS

E. T. Howson, engineering editor *Railway Age Gazette*, presented a paper on the "Methods of Keeping Tie Records." He gave a tabulation of the methods used by twenty-eight steam railroads. Owing to the difficulty of securing accurate records of all ties from the average section foremen, it was becoming generally realized that a more accurate system of collecting data was necessary. The Chicago, Burlington & Quincy Railroad was the first to discontinue keeping a record of all ties and to substitute test sections with ties properly marked and inspected at regular intervals by competent men. On the Santa Fé system the monthly report of all ties renewed on similar test divisions had been made since 1910, and every three months an inspector from the timber-treating department examined all ties removed from such sections, in addition to which he made a close annual inspection of all ties on these divisions. Special care should be taken to secure No. 1 ties for test sections. It was also advantageous, though not essential, to place 100 ties of each kind together so that records would be at once available in terms of percentages and at the same time no one set of ties would be required to carry a portion of the load of other kinds of ties which might fail early.

The most common means of identification was by the use of large-headed dating nails, where the only record kept was that of the date of installation. In some cases the shape of the nail head had a special meaning; thus, on the New York Central & Hudson River Railroad, nails with square heads indicated ties treated in the company's plant while those with circular heads indicated ties treated elsewhere. The nails were also placed in a variety of positions. One of the earliest methods of marking ties, which was returning to favor, was the hammer stamping on the end. From 1885 to 1900 the Santa Fé Railroad used a branding hammer, and within the past two years air hammers had been installed on the adzing machine in the treating plant of the Delaware, Lackawanna & Western and the Philadelphia & Reading Railroads so that the ties were stamped as they were adzed before treatment. Various symbols were used to indicate the weight of rail, kind of wood wanted, etc. While the end stamping was not visible without moving the ballast from the end of the ties, it was superior to the metal dating nail in remaining legible for the full life of the ties provided the latter had not been mauled by tools.

OTHER PAPERS

"A Comparison of Wood Paving in European Countries and the United States" was the title of a paper read by S. R. Church, manager research department Barrett Manufacturing Company. The different conditions made a real comparison impossible, but he emphasized the points that in the United States greater care should be used in preparing the concrete foundation and that deeper blocks were desirable. The sealing of the pavement joints with coal tar pitch to prevent the entrance of moisture had proved so satisfactory in England that it was universally used there. England had both soft-wood and hard-wood paving, but the latter, which was ordinarily laid untreated, was going out of favor rapidly, because it was usually rough and noisy. These hard-wood pavements were the Australian Jarrah and Karri species of the eucalyptus. Their uses had unquestionably proved a failure.

J. B. Card, manager Chicago Creosoting Company, presented a paper on "New Type of Paving Block Plant."

R. H. White, president Southern Wood Preserving Company, Atlanta, Ga., discussed the savings obtained by piling creosoted wood blocks closely in cages.

F. J. Angier, superintendent timber preservation Baltimore & Ohio Railroad, discussed "Air Pumps Versus Hydraulic Pumps for Injecting Preservatives Into Wood."

Clyde H. Teesdale, Forest Products Laboratory, Madison, Wis., presented a paper on "The Effect of Varying the Preliminary Air Pressure in Treating Ties Upon the Absorption and Penetration of Creosote."

Lambert T. Ericson, assistant superintendent Port Reading Creosoting Plant, discussed "Mechanical Handling of Railroad Cross Ties and Timbers at Timber Preservation Plants." Mr. Ericson showed by illustrations and cost figures that flat cars equipped with cranes were very desirable for this work. Each car held an average of 190 standard ties which were loaded in slings of thirty or sixty, according to the height of the piles and the size of the stacking crane. The slings were picked up and landed on the piles. They were then lifted off by hand at a piece-work rate. The crossties were placed in rectangular piles 51 ft. long, perpendicular at each end to an average height of 25 ft., and contained usually 1850 ties. The switch timber was either piled with the lengths varied, and all running one way, to an average height of 21 ft., or was lifted on to the ground by the crane, sorted into lengths by hand, made into slings and then picked up by the crane again and put on the piles.

Robert E. Prince, Forest Products Laboratory, Madison, Wis., presented a paper on "Preliminary Work in Fireproofing Wood." Ammonium salts were of great value in fireproofing wood, as it was found impossible to ignite wood treated with them. Borax was of somewhat less value but promised a means of lessening the cost of treating by using it with another salt of greater value. From the good results already obtained it appeared possible to devise a reasonable, inexpensive method of rendering wood fire-retarding. The present report was purely of a preliminary character. Further work was now being conducted by the laboratory to determine the least amount of each fireproofing agent necessary to accomplish the desired results, and it was also investigating new fireproofing compounds.

SHORT SUBWAY FOR CHRISTIANIA

The Holmenkol Railway, Christiania, Norway, which operates a 4-mile, 600-volt d.c. line to a suburb is now constructing a 1¼-mile extension as a subway from 65 ft. to 100 ft. below the street surface. The franchise was granted in January, 1912, for a period of sixty years, and work was begun in May, 1912. Ultimately the tunnel will consist of two single-track sections, each entirely independent. Only one of the tunnels is under construction. About 75 per cent of the work is through stony ground and the rest through clay. The tunnel is being constructed as a reinforced concrete arch. The ties will be of creosoted wood on broken stone, and the rails will weigh 70 lb. per yard. In the tunnel current will be taken from a third-rail but from the trolley elsewhere. The signals and switches will be electro-pneumatically operated. The cars will be 50 ft. 6 in. long and 10 ft. 10 in. wide. Their normal capacity will be eighty and their rush-hour capacity 180 passengers. Each car will weigh about 60,000 lb. and carry four 64-hp motors with multiple-unit control. Electro-magnetic track brakes, as well as hand and air equipment, will be provided because of a 5 per cent grade on one of the outlying sections.

Suburban Fare Zones on Milwaukee System

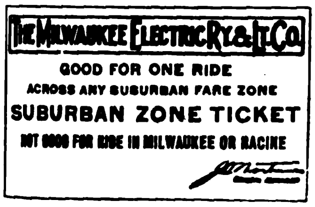
Suburban Territory in Milwaukee District Is Divided Into Fare Zones by Order of the Railroad Commission of Wisconsin—Rates in Suburban District Will Be 2 Cents a Mile with Minimum Fare of 5 Cents

As mentioned in last week's issue, the Railroad Commission of Wisconsin has established for the suburban territory of The Milwaukee Electric Railway & Light Company a zone system of fare charges and collections.

At the same time the commission readjusted the system of fares on the extensive interurban lines of the company, doing away with the old basis and the discriminations and inequalities it contained, and substituting therefor the mile basis of rate-making, with a charge of 2 cents per mile. The new rates became effective on Jan. 18, 1914. The commission left the Milwaukee city fare points and the rate charged therein undisturbed.

Previously there was outside of the single-fare city zone an outer irregular zone in the suburbs, in which a 5-cent fare was charged. There were also commutation tickets, the effect of most of which was to reduce the rate for these two zones from 10 cents to 7½ cents a ride. Outside of the first outlying suburban zone there was also in a few instances another outer zone for which a separate fare of 5 cents was charged.

By the order of the commission all of these outside zones are abolished and, beginning from the city single-fare limits, the suburban territory is divided into zones of approximately 1 mile each and a fare of 2 cents is charged for the ride into or through any such zone if it is a part of a longer haul, the minimum fare being 5 cents. The effect is to reduce the fare to the popular resort at Whitefish Bay, to the southern end of North Milwaukee, to the center of the city of Wauwatosa and to the center of the city of West Allis. It increases the fare to the northern edge of the village of Whitefish Bay, to Fox Point, to Tippecanoe and to South Milwaukee. The fare to the northern part of North Milwaukee, to the western part of West Allis and to the western part of Wauwatosa is the same. The withdrawal of the commutation tickets sold in blocks at a rate of 7½ cents each makes some of these fares show a slight advance. The reductions are effective on those parts of lines most used by suburban or holiday riders. Limited personal use tickets have been put into temporary use between Milwaukee and the center of South Milwaukee at a rate of 12½ cents in blocks of twenty.


THE MILWAUKEE ELECTRIC RY. & LT. CO.

GOOD FOR ONE RIDE

ACROSS ANY SUBURBAN FARE ZONE

SUBURBAN ZONE TICKET

NOT GOOD FOR RIDE IN MILWAUKEE OR RACINE

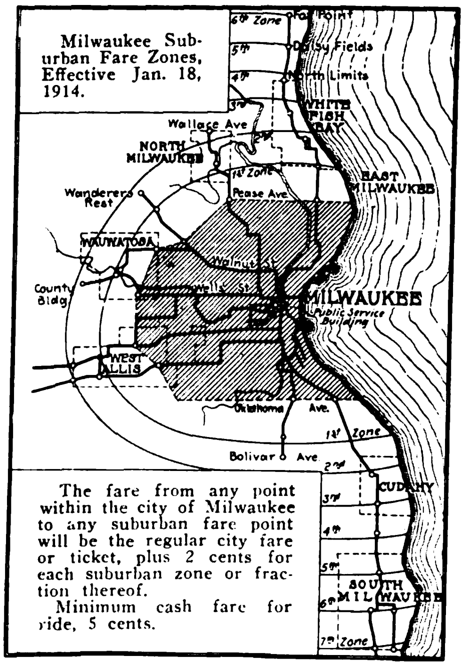
Suburban Zone Ticket

Under the plan of operation suburban passengers outbound from Milwaukee will pay, on entering the car, a city ticket or 5 cents cash. On leaving the car they will deposit in the fare box 2 cents cash or a 2-cent zone ticket for each zone into or through which they travel. The zone limits are at well-established points, making it easy for passengers to distinguish the zones and leave the car at the point nearest their destination. Suburban passengers inbound to the city will pay to destination as they enter, using cash or zone tickets in connection with city tickets if they desire. If a city fare is paid, transfers will be issued to any city line if requested when the fare is paid. Passengers desiring to ride in suburban territory only will pay 2 cents cash or a zone ticket for each zone into or through which they ride, the minimum cash fare being as stated, 5 cents for any suburban ride.

The old stations, stopping points and fare points are retained but the fares between them are adjusted to the distance traveled, and new stations, stopping points and fare points are created so as to do away with the discriminations and inequalities under the old system. The fare within the various cities, Milwaukee, Racine, Burlington, Waukesha and Watertown, is retained and added to the suburban mileage of passengers traveling in any part of the suburban zones.

All reduced fare round-trip tickets are discontinued and the round-trip rates are made the total of the flat rate each way. This means that while many of the one way rates have been reduced most of the round-trip rates have been increased. As a concession to those who travel much a 300-mile coupon book is sold at $5.40, with a minimum tear of 5 miles.

The Milwaukee Light, Heat & Traction Company has title to property situated beyond the single-fare limits of Milwaukee and is the owner of 24 miles of track in the city of Milwaukee for which The Milwaukee Electric Railway & Light Company pays rental. All of the property is operated by The Milwaukee Electric Railway & Light Company. The company operates suburban service to West Allis, Wauwatosa, North Milwaukee, Whitefish Bay, Fox Point, Cudahy, Tippecanoe and Wanderer's Rest, and interurban service to Waukesha, Oconomowoc and Watertown, to Racine and Kenosha, to St. Martins and East Troy and to St. Martins and Burlington and intermediary points. The extent of this service is indicated on the accompanying map.


Milwaukee Suburban Fare Zones, Effective Jan. 18, 1914.

The fare from any point within the city of Milwaukee to any suburban fare point will be the regular city fare or ticket, plus 2 cents for each suburban zone or fraction thereof.

Minimum cash fare for ride, 5 cents.

Map Showing Fare Zones

The service is operated under various franchises and right-of-way agreements. The 5-cent zone of the original system was developed generally with the growth of the lines and not on scientific rate-making principles. Some of the rates were stipulated in franchises and were necessarily effective prior to the time when the Railroad Commission assumed jurisdiction.

Under the 5-cent suburban zone system, now abandoned, the company charged, in one case, 5 cents for

2.04 miles and in another extreme case 5 cents for 7.17 miles. On another interurban line it charged 5 cents for 0.99 mile and the same fare for 3.35 miles. On another line it charged 5 cents for 1.66 miles and the same fare for 3.89 miles. These rates may be contrasted with the haul of 3.36 miles on one line for which the company formerly charged 10 cents.

DECISION OF THE COMMISSION

The decision of the commission says in part:

"Directly due to the inequitability of the 5-cent zone system is the practice of granting overlapping zones, special and round-trip rates to favored points. When overlapping zones are interjected into the 5-cent zone system we have a rate scheme which places every locality in competition with its neighbors. For instance, it is usually contended that if a company extends the limits of an interurban zone for a half mile so as to reach a certain locality and thereby grant a lower fare to this locality to all points through the overlap it logically follows that the next locality a quarter or half mile distant should receive a similar concession. The result is that this necessity of granting overlaps causes the rate schedules to become even more discriminatory, and carried to its logical conclusion the entire schedule ultimately must fall to the ground.

"Upon the suburban lines extending from Milwaukee a number of overlapping zones have also been established. The zones were originally of proper distance, but have become extended with the extension of municipal limits, the idea being in most cases to have the unequal zone conform with the political boundary line, and the result has been that zones immediately adjacent to the municipalities have been narrowed and the passengers originating in such zones discriminated against.

"In any equitable system of fares for suburban and interurban service the overlapping zone cannot be justified except under very extreme conditions.

"In establishing a revised system of interurban and suburban fares it is fully realized that the present fares will be considerably disturbed in some sections of the tributary territory, but this is not due to the application of any radical or untried theory of rates. It is due principally to the fact that the existing fares do not rest upon any scientific basis but are based upon unequal zone distances and favored local concessions. The results of such a schedule are obvious. Invariably one or more localities are built up at the expense of others. Patrons favorably situated obtain extremely low fares, part of the cost of which has to be borne by those less favorably situated and paying excessive rates. With these facts in mind, a revision is here undertaken with the sole aim of removing as much of the discrimination as possible and placing a schedule of fares in force, upon a uniform rate per passenger mile, which will equalize opportunity for local growth and expansion, insure equitability between persons and reasonably preserve the amount of traffic upon the various lines.

MILEAGE BASIS OF OTHER LINES

"In this State the Sheboygan Electric Railway, running between Sheboygan, Plymouth and Elkhart, changed over to a mileage basis of fare six years ago; the Milwaukee Northern Railway, running between Milwaukee and Sheboygan, adopted the mileage system when it began operation in 1908; the Rockford & Interurban Railway, running between Rockford, Ill., and Janesville, changed over to a distance basis last year, and the three interurban lines operating between Oshkosh, Fond du Lac, Neenah and Omro, in the region of Winnebago Lake, have filed an application with the commission to change their 5-cent zone rates to a mileage basis. The application of the respondents, filed Aug. 15, 1913, with this commission, to abandon the 5-cent zone system and place the rates on a more uniform basis is in line with this general change. In this State and in the States of Minnesota, Iowa, Illinois, Michigan, Indiana and Ohio returns show that out of eighty-three electric interurban companies more than one-half now operate under some form of mileage rate; and it may be stated that the Pennsylvania and New Jersey state commissions have declared in favor of the mileage basis.

"The rate of return upon the total interurban physical property of The Milwaukee Electric Railway & Light Company amounted to 3.10 per cent in 1908, 3.05 per cent in 1909, 1.84 per cent in 1910, and 2.35 per cent in 1911. Similar computations for 1912 show the per cent return to approximate 1.6 per cent. These facts indicate that when 7.5 per cent is considered a fair return the rates of return as quoted for the past five years have fallen considerably below an adequate return. To bring the revenues to the point where they would yield such a return for 1912, for instance, it would be necessary—assuming no decrease in traffic, which is very unlikely—to establish the basic rate at about 2.75 cents per passenger mile. When the conditions prevailing on the interurban system are considered as indicated by the passenger density per car mile, increasing only from 2.09 in 1908 to 2.13 in 1913, it seems best to place the rate at a lower figure than the cost of service would demand so as to encourage the passenger density with this lower rate to increase sufficiently to bring the revenues to the point where they will bring an adequate return above all expenses. It should also be stated that a rate of 2.75 cents per passenger mile would result in a large number of increases upon the entire system, while a rate of 2 cents, although increasing certain low rates, reduces a considerable number and thus equalizes the conditions on a more satisfactory basis."

An accompanying illustration shows the form of the suburban zone tickets. These tickets have a value of 2 cents each and are sold in strips of five for 10 cents or twenty-five for 50 cents. They will be sold by conductors on the city and suburban cars. They will be good for the payment of suburban fares only and are not good for fares within the single-fare limits of the city of Milwaukee or Racine or fares on the interurban lines between points beyond the terminus of the suburban territory.

The Massachusetts Institute of Technology, Boston, Mass., has issued its bulletin for December, 1913, which contains a general description of the various technical courses of instruction offered. Of particular interest to students who propose to enter the electric railway field are the courses offered in the department of electrical engineering, which include these subjects: alternating currents and a. c. machinery, electric light and transmission of power, central stations, electric railways, dynamo design, storage batteries and their design. In addition to the above regular courses of instruction, occasional lectures are given before the Electrical Engineering Society by prominent engineers not connected with the institute upon subjects with which they are especially familiar. Visits of inspection to the numerous activities of engineering interest about Boston, planned by the Electrical Engineering Society and carried out with the co-operation of the instructing staff, are made by third and fourth year students each year, and occasional tests are made of operating electrical plants in the vicinity.

The library of the Public Service Corporation of New Jersey, Newark, N. J., has issued a 152-page author and title catalog covering its large and complete collection of books and publications relating to electric railways and allied technical subjects.

Program for the Midyear Conference

Committees of the American Electric Railway Association and Allied and Affiliated Associations to Meet in New York Next Week—Plans for the Annual Dinner and the Conference

Additional details in regard to the program for the midyear conference of the American Electric Railway Association to be held next week at the headquarters of the association in New York have been announced.

MEETINGS OF MANY COMMITTEES

One of the principal features of the gathering of representatives of electric railways from all sections of the country will be a large number of meetings of committees of the various associations. The first of the meetings will be that of the classification committee of the Accountants' Association, which will hold sessions daily from Jan. 26 to 29. The work of this committee consists of the consideration, with the representatives of the Interstate Commerce Commission, of the new classification of accounts which has been under discussion for some time. In the last year the committee has held a number of meetings with representatives of the Interstate commission so that the work on the new classification is now well advanced. The committee, however, has some final details to consider in conference with representatives of the commission before the completed classifications can be sent out for the attention of the electric railway companies throughout the country.

Another of the important meetings to be held next week is that of the committee on the joint use of poles of the American Association. It will be recollected that the report of this committee was presented at the convention of the American Association held in Atlantic City in October of last year. Lack of time prevented full consideration and discussion of the report at the convention. After preliminary discussion, therefore, it was suggested that the committee write to member companies asking for comments on the report and that the entire matter be taken up at the midyear conference. In accordance with this suggestion the committee has written to member companies and a large number of replies will be before it for attention.

The extent of the total of committee meetings planned for the week is indicated by the fact that twelve committees of the American Association will meet, one of the Manufacturers' Association, two of the Claims Association, ten of the Engineering Association, seven of the Accountants' Association and seven of the Transportation & Traffic Association. Some of these meetings, however, are meetings of joint committees of two of the associations. The committee meetings are announced as follows:

AMERICAN ASSOCIATION

The committee on joint use of poles will meet on Wednesday, Jan. 28, at 9:30 a. m. The following committees are scheduled to meet at 10 a. m. on Thursday, Jan. 29: Subjects, relations with sectional associations, public relations, insurance, federal relations, education, compensation for carrying United States mail, company sections and individual members, *Aera* advisory. The executive committee is to meet at 2 p. m. on Jan. 29. The committee on company membership is to meet at 4 p. m. on Jan. 29.

MANUFACTURERS' ASSOCIATION

The executive committee will meet at 10:30 a. m. on Thursday, Jan. 29.

CLAIMS ASSOCIATION

The executive committee and the committee on subjects are scheduled to meet at 10 a. m. on Thursday, Jan. 29.

ENGINEERING ASSOCIATION

The committee on electrolysis will meet on Tuesday, Jan. 27, at 10 a. m. The committee on power distribution will meet at 9:30 a. m. on Wednesday, Jan. 28. The committee on way matters will meet at 10 a. m. on Jan. 28. The joint committee with the Accountants' Association on engineering accounting will meet at 2:30 p. m. on Jan. 28. The committee on equipment will meet at 10 a. m. on Thursday, Jan. 29. The joint committee on block signals with the Transportation & Traffic Association will meet at 11 a. m. on Jan. 29. The committee on standards will meet at 9 a. m. on Jan. 30. The committee on power generation will meet at 10 a. m. on Jan. 30. The joint committee on transportation engineering with the Transportation & Traffic Association will meet at 10:30 a. m. on Jan. 30. The committee on heavy electric traction will meet at 3 p. m. on Jan. 30.

ACCOUNTANTS' ASSOCIATION

The committee on a standard classification of accounts will meet at 10 a. m. each day from Jan. 26 to 29, inclusive. The joint committee on engineering accounting with the Engineering Association will meet at 2:30 p. m. on Jan. 28. The committees on education and express and freight accounting and the executive committee will meet at 10 a. m. on Jan. 29. The committees on interline accounting and overhead charges will meet at 2:30 p. m. on Jan. 29.

TRANSPORTATION & TRAFFIC ASSOCIATION

The executive committee and the committees on fares and transfers, schedules and timetables and training of transportation employees will meet at 10 a. m. on Thursday, Jan. 29. The joint committee with the Engineering Association on transportation engineering will meet at 10:30 a. m. on Jan. 29. The joint committee on block signals with the Engineering Association will meet at 11 a. m. on Jan. 29. The committee on express and freight traffic will meet at 2 p. m. on Jan. 29.

ANNUAL DINNER

As announced previously, the annual dinner of the association will be held in the grand ballroom of the Waldorf-Astoria Hotel at 7 o'clock on the evening of Thursday, Jan. 29. It was announced officially at the time this issue went to press that the number of advance registrations exceeded the total received at the corresponding time last year. President Charles N. Black will preside at the dinner. The speakers announced are Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company; Cornell S. Hawley, president of the Manufacturers' Association, and Henry W. Anderson, vice-president Virginia Railway & Power Company.

PROGRAM OF THE CONFERENCE

The regular midyear conference will be called to order at 10:30 a. m. on Friday, Jan. 30. The first order of business will be a brief statement from the American Association committee on company sections and individual membership. This will be presented by Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J.

The report of the committee on the joint use of poles will be presented next.

Halford Erickson, member of the Railroad Commission of Wisconsin, will then read a paper on "The Economic Aspects of Regulation Compared with Profit Sharing with Municipalities." This paper will be discussed by Arthur W. Brady, president Union Traction

Company of Indiana. It will then be open for general discussion.

Lunch will be served in the Engineering Societies Building at 1 p. m.

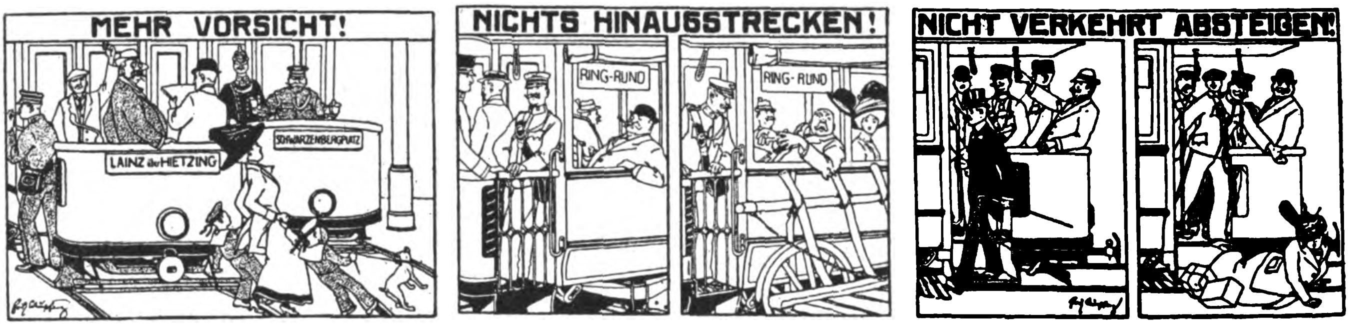
The association will reconvene at 2:30 p. m., and F. W. Hild, general manager Portland Railway, Light & Power Company, will read his paper on "The Effect of the Rate of Fare on the Riding Habit." This paper will be discussed by Luther P. Nash, of Stone & Webster, and will then be open for general discussion.

C. L. S. Tingley, vice-president American Railways Company, will then read a paper on "Present-Day Influence of Labor on Legislation." The paper will be open for discussion.

A paper on "Inherent Hazards of the Electric Railway Industry," which had been expected, will not be presented.

MOVING PICTURES AND POSTERS USED IN VIENNA TO PREVENT ACCIDENTS

An article in the Dec. 14, 1913, issue of *Elektrische Kraftbetriebe und Bahnen* describes the moving pictures and posters prepared by the Vienna Municipal Tramways in connection with accident work. The moving pictures embrace thirteen subjects. Some of these show the results of carelessness of drivers and chauffeurs, others those of pedestrians, and still others those of passengers. Furthermore, the pictures are also intended to show that undue haste increases congestion as well as accidents.



Accident Warning Posters of the Vienna Tramways System. Note that Operation Is Left-Handed

In view of the fact that moving pictures cannot be made to reach all the public, especially those who patronize the cheaper theaters, where American Wild West films are favored, a number of posters of unusual design have been prepared for car and station display. One of the three reproduced herewith shows the result of getting off the car backward, another that of leaning out of the windows, and the third that of failing to watch for cars coming in the opposite direction. In looking at the positions in the views it should be borne in mind that Vienna cars are operated left-handed. Fac-similes of these posters made in postage-stamp size are distributed to school children and are placed on all envelopes and wrappers mailed by the railway management.

The Worcester Polytechnic Institute offers through its annual catalog for 1913-14 a large number of courses in electrical engineering. These courses are classified in general under the following subjects: elements of electrical engineering, theory of a.c. circuits, transmission and distribution circuits, electrical engineering design, electric railway engineering, engineering business organization and finance, power plant engineering and transportation engineering. In connection with several of the above subjects laboratory courses are also offered.

ELECTRIFICATION OF STATE RAILWAYS IN SWITZERLAND

It is reported that the Swiss federal government has definitely decided to electrify 1875 miles and to make a beginning where electrification is most urgently needed, namely, on the Gotthard tunnel line, the most important in Switzerland. A preliminary credit of $7,700,000 has been granted for this first electrification, and the work, which is to be completed in 1918, has already been begun between Erstfeld and Bellinzona, a distance of 67¾ miles. At Amsteg a hydroelectric plant able to supply 32,000 hp is being installed, and at Piotta a similar plant of 39,000 hp. One station alone, however, could take the loads expected in 1918, namely, 12,000 hp normal and 32,000 hp maximum. These stations will also be tied in with others to avoid possible failure of water. The power generated will be conducted at 60,000 volts to from three to six substations, from which the current will be stepped down and delivered to a 15,000-volt or 7500-volt trolley.

In view of the experience of the Lötschberg Railway, it has been definitely decided to use the single-phase system. Even if 7500 volts were reserved eventually for the Gotthard line, 15,000 volts could be adopted for the rest of the federal lines, where tunnels are less frequent. The choice of system is most significant because whatever one is chosen on this line it must afterward be extended to all the other lines in the country that are operated by the government.

The steam locomotives on the Gotthard express trains now draw eight four-axle coaches, but the electric engines will be designed to draw ten such coaches. Two kinds of engines are contemplated, one with a speed of about 56 m.p.h. for international express trains but capable of being used for any other trains, and the other a lighter type. The present shops at Bellinzona will have a special department for the repair of electric rolling stock and inspection plants will be located at Biasca, Erstfeld, Airolo and Göschenen.

It has been finally decided that the Federal Railways themselves shall own the power stations and generate their own supply of electricity and that this work shall in no case be intrusted to private firms or be contracted for. The total cost of electrifying the Erstfeld-Bellinzona section of the Gotthard railway is officially estimated at $7,700,000, but much of the plant will be used not merely on the Erstfeld-Bellinzona line, but throughout the fifth section of the Swiss Federal Railways, of which the Gotthard line is a part.

The principal advantages which the Swiss Federal Railways hope to reap from the electrification are independence of foreign coal supply, suppression of smoke nuisance, increased train speed and capacity and more tourist travel. It is also hoped that ultimately electricity will prove considerably cheaper in actual operating cost.

Business Prospects for 1914

These Letters, with Those Published Last Week, Indicate an Optimistic View of Business Prospects

In the last issue of the ELECTRIC RAILWAY JOURNAL expressions of opinion as to business prospects from a number of manufacturers of electric railway apparatus were published. Additional views are presented this week. Many of the manufacturing companies quoted this week, it will be noticed, supply material for steam railroads as well as for electric railways, and some of them also do a very large business in other lines of industry.

CARNEGIE STEEL COMPANY, PITTSBURGH AND NEW YORK: "We certainly feel optimistic with regard to the business of our company during 1914. The needs of the country in steel lines are continually growing. Stocks to-day are very low, and the fundamental monetary and commercial conditions are sound. We cannot but feel that before the year has progressed very far we shall have a volume of business quite equal to our capacity."

BRIDGEPORT BRASS COMPANY, BRIDGEPORT, CONN.—"We are inclined to be optimistic regarding the outlook for the year 1914. Our plant is runnning full time and our prospects for increased business are indeed promising, to say the least. 'Phono-Electric' trolley wire made a fine showing in 1913 and, in fact, stood more trial tests successfully than in any previous year. This, of course, led to increased orders and no doubt will influence the output for this year. We are going ahead with very active sales and advertising plans and have made improvements which we believe will be to our customers' benefit. We are keeping up the efficiency of the men and of our machines in our plant, for 'quality and accuracy' is our watchword."

NATIONAL BRAKE COMPANY, INC., BUFFALO, N. Y.: "Our orders for the first month of the new year will hardly exceed those of the first month of 1913. Inquiries, however, are greatly in excess of those received during January of last year, and if this line of inquiries is maintained throughout the year and if the cars for which we have received inquiries for brakes are built, the year 1914 will probably be better than an average car-building year. So far as our own business is concerned, we can hardly expect it to reach the volume it did during 1913 because during that year more than 4000 brakes were sold to one purchaser. The fact that we have recently added the automatic stop to our Peacock brake, reducing the amount of winding necessary to set the brake to a minimum, should secure the specification of the brake on a larger percentage of the number of cars built than ever before."

GALENA-SIGNAL OIL COMPANY, FRANKLIN, PA.: "Our sales during the year 1913 exceeded those for the previous year and we consider that the prospects for the year 1914 are exceptionally bright. We believe that our business is, in a way, a barometer of trade conditions in the United States, as it is confined exclusively to the sale of lubricating and burning oils to steam and electric railways. The railroads of necessity depend upon the transportation of manufactured and raw products to insure constant movement of their equipment, and the facts that our sales to the railways in 1913 were in excess of those for the preceding year and that so far this month we have run in excess of the same period in 1913 are an indication that the railroads are moving freights. Of course, at certain seasons during the past year there has been experienced slackness in certain lines of trade, but we believe a little investigation would have shown that it was due to perfectly natural and temporary depressions that are experienced every year."

THE PROTECTIVE SIGNAL MANUFACTURING COMPANY, DENVER, COL.: "In our opinion, the business prospects for any of the railway supply companies for the coming year depend very largely upon the attitude of Congress and the decision of the Interstate Commerce Commission in reference to the just and reasonable demands of the railroads. The attitude of the administration at Washington and the future legislation also enter largely into this question. The railroads to-day are the greatest factor for the development and progress of the whole country. They are ably managed, the rights of the public are being carefully considered, and everything is being done for the protection and welfare of the public as well as for the employees. It is absurd and foolish to attack and hamper by antagonistic and radical legislation the foremost industry in the country because of errors of omission or commission ten or fifteen years ago. Should the railroads receive any degree of fair treatment, we look forward to a gradual and steady increase in the prosperity of every manufacturing industry in the country."

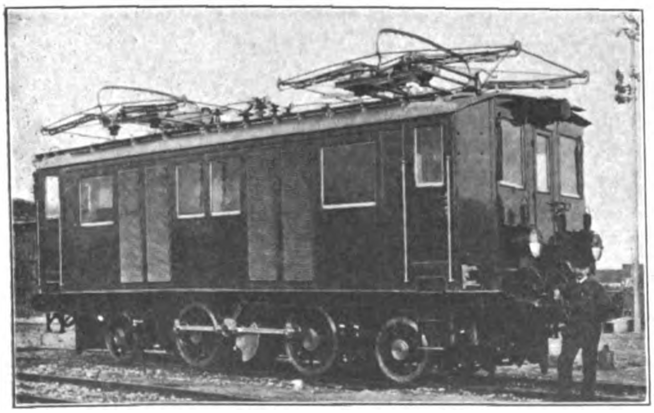
CAMBRIA STEEL COMPANY, JOHNSTOWN, PA., through J. L. Replogle, vice-president and general manager of sales, writes: "We believe that the business prospects for this year will depend largely upon the decision of the Interstate Commerce Commission as to the 5 per cent increase in freight rates for which the railroads are asking. If this increase is authorized within the next two months, I personally believe our mills will be running to capacity during the rest of the year, as there is a large tonnage of rails, cars and other railroad supplies ready to be placed as soon as the railroads feel they are justified in buying. Many of them do not feel that present conditions permit of any extensive purchases at this time and are confining their purchases to immediate necessities. Stocks throughout the country are generally low. The writer has recently returned from several extensive trips and does not believe the stocks of the fabricating structural concerns are over 25 per cent of normal. Inventories have been taken, and, while there may be a fairly good buying movement this spring, business in our line cannot be good without a good volume of railroad business, which we cannot expect under present conditions."

LORD MANUFACTURING COMPANY, BROOKLYN, N. Y.: "Conditions in this country are becoming, we believe, fundamentally more sound than they have ever been. Irrespective of one's politics, it is manifestly clear that the people and business men are daily increasing their confidence in the present administration. In the process of adjustment now going on the railroads have had to bear a large share of the sacrifices, and so accordingly have companies like our own which are engaged in manufacturing protective and economizing devices for the railroads. Nevertheless, 1913 was the best year in the history of our company, as well as in that of our parent organization, the Lord Electric Company, now engaged in the electrical construction work on the new ship-barge canal. Our plans are based on the belief that 1914 will be on the whole much like 1913, except that the better half of the year will be the last six months instead of the first. Our aggregate business will be much larger than last year, however, by reason of the addition to our line of the old and successfully established Sterling-Meaker products, including gear brakes, trolley bases, wheelguards, fenders, sand boxes and ticket punches. We have recently increased the size of our factory."

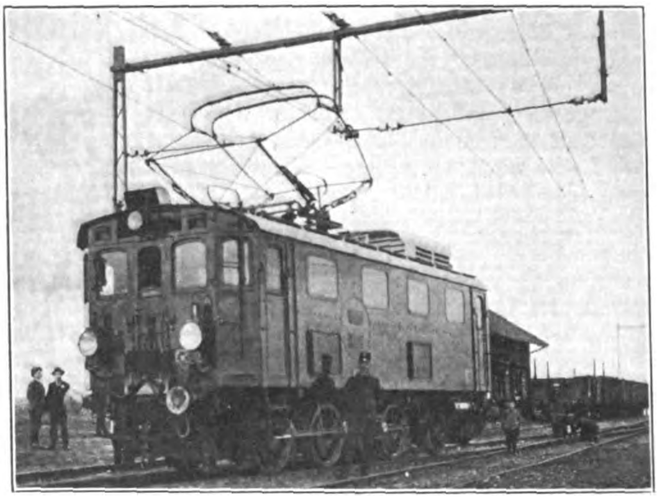
The Cleveland Fare Box Company, Cleveland, Ohio: "Our activities during the past year have been primarily centered in Ohio and adjacent states, but we are anticipating the broadening of our sales efforts during 1914 to meet the demands that are being made in other states by conservative, efficient railway men for the safeguarding of the fares collected on their system. We not only believe that conservative national legislation on corporate matters will re-establish the broadest confidence that is possible and bring about the resumption of buying of materials and devices that are needed, but that it will as well impress on the minds of the buyers the necessity of efficiency in buying and will bring prosperity to the manufacturers who have reliable devices to sell. We believe that closer scrutiny of electric railways will result in the general adoption of more efficient methods of fare collections on street cars and the safeguarding of these collections after they have been made. In our judgment, it is as essential to take care of the ticket fares (which are really money) as it is to take care of the cash that is collected as fares. This can be done only by the use of a reliable, non-tamperable fare box that is designed to take care of both tickets and cash. In addition to our single compartment lock-box fare box, which has been made standard by several of the largest street railway systems in this part of the country, we are now building a four-compartment locked box that is attracting much attention among railway men who find it desirable to keep the fares collected on each run separate from other runs. The locked box principle of fare collection eliminates the 'middleman' and insures the safe delivery of every fare collected into the counting room of the company. Fare boxes of this type will assist in bringing increased revenue and the resulting prosperity to the street railways of the country."

A 16,000-VOLT SINGLE-PHASE LINE BETWEEN VIENNA, AUSTRIA, AND PRESSBURG, HUNGARY

The new single-phase line between Vienna and Pressburg was recently described in a lecture before the National Economy Society by Etienne de Fodor, director-general Budapest General Electric Company. This road, which is 43 miles long, receives energy from the municipal central station of Vienna. The steel transmission towers carry one 16,000-volt traction line and two 35,000-volt three-phase lines for lighting the towns along the route. The trolley potential is 16,000 volts, but on the locomotive this is transformed to 600 volts for use by single-phase commutator motors. Both the passenger and freight locomotives shown in the illustrations are rated at 750 hp each. The passenger trains are hauled at 46.5 m.p.h. and the freight trains at 25 m.p.h. Both locomotives are furnished with pantograph type collectors. Two views of the locomotive are shown. A third illustration shows the light steel pole and bridge construction employed for the catenary suspension. This view was taken at the boundary of Austria and Hungary. Meters for registering the current that passes over the Hungarian part of the road are installed in the tower house shown at the rear.

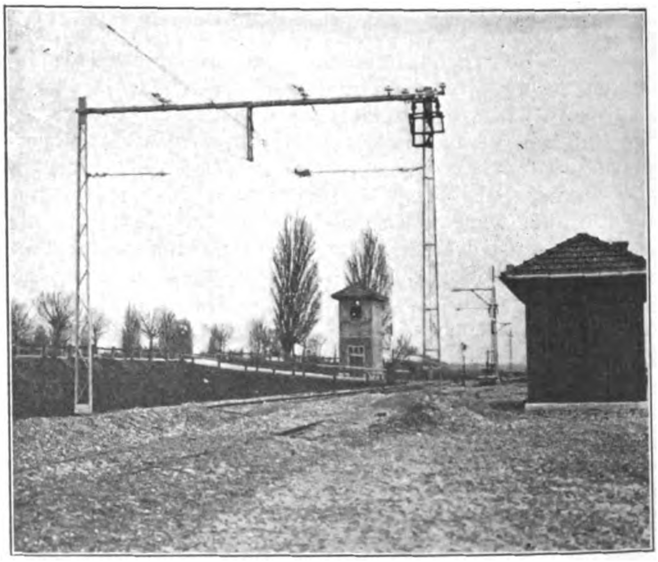


Vienna-Pressburg Single-Phase Line—Passenger Locomotive for Express Train Service



Vienna-Pressburg Single-Phase Line—Freight Locomotive

On Jan. 1 there were 88,586 shareholders in the Pennsylvania Railroad Company, the largest number in the history of the company and showing an increase of 13,431 for the calendar year 1913. Of this total 42,514 shareholders were women, there having been an increase during the year of 6266 women stockholders. Women constitute almost 48 per cent of the total number of Pennsylvania Railroad stockholders. Stockholders abroad now number 11,676, a total of 1047 having been added during the past year.



Vienna-Pressburg Single-Phase Line—View of Typical Steel Pole and Bridge Catenary Construction

THE RELATION OF THE STREET RAILWAY TO AGRICULTURE

The regular monthly meeting of the Massachusetts Street Railway Association was held at the Engineers' Club, Boston, on Jan. 14, President Crapo being in the chair. The evening was devoted to addresses upon the relation of the street railway to agriculture, the principal speakers being Messrs. R. W. Perkins, president Shore Line Electric Railway, Norwich, Conn.; John R. Graham, president Bangor Railway & Electric Company, Bangor Maine; G. C. White, of the Office of Markets, United States Department of Agriculture, Washington, D. C.; B. E. Kingsley, of the Bay State Street Railway, Boston, Mass., and Harry B. Ivers, general manager Cumberland County Power & Light Company, Portland, Maine.

Mr. Perkins maintained that the transportation companies should take a more prominent part in the repopulation of rural New England and gave numerous statistics of the agricultural development of Connecticut tending to show the possibilities of its soil as compared with other parts of the world. He stated that on the Shore Line system a farm bureau had been established in which were maintained lists of all farms and other real estate on the markets. The employees of the company had in a number of cases joined local granges to come closer to the farmers, and an active co-operative movement was under way along the lines found successful by the government. The company operated about 240 miles of track in Connecticut and Rhode Island and was seeking in every feasible way to develop its territory and encourage first-class farming methods. Instead of establishing and maintaining a model farm of its own, the company favored helping the local farmers to secure the best results on their own properties. Demonstrations were therefore made on the farms themselves, the work being done by the farmers under expert guidance. In this way the temptations to do too much on a grand scale common to corporate farms were avoided.

At Norwich a five-story warehouse about 135 ft. long and 130 ft. wide had been built and a physical connection was in service between the Shore Line and the New York, New Haven & Hartford Railroad. Another warehouse was located at New London, Conn. In the former city the farmers on the company's tributary lines maintained an agent at the terminal who was thoroughly experienced in grading, sorting, crediting, shipping, packing and selling agricultural products, and the results were most beneficial. Time was saved to the farmers by the shipment of their products into these terminals by electric express cars and better prices were secured than where sales were handled by the farmer as an individual. Through this co-operative movement efforts were being made to establish a standard quality of products which would yield profits through their reputation.

Mr. Perkins said that the farmer must be convinced that the railway man was in earnest and that the farmer must be enabled to realize actual money as a result of the co-operation in order to insure success. The feeling that New England farmers could not compete with those in the West in beef raising must be overcome by acquainting the farmer with the changed conditions now prevailing in the West as a result of the occupation of that territory and the passing of the public cattle range. The speaker contended that alfalfa could be raised in Connecticut as well as in the West, and pointed out that its yield of corn per acre about equaled that of Iowa. He outlined the benefits of co-operation in selling products among the citrus growers of California, the peach growers of Georgia, the apple raisers of Oregon and the early vegetable raisers of Texas, and in closing emphasized the fact that $6,000,000,000 worth of farm products were annually raised in the United States. These products were sold to the ultimate consumer for $13,000,000,000, and it was the hope of the electric railway man interested in developing his service to reduce in some way this huge gap between the producer and consumer through economical transportation and closer co-operation with the farmer, cutting the cost to the consumer and helping the farmer to receive more for his products.

Mr. Graham described the development of traffic on the Bangor-Charleston line of the Bangor Railway & Electric Company, a branch of the system 25 miles long which served a rural territory with a population of about 2500. Before the speaker took hold of this line it was highly unprofitable. The gross receipts on the line were about $32,000 per year, and a radical step toward increasing traffic was taken about six years ago when the electric freight rates on potatoes and cordwood, the chief products of the territory through which the line passes, were cut in half. This reduction was advertised widely and greatly facilitated building up the territory served. The traffic in potatoes increased from eighty-one carloads in 1907 to 438 carloads in 1913, and it was expected that 600 carloads would be hauled this year. The receipts had increased to $65,000 per year. No reduction was made on supplies shipped to the farms over this line, and the company gained a large amount of business through the transportation of fertilizers, farming implements and other commodities into the territory.

Aside from establishing a model farm 6 miles from Bangor the company had organized an association for selling produce. No house deliveries were made in the handling of the trolley express service, but ample facilities were given to farmers along the line in the collection and distribution of freight from the track. The company's model farm was being conducted with the co-operation of the University of Maine. Closing, Mr. Graham pointed out the possibilities in the way of stock raising provided adequate fencing was installed on the farms.

Mr. Kingsley stated that since 1906 about 400 miles of electric railway lines had been provided with trolley express service in eastern New England. These facilities were now available in 181 municipalities. He described the development of strawberry culture at Dighton, Mass., which had resulted from the increase of electric express facilities. Attempts on the part of the farmers to ship these berries to the Boston market by steam railroad were unsatisfactory. On account of the slow service the quality of the berries was impaired and the farmer realized but 3 cents to 8 cents per quart. Refrigeration cars were tried, but the cost of icing destroyed the extra compensation, and the industry languished until, by the introduction of electric express service with cars having open bulkheads, it was revived again. When the service was extended to Neponset in 1912, 4000 crates of berries were shipped into the Boston market, and last year over 10,000 crates were handled with the through service to the heart of Boston. The Bay State Street Railway express cars enabled fruit picked late in the afternoon to be sold in Boston early the following morning at from 8 cents to 18 cents per quart. Other products of the garden had been developed as a result of this service.

Mr. Ivers included many personal reminiscences of electric railway history in his remarks, and in describing the co-operation maintained in the Lewiston district of Maine with the farmers he touched upon the value of supplying mailing lists of farmers residing along the company's lines to merchants in the towns. The electric railway could, he said, help the farmer in securing credit at local banks, and conferences with the farmers in small groups were mutually helpful. The evening travel habit had been stimulated on his lines by the use of free theater tickets and in this way the farmer had been brought to realize the possibilities of the electric railway in catering to his natural desire for amusement after the day's work was done.

Mr. White pointed out the unanimity of interest existing between the farmer and the railroads, and said that an imperfect system of distribution, and not overproduction, was the fundamental cause of the inadequate return that the producer received. He commended the work done by organizations of farmers in connection with the purchase of supplies, sales and transportation.

Charles C. Peirce, Boston, also spoke, briefly describing his farming experiences.

REPORTS OF NEW YORK PUBLIC SERVICE COMMISSIONS

The seventh annual report of the Public Service Commission, Second District, New York, was submitted to the Legislature on Jan. 19. Several important amendments to the Public Service Commissions law are recommended. Among them the commission urges that it receive authority, such as is now possessed by the Interstate Commerce Commission, to suspend for a period not exceeding four months the taking effect of advanced rates pending investigation as to the reasonableness of the proposed advance. The commission also asks for a modification of the so-called "short and long haul" clause of the law so as to make it similar to that in the interstate commerce law.

During 1913 corporations operating stage route or autobus lines were placed under the jurisdiction of the commission, and it suggests that the statute in regard to these lines be amended so as to require specified reports from them to the commission.

The report calls attention to the increased safety of operation of high-speed interurban electric railroads, and states that during the past year no serious accident on these roads has occurred because of defective track conditions or failures of structures. Careful attention has been given to the operating methods employed on these roads, especially in train dispatching. Improvements have resulted from frequent conferences regarding safety which have been held with operating officials. The equipment of interurban roads has been well maintained and standards have been adopted for proper inspection and maintenance of rolling stock. On nearly all of the single-track roads a satisfactory train-dispatching system has been employed, and several interurban roads have recently been equipped with proper block signal systems.

Extensive investigations of city street railway systems have been made in Rochester, Binghamton, Schenectady and Utica.

During the year 22,232 rate and fare schedules were tendered for filing, 22,123 of which were passed into the files, 109 being rejected for statutory reasons. There were also filed 989 authorities relating to schedule publications, making the total of all tariff filings for the year 23,112 and for all tariff filings since the establishment of the commission 133,785.

The expenses of the commission for all purposes whatsoever for the fiscal year from Oct. 1, 1912, to Sept. 30, 1913, were $373,068.21. The appropriation of the Legislature for the fiscal year from Oct. 1, 1913, to Sept. 30, 1914, is $405,245.90. This does not include any appropriation for the State's portion of the expense of grade crossing eliminations under the provisions of the railroad law. The estimate which has been submitted to the state authorities for the total expenses of the commission for the fiscal year commencing Oct. 1, 1914, is $434,205.90. The commission has also asked the present Legislature to appropriate for the purpose of defraying the State's share of grade crossing eliminations during that year the sum of $500,000.

The statistics published with the report include a table showing the comparative cost of fuel for steam power used in generating electricity by different electrical corporations; a condensed income statement for each electric railway company reporting to the commission, covering the year ended June 30, 1913; a statistical summary showing the total for all electric railways for each year since the establishment of the commission, of revenues, expenses, passengers carried, etc.

Reference is made to the difficulties caused by the tendency of many corporations to include in their property accounts items which should be paid for from income as operating expenses, a practice which is forbidden by the commission's standard classification of accounts. This is especially true of expenditures for replacements of their capital investment.

The report also says that the subject of depreciation has received considerable study from the commission in connection with capitalization and rate cases which have been before it for decision. The commission admits that this is a very complex matter, but it is certain that unless the public service corporations are not only permitted but required to charge to their operating expenses a sufficient amount not only to cover current wear and tear but to make it possible for them to retire antiquated and inadequate apparatus, the prosperity of the district which they serve will be seriously hampered.

REPORT OF PUBLIC SERVICE COMMISSION, FIRST DISTRICT, NEW YORK

The annual report of the New York Public Service Commission, First District, for the year 1913 is devoted mainly to rapid transit matters, as they required most of its time.

The total number of passengers carried by all street railroads in the district during the year was 1,769,889,284, an increase of 5.29 per cent over 1912. The total amount of passenger fares was $87,718,359. This is equivalent to about $17.50 per capita on a basis of 5,000,000 population. For gas the New York City public paid during the year $34,319,912. This was equivalent to 81.45 cents per 1000 cu. ft. For electric current it paid $29,990,908. This makes a total of $152,029,179, or upward of $30 per capita, for transportation, gas and electric service.

The following figures show the total number of passengers carried by street railroads in New York City, including surface, subway and elevated lines, for the fiscal year ended June 30 of each year since the organization of the commission:

1908	1,358,000,407	1911	1,603,901,397
1909	1,402,417,642	1912	1,680,913,935
1910	1,531,262,914	1913	1,769,889,284

During the year the commission received 6329 complaints, of which 1768 were against transportation companies. The commission authorized stock and bond issues by various corporations under its jurisdiction to the amount of $287,342,000. This makes a total of such authorizations from July 1, 1907, to Dec. 31, 1913, of $517,535,219.

The commission strongly urges upon the Legislature the necessity for appropriations by the State to permit the prosecution of grade crossing elimination in New

York City. It asks for an appropriation for the year of $1,500,000. The number of accidents on railroads and street railroads was 71,631, an increase of 1087 over 1912. The details are shown in the accompanying table.

DATA ON ACCIDENTS FOR YEAR ENDED DEC. 31, 1913

Car collisions	1,441
Persons and vehicles struck by cars	17,914
Boarding	10,746
Alighting	11,218
Electric shocks	336
Derailments	1,995
Other accidents	27,981
Totals	71,631
Injuries	
Passengers	31,149
Employees	7,568
Others	6,643
Totals	45,360
Serious (Included in Above)	
Killed	319
Fractured skulls	77
Amputated limbs	40
Broken limbs	337
Other serious	1,898
Totals	2,671

COMMUNICATION

SYSTEMS FOR MAIN LINE ELECTRIFICATION

CANADIAN PACIFIC RAILWAY COMPANY
MONTREAL, Jan. 16, 1914.

To the Editors:

Referring to your editorial of Dec. 20 on "Systems for Main-Line Electrification," I do not feel that your suggestion of a committee to report on electrification systems is really practicable. I am afraid that the determination of the system to be adopted will have to be fought out in the old-fashioned way of trying out the various methods and the survival of the fittest.

I cannot agree with the statement in your article as to there not being any great necessity for a standard system even for one road. I would illustrate this by first saying that it might be possible to operate from New York to Buffalo on one system but that the introduction of two systems in that district would necessarily restrict the transfer of locomotives and would be seriously objectionable on that account. Any change of system at Buffalo between the New York Central or Lake Shore lines would, I believe, be objectionable on account of the impossibility of running the same locomotives in either direction.

When electrification is restricted to locomotive service in distinct electric zones, the use of different systems for different districts may not be objectionable. But as soon as electricity becomes a general railway proposition a considerable additional investment will be necessary if each district must be supplied with the maximum amount of power which it requires at any one time.

H. H. VAUGHAN,
Assistant to Vice-President.

The catalog of the college of engineering, Polytechnic Institute of Brooklyn, for 1914-1915 contains among its descriptions of technical courses an outline of the four-year course in electrical engineering. In addition to its regular day courses, the college offers a parallel series of afternoon and evening courses in electrical engineering, especially designed to afford men in actual practice opportunities for professional study. These courses may be taken either independently or in connection with the regular work of the courses leading to the degree of electrical engineer. No formal examinations for entrance are required of those not seeking a degree, although secondary-school preparation is assumed.

ANNUAL MEETING OF AMERICAN SOCIETY OF CIVIL ENGINEERS

The annual meeting of the American Society of Civil Engineers took place in New York Jan. 21 and 22. Progress reports of the committees on valuation, on bituminous materials for road construction, on steel columns and struts and on bearing values of soils were submitted. The committee on engineering education reported that the Carnegie Foundation for the Advancement of Teaching had announced its readiness to conduct, at its own expense, a thorough investigation of the subject, co-operating with all of the national engineering societies.

A joint committee, to act with representatives of the American Railway Engineering Association, to investigate stresses in rails, ties, etc., was appointed as follows: Chairman, A. N. Talbot; A. S. Baldwin, J. B. Berry, G. H. Bremner, John Brunner, W. J. Burton, C. S. Churchill, W. C. Cushing, E. Gerber, R. W. Hunt, G. W. Kittredge, William McNab, G. J. Ray, F. E. Turneaure and J. E. Willoughby.

Hunter McDonald was elected president for the ensuing year.

INSPECTION OF THE DUAL SUBWAY SYSTEM

On the afternoon of Jan. 21 more than 300 members inspected part of the dual subway system in course of construction for the city of New York under the control of the Public Service Commission. The work visited comprised three contract sections in various stages of completion, extending from Rector Street on Trinity Place to Prince Street on Broadway, which are part of the system to be operated by the Municipal Railway Corporation under its part of the dual subway contract with the city of New York. Alfred Craven, chief engineer Public Service Commission, had members of his staff escort the visitors in groups of ten to twelve men through the work and explain the various interesting and difficult features. The contractors, F. L. Cranford, the Degnon Company and the Underpinning & Foundation Company, extended all the necessary facilities and provided the lighting to allow a proper inspection of the subway. The work visited was Sections 1, 1A, 2 and 3 of Route 5, the visitors assembling at the shaft located at Prince Street and Broadway. The party walked south to Grand Street, where the two express (center) tracks are depressed for a turnout into Canal Street, the subgrade being 40 ft. below ground water, and where two pumps are required to keep the water level down. Section 2, immediately to the south, was next visited.

The chief point of interest in this section of the work is the two-story station at City Hall, 480 ft. long. This station has the south terminal for local trains on the lower level, the expresses continuing through on the upper level. The station is 85 ft. wide, occupying the full width of the street, and 40 ft. deep, the subgrade being several feet below ground water. The S-shaped curve from Broadway to Church Street, which consists of two single-track tunnels lined with cast iron and which passes under the old Astor House property and St. Paul's Churchyard, was of particular interest, especially the method used for underpinning the five-story brick Vestry Building and the methods of tunneling employed.

The last section visited showed the novel and excellent methods used in excavating in bad soil while maintaining the street and car traffic on the surface and also underpinning the foundations of the elevated railroad columns which are on top of, or immediately adjoining, the subway structures. The part of the subway inspected is 1½ miles long. The trip lasted two hours.

Equipment and Its Maintenance

Short Descriptions of Mechanical and Electrical Practices from Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for in Accordance with Our Regular Rates.)

AN INEXPENSIVE RAIL FILE FOR NEW JOINT WORK

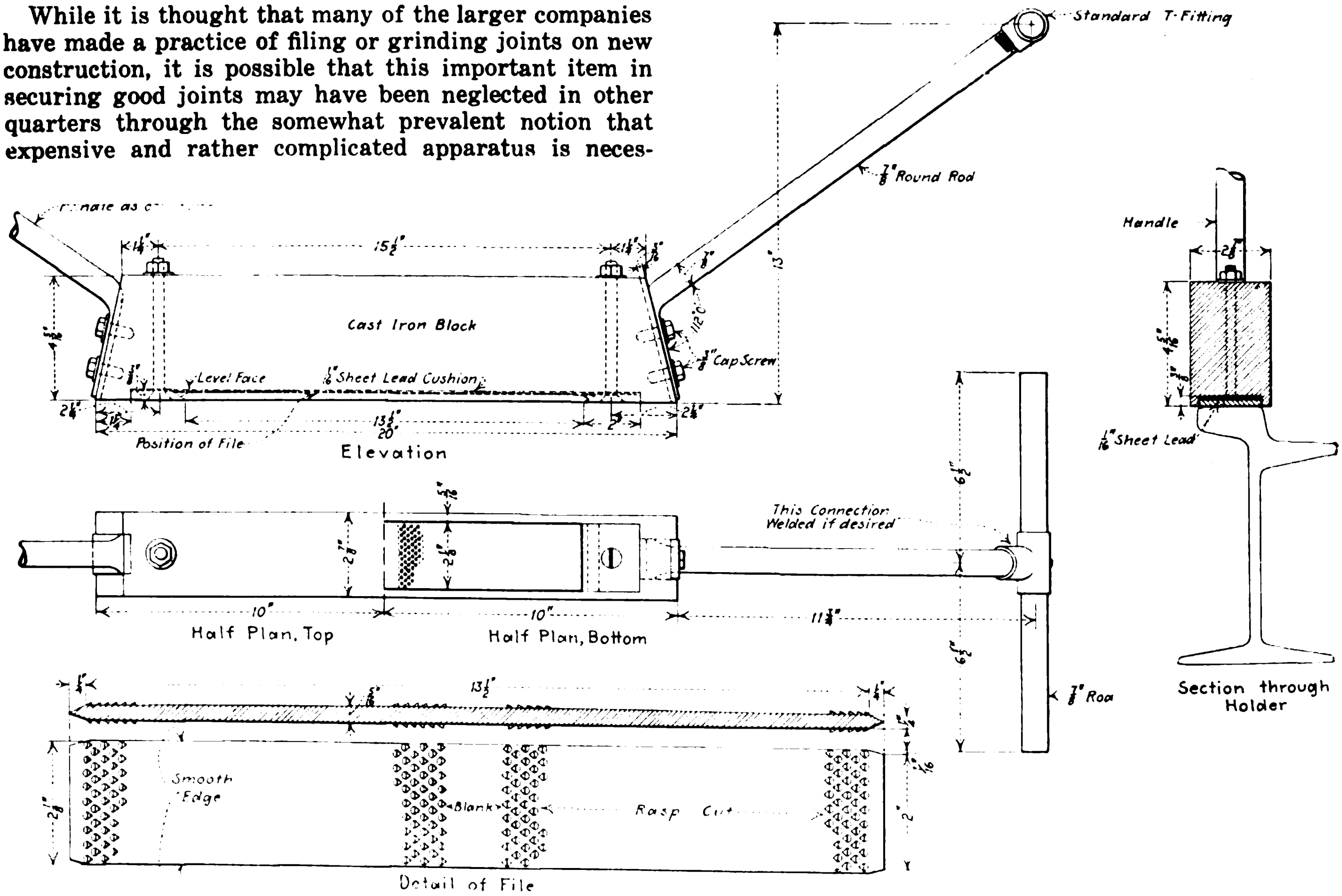
BY R. C. CRAM, ASSISTANT ENGINEER WAY AND STRUCTURE DEPARTMENT BROOKLYN RAPID TRANSIT SYSTEM

Track engineers are agreed as to the desirability of filing the tops of the rail heads at joints in new rails to insure an even surface by removing the slight differences in the head sections which are found in rails as received from the mills.

While it is thought that many of the larger companies have made a practice of filing or grinding joints on new construction, it is possible that this important item in securing good joints may have been neglected in other quarters through the somewhat prevalent notion that expensive and rather complicated apparatus is necessary to secure good results. On the contrary, the work may be done by means of a comparatively simple and inexpensive device, such as the one which is in use by the way and structure department of the Brooklyn Rapid Transit System.

This device consists mainly of a cast-iron "holder" weighing about 70 lb. and so constructed that special file blades, made for filing high-grade steel and having a peculiar form of tooth, may be quickly detached and removed. The blades are made with teeth on both surfaces and are reversed in the holder when one side has become dull; they are discarded only after the second face has been dulled. Handles are attached to the "holder" at such an angle as to provide effective cutting with the file blades when the apparatus is operated as intended, namely, by two men who when the track is open are seated directly upon the rails or, when the track is back-paved before filing, upon boxes or paving blocks. These latter provide a seat about 8 in. above the level of the rails. The accompanying drawing gives the principal details of the construction of this device. A halftone view of the men seated upon the rail and operating the file was shown on page 922 of the ELECTRIC RAILWAY JOURNAL for Oct. 25, 1913, in an article entitled "Cast-Weld Joints and Steel Ties in Brooklyn."

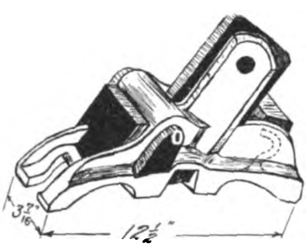
The holder castings cost about $5 each completely assembled. The file blades are purchased by the dozen from Henry Disston & Sons, Philadelphia, Pa. It has been observed that on new rail work one double-faced file blade will level down from fifty-six to eighty joints, depending mainly on the depth of cut necessary. As a rule, two men will file twelve to fifteen joints in a ten-hour day. It is customary to have one of these rail files in the tool box of each gang regularly assigned to reconstruction and joint repair work.



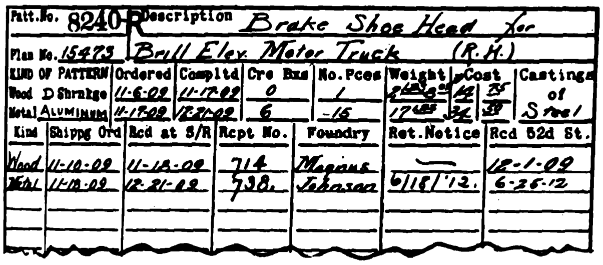
Construction Details of Inexpensive Hand-Operated Rail File Used for the Accurate Finish of New Joints on the Brooklyn Rapid Transit System

PATTERN SKETCHES ON RECORDS

A convenient feature of the pattern records of the mechanical department Brooklyn Rapid Transit System is the incorporation of pattern sketches on the back of the record. An example of this practice as applied to a brakeshoe head is offered in the accompanying reproductions of the back and front of the standard 6-in. x 4-in. card kept in the drafting room of the Superintendent of Equipment. In the original sketch the core sections are shown in red, while in the reproduction they appear in heavy black. The use of such sketches saves a great deal of time when hunting for one pattern among thousands because the pattern clerk knows just what the object looks like. These sketches are also of considerable value to the draftsmen in studying the development of previous types when they make up new designs. Several of the foundries with which the Brooklyn Rapid Transit System does business follow the same plan for their own convenience.



Sketch on Back of Record



Patt. No. 8240-R Description *Brake Shoe Head for*
Plan No. *15473* *Brill Elev. Motor Truck (R.H.)*

KIND OF PATTERN	Ordered	Compltd	Cre Bxs	No. Pces	Weight	Cost		Castings
Wood D Shrnkge	*11-6-09*	*11-17-09*	*0*	*1*	*2 lbs 8 oz*	*12*	*75*	of
Metal *ALUMINUM*	*11-17-09*	*12-21-09*	*6*	*16*	*17 lbs*	*34*	*38*	*Steel*

Kind	Shippg Ord	Rcd at S/R	Rcpt No.	Foundry	Ret. Notice	Rcd 52d St.
Wood	*11-10-09*	*11-18-09*	*714*	*Magnus*	—	*12-1-09*
Metal	*11-18-09*	*12-21-09*	*738.*	*Johnson*	*6/18/'12.*	*6-26-12*

Brooklyn Pattern Record

MECHANICAL STRAINS IN A. C. CONDUCTORS

In planning the distributing system for the Interborough Rapid Transit Company's new 30,000-kw turbines it was found that the currents under short-circuit conditions and with the proposed arrangement of electrical equipment would momentarily run up to 60,000 amp. Electrically this presented difficulties which were by no means insurmountable, but it was found at the same time that the repulsive action between the conductors of the two phases across which the short-circuit was assumed to exist would be of extraordinary intensity. Approximately speaking, the force amounted to 1 ton per linear foot of cable, thus producing a really astounding disruptive effect. As a matter of fact, it was soon afterward discovered that the helical paper wrapping of the proposed cables possessed an unsuspected strength which was sufficient to withstand the strain and in consequence the difficulty thus eliminated itself. Nevertheless, the incident points clearly to the fact that the repulsive force between parallel a.c. conductors must always receive serious consideration in design.

A somewhat similar case was discovered on the single-phase cars of the New York, Westchester & Boston Railway on which the six transformer taps originally ran unsupported for about 2 ft. to the switch group. With these cables the insulation was continually breaking down and the cables were short-circuited on the car framing above them until they were heavily roped in place, the trouble being due solely to repulsive action which caused one of each pair to fly upward like a shot from a gun whenever current was turned on.

The phenomenon displayed in both of these cases has been brought to the front more or less within the last two years through its influence in transformer design, yet the incidents naturally involve the question whether it is generally borne in mind in matters relating to low-voltage a.c. circuits, in car equipment or in substations, especially where the conductors are insulated. On high-voltage lines the necessity for wide separation of the different phase wires to prevent arcing obviates serious consideration of the repulsive effect, which acts inversely as the distance between the conductors, but where the cables are set close together, possibly separated only by a small thickness of insulating material, the intermittent mechanical stresses may easily be sufficient to cause rapid deterioration of both insulation and copper even under normal current.

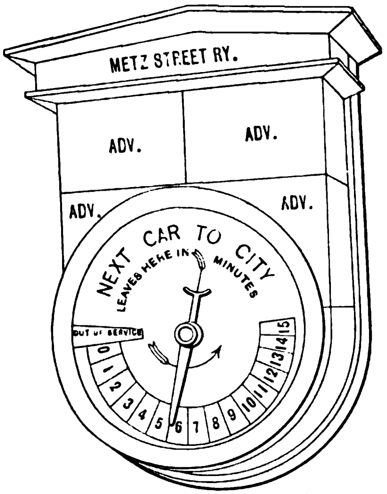
Under short-circuit conditions, of course, the opportunity for destruction becomes enormous, a simple formula, submitted before the A. I. E. E. at its midyear convention in February, 1911, showing that the mean repulsive force in pounds per linear foot of cable was equal to 0.538 time the square of the current in amperes, divided by 1,000,000 times the distance between cables in inches; and, since the force varies as the square of the current, even, the surges which may be normally expected whenever an alternating circuit is made or broken are likely to subject adjoining cables to serious mechanical strains.

On single-phase cars or locomotives the actual motor voltages are low and the currents are proportionately high. In some cases the low-tension cables on such equipment cannot be run in conduit for mechanical reasons, and in others the use of conduit is practically prevented on account of heating. Consequently, the cables must depend upon their own qualities of mechanical strength to avoid damage. If they are stretched tightly, the lack of the equivalent of sag in an overhead wire naturally causes the tensile strain at the ends to be multiplied many times, and if they are hung loosely between supports, the opportunity for mechanical damage to the insulation by vibration and by striking adjacent objects is vastly increased. However, one sure method of avoiding difficulty is by separating the cables and supporting them firmly in their relative positions, a distance of 12 in. being sufficient on the normal types of equipment to reduce the repulsive force, even on a dead-short-circuit, to a point where its effects are easily controlled. On a single-phase locomotive, for example, taking a normal accelerating current of, say, 8000 amp at the motors, the repulsive force between two cables, even if they carried the entire current, would then average only 5.3 lb. per linear foot, varying between 0 lb. and 10.6 lb. with each half cycle, and this pressure would hardly be sufficient to set up abrasion of the insulation against the cable supports, provided they were set reasonably close together.

The municipal council of the city of Carlsbad, Austria, has under consideration a number of projects for improvements of some importance. The project for a 7-mile, meter-gage street railway, reported in 1910, has been revived and a new concession has been secured from the government. As the City Council plans to make this a municipal enterprise, there is a great deal of opposition by property owners, who see prospects of increased taxes to meet bond interest, and by hotel keepers, who fear that the value of their property will suffer on account of the noise of the traffic and the cheap transportation which will take their guests to the attractive suburbs. Thirty-four cars will be required.

HEADWAY CLOCK TO SHOW WHEN CAR IS DUE

The accompanying illustration is a drawing of a new headway clock which has recently been installed on suburban lines of the street railway system at Metz, Germany. The lower half of the dial of this clock is divided into the number of minutes which represent the longest headway on the system. The minute hand, which travels over these numbers, moves from the highest figure to zero. thus showing within how many minutes the next car is due. This scheme is very convenient for the prospective passenger, for without consulting a watch or timetable he can see at once how long he must wait for the next car. The clock is installed at regular stops and is operated as follows: On reaching the stop the conductor leaves the car and by means of a key sets the indicator for the prevalent headway of, say, ten or fifteen minutes. The setting of the minute indicator also winds up the clock spring for a complete run over the dial. When the indicator reaches zero it remains there for two minutes to take up minor delays in the schedule. If the delay exceeds two minutes, the indicator moves beyond zero to the section marked "out of service." This last position, therefore, indicates that there has been some unusual blockade. The clock is installed in a cast-iron housing with wooden top and may be mounted on an ordinary pole. The dial is about 9 in. in diameter. The housing is larger than necessary as the space above the dial is used for advertisements. This foregoing description is based upon an article in the *Deutsche Strassen u. Kleinbahn Zeitung*.



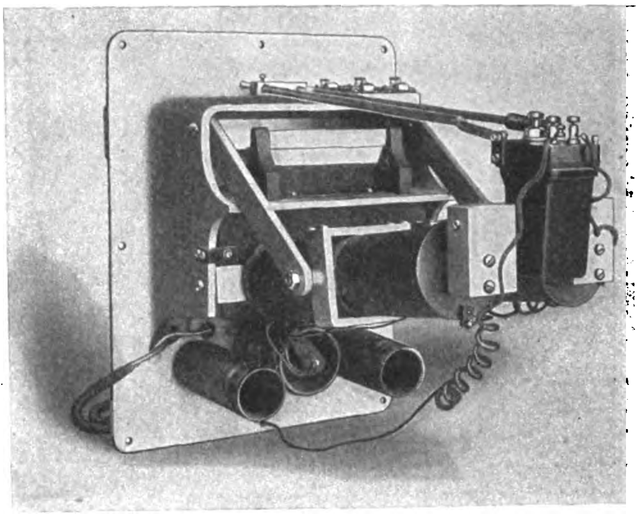
Electric Ry. Journal

Headway Clock at Metz

VOLTMETER FOR INDICATING PEAK VOLTAGES

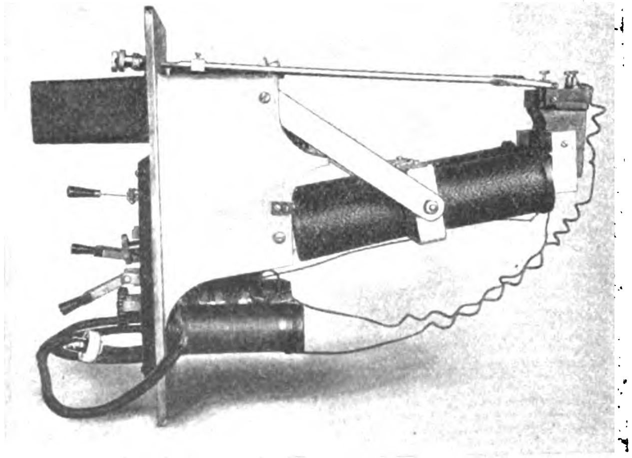
In testing insulated wires and cables the ordinary voltmeter often fails to measure adequately the stresses to which the dielectric is subjected. Voltmeter readings which are based on the integration of the sine wave—or the square root of the mean square of instantaneous values—give little or no indication of unusual peaks in the voltage wave or of surges in the circuit. The need of an instrument which would give such readings arose in high-voltage work, for in such tests of wires and cables the peak of the wave is what counts in breaking down the insulation. So long as a sine wave is maintained the ordinary voltmeter indicates the peak voltage (a definite percentage above the voltmeter reading); but in cable testing there is a large charging current due to the electrostatic capacity of the cable. As this current is likely to distort the wave form, the ordinary voltmeter may give no definite information as to peak voltage.

After trying and discarding both a spark gap, which proved to be too easily affected by outside conditions, and an oscillograph, which is too delicate an instrument for factory use, the engineers of the Simplex Wire & Cable Company, Boston, Mass., proceeded to develop for their own use apparatus which would give the required results. Based upon the principle of the oscillograph, but with its movement confined to a straight line, the new instrument, illustrated herewith, indicates the peak of the voltage wave at the limit of oscillation along that line. It does not show the character of the wave or form of its peak, but it does give very clearly the reading for that peak, whatever the shape of the wave may be. This peak voltage meter, in its original crude form, was used successfully in the Simplex factory for some time and thus thoroughly tested out. It has been completed in its present form after an experimental period extending over two years. Arrangements are now being made to market it.



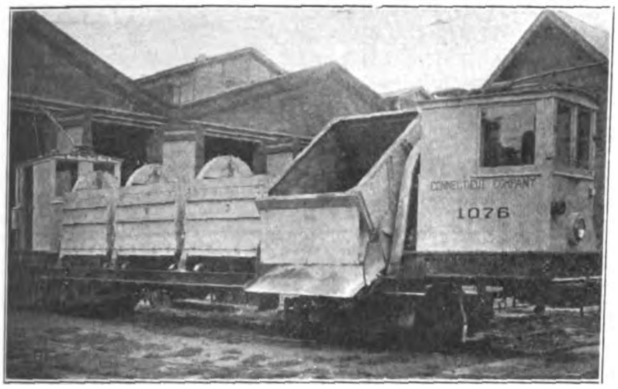
Rear View of Peak Voltage Meter Showing Vibrator Containing Box and Other Details of Construction

The voltmeter, which is of switchboard type, measures about 10 in. x 12 in. on the front and 14 in. deep. It consists essentially of a heavy electromagnet, between the poles of which the vibrator is placed. By a suitable arrangement of lamp, mirror and lenses, a beam of light is thrown on a ground glass scale in front, graduated in volts. This instrument is connected, through a potential transformer, directly on the high-voltage circuit, the current being so small that the apparatus can be left in the circuit all the time. It can be quickly calibrated at any time by applying direct current of known voltage.

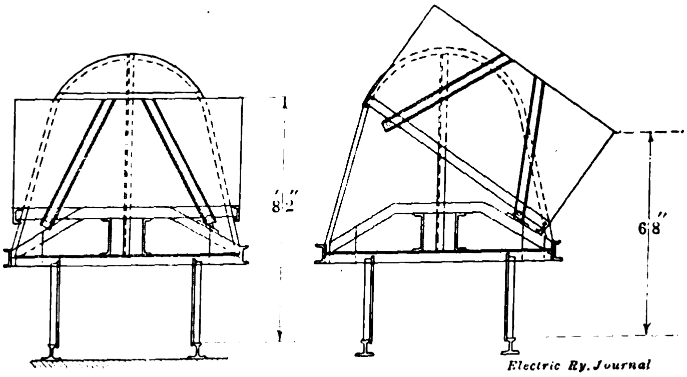


Side View of Peak Voltage Meter Showing Magnet Coils and General Construction

MOTOR-OPERATED STEEL DUMP CARS



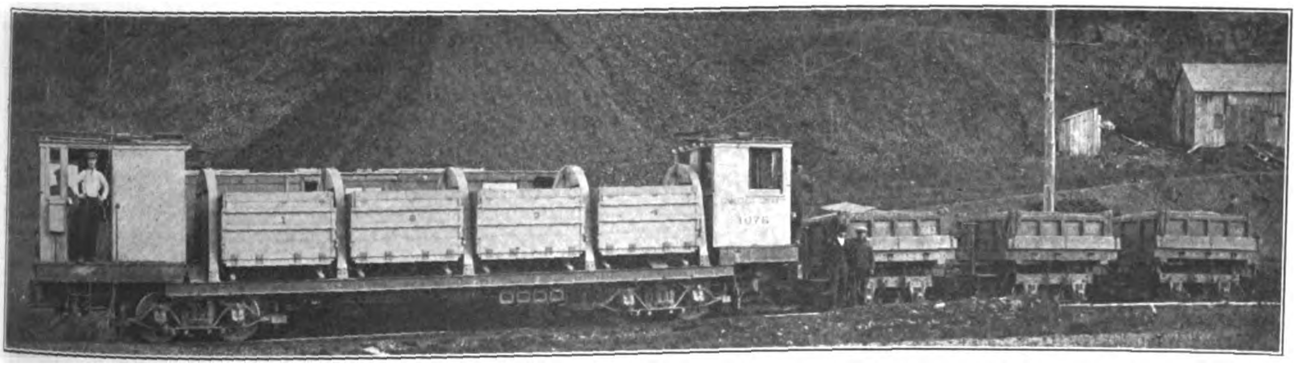
Steel Multiple Dump Car—View Showing Position Taken by Shelf When Dumping a Section



Steel Multiple Dump Car—Body in Normal Position and in Dumping Position with Sides Closed for Loading

Since June, 1913, the New Haven lines of the Connecticut Company have been using one and the Hartford lines of the same company four steel motor cars of the multiple-dump design shown in the accompanying drawings and illustrations. This car is the invention of one of the officials of the Connecticut Company, and it is built by the Wason Manufacturing Company, Brightwood, Mass. Such rolling stock naturally costs more than a home-made outfit of odds and ends, but its substantial construction and specialized design effect savings in operating cost which more than offset the bigger investment. Aside from this, it is wise to have every vehicle of the company free from unsightliness and inefficiency, no matter what purpose it serves.

The all-steel car is much cheaper to operate than the former train of ballast cars because its larger capacity, automatic dumping mechanism and self-contained propulsion equipment make it possible for one workman to dump easily in three minutes a load of 24 cu. yd. compared with the hard work of three men to dump in ten minutes a load fully 2 cu. yd. less. As a double-end, individual motor car, it can be maneuvered forward and backward with greater ease and safety than a train, nor does it have couplings to break on down grades or elsewhere. That it takes far less track space is evident from the accompanying halftone on which are paralleled a single 49-ft. steel dump car of 24 cu. yd. capacity and a 93-ft. combination of motor car locomotive and four trailers of 22 cu. yd. capacity. On right-of-way and other free-running sections this car is operated at speeds of 25 m.p.h. to 30 m.p.h. with perfect safety, which fact, taken in connection with its dumping mechanism, permits the cars at Hartford to run seven trips a day instead of the six trips customary with trains. Roughly speaking, the multiple dump car has reduced the cost of operation in the ratio of 7.5 to 5. An auxiliary advantage of this car is that when used for macadam work the dumping can be regulated so neatly that track scrapers may be dispensed with.



Steel Multiple Dump Car—Single-Motor Car of 24 Cu. Yd. Capacity Placed Alongside Train of Old Ballast Cars of 22 Cu. Yd. Capacity to Show That Latter Is 44 Ft. Longer

GENERAL DIMENSIONS AND CONSTRUCTION

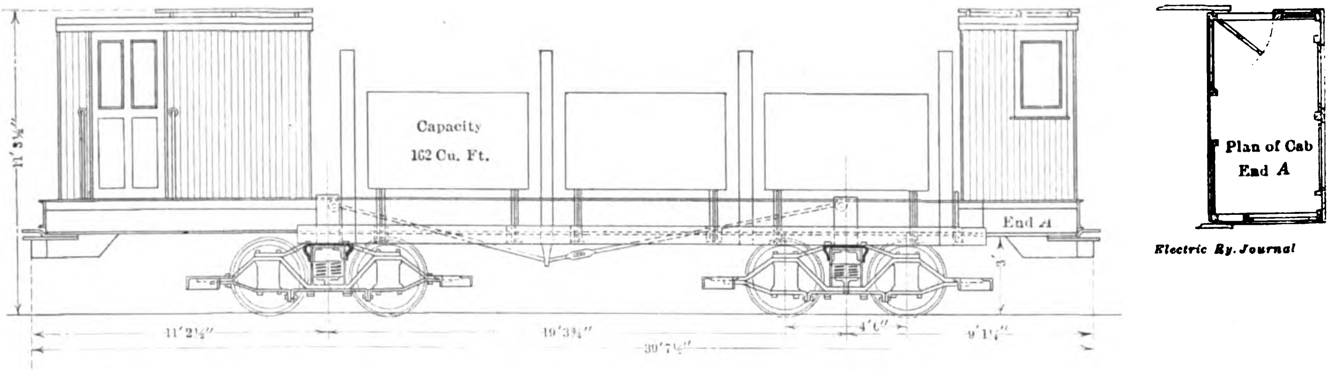
One of the first five cars built is shown in the halftone illustrations. These cars were made 48 ft. 8 in. over all and were fitted with four "dumpies" and a motorman's cab at each end. Except for the cabs, they are constructed of steel throughout, weighing 40 tons empty and 72 tons loaded. They are equipped with GE-80 motors and K control and are always operated singly. The motor for the dumping mechanism is of 6-hp capacity. Each of the four compartments can hold 8 tons of trap rock.

Experience with these cars showed that it was possible to cut down the weight without affecting stability. A lighter design, therefore, is now being incorporated in the smaller cars. The latter will have three 8-ton compartments and weigh approximately 90,800 lb. loaded. A description of this design follows:

The new cars are 39 ft. 7½ in. long over all, 8 ft. 3 in. wide, 8 ft. 5 in. from the top of the rail to the top of a compartment and have 19-ft. 3¾-in. truck centers. The underframe consists of side sills of 7-in channels, 9¾-lb. section, with 5-in. x 3-in. x ⅜-in. angles at the ends; two center sills of 15-in. channels, 33-lb. section, end sills of 12-in. channels, 20½-lb. section and truss rods of 1½-in. round iron upset at center to 1¾ in. and connected with turnbuckle. Both the top and bottom plates of the bolsters are of 10-in x 1-in. wrought iron or steel. The floor, end and apron plates of the body are ¼ in. thick. The trucks are of the Wason No. 30 type with 4-ft. 6-in. wheelbase and carry heat-treated axles with 4¼-in. x 8-in. journals and Symington journal boxes.

The dumping sections are operated from one cab by a 6-hp motor through drum and cable mechanism. The operator requires only twenty seconds to dump any single compartment in either direction. The sideboards open and close automatically with the raising or lowering of the dumping body. These boards, in opening, make an extended shelf or apron so that the trap rock or other material will be dumped far enough away from the track to avoid interference with the steps of passenger cars. The hoisting devices cut out automatically, so that when the body is raised high enough to dump the motor stops working; also when the body comes back in place the motor is automatically cut out and stops, thereby making it impossible for an inexperienced man to damage the machinery. The dump car is so geared that the maximum time for dumping and restoring the three sections is from two to three minutes. This speed makes it possible to use the dump car for hauling material and dumping it on track of all but the busiest lines without detriment to the regular schedule of passenger cars.

On most of the dump cars now in use it is necessary for the crew to unlock or open the sideboards from the ground, either with a bar or handle, thus delaying the operation of the car and subjecting to possible injury the men who unlock the sideboards. In this car these disadvantages are avoided by the self-operating doors on the dump car bodies, which require no attention from the crew because they act automatically in unison with the bodies when elevated to discharge the load.



Electric Ry. Journal

Steel Multiple Dump Car—Side Elevation

When the cars are to be used on construction work and it is necessary to shovel from the ground into the car, special catches are used in order that the sideboards may be fastened to the body and the bodies elevated to such a point that the top of the lower sideboard is only 6 ft. 8 in. from the ground. This enables the laborers to shovel from 4½ cu. yd. to 5 cu. yd. of material into the body, whereupon power may be applied to right the compartment. The weight of the car body and trucks, without load, air brake or power electrical equipment, is 44,000 lb.

A PROPOSED HOLLOW CONCRETE POLE

The Natural Reinforced Concrete Pole, Pile & Pipe Company, of Denver, Col., has been organized for the purpose of developing the use of reinforced concrete for constructing poles and pipes in place of wood and steel, a new process patented by R. M. Jones covering the basic method of manufacture. In this scheme the concrete for the poles is not cast in the usual manner but is rolled upon a collapsible central core by means of a moving belt. The concrete is carried in a loop in the belt and is subjected to heavy pressure by large rolls on either side so that the concrete, although it is mixed quite dry, is worked sufficiently to cause the excess water to run from the surface. The reinforcement is centrally located in the concrete walls and is made up of twisted square bars which are carefully woven with steel-wire warp.

The poles may be in any length desired up to 35 ft. in monolithic form. For greater lengths two sections are spliced by casting a short core of solid concrete inside of two poles set end to end, the reinforcing bars of each being extended beyond the ends into the core. The hollow construction makes the poles very light, comparatively speaking, and the casting machines are said to be relatively small, weighing about 30 tons and costing completely installed about $20,000. A casting machine is reported to be able to turn out one pole every fifteen minutes at a labor cost of approximately $1.50. The makers estimate the cost of the poles and fittings for a three-phase transmission line at about $976 per mile, using wooden poles spaced at 120-ft. intervals. With the new concrete poles spaced at 176-ft. intervals the cost is stated to be about $966 per mile, the greater span being permitted on account of the greater strength inherent in the concrete poles.

A NEW SYSTEM FOR TRACK-CIRCUIT SIGNALING WITHOUT PRELIMINARIES

The latest method of single-track automatic block signaling without preliminaries, developed by the Union Switch & Signal Company and known as the traffic direction block, or "T D B" system, was briefly described in the ELECTRIC RAILWAY JOURNAL for Oct. 4, 1913. Since that time several actual installations have been completed and, in consequence, additional details of the engineering features have become available. The features of the system aside from the elimination of preliminaries are the facts that two cars are permitted between sidings for following movements and that there is but one track circuit and four signals for each opposing block, the differentiation between opposing and following blocks being made because there are two following blocks contained in each opposing block which extends from siding to siding. A description of the arrangement of the apparatus that effects these conditions is given in the following paragraphs and diagrams on page 199.

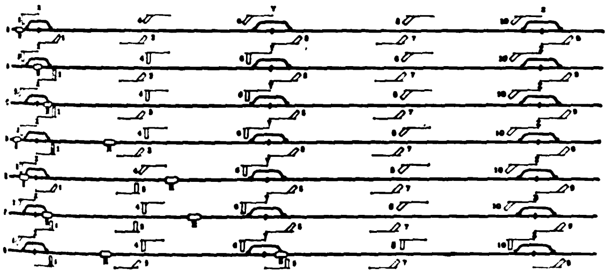
Each opposing block has one track circuit with two track relays, one at each end, and a transformer which supplies current at the center of the block. Each track relay will be shunted by any car which may be on the track circuit between the track relay itself and the transformer feeding it. Also, each track relay will be shunted by a car within a short distance on each side of the transformer. There is, therefore, a territory on each side of the transformer within which a car will shunt both relays.

Referring to the illustrations, it will be seen that in the block between *X* and *Y* there will be one track relay at signal 1 and another track relay at signal 6. Normally, signals 1 and 6 are controlled by both track relays or the entire section of track between signals 1 and 6. Signal 3 is controlled by the track relay at signal 6, and signal 4 is controlled by the track relay at signal 1.

An eastbound car entering the block *X-Y* at *X* will de-energize the track relay at signal 1, and thereby set signals 1, 4 and 6 at stop. As signal 3 is controlled by the track relay at signal 6, it will not be set at stop until the car reaches the point where it affects this track relay.

The car, in setting signal 4 at stop, energizes a line relay which is used to clear signal 1 after a car has passed signal 4. This line relay cuts out the control of signal 1 from the track relay at signal 6. As the car proceeds, passing signal 3, the track relay at signal 6 is de-energized, setting signal 3 at stop and still holding the other three signals at stop. When the car passes signal 4, the track relay at signal 1 is again energized and signal 1 is cleared. Incidentally, signal 4 is cleared because the track relay at signal 1 is energized, but this has no effect on east-bound movements. When the car has passed signal 6 all signals and relays again assume their normal positions unless a second car has entered the block at signal 1 before the first car passed signal 6. The operation for west-bound cars is similar.

The line relay is active only in connection with east-bound movements; west-bound movements have no effect upon it. Therefore a west-bound car will set signal 1 at stop when signal 6 is passed. Another line relay is used to limit the control of signal 6 in a similar manner for west-bound movements.



Block Signal System—Progressive Positions of Semaphores for Following Cars

The circuits are so arranged that but one of the two line relays can be energized at any one time. It will be evident that if an east-bound car should pass signal 1 at the same time that a west-bound car passed signal 6, signals 3 and 4, being directly controlled by the track relays, would afford positive protection.

It is not necessary to have any certain sequence of car movements. An east-bound car could proceed past signal 1 and afterward back out of this block instead of proceeding through, and all apparatus would again become normal when the car had left the block. The same would happen if a west-bound car should enter at signal 6 and then back out. The arrangement of circuits in conjunction with a standard relay so that it will be active for one direction of traffic only is not novel, nor does it involve complication of apparatus or circuits.

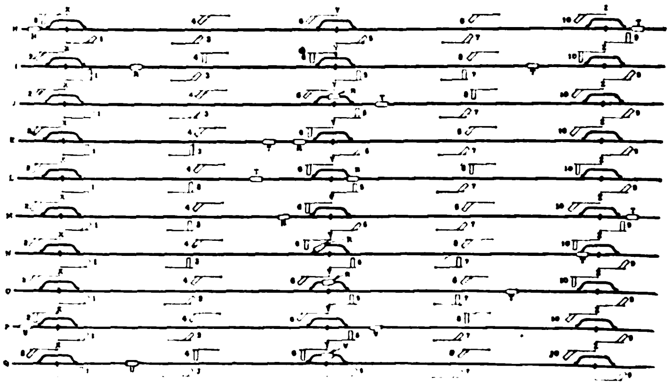
INSTALLATIONS

This signal system is now either in service or being installed on the interurban railways shown in the following table, in which a block is considered as the territory from siding to siding:

	Miles	Blocks
Chicago, Lake Shore & South Bend Railway........	55	20
Indianapolis, Columbus & Southern Traction Company	22	13
Chicago, South Bend & Northern Indiana Railway..	9.5	6
Louisville & Northern Railway & Lighting Company	3.5	2
Ohio Electric Railway........................	4.2	2
Scranton & Binghamton Railroad..................	10.1	9
	104.3	51

On these lines the semaphore signals, where used, are of the style "B," electrically lighted, two-position type, working in the upper left-hand quadrant. They are equipped with induction motors and the mechanisms are at the bottom of the posts. On the Chicago, Lake Shore & South Bend and the Chicago, South Bend & Northern Indiana all signals are semaphores. On the other roads light signals are used between sidings. These light signals are equipped with two 8-in. lenses each, and they carry hoods to screen the lenses from sunlight and backgrounds to increase the visibility. Behind each lens are two 25-watt, 16-cp tungsten lamps. The semaphore signals are directly controlled by the track relays, whereas the light signals require line relays which operate on 110-volt circuits controlled by the track relays.

All signal apparatus is designed for sixty-cycle operation except on the Scranton & Binghamton and the Ohio Electric Railway, where twenty-five-cycle current is used. The signal slot coils are controlled by line wire circuits through the track relay contacts, whereas the signal motor circuits receive their current from transformers at the sidings. They are on purely local circuits. Transformers with two secondaries, one for the track circuits and one to deliver 110 volts, supply current at the center of the block for the track and to line and intermediate signal circuits. Other transformers with one 110-volt secondary each, placed at the turnouts, supply current for the siding semaphore signals and line circuits. These transformers are provided with taps as required, and all receive current from the 2200-volt a.c. mains.



Block Signal System—Progressive Positions of Semaphores for Opposing Cars

On the five 600-volt, d.c.-propulsion roads the impedance bonds have a capacity of 500 amp per rail. The impedance bonds on the Chicago, Lake Shore & South Bend, where alternating current at 6600 volts is used, have a capacity of 200 amp per rail. Circuit controllers connected to the switch points require the switches to be set for the main line before the signals at the sidings can assume the clear position.

It is reported that work on the Granada-Maracena tramway will begin at once. This line, beginning in Granada, Spain, follows the Alcandete national highway to the Sur de España Railway bridge part way and then the district highway to Maracena.

News of Electric Railways

Communication from Company Regarding Franchise Negotiations in Toledo

At a meeting of the railways and telegraph committee of the City Council of Toledo, Ohio, on Jan. 15, F. R. Coates, president of the Toledo Railways & Light Company, asked that the city take steps at once toward arranging a conference on the franchise question with the representatives of the company. He explained that the company desires to furnish the best service obtainable at the lowest possible cost, but that it will not be able to operate on a 3-cent fare, as provided in an ordinance, in effect on March 27, passed by the old Council. Mr. Coates suggested that the city name two representatives and that he and one of the company's attorneys represent the company, the four to choose a fifth man from among the business men of the city. The committee appointed a sub-committee, consisting of Mayor Keller, City Solicitor Thurstin and Councilman Harry T. Irwin, C. C. Kilbury and F. M. Dotson, to confer with the railway officials and report some plan of procedure to the Council by Feb. 1.

In addressing the committee Mr. Coates said in part:

"The corporation I represent is extremely anxious to get down to cases on this franchise question. We want to be fair with the city and all persons in the city. The interests of Toledo are our interests and we want to provide the best possible street car service at the lowest possible cost to our patrons. All we ask is as fair consideration from the city. A report of investigators who examined the company's books for 1912, of which the company and the city have copies, shows that it is impossible for the company to provide adequate service at a 3-cent fare.

"This report and our records prove that the ordinance passed by the last Council, to become effective March 27, is unjust and prohibitive of continued street car service from the company. The company asks only a fair income from its investment, which any corporation must have in order to retain capital and do business. I believe the people of the city want the company to have the fair wage it asks. Prompt and fair examination of the situation by both interests should result in an early and satisfactory franchise agreement being reached."

In his first communication to the City Council City Solicitor Thurstin recommended that the municipal pledge of 3-cent fares and universal transfers be adhered to, that street railway and other utility privileges be awarded to the corporations which made the best bid and that interurban lines operate through the city on separate and independent franchises.

In his first message Mayor Keller recommended low street railway fares and said that municipal ownership is the ultimate end of all negotiations with the company.

Inaugural Address of Mayor Hocken of Toronto

Mayor Hocken of Toronto, Ont., on Jan. 12 delivered an inaugural address covering a wide range of subjects. Referring to the street railway question, he announced that the agreement which it is proposed to submit to the ratepayers has been prepared. He said in part:

"If the provincial government could be induced to enter into negotiations for the acquisition of the Toronto & York Radial Railway outside the city and the electrical plant now controlled by Sir William Mackenzie, it would clean up the franchise within the city of Toronto and practically over the whole of Ontario."

He urged members of the Council to avoid being "stampeded" into decisions against their own judgment. The possibility of the extension of the civic car lines was outlined, the prophecy being that these would be extended to connect with the existing city system at points like Lansdowne Avenue and Royce Avenue and at Dovercourt Road and Van Horne Street.

At the request of the Mayor, a committee has been appointed by Council from the different public bodies for the purpose of digesting all the information available upon the street railway transportation question, and with power to make any further investigations that the members may deem desirable, in order to prepare a recommendation to submit to the properly qualified ratepayers.

Comptroller Church brought forward the question of providing further civic car lines at the session of the Board of Control on Jan. 16, and it was decided that Works Commissioner Harris should report on a civic belt line at the Beaches to connect with the Gerrard and Danforth car lines, on Windermere Avenue to connect with the portion of the Mimico Division of the Toronto & York Radial Railway, which the city will purchase, on the Lansdowne Avenue extension, and on a belt line in Ward Seven. He also seeks to have the corporation counsel report on the cancellation of the stub-line franchise at the Beaches.

Subway Matters Considered in Chicago

Plans for subways for the surface railways of Chicago, to cost in the aggregate $32,385,000, were tentatively agreed upon by the subway committee of the local transportation committee of the City Council on Jan. 10. Recommendations of the board of supervising engineers already submitted involve an estimated expenditure of $27,285,000. George Weston of the board of supervising engineers was asked to prepare plans to extend the system, principally on the West Side, as far as possible with an additional expenditure of $5,100,000. The subway routes tentatively adopted by the committee and the estimated cost of the tunnels are given below:

Clark Street, North Avenue to Twenty-second Street..	$11,500,000
Washington Street from the tunnel under the river to Michigan Avenue, Michigan Avenue from Washington Street to Jackson Boulevard, Jackson Boulevard to Van Buren Street tunnel, including also an extension west on Washington Street to Sangamon Street.....	7,900,000
Robey Street, Fullerton Avenue to Diversey Boulevard	990,000
Robey Street, Blue Island Avenue to Thirty-second Street	2,290,000
Robey Street, Thirty-ninth Street to Forty-sixth Street.	2,420,000
Ashland Avenue, Clybourn Place to Clybourn Avenue..	1,030,000
California Avenue, Grand Avenue to Kinzie Street.....	1,155,000
Total	$27,285,000

The first two items are for subways complete, including track equipment and power distribution system. The last five items are exclusive of whatever sum is necessary for private property easements.

Under a suspension of the rules approval was obtained on Jan. 12 of a resolution providing for the printing of 50,000 subway petition blanks to be circulated under the direction of the local transportation committee. The form in which it is planned to present the question follows:

"Shall the city of Chicago use its traction fund, to the extent the same shall be sufficient, to construct an initial system of municipally owned passenger subways in Chicago, such system of subways to be extended from time to time as traffic conditions shall require, and when constructed, the use thereof, to the extent specified in the following named ordinance, to be leased on a fair basis to the surface street railways of Chicago to Feb. 1, 1927, and to be operated by them in connection with the unified operation of their systems, for a single 5-cent fare with universal transfers, all pursuant to the terms and provisions of an ordinance passed by the City Council of Chicago prior to April 7, 1914?"

On Jan. 15 Bion J. Arnold presented to a sub-committee of the Council committee on local transportation a report supplementing the recommendations he made last October. He showed how the bores could be extended into districts aldermen said were "ignored" in the first report. In addition to the Clark Street subway under the central section and the west side double route using the existing tunnels under the river, he charted extensions for the benefit of the west, the northwest, and the southeast sections of the city. The cost of the two initial routes Mr. Arnold has placed at $17,909,000. The extensions would cost $8,868,000 more. The opening of five stretches of "closed" street of the west side, already approved by the Aldermen, would cost $7,540,000, he figured. Further, he proposed the creation of underground car storage facilities that would cost $1,000,000.

These figures total $35,317,000 for the subway structure, and the estimate of the cost of equipment, including tracks, station furnishings, lighting, ventilating, and signaling, is $1,606,000. The routes and estimates of cost furnished by Mr. Arnold in his report were:

	Subway Structure	Equipment
Clark Street, Nineteenth Street to North Avenue	$11,093,000	$407,000
Washington Street, Michigan Avenue, Jackson Boulevard and Franklin Street, between east ends of tunnels	6,816,000	184,000
Car storage facilities under Michigan Avenue and Grant Park, Washington Street to Jackson Boulevard	1,000,000	276,000
Totals	$18,909,000	$867,000
North Robey Street, Fullerton Avenue to George Street	926,000	64,000
South Robey Street, Blue Island Avenue to Thirty-third Street	2,214,000	76,000
North Ashland Avenue, Clybourn Place to Fullerton Avenue	968,000	62,000
South Robey Street, Thirty-ninth Street to Forty-sixth street	2,332,000	88,000
North California Avenue, Grand Avenue to Fulton Street	1,100,000	55,000
Totals	$7,540,000	$345,000
West Washington Boulevard, west end of the tunnel to Union Park	2,979,000	125,000
Jefferson Street or Desplaines Street to Milwaukee Avenue, thence to Chicago Avenue	2,831,000	111,000
Indiana Avenue, Sixteenth Street, under Grant Park to Washington Street	3,058,000	158,000
Total of extensions	$8,868,000	$394,000
Grand totals	$35,317,000	$1,606,000

President Wilson's Message

Among the significant statements made by President Wilson in his message on anti-trust legislation which he read to Congress on Jan. 20 were the following:

"It will be understood that our object is not to unsettle business or anywhere seriously to break its established courses athwart. On the contrary we desire the laws we are now about to pass to be the bulwarks and safeguards of industry against the forces that have disturbed it. What we have to do can be done in a new spirit, in thoughtful moderation, without revolution of any untoward kind.

"The country is ready to accept a law which will confer upon the Interstate Commerce Commission the power to superintend and regulate the financial operations by which the railroads are henceforth to be supplied with the money they need for their proper development to meet the rapidly growing requirements of the country for increased and improved facilities of transportation. We cannot postpone action in this matter without leaving the railroads exposed to many serious handicaps and hazards. The prosperity of the railroads and the prosperity of the country are inseparably connected.

"The business men of the country desire the advice, the definite guidance and the information which can be supplied by an administrative body, an interstate trade commission.

"In connection with producing industries there ought to be an administrative commission capable of directing and shaping such corrective processes, not only in aid of the court, but also by independent suggestion if necessary.

"Inasmuch as our object and the spirit of our action in these matters is to meet business half way in its processes of self-correction and disturb its legitimate course as little as possible, we ought to see to it that penalties and punishments should fall, not upon business itself, to its confusion and interruption, but upon the individuals who use the instrumentalities of business to do things which public policy and sound business practice condemn.

"We are agreed, I take it, that the holding companies should be prohibited, but what of the controlling private ownership of individuals or actually co-operative groups of individuals? Shall the private owners of capital stock be suffered to be themselves in effect holding companies? Shall we require the owners of stock when their voting power in several companies which ought to be independent of one another would constitute actual control to make election in which of them they will exercise their right to vote? This question I venture for your consideration.

"I hope that we shall agree in giving private individuals who claim to have been injured by the exterminating forces of combination the right to found their suits for redress upon the facts and judgments proved and entered in suits by the government where the government has upon its own initiative sued the combinations complained of and won its suit, and that the statute of limitations shall be suffered to run against such litigants only from the date of the conclusion of the government's action."

Strike in Hazleton

Thirty-five conductors and motormen employed by the Lehigh Traction Company, Hazleton, Pa., went on strike on Jan. 1. Recognizing the responsibility resting on it, the company has endeavored to reach a satisfactory adjustment of the differences. Under the existing agreement governing the wages of the motormen and conductors of the Lehigh Traction Company, the following scale is in force: First year, $1.98 a day, or 22 cents an hour; second year, $2.07 a day, or 23 cents an hour; third year, $2.16 a day, or 24 cents an hour. The demands made by the men are briefly 35 cents an hour, or $3.15 a shift of nine hours, with time and half-time for overtime, or 52½ cents an hour. The company submitted the following proposition, to wit: First year, 23 3/9 cents an hour; second year, 24 4/9 cents an hour; third year, 25 5/9 cents an hour; for overtime, 26 cents an hour. This is equivalent to an advance of more than 7 per cent. In a statement which it issued the company said in part:

"The revenue derived from the operations of the company does not warrant an advance in wages, even to the extent of the increase proposed by the company. It is only in anticipation of a greater volume of business in the future that the officials of the company feel justified in offering the increase proposed.

"To accede to the demands thus made would invite serious consequences to the bondholders and stockholders of the company. It must be remembered that during the twenty years of its operation the company has thus far been unable to declare a dividend upon its stock. We cannot, as officers, justify an advance which the earnings of the company will not warrant. To do so would lead to financial disaster.

"The second point in controversy is the demand of the employees that all questions, including rates of wages, which cannot be agreed upon between a committee of employees and the officers of the company shall be submitted to arbitration. The company is willing to arbitrate all questions except the right to hire, discharge and discipline employees. Inasmuch as the agreement stipulates the rate of wages, there is nothing in that feature to submit to arbitration."

In the negotiations which preceded the strike the company endeavored to treat its employees and their committee with deference and courtesy. It was requested that no decisive step be taken in the matter, nor should negotiations be broken off, until Jan. 10. This was done so that the public might take steps in the interest of its own convenience. The company received assurance that at least two full days' notice would be given before the inauguration of any strike. In this matter the employees did not evince good faith. The strike was precipitated with only one day's notice.

Group Insurance for San Francisco Employees

On Jan. 1 the United Railroads, San Francisco, Cal., took out group insurance for all of its employees who have been in the service of the company three years or more. All of those who have been in the service of the company between three and four years were insured for $250 each; those employed four to five years, $500 each; five years and over, $1,000 each. The individual is not furnished with a policy, as the men are all insured in the name of the company, but each employee was presented with a card which will entitle his or her beneficiary to receive from $250 to $1,000, in accordance with the plan. The insurance was placed without cost to the employee. At the time the company notified its employees of the group insurance plan it advised them of an increase in wages. These matters were covered by the following notice issued to trainmen and employees:

"The new administration of the United Railroads has thus far occupied itself chiefly with two considerations—the improvement of its service and the welfare of its employees. Notwithstanding the very severe conditions existing in the money markets of the world, the company has thus far been able to comply with all the requests of the city and state officials and with many of the requests of the improvement clubs of the city. It has investigated every complaint and endeavored in each instance to remove the causes of the criticism.

"It has appreciated that with the present high cost of living it must go to the limit of its resources in improving the condition of its employees, and to this end it proposes to inaugurate the three following plans:

"First—The families of all employees of the company who may die while in the employ of the company will, without any expense for premiums or otherwise, receive $250 after three years' service, $500 after four years' service and $1,000 after five years' service. Even at the present time this benefit would accrue to the families of about 1600 employees.

"Second—Beginning with Jan. 1, 1914, the wages of platform men who have served six months will be increased 1 cent an hour; the wages of those having served one year or more will be increased 2 cents an hour.

"Third—In view of the fact that the paramount duty of the company is to avoid the killing and maiming of people, and that to accomplish this we must have the loyal and skilful co-operation of our platform men, it is proposed to offer a special reward for such co-operation. The basis for the proposed plan will be the money paid during the year 1913 for damage claims, and to the extent that in succeeding years the amount of such claims may be diminished we shall distribute among the platform men the entire amount so saved, in proportion to their actual hours of employment during the year in which the saving was effected."

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., has issued a statement in regard to the company's future policy relative to the improvement of the service rendered and the welfare of its employees.

Annual Report of Chicago Smoke Abatement Committee

The committee which is investigating smoke abatement and electrification of railway terminals for the Chicago Association of Commerce has submitted its annual report for the year 1913. Researches concerning sources of atmospheric pollution have been completed, and the conclusions are now being prepared for final presentation. The committee has investigated types of locomotives which might be substituted in the terminal district of Chicago for the existing steam locomotives. In these investigations it has conferred with those interested in the development of an internal combustion engine-locomotive and has studied the storage battery as applied to traction. No locomotive of these general types has as yet been produced in any country which is capable of performing satisfactorily the present-day switching and other services in the railway terminals of Chicago.

The changes which would be necessary in the existing structures of the steam railroads, such as overhead bridges, station platforms, signal masts and bridges, track circuits, etc., in order to install the third-rail or overhead contact systems are being listed and their cost estimated to the end that upon the completion of this phase of the work complete data on all phases of the work may be available.

Revocation of Union Depot Franchise in Cincinnati Recommended—Other Events

The ways and means committee of the City Council at Cincinnati, Ohio, has recommended the revocation of the White-Bleekman union depot franchise, notwithstanding the fight made by Mr. Bleekman to retain it. City Solicitor Bettman has, however, prepared another franchise ordinance which will separate the steam railway and electric railway depot plans and provide for commissions for each to see that the terms of the franchises are carried into effect. The determination to revoke the depot franchise was brought about through delay in beginning the construction at the time specified in the franchise.

The final changes in the general re-routing plan adopted by the Council some months ago were put into effect by the Cincinnati Traction Company on Dec. 27, 1913, so far as it was possible to do until still further changes are made in the tracks in the down-town district.

William F. Molloy has been recently bound over to the grand jury by Municipal Judge Alexander in the sum of $1,000 each on the charges of assault with intent to kill and hurling missiles at a street car. The alleged acts took place during the strike of the employees of the Cincinnati Traction Company last May. He is said to have confessed that he threw a bag of cement and a heavy window weight from an upper floor of the new Union Central Life Building, then in course of construction. The cases against John Brulard and Walter Maley, who were arrested on similar charges, have been dismissed.

Conference Regarding Cleveland Subway

After a conference on Jan. 13 with W. R. Hopkins, A. B. du Pont and Thomas Schmidt of the Cleveland Underground Rapid Transit Company, Mayor Newton D. Baker of Cleveland, Ohio, announced that the city's plan for building an underground terminal at the Public Square and a subway between that point and West Ninth Street would in no way interfere with the company's plans. The subway proposed by the city will cost about $1,600,000, according to estimates made by the city's engineering department. The city has requested the Cleveland Underground Rapid Transit Company to co-operate with it in the construction of the subway.

Councilman Stolte started a movement recently to reduce the salaries of a number of city officials and employees and included Peter Witt, the street railway commissioner, in this number. He proposed to reduce Mr. Witt's salary from $7,500 a year to $7,000. Mr. Witt announced that he would resign if his salary is reduced.

Differences of opinion over rates are said to have delayed the establishment of freight service by the interurban lines entering Cleveland. The merchants want a tariff only slightly above the steam railroad rates. The interurban roads furnish practically an express service and the managers of the companies say that they cannot furnish this service with profit to themselves at the rates the merchants desire.

Protest Against Order of Ohio Commission.—Attorneys Thomas Hogsett, Cleveland, and John C. Welty, Canton, representing the Northern Ohio Traction & Light Company, appeared before the commission on Jan. 14 to protest against the order of the commission requiring concrete foundations for the local tracks in Massillon. T. H. Davis, Massillon, city solicitor, appeared in behalf of the town.

Further Negotiations for Batavia Property.—W. R. Brown, representing the Railway Storage Battery Car Company, New York, N. Y., has been in communication with the Mayor of Batavia and the committee which is endeavoring to assist the Buffalo & Williamsville Electric Railway to sell its line in Batavia, N. Y. If Mr. Brown does not buy the line, the Mayor says he will organize a company to take over the property.

Utilities Board in the Philippines.—The appointment of a public utilities commission in the Philippines was announced to the War Department on Jan. 16, 1914, by Governor-General Harrison. Judge Mariano Cui has been named Chairman, to serve six years, and the other members are Stephen Bonsal, four years, and Clyde A. DeWitt, two years. Judge Cui long has been prominent in Philippine affairs, Mr. Bonsal was Governor Harrison's secretary, and Mr. DeWitt, an attorney, has been in the Philippines since 1902.

Drivers of Vehicles Must Exercise Reasonable Care.—In a decision dismissing the action of the owner of a horse-drawn vehicle for damages caused by the vehicle being knocked over by one of the cars of the Montreal Park & Island Railway, Montreal, Que., the judge stated that while those in charge of cars must take every means to render their operation as safe as possible, cars are a public necessity and have the right-of-way on their tracks and it is the duty of others using the streets to respect that right-of-way.

Mr. Harvey Approves Withdrawal of Kansas City Franchise.—Ford Harvey, one of the receivers for the Metropolitan Street Railway, Kansas City, Mo., approved the action of his colleague on returning to Kansas City from Chicago recently. He said: "I think it was unfortunate that Mr. Dunham was forced to withdraw the franchise ordinance from the consideration of the council committee, but nothing else could be done under the circumstances. Mr. Dunham had no alternative. His action meets with my approval."

Finding of Arbitration Board in Cincinnati.—The board of arbitration which has been considering the differences between the Cincinnati Traction Company and its motormen and conductors made public its finding at a meeting on Jan. 14. The vote was unanimous. The finding comprised the terms submitted to the men some time ago and approved by them. The board consisted of Walter A. Draper, representing the company; John Frey, representing the men, and Herman Schneider, dean of the University of Cincinnati, as umpire.

The Potters of Providence.—The Providence *Sunday Journal* of Jan. 4, 1914, contained a review of the connection of A. T. Potter and A. E. Potter, father and son, with street railway and electric railway development in Rhode Island. A. T. Potter has for some time been vice-president of the Rhode Island Company, operating in Providence and elsewhere in Rhode Island, and A. E. Potter was recently elected president of the company to succeed Howard Elliott, who is now chairman of the board. The article was accompanied by excellent likenesses of both the Potters.

Columbus to Provide for Municipal Ownership.—A special committee of the charter commission of Columbus, Ohio, is working on the sections that will provide for municipal ownership of public utilities. Franchises granted under the charter are to be operative for twenty-five years and no renewal is to be made earlier than two years before the expiration of the grant. Exclusive franchises will not be permitted. Nothing in the ordinance or contract granting a franchise is to prevent the city from acquiring the property of the utility by condemnation proceedings or in any other lawful way.

Bids for Additional Rapid Transit Sections in New York.—Bids for two more sections of the new rapid transit railroads in the Bronx were advertised for on Jan. 19, 1914, by the Public Service Commission for the First District of New York. One of the sections is on the White Plains Road extension of the existing subway, and the other on the Jerome Avenue branch of the Lexington Avenue subway. The White Plains Road section is known as Section No. 1 of Route No. 18. The section on the Jerome Avenue branch of the Lexington Avenue line is known as Section No. 2 of Route No. 16, and extends from about 182d Street to Woodlawn Road, the terminus of the line. Bids for this section will be opened on Feb. 10. The railroad in both sections will be a three-track elevated line.

New Jersey Supreme Court Upholds Commission.—On a writ of certiorari to determine the legality of a permit of the Board of Public Utility Commissioners of New Jersey to the Phillipsburg Horse Car Railroad granting permission to reconstruct its lines with tracks of standard gage, the Supreme Court sustained the action of the commission as against the pre-existing contract between the car line and the municipality. The court held that the power conferred upon the town to regulate the exercise of the franchise of the railroad was in the nature of a police power that might be modified or repealed by the Legislature as public expediency demanded. The court stated that the change of gage ordered by the commission was not intended to change the legal status of the road or vary its obligations to the municipality under the provisions of any special statute applicable to it.

Tax Question in Ohio.—Attorney-General Hogan of Ohio has requested the Supreme Court to pass upon the question as to whether railroads which lease their properties to other companies must pay the Willis law tax of three-twentieths of 1 per cent on their capital stock. The question was raised in the case of the State against the Cleveland & Pittsburgh Railroad, the property of which is operated by the Pennsylvania Railroad under lease. The Common Pleas Court decided for the State, but the decision was reversed by the Court of Appeals. This court has been asked to certify the case to the Supreme Court for review. The Common Pleas Court gave judgment for $85,000 in favor of the State. Should the State win in the end, it is said that the back taxes will amount to more than $1,000,000. Several interurban roads, as well as street railways and light and power companies, are interested in the case.

Separate Operation of the Fort William-Port Arthur Line.—The municipal departments of Fort William and of Port Arthur, Ont., have made a temporary arrangement for the operation of a through service between the two cities just as in the past when the municipal electric railway between the two cities was under the management of a joint board appointed by the cities. Cars and crews will run through, but the fare boxes will be changed at the boundary between the cities. It is provided that if, in the regular schedule time of operating this through service, cars should be detained longer in one city than in the other, that city in which cars are detained shall pay the extra operating cost. Each city is to have distinctive tickets. The wages of the employees are to be the same in both cities. The power wires are to be equipped with a section breaker at the boundary line, but a cut-over is to be arranged so that either city can feed the other's line in case of an emergency. A by-law is to be submitted at Fort William to authorize the city to raise $238,000 to improve and extend the system in Fort William.

Track Material Wanted for Subway Work in New York.—In preparation for the temporary operation of the Fourth Avenue subway in Brooklyn, the Public Service Commission for the First District of New York has prepared a form of contract for track materials, etc., to be used in equipping the subway. Heretofore it has been the practice of the city to let a contract for the equipment of subways and allow the contractor to purchase the materials. With the dual system, however, there is so much of this work to be done that the commission has decided to go into the market itself and purchase rails, ballast, spikes and other articles necessary for placing the subways in shape for operation. Public hearings on this contract have been held, and the commission will soon advertise under it for proposals to supply the quantities of such materials estimated as necessary for the equipment of the Fourth Avenue subway between Manhattan Bridge and Eighty-sixth Street station. The engineers estimate that 3399 tons of No. 1 open-hearth rails, 200 tons of No. 2 open-hearth rails, 260 tons of manganese rails, 45,850 cu. yd. of ballast, 6820 cu. yd. of concrete and 1,765,000 ft. of ties will be used in the equipment of the line.

Subway Construction Contract Re-awarded.—The Supreme Court having declined to order the Public Service Commission for the First District of New York to allow the Thomas J. Buckley Engineering Company to change the figures in its bid, the commission has awarded the contract for Section No. 2 of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhatan, to the Degnon Contracting Company, for $3,059,522. Bids for this section were first opened on Oct. 1, 1913. The Thomas J. Buckley Engineering Company was the lowest bidder. The chief engineer of the commission made an unfavorable report on the Buckley bid, on the ground that the company lacked the experience and equipment necessary to perform one of the most difficult pieces of work on the new subway system. The commission thereupon rejected all bids and readvertised the section. The bids under readvertisement were opened on Dec. 2, 1913, and according to the official figures the Degnon Contracting Company was the lowest bidder, at $3,059,522. The Thomas J. Buckley Company was the third lowest bidder, and claimed that it would have been the lowest if a mistake had not been made in transcribing certain figures in its bid to the official copy submitted to the commission. The Buckley company then asked the court for an order to prevent the commission from awarding the contract to the Degnon company and to authorize the commission to allow it to change its figures. This the court refused to grant.

Judgment in Easement Case in Seattle.—The failure of Peabody, Houghteling & Company, Chicago, representing the bondholders of the Seattle, Renton & Southern Railway, Seattle, Wash., to appear in the condemnation proceedings instituted by the city of Seattle for the widening and changing of grades on Rainier Avenue has resulted in the entering of a default judgment of $10 for all of the right-of-way claimed by the company and the bondholders between Jackson Street and Kenyon Street, on the line of the Seattle, Renton & Southern Railway, valued at $1,200,000, and on which the company will be forced to expend $475,000 to bring its tracks to the new grade and make other improvements proposed by the city for Rainier Avenue, including paving. This judgment does not in any way affect the right of the company to retain and operate its tracks on the street. Scott Calhoun, receiver of the company, was prevented from appearing as the attorney for the bondholders after appearing for the company. The right of John G. Higgins and W. A. Peters, who have represented the bondholders in other litigation, was questioned through their failure to show credentials, and Judge Humphries entered the judgment for $10, claiming that nearly a year ago the bondholders had defaulted by not being represented in court when the original condemnation proeedings were before the court. In 1907 a franchise was granted to W. R. Crawford for the Seattle, Renton & Southern Railway, with the provision that he deed the right-of-way, acquired by purchase and dedication, to the city for street purposes. The quitclaim deed for the property was delivered to the city by the terms of the franchise grant in 1908. A few months before the delivery of the deed, however, all of the property was mortgaged and the trustee of the mortgage declined to become a party to the transfer. Assistant Corporation Counsel Howard M. Findley, who represented the city in the proceedings, will ask the City Council to accept the award of the jury and the acceptance of the award will be the signal for the resumption of improvement work on Rainier Avenue and intersecting streets.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

More than 350 bills have been filed for the consideration of the incoming Legislature. Among the measures are the following: To authorize the Public Service Commission to employ auditors; to regulate the sale of securities similar to the Kansas "blue sky" law; to amend Section 33, Part 3 of Chapter 463, Act 1906, so that a street railway may, with the approval of the Public Service Commission, purchase for its sinking fund and other special funds its own or stocks and bonds of other companies; to permit street railways with the approval of the Public Service Commission to issue bonds, coupon notes and other evidences of indebtedness payable at periods of more than twelve months to such an amount in excess of the amount of capital stock at time actually paid in as determined in Chapter 620, Acts 1908; to have annual returns on street railways and returns for assessment of the commutation taxes cover the same periods of time in each year.

NEW YORK

The legislative committees were named on Jan. 19. On Jan. 20 Assemblyman Sullivan, of Chautauqua, introduced a bill providing for a maximum railway passenger fare of 2 cents a mile but giving the Public Service Commission power to exempt any railroad upon proof that it could not earn a reasonable compensation at that rate. A bill similar to this was vetoed by Governor Hughes in 1907. Senator Griffin, of the Bronx, has re-introduced his bill of last year providing for a 5-cent fare on all steam and electric railways between stations in one borough of New York City and stations in an adjoining borough. Mr. Thompson, of Niagara County, has introduced a bill in the Senate to extend the time within which the line of the Electric City Railway may be finished and put in operation. Senator Carswell has introduced a bill amending the stock corporation law by making the provisions of the section relative to the consents of stockholders to mortgage the corporation's property and the certificate showing such consent applicable to the mortgaging of real property situated within the State and belonging to a foreign corporation. The measure has been referred to the judiciary committee.

The following act to amend the railroad law in relation to the minimum number of employees to be employed in the operation of street surface railroads has been introduced in the Assembly and referred to the committee on railroads:

"Section 1. Article 5 of Chapter 481 of the Laws of 1910, entitled 'An act in relation to railroads, constituting Chapter 49 of the Consolidated Laws,' is hereby amended by adding at the end thereof a new section, to be Section 210, to read as follows: 'Sec. 210. Crew for surface car. No passenger car of any street surface railroad propelled by animal or horse power, cable or electricity, shall be operated upon such street surface railroad, its extensions or branches unless there shall be employed thereon at least one employee additional to the person operating and in charge of the motive power propelling the same, and the person or employee in charge of the motive power of such car shall have no other or further duties while actually so engaged than are incidental to the operation of the same. A person or corporation violating the provisions of this section shall be liable to a penalty of $50 for each violation.' This act shall take effect immediately."

OHIO

Former Senator John N. Stockwell, one of the chief supporters of Mayor Newton D. Baker of Cleveland, has forwarded to Governor Cox of Ohio a draft of a bill that he will ask to be enacted into a law at the special session of the Legislature to be convened soon. This will provide that bonds may be issued in excess of the legal debt limit by cities to provide funds to acquire or construct public utilities within or without the city, provided such utilities produce sufficient income at the time they are acquired to cover the interest charges, pay operating expenses and provide a sinking fund. The bonds are to be a lien on all the property of cities following this plan. It is plain from the letter accompanying the measure when he transmitted copies of the draft to members of the Legislature that Governor Cox does not wish to father this bill at the present time. A bill similar to this passed the House at the last session.

RHODE ISLAND

A resolution creating a legislative committee to inquire into the advisability of the State acquiring the electric railways in Rhode Island has been introduced in the Senate by Senator Munroe, of Providence. The resolution has been referred to the judiciary committee with instructions to report to the Legislature before March 1, 1914. Recommendations for legislation requiring public utilities to submit uniform accounts and information concerning the physical valuation of their property are made in the second annual report of the Rhode Island Public Utilities Commission. Legislation is also asked providing for the employment of inspectors qualified to supervise and inspect the several utilities. The request for a law requiring the submission of reports to the commission is made necessary, the report states, by the apparently unintentional repeal of sections of the general laws which prescribed the obligation. The legislation sought is substantially similar to that now in force in Wisconsin.

PROGRAM OF ASSOCIATION MEETING

"Safety First" Convention

The "Safety First" convention will be held at the University of Nevada, Reno, Nev., on Jan. 26-27, under the joint auspices of the University of Nevada and the Nevada Industrial Commission. The chairman of the first day will be Governor Oddie of Nevada. The vice-chairman will be William E. Wallace of the Brotherhood of Railroad Trainmen, and W. R. Scott, general manager of the Southern Pacific Company. The following papers will be read on the first day: "The 'Safety First' Movement in Nevada," by John J. Mullin, secretary of the Nevada Industrial Commission; "'Safety First' on the Oregon Short Line," by L. E. Abbott, safety commissioner of the Oregon Short Line; "Safety First in Practice," by Frank W. Ingram, secretary of the Locomotive Firemen," Sparks, Nev.; "Safety Regulations for Power and Light Companies" (speakers to be announced later). There will also be a discussion on "Electric Headlights," to be opened by Prof. J. R. Schrugham, and moving pictures illustrating safeguarding in some of the large industrial plants of the United States. The meeting on the second day will be devoted largely to the question of "Safety First" in mining. There will be a banquet in the evening of Jan. 27 given by the Engineers' Club of the University of Nevada.

Financial and Corporate

Stock and Money Markets

Jan. 21, 1914.

Greater buoyancy than usual was manifested on the New York Stock Exchange to-day, and increased activity was shown in the bond market. The average price of railways and industrials was 72.06, a level last reached on Sept. 15, 1913. The favorable flotation of state bonds improved the tone of railroad bonds. Rates in the money market to-day were: Call, 1¾ @ 2 per cent; sixty days, 2¾ @ 3 per cent; ninety days, 3¼ @ 3¾ per cent; four and five months, 3½ @ 3¾ per cent; six months, 3¾ @ 4 per cent.

A strong tone was shown on the Philadelphia Exchange to-day. Union Traction sold down to 45½, but recovered to 46.

The Chicago Stock Market showed activity in the stock issues and strength in bonds to-day. Chicago Railways stocks and bonds were in fair demand.

In Boston general advances were recorded, mining issues being most called.

Trading in the general list was active in Baltimore to-day. Bond sales totaled $150,000, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 14	Jan. 21
American Brake Shoe & Foundry (com.)	89	90
American Brake Shoe & Foundry (pref.)	128½	131
American Cities Company (com.)	36	36
American Cities Company (pref.)	61⅞	64¼
American Light & Traction Company (com.)	336	328
American Light & Traction Company (pref.)	107	105½
American Railways Company	38	39
Aurora, Elgin & Chicago Railroad (com.)	37½	37½
Aurora, Elgin & Chicago Railroad (pref.)	80	80
Boston Elevated Railway	90	88½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*58	60
Boston & Worcester Electric Companies (com.)	*6½	*6½
Boston & Worcester Electric Companies (pref.)	37	39
Brooklyn Rapid Transit Company	89⅝	91½
Capital Traction Company, Washington	112	112⅝
Chicago City Railway	160	140
Chicago Elevated Railways (com.)	25	20
Chicago Elevated Railways (pref.)	75	70
Chicago Railways, ptcptg., ctf. 1	*91	96½
Chicago Railways, ptcptg., ctf. 2	30	32½
Chicago Railways, ptcptg., ctf. 3	6	7
Chicago Railways, ptcptg., ctf. 4	2	2½
Cincinnati Street Railway	102½	106
Cleveland Railway	105¼	104
Cleveland, Southwestern & Columbus Ry. (com.)	5	5
Cleveland, Southwestern & Columbus Ry. (pref.)	26	26
Columbus Railway & Light Company	18	18
Columbus Railway (com.)	50	62
Columbus Railway (pref.)	77½	80
Denver & Northern Railway	70	70
Detroit United Railways	80	71
General Electric Company	144½	147¾
Georgia Railway & Electric Company (com.)	120	120¼
Georgia Railway & Electric Company (pref.)	83	83
Interborough Metropolitan Company (com)	15⅝	15¾
Interborough Metropolitan Company (pref.)	62	61⅞
International Traction Company (com.)	30	*3
International Traction Company (pref.)	90	*90
Kansas City Railway & Light Company (com.)	15	15
Kansas City Railway & Light Company (pref.)	30	30
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	*24	*24
Manhattan Railway	125	130
Massachusetts Electric Companies (com.)	12½	12
Massachusetts Electric Companies (pref.)	64	63½
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	24¾	*24¾
North American Company	70	72⅝
Northern Ohio Light & Traction Co. (com.)	57	70
Northern Ohio Light & Traction Co. (pref.)	101	101¼
Philadelphia Company, Pittsburgh (com.)	41	41½
Philadelphia Company, Pittsburgh (pref.)	41	42½
Philadelphia Rapid Transit Company	19⅞	20
Portland Railway, Light & Power Company	48	48
Public Service Corporation	107	107
Third Avenue Railway, New York	45½	43¼
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	105½	107¾
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	25	25¼
United Rys. Inv. Company (com.)	20	21
United Rys. Inv. Company (pref.)	39	41½
Virginia Railway & Power Company (com.)	50	53
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	88¼	89
Washington Ry. & Electric Company (pref.)	88½	89
West End Street Railway, Boston (com.)	71	73
West End Street Railway, Boston (pref.)	89	90
Westinghouse Elec. & Mfg. Company	67½	69¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	116	117

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*Last sale. a Asked.

ANNUAL REPORT

Third Avenue Railway

The following statement of earnings of the Third Avenue Railway, New York, N. Y., for the six months ended Dec. 31, 1913, has been made public in accordance with the terms of the adjustment mortgage of the company:

	1913	1912
Operating revenue:		
Transportation	$5,456,890	$4,799,774
Advertising	47,750	43,999
Rents	90,797	77,751
Sale of power	58,426	61,718
Total operating revenue	$5,653,864	$4,983,242
Operating expenses:		
Maintenance of way	$425,653	$480,893
Maintenance of equipment	373,005	311,934
Power supply—horse car operations	1,679	....
Power supply—electric	379,963	398,161
Operation of cars	1,425,224	1,250,016
Injuries to persons and property	302,486	225,819
General and miscellaneous expenses	273,240	296,606
Total operating expenses	$3,181,250	$2,963,429
Net operating revenue	$2,472,614	$2,019,812
Taxes	399,643	349,895
Operating income	$2,072,971	$1,669,917
Interest revenue	37,138	28,100
Gross income	$2,110,109	$1,698,017
Deductions:		
Interest on first mortgage bonds	$274,640	$279,265
Interest on first refunding mortgage bonds	315,800	315,800
Interest on adjustment mortgage bonds	563,400	281,700
Interest on notes payable—others	90,845	40,500
Interest on receiver's certificates	....	1,045
Interest, miscellaneous	....	249
Track and terminal privileges	7,479	6,919
Miscellaneous rent deductions	6,849	7,399
Amortization of debt, discount and expense	2,188	....
Sinking fund accrual	15,000	15,000
Depreciation	255,000	220,000
Total deductions	$1,531,201	$1,167,717
Net income	$578,908	$530,300

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*Results of operations of belt line railway corporation included in system from April 1, 1913.

F. W. Whitridge, president of the company, says in part: "It appears from this statement for the past six months that the surplus earnings over and above all interest charges, depreciation and other proper deductions were $578,908, making $969,000 for the calendar year, and I accordingly recommended the payment of the full interest of 2½ per cent on the adjustment bonds on April 1, 1914.

"The detailed budget of the expenditures necessary or desirable during the next year speaks for itself, but I might add that the proposed new substation at Fifty-fourth Street will effect a saving of about $17,000 a year. The budget as far as the track department is concerned depends upon the work actually undertaken by the city and is made up from the budget of the city engineers, which is not always final. The major part of the expenditures is upon the Union Railway. The territory in which that company operates is developing from a rural or suburban community to an urban district, numerous streets are being changed from macadam or earth roads to paved streets, and the grading of streets and the laying of sewers is work which results in considerable expense to the railroad companies and is likely to continue so for some years to come.

"A day seldom passes that I am not asked about a dividend on the stock. Our accounts are kept in accordance with the rules of the Public Service Commission, and if the figures are misleading the odium must be shared by the commission. Our present surplus earnings are not applicable to dividends at all, because it is necessary and desirable, and, so far as I can foresee, it will continue to be necessary and desirable, to expend these earnings upon the property for several years to come.

"It would therefore not be honest to pay a dividend until the property is in such condition that our allowance for depreciation will thereafter care for its needs over and above the ordinary maintenance, and further until the effect of the new subways on our earnings has been ascertained."

The first semi-annual distribution on the $22,536,000 of income bonds of the company was made on April 1, 1913. It was for 1¼ per cent. The second distribution was made on Oct. 1, 1913. It was for 1½ per cent.

Foreign Option on Oakland Properties Exercised

In the ELECTRIC RAILWAY JOURNAL of Aug. 30, 1913, mention was made of an option running until Jan. 1, 1914, given on the properties of the San Francisco-Oakland Terminal Railways. The advisory committee representing the holdings of F. M. Smith in the United Properties Company and trustees of the company have now arranged with George C. Moore, representing the Investment Registry, Ltd., and B. Fitzgerald, representing Basil Montgomery, Fitzgerald & Company, both of London, Eng., to conclude the deal. As soon as the new interests find it possible a new board of directors will be chosen and active steps taken to determine the needs of the properties. The San Francisco-Oakland Terminal Railways was incorporated in 1912. It owns and operates 241.62 miles of track comprising street and interurban railway lines of Oakland, Berkeley, Richmond, Emeryville, Alameda, San Leandro and Hayward, and five ferryboats between San Francisco and Pier-head, Oakland, connecting with its own electric lines. Provision has been made for the extension of $3,000,000 of notes of N. W. Halsey & Company to Sept. 12, and the $1,100,000 of Key Route Basin notes to Nov. 20. The plans, however, are contingent upon the action of the California Railroad Commission, whose approval must be secured. At the office of the Smith-Tevis-Hanford Company, New York, N. Y., which dealt in the securities of the companies, it was stated that no announcement in regard to the negotiations would be made by that company at this time.

Chicago (Ill.) Railways.—A dividend of $4 has been declared on the participation certificates, Series 1, of the Chicago Railways and an initial payment of $2 on the Series 2, both payable on Feb. 10, 1914, to holders of record of Jan. 26.

Columbus Railway & Light Company, Columbus, Ohio.—On Jan. 13 the stockholders of the Columbus Edison Company voted to sell the property of the company to the new Columbus Railway, Power & Light Company. About 90 per cent of the stock was voted.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The old board of directors of the Coney Island & Brooklyn Railroad elected in 1912, consisting of J. H. Walbridge, Howard Fitzgerald, George H. Prentiss, Allen McCulloch, S. W. Huff, William A. Day, Duncan C. Cannon, John A. Thake and Edward W. Clucas, was succeeded recently by S. W. Huff, formerly president of the company and now vice-president of the Brooklyn Rapid Transit Company; Charles D. Meneely, vice-president and treasurer of the Coney Island & Gravesend Railway; Walter St. John Benedict, a director of the Coney Island & Gravesend Railway; C. L. Woody, of counsel for the Brooklyn Rapid Transit Company; Frank D. Tuttle, a director of the Nassau Electric Railway; W. A. Day and J. H. Walbridge, Mr. Huff, Mr. Day and Mr. Walbridge being the only directors re-elected. At a subsequent meeting of the board a dividend of 6 per cent was declared on the $2,983,900 of stock outstanding, $2,637,000 of which was recently acquired by the Brooklyn Transit Company through the Coney Island & Gravesend Railway. This dividend is the first distribution since February, 1907, and it is announced that it will be paid before the property of the company is turned over to the Brooklyn Rapid Transit Company. At the meeting at which the dividend was voted, W. A. Day, who is president of the Equitable Life Assurance Society, and J. H. Walbridge, who is president of the Lalance & Grosjean Company, both protested against the action and resigned as directors. Mr. Walbridge contended that the payment of the dividend would practically exhaust the cash resources of the company. According to report, the earnings were at the yearly rate of 7 1-3 per cent upon its capital during most of last year and of 8 per cent during the last quarter. It is said that practically all of the stock of the Coney Island & Brooklyn Railroad acquired by the Brooklyn Rapid Transit Company through the Coney Island & Gravesend Railway was purchased by the Brady interests at an average price of about $75 a share. It will be turned in to the Brooklyn Rapid Transit Company at par.

Danbury & Bethel Street Railway, Danbury, Conn.—At the meeting of the directors of the Danbury & Bethel Street Railway, Danbury, Conn., on Dec. 24, 1913, the resignations of M. H. Griffing and A. E. Tweedy as directors were accepted, also the resignation of Mr. Tweedy as president and Mr. Griffing as treasurer. No new directors were elected to fill the vacancies. John Sanders, who has been manager, was also elected president, and S. W. C. Jones secretary and treasurer.

Detroit (Mich.) United Railway.—The Detroit United Railway has sold to William A. Read & Company, New York, N. Y., $2,000,000 of two-year 6 per cent collateral notes, dated Feb. 5, 1914, approved by the Michigan State Railroad Commission. The notes are redeemable on thirty days' notice at 102 and interest. The collateral pledged on the notes is composed of stocks and bonds of the Detroit United Railway and underlying companies. The notes have been issued to pay temporary loans which were made to secure funds for extensions and betterments.

East St. Louis & Suburban Company, East St. Louis, Ill.—Most of the $14,000,000 of capital stock of the East St. Louis & Suburban Company having been deposited under the reorganization project, E. W. Clark & Company announce that the plan has been declared operative. Stockholders who desire to subscribe for the convertible bond issue are being asked to present their interim receipts and pay the amounts due, on Feb. 2, when the new bonds will be distributed. Stock certificates will be ready for delivery in March. A new company, The East St. Louis & Suburban Company, has been incorporated under the laws of Delaware. The original corporation was chartered in New Jersey, with $7,000,000 of preferred and $7,000,000 of common stock outstanding. The new capitalization is: 6 per cent five-year convertible bonds, $2,000,000; 5 per cent cumulaitve preferred stock, $6,000,000; common stock, $6,000,000. Dividends on the preferred stock of the old company will be paid as usual on Jan. 31, for the quarter ending that date, to holders of interim receipts and shareholders of record Jan. 15. The new convertibles will bear interest from Feb. 1.

Grand Valley Railway, Brantford, Ont.—The city of Brantford has appealed from an order of the court appointing E. B. Stockdale liquidator of the Grand Valley Railway, and has requested that another appointment be made. G. H. Watson, who appeared for the company, while not opposing the application, suggested that a representative of the first mortgage bondholders should be appointed to act with Mr. Stockdale. Judgment was reserved. The offer of W. P. Kellett to purchase the Brantford Street Railway will be renewed at the meeting of the bondholders of the Grand Valley Railway in Toronto, Ont., about Jan. 21.

Mexico (Mex.) Tramways.—The Mexico Tramways has passed up the 1¾ per cent quarterly dividend on the common stock of the company, due at this time. It is stated that the dividend on the common stock will be suspended until peace is restored in Mexico. The company has paid 7 per cent per annum since 1910.

New York (N. Y.) Railways.—The directors of the New York Railways have decided not to take any surplus money out of the acident reserve fund to make up the difference in interest on the 5 per cent income bonds sufficient to permit the payment of 3.37 per cent for the six months ended Dec. 31, 1913, which would make a full 5 per cent for the twelve months. The earnings available for the income for the six months ended Dec. 31, 1913, will, it is said, be possibly between 2¼ per cent and 2½ per cent, so that the full payment for the calendar year will not be more than 4 per cent. The action was taken on the recommendation of the income bondholders'. committee, which is composed of five members of the board. Swartwout & Appenzellar, New York, N. Y., who, it is said, represent the holders of several millions of the bonds, contend that the balance of the 8 per cent set aside for "injuries to persons and property" not actually needed in 1913 should be turned back into surplus earnings available for the income bonds. The firm says: "To return the balance from the injury account in accordance with the terms of the indenture means tha full 5 per cent will have been earned. and will necessarily be paid as interest on these bonds for the year 1913. The indenture does not leave it to the discretion of the directors to determine the amount set aside for contingencies, but gives a definite rule based on actual expenditures."

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway has applied to the Railroad Commission of California for authority to issue $700,000 of 6 per cent four-year convertible gold notes and to use the proceeds for liquidating outstanding indebtedness. It is proposed that the notes shall be convertible at 85 into the company's bonds.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Lee, Higginson & Company, Boston, Mass., and Harris, Forbes & Company, New York, N. Y., are offering for subscription at 99 and interest to yield about 6¼ per cent $7,000,000 of Puget Sound Traction, Light & Power Company five-year 6 per cent first mortgage gold bonds, dated Jan. 15, 1914. The issue is callable as a whole but not in part at 101 and interest on any interest date until and including Feb. 1, 1917, and on any interest date thereafter at par and accrued interest. The coupon bonds are in the denominations of $1,000 and $500 each, with the privilege of registration as to principal only. Fully registered bonds are in the denominations of $1,000, $5,000 and $10,000. The total authorized issue of the bonds is $15,000,000. Of this sum there is outstanding the allotment now offered, namely, $7,000,000. There is in the company's treasury, $500,000, and $7,500,000 is reserved for additions, etc., at 75 per cent of their cost.

Toledo Railways & Light Company, Toledo, Ohio.—In order to bring about conditions necessary to the reorganization of the Toledo Railways & Light Company, Toledo, Ohio, Henry L. Doherty, Frank W. Frueauff and Charles T. Brown, representing Henry L. Doherty & Company, New York, filed a petition in the United States District Court on Jan. 16, asking for a receiver for the Toledo Railways & Light Company. This suit was based upon a judgment for $84,000 secured in the Common Pleas Court shortly before the petition was filed. Judge Killits was in New York at the time and expected to be absent until Jan. 29. At the annual meeting of the stockholders of the Toledo Railways & Light Company on Jan. 15 twenty-one directors were elected. In addition to those who had been serving on the board, E. H. Close, S. D. Carr and Walter Stewart were made members of the board. Henry L. Doherty was elected chairman. The board organized with the following officers: Frank R. Coates, president; Rathben Fuller, Toledo, and Frank W. Frueauff, New York, vice-presidents; S. D. Carr, Toledo, treasurer; C. E. Murray, Toledo, secretary; E. E. McWhinney, Toledo, assistant secretary; W. F. Troth, assistant treasurer.

Toronto (Ont.) Railway.—The first of Bion J. Arnold's estimates of future earnings of the Toronto Railway was confirmed on Jan. 5, when the figures of the company's business for the calendar year 1913 were made public at the city auditor's office. Mr. Arnold forecasts gross receipts from the company's system of $5,992,855 from Jan. 1 to Dec. 31, 1913. The actual receipts were $6,056,004. The city's share of the earnings for the year amounts to $939,990, compared with $798,958 in 1912. The rental paid by the company for the use of streets, which is at the rate of $800 per mile of single track, will approximate $92,000, compared with $90,953 in the previous year. Thus the payments of the company to the city will total about $1,032,000 for 1913, compared with nearly $890,000 in the previous twelve months. The gross receipts of the company in 1912 were $5,448,050, and the increase represented by the receipts of 1913 is $607,954, or more than 11 per cent. The receipts for 1913 were about $13.60 per capita, on a population estimate of 445,590.

United Railroads, San Francisco, Cal.—Jesse W. Lilienthal, the new president of the United Railroads, is quoted as follows regarding the affairs of the corporation: "As long as I am president of the company none of the earnings will be diverted to the stock until the funded debt is properly secured. The only exception to this is the preferred stock, which secures $5,000,000 cash advanced to the company to rehabilitate the property after the fire of 1906. I have had prepared a budget for 1914 based upon a reasonable probability of earnings and expenses. After meeting all essential charges and setting aside a small amount for construction, I estimate that we shall have left a surplus amounting to $1,000,000, after providing for all sinking funds."

Dividends Declared

Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Brazilian Traction, Light & Power Company, Toronto, quarterly, 1½ per cent, ordinary.

Chicago (Ill.) Railways, $4, participation certificates, series 1; $2, participation certificates, series 2.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, common and preferred.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

International Traction Company, Buffalo, N. Y., 2 per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1¾ per cent, common; quarterly, 1½ per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1¾ per cent, preferred.

Railway & Light Securities Company, Boston, Mass., 3 per cent, common; 3 per cent, preferred.

York (Pa.) Railways, $1.25, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '13	$65,372	*$28,704	$36,668	$17,354	$19,314
1 " " '12	61,681	*27,368	34,313	17,239	17,074
12 " " '13	758,775	*344,605	414,170	207,571	206,599
12 " " '12	704,076	*704,076	316,678	387,398	197,801

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov., '13	$97,032	*$59,424	$37,608	$26,072	$11,536
1 " " '12	91,293	*55,362	35,931	22,678	13,253
12 " " '13	1,200,004	*713,937	486,067	295,930	190,137
12 " " '12	1,053,047	*627,765	425,282	263,095	162,187

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Nov., '13	$195,100	*$110,630	$84,470	$63,576	$20,894
1 " " '12	176,866	*98,068	78,798	56,510	22,288
12 " " '13	2,324,384	*1,298,822	1,025,562	707,207	318,355
12 " " '12	2,123,117	*1,225,875	897,242	637,931	259,311

EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.

1m., Nov., '13	$245,851	*$146,149	$99,702	$49,940	$49,762
1 " " '12	224,023	*118,852	105,171	48,598	56,573
12 " " '13	2,690,543	*1,572,337	1,118,206	590,451	527,755
12 " " '12	2,426,947	*1,327,747	1,099,200	576,068	523,132

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

1m., Dec., '13	$3,089,802	$1,158,100	$1,931,702	$1,087,799	$843,903
1 " " '12	3,008,276	1,182,234	1,826,042	1,106,128	719,914
6 " " '13	16,326,195	6,334,073	9,992,122	6,719,548	3,272,574
6 " " '12	15,943,213	6,499,085	9,444,128	6,617,157	2,826,971

MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.

1m., Dec., '13	$87,791	$34,266	$53,525	$26,174	$27,351
1 " " '12	71,731	25,192	46,539	24,454	22,085
12 " " '13	960,262	346,712	613,550	298,048	315,502
12 " " '12	847,896	331,527	516,370	260,777	255,593

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov., '13	$189,660	*$106,246	$83,414	$39,828	$43,586
1 " " '12	181,156	*98,268	82,888	36,994	45,894
12 " " '13	2,198,392	*1,313,997	884,395	461,301	423,094
12 " " '12	2,068,622	*1,186,649	881,973	431,739	450,234

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Dec., '13	$2,141,522	$1,248,860	$892,662	$808,663	$83,999
1 " " '12	2,065,830	1,221,530	844,301	762,640	81,661
6 " " '13	12,239,538	7,136,035	5,103,503	4,796,161	307,342
6 " " '12	11,926,124	7,086,774	4,839,350	4,560,921	278,429

PORTLAND (MAINE) RAILROAD

1m., Nov., '13	$75,113	*$50,468	$24,645	$21,695	$2,950
1 " " '12	76,071	*57,798	18,273	10,254	8,019
12 " " '13	1,033,142	*698,666	334,476	167,636	166,840
12 " " '12	976,504	*695,489	281,015	120,657	160,358

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov., '13	$576,244	*$272,250	$303,994	$176,425	$127,569
1 " " '12	570,863	*288,933	281,930	151,765	130,165
12 " " '13	6,703,123	*3,301,122	3.402,001	1,984,520	1,417,481
12 " " '12	6,611,849	*3,306,962	3,304,887	1,742,338	1,562,549

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*Includes taxes.

Traffic and Transportation

Massachusetts Public Service Commission Hears Watertown Fare Petition

The Massachusetts Public Service Commission heard on Jan. 13 the petition of the selectmen of Watertown for a 5-cent fare within the municipality on the connecting lines of the Middlesex & Boston Street Railway and the Boston Elevated Railway. Chairman Monks of the Board of Selectmen urged a 5-cent fare on the ground that it would develop the community.

Matthew C. Brush, second vice-president of the Boston Elevated Railway, cited the provisions of the company's charter which entitle it to a 5-cent fare for every continuous ride in the same general direction and pointed out the inability of the company to grant fare concessions of any nature in its present financial condition. Mr. Brush said that the situation in Waltham is similar to that in Medford, Malden and Hyde Park, where patrons of lines connecting with the Boston Elevated Railway desire a 5-cent fare embracing the entire system. The arguments addressed by the company to the joint commission upon metropolitan traffic conditions apply with equal force to Watertown. During the past sixteen years the frequency of service, the carrying capacity of cars and the schedule speed have been increased in Watertown far more rapidly than has the population and the community receives first-class service in every particular.

George M. Cox, general manager of the Middlesex & Boston Street Railway, pointed out that his company operates 1 1/3 miles of track in Watertown between Watertown Square and the Waltham city line. Crews are changed at the former point and an additional 5-cent fare collected by the receiving company. Mr. Cox said that the revenue derived from this stretch of track does not exceed the total excise tax which the company pays to the town. The line is chiefly of value in connection with through travel between Waltham and Boston. He reviewed the company's history in connection with the establishment of 6-cent fares on certain lines and said that the company was not in a position to carry passengers at reduced rates. Last year the company paid 4 per cent dividends and had a surplus of $436. Instead of reducing its fares it should raise its rates and do something in the way of increasing wages out of the additional income. Mr. Cox contended that if the mill owner finds it difficult to obtain suitable employees on account of the cost of transportation he should add the necessary 10 or 20 cents a day to the worker's wages.

Chairman McLeod said that neither the board, the Legislature nor the courts are authorized to ask the Boston Elevated Railway to charge less than a 5-cent fare. He said it would be unfair to require connecting companies to carry passengers without adequate compensation. The joint board is now at work upon the problem of fare relations involved in the case of the Boston Elevated and connecting companies, but no solution has been found by which persons whose journeys originate on one system and terminate on another equitably can be required to pay only one fare for each trip.

Handling the Ford Employees

Following the establishment of a seven-for-a-quarter rate of fare, the Detroit (Mich.) United Railway found that on account of the sale of strips of tickets on the cars much time was lost in loading cars at the plant of the Ford Motor Company, which employs 16,500 men. To remedy this a ticket office was established in the Ford plant where employees could purchase tickets without loss of time or chance of error. The ticket office is in a permanent booth convenient for the men and ticket sales have averaged about $100 a day, or 400 strips of tickets, since the plan was adopted. The operating department of the railway reports a considerable improvement in handling the rush which occurs when the factory dismisses its employees.

The Ford Motor Company releases shifts of its staff at 3 p. m., 4.30 p. m. and 11.40 p. m., the largest number leaving the factory at 3 o'clock. To take care of the riders the railway stores thirty-three cars at 3 o'clock, twenty-five cars at 4.30 and sixteen cars at 11.40 p. m. All of these cars operate on Woodward Avenue in addition to the regular one-minute line during the afternoon hours. While the tripper cars are not for the exclusive use of the Ford employees it has been found that the cars really become exclusive. In addition to the Woodward Avenue service the railway operates the Hamilton line under a six-minute schedule and the Victor line under a ten-minute schedule. Both of these lines operate within a short distance of the Ford plant and assist in the transportation of the employees.

The Detroit United Railway has tried on several occasions through its own efforts and the Board of Commerce to perfect an arrangement with manufacturers employing large forces of men whereby the working hours would be differently arranged, so that the company might be enabled to provide adequate rush hour facilities. Unfortunately, these efforts have not met with success, no concerted action having been taken by the employers to assist in relieving the situation.

Massachusetts Commission Issues Bay State Findings

The Public Service Commission of Massachusetts issued six orders on Jan. 2 in connection with service and fares on various parts of the Bay State Street Railway system. Upon the petition of the Mayor and the city solicitor of Beverly relative to transfer privileges and service improvements the board points out that on the Beverly-Wenham line the traffic is of insufficient volume to justify the commission in recommending the use of larger cars, double-truck cars being used in the regular winter service and single-truck equipment being run only in extra service. In compliance with the board's suggestion the company has installed transfer privileges to Gloucester Crossing at the Salem-Peabody line; on North and Tremont Streets; at the Salem-Marblehead and Salem-Swampscott lines, and at intervening points between these and Town House Square, Salem. A shelter has been erected at North Beverly on the Gloucester-Essex line and a starter has been provided at Beverly on Sundays and holidays, when the traffic is heavy in the North Shore district.

Regarding service conditions in Lawrence, the board states that the citizens of the district who appealed to the board had legitimate cause for complaint but that the conditions have been greatly improved by the installation of a double-tracked line in Newbury Street and the furnishing of additional cars. The commission points out that while exceedingly heavy rush-hour travel on the lines in the Lawrence division makes it almost impossible to avoid occasional crowding of the cars, the changes made have resulted in a substantial improvement in the service. In Essex about 1 mile of new track has been built and the entire line between Gloucester and Beverly has been improved. Further improvements in the roadbed and track are indicated for the coming summer season.

On the petition of citizens of Lynnfield requesting a 5-cent fare from any part of Lynnfield to Central Square, Lynn, via either Saugus or Newhall turnout, Peabody, the commission finds that the line appears to be operated at a loss to the company and that the extension of fare limits demanded by the petitioners is unreasonable. Favorable action upon the petition would involve the granting of a 5-cent fare for transportation for a maximum distance of more than 9 miles. Improvements in the roadbed on this line are recommended.

The board has denied the petition of the selectmen of Whitman for free transfer privileges enabling passengers to ride between the center of Brockton and any part of Whitman for a 5-cent fare. Several years ago the fare between the two municipal centers was reduced from 10 cents to 5 cents upon the recommendation of the Railroad Commission. Later the company, of its own volition, extended the fare limit so that passengers could ride from Brockton through to Winter Street, Whitman, for a 5-cent fare. Seven-cent commutation tickets are also furnished during certain hours of the day from any part of Whitman to any part of Brockton. These tickets are good for a maximum distance, including transfers, of 12.24 miles. The board points out that the situation is similar to that represented in the petition from the town of Abington, which recently was acted upon adversely by the Railroad Commission, and says: "The commission is of the opinion that street railway transportation is now furnished the residents of Brockton and adjacent towns at as low rates as prevail in any portion of the State where similar conditions of transportation exist and at as low rates as the company can reasonably be asked to furnish, consistent with a proper maintenance of its service."

Stock Bonus Without Cost to Beneficiaries

The directors of the Monongahela Valley Traction Company, Fairmont, W. Va., voted on Dec. 31, 1913, to distribute $22,400, par value, of the company's preferred stock among employees who had been in its service for two years or longer. There were 224 men—motormen, conductors, line foremen, track foremen and substation men—who were beneficiaries under the plan. Each man received on Jan. 3 one share of preferred stock, on which dividends at the rate of 5 per cent a year are being paid. The action of the company was in recognition of faithful and efficient service. It is believed that the Monongahela Valley Traction Company is the first public service corporation in the United States to distribute cash bonuses in the form of stock among a limited number of its employees without cost to the beneficiaries. The stock which the directors of the company voted as a bonus to the men is quoted at $85 a share. The communication addressed by James O. Watson, the general manager of the company, to each man entitled to participate in the distribution follows:

"At a special meeting of the directors of this company held to-day, you were unanimously voted one share of the preferred stock of the company in appreciation of two years of efficient service. Stock will be ready for delivery at the company's offices on Jan. 3."

Operation of Two-Car Trains Extended in Buffalo.—The International Railway, Buffalo, N. Y., has extended the operation of two-car trains to the Elmwood Avenue line during the rush hours. The Main Street, Broadway and Elmwood lines now have the benefit arising from two-car train service.

Increase in Wages on West Virginia Line.—Announcement has been made by S. M. Gallaher, superintendent of the Charleston (W. Va.) Interurban Railroad, of an increase in wages of all motormen and conductors, ranging from 1 cent to 3 cents an hour, according to length of service.

Increase in Fare Unit on Massachusetts-Rhode Island Line.—The Providence & Fall River Street Railway, Swansea Center, Mass., has notified the Public Service Commission of Massachusetts of a proposed increase in its rates of fare for local passengers from 5 to 6 cents per passenger per fare zone, effective on Feb. 1, 1914.

Conference to Consider Uniform Rules in Michigan.—The Michigan State Railroad Commission called a meeting of electric railway officials for Jan. 21 to appoint a committee to formulate a tentative set of rules for the uniform operation of interurban electric railways, which will be discussed and amended for permanent adoption.

"Safety First" Folder for Detroit Employees.—The Detroit (Mich.) United Lines has issued a four-page folder, 3½ in. wide by 6¼ in. high, for all its employees, but for motormen and conductors particularly, and has distributed copies as a part of the present "safety first" campaign. The folder is printed in purple and red.

New Transfer Regulation of Hudson Valley Railway.—The Hudson Valley Railway, Glens Falls, N. Y., has announced that hereafter transfers will, upon request to the conductor at the time last zone fare is paid, be issued from interurban cars to cars of Glens Falls local lines for all points within Glens Falls reached by local lines.

Resolution Ordering Rear Doors in Near-Side Cars.—An ordinance embodied in a resolution which calls upon the International Railway, Buffalo, N. Y., to install emergency doors in the rear of its new near-side cars in Lockport has been passed by the Council of that city. The company will have nine months' time in which to comply with the ordinance.

Kansas Park Dismantled.—The Topeka (Kan.) Street Railway, which closed Vinewood Park, a summer resort, 5 miles from Topeka, several years ago, has dismantled the park arcade and stored it at Topeka. The park was established about five years ago for the purpose of stimulating traffic between Topeka and Vinewood. The resort failed to attract the Topeka public, and it was closed.

Smoking Forbidden in Buffalo.—Smoking has been forbidden on all cars of the International Railway within the city limits of Buffalo with the exception of a few cars on the Lockport, Niagara Falls and Rochester interurban lines. This action on the part of the company was prompted by recent statements of the commissioner of health in Buffalo. The company proposes eventually to eliminate smoking compartments on all of its cars on all lines.

Accidents During Rush Hours in New York.—During the morning rush hour on Jan. 20 accidents tied up the subway and the Third Avenue elevated in New York. The two accidents occurred almost at the same time. For about fifteen minutes both uptown and downtown subway traffic was stalled because of an accident at Ninety-sixth Street. The Third Avenue elevated accident occurred just above New Chambers Street, when a loose shoe tore up the third-rail and threw one of the cars off the track.

Answer Filed to Fare Complaint.—The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, filed an answer on Jan. 14 to the complaint of citizens of Berea that the rate of fare between that place and the Lorain Street depot in Cleveland is too high. The cash fare is 1½ cents a mile and commutation tickets are sold at 1¼ cents a mile, making the cash fare 15 cents, or on commutation tickets 12½ cents. The company claims that these rates are not excessive and asks the commission to allow them to stand.

Discrimination Charged at Buffalo.—The Public Service Commission of the Second District of New York has received a complaint against the International Railway, Buffalo, stating that the company in selling tickets at Niagara Falls under certain conditions of time and distance, at the rate of ten tickets for 25 cents, is discriminating against Buffalo passengers. It is further alleged that the service in the city of Buffalo is inadequate, that the routing of cars between the east and west sides of the city is not in the interest of a majority of the riders, and that the rates of fare charged in Buffalo are unreasonable.

Report of Missouri Commission.—Of 877 public service corporations existing in Missouri, only twenty-one are electric railways, according to the report of the Public Utilities Commission. This is as compared with ninety-nine steam roads. The report covers only the eight and one-half months of the commission's existence. During that time it adjusted 136 complaints, while 103 more are pending. Of 231 informal complaints filed, 172 have been adjusted and fifty-nine are pending. No classification of the complaints was made in the report. The commission has inspected 3594 miles of track, caused fifty miles to be relaid, and will inspect the entire steam and electric railroad mileage of Missouri during the coming year. The expenses of the commission, aside from the salaries of $5,500 for each member, have aggregated $34,598. The revenue from fees was $35,308.

The Automobile a Menace.—That the carelessness of the drivers of automobiles is responsible for most of the railroad and interurban crossing accidents was the opinion expressed at a meeting of claim agents of Texas railroads held at Galveston recently and attended by representatives of both steam and electric railways. R. M. Watson, claim agent of the Northern Texas Traction Company, Fort Worth, presided. Among the speakers were Isaiah Hale, safety commissioner of the Santa Fé system at Topeka; Gail Goodlee, inspector of transportation of the San Antonio & Aransas Pass at San Antonio; L. W. Ernest, claim agent of the San Antonio and Aransas Pass at San Antonio, and R. N. Graham, of the Houston Electric Company. Mr. Graham's subject was "Educating Automobile Drivers." The problems arising from accidents due to trespassing were discussed, and a committee was appointed to investigate the matter and report at the annual meeting of the association, which will be convened in Galveston, Tex., next July.

Organization of Unified Chicago Surface Lines

The Chicago Surface Lines, the official name of the unified properties of the Chicago Railways and the Chicago City Railway, came into existence with the first meeting of the board of operation provided under the unification ordinance. This meeting was held on Jan. 16, 1914. Henry A. Blair, John M. Roach, Charles C. Adsit and Wallace Heckman were elected to represent the Chicago Railways and Leonard A. Busby, Ira M. Cobe and F. O. Wetmore were elected to represent the Chicago City Railway. Mr. Blair was elected chairman of the board, and his duties include a wide supervision of the affairs of the surface lines and extensive activities as a member of the executive committee. Mr. Cobe was elected chairman of the executive committee. Mr. Blair and Mr. Busby will be associated with him on this committee. John J. Mitchell, of the Illinois Trust & Savings Bank, was elected umpire to determine any differences that may be referred to him. At this first meeting the following officers were elected: President or operating head of the merged lines, L. A. Busby; vice-president, Williston Fish; general auditor, John J. Duck; treasurer, Markham C. Orde; assistant treasurer and secretary, Fred D. Hoffman; assistant secretary, Frank L. Hupp and general counsel, W. W. Gurley. Immediately following his election as president Mr. Busby selected the heads of the different departments of the merged properties coming under his supervision. H. B. Fleming, vice-president and chief engineer of the Chicago City Railway, was appointed chief engineer of the unified lines; W. M. Weatherwax, superintendent of transportation of the Chicago City Railway, was appointed superintendent of transportation; J. Z. Murphy, chief engineer of the Chicago Railways, was appointed electrical engineer; Sidney Ossoski, formerly general claim agent of the Chicago Railways, was appointed general claim agent; F. C. Evans, purchasing agent of the Chicago City Railway, was appointed purchasing agent; J. J. Duck, formerly auditor of the Philadelphia (Pa.) Rapid Transit Company, was appointed general auditor, and John R. Guilliams, formerly general attorney of the Chicago Railways, was appointed general attorney, litigated cases.

L. A. Busby

W. M. Weatherwax

Leonard A. Busby, the newly elected president of the Chicago Surface Lines, was born in Jewett, Ohio, in 1869. His boyhood was spent on the farm. He was educated in the public schools and was graduated from the Ohio Wesleyan University in 1894, as first honor man. In June, 1895, he completed a course in the law school of Northwestern University, and began his professional career as a law clerk in the offices of Lyman & Jackson, of which firm he became a member in 1898. Mr. Busby continued the general practice of law until 1906, when he was appointed counsel for the receiver of the Calumet Electric Street Railway, Chicago. Later he was appointed counsel for the Calumet & South Chicago Railway. In 1910 he was made general counsel for the Chicago City Railway and the various lines controlled by the Chicago City & Connecting Railways Collateral Trust. In January, 1912, he was elected president of the Chicago City Railway, the Calumet & South Chicago Railway, the Southern Street Railway and the Hammond, Whiting & East Chicago Railway.

H. B. Fleming, formerly vice-president and chief engineer of the Chicago City Railway, has been appointed chief engineer of the Chicago Surface Lines. Since its beginning Mr. Fleming has represented the Chicago City Railway on the Board of Supervising Engineers, Chicago Traction. He has been connected with the Chicago City Railway for the last fourteen years. His engineering education was obtained at Washington University, St. Louis, Mo., and after receiving his bachelor's degree he did post-graduate work at that university and obtained his master's degree. After completing his engineering education Mr. Fleming was made assistant engineer in the water department of the city of St. Louis, and later entered street railway work in the operating and engineering departments of the National Railway, St. Louis. This company was absorbed by the St. Louis Transit Company and he continued to serve in the engineering department until 1900. After resigning from the St. Louis Transit Company Mr. Fleming entered the service of the Chicago City Railway as superintendent of tracks and buildings. In 1905 he was appointed chief engineer of the Chicago City Railway and in 1907 he was appointed a member of the Board of Supervising Engineers, Chicago Traction. In March, 1912, he was elected vice-president and a director of the Chicago City Railway, which positions he held in addition to serving as chief engineer of the company. Mr. Fleming will have charge of track and roadway, shops and equipment, buildings, material and supplies and wreck wagon service with the Chicago Surface Lines. He is a member of the American Society of Civil Engineers, the Western Society of Engineers, the Western Railway Club and the American Electric Railway Engineering Association.

W. M. Weatherwax, who for the last eight years has been in charge of the transportation department of the Chicago City Railway, has been appointed superintendent of transportation of the Chicago Surface Lines. Mr. Weatherwax was born on a farm near Lansingburgh, now Schaghticoke, N. Y., in 1866. He was educated in the country schools and worked on the farm during vacation time. He began street railway work as a conductor on the Troy & Lansingburgh Street Railway, Troy, N. Y., in 1884. He left railway work after a few months' service and came to Chicago. He was then eighteen years old. His first employment in the West was with the Northern Transportation Company, where he advanced successively from watchman to lookout and finally to wheelsman of a large lake freighter running between Chicago and Ogdensburg, N. Y. In 1886 he entered the service of the Chicago City Railway as a driver of tow horses. He was soon thereafter transferred to general carhouse service. He was next made a conductor, in which position he remained until April, 1890, when he was advanced to assistant foreman in charge of cars and trainmen at one of the carhouses. In April, 1893, he was made foreman in charge of one of the carhouses, and later was transferred to what is now known as the Englewood carhouse with the same title until the position was redesignated division superintendent. His last important promotion came in November, 1906, when he was made superintendent of transportation of the Chicago City Railway, which position he has held continuously since then.

J. R. Guilliams

Sidney Ossoski

John Z. Murphy, who for the last fourteen years has been chief engineer of the Chicago Railways, has been appointed electrical engineer of the Chicago Surface Lines. He entered street railway work in 1889, with the West Chicago Street Railway, then a cable line, as chief operating engineer in charge of outside mechanical equipment including cables and machinery in the cable slots. At the time this company changed from cable to electric power Mr. Murphy was placed in charge of the construction of power houses. In 1900 J. M. Roach, president of the Union Traction Company, appointed Mr. Murphy chief engineer in charge of all engineering work. He continued in that position when the Union Traction Company was absorbed by the Chicago Railways. For the last seven years Mr. Murphy has represented the Chicago Railways on the Board of Supervising Engineers, Chicago Traction. Mr. Murphy will have charge of power stations, substation distribution, metering and tunnels with the Chicago Surface Lines.

Sidney Ossoski has been appointed general claim agent of the Chicago Surface Lines. He was born in 1874 at Hornell, N. Y., and after graduating from the high school of that place completed a course at Cornell University in 1893. Later he was graduated from the Columbia Law School, after which he attended the University of Berlin, in Germany, for one year. He was admitted to the bar in 1897 at Rochester, N. Y., and later practised law in New York City. Mr. Ossoski specialized in corporation law until he entered the service of the Chicago Railways as secretary of the finance committee in 1908. In 1911 he was appointed general claim agent of that company.

F. C. Evans, who for the last year has been purchasing agent of the Chicago City Railway, has been appointed purchasing agent of the Chicago Surface Lines. Mr. Evans was born in Burlington, Ia., in 1887, and was graduated from high school and business college. He entered the service of the Chicago City Railway as a stenographer in 1907. Subsequently he was promoted to the position of assistant purchasing agent and in May, 1912, was appointed purchasing agent of that company.

J. J. Duck, who resigned as auditor of the Philadelphia (Pa.) Rapid Transit Company on Dec. 31, 1913, has been appointed general auditor of the Chicago Surface Lines. Mr. Duck was born in Bristol, England, in 1867, and soon after his graduation from Mount St. Mary's College, England, in 1883, he came to America. He entered railroad service as a clerk in the Englewood freight station, Chicago, Ill., of the Lake Shore & Michigan Southern Railway, where he remained until 1890, when he accepted a position as clerk in the accounting department of the Chicago & Eastern Illinois Railroad in Chicago. After successively passing through the various branches of the accounting department, he was made chief clerk of the department in 1900. The following year he was appointed assistant auditor and assistant secretary of the company and continued in that position after the road was purchased by the St. Louis & San Francisco Railroad and after it was absorbed by the Rock Island System. In October, 1907, Mr. Duck resigned from steam railroad service to accept the position of assistant auditor of the Chicago City Railway, then under the management of T. E. Mitten. After about one month's service he was elected auditor of the company, which position he retained until June, 1912, when he resigned to accept the position of auditor of the Philadelphia Rapid Transit Company, under the Stotesbury-Mitten management.

J. J. Duck

F. C. Evans

John R. Guilliams, formerly general attorney of the Chicago (Ill.) Railways in charge of litigated cases, has been appointed general attorney of the Chicago Surface Lines. Mr. Guilliams was born in Hendricks County, Ind., in 1873. He was educated in the common schools and the State Normal School at Danville, Ind., and was graduated from Lake Forest University law school in 1894. After leaving college he read law in the offices of W. C. Gouty, then general counsel of the Chicago & Northwestern Railroad. In August, 1902, he was appointed assistant attorney in the State of Wisconsin for that company, but resigned in December, 1906, to become connected with the trial department of the Chicago Union Traction Company. After serving that company and later with the Chicago Railways during the period of negotiations which resulted in the 1907 settlement ordinances, he was appointed head of the trial department in 1908. In March, 1911, he was made general attorney for the Chicago Railways.

H. B. Fleming

J. Z. Murphy

New Haven Underwriting Syndicate Dissolved

Messrs. Morgan, Stone and Milner have resigned as directors of the New York, New Haven & Hartford Railroad. Their successors have not yet been chosen. The directors of the company have approved unanimously the arrangement made between Howard Elliott, chairman of the board, and the Department of Justice for disposition of the so-called outside properties. These comprise the Maine Steamship Company, Merchants & Miners' Transportation Company, Connecticut Company, Rhode Island Company and Boston & Maine Railroad. The directors have taken no action on any new plan of financing, but have voted to return to stockholders money subscribed for extensions, permission to issue which was denied by the Massachusetts Supreme Court. Members of the syndicate formed by J. P. Morgan & Company to underwrite the company's twenty-year convertible 6 per cent debentures have received the following letter from the syndicate managers: "In accordance with the decision of the Supreme Court of Massachusetts, the company has withdrawn its offer of Oct. 15, 1913, of rights to subscribe to new 6 per cent convertible debentures. Our contract with the railroad is thereby terminated and we therefore hereby dissolve the syndicate."

The Ottawa (Ont.) Electric Railway gave notice some time ago that on and after Dec. 1 an extra fare would be charged to all passengers who rode from Holland Avenue, the western limit of the city, to Britannia and intermediate points. As a result of an application filed with the Board of Railway Commissioners on behalf of the city, asking the commission to investigate the company's tariffs and its alleged unwillingness to make any further extensions in the city before the expiration of the franchise in 1923, an order was issued restraining the company from putting the proposed increase in rates in effect before Jan. 1. The application was subsequently withdrawn, on the understanding that the matter will be brought up again toward the end of the year.

Personal Mention

Mr. L. C. Gilman, the newly elected president of the Spokane, Portland & Seattle Railway, has been elected president of the Spokane & Inland Empire System, Spokane, Wash.

Mr. E. N. Sanderson, who has been vice-president of the Federal Light & Traction Company, New York, N. Y., has been elected president of the company.

Mr. William J. Wood, Evansville, Ind., formerly chairman of the Railroad Commission of Indiana, which has been succeeded by the Public Service Commission, has been appointed a special examiner for the Interstate Commerce Commission.

Mr. Edward Hewitt has been appointed joint freight agent in Tacoma, Wash., of the Tacoma Railway & Power Company, the Puget Sound Electric Railway and the Pacific Traction Company. Mr. Hewitt was formerly connected with the Great Northern Railway for many years in different capacities.

Mr. George F. Maddock has been appointed manager of the department of examinations and reports of H. M. Byllesby & Company, Chicago, Ill. Mr. Maddock has been assistant professor of engineering at a prominent university, manager of several utility properties, has had the engineering, designing and direction of a large amount of utility plant construction, and for several years was works manager of a large steam engine manufacturing plant.

Mr. W. D. Scott has been appointed general manager of the Oregon Electric Railway and the United Railways, Portland, Ore., with jurisdiction over the operating, mechanical and purchasing departments. Mr. Scott has also been appointed general manager of the Spokane, Portland & Seattle Railway and the Oregon Trunk Railway, Portland, Ore., with jurisdiction over the operating, mechanical and purchasing departments. The office of general superintendent has been abolished.

Mr. John S. Kennedy has been appointed secretary of the employees' benefit fund committee of the New York Telephone Company, the Bell Telephone Company of Pennsylvania, the Chesapeake & Potomac Telephone Company and associated companies. Mr. Kennedy has been connected with the New York Telephone Company since May, 1913. He was formerly secretary of the Public Service Commission of the Second District of New York. Before that he was connected with the Railroad Commission of the State of New York.

Mr. Roger Clarkson Mills, who has been secretary of the Sioux Falls (S. D.) Traction System, has been elected secretary-treasurer of the company. Mr. Mills was graduated from Iowa Agricultural College, enlisted for the Spanish war and was transferred to the quartermaster's department, in which he served first in the field and then in the transport service. Later he was transferred to headquarters at San Francisco, then to Seattle, Fort Townsend and Spokane in the construction department. After eight years of service he resigned to take up farming in Michigan where he conducted a fruit farm at Benton Harbor and a grain, dairy and orchard farm at Dowagiac.

Mr. Andrew Kalbach, formerly manager and engineer of the New York City Interborough Railway, which is now controlled by the Third Avenue Railway, New York, N. Y., has been appointed deputy commissioner of street cleaning in charge of the Bronx by Mayor Mitchel of New York. Mr. Kalbach was graduated from Annapolis. In 1903 he resigned from the navy to become assistant engineer for the Rapid Transit Subway Construction Company, New York, N. Y. He was subsequently appointed general manager and engineer of the New York City Interborough Railway, the majority of stock of which was controlled at that time by the Interborough Rapid Transit Company.

Mr. J. H. Harvey, now superintendent of the Forty-eighth and Harrison division of the Metropolitan Street Railway, Kansas City, Mo., joined the company in 1903. His first work was as timekeeper in the construction department of the company. He continued in that capacity from March until September of that year, when he was made chief timekeeper. For six years he had charge of this important phase of the accounting department. In June, 1909, he was made secretary to the president and held that position until December of the following year. He was then advanced to superintendent of employment. After serving three years at the head of the employment department, he was made superintendent of the Forty-eighth and Harrison division of the company.

Mr. John Sanders, general manager of the Danbury & Bethel Street Railway, Danbury, Conn., since October, 1912, has in addition been elected president of the company to succeed Mr. Arthur E. Tweedy, who has also retired as a director. Mr. Sanders was connected with the railway and construction engineering department of the General Electric for several years and was also connected for three years with the Aetna Construction Company and the Sperry Engineering Company, New Haven, Conn., in charge of the installation of the power equipment, overhead construction and the rolling stock of the Shore Line Electric Railway. Previous to that he was connected with the New London & East Lyme Street Railway and the Bridgeport & Danbury Street Railway as engineer.

Mr. Daniel L. Fennell, the new secretary to the general superintendent of the Metropolitan Street Railway, Kansas City, Mo., has devoted practically his entire business career to electric railway work. Mr. Fennell became connected with the company in 1903 as timekeeper in the construction department. He held this place for four years and was then promoted to timekeeper of the shops. In 1909, after a brief period as assistant superintendent, Mr. Fennell became division superintendent of the Holmes Street division, and since that time has been with the transportation department of the road. In 1912 he was placed in charge at Forty-eighth and Harrison, the most important division operated by the company. After holding that place more than a year, Mr. Fennell was made secretary to the general superintendent. Mr. Fennell is a native of Kansas City and was educated in that city.

Mr. Edward Hammett has been appointed general manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis., to succeed Mr. Ernest Gonzenbach, whose resignation as vice-president and general manager of the company was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914, following the sale of the controlling interest in the company to local interests in Sheboygan. Mr. Hammett has been superintendent and purchasing agent of the company since March, 1910. He was born in Wheaton, Ill., and entered railway work with the Aurora, Elgin & Chicago Railroad under Mr. Gonzenbach, who was then electrical engineer of that company. Mr. Hammett was promoted rapidly while with the Aurora, Elgin & Chicago Railroad, and finally entered the selling field as district manager of the Electric Service Supplies Company at Pittsburgh, Pa., from which position he resigned to become connected with the Sheboygan Light, Power & Railway Company, the predecessor of the Sheboygan Railway & Electric Company.

Mr. S. F. Hazelrigg, for many years vice-president and general manager of the Richmond Light & Railroad Company, New Brighton, N. Y., has tendered his resignation, effective Feb. 1, and will devote his time to the Atlantic Coast Electric Light Company and other properties on the Jersey coast of which he is president. Mr. Hazelrigg has been connected with the Staten Island company since 1902, and in addition to being vice-president and general manager of the Richmond Light & Railroad Company he is vice-president and director of the Asbury Park & Sea Girt Railway, president and director of the Atlantic Coast Electric Light Company, president and director of the Atlantic Coast Electric Railway, president and director of the New Jersey & Staten Island Ferry Company, director of the Sea Coast Traction Company of Asbury Park, N. J., director of the Seashore Electric Railway, president and director of the Southfield Beach Railroad, president and general manager and director of the Staten Island & Midland Railway, and secretary, treasurer and director of the West End & Long Branch Railway. He is also connected with a number of industrial and banking institutions.

Mr. Frederick E. Webster has resigned as assistant clerk of the Public Service Commission of New Hampshire to accept the position of treasurer of the Massachusetts Northeastern Street Railway and the Rockingham County Light & Power Company, Portsmouth, N. H., with headquarters at Haverhill, Mass. For a number of years Mr. Webster was connected with the accounting department of the Concord & Montreal Railroad. When that property was leased to the Boston & Maine Railroad he resigned the position of chief clerk to become treasurer and auditor of various subsidiary companies of John P. Squire & Company. In 1903 he was appointed chief clerk and accountant of the New Hampshire State License Commission, and in 1911, when the Public Service Commission of that State was organized, he was appointed assistant clerk of the commission in charge of its office and accounting matters. Mr. Webster prescribed the system of accounts adopted by the commission, supervised the issuance of the annual reports of the commission, and gave such instruction to the reporting utilities as was needed in order to comply with the requirements of the department.

Mr. W. W. Stephens, who has succeeded Mr. J. H. Harvey as superintendent of employment of the Metropolitan Street Railway, Kansas City, Mo., became connected with the auditor's office of the company in 1892. Later he was made paymaster and placed in charge of all transfers. At that time the company paid all of its men by check and the paymaster devoted only about one day of the week to the work of signing checks. As manager of transfers, Mr. Stephens did some excellent work, directed largely toward economy of action with conductors. At that time the conductors were punching transfers four times. This number was halved by the company, following recommendations by Mr. Stephens. The two-color system was adopted. Green slips were used to indicate morning and white to indicate afternoon and night. The date was printed on the transfers, instead of punched, as had been the practice up to that time. Only two punches are now made by conductors, denoting the time and direction. When the Metropolitan Street Railway began paying its men, with the exception of those in the offices, in cash, a paymaster was appointed to give all of his attention to this work. Mr. Stephens has since then devoted most of his time to the transfer and accounting departments.

Mr. P. H. Korst, who is general manager of the Janesville (Wis.) Electric Company, was elected president of the Wisconsin Electrical Association at the sixth annual convention held in Milwaukee on Jan. 15 and 16. Mr. Korst was born fifty years ago at Chillicothe, Ohio. After leaving high school in 1880 he engaged in telephone work and later became arc expert for the Wood Arc System. He took the Thomson-Houston factory expert course in 1888, after which he became manager and secretary of the Badger Electric Company at Racine, Wis. He remained at Racine eleven years until the sale of the property to The Milwaukee Electric Railway & Light Company. He has been manager of the Janesville Electric Company for the last thirteen years. He was a charter member of the old Northwestern Electrical Association and also of its successor, the present Wisconsin Electrical Association. In 1908 he was elected president of the Northwestern Electrical Association.

P. H. Korst

OBITUARY

Edwin Emerson Nolan, head of the materials disposition department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., died on Jan. 13. Mr. Nolan began work with the Westinghouse Electric Company in 1887. In 1898 he was sent by the company to France to establish a factory at Havre. In 1902 he returned to the United States and was placed in charge of the materials disposition department. Mr. Nolan was born in Chicago on Aug. 10, 1857.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) denotes a project not previously reported.

RECENT INCORPORATIONS

***Southern Traction Company, Bowling Green, Ky.**—Application for a charter has been made by this company in Kentucky to build an electric railway in Bowling Green. Capital stock, $20,000. Officers: Charles Roemer, president; J. S. Lewis, vice-president and general manager; Lon D. Hanes, secretary, and Joseph W. Ford, treasurer.

***Pease River Tramway & Navigation Company, Ottawa, Ont.**—Application is being made to the Canadian Parliament for the incorporation of this company, to build an electric railway from Smith's Landing, on Pease River, to Fort Smith, on the northern boundary of Alberta; a line from Vermilion Rapids easterly along the northern bank of the Pease River to Vermilion Falls, with branch lines, and to operate steamships on the Pease, Slave and Mackenzie Rivers. Pringle, Thompson, Burgess & Cote, Ottawa, Ont., are solicitors for the applicants.

***Beaver Valley & Ohio Railway, Beaver Falls, Pa.**—Chartered in Pennsylvania to build an electric railway in Beaver Falls. Capital stock, $20,000. Incorporators: W. A. Goehring, Zelienople, president; M. G. Gibbs, Pittsburgh, W. A. Goehring, Jr., R. R. Goehring, F. R. Latshaw and F. B. Hall, all of Zelienople.

FRANCHISES

Birmingham, Ala.—The Birmingham, Ensley & Bessemer Railway will ask the Council for franchises in Birmingham to extend its lines to Norwood, Avondale, Southside, West End, Powderly and Bessemer.

Sausalito, Cal.—The Marin Electric Railway has asked the Council for a franchise to build an electric line in Sausalito and extend it to Mill Valley. [E. R. J., Dec. 6, '13.]

Stockton, Cal.—The Stockton Electric Railway has asked the Board of Supervisors for a fifty-year franchise to extend its lines on El Dorado Street to Castle, across the Lower Sacramento Road and through Tuxedo Park in Central Court to the western boundary of the park.

Pocatello, Idaho.—J. B. Browning, Pocatello, and associates have asked the Council for a fifty-year franchise in Pocatello. [E. R. J., Nov. 22, '13.]

Herrin, Ill.—The Southern Illinois & St. Louis Railway has received a franchise from the Council on Monroe Street in Herrin. The company has secured franchises from the City Councils of Johnston City and Marion. This is part of a plan to build an electric railway between Marion and Harrisburg with branch lines to Benton and to Johnston City and Herrin. William Rothman, Chicago, is interested. [E. R. J., Jan. 3, '14.]

Onondaga, N. Y.—The New York State Railways has asked the Council for a franchise to double-track its line in Seneca Street from South Salina to its present double-track in Onondaga.

***Newbern, N. C.**—The City Council is asked to grant a franchise to build an electric railway from a point near the Union Station in Newbern to the Eastern Carolina Fair grounds and to Glenburnie Park.

Lawton, Okla.—The Lawton Railway & Light Company has asked the Council for a franchise in Lawton. It is planned to build a line through Lawton and extend it to Fort Sill.

Galt, Ont.—The by-law authorizing the renewal of the franchise of the Galt, Preston & Hespeler Railway for twenty-five years with power to make certain extensions and improvements of its lines in Galt has been carried by a large majority.

***Portland, Ore.**—The Heights Trust Company has asked the Council for a franchise to build electric lines in Portland to connect with the lines of the Portland Railway, Light & Power Company's lines in Portland.

Ellwood City, Pa.—The Mahoning Valley Street Railway has asked the Council for a franchise in Ellwood City.

Plainview, Tex.—A. E. Harp, Plainview, has asked the Council for a franchise to build either an electric or a gasoline railway in Plainview.

Bremerton, Wash.—Gustav Rust, Seattle, and associates have received a franchise from the Council to build an electric railway in Bremerton. It is proposed to connect Hood's Canal and other points on Puget Sound with Bremerton. It is stated that a site has been secured on the Hama River near Bremerton on which it is planned to build a new power house to cost $350,000.

Cashmere, Wash.—Hyman Harris, Wenatchee, has asked the Council for a franchise in Cashmere. This is part of a plan to build a 35-mile electric railway from Malaga to Leavenworth. [E. R. J., Dec. 20, '13.]

Shelton, Wash.—A. E. Hillier, Shelton, has asked the City Council for a franchise for an electric railway and power lines in Shelton.

TRACK AND ROADWAY

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—Work will be begun at once on the extension of the Walnut Street line in Gadsden from Twelfth Street as far as the steel works in South Gadsden.

North Alabama Traction Company, New Decatur, Ala.—During the next few weeks this company will award a new paving city contract in New Decatur.

Fresno & Clovis Interurban Railway, Fresno, Cal.—Preliminary arrangements have been completed and construction will be begun at once on the section of the line on Blackstone Avenue in Fresno. It will extend from Fresno to Clovis and the foothills of the Sierra Nevada Mountains. F. S. Granger, Clovis, promoter. [E. R. J., Dec. 27, '13.]

Glendale & Montrose Railway, Glendale, Cal.—This company is rebuilding about 8 miles of its lines in Glendale.

San Diego (Cal.) Railway Electric Railway.—A 3-mile extension will be built in San Diego during the year.

Stockton Terminal & Eastern Railway, Stockton, Cal.—During the year this company plans to build an extension between Bellota and Jenny Lind.

Carolina & Georgia Railway, Augusta, Ga.—Work will be begun on Feb. 1 to build this 108-mile railway between Aiken and Greenwood. A few miles have already been graded from the Greenwood end of the line. James U. Jackson, Augusta, president. [E. R. J., Dec. 27, '13.]

Idaho Traction Company, Boise, Idaho.—An extension from Boise to Barber is being contemplated by this company.

Chicago (Ill.) Railways.—It is planned to build 27 miles of new track in Chicago during the year.

Northern Illinois Electric Railway, Chicago, Ill.—An extension from the end of the present line to Rochelle, 13 miles, will be constructed during the year.

Chicago, Ottawa & Peoria Traction Company, Ottawa, Ill.—Plans are being made to tear up a branch line 1½ miles in length in La Salle.

Rock Island Southern Railway, Rock Island, Ill.—During the year this company will finish the construction of its line into Galesburg.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—An extension east from Geneva to Celina, Ohio, is being considered by this company.

Columbus Street Railway & Light Company, Columbus, Ind.—About 3 miles of new track is being built by this company in Columbus.

Fort Wayne & Springfield Railway, Decatur, Ind.—Plans are being considered to extend this line to Portland, Ind.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Plans are being made by this company to extend its lines in Bloomingdale.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Grading has been completed between Bonner Springs and Kansas City and tracklaying will be begun at once. Preliminary surveys are being made for the extension to Lawrence. J. D. Waters, Bonner Springs, president. [E. R. J., July 19, '13.]

Independence, Neodesha & Topeka Traction Company, Independence, Kan.—This company, which plans to build a 17-mile line between Independence, Neodesha, Altoona and Topeka, has elected the following officers: T. J. Booth, president; H. E. West, vice-president; W. M. Nees, second vice-president, and R. E. Eakin, secretary and treasurer. [E. R. J., Jan. 10, '14.]

Salina Street & Interurban Railway, Salina, Kan.—A 2-mile extension will be built by this company in Salina during the year.

Kansas Central Traction Company, Topeka, Kan.—Petitions have been presented to the Columbus City Council for an election to authorize an issue of $10,000 of bonds as a bonus to this company, which will build an interurban line between Altamont and Columbus. Oswego and other towns have issued bonds for that purpose. [E. R. J., Jan. 10, '14.)

Topeka (Kan.) Railway.—During the year this company plans to build a 1½-mile extension in Topeka.

***Central City, Ky.**—Plans are being considered to build an electric railway from Central City to Greenville in a westerly direction and from Central City to Drakesboro in a southerly direction, thus placing Central City in touch with twenty-five small towns. Applications for franchises will soon be made. No names are yet given of those interested in this project.

New Orleans Railway & Light Company, New Orleans, La.—It is planned to build 7.06 miles of new track in New Orleans during the year.

Rockland, Thomaston & St. George Railway, Rockland, Maine.—Approximately 2 miles of new track will be built during the year in Rockland.

Electric Short Line Railroad, Minneapolis, Minn.—This company plans to build a line southwest from Minneapolis via Wayzata, through Sibley County and Nicollet County, via New Sweden, Granby, Nicollet and crossing the Minnesota River at Judson. From there the line will pass through Butternut and cross the Watonwan River at Cresco and then on to Fairmont and into Iowa.

Twin City Rapid Transit Company, Minneapolis, Minn.—Plans are being considered to build an extension from Hibbing via Keewatin, Nashwaul, Taconite, Holman, Coleraine and Bovey to Fayton. The company will soon ask for franchises.

St. Paul Southern Electric Railway, St. Paul, Minn.—During 1914 the Interurban Construction Company plans to build for the St. Paul Southern Electric Railway about 36 miles of new track to connect Hastings, Cannon Falls, White Rock and Zumbrota.

Hattiesburg (Miss.) Traction Company.—During the year this company plans to build 2 miles of new track in Hattiesburg.

Meridian Light & Railway, Meridian, Miss.—About 1¾ miles of new track will be built by this company during the year in Meridian.

Billings, Mont.—The Big Horn Canyon Irrigation & Power Company has completed plans for the construction of 2½ miles of electric railway from Custer to the mouth of the Big Horn River. Construction will be begun in the immediate future. [E. R. J., Jan. 10, '14.]

Missouri Interurban Railroad, Sedalia, Mo.—Surveys have been completed for this 40-mile line to connect Sedalia and Prairie Home via Smithton, Otterville and Bunceton. Construction will not be begun until the entire right-of-way has been secured and financial backing has been obtained. Officers: A. W. Nelson, Bunceton, president; J. W. Mellor, secretary, and B. H. Colby, Security Building, St. Louis, chief engineer. [E. R. J., July 22, '11.]

Freeport (N. Y.) Railroad.—Plans are being made to build an extension through Grove Street northward into Railroad Avenue and eastward, making its terminus in front of the Long Island depot in Freeport.

Beach, N. D.—Plans are being made to build an electric railway from Baker, Mont., via Dennis, Carlyle, Alpha and Williams to Beach, N. D. [E. R. J., Jan. 3, '14.]

Cincinnati (Ohio) Traction Company.—Plans are being considered to build an extension on Fairfax Avenue in Cincinnati to Wold.

Toledo & Western Railroad, Toledo, Ohio.—This company is asked to consider plans to build an extension from Alvordton to Hillsdale.

Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont.—This company has awarded a contract to the United States Steel Products Company for the supply of rails to be used on its lines on King Street and Princess Street in Kingston.

London & Lake Erie Railway & Transportation Company, London, Ont.—Plans are being prepared for extensions of this company's lines, work on which it is said will be begun in the spring.

Toronto Suburban Street Railway, Toronto Junction, Ont.—Grading has been completed and track is being laid on the extension from Weston to Woodbridge.

***Sandy, Ore.**—A company has been formed in Sandy to build a 7-mile electric railway from Sandy to Boring. The County Court, Clackamas County, has the matter in hand at this time.

Lehigh Valley Transit Company, Allentown, Pa.—This company plans to spend $150,000 on improvements of its lines. It has decided to rebuild its tracks in New Jersey and purchase equipment to rebuild the Phillipsburg Horse Car Railroad, 7 miles.

***Reading, Pa.**—A company is being formed to build a 40-mile double-track electric railway between Reading and Allentown via the East Penn Valley. Surveys have been completed. No names are yet given of those interested in the project.

Scranton & Binghamton Traction Company, Scranton, Pa.—Work will be begun at once on extensive improvements which will cost about $500,000.

Montreal (Que.) Tramways Company.—A new belt line in Westmont, which joins the upper and lower levels of the city, has been placed in operation.

Jackson Railway & Light Company, Jackson, Tenn.—Surveys have been begun on the extension to West Jackson via Poplar Street.

Maryville-Knoxville Interurban Railway, Knoxville, Tenn.—Work has been begun by this company on the Maryville end of the line. This 14-mile railway will connect Maryville, Rockford, Little Rock, Vestal and Knoxville. John M. Clark, Barryville, secretary. [E. R. J., Jan. 10, '14.]

***Nashville, Tenn.**—The commercial interests of Nashville are considering plans to build an electric line to the Hermitage, several miles from Nashville.

Nashville (Tenn.) Traction Company.—An increase in the capital stock of this company from $500,000 to $2,500,000 has been authorized. The organization of the Nashville & Detroit Construction Company, which is to do the construction work for the traction company, has been completed. W. O. Parmer, Nashville, president [E. R. J., Dec. 20, '13.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next three months this company will award contracts to build 2 miles of new track in Corpus Christi.

Dallas (Tex.) Consolidated Electric Railway.—The line on Bryan Street from St. Joseph Avenue to Garrett Avenue will be double-tracked by this company in the near future.

Texas Traction Company, Dallas, Tex.—The extension to St. Vincent's Sanitarium has been completed and it is planned to build soon another extension on Binkley Street to the new Sherman Hospital in Sherman.

Houston (Tex.) Electric Company.—Among the improvements planned by this company will be a new line on Main Street from Capitol Avenue to Dallas Avenue and on Dallas Avenue from Main Street to Louisiana Street, in Houston.

Marshall (Tex.) Traction Company.—During the year about ½ mile of new track will be laid in Marshall.

Temple, Tex.—Preliminary surveys have been completed for the proposed 30-mile electric line between Temple, Lott and Marlin. Kansas City capital is understood to be ready to construct the line as soon as financial conditions are adjusted. No names are yet given of those interested in the project. [E. R. J., Nov. 15, '13.]

Ogden (Utah) Rapid Transit Company.—Plans are being made to begin work at once on the extension to Logan and one from Hermitage, in Ogden Canyon, to Huntsville. The material for these lines has been ordered.

Utah Light & Railway Company, Salt Lake City, Utah.—It is planned to extend the Wandamere line to Fourteenth South Street from the park in Salt Lake City.

Charleston (W. Va.) Interurban Railway.—A 25-mile extension from Charleston to Montgomery is being planned by this company.

Elkins (W. Va.) Electric Railway.—A 1-mile extension between Harding and Roaring Creek Junction will be built during 1914.

Morgantown & Southern Railway, Morgantown, W. Va.—During the year it is planned to build 2 miles of new track in Morgantown.

Minneapolis, Merrill & Marinette Railway, Merrill, Wis.—This company states that its 35-mile line will be operated by steam.

SHOPS AND BUILDINGS

Glendale & Montrose Railway, Glendale, Cal.—This company expects to build a new carhouse in Glendale. The structure will be 40 ft. x 60 ft. A waiting room, 30 ft. x 40 ft., will also be built.

Chicago & Interurban Traction Company, Chicago, Ill.—Plans are being considered by this company to build a new passenger station at Crete, near Chicago Heights.

Chicago & Milwaukee Electric Railway, Chicago, Ill.—Work will be begun at once by this company on its new depot on Stanley Street in Chicago.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—New concrete repair pits, new tracks and other improvements are being made by this company at its carhouse in Oskaloosa.

Massachusetts Northern Railways, Greenfield, Mass.—Plans are being made for the enlargement of this company's carhouse in East Templeton. The addition will cost about $10,000.

Montreal (Que.) Tramways.—This company has purchased from the Canadian Light & Power Company a block of land in the parish of Lachine on which it plans to build new carhouses.

POWER HOUSES AND SUBSTATIONS

Danbury & Bethel Street Railway, Danbury, Conn.—This company has recently placed a contract with the General Electric Company for a 600-kw, 2300-volt, sixty-cycle turbo-generator, 25-kw turbo-exciter set, 17½-kw motor-driven exciter set, two 200-kw, sixty-cycle rotary converters and six 65-kw step-down transformers. This apparatus will be installed within the next four months. In the near future the company plans to enter the lighting field. It is now making arrangements for the construction of a transmission line from Danbury to Newton, about 9 miles distant. This company plans to install new material in its power house at Danbury, and in order to do this it will be necessary to remove the present direct-current turbo-generator. The new alternating-current machine will be placed on the foundation which is now occupied by the direct-current machine.

Durham (N. C.) Traction Company.—This company is installing at its power house in Durham two new boilers and auxiliaries of 752 hp at a cost of $12,800.

Dominion Power & Transmission Company, Hamilton, Ont.—Plans are being considered by this company to build a new steam plant in Hamilton in the spring. The plant will represent an expenditure of over $3,000,000.

El Paso (Tex.) Electric Railway.—Among the improvements planned by this company in the near future will be the construction of several additions to its power plant in El Paso.

Ogden (Utah) Rapid Transit Company.—This company has dismantled in the past sixty days its complete steam-power plant and is now utilizing the space formerly occupied by the steam plant equipment for electrical substation equipments, having entered into a contract to purchase all necessary power for the next ten years.

Manufactures and Supplies

ROLLING STOCK

Cleveland (Ohio) Railway is in the market for fifty center-entrance cars.

Jacksonville (Fla.) Traction Company is in the market for ten passenger cars.

Detroit United Railway, Detroit, Mich., is in the market for fifty single-truck cars.

Dallas Consolidated Electric Street Railway, Dallas, Tex., is in the market for fifteen passenger cars.

Rockford, Beloit & Janesville Railway, Beloit, Wis., is in the market for four city cars.

Northern Ohio Traction & Light Company, Akron, Ohio, is in the market for ten city and five interurban cars.

Northern Texas Traction Company, Fort Worth, Tex., is in the market for twenty passenger cars.

Puget Sound Traction, Light & Power Company, Seattle, Wash., is in the market for eleven passenger cars.

Danbury & Bethel Street Railway, Danbury, Conn., is contemplating the purchase of two or three cars, probably single-truck, within the next three or four months.

Glendale & Eagle Rock Railway, Glendale, Cal., expects to purchase four double-truck forty-four-passenger California cars, one 30-ton flat car and one 30-ton freight box car.

Wellsburg, Bethany & Washington Railroad, Wellsburg, W. Va., is completing a new switch from its main line to a coal mine and will equip its road with a car of about 12 tons to 20 tons capacity.

Austin (Tex.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 1, 1913, as expecting to purchase four closed cars, has ordered these cars from the American Car Company, which expects to ship them in the middle of March.

Ogden (Utah) Rapid Transit Company, noted in the ELECTRIC RAILWAY JOURNAL as being in the market for city cars, has ordered from the American Car Company six 42-ft. city cars, to be complete in every detail, shipment to be made about March 1, 1914.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex., expects to purchase within four weeks and would like data and prices at once on two new single-truck pay-as-you-enter cars, 32 ft. over all, seating capacity about thirty persons, with two GE motors under same.

Ohio Electric Railway, Cincinnati, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 20, 1913, as having ordered five all-steel center-entrance cars from the Cincinnati Car Company, has specified the following details for these cars:

Seating capacity..........70
Weight car body...24,000 lb.
Bolster centers, length..32 ft.
Length over vestibule, 50 ft. 2 in.
Width over sills....8 ft. 6 in.
Width over post at belt.9 ft.
Width, sill to trolley base ....9 ft.
Interior trim.....mahogany
Underframe ....metal
Air brakes............West.
Bolsters, body, two steel "Z" bars
Bolsters, truck....cast steel
Bumpers.....stationary type
Car trimmings......Dayton
Center bearings, half ball, special design
Control system, double-end HL
Couplers ....Tomlinson
Curtain fixtures, Nat'l Lock Washer
Curtain material...Pantasote
Gongs...rotary pedal alarm
Hand brakes, Cin. Car Co. std. with "Pittsburgh" drop brake handle
Heating system.Peter Smith
Headlights ....Dayton
Journal boxes........M.C.B.
Motors, West. No. 303. double
Roofs ....turtle-back
Sash fixtures........Dayton
Seats, Cin. Car Co. special design
Seating material, slat construction
Side bearings....roller type
Step treads..........Mason
Trolley retrievers...Knutson
Trolley base........bayonet
Trolley wheels.6-in. O.E. std.
Trucks ....special design
Ventilators ....Utility
Wheels....34-in. rolled steel
Special devices, etc., Hedley anti-climber, wearproof aisle mats, Alert fire extinguisher

TRADE NOTES

Paducah Pole & Lumber Company, Paducah, Ky., which is one of the largest handlers of poles for traction and other purposes in that section, has established a branch yard at Metropolis, Ill., on the other side of the Ohio River.

Hart & Hegeman Manufacturing Company, Hartford, Conn., at its annual meeting appointed Shiras Morris as president and treasurer to succeed the late Alfred H. Pease. Mr. Morris was formerly secretary and treasurer of this company. Other officers appointed were: vice-president, Charles A. Pease; general sales manager, McKew Parr; secretary, Arthur L. Shipman.

Cutter Electrical & Manufacturing Company, Philadelphia, Pa., has opened a new branch office in Indianapolis, Ind., under the direction of Linn O. Morrow, whose territory will include southern Indiana and Illinois, Kentucky, Tennessee and Missouri. Mr. Morrow has been connected with this company for over six years, having spent about four years in the engineering department. The Indianapolis office will be under the supervision of H. F. Darby, Jr., Chicago district manager.

ADVERTISING LITERATURE

C-A-Wood-Preserver Company, St. Louis, Mo., has issued copies of a report of the United States Department of Agriculture on successful results obtained from volatility tests made with this company's preservative, in comparison with creosote L-54. Results show that the coal tar creosote lost considerably more oil by volatilization than the wood preserver.

Joseph Dixon Crucible Company, Jersey City, N. J., is distributing a booklet entitled "Joseph Dixon, One of the World-Makers," written by Elbert Hubbard and published by the Roycrofters, East Aurora, N. Y. The booklet contains a short biography and personal estimate of Joseph Dixon, together with a sketch of the development of the Joseph Dixon Crucible Company.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. A4189, devoted to small plant d.c. three-wire switchboards of 125 volts and 250 volts and 10 kw to 100 kw. Bulletin No. A4199 illustrates and describes railway motor gears and pinions and contains curves and data on this subject. Bulletin No. A4143 describes belt-driven alternators, known as Form B. Bulletin A4197 describes electric fans.

General Railway Signal Company, Rochester, N. Y., has issued a catalog which contains a detailed description of a.c. block signals on the Southern Railway by W. J. Eck, signal and electrical engineer Southern Railway, and which also includes arguments in support of the a.c. block signal system as compared with the d.c. system, from the viewpoints of maintenance, cost of operation, reliability, length of track circuits, signal lighting and other facilities.

Hess-Bright Manufacturing Company, Philadelphia, Pa., is distributing a reprint from the *Journal* of the American Society of Mechanical Engineers entitled "Comparative Tests of Three Types of Lineshaft Bearings," by C. C. Thomas, E. R. Maurer and L. E. A. Kelso. The types of bearings included in the tests were ring-oiled bearings lined with babbitt metal, roller bearings and Hess-Bright ball bearings. Curves illustrating the results of these tests show in favor of the ball bearings a low comparative consumption of power by friction at given loads and speeds per bearing.

Weir Frog Company, Cincinnati, Ohio, has issued Catalog No. 9, a bound handbook of 225 pages, describing and illustrating fully its various designs of frogs, switches, crossings and all kinds of track work. At the end of the catalog is arranged a useful set of tables containing dimensions of different types of track construction, such as turn-outs for stub switches, split switches and spring frogs; three-throw turn-outs, with split or stub switches and cross-overs. Other tables show tie dimensions for each kind of track, the total number of feet (board measure) in cross-ties per mile of track, tons of rails required per mile of given weights per yard, number of joint fastenings to the ton of rails, rail spike data, splice bars and bolts per mile of track, middle ordinates in inches for curving rails, decimal parts of a foot for each 1/64 in., and rail dimensions and weights.

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THE DETROIT CRISIS AND ADVERSARY

"It brought the crisis in the twenty-year warfare with our ancient adversary, the Detroit United Railway." Thus speaks the Mayor of Detroit in telling what the last year did for the city. It is the attitude which such words indicate, whether displayed by company or city, that makes it so difficult to settle public utility problems. "Ancient adversary" and "twenty-year warfare" are not the conciliatory terms that should come from either side in such a controversy. They are not a basis for the co-operative relations that ought to exist between a city and its utilities in order that the best service may be provided. An attitude of this kind is the strongest argument for a state commission to deprive a city wholly of the power of regulation. If a city regards a utility as its adversary it cannot decide what is fair for either itself or the utility. Reasonable action can be expected only from an able state commission which recognizes neither side as an adversary but seeks to develop a reasonable co-operative policy. If the Detroit United Railway is an adversary of the city of Detroit as the Mayor claims, it is not the only adversary in Detroit. It has yet to be proved that the company is an adversary to the growth and prosperity of the city.

MR. ERICKSON'S PAPER ON REGULATION

The midyear conference was fortunate in hearing so expert an opinion on the respective merits of regulation and profit-sharing as it had from Mr. Erickson. The able member of the Wisconsin commission has studied so effectively the problems of public utilities and their relation to public welfare that his views on any issue affecting these conditions are important. In his paper the wholesomeness of the policy of state regulation is set forth in contrast with the dangers of a substitute policy of profit-sharing. Any plan of division of earnings in a municipality necessarily means local regulation instead of state regulation. This is a detriment. It also means, as Mr. Erickson says, a tendency to place the advantage of the taxpayer above the interest of the user of the service. The reason why this is unwise is that the user of the service may feel that something is taken from him and given to the taxpayer. If that is his conclusion, he may resent it. It is true that the so-called profit is but a misleading name for a tax and that the amount of it is part of the cost of operation. This cost the user of the service has to pay. Franchises have not been drawn on wholly economic grounds. Sometimes economic laws have been rudely disregarded. The terms of contract have been fixed by barter between a company and the city officials in power at the time. These officials would enter into a contract on terms involving so-called profit-sharing. They would not enter into a contract on other terms. The bargain was made and the future left to the "rough play of economic forces"; and all must admit that these forces have had their inning. The equitable basis of relations between the companies and the public is regulation by a higher power than a municipal body. Mr. Erickson has done a good service to both public and companies in pointing this out in the way in which his unique subject and his discussion emphasized it.

ADMINISTRATION VIEWS ON HOLDING COMPANIES

In his message of Jan. 20 President Wilson startled the country by saying: "We are agreed, I take it, that the holding companies should be prohibited," and then he asked whether the owners of stocks (presumably those who own a majority in a holding company) should not be forced to divest themselves of stock control of all but one of the corporate fragments into which the holding company is to be broken. Whatever one may think of companies organized to secure the control of competing interstate railroads, such as the famous Northern Securities Company, it was almost incredible that the administration should seriously contemplate a campaign against holding companies as they are understood in the electric railway and lighting field. It was, therefore, satisfactory to read in the daily papers early this week the semi-official denial that interference was being considered with this kind of holding company. Indeed, any such plan would be almost a catastrophe not only to the electrical industry but to the smaller communities which now enjoy electric service which they could not possess without the device of the holding company. Such bodies are organized not to stifle competition but to give the benefit of expert aid in engineering, operation and finance to scattered plants whose existence otherwise would often not be warranted. Each isolated plant may be a monopoly within its own territory, but practically all political economists believe that municipal utilities must be monopolies if the greatest efficiency is to be secured. The holding company organization is obligatory in a plan of this kind because each local operating company usually must incorporate under the laws of the state where its service is given so as to secure the right of eminent domain and other privileges. To go back to the old plan of separate ownership would not only greatly cripple many existing undertakings but would probably lead to the abandonment of some of them and the loss of their services to the cities concerned.

RATE OF FARE AND RIDING HABIT

The paper of Mr. Hild at the midyear meeting of the American Electric Railway Association is a clear refutation of the claim often made by advocates of low fares for city railways that "the lower fares will induce so much more travel as more than to offset the losses due to the lower rates." It would be easy to show the falsity of this claim by a *reductio ad absurdum.* For instance, if the statement is broadly true, and a 4-cent fare is desirable, a 3-cent fare should be even better and a 1-cent fare would be the height of wisdom. The truth is that the rule has so many limitations so far as electric railway operation is concerned as practically to nullify it. As Mr. Hild says, the rate charged for transportation is one factor only of those which affect railway traffic, and it is by no means the most important. Very properly, he puts safety first and service next. He also calls attention to the fact that European practice in regard to low fares establishes no criterion for American practice because, while the fares are low, the ride is short, and the result is that the receipts per car mile do not differ greatly from those in this country.

Of course, purely as an abstract proposition, a reduction in fare on a street railway seems a desirable thing to the average citizen, just as would a reduction in the price which he would have to pay for any commodity, provided he can get the same commodity or the same service for the low price that he formerly did at the high price. Consequently, when low-fare campaigns are being conducted the advocates of the reduced fare have never, so far as we know, proposed that the railway company should reduce the character of service or the length of ride to make up for the lower fare. But if given a choice between a reduction in service and a corresponding reduction in fare, we do not believe that the American people as a whole would ever choose the latter.

We base this conclusion upon the experience of the past. When gas was introduced as an illuminant it was more expensive than oil, and it still is, but most people who have the opportunity to make the choice prefer to pay the higher price for the better service. The same principles apply in a comparison between gas and electricity as an illuminant and are equally true in the field of city transportation. The electric railway passenger of to-day travels in luxury compared with his predecessor of twenty or even of ten years ago. He enjoys better lighting, better heating, better ventilation and greater comfort, and he is carried a far greater distance for the same fare. One can hardly realize the extent of the improvements made during this period unless he sees the modern car and the ancient car side by side. Yet we do not believe that there is a city in this country which would be willing to return to the old order of things, if it were possible to do so, in order to gain a reduction in fare of, say, a portion of a cent.

The fact is that the increased cost of operation plus the increased demand for better facilities have brought about a condition where the former rates of fare are no longer adequate. Indeed, it is becoming more difficult every day for the electric railway companies to make both ends meet even with a 5-cent fare. The problem in most cities is not how to prevent a reduction of the fare from 5 cents but how best to put in force a higher average fare than 5 cents. Should there be a uniform fare at a higher rate? Or should a charge be made for transfers? Or should a zone system be adopted for the longer rides? These are really vital questions which will have to be answered before long, and the railway companies should be in a position to answer them when that time comes.

THE WORK TO FOLLOW THE MIDYEAR CONFERENCE

In deciding to adopt a code of principles the American Electric Railway Association has taken a constructive step. This is the most important act of the midyear conference. It is the promised contribution of the conference to the industry. Just how purposeful the principles will be has yet to be seen. Just how effective they will be cannot be told in advance. This much is clear: The real work is still before the industry. A decision to declare principles must come before the principles can be drawn. But the drawing of them, no matter how carefully or laboriously done, is only a part of the real problem. Assuming plain and fair principles, the test of them will come when the association asks the companies to make the principles their own. If there is failure at this point, the whole effort will be useless. If the companies do not adopt them, the public cannot be expected to accept them as representing the views of the companies. It is the companies, acting individually, that will have to live up to the principles if, as an effort to help the industry, these principles are worth the paper they are to be written on.

The announcement of President Black at the dinner, pledging the association to the new policy, well emphasizes the usefulness of the conference to the industry. Here was a matter which had long been the subject of informal discussion and correspondence. The public relations problem worried the companies. The public relations committee met and adopted a constructive program, and it became at once the most vital topic before the industry. In doing as it has done the committee speaks for the industry. It would have been interesting if this action could have been made the subject of general discussion as part of the program at Friday's conference. Railway executives express views in their meetings that are of direct interest and importance to other railway officials. But the code of standards of the association, if effective, will be of direct interest and importance to the public. The best thought of the industry will have to be directed toward the successful consummation of the policy from now on, therefore, in order that it may represent, not alone the remedies which railway officials express privately to others, but those which they can fairly outline to the public as salutary. If the 1914 midyear conference was measured only by its public relations work, it would amply justify the large expenditure of time and money which officials of member companies contributed. Thus to elevate the work of the committee is not to reflect upon the other well-planned features of the meeting; it is simply to point to the work of the committee as a word of hope to an industry in trouble.

WHERE DOES THE ASSOCIATION STAND ON PUBLIC RELATIONS?

The speech made by Mr. Tripp at the American Electric Railway Association dinner is a first-rate analysis of present conditions. If we did not urge our readers to heed it and the association to follow its recommendations, we should fail to do our plain duty. Fortunately the association has already resolved to declare the principles it stands for. Mr. Tripp's long experience as an operator has taught him the practical and inherent difficulties of the companies. He knows that the problems have been many and insistent and that the companies are not yet out of the woods. From his large experience he has formulated principles for the industry to adopt if it will. But before outlining policies he accurately describes difficulties which hamper the effort to make public relations satisfactory.

Mr. Tripp mentions the effect of arrested development due to inability of the companies to market securities. It is not surprising to hear the speaker's opinion that the cause of this effect cannot be told in a word. As we understand Mr. Tripp's idea, it is that, no matter what or who is responsible, conditions must be dealt with as they are; not as they might have been, not as they will be or may be, but as they stand now. Whether public relations are the cause or the effect, Mr. Tripp would improve them and thus let them be the new cause of a new effect. In other words, if these relations become good, the wider market for securities will necessarily follow.

Use has made the term "educating the public" familiar. The thought behind Mr. Tripp's suggestion should cause it to be discarded. As a substitute he would deal with the public through "co-operation." It is easy to wave this aside by saying that there cannot be co-operation unless the public will co-operate. But what the industry wants is the help of a constructive suggestion, and that is offered. It should not be rejected. It is not easy to lay down a program which will lead the public to see that its fair part is to co-operate. Yet the speaker, in elaborating his suggestion, did not fail to remind the companies that they as well as the public have corrective acts to perform. First, Mr. Tripp would correct, repeatedly and with provable statements of fact, misstatements by "self-appointed advisers of the people." To the untruths, the half truths and truths expressed in a misleading way in deliberate or ignorant magazine and newspaper articles effective rejoinders should be made. Often the correction will not be noticed. Often, if noticed, it will be garbled. But in time the results will count. Until that time patience and determination will be required.

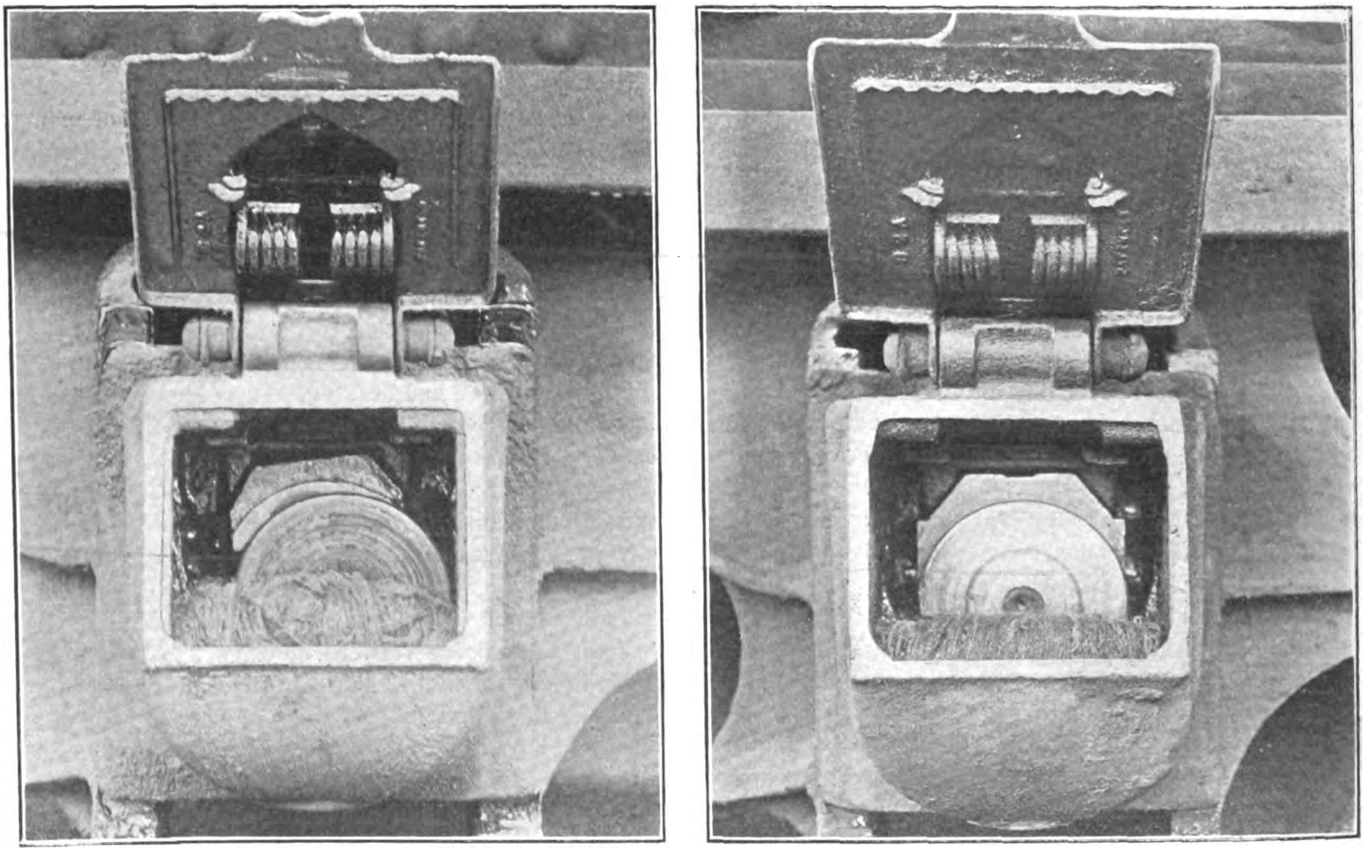
In brief, the plan discussed by Mr. Tripp and arranged for almost simultaneously and independently by the committee on public relations is to have the association stand for a code of ethics. Shall it represent the best ideas of the times with respect to business practices, and shall the companies depart therefrom at their peril? Or shall it represent the practices of the times, and shall the ideas of the public be conformed thereto? Or are the best ideas of the times and the practices of the times the same? If they are not the same, they ought to be. If they are, let the association say so. Companies that lag behind the line of standards would undoubtedly, as Mr. Tripp realizes, be affected. But would the mismanaged companies be affected as seriously by a standard which they do not measure up to as the well-managed companies are affected by the backwardness of companies that do not try to reach a high standard? The answer should be that the association, seeking the advancement and good of the industry, will set out in writing the best and fairest standard that it can frame. Starting from the present, the duty then will rest upon each company in the industry, not to lower the standard, but to live up to it as best it can. We heartily indorse the plan for a declaration of principles. It should be strong, straightforward and fair to the public interest.

THE M. C. B. BRASS SHOULD BE DISCARDED

From time to time during the past two years we have endeavored to call attention to the unsuitability of the standard M. C. B. brass for passenger equipment subject to high acceleration and braking. These comments were based upon the possibility of the journal shifting out from under the shallow bearing when heavy brake applications were made, and they were supported by ample circumstantial evidence. Now, in the article on the New York, Westchester & Boston Railway, published elsewhere in this issue, additional evidence on the point is submitted, and it is *prima facie* in character. After one sees the two illustrations on page 220 it will be difficult indeed for him to advocate the continued use of the M. C. B. design in this class of service. In one illustration a journal is shown to have moved so far and the brass to have tilted to such a degree that, obviously, the only restraining influence against further motion is the striking of the journal on the rough surface of the cast-iron box. Certainly no extended argument is needed to demonstrate that this must produce hot boxes, to say nothing of the damage to the fit of the babbitted brass on the journal. Both the New York, Westchester & Boston Railway and the Interborough Rapid Transit Company have effected an astonishing reduction in hot-box troubles by the use of a special brass of practically full semi-circular cross-section, and there is absolutely no excuse for the electric railways operating a high-speed, frequent-stop service to retain as a standard a brass which was manifestly designed for freight cars with about 30 per cent braking power. It would be well for the A. E. R. E. A. committee on equipment to consider this subject with the idea of recommending a design of brass which would not be subject to the glaring defects of the M. C. B. standard.

Maintenance of the Mechanical Equipment of the New York, Westchester & Boston Railway

On This Suburban Line, Which Has Been in Operation for Nearly Two Years, the Cost of Maintenance and Inspection for the Cars and Their Equipment Has Been Reduced to Approximately 2 Cents per Car Mile—An Account Is Given of the Early Difficulties Which Were Experienced and of the Means Taken to Overcome Them



Westchester Equipment—Result of Emergency Application of Brake with Standard M.C.B. Brass and with Special Semicircular Brass

This is ocular proof of one cause of hot-boxes. For some time past it has been suspected that journals were shifted out from under their brasses under heavy brake applications, and full-semicircular brasses have been recommended instead. These illustrations furnish unanswerable support of the contention, and demonstrate that the M.C.B. standard brass is unsuitable for passenger cars.

The New York, Westchester and Boston Railway, a high-speed suburban line extending northward about 20 miles from New York City, was described in a series of articles in the Electric Railway Journal during 1912. It was opened to traffic on May 29, 1912, and since that time the mechanical and electrical costs have been steadily decreasing until the total maintenance charge is now less than 2 cents per car mile. These results, however, were not obtained without many investigations and experiments. In fact, during the early days of operation the difficulties appeared almost insurmountable, and it has only been by the introduction of numerous changes and improvements that the present conditions have been reached. In this article the difficulties with the mechanical equipment are outlined, and the means which were taken to eliminate them are described in detail. The experiences with the electrical apparatus will be treated in a later article.

PANTOGRAPHS

Since the road was opened a certain amount of trouble has been experienced with the pantographs. During the early months of operation much of this was due to the fact that both the overhead conductor and the roadbed were new and had not settled into their proper working positions. The troublesome points were, of course, eliminated as soon as they were exposed by actual operation. Pantograph shoes were found to have but a short life owing to the excessive wear and to the burning of the arcs. However, as pointed out in a recent communication to these columns from R. R. Potter, superintendent of equipment, since that time the steel contact wire has worn slightly flat, thus providing a contact which is an actual area rather than a single line. All of the burning has been eliminated, and the abrasion has been reduced materially. In the early days, also, the wrecking of pantographs was no unusual matter as their extremely light construction makes them susceptible to destruction even when they are caught only partially in the overhead work.

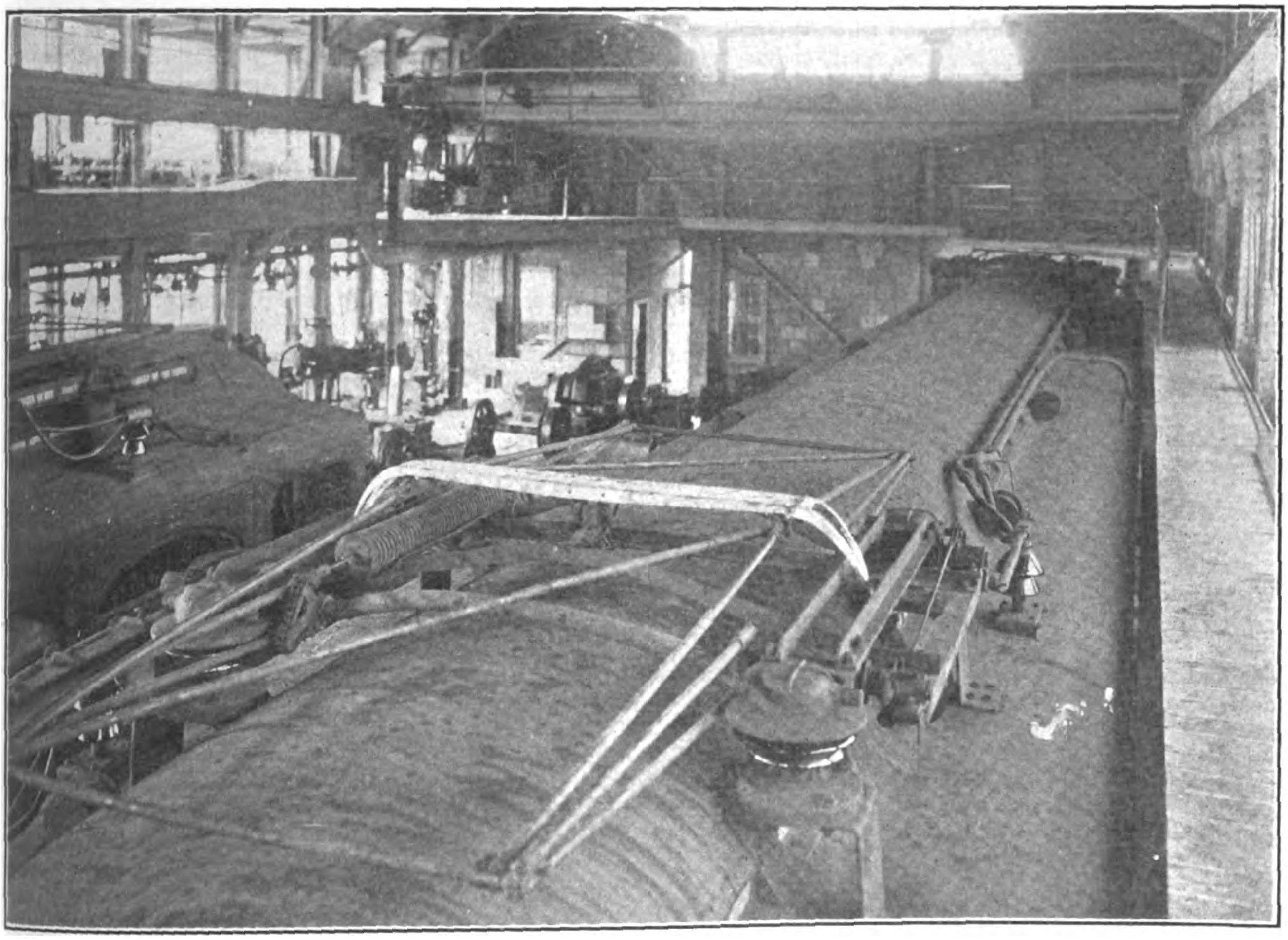
The pantograph frames, it should be said, are constructed of light seamless drawn tubing, the metal being only about No. 22 gage. The pantograph is extended or held up by means of a long spring in tension which is capable of considerable adjustment. It is lowered by an air-operated piston which pulls against this spring, and the whole framework rests upon insulators mounted on the roof of the car, the current passing through the framework on its way to the transformer. The extreme lightness of the construction is necessitated because at high speeds the pantograph must follow the variations in height of the conductor wire without any tendency to bounce away from it; and, following out this idea, the pantograph shoes are made of 1/16-in. metal and weigh only 7 lb. Increased mileage could, of course, be obtained by increasing the thickness of the shoe, but this would add weight at a point where the increased inertia would make it difficult for the pantograph to follow irregularities in the overhead construction. Horns of aluminum are provided at each side of the shoe in order to prevent the shoe from catching at its side on the wire, and a latch is bolted to the center of the shoe so that it may be held down when in its lowest position. The whole shoe with the horns and latch weighs but 13 lb.

At present the galvanized-iron shoes are being replaced by black mild-steel shoes of the same thickness, it having been found that a slightly greater life may thus be obtained. The black steel shoes give an average life of 2600 miles, and this, with the present thickness of shoe of 1/16 in., seems to be about the best that can be obtained. These shoes are formed from sheet metal in the wheel press, which is equipped with special dies for the purpose. The operation requires two men, shoes being turned out at a rate of seventy per hour. The pressure is limited by a safety valve to 100 tons as more than this pressure prevents the shoe from being correctly formed. The 1/16-in. galvanized shoes originally used required only 75 tons pressure.

The original shoes were made with a groove in which was placed grease, but the use of grease has been abandoned, as the management has decided within the last year that it is unnecessary.

It has also been found that the pressure of the shoe against the contact wire should be as light as possible, and the company is now using a pressure of 10 lb., measured when the pantograph is being pressed down. This adjustment, made by the springs already described, will permit the pantograph to rise about 1 ft. above the normal height of the contact wire. During the spring and autumn, however, on account of the variable weather and the alternate expansion and contraction of the catenary, the pantograph is adjusted temporarily so that it will go to the full height of 1 ft. 9 in. above the normal height of wire. This requires an additional pressure of from 4 lb. to 5 lb., but as soon as the overhead work adjusts itself permanently for winter or summer conditions the pressure is again reduced to the original figure of 10 lb.

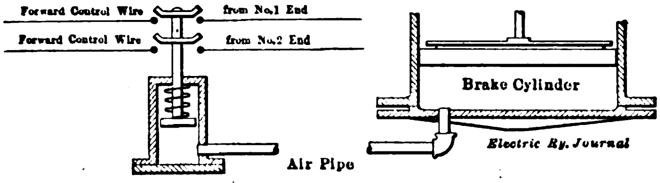
An important addition to the pantograph equipment consists in what is called a "ground hook." This is a latch hook on a short piece of cable which is grounded to the roof of the car, and it is used to hold the pantograph in its lowest position whenever anyone is working upon it. When the ground hook is in place, even if some one in the cab should attempt to raise the pantograph, it cannot reach the normal lowest height of wire, and if the pantograph at the other end of the car should be raised, the overhead wire would be at once grounded through the connection to the car roof, thus throwing out the circuit breaker at the nearest anchor bridge. A stringent rule has been made that no one must work upon the roof of the car except when these ground hooks are in place. As a consequence of this



Westchester Equipment—View from Pantograph Gallery in Shop, Showing Top of Car precaution, no accidents of any kind have occurred through motormen, inspectors or repairmen touching a live pantograph or having current turned on to the pantograph upon which they were working. Two of these ground hooks are to be provided for each pantograph on all future cars. On each car is also provided a long stick with a hook at the end for use in case a pantograph should remain partially raised when in a damaged condition. The stick is impregnated with oil and is therefore a non-conductor, insulating the man who holds it so that he may work on the live overhead construction with impunity.

One feature of the construction on these cars which is unusual is that the rubber hose inserted in the air line which controls the pantograph operating cylinder and the holding-down latch is fully 6 ft. long. This hose connects the air pipes, which are grounded, to the pantograph cylinder, which is charged with 11,000 volts pressure, and in consequence it has to insulate the live construction from the ground when the pantograph is raised. On other single-phase roads it has been the experience that shorter hoses have deteriorated very rapidly due to the action of creepage current, but on this line no such trouble has occurred, and up to the present none of these hoses has been replaced.

The high-tension insulators at the pantograph base have seldom been broken, and none of them has ever broken down electrically. On future cars, however, the insulators are to be made with ball-joint tops so that the pantograph frame will assume a natural bearing on all four supports. On the pantograph frames and bearings, which have been running steadily for one and a half years, no wear is observable, but a great deal of attention is paid to them on account of the necessity of keeping them moving very freely. In fact, it is believed that the elimination of much of the pantograph trouble has been due to the policy of the company in keeping the pantograph exceptionally light and free-moving.



Westchester Equipment—Diagram Showing Arrangement of Air-Brake and Control Interlock

AIR-BRAKE AND CONTROL INTERLOCK

Another important improvement which was applied to the cars consisted of an interlocking device which prevented the application of power to the motors whenever there was air pressure in the brake cylinders. This was installed because it had been found when cars dragged in starting, as they would if the brakes were not fully released, that the short-circuiting current on the commutator bars was very injurious to the commutator and that the resistance leads in the armature became very hot.

In effect the device consists of a double-throw switch, placed in the control-circuit from the controller at each end of the car, which opens and closes the main switches for the movements ahead, but not for movements in the reverse direction. This double-throw switch is operated by an air cylinder which is connected to the brake cylinder on the car through a small air pipe. When there is air pressure upon the small cylinder the switch is held open, but when the air pressure is released, or, in other words, when the air is removed from the brake cylinder, a spring returns the switch to closed position, thereby enabling the motorman to apply power to the motors.

While the main reason for installing this device was to prevent starting the cars as long as there was air pressure on the brake cylinders, an incidental advantage has been found in that it prevents cars from dragging after a heavy application and release have been made, and in this way it saves considerable current. It also has a tendency to make trains come to an actual stop at all stations, a feature of some value, as sometimes motormen display a tendency to run past stations without making an actual stop when they see no passengers on the platform as they approach it. In making a stop on this line the rules call for a heavy reduction in brake-pipe pressure for the first application, the air being graduated off as the train slows down, and since the interlocks have been applied it has been found that, notwithstanding the belief of the motormen that the power consumption would be increased by their installation, it has actually been decreased by eliminating the dragging, as shown by the recording wattmeters which are installed on all of the cars on the line.

BRAKES

In addition to the installation of the air-brake-control interlock, as previously described, certain other changes have been made in the brakes. These are of the Westinghouse A.M.C.E. type, and a certain amount of trouble with stuck brakes has been experienced. The necessity for waiting until the pressure chamber has leaked off enough pressure to release the brake, thus causing a serious delay to the train, has been eliminated by placing a release valve on the pressure chamber of the control valve. By opening this by hand from the ground the brakes are released, and delays from this cause are now never in excess of one minute, which can be made up.

It was also found that if inspectors, after changing brakeshoes, set up the slack adjuster to give a 2-in. travel of the brake cylinder pistons, which is sufficient to give slack to the shoes on the wheels, the brakes would not hold satisfactorily when the car went into service. On the other hand, a travel of 4½ in. was found to give satisfactory results, this being the travel at which the slack adjuster works. This unusual condition was traced to the angularity of the brake levers, which was sufficiently acute with the extremely short piston travel to reduce materially the effective pressure upon the shoes, practically the same pressure being applied to the piston regardless of the travel, as the application in this type of brake is made from the main reservoir on each car.

Several other minor changes in the brake rigging and piping were made, among them being the installation of a short nipple close to the end of the train line, so that broken hose nipples did not involve dismantling a considerable length of pipe. The feed valve for the control of brake pipe pressure was placed inside the car on account of its tendency toward freezing up in cold weather, and the feed groove in the quick-action slide valve was enlarged to prevent undesirable emergency applications under normal reductions of brake-pipe pressure. A relief hole was drilled in the cutting-in cock for the air-compressor governor, as it was found that the leakage past the piston moving the control switch was sometimes insufficient to start the compressor. Since there is a main reservoir on each car of the train in this brake system, it was found necessary also to put a choke fitting in the hose connection between the main reservoirs on adjacent cars, for the reason that when a train was broken in two the main reservoir pressure would otherwise be exhausted into the atmosphere without making a sufficient application of the brakes.

The "clasp" brakes, which provide two shoes to each wheel, have been found very satisfactory on the motor trucks, and their use will be extended to the trailer trucks on all future cars. Brakeshoe heads, it should be said, are kept in line with the tires by the use of a spring lock washer between the hangers and the sides of the head, the whole being bolted up tight, the shoe and head adjusting themselves to the wheel upon the first application of the brakes.

TRUCKS

In general, trucks are shopped only for worn wheel flanges, although not a great deal of this trouble is experienced. The cause next to this in frequency for shopping a truck has been broken gears, it having been found that with cast-steel gears the spokes cracked, while with tempered-steel gears the teeth were sometimes broken out. Out of twelve flexible gears which were supplied for trial with the original cars three have been removed on account of various defects due to insufficient strength. These flexible gears are made with a loose rim held from turning on the hub by means of springs. However, the flexible gears have been redesigned recently and these, it is said, will be eventually made standard on the road, as their ability to absorb vibration is very advantageous with the alternating-current motors. Case-hardening of the wearing surfaces of the teeth is found to be desirable under all circumstances. as the strains upon the gear teeth due to vibration are very severe. The case-hardening process gives a sufficiently hard external film of metal for a wearing surface but permits this to be backed up with soft metal considerably less brittle and less subject to fracture.

Trucks are occasionally brought into the shops on account of the necessity for turning and slotting commutators, but this work is generally done when the truck is in the shop for other work. Journal-box shoes do not wear at all on the motor truck on account of the clasp brake which is used. On the trailer truck, however, the common type of single-acting brake is installed and this causes a considerable amount of wear upon the shoes and boxes, a special lubricating device being under consideration at present.

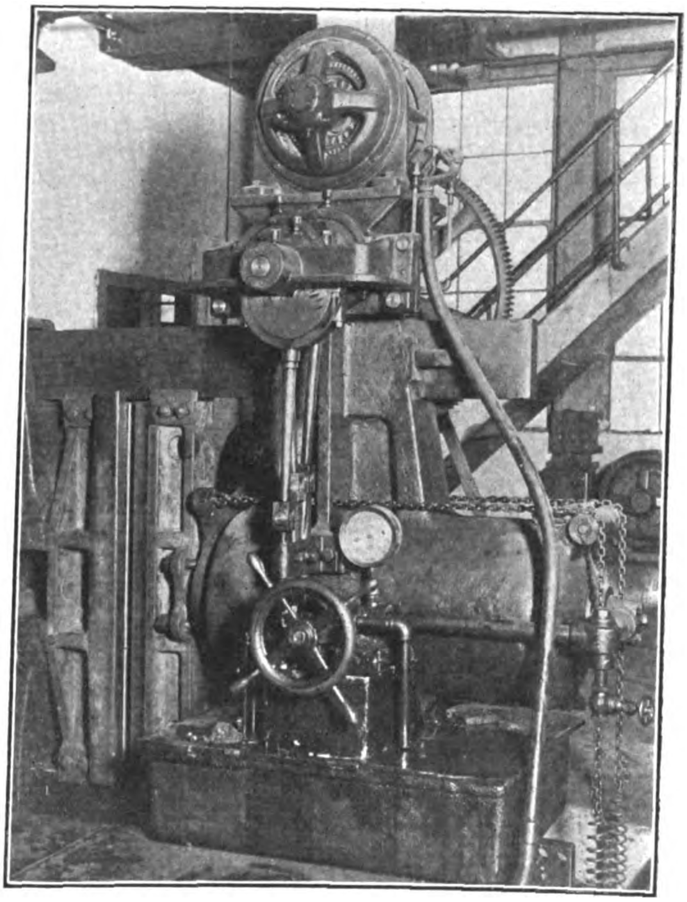
The original truck center plates were found to be difficult to lubricate on account of the cast-steel-on-cast-steel bearing. These ran absolutely dry in spots, and to eliminate the trouble the truck center plate was babbitted by running ¼ in. of hard bearing metal into it. Since this has been done no further trouble has been experienced with the center plate lubrication, the improved quality of the cast-steel-on-babbitt bearing being one reason for this and the flowing of the babbitt so as to give a larger bearing surface regardless of irregularities on the upper plate being another.

There appears to be no working of any of the members of the truck notwithstanding the year and a half of service through which they have passed. This is probably due to the fact that the trucks are made up of pressed-steel shapes throughout and are heavily riveted together. The truck has, however, been changed slightly from the original design, as shown in the ELECTRIC RAILWAY JOURNAL for March 30, 1912, page 496. The change consists in the addition of plates which have been riveted to the end frames at the top and extend back diagonally to the side frames. These were installed because it was found that the pull from the brakeshoes was bending down the truck end frames.

No spiral springs have been renewed, but eight of the leaf springs supporting the bolsters have failed on account of insufficiently reinforced ends. It is intended in the future to replace broken springs with springs having box ends, the ends of the leaves being held together by a U-shaped clip. Flat wheels, it should be said, are practically unknown, only four cars having developed them at the commencement of operation. Three of these cases were caused by a bad rail and one by a hand-brake which was left set when the car left the terminal.

Hot journals on the motor trucks are practically unknown, but on the trailer trucks a considerable amount of trouble has been experienced. This was found to be due to the fact that the latter trucks were equipped with M.C.B. brasses which had insufficient depth to hold the axle in place during an emergency application of the brake. The illustrations on page 220 show the effect of emergency application to the brass as originally installed and as installed after the difficulty had been discovered and remedied.

One of the halftones shows the effect of an emergency application on a 5-in. x 9-in. M.C.B. brass on a trailer axle. The photograph was taken when the car was standing still, and it was found that the brass started to leave the journal at about 60-lb. brake-cylinder pressure, the full emergency application producing a brake-cylinder pressure of about 95 lb. With the car moving the vibration would probably cause the journal to be pushed out from under the brass at a still lower pressure, and it is quite possible that the journals are pushed out even when the full service application is made, as a train-pipe pressure reduction of 20 lb. gives a pressure of 50 lb. in the brake cylinder.



Westchester Equipment—View of Standard 400-Ton Wheel Press with Dies in Place for Forming Pantograph Shoes

The dies, which stand in a vertical position, are shown at the extreme left of the illustration between the ram and the yoke, one die being attached to each.

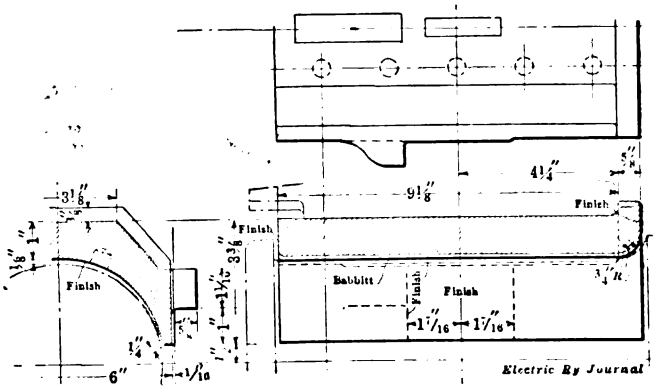
The other halftone shows the special 5½-in. x 10-in. brass designed especially for the motor trucks of these cars and having long ears at each side, thus providing a practically full semicircle of bearing surface on the journal. In the case in point one of these 5½-in. x

10-in. brasses has been placed upon the trailer journal, which is 5 in. x 9 in., and the difference in diameter has been filled out with babbitt. It will be seen that the emergency application has not shifted the journal under the brass in the slightest degree. The emergency braking pressure is about 90 per cent of the wheel load.

CAR BODIES

No bad effects from the vibration of the single-phase motors have been observed on the car bodies, which are, as previously described in these columns, built up of pressed-steel unit sections. Only one car has been in a collision. This occurred between an electric locomotive with a freight train and a motor car before the road was in operation, and, although the collision was very severe, all of the damage was concentrated at the car platform, the car body not being affected in the least and not even a light of glass being broken.

During the past year a paint shop has been erected, and the cars are now being re-varnished. It has been found necessary to apply only one coat of color and two coats of varnish to the bodies. On account of the use of steel trolley wire and steel contact shoes a great deal of rust is deposited, and the roofs, originally painted a dark-gray color, are now being painted to match the rust which falls upon them. This rust during storms is washed down over the sides of the cars and makes an excessive amount of cleaning necessary. In addition, it is also found to have a bad effect on the varnish, but this bad effect is now being overcome by use of an oil cleaner, and it is expected that cars will need re-varnishing only at eighteen-month intervals.



Westchester Equipment—Special Brass with Long Side Extensions to Prevent Shifting of Journal

INTERIOR FITTINGS

A few changes in the car-body interior fittings have been made, of which probably the most important is the installation of motorman's safety gates which fold across the controllers when not in use, so that the motorman, before he can start the car, is compelled to bring them out into place and is thus protected from falling out of the platform door when he is at work. The car as originally designed had 108 deck lights which could not be opened and were used only for the purpose of lighting the ceiling of the car. It was found that they could not be kept tight and that, in consequence, whenever a heavy rain occurred the roof leaked quite badly. It was finally decided that these lights were not necessary, so that they have been covered with metal strips which are soldered to the car roof. The company also plans to use brass guides for the sash as it has been found that varnished wood or metal makes the sash stick. Sash balances are to be eliminated as they tend to raise the sash when not in exact adjustment and thus cause drafts in the car. Brass beading strips are also to be installed eventually for the sash, as it has been found that the wooden beads splinter.

COMMITTEES OF THE ENGINEERING ASSOCIATION

J. H. Hanna, president of the American Electric Railway Engineering Association, has announced the appointment of the following committees for the ensuing year. These include all of the committees of the association except those on power distribution and subjects, which were published in the issue of Dec. 13, 1913. There is still one vacancy in the list of members which will represent the Engineering Association in the joint committee on transportation engineering, two vacancies in the committee on power generation and three vacancies in the committee on buildings and structures.

WAY MATTERS.

Chairman, C. S. Kimball, Washington, D. C.; vice-chairman, H. F. Merker, East St. Louis, Ill.; E. H. Berry, Cincinnati; C. H. Clark, Cleveland; E. P. Roundey, Syracuse, N. Y.; W. F. Graves, Montreal; R. C. Cram, Brooklyn; C. W. Gennet, Jr., Chicago; J. B. Tinnon, Joliet, Ill.

HEAVY ELECTRIC TRACTION

Chairman, E. R. Hill, New York; vice-chairman, E. B. Katté, New York; Hugh Hazleton, New York; W. S. Murray, New Haven, Conn.; J. M. Bosenbury, Peoria, Ill.; C. H. Quinn, Roanoke, Va.

EQUIPMENT.

Chairman, F. R. Phillips, Pittsburgh; vice-chairman, W. G. Gove, Brooklyn; L. M. Clark, Indianapolis; J. P. Barnes, Syracuse, N. Y.; W. R. McRae, Toronto, Ont.; R. N. Hemming, Anderson, Ind.; F. J. Doyle, Schenectady; F. W. Garrett, Boston; D. E. Crouse, Annapolis, Md.

STANDARDS.

Chairman, H. H. Adams, Chicago; vice-chairman, Martin Schreiber, Newark, N. J.; F. H. B. Paine, Philadelphia; E. B. Katté, New York; G. H. Pegram, New York; W. H. Roberts, Akron, Ohio; Norman Litchfield, New York; F. R. Phillips, Pittsburgh; B. F. Wood, New York; G. W. Palmer, Jr., Boston; E. R. Hill, New York; C. S. Kimball, Washington; C. F. Bedwell, Newark.

BLOCK SIGNALS FOR ELECTRIC RAILWAYS.

Chairman, J. M. Waldron, New York; Gaylord Thompson, Trenton, N. J.; C. H. Morrison, New Haven, Conn.; J. Leisenring, Peoria, Ill.

ELECTROLYSIS.

Chairman, Prof. A. S. Richey, Worcester, Mass.; E. B. Katté, New York; G. W. Palmer, Jr., Boston; E. J. Blair, Chicago.

LIFE OF RAILWAY PHYSICAL PROPERTY.

Co-chairman, Martin Schreiber, Newark, N. J.; R. B. Rifenberick, Detroit; Edwin Gruhl, Milwaukee.

TRANSPORTATION ENGINEERING.

Co-chairman, R. N. Hemming, Anderson, Ind.; E. T. Munger, Portland.

ENGINEERING ACCOUNTING.

Co-chairman, J. P. Barnes, Syracuse, N. Y.; J. P. Ripley, New York; Martin Schreiber, Newark, N. J.; F. A. Bagg, Gloversville, N. Y.; Lee H. Parker, Boston.

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Chairman, B. F. Wood, New York; vice-chairman, W. H. Sawyer, New York; L. E. Sinclair, Washington, D. C.; J. W. Welsh, Pittsburgh; L. P. Crecelius, Cleveland; R. J. S. Piggott, New York; G. C. Hall, New York.

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Chairman, C. F. Bedwell, Newark, N. J.; H. G. Salisbury, Toronto, Ont.; L. C. Datz, New Orleans, La.; W. B. Ingham, Newark, N. J.; R. C. Bird, New York; F. H. Miller, Louisville, Ky.

Electrolysis Mitigation in Springfield, Ohio

This Is an Abstract from a Bulletin of the Bureau of Standards by E. B. Rosa and Burton McCollum, the Joint Authors of Two Previous Articles on Electrolysis Which Were Published in the Issues of Jan. 3 and Jan. 17

In Bulletin No. 27, recently issued by the Bureau of Standards and written by E. B. Rosa and Burton McCollum, respectively chief physicist and associate physicist of the bureau, there is presented a report upon the conditions with regard to electrolysis existing in Springfield, Ohio, and also recommendations as to methods for mitigating the damage from this cause. The findings are given in abstract in the following paragraphs:

The Springfield Railway installed, some time ago, a return feeder system consisting of a number of insulated overhead copper feeders running directly from the busbar to various points in the track. The experimental data secured by the engineers of the Bureau of Standards show that this feeder system has brought about a material improvement in electrolysis conditions in Springfield, but that some modifications of this system will be necessary before a satisfactory degree of protection will be assured. A study of the system as it now exists shows that with certain modifications, which are set forth in detail below, trouble from electrolysis to the water and gas pipes can be very satisfactorily eliminated.

INTERCONNECTION OF TRACKS

The proper interconnection of the tracks of the Springfield Railway and of the Ohio Electric Railway at all crossings is of prime importance, not only because of the marked economy that would result, but also because of the fact that it would be practically impossible by any means to secure satisfactory electrolysis conditions if these railway tracks were not electrically interconnected. The tracks on North Street will have when the present rehabilitation work is complete rails weighing 90 lb. per yard, having a resistance of about 0.024 ohm total between Isabella and Sycamore Streets, the distance being approximately 10,000 ft. The Springfield Railway tracks on Main Street will be for the most part 60-lb. rails, having a resistance of 0.0037 ohm for the entire distance between Isabella and Sycamore.

The current of the Ohio Electric Railway which may be considered as originating at point *D* on the accompanying charts, east of Lagonda Avenue, amounts to approximately 400 amp on the average. The current of the Springfield Railway line coming from west of Lagonda is during the average day load of the order of about 1000 amp. This is, of course, distributed over the entire city, but for purposes of illustrating the advantage of the interconnection of the two railway track systems it may be assumed that a load of 500 amp is concentrated on west Main Street in the vicinity of Western Avenue.

This will, of course, not represent an actual condition, but it would give a total drop on the Main Street tracks to the power houses that is approximately equal to that produced by the distributed load actually existing there. Under these assumptions the drop on the Ohio Electric tracks along North Street between point *D* and the Ohio Electric power house at point *B* would be the current multiplied by the resistance. This equals 400 × 0.024 = 9.6 volts, the gradient being from east to west. The drop on the Springfield Railway tracks along Main Street between point *C* and the power house *A* would be 500 × 0.037 = 18.5 volts. Since these drops are in opposite directions, it will be impossible to prevent large differences of potential between the tracks on Main and North Streets.

If, for instance, rails at both power houses are at zero potential, then the Ohio Electric tracks near Columbia and North will be 9.6 volts positive to the rails of the Springfield Railway, giving rise to large leakage of current through the earth between the two systems, which would cause serious injury to the pipes. Further, the potential between the Springfield Railway tracks west of Main and the tracks on North Street near the Ohio Electric power house would be about 18.5 volts, producing an even more serious condition than the former. The distance between the tracks here being only about 1000 ft., the potential gradient will be seen to be enormous, and it would inevitably result in serious injury to the pipes in that locality.

If, however, the tracks are tied together at all streets on which cross tracks now exist—namely, at Isabella and Western, Wittenberg, Limestone, Sycamore and Lagonda—the currents from the two directions would divide between the tracks, and since they would flow in opposite directions, the resultant current would be the difference between the two, or only about 100 amp, which would be directed eastward and toward the Springfield Railway Company's power house.

The combined resistance of the two tracks in parallel is only 0.015 ohm, giving a drop of 1.5 volts over the entire 10,000 ft. It would thus be impossible to produce any large difference of potential between any two points on the tracks. Further, the drop would in this case be in the same direction on both tracks instead of the opposite direction, as would be the case if the tracks were not interconnected, so that they would be almost absolutely at the same potential throughout their entire length. It will thus be seen that the voltage conditions will be enormously improved by tying the tracks together, and what would otherwise be a very dangerous condition along the entire line between the two power houses would be converted into a condition of comparative safety. Tying the tracks together at various points amounts, in effect, to an interchange of current on the negative side between the two power houses. The Springfield Railway's power house would then intercept the Ohio Electric's current coming from the east beyond Lagonda, while the Ohio Electric Company's station would take a corresponding amount of current from the Springfield Railway tracks in the western part of the city, only the difference between the Ohio Electric load and the Springfield Railway load being taken to the Springfield Railway power house.

In addition to the improvements in the electrolysis conditions above noted, there will also be a large saving in power. With the tracks separated the loss on the Ohio Electric tracks between Lagonda and Isabella will be the current multiplied by the voltage drop, or 400 × 9.6 = 3840 watts, or 3.84 kw, and on the basis of an eighteen-hour day this gives a total of about 25,000 kw-hr. per year. On the Springfield Railway tracks between Lagonda and Western Avenue the loss would be 500 × 18.5 = 9250 watts, or 9.25 kw, giving a total annual loss of 60,000 kw-hr. The total loss on both tracks would therefore be 85,000 kw-hr. per year. At 1 cent per kw-hr. this is $850 per year.

As seen above, however, if the tracks are tied together, the average current in this same section is reduced approximately 100 amp and the total drop to only 1½ volts; hence the loss is but 150 watts, giving an annual loss of 972 kw-hr. per year, which at 1 cent per kw-hr. would be worth but $9.72. The saving, therefore, resulting from tying the tracks together would be over $840 per year, the capitalized value of which would at least be $14,000. Special precautions should be taken therefore to insure thorough bonding between the tracks of the two systems at all intersections.

CROSS-TYING OF TRACKS

Another matter of importance in addition to the installation of a properly designed insulated feeder system is the placing of a proper cross tie between the tracks on East Main and East High Streets at or in the vicinity of Sycamore or Lagonda Avenue. The reason for this is that these tracks run approximately parallel and quite close together for a long distance without any cross lines to produce a proper electric connection between them.

It will be evident that the potential difference between the two lines at adjacent points will be due to differences in the drop along the two tracks extending eastward from Limestone Street, at which point they are practically tied together by the rails on the Limestone Street line. Thus, if the drop along Columbia between Lagonda and Limestone should be 10 volts and the drop on East Main Street over the same distance should be, say, 5 volts, then the potential drops between the tracks at Lagonda would be 5 volts. Since the distance here is very short, this would give rise to a very high potential gradient between the two lines, which would be sufficient to cause dangerous leakage of current into the earth and, consequently, serious damage to the pipes. In order to overcome this difficulty a heavy copper cable should connect the two lines on High and Main Streets to serve as an equalizer and prevent any large differences of potential of this sort from arising.

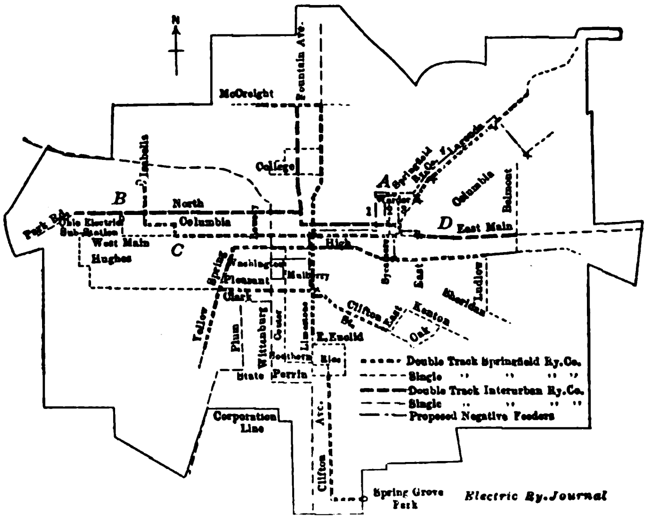

N
McCreight
Fountain Ave.
Isabella
College
B
North
A
D
East Main
Columbia
Belmont
Ohio Electric Sub-Station
West Main
Hughes
C
High
Washington
Pleasant
Mulberry
Clark
Sycamore
East
Ludlow
Sheridan
Clifton Ave.
Kenton
Oak
Yellow Springs
Plum
Wittenburg
Limestone
E. Euclid
Southern
State
Ferris
Corporation Line
Clifton Ave.
Spring Grove Park
Double Track Springfield Ry. Co.
Single " " " "
Double Track Interurban Ry. Co.
Single " " "
Proposed Negative Feeders
Electric Ry. Journal

Fig. 1—Springfield Electrolysis—Chart Showing System of Negative Feeders Actually Installed

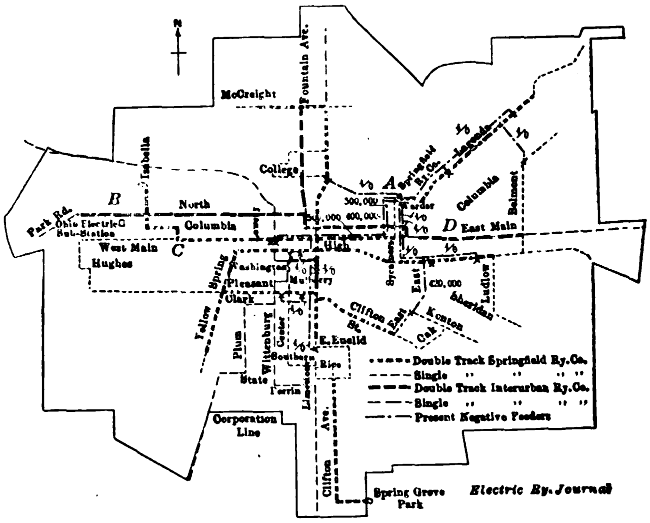

N
McCreight
Fountain Ave.
Isabella
College
B
North
A
D
East Main
Columbia
Belmont
500,000
400,000
Ohio Electric Sub-Station
West Main
Hughes
C
High
Washington
Pleasant
Mulberry
Clark
Sycamore
East
250,000
Ludlow
Sheridan
Clifton Ave.
Kenton
Oak
Yellow Springs
Plum
Wittenburg
Limestone Ave.
E. Euclid
Southern
State
Ferris
Corporation Line
Clifton Ave.
Spring Grove Park
Double Track Springfield Ry. Co.
Single " " " "
Double Track Interurban Ry. Co.
Single " " " "
Present Negative Feeders
Electric Ry. Journal

Fig. 2—Springfield Electrolysis—Chart Showing Suggested System of Negative Feeders

NEGATIVE FEEDER SYSTEMS

The above recommendations, while important and necessary to the securing of satisfactory immunity from electrolysis troubles, must nevertheless be considered as secondary in importance to the installation of a properly designed and maintained system of insulated negative feeders connecting the negative busbar to various points in the rail return. The system of negative feeders already installed is shown in Fig. 1.

As at the present constituted, this feeder system, while undoubtedly greatly improving electrolysis conditions, is not altogether satisfactory for several reasons. In the first place, the arrangement of the feeders is such that there is comparatively little current on Lagonda and East High Streets, while a relatively large amount of current is taken from the feeders running to Limestone and beyond. As a result of this, direction of current flow in the rails on Columbia and East Main and East High Streets between Sycamore and Limestone Streets is actually away from the power house. This tends to produce the lowest potential up in the heart of the city and causes a complete loss of the conductivity of the double-track lines on these streets, which could be utilized if the feeder system were so proportioned as to cause a considerable amount of current to flow eastward on those streets and be taken off in the region of Sycamore Street.

A redesign of the cables so as to take less current from the territory surrounding Limestone Street and a greater proportion from feeders draining the region to the east of Sycamore Street would at once produce better potential conditions and likewise give rise to much greater economy because of the more direct route by which the current would then be returned to the power house.

Another disadvantage of the present feeder system is the relatively large potential drop which now occurs on these feeders, thus giving rise to a large energy loss. As will be shown later by a detailed calculation, a redistribution of the feeder copper would result in large economies in this direction. A further defect growing out of the high drop of potential of the feeders is the fact that the potential difference between the different points at which the feeders are connected to the tracks depends on the differences in the potential drop in the various feeders themselves. Since the load is constantly fluctuating from point to point, the drop on these feeders will necessarily change, so that it is impossible to maintain the terminal points of the various feeders always at the same potential. It will be evident that a given shifting of load, producing a certain percentage variation in the drop on an individual feeder, will cause a greater potential difference between termini of the feeders if the total drop on the feeders is larger than the same percentage variation of a load would produce if the total drop on the feeders were relatively small. For this reason, by a redistribution of the feeder copper such as to reduce considerably the total drop on the negative feeder at those points on the track to which the feeders are connected, and consequently the earth gradients throughout the city, electrolysis would be correspondingly lessened.

SUGGESTED REDESIGN OF SYSTEM

In order to show how the system can be redesigned to overcome these objections, there has been worked out a detailed plan for changing the present negative feeder system in such a manner as to secure at once adequate protection of the pipe systems and the greatest economy in installation and operation. This plan of reorganizing the negative feeder system is outlined in detail below. A complete plan of the proposed feeder system is shown in Fig. 2, showing the size and location of the feeders required and the points at which they should be tapped to the rails. There is also given a careful estimate of the cost of converting the present system into the system proposed, together with an estimate of the economies resulting therefrom. It will be found that while the proposed changes contemplate the expenditure of about $4,900, they will be accompanied by certain operating economies which will result in saving sufficient to pay large returns on the cost.

INSULATED NEGATIVE FEEDERS FOR SPRINGFIELD RAILWAY

	Location	Length, Feet	Current, Amp	Cross-Section, M.C.M.	Potential Drop, Volts	Loss, Kw	Copper, Weight, Lb.	Copper Added, Lb.
1	Limestone-Pleasant to Main	2,440	120	0.605	4.84	0.581	4,470	2,165
	Main-Limestone to power house	5,520	200	1.000	11.04	2.208	16,720	8,360
Tap	At Limestone and Main	....	80	....	3.67	0.294	....	....
2	Columbia to power house, Sycamore	1,700	310	0.413	12.72	3.900	2,130	2,130
Tie	Sycamore-High to Main	1,050	240	3.410	0.74	0.178	10,850	9,540
3	Sycamore-Main to power house	2,220	380	0.837	11.04	4.600	5,640	2,750
	Main-East to Sycamore	1,160	140	0.605	2.69	0.377	2,130	820
Tap	Main and Sycamore	....	300	....	1.95	0.585	....	....
4	James-Lagonda	5,510	40	0.212	10.40	0.416	3,540	0
Tap	Lagonda and James	....	40	....	6.25	0.250	....	....
4	Nelson-Lagonda to Warder	1,270	80	0.317	3.20	0.256	1,220	406
Tap	Lagonda and Warder	....	130	....	9.24	1.200	....	....
Con	Warder-Lagonda to power house	1,060	210	0.794	2.80	0.589	2,560	1,870
	Total					15.434	49,260	28,041

Annual energy loss = 101,200 kw-hr. Annual energy loss = $1,012. Copper value = $12,315. Annual interest on copper = $985.20.
Annual saving in energy loss = $2,805.

In making the calculations for the negative feeder system it was necessary first to secure data as to the average distribution of load in the track network. In order to do this the car schedule of the entire system was obtained from the Springfield Railway, and from this schedule the average car distribution was laid out on a map of the railway system. The average current per car was found to be very close to 40 amp, and this value has been used in all calculations. In making the calculations the normal average load car distribution is determined from the car schedule. A careful study of the load and track layout was made and the approximate distribution of the current in the rails determined, beginning in the outlying portions and gradually tracing the current distribution as the station was approached. Where it was found that the current density at any point was such as to give a potential greater than ½ volt per 1000 ft. a feeder of suitable size was connected to the rails to carry off the excess current. In this way the potential gradient throughout the entire negative return of the railway is maintained below ½ volt per 1000 ft. This is but a small fraction of the potential gradient existing in the rails prior to the installation of any negative feeder system, and it will of course give rise to a corresponding reduction in electrolysis troubles. It is believed that this figure is sufficiently low to eliminate practically any serious electrolysis trouble. The result of the calculations shows that a total of four feeders are required, together with a suitable number of taps as hereinafter described. These feeders and their routing are described in detail below, and a condensed statement of all the essential data in regard to them is given in the accompanying table.

The proposed feeder system would require a total of 49,260 lb. of copper, of which, however, 21,220 lb. is already in place. The total power loss as seen from the table is 15.4 kw, which gives an annual loss of 101,200 kw-hr., having a value, at 1 cent per kw-hr., of $1,012 per year. To determine the cost of the system, however, it is necessary to deduct the value of copper which can be removed in making the change, and also to determine the saving in power that results. A study of the proposed layout shows that 11,630 lb. of copper that is now in place can be removed. The value of this is figured at 18 cents per lb., after allowing for the cost of removal, which gives a value of $2,095 as the value of the copper recovered. From the table it is seen that the total copper required to be added is 28,040 lb., the cost of which, estimated at 25 cents per lb., is $7,010. The net initial investment required would therefore be $7,010—$2,095 = $4,915. The annual cost of the copper added, reckoning 8 per cent on the initial investment, amounts, therefore, to $393. From this annual cost, however, there must be deducted the annual value of the power saved by changing to the proposed installation.

Measurements of the total drops of potential on the present feeders show that the average drop on all the feeders during the average day load amounts to about 44.3 volts, and since all the current returns over these feeders under the present system, the average power loss is equal to the average drop on the cables multiplied by the average current, which gives $44.3 \times 1310 \times 10^3 = 58.1$ kw. This gives an annual loss of 381,700 kw-hr., which, at 1 cent per kw-hr., has an annual value of $3,817. It was shown above that the annual energy loss under the proposed system would amount to $1,012, so that the net saving in power loss reaches $2,805 per year. Deducting from this saving in power the above figure of $393, which was the annual cost of the necessary changes in the copper feeders, we get a net saving of $2,412 per year under the proposed plan. Another way of looking at it is that the total saving in power, amounting to $2,805 per year, yields 57 per cent on the total cost of reconstructing the negative feeder system.

It appears, therefore, that from the standpoint of economy alone it is highly important to make the changes recommended. It will be evident also that since the total drop on the feeder, as shown by the table, has been reduced to not more than one-fourth of the drop under present conditions, any fluctuations in load distribution will produce very much smaller potential differences between the termini of the feeders than at present, and consequently the tendency for high potential gradients in the earth will be very greatly reduced and electrolysis conditions through the city correspondingly improved.

It will be noted that in the proposed plan there is no direct connection between the rails and the negative bus out of the power house. Such connection is omitted primarily for the reason that this district is in low ground that is likely to be comparatively damp, and consequently of low resistance, so that to make this the most positive part of the system, as would be the case if any considerable current were taken off at the power house, would be to throw the positive area in a region where it would do the greatest amount of damage. On the other hand, by removing the power-house connection the positive areas are thrown out at the termini of the feeders which are located on relatively high ground, where, owing chiefly to lower moisture content, the average resistance of the soils will be much higher than down near the power house, so that the given difference of the potential between pipes and rails would be much less serious. This is an important point which should always be considered in the design of insulated negative feeder systems.

In considering the need for a negative feeder system at the Ohio electric station, it is found that owing to the comparatively small current taken from the tracks east of the substation the tracks alone will have ample carrying capacity up to the corner of Isabella and North Streets, provided that the tracks of the two railway systems are interconnected, as recommended in the foregoing. However, to facilitate the interchange of current on the negative side to reduce the potential gradient in the tracks between Isabella and North and the substation, it is very desirable to run a short feeder directly across South from the Ohio electric substation to the Springfield Railway tracks on West Main Street. This feeder will need to carry only about 120 amp, so that the section should be about 400,000 circ. mil. The distance would be about 950 ft., giving a weight of 1150 lb. of copper. In order to make proper use of this and to prevent too large gradients in the tracks on North Street, it would be necessary to install a very low resistance tap between the negative busbar and the North Street tracks at the power house, such as would give a drop of potential of about 0.85 volt between the tracks and the busbar. This would probably not require much additional resistance above that possessed by the tap already in use. The total cost of this feeder installed would not exceed $285.

SUMMARY

Reviewing the recommendations in the foregoing report, it will be seen from the discussion of the various proposed methods of electrolysis mitigation that those methods which are intended to be applied to the pipe system are regarded as unsatisfactory for conditions as they exist in Springfield. This is the more emphasized by the fact that there are in the pipe systems at Springfield, especially the gas system, a considerable number of insulating joints, the gas company having several hundred Dresser couplings scattered throughout its system.

So long as these insulated couplings are in place, the application of drainage connections to either the gas pipes or the water pipes, or to both, would prove disastrous to the gas system in the vicinity of these insulating couplings. On the other hand, if the system of insulated negative feeders be applied to the tracks as recommended in the report so that the potential differences between different parts of the networks are reduced to a comparatively low value, the presence of these insulating joints would be decidedly beneficial, since they would tend still further to reduce the current flow in the pipes, while the potential gradients would be so small that dangerous potential drops across the insulating joints could not arise.

It is recommended that the joints in all the railway systems operating in the city of Springfield be tested at intervals not exceeding six months or a year, and all joints showing resistances exceeding that of 3 ft. of rail should be immediately rebonded so as to maintain perfect continuity of the tracks throughout the city.

It is also of very great importance to have the railway tracks of the Ohio Electric Company and the Springfield Railway Company interconnected electrically at all crossings, both for the sake of economy of operation and for the safety of the pipe system. To neglect this interconnection, or to deliberately insulate the two systems from each other, would invite certain disaster to the underground pipes.

GHOICE OF WOOD IN SOUTH CAROLINA CAR CONSTRUCTION

In a recent report based on an investigation undertaken by the Forest Service in co-operation with the Department of Agriculture, Commerce and Industries, State of South Carolina, statistics on car construction are given, compiled from data covering the calendar of 1912. The statistics are accompanied by illustrations showing views of street cars in process of construction. Seven woods were used in South Carolina during 1912 for the manufacture of street cars, railway passenger and freight cars. Longleaf pine headed the list in amount, and was placed as car sills, frames, floors and the heavier timber parts of both railway and street cars. The shortleaf furnished siding, ceiling and decking of freight cars. The white oak was quartered and converted both into finish and into the exposed parts of street and railway passenger cars; red oak was employed in the same way, some of it also going into freight cars. Ash and yellow poplar were finish woods and were used mostly in street car vestibules and for sides, finish and panel work in railway passenger cars. The birch was all made into finish for passenger cars. Over 99 per cent of the material was grown in South Carolina. The highest-priced wood was birch and was procured in Pennsylvania. Longleaf pine cost less than shortleaf because the material was procured in large amounts and in dimension sizes, while the shortleaf was good grade material, sawed into smaller lumber. The report states the average price of car stock in this State to be $16.56 per 1000 ft. and the amount used annually under 1,345,000 ft.

At the present time there is perhaps no section of the country that is being so rapidly developed as the South. Contributing in a large measure to this are the development of its water-power resources and the consequent attractive inducements that are being made to manufacturers to locate there. A development of 31,000 hp ultimate plant capacity, known as the "Stevens Creek Development," is being built by the J. G. White Engineering Company for the Georgia-Carolina Power Company on the Savannah River, about 8 miles above Augusta, to supply the power market in the vicinity, and a development of 29,000 hp ultimate plant capacity, known as the "Parr Shoals Development," is being built by the same firm for the Parr Shoals Power Company on the Broad River, about 27 miles above Columbia, S. C., to supply a rapidly growing demand for power in and about that city.

Effect of Rate of Fare on Riding Habit

There Are So Many More Important Factors than Fares Which Stimulate Riding that Its Effect Is Practically Negligible—The Author Cites Record from Different Cities to Support This Contention

BY F. W. HILD, GENERAL MANAGER PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Safety first, service next, rates last.

This, in the opinion of students of public utilities, is the logical order in which regulation of public service corporations should be approached. Far too often, however, the order has been reversed, and regulation frequently has taken the form of reduction in rates first.

In the street railway field it is becoming painfully apparent that the economic limit of reduction in prices for service has been generally reached and in some instances passed. Nevertheless, when it has been shown that still further reductions will usually mean serious loss of revenue and that the company so fortunate as to enjoy a margin of return above operating cost might better devote a portion of this margin to the public in the form of additional facilities to promote safety or to give added service rather than to enforce fare reductions, the reply of the advocates of the latter policy almost always is that "the lower fares will induce so much more travel as more than to offset the losses due to the lower rates."

This generalization, without figures to support it, constitutes the chief and almost the sole argument of the active proponents of lower street car fares, who usually are politicians seeking to retain or obtain political preferment and to whom "safety" and "service" do not appeal as being such potent vote-getters as "lower fares." Unfortunately, this unwise counsel has been allowed to prevail in a number of American cities, and others are threatened by it. But the sober thought, good sense and fairness of the American people may be relied upon to check this as they become familiar with the economic problems involved.

There is a business maxim that "lower prices will stimulate business," and experience has shown that this operates within certain practical limits.

In general, stimulation may be expected to be proportional roughly to the degree of price reduction; hence relatively small reductions will create relatively small stimulation, while relatively greater reductions will create larger stimulation. Furthermore, the percentage of price reduction necessary to create an appreciable increase of business depends upon the unit price. At low unit prices, the cut measured in percentage of price must be greater to cause stimulation than in a business having high unit prices. Every business man seeking to apply this general maximum knows that unless he cuts to certain figures smaller reductions would be absolutely useless for his purpose; that is to say, relatively small reductions result usually in negligible stimulation. Finally, if price reduction is carried to or below cost, the stimulation must reach zero and then become negative, since no business can survive indefinitely operation at a loss.

This general maxim that "lower prices will stimulate business" and its limitations are well understood by every intelligent business man. Certainly the maxim was not unknown to the able, courageous American business men who financed, built and operated our public utilities. Great in number are the instances of voluntary rate reductions by electric companies, gas companies and railway companies, all done with the hope and expectation of increased business. The introduction of universal transfers on American street railways, thus enormously extending the travel zone for the same price per trip, was certainly a very substantial cut in rate for service and, as expected at the time, created a large volume of additional travel. In like manner the extension of lines as the city limits expand, while the price for the trip remains the same, thus giving greater service for the same charge, is also equivalent to a reduction in rates for service.

The system of charging in proportion to service rendered is generally admitted to be the most equitable. In the railroad field this system, where applied, takes the unit distance traveled as the basic factor. It finds expression in the charges figured at a certain number of cents per mile for passenger service on our American steam and interurban railroads and in the European zone system of charges for street car service.

DATA ON LENGTH OF RIDE AND RATES OF FARE IN PORTLAND, ORE.

	Longest Ride for Single Fare and Transfer.	Rate per Mile in Cents.	
	Miles	Cash	Tickets
1872—First horse car line built on First Street; fare 5 cents.			
Glisan Street to Caruthers Street...	1.6	3.1	...
1887—Three horse car lines in operation; no transfers between lines of different companies.			
Fourteenth and Savier to Third and Caruthers	2.75	1.82	...
1888—First steam motor line in Oregon, built to Mount Tabor; two zones of 5-cent cash fare each, but commutation through tickets sold at rate of 5 cents each.			
1889—First electric line in Oregon; light steam road to St. Johns.			
1891—Several car lines electrified.			
1892—Several new suburban lines in operation; free transfers between lines of different companies; commutation tickets with transfer privileges were sold at rate of 5 cents each.			
St. Johns to Woodstock............	15.6	0.64	0.32
About 1893—10-cent cash fare on St. Johns and Mount Tabor lines reduced to 5 cents.			
St. Johns to Woodstock............	15.6	0.32	0.32
About 1894—Commutation tickets at 4½ cents each generally introduced.			
St. Johns to Woodstock............	15.6	0.32	0.29
School tickets (thirty-three for $1) were introduced about this time.......	...	...	0.192*
1904—Consolidation of two systems resulting in free transfers among all three systems then operating.			
St. Johns to Lents................	18.1	0.28	0.25 0.166*
1913—Single fare zone extended.			
St. Johns to Lents Junction........	18.7	0.27	0.24 0.16*

*School tickets.

Successive reductions in rate for service are disclosed by a review of the street railway history of almost any American city. For example, the numerous increases in length of maximum ride, while representing the extreme, operated very strongly to reduce the average charge per mile. The experience of practically any American city may be taken for illustration; hence the accompanying data concerning Portland, Ore., which were available to the writer, will serve for demonstration. The years given are those when the various things stated are known to have been in effect. They do not necessarily mean the years when the various steps were initiated.

The rates per mile in this table, as stated, are the lowest rates charged on the system; the average rates were, of course, higher. The average rate per mile paid by the passengers, under either the zone system or the American system, cannot be feasibly ascertained with any degree of accuracy as it involves determining where each passenger boards and alights from the cars.

In British cities, which for the most part use the zone system without transfers, the rate per mile for each of the several zones is definitely fixed and usually legislative enactment is required to change it.

In American cities, owing to the transfer and to the constantly increasing length of average haul or trip with the stationary charge per ride, the average rate per mile has been and is constantly diminishing. This constantly diminishing average rate per mile, accelerated by forced reduction in fares by legislation, has brought the American street railway as an industry to the lower limit of the general maxim; that is, the rate for service is generally at or about cost, and in some instances—notably Cleveland—it is below cost. Unlike the manufacturer or merchant, who when threatened with ruin can stop or move his business to another more favorable place, the street railway is a public necessity in the city of its location and cannot be permitted to be destroyed. But the economic law that a continuing business must have a margin of revenue above cost is inexorable, no matter what or where the business is. Hence, if the unwise counselors of fare reductions continue to have their way, the present stockholder of the street railway must step down and out, and the taxpayer must step up in his place and must make up through taxation the difference between cost of service and charges for service, so that the revenue derived from the riders and the taxpayers combined shall always equal or exceed the cost of the service.

The advocates of fare reductions generally seek to support their contentions by vague references to other cities where fare reductions have been made. They ignore entirely the different conditions of operation and travel which obtain in the various cities. Even so conservative a body as the Wisconsin commission has allowed itself to fall into this error and to indulge in this generalization without supporting data.

In the Superior (Wis.) fare case the commission, in its decision and order of Nov. 13, 1912, says:

"The reductions in the earnings of the respondent that would be brought about by the use of such tickets (six for 25 cents), based upon the experience in other cities of about the same size, would not be unreasonable under the circumstances. . . .

"General observation indicates that the introduction of a ticket rate as described will do much to induce more riding, or, in other words, increase the riding habit and consequently bring a higher density of traffic. The expense of carrying such additional traffic would be more than offset by the increase in revenues due to a higher load factor."

The commission submitted no figures which proved that "the expense of carrying such additional traffic would be more than offset by the increase in revenue due to a higher load factor."

RIDING HABIT

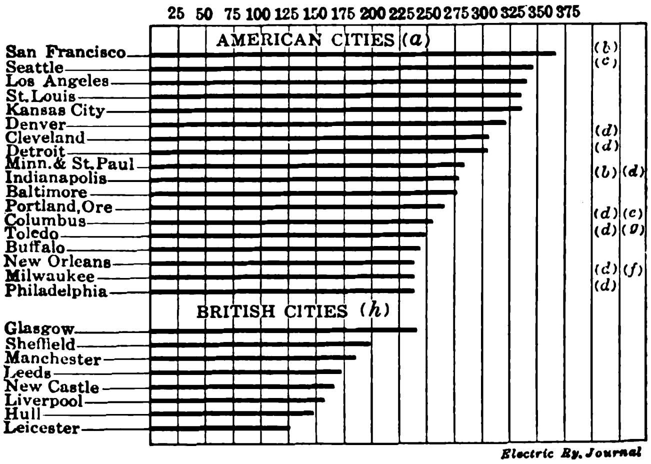
The number of rides per inhabitant per annum is a measure of the street car patronage, often spoken of as the "riding habit," and is obtained by dividing the revenue rides per annum by the population. Fig. 1 shows the "riding habit" for a number of American and British cities having populations greater than 150,000.

It is quite clear from the chart that a low rate of fare is by no means the important determining factor in the creation of the riding habit. If it were, we should naturally expect to find the British cities with their smaller zone charges heading the list, while in the United States we would look for Cleveland, the champion low-fare city, at the top of the list, with Toledo next and Columbus, Toronto, Indianapolis, Milwaukee and other reduced-fare cities ranking close behind. As a matter of fact, the riding habit is seen to be greater in cities having straight 5-cent fare (Seattle's twenty-five tickets for $1 do not carry transfer privilege). Cleveland is about midway and Toledo near the bottom of this list of American cities, while the British cities, despite the lower charges per ride, are far below American cities in the extent of street car patronage.

FACTORS FAVORING THE RIDING HABIT

In the judgment of the writer, the riding habit or the street car patronage by the people of a city depends upon:

(1) Facilities. Without facilities there can, of course, be no street car patronage. On the other hand, the more and better the facilities, the greater the incentive to ride. The amount of trackage per capita and the number of cars operated per capita are probably the fairest measure of street car facilities in cities which have no rapid transit system like subways and elevated railways. In this respect the Pacific Coast cities lead the world, and this is reflected in the high degree of patronage they enjoy. In like manner, the rapid transit facilities of New York encourage the high riding habit of that city. This is strikingly brought out in Fig. 2, which is taken from the admirable report on rapid transit in Philadelphia prepared by the director of city transit of that city with the assistance of Ford, Bacon & Davis as consulting engineers.



Electric Ry. Journal

Fig. 1—Riding Habit—Annual Revenue Rides per Capita

Only cities exceeding 150,000 population were considered in the comparisons.

(a) 1910 census and 1910 statistics, except as noted. Most of data from McGraw's Manual of Electric Railways or direct from companies.
(b) Partial data.
(c) Statistics for 1911-1912. Population estimated.
(d) Low fare, i. e., majority of revenue passengers pay less than 5 cents per ride.
(e) Statistics for 1911, strike in 1910. Population estimated.
(f) Includes free, as well as revenue, passengers.
(g) Statistics for 1912. Population estimated.
(h) Data from Garcke's Manual of Electrical Undertakings. 1913.

(2) Topographical Conditions. People living in hilly cities will naturally ride more frequently than those in flat, level cities. Thus we should expect to find cities like San Francisco, Kansas City, Seattle and Pittsburgh show a high riding habit.

(3) Climatic Conditions. Cities enjoying a great deal of sunshine and clear weather invariably show a higher street car patronage than cities where climatic and weather conditions are less favorable. During the bright, pleasant days people will come out for purposes of pleasure and convenience as well as business. In other weather they come out only of necessity. This is proved by the experience of each city considered by itself in connection with the seasonal fluctuation of

travel. Los Angeles, New York and tropical cities like Havana have favorable climatic conditions, and the effect is shown in the street car business. Such cities generally attract a relatively large floating population, which, of course, helps out in the street car patronage.

(4) Temperamental Characteristics. A pleasure-loving people are usually liberal spenders, and they generally patronize the cars quite freely, as in Havana. People in mining communities are known everywhere to be more liberal spenders than those in agricultural or mercantile communities. Cities which originated in the mining camps seem to have perpetuated these proclivities, and this characteristic is reflected in the riding habit. Thus one would expect San Francisco, Denver, Seattle and Pittsburgh to rank high in this respect.

(5) Rates of Fare. At the rates of fare which now prevail, changes in rate, unless very radical, will have the least effect of all the factors which determine street car patronage. If fares were abolished and transportation were free, the riding would, of course, vastly increase, while, on the other hand, if the present fares were doubled or otherwise very radically increased, the riding would naturally fall off. All this assumes that the facilities for urban transportation remain about the same. Increase of facilities, either in the form of greater comfort or in more widespread, quicker or added service, may stimulate enough travel from another group of patrons to counterbalance that lost by the higher charges. Thus, when the New York surface lines were separated under receivership proceedings, the transfer privileges were materially cut down, but the decrease in number of riders, if any, was more than made up by the patronage of the subways, for, as shown in Fig. 2, the points of the curve of riding for New York have constantly increased. A further demonstration of the principle is the liberal patronage created by the Pullman service of the railroads and the popularity of many extra-fare trains.

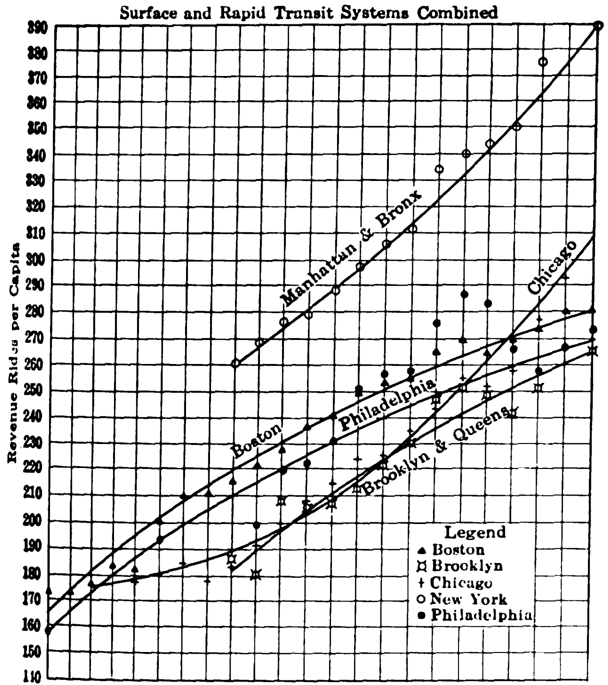


Fig. 2—Riding Habit—Revenue Rides per Capita

A recent example of radical fare reduction resulting from increased travel is that of Glasgow. The cut was equivalent to 50 per cent in the halfpenny zones, which alone were affected. Professor Knopp, in his interesting book on "Municipal Trading," discusses this very clearly. I take the liberty of abstracting from his work the following:

"In December, 1911, the Glasgow Corporation decided to make a concession by way of experiment for three months; passengers were to be entitled to travel two of the original (half-mile) halfpenny stages for a halfpenny, or, in other words, the distance which might be traveled for a halfpenny was doubled."

The accompanying table shows the number of passengers carried at different fares on the Glasgow Corporation Tramways during the five weeks ended Jan. 14, 1911, and January 13, 1912.

"If a comparison is instituted between the first five weeks during which the new system has been at work and the corresponding period of the previous year, it will be seen that the number of passengers carried has increased by some 5,000,000, though it is impossible to say how many of these additional passengers have been induced to travel by the lengthening of the distance which can be traveled for a halfpenny. . . .

TABLE SHOWING PASSENGER TRAFFIC BY ZONES IN GLASGOW

	Passengers Carried During Five Weeks Ended Jan. 14, 1911		Passengers Carried During Five Weeks Ended Jan. 13, 1912. (First Five Weeks of Double Halfpenny Stage)		Increase (+) or Decrease (—) in Five Weeks Ended Jan. 13, 1912 as Compared with Corresponding Period for Previous Year	
Fares	Number of Passengers (Last 000 Omitted)	Percentage of Total	Number of Passengers (Last 000 Omitted)	Percentage of Total	Number of Passengers (Last 000 Omitted)	Percentage
½d.	6,632	28.29	16,872	59.41	+ 10,239	+ 154.44
1d.	13,751	59.07	8,585	30,23	— 5,165	— 37.57
1½d.	1,921	8.25	1,929	6.80	+ 7	+ 0.38
2d.	550	2.36	561	1.98	+ 11	+ 2.04
2½d.	211	0.91	229	0.81	+ 18	+ 8.67
3d.	111	0.48	113	0.40	+ 1	+ 1.61
3½d.	87	0.38	90	0.32	+ 2	+ 3.20
4d.	13	0.06	13	0.05	+	+ 1.97
	23,280	100	28,395	100	+ 5,115	+ 21.97

NOTE.—The new system came into force on Dec. 10, 1911.

"Roughly, half the increase in the number of halfpenny passengers was due to the transfer of 5,000,000 from the penny class; the other half was accounted for by some 5,000,000 persons riding short distances who had previously walked."

The results of this experiment with reduced fares in Glasgow are not applicable to American cities with their uniform fare for all distances. Short riding can be stimulated only by making the fare so low that people wishing to travel easy walking distances will take to the cars because the charge is of slight consequence, and it is only where the zone system of charging is employed that such low fares are practicable. Wherever the uniform fare is adhered to, it is impossible materially to stimulate short riding without reducing the fare below the average cost of carriage.

That the Glasgow fares are relatively higher than American fares seems to be the conviction of at least one American street railway company, for the Detroit United Railway, through the columns of its sparkling weekly publication *Electric Railway Service*, has repeatedly offered to operate the Detroit system at Glasgow rates and to continue to pay Detroit wages, which are about double Glasgow wages. The investment per capita in street railway facilities is also much greater in Detroit than in Glasgow.

Among American cities, Cleveland's 3-cent fare is probably the lowest. This was reached after a succession of reductions, and certainly the able exposition of the Cleveland situation by C. N. Duffy at the association meeting last October, wherein was demonstrated that the system is being operated at a loss, can give no support to those who claim that the "lower fares will so stimulate travel as more than to offset the losses due to the lower rates."

In regard to street car fares in America, even the political gentlemen whose economic ideas are governed by the vote-getting aspect of the issues they raise have come to realize that anything like a substantial reduction in American street car fares is to-day out of the question. Even they have begun to see the folly and possible disaster of repetitions of the Cleveland 3-cent fare experiment, so their efforts are usually for six or seven tickets for 25 cents. Such reduction, which is slight in respect to the individual riders, falls within the second limitation of the maxim, and the stimulation resulting from the reduction has been correspondingly slight or negligible. This was the experience of Milwaukee, Cleveland and Detroit with six and seven tickets for 25 cents, and all of these cities report large loss of revenue as the result of the use of these tickets. From the standpoint of the company, the reduction, though benefiting only very slightly the individual rider, is multiplied by millions of passengers carried annually and aggregates annual losses running into the hundreds of thousands of dollars.

Detroit's recent experience is illuminating. Beginning Aug. 15, 1913, the rate of fare on the 5-cent lines was reduced to seven tickets for 25 cents. The rate of eight tickets for 25 cents between 5:45 a. m. and 8 p. m. on the so-called "3-cent lines" continued in effect.

The average fare per revenue passenger for the first month with the reduced fare was 3.67 cents, compared with 4.38 cents for the corresponding month of the preceding year, a drop of 16.2 per cent. That this reduction had but little effect in stimulating traffic is shown by the following statistics:

PERCENTAGE INCREASE IN NUMBER OF REVENUE PASSENGERS WITHIN SINGLE-FARE ZONE OVER CORRESPONDING PERIOD OF PREVIOUS YEAR

	Per Cent Increase
1909, twelve months	12.81
1910, twelve months	15.88
1911, twelve months	10.43
1912, twelve months	14.76
1913, Jan. 1 to July 31	16.67
August (fare reduced)	16.03
September (fare reduced)	19.42
October (fare reduced)	16.41
November (fare reduced)	14.65

Certainly no "stimulation sufficient to offset the losses due to the lower fares" can be discovered in this table.

A recent effort to enforce the sale of six tickets for 25 cents in Portland caused the writer to investigate the probable effect of this reduction, particularly since the same old generalization was urged that "lower fares would create enough additional travel to make up for the loss due to the tickets."

Five cities which gave six tickets for 25 cents stated that the percentage of revenue passengers using tickets were as follows:

	Per Cent
Milwaukee	84
Indianapolis	82
Washington, D. C.	80
Toledo	80
Ottawa	78

The operating data from Portland for the year 1912 are:

Total passengers	89,869,096
Revenue passengers	64,768,170
Operating cost per total passenger revenue and transfer, exclusive of investment return	2.63 cents

On the basis that 80 per cent of the 1912 revenue passengers would have used the six-for-25-cents tickets, the loss in revenue would have been about $387,403.

The number of additional 4.167-cent passengers which would have to be carried at a cost of 2.63 cents in order to overcome the loss of $387,403 would, of course, be

$$\frac{387{,}403}{4.167 - 2.63} = 25{,}300{,}000$$

If to this number we add 64,768,670, or the number of revenue passengers carried during 1912, we would obtain 90,068,670 as the total number of passengers. This sum represents an increase of nearly 40 per cent in passenger traffic. As the estimated city population of Portland in 1912 was 236,000, this would mean 385 rides per inhabitant per annum, which is higher than obtains in any other city in the world. It would be some 25 per cent higher than Cleveland and some 55 per cent higher than Toledo, cities having the lowest fares in the United States.

Among cities of more than 150,000 population, Portland ranks with Los Angeles as one of the two leading cities in the world in extent of street car facilities when measured by the amount of trackage per capita and cars operated per capita. It certainly then fulfils the first and most important essential for creating "riding habit" or street car patronage. It already enjoys a rate of 4½ cents for tickets sold in lots of fifty. The other three factors, however, of topography, climatic conditions and temperamental traits are not so favorable to development of the "riding habit," so that world leadership in that regard cannot be expected.

People rarely take to street cars for the sake of the ride itself. They ride as a means to some other end, such as a visit or business or other objective. The ownership and fostering of amusement parks by street railway companies is evidence that something more than the street car journey is necessary to induce people to ride. The difference of a fraction of a cent in the cost of the ride would influence them only very slightly.

The ELECTRIC RAILWAY JOURNAL, in its issue of March 30, 1912, discussing editorially the influence of fare on volume of traffic, puts it this way:

"It may be said, first, that low fares generally stimulate some extra traffic; second, that high fares generally discourage some extra traffic. People will ride more freely when the fares are low. But the traffic stimulated by low fares may be undesirable because it may develop at rush-hour periods and cost so much to handle that the expected margin of profit may disappear in loss.

"Furthermore, the street railway cannot, as is often possible for the steam railroad, restrict reduced fares to out-of-the-season travel. Its rate for one is the rate for all. The regular patrons supply the bulk of the traffic, and if a reduced rate applies to them as well as to the extra riders who are induced to travel solely because of the economical opportunity offered, the average revenue passenger dwindles materially. The ability of the company to provide proper service and to maintain its property is therefore curtailed in corresponding measure."

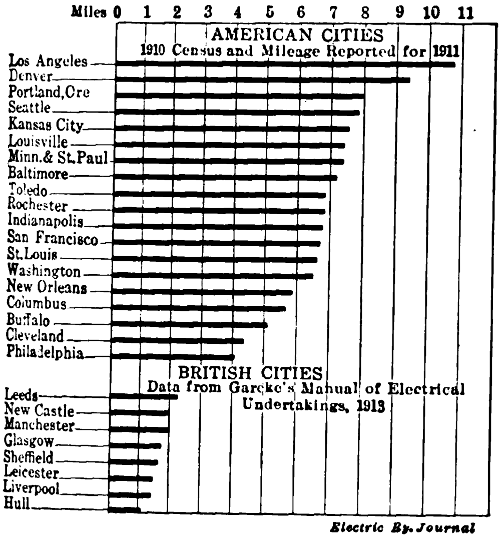
Since reductions in rate of street car fares are necessarily limited to extremely small reductions in the charge per ride and because of the many other factors which enter into the determination of street car patronage, the stimulation of travel due to such reduction cannot be quantitatively measured beyond the general conclusion that it will be slight even to the degree of negligibility.

GENERAL

"Lower prices stimulate business" as a business maxim has an important corollary which is sometimes expressed: "In the long run you get exactly what you pay for, no more, no less." Thus good prices justify the expectation of fair goods and liberal service, while "cheap prices mean cheap goods." The latter maxim, indeed, but exemplifies an important phase of the natural struggle for self-preservation which is a law of business as well as of nature.

In the street railway field the operation of this corollary is significantly shown in the accompanying charts of trackage per capita (Fig. 3) and of cars operated per capita (Fig. 4), which combined are a fair measure of the investment per capita for street railway purposes. Thus the 5-cent fare cities lead the "reduced" fare cities in street car facilities. Cleveland, famous as having the lowest fare in the United States, has since the beginning of the 3-cent car service in 1910 added only 5 miles of track, despite the fact that its average increase of population has been and presumably continues at the rate of about 18,000 per year. Its total of trackage and cars operated per capita rank it below other cities which so far have escaped the fallacy of "reduced fares."

The absence of data as to "cars operated" in the British cities makes it necessary to consider the British "cars owned" in the cities compared. The charts of trackage and cars per capita strikingly bring out the superiority of American cities. To just what extent low fares or the deadening inertia of municipal ownership is responsible for the marked inferiority of the British systems, in the extent of street car facilities, is difficult to state. But no doubt both contribute to the showing.



Electric Ry. Journal

Fig. 3—Riding Habit—Miles of Single Track per 10,000 Inhabitants

Only cities exceeding 150,000 population were considered in the comparisons.

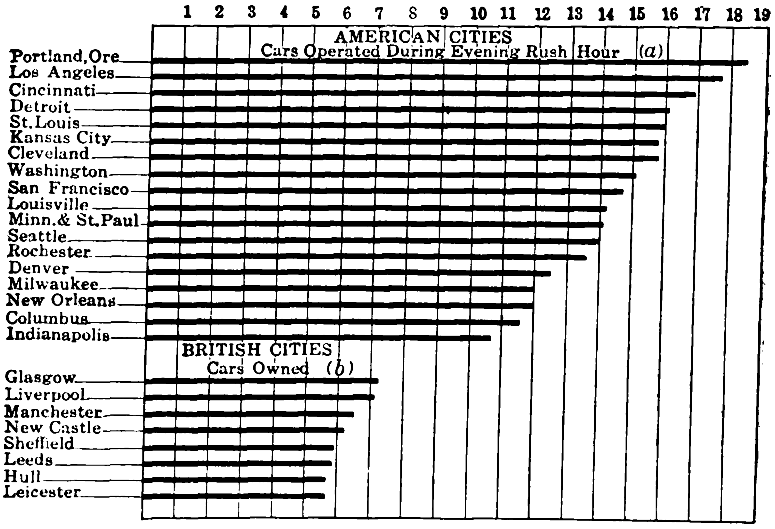


Fig. 4—Riding Habit—Cars Operated During Evening Rush Hour

Only cities exceeding 150,000 were considered in the comparison.

(a) Data for cars operated supplied by the companies in December, 1912.

Population taken at 1910 census plus one-fifth increase of last decade.

(b) From Garcke's Manual of Electrical Undertakings, 1913.

CONCLUSION

In the opinion of the writer, prices for utility service should generally be left to the natural workings of business economies. Ordinary business practice will not allow prices to be held excessively high, for then there would not be enough revenue to support the investment, and experience shows that compulsion is not necessary to reduce prices for service in order to expand the business.

Rate reduction by means of legislative power, except to remove unfair discrimination, is a serious blunder and generally vicious in the present state of utility development. The writer does not wish to be understood as favoring exorbitant or unlimited profits from utility operation; on the contrary, he is a firm believer in regulation which will be reasonable and fair to all. By all means, let us determine what is "fair value" and what is "fair return on utility investment" and then allow and maintain both.

Enforced rate reduction is a serious mistake at this time, for no utility, whether public or private, is perfect or complete in its service to its community. Extensions and improvements are ever necessary. The best of safety precautions should be everywhere required as soon as the utility can afford their installation, every person should ultimately be served, wires should ultimately go underground, and the sooner all these take place the better for all concerned. But how can they be done if the very foundation, the revenues for their accomplishment, are cut away? So if the utility is earning more than the "fair and reasonable" return, then before reducing the rates charged for service the utility should be required to invest excess profits, first, in that which will properly and consistently make for safety in the service; next, in added service and extensions where properly and reasonably required, and, finally, when the community is well served, let us consider enforced rate reduction. If the utility is publicly owned, then, after safety and service, the excess revenues may be well applied to relief of taxes.

Enforced rate reduction at this stage of utility development is generally vicious, for in nearly all cases the motive is found in the selfish interest of some politician or some demagogue or some other small group of individuals who, for their own petty gain, are quite willing to sacrifice the best interests of the vast majority whose unfamiliarity with the economic problems of the utilities permits the few thus to take unfair advantage of the many.

In conclusion, let us then repeat and urge: Safety first, service next, rates last.

A light railway near Stockholm, Sweden, will shortly be converted to electric traction on the single-phase system. The line runs from Nyäs to Södertörn Villastad and is to be extended to Stockholm. The total length will then be about 36 miles. According to the *Elektrotechnische Zeitschrift*, the single-phase locomotives will be supplied with current at 15,000 volts, fifteen cycles, and the annual energy consumed will reach nearly 6,000,000 kw-hr. The running costs are estimated at 16 cents per locomotive mile, or 0.096 cent per ton mile, on a total annual traffic of 81,400,000 ton miles.

The Midyear Banquet

Abstracts Are Published of the Speeches at the Banquet Which Was Held at the Waldorf-Astoria on the Evening of Thursday, Jan. 29, for the Delegates at the A. E. R. A. Midyear Conference

The annual banquet was held at the Waldorf-Astoria on Thursday evening, Jan. 29, and as usual was a most enjoyable affair. Guests and management were so prompt that the dinner began at 7.30. An orchestra, soloists and an operatic quartet offered most pleasing entertainment in addition to the usual volunteer singing.

The first speaker was Charles N. Black, president American Electric Railway Association. Mr. Black's address follows:

PRESIDENT BLACK'S ADDRESS

"By virtue of the high office you have honored me with, I to-night propose to sound a call to arms, and any man among you who fails to volunteer promptly will be drafted without delay.

NEED OF PUBLICITY

"The industry in which we are so deeply interested has reached without question the most critical period of its history. It is being attacked in front and rear as well as on both flanks, and it behooves us to rally all of our strength if we are not to be utterly routed. Some few of these attacks are inspired by political motives, but whatever the motives may be, the attacks we have most to fear derive their strength from the ignorance of our industry on the part of the public. This ignorance is all the more dangerous by reason of the fact that the public generally, far from realizing its absolute lack of knowledge of the transportation business, on the contrary firmly believes and vigorously maintains that nothing could be simpler than the operation of an electric railway. There is scarcely one man in a hundred in any community who is not ready and willing to make any number of suggestions for the improvement of the service, and it is difficult for him to understand why these suggestions should not be adopted.

"To the man or woman, tired after a day's work, who attempts to board a street car in one of our busy American cities between 5 and 6 o'clock in the afternoon, only to find every available inch of space occupied, it would seem that by operating a few more cars these intolerable conditions could be easily remedied. They condemn the management of the railway company for not doing what apparently is such a very simple thing.

"The cars operating over tracks laid in the streets are about all the average man sees of the complicated and intricate system and organization required to operate a modern electric railway. To the uninitiated the only apparent difference between the present and the old horse-car days is the elimination of the horses and the installation of some overhead wires.

"Of the vast sums that have been expended in bringing about this superficially slight change, the public has no knowledge, and of the economic difficulties with which every transportation company has to contend know it even less.

"The question of public relations has been the subject of numerous articles in our technical magazines, and during the past three or four years it has been discussed at almost every convention and meeting this association and the National Electric Light Association have held, as well as at practically every meeting of the allied or affiliated associations. Committees consisting of the ablest men interested in our railway and lighting companies have been devoting their time and energy to bettering these relations. However, up to the present time their combined efforts have, apparently, produced but very meager results, entirely disproportionate to what we might expect.

"There must be some good reason for this lack of success, and, in my opinion, it is entirely due to the failure on our part to appreciate and understand the public's attitude. We have been altogether too ready to bow down to the demagogue's accusation that all public service corporations are overcapitalized and have been subject to gross mismanagement. We have tacitly assumed that this is the fundamental cause of the public's hostility, while in reality it is primarily due to our own negligence in not telling our story in words that can be understood by the average man.

"The owners and managers of our electric railways are as efficient and honest a body of men as can be found in any walk of life, and our business requires as much ability, efficiency and skill as any other, and more than most.

"While in most ordinary commercial enterprises the capital is turned over from one to four or five times every year, in the electric railway business it requires from four to seven or eight years to turn it over even once. This fact naturally makes it far more difficult to recoup losses due to mistakes or any other causes.

"It has developed probably more rapidly than any other industry the world has ever known, and it is hardly surprising that the layman knows so little about it.

"It is a herculean labor, this education of the masses, and as General Harries said in his presidential address at our last convention, 'Education of the mass, as a mass, is impracticable'; but the individual can be educated, and if we educate enough individuals, we will finally secure an educated mass. This can only be accomplished, however, through a broad and carefully planned campaign, carried forward not only through the technical press, but also by means of the daily papers, weekly periodicals and monthly magazines, as well as through every other available method of publicity. It cannot be accomplished in a day or in a year, but it must be accomplished before we can hope for any material improvement in the attitude of the public toward our business. Every one of you gentlemen here to-night can do his part, and it is his duty to lend every assistance to the cause if he is interested in the welfare of the industry.

"In the meantime, municipal ownership and municipal operation will inevitably develop in some of our cities. This is by no means without its compensating features, and will probably be as important an educating factor as any we could possibly devise.

"In San Francisco we already have a municipally operated street railway, and in that community it has permanently laid at rest several questions which have vexed and harassed the street railroads in many of the more radical cities of the country, such as, for example, the no-seat no-fare ordinances, the overcrowding of cars during the rush hours and a number of others which I might mention.

DEPRECIATION IS DEFERRED MAINTENANCE

"This, however, is by no means the only important problem confronting us. During the past few years a large number of the states have appointed public service commissions with, in many instances, practically plenary powers. The men appointed to these commissions have been drawn principally from the legal fraternity, and while, naturally, many of the questions which the commissions have to decide have been of a legal character, the most important ones are economic in their nature and should be decided upon economic principles rather than upon legal ones. This, no doubt, explains some of the unfortunate decisions that have been handed down by several of the public service commissions, and even by the Supreme Court of the United States.

"Lawyers, generally, have had but little experience in business matters. The average lawyer is no more qualified to decide an important economic question than would the ordinary business man be competent to pass upon some abstruse question of the law. No more striking illustration of these unfortunate and unsound decisions can be given than those in many of the so-called rate cases, in which the rate of return has been fixed, based upon the depreciated value predicated upon reproduction cost of the property being investigated. From an economic point of view, this method in its last analysis is absolutely confiscatory. It is surprising that it has been tacitly acquiesced in by so many of our steam railroads and public service corporations.

"Why should a consumer for the same service equally efficiently rendered be entitled to a lower rate from a property which is, for example, five years old than from one which is absolutely new? But such is bound to result if the charge for service is based upon the depreciated reproduction cost.

"And how would the owner of a mortgage on improved real estate view the proposition that he should be entitled to the interest on a decreasing capital each year although he was assured that his principal was being protected and kept intact by a sinking fund which would be turned over to him at maturity?

EXAMPLE IN DEPRECIATION

"But let us consider an even more elementary example. A man with, say, $5,000 goes to a savings bank to deposit it for a period of five years. The prevailing rate of interest is 5 per cent and the bank president tells him that he will be allowed 5 per cent on $5,000 the first year, 5 per cent on $4,000 the second year, 5 per cent on $3,000 the third year, 5 per cent on $2,000 the fourth year, and 5 per cent on $1,000 the fifth year, but at the end of the fifth year his $5,000 will be returned to him. Is it probable, other things being equal, that any man would place his money in that bank? But this is exactly in accordance with many of the decisions of the commissions and even with that of the Supreme Court of the United States in the Minnesota rate case. I was simply astounded the other day in reading the report of a special committee of the American Society of Civil Engineers which had been appointed to investigate this subject to notice that it practically acquiesced in this fallacious doctrine.

"Is it surprising, under these conditions, that it is becoming more and more difficult to raise money for investment in public utilities?

"All of this misapprehension, in my opinion, would be cleared away if we could only forget the word 'depreciation' and substitute for it the words 'accruing or deferred maintenance.'

"Maintenance is recognized by every commission and every court as an operating expense. Accruing or deferred maintenance, or so-called 'depreciation,' is fundamentally the same, the only difference being that maintenance proper is taken care of by an actual expenditure of money during the past fiscal period, while accruing or deferred maintenance should be provided for by the setting aside of a sum of money to be used for an identical purpose, namely, the upkeep of certain parts of the plant at some future period.

"That this accruing or deferred maintenance should be deducted from the reproduction cost of a plant for rate-making purposes is logically unsound and economically confiscatory, but unfortunately it has been so generally acquiesced in that it will be most difficult to correct.

GOING VALUE

"Such is not the case, however, with another mooted question in connection with the valuation of public service corporations, namely, that element which is sometimes termed going value. We all know that there is such an element of value, but who has defined it clearly and accurately or pointed out the way to estimate it correctly?

"The Wisconsin Commission recognizes it but identifies it with the cost of developing the business and measures it by the deficits which usually occur during the early years of operation of a property, as illustrated in its decision of Aug. 14, 1913, in the case of the City of Milwaukee vs. Milwaukee Gas Light Company. There is a dictum in this decision, however, which appears to me absolutely inconsistent with the conclusions reached. In its criticism of the method employed by John W. Alford, in his estimate of the going concern value, the commission uses the following language: 'The cost of development must not be confused with what an investor would be willing to pay in the market above actual physical value for an established business.'

"The commissioners thus apparently admit that there is some element of value in a going concern or established business in addition to the physical value and cost of developing the business, but in their findings they fail to make any allowance for it.

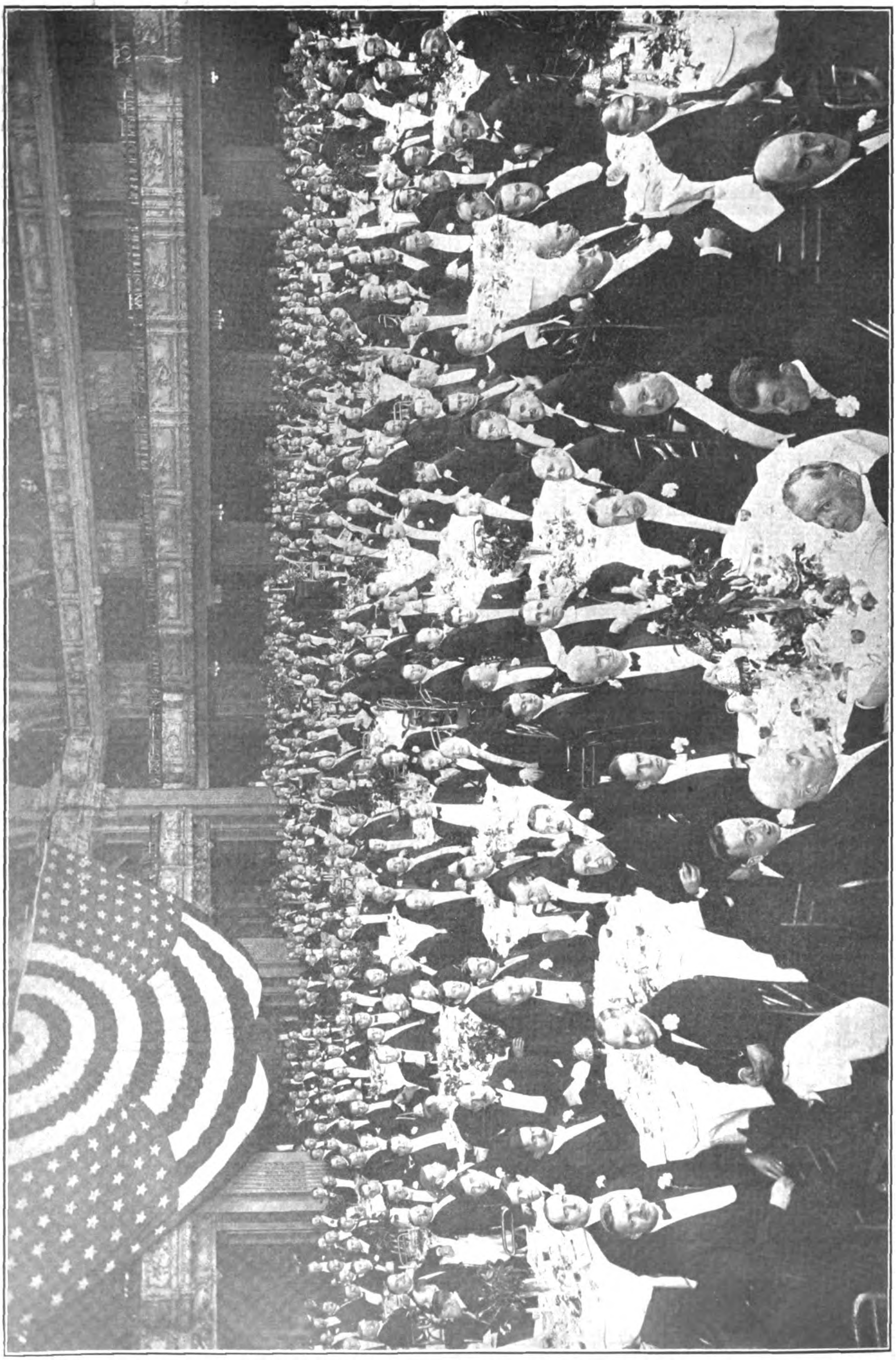
"This admission, however, from one of the ablest commissions in the country is significant and encouraging. We should lose no time in clearing up our own minds if we are to hope for a just recognition of this important element of value.

"In these questions and many similar ones all public service corporations are equally and vitally interested; they are economic in their character and should be settled by business men rather than by lawyers or engineers and they are of such vital importance that it seems to me no more fertile field of work lies within the horizon of our association than their careful and systematic study and solution.

PUBLIC RELATIONS

"To-day we held a meeting of the public relations committee. Last October in making up the list of names to serve on this committee I had the importance of the work to be done in mind. I appointed this committee with the full intention that it do more than similar committees had done in the past, or that it should report back to the association that public relations all over the country were in such good condition that no work along this line was necessary. [Mr. Black then read the names of the members of the committee on public relations.]

"Most of these men were present at to-day's meeting of the committee, and a very thoughtful and thorough discussion took place. The work to be done in general was gone over, and it was the unanimous opinion of



Members and Guests at the Joint Banquet of the A. E. R. A. and the A. E. R. M. A., Held at the Waldorf-Astoria Jan. 29, 1914 all present that the committee should get busy and that, with the co-operation of all the member companies, the manufacturers and all others interested, a most effective work can be accomplished during the present year. To this end the following resolution was adopted:

"'That a sub-committee of five be appointed by the chairman to draft a set of principles for the association, setting forth the association's view in general terms on the problems confronting us, and outlining a comprehensive plan of educational publicity along the lines suggested tentatively by Chairman McCarter, and to prepare a plan for raising a publicity fund of $50,000 or more, all of which is to be submitted to the full committee, it is hoped, within a month's time.' The chairman then appointed the following committee: James H. McGraw, chairman; Guy E. Tripp, C. Loomis Allen, Frank R. Ford and Col. T. S. Williams, with Chairman McCarter a member ex officio.

WORK OF THE SUB-COMMITTEE

"This sub-committee has already arranged for a meeting to take place early next week, and it is my thought that it will draft a plan that will be approved by the full committee, and I bespeak for this committee your active and earnest co-operation in this most important work to be done, including the raising of this sum of money for publicity purposes. The committee has it in mind to get in touch with the public policy committee of the National Electric Light Association, which has done splendid work during the past several years, and with a similar committee in connection with the gas interests, and possibly other similar national organizations.

"The committee on public relations is enthusiastic and progressive, and at the same time is conservative. You may depend upon it that it will not do anything rash, but we are all looking to it to do a most helpful and constructive work. The sum mentioned is to be used for the first year's work. If the efforts of the committee prove satisfactory, some means, such as raising the dues temporarily, may be devised to continue the work."

PROPOSED SAFETY MEDAL

President Black then read a communication from the American Museum of Safety in which announcement was made that a gold medal with silver and bronze replica, in memory of the late Anthony N. Brady, would hereafter be granted annually to the American electric railway which did most to promote the safety of its service. The suggestion was made that this award be granted in accordance with the conditions and recommendations set forth by a committee of the American Electric Railway Association. President Black announced that this subject had been referred to the executive committee and that he would appoint a committee to comply with the Museum's request.

The second speaker was Cornell S. Hawley, President American Electric Railway Manufacturers' Association, whose speech follows.

MR. HAWLEY'S ADDRESS

"We manufacturers are often styled 'specialists,' and I thought we were, at least in the matter of arranging for good dinners; but this joint banquet is such a huge success that I feel sure our railway friends have also found time for specializing along these lines.

"In the office of a prominent railroad official I recently saw a card bearing the following: 'Some people grow under responsibility, others merely swell.' Now, the latter part of that statement was never intended to apply to railway officials in this country. The public demands and the criticisms in the public press are alone sufficient to prevent any swelling on their part. I had the pleasure of meeting President Black some thirteen years ago, when I first came to New York. He was prominent then in the engineering line, but we know that he has done no swelling but has grown rapidly under the many responsibilities he has since assumed, resulting in his present high position with a large railway system and his election to the presidency of your railway association.

"The railways have problems not common to manufacturing companies, and as Howard Elliott has said in one of his great speeches on the subject of railroads: 'The railway owner, if he does not like his investment, cannot shut up shop and wait awhile until business is better. He cannot even abandon his business and pocket his loss. He must go on, whatever the conditions may be, with the hope that the ultimate good sense and justice of the American people will give him even a part of that protection and encouragement that are given to those who may be engaged in agriculture and in manufacturing.'

"The manufacturers devote much time and study to the development of new devices for electric railways, and they work with the railway men in the endeavor to perfect appliances for more economical operation and to meet the constantly increasing demands of a critical public.

"Probably no industry has been compelled to scrap and replace so much valuable machinery and equipment within a period of a few years as the electric railways. A striking example is the short life of the style of an electric railway car, as shown by a street parade in this city about a year ago. Seven distinct types of cars were shown, four of which had been adopted within a period of five years. Again, at the New York Street Railway Convention at Brighton Beach last summer seven classes of Brooklyn surface cars were shown. These had all been developed during a period of fifteen years.

"The early history of the street railways is described by Mr. Joseph Smith, of Boston, in the following expressive paragraph:

"'In former days, if we are to believe the traditions handed down to us by spavined hackmen and rheumatic liverymen, a street railroad was a bunch of bobtail cars, run on two rusty, billowy tracks, pulled by horses and pushed by asses, the horses supplying the muscle and the asses the money to transport a greedy and ungrateful generation. When the prices of horses, selectmen and aldermen became prohibitive, the trolley was invented, the horses were transformed into pony coats for ladies, and the selectmen and aldermen into starters and motormen; live wires pushed the cars and live-wire pullers rooted for the systems; the almighty dollar was retired, and the plugged nickel of the people was introduced into society.'"

OTHER SPEECHES

The third speaker was Guy E. Tripp, chairman board of directors Westinghouse Electric & Manufacturing Company. Mr. Tripp's address on "Public Relations" appears elsewhere in this issue.

The last speaker of the evening was Henry W. Anderson, vice-president Virginia Railway & Power Company, Richmond, Va. Mr. Anderson's address on "The Relations of Public Service Companies and the Public" appears elsewhere in this issue.

On motion of President Black a vote of thanks was tendered to the banquet committee. The meeting concluded with "Sixty Seconds of Optimism" by Past-president Harries.

Public Relations

In This Speech, Which Was Delivered at the Banquet Thursday Evening, the Inherent Stability of the Railway Business Is Emphasized and the Companies Are Urged to Take Certain Steps to Improve Public Relations

BY GUY E. TRIPP, CHAIRMAN WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

I represent a company which depends in a large measure upon the prosperity of public utilities. All the problems and difficulties which confront them also confront us, and nothing good or bad can happen to them that does not also affect our business. When they are prosperous and cheerful we are also prosperous and cheerful because then they buy our goods and our factories are full. Our 20,000 employees are then busy and their families well cared for. Therefore, every man on our payroll whose job is jeopardized when your trade falls off has a vested right in your vested right to protection in the honest pursuit of your business. That is why I feel within the bounds of propriety in speaking here to-night.

It is evident that the business as a whole is not prosperous because the needs of a growing population call for more facilities and investors do not buy enough securities to furnish the money. Temporary expedients such as short-time obligations have only added to your financial burdens instead of lightening them, and, notwithstanding that they may appear so outwardly, public utilities will not be really and soundly prosperous until all their fixed investments in plant have been permanently financed with stock or long-term bonds. It is a bad thing to have a debt that you never intend to pay and never can pay, and that is what such short-time notes are.

If your troubles were due to unreliable machinery and apparatus, and in consequence of it your service had failed to secure the confidence of the public in your ability to serve their needs, the responsibility would rest largely on the manufacturers. But the reverse is the fact. We manufacturers have expended money, time and thought without reserve in producing year by year lower-priced and more efficient apparatus, and you have courageously adopted the new and scrapped the old until to-day the street railway is a modern, efficient, up-to-date plant and fully capable of doing its work well. Not only that, but the savings which have been thus jointly made have not resulted in additional profits to you or to ourselves. It is impossible to trace the actual distribution of these economies, but the public has received the entire benefit of them through increased wages, reduced rates or otherwise.

If the street railway is as good a plant as I have described, why can it not readily sell its securities, and, if it is a necessity, why is it not encouraged more by the community which it serves?

The answer involves so many human impulses and economic checks and counter-checks that to marshal them in order of their importance would be too great a task for me; but to consider this subject from the standpoint of cold business logic, ignoring the human side of it, is only half to consider it.

While it is true that the primitive instincts of all human beings are the same, the mental processes of different races differ widely, and our particular institutions were founded on the peculiar mentality of the Anglo-Saxon race. Now, I do not believe that such people turn naturally to socialism, although they may be temporarily misled by a misunderstanding of a subject and led astray by misguided leaders of one kind or another; and when men who apparently do not consider themselves a part of the public refer to the "peepul" in more or less contemptuous language, they do not remember that under our form of government the people have the power to get anything that the majority wants, except of course when checked by economic or natural laws, and that the moderation of an irritated public with that supreme power is ample evidence of its deep sense of justice and right.

Of course, we find in this country many standards of ethics, ranging from the highest to the lowest, and we find people roughly grouped by these standards, following the theory that birds of a feather flock together. In consequence we have many grades of men representing the people in public office. But to characterize broadly the representatives of the people as incompetent and unfair is as untrue as it is foolish, when it comes from the mouths of public service corporations. If it were true we should be certainly in a bad way and wasting our time in a discussion looking to the improvement of public relations. Anyway, there they are, and you must deal with them, for the monopoly of a public necessity is not and ought not to be an unrestricted private business.

EDUCATION OR CO-OPERATION?

How shall we deal with the people? Shall it be through education or co-operation?

I think education is a poor term to use even if it describes the same work that co-operation does, which it does not. The very use of the word education tends to place our minds crosswise to the trend of the times, and, instead of being instructors, we are in danger of becoming obstructors who never furnish constructive suggestions. We should also remember that public service corporations have received quite as much education during the past twenty years as the people have; in fact, both sides are becoming fairly well educated.

Public service corporations now understand that regulation and competition are the only alternatives lying between unrestrained operation for private profit and governmental ownership. They have also learned that regulation is better than competition, and that it is possible to prosper under a system that would have been regarded as visionary and ruinous only a few years ago. I also believe the people understand that regulated private operation is a great deal better than governmental ownership, and that regulations or laws which run counter to natural or economic laws defeat themselves. With all this painfully acquired education behind us I believe the time is ripe for co-operation, and that results will follow from it that would have been impossible a few years ago.

By co-operation with the people I would not have you understand that I mean co-operation with those self-appointed advisers of the people who fill our magazines with misstatements of facts and upon such premises build their attractive and popular arguments. For an example, take the misstatement by Mr. Brandeis in *Harper's Weekly*, that the Westinghouse Electric & Manufacturing Company and the General Electric Company are only alleged competitors. If all his facts are as false as that one (and I know that one to be false), his conclusions are worthless.

As to this dangerous influence (dangerous because it is irresponsible and has nothing to lose by any damage that it may work), I think a well-organized bureau should be maintained for the purpose of correcting authoritatively and widely all misstatements of facts as fast as they appear. While it is gratifying to note that the number of these disseminators of misinformation is dwindling, it is well to bear in mind that the ablest of them still remain and that they can only be disarmed by publicity. This work should be done temperately. Correction after correction, proved and repeated again and again, must eventually make an impression upon the public mind, and gradually the real prophets will be separated from the false ones. The real representatives of the public with whom we must co-operate are those men who are elected and appointed by the people and who are responsible to the people for their words and actions. When the officers of a public utility meet the official representatives of the people, two responsible agents are in conference, and the outside skirmisher contributes nothing to the argument. But where there is no mutual confidence there can be no co-operation, and when the agents of public utilities say in effect that they have no confidence in the people they are deluding themselves; otherwise they have no right to continue offering their securities to investors.

NECESSITY OF GOOD FAITH IN CORPORATIONS

I venture to say that when the time comes that the public shall have as much confidence in the good faith of public service corporations as you really now have in the public, your securities will sell on a very low interest basis; for, excepting government, state and municipal bonds, I know of no fundamentally safer investment than the securities of a public utility whose business and financial methods deserve and have the confidence of the people. There is no business less subject to fluctuations and whose growth is more continuous and even. Public service securities ought to be a favorite and preferred investment, and I believe they will be so when public confidence has been secured.

The work of co-operation must start from conditions as they now exist or it will not start at all. An attempt to punish public utilities or penalize their customers for past actions will create a situation which prohibits co-operation. Not only that, but it is equitable to begin anew with the present.

A company which in the past has been unwisely or dishonestly financed, engineered or administered ought not to assess its patrons for the ills which time has not yet cured and which still remain to plague it. In like manner, the public, which in the past has granted or dishonestly sold franchises, accepted premature extensions of service or other benefits and has not shown any disapproval of past financing or of past interpretations of law by the courts, is now estopped from repudiating the results if they are unsatisfactory. Therefore, taking its stand that the past is a dead issue, I think that the American Electric Railway Association should bring the street railway industry before the people as a public utility that wishes to co-operate for the future.

This association is the accredited representative of the industry, and, while it cannot interfere in the local problems of its members, it can establish a standard of business ethics. It can proclaim and publish a platform of principles which will be effective if it has the courage not to avoid a single embarrassing issue, and I believe that this platform of principles can be so full and fair that it will be a text for the new co-operation. I fully appreciate that the step is a very important one and that it is forging a weapon to be used against those whose methods do not in the future square with the new gospel; but we cannot have our cake and eat it too. To be effective as an agent to co-operate with the public this association must have definite principles, and there must be no mental reservations when they are announced.

DECLARATION OF PRINCIPLES

For the purpose of illustrating my ideas as to the character of the platform I have in mind, I venture to suggest a few of the important things upon which the public will probably expect us to state our position.

How do we analyze and define the principles governing a fair return on a fair investment in the street railway business?

A fair return is, of course, one that will cause capital to flow into the business; but, as it varies with the time and the locality, it cannot be permanently fixed. If a permanently fixed rate cannot be established, can this problem be solved for the future in any better way than by the sale at the best prices obtainable of securities which have been approved by a public service commission on a certificate of public necessity? If so, what is that "better way?"

When the question is raised that the return on past investment is inadequate or excessive have we any better basis for a determination of the facts than a valuation of the property involved? If so, we should suggest it. If we haven't a better suggestion we should co-operate in defining principles that should govern such valuations and catalog the items for which a public utility is entitled to credit, in a valuation looking to a fair return on a fair investment; for example:

The cost to reproduce new.
Discount on the sale of securities.
Engineering commissions.
Promotion service.
Cost of developing a going concern.

We should also decide whether as a matter of principle we are entitled to a cumulative fair return for the future only, or whether we should also be reimbursed for past deficits.

If a company has not provided for past depreciation, it will be compelled by the force of logical events eventually to withhold earnings from its security holders until depreciation is cared for.

But is the force of logical events the one that should be relied upon as the best way to remedy past errors of this kind with the least disturbance or chance of disaster? Of course, I believe that it is the best way. At all events, I believe it would be as absurd to deduct depreciation from valuations made for the purpose of determining a fair basis for a fair return as it would be to charge "less for eggs because the hen is growing older," as a lawyer friend of mine has aptly put it.

The public would like to hear our opinion upon the approximate relative proportions of mortgage bonds and stock that should be maintained on a public utility in order to keep within the limits of safe financing. Also, under what conditions bonus or watered stock should be issued; whether the amount should be governed entirely by the exigencies of a given situation; whether, instead of being merged with other securities, it should be tagged in some manner; or whether the practice should be entirely condemned and some other method adopted of paying the projector and pioneer the wages that he must get, for otherwise he will not do the development work.

Of course, having once agreed upon the principles governing a fair return upon a fair investment, it theoretically makes little difference to the consuming public how many or what kind of securities are outstanding upon the property which serves it.

But the people generally do not hold to this theory, and the investing public is without doubt vitally interested. Therefore, the more definite our announced principles upon this important question can be made, the more confidence we will receive from the public.

HOLDING COMPANIES

A new factor has appeared during the past few years which undoubtedly has been a great engine of force in the development of public utilities, and that is the holding company and syndicate form of operation. And it is quite likely that, so far as the public is concerned, this new element has now become the most important and least understood influence in the public utility field, and possibly more securities are offered through this channel than by all the "single-barreled" companies added together.

Holding companies vary widely in organization and method of conducting their business, extending from the ownership or control of contiguous, homogeneous properties to the ownership or control of widely separated properties of entirely different characteristics. They range from syndicate control of individual properties, each one having its own security issues, to consolidations holding from bare control of its subsidiaries on the one hand to complete ownership on the other.

This is comparatively a new evolution, presenting so many angles that it would be a brave man who would undertake to formulate an ideal plan upon which all holding companies should be built; and it will require a few years to grade them according to their deserts. But the principle of a centralized ownership or control of public utilities by non-resident corporations and the issuance by these corporations of securities based on those of subsidiary local companies is one that can be properly and profitably dealt with in the declaration of principles uttered by this association.

It will be wise for this association to give this question attention, because it ought to anticipate a visit of inspection by the public while it has the opportunity. It will be profitable to the industry because we can bring to the attention of the sponsors for this new development the great responsibility that rests on them to conduct their business in such a manner as to create and preserve public confidence in our public utilities.

That those in control of these centralized organizations should so conduct their business that no injury will result either to the public service industry or other business interests is a principle the importance of which cannot be overestimated. For example, the support and approval of my company and its stockholders cannot be expected in those cases where centralized control results in a door closed to our fair competition and a serious loss to us. It will be still further profitable because with your indorsement in principle the securities of the well-financed and well-managed holding company will be assisted in becoming what they really are—a high-grade investment—because of the fact that they are not subject to the varying fortunes of a single company or locality and because they can obtain money at lower rates than an isolated company can.

TIME TO BEGIN IS NOW

I shall not undertake to set out a complete platform of principles in this talk. I am simply trying to illustrate my ideas upon the subject with a few examples. I feel, however, the time is ripe for the association to do good work in the direction of co-operating with the public, and I believe the street railway business in particular is coming into its own very soon.

For many years the earnings per car mile have been slowly increasing. The lesson of over-extension and long haul has been learned, the public has almost become convinced that the business is not a gold mine, and I believe the industry is on the eve of blossoming once more.

Therefore, it is especially essential that relations of greater mutual confidence shall be established between the street railway and the public it serves, to the end that the hopeful prospects for the future may not be entirely wiped out by additional burdens imposed by a misled and irritated public.

I know that it will be difficult for strong men to moderate their ambitions for profit and power, and that it will also be difficult for public servants to refrain from playing politics; but, if both sides can agree on a platform of principles and be a little ashamed every time they fail to live up to it, they will gradually grow more and more sincere with each other.

ELECTRIC RAILWAY DEVELOPMENT IN UTAH

Owing largely to its extensive electric power development systems, Utah has shown a noteworthy extension of its electric railway facilities during the past year. On page 87 of the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 10 an account was published of the new Salt Lake & Utah Railway, but the two other principal lines in Utah have also been making extensions.

Thus the Salt Lake & Ogden Railway (Bamberger line) has purchased during the past year eight new electric motor cars, one 40-ton electric locomotive and fifty box, brick and flat cars, and has built in its own shops one high-speed emergency line car and one caboose. Other improvements include large expenditures to secure better power supply. The company has also announced its intention of building carhouses at Ogden large enough to hold all of the equipment of the system.

The Ogden Rapid Transit Company has completed surveys for a new line from Ogden to Logan, about 60 miles, and contract work is to be started in April. The company is also laying out a line from Ogden to Huntsville through Ogden Valley, and enough track work has been done on it to enable the line to be placed in operation within sixty days after work is inagurated on the new portion of the line.

The pay-as-you-enter type of street car will be another improvement on the Ogden city lines during the coming year. The company has already purchased six of these cars, and as soon as they are placed in operation the other cars now in use will be converted to the same type. The heart of the Ogden city system, at the intersection of Washington Avenue and Twenty-fifth Street, is to be rearranged early in the year at an approximate cost of $15,000. This point will be double-tracked in every direction to facilitate the increased schedule and the number of cars now passing this corner. Before the opening of the summer season an automatic block signal system will be installed on the Ogden Canyon line.

The prospect of still another electric interurban line connecting Ogden with the cities and towns of northern and southern Idaho is held out by the activities of the Ogden, Lewiston & Northern Railway Company, which purposes to construct a line between Ogden and Preston, Idaho. Surveys have already been made for the proposed line, which will extend through Cache Valley, Ogden Valley and Ogden Canyon.

A newspaper dispatch dated Jan. 27 states that the French banking firm of Perrier & Company has obtained a concession to light Jerusalem by electricity, to establish a water supply and to construct a tramway from Jerusalem to Bethlehem.

The Relations of Public Service Companies and the Public

This Speaker at the Banquet of the Association Defined the Contractual Relations Between the Utilities and the Public and Suggested that the Utilities Educate Themselves to Take a Broader View of Their Duties

BY HENRY W. ANDERSON, VICE-PRESIDENT VIRGINIA RAILWAY & POWER COMPANY

The companies engaged in every branch of public service in this country are confronted by very serious conditions. Unwise and often destructive legislation, in response to public agitation or prejudice, and regulations imposed by various commissions have reached a point where the companies themselves are left with but little, if any, discretion in the management of their properties and are forced to adopt methods which are not only unprofitable but often economically unsound. They are thus in the position of supplying money for the public service without control or authority over its expenditure or use.

This separation of control over the operation and administration of such properties from the responsibility for the financial or operating results has impaired the credit of the companies and greatly increased the difficulty and cost of securing the necessary capital for their continued development. Unless the evil in these conditions can be traced to its source and some effective remedy applied, the end must prove disastrous not only to the capital invested but also to the public interest.

PUBLIC SERVICE A CONTRACT

There is no primary obligation upon any man or body of men to provide public utilities or to discharge the functions which are usual to public service companies. This obligation, if it exists at all, arises only as a result of the contract between the company formed for that purpose and the public.

The contract is embodied in the charter of the company and the state or municipal franchises under which it undertakes to render a specific public service. The public, through its proper legislative body, grants to the company certain rights and privileges to be exercised in a certain manner and for a specific purpose, while the company, on its part, assumes certain definite obligations expressed in the contract or necessarily arising therefrom.

The general effect is to create a relation which partakes of the nature both of a partnership and of principal and agent. It is a partnership in mutuality of interest in and benefits from the enterprise, a relation of principal and agent in that the company is an agency for certain specific objects and the public reserves the right of regulation and control of the business. The company undertakes to provide the capital for the construction and operation of a necessary public work; to dedicate the same to the public use, not generally, but for the specific purpose and to the extent and upon the conditions prescribed in, or implied from, its contracts, and undertakes so to operate its properties as to render a reasonable service for a proper and reasonable compensation. The public undertakes to guarantee to the company the enjoyment of the rights and privileges granted, upon the faith of which the capital is invested, including always the essential right to charge a reasonable rate for the service rendered, and to afford to the private property so employed in the public service that protection guaranteed to all private property by the constitution and laws of this country.

The public, though a party to the contract, reserves the right of such reasonable regulation and control over the properties of the company as to insure the service called for by the contract at the rates therein prescribed, or, in the absence of any specific provision for service or rates, then a reasonable service at reasonable rates.

PUBLIC POWER TO CONTROL INVOLVES POWER TO PROTECT

The resulting position of the property of a public service company is peculiar. It is neither private property in the ordinary sense of that term nor is it public property, but it partakes of the nature of both. It is private property to the extent that it cannot be used by the public for any other service than that provided by the contract and then only for a fair and just compensation and subject to conditions that may be prescribed in the contract. It is public property in the sense that it is subject to the public use upon the conditions of the contract. If property is employed in an ordinary commercial enterprise and it is found that owing to unfavorable conditions or other reasons the enterprise is not profitable, the business may be discontinued and the capital withdrawn, but when once a public service corporation is established it must continue its operations. This power to deny to the owner of the property the right to discontinue the business or to withdraw the capital from the public service when once it has been so engaged, together with the unusual power in one of the parties to the contract to regulate and control the performance thereof by the other party, imposes upon the public to a peculiar degree the obligation to protect the company in the enjoyment of its contract rights and to protect the property used in the public service to the full extent required by the principles of justice and fair dealing. This power to control necessarily involves the duty to protect.

Where the rights, duties and obligations of the respective parties are defined by contract or arise therefrom and where their interests are thus in common to the extent that the success and prosperity of one is dependent upon the success and prosperity of the other, it would seem natural to expect that their relations would be comparatively simple and that they would be found working in harmony for the advancement of their common welfare. But we know that such is not the case, that the history of the development of public service companies in America is but the record of one long series of controversies in and out of the courts, and that these controversies have now reached the stage where it is a question whether the companies can continue to secure the capital with which to render the service for which they were created.

WHY ARE PUBLIC SERVICE COMPANIES UNPOPULAR?

There must be some reason for this condition. The source of the trouble must be found before any effective remedy can be applied. This involves an inquiry as to how far the companies and the public have lived up to their respective obligations.

The primary and important duty of a public service corporation is to render a reasonable service in its chosen field of operation, at reasonable rates. Speaking generally, I believe that an unprejudiced examination of the record of the public service companies in the United States will demonstrate that they have discharged this obligation. I do not mean to say that there are not many cases in which the companies have failed to render a reasonable service or have charged excessive rates. But, taking the situation as a whole, the public service companies may justly claim that, from their inception, they have rendered a reasonable service, having regard to the surrounding conditions and circumstances and that this service has been given at low and constantly decreasing rates.

The conditions are such in the United States that any comparison with a similar service in other countries is liable to be misleading. In most foreign countries the public utilities are operated under entirely different conditions as to density of traffic and extent of territory served, and the zone system of charges is largely applied. In America the rapid growth of our cities has created a public demand for the extension of lines into suburban territory, which are often unprofitable, while the system of fixed rates for the service rendered without regard to the distance or territory covered tends to produce a constant decrease in the rate of compensation charged for the more extensive service, at the expense of the company and to the profit of the public.

The records of rate reduction and improvement in service demonstrate that whatever may have been their shortcomings in other respects, the public service companies have supplied to the public an essential convenience with constantly improving service and decreasing rates, while the cost of all other public necessities or conveniences has increased.

Let us turn for a moment to the other side of the case. We have seen that in consideration of the capital invested and service rendered the public is under obligation to protect the company in the enjoyment of the rights and privileges granted, and so to exercise the power of regulation and control as to encourage, rather than embarrass, the legitimate development of the public service property. How have these obligations been discharged?

In the early stage of public service development broad and liberal rights and powers were granted to such companies as an inducement to the investment of capital in experimental and hazardous enterprises. Even then the business was rarely successful and failure followed failure, with one reorganization after another, resulting in heavy loss to the original investors. When at last the business had been developed to a point where it gave promise of profit and the companies began to exercise the powers so granted, the public took steps to limit and restrict these powers in every manner permitted by the constitutional provisions against the impairment of contracts. In many instances the companies were forced to yield to the public demands to the extent that the old contracts and franchises were surrendered and new franchises accepted imposing harsh conditions and requiring a more extensive service at lower rates.

GROWTH OF REGULATION

Under the name of regulation, the companies have been required to extend their service into unprofitable territory, to the great profit of the public and enhancement of property values, but often at great loss to the companies themselves.

Although not contemplated in original contracts, the public has undertaken to supervise all financial arrangements and to regulate operations to a point which has, in effect, deprived the companies of any substantial control over their properties, and this regulation and control have often been exercised by agencies wanting in experience and knowledge of financial and operating problems.

The properties of public service companies have been segregated as special subjects of taxation and thus deprived of that equality before the law which is essential to justice. The public has appropriated their revenue in the form of taxes until to-day many of these companies are paying in excess of 10 per cent of their gross revenues to the support of the public.

Special legislation has been passed imposing liability upon the companies for accidents and for other causes to which other classes of industry in the community are not subject.

Even in the courts, the prejudice of juries has resulted in constantly increasing verdicts, frequently in cases which are without merit, so that the expense of accident and personal injury claims often consumes from 5 to 10 per cent of the gross revenues of the company.

The demands of labor for constantly increasing compensation have the public support, and at the same time in many communities the companies are required by legislation or franchise provisions to furnish special rates at certain hours of the day, thus giving special privileges to this large class.

At every meeting of a State legislature numerous bills are introduced, which if passed into laws would render the successful operation of the companies impossible. Thus the companies are constantly on the defensive and their energies and resources are consumed in efforts to safeguard their properties which the public is under obligation to protect.

In the face of these harsh conditions and many others which might be enumerated, the public insists upon a constantly improved service at decreasing rates. It is willing to pay more for all other necessities and conveniences of life, but when it comes to the service rendered by public service companies it insists that it shall get more and pay less.

The reasons for these conditions must be understood before an intelligent effort can be made to find or apply a remedy.

It is very human to try to blame others for our troubles. I am afraid we are too often disposed to condemn the public for a spirit of unfairness and injustice in dealing with public service companies, just as the public is disposed to question the honesty of purpose and sincerity of the companies themselves. We will always have demagogues and dishonest men, but to contend that any large proportion of the public is dishonest or intentionally unfair is to contend that society is a failure. Nothing is gained either by the public or the companies by criticism or recrimination. It is essential that each of the parties to the arrangement should recognize the honesty of purpose of the other as a condition precedent to any mutual understanding or co-operation.

DEFECTS IN PRESENT CONTRACTUAL RELATIONS

There are certain inherent defects in the contract or relation between the companies and the public which tend to produce the conditions which I have just described.

The power of regulation and control of public service properties is reserved in the public, while the responsibility for their financial success rests upon the company. The results of the exercise of this control are direct in their effect upon the owners of the property, while, to a great extent, they are indirect in their effects upon the public. If this power is unwisely exercised it results in immediate loss to the owners of the property, but a service will still be rendered by receivers or otherwise and the effect upon the public interests will be seen only in the indirect consequence, depreciated public service and resulting restrictions upon the prosperity and development of the community. The public, therefore, fails to realize that these conditions resulted from its own unwise action, blames them upon the company, and seeks by imposing additional regulations and restrictions to remedy the evils which have resulted from too much or unwise regulation.

PUBLICITY AND PARTNERSHIP

Much may be done to remedy this condition by impressing upon the public the direct interest which it has in the success of the public service companies. A large proportion of the revenues of such companies goes to the public either in payment for wages and material or taxes and public charges, and the benefits to the public in increased values of property resulting from the public service rendered far exceed the benefits derived by the owners of the property from its operation. If the public could realize these essential facts, it could then see that it was to its interest to promote and encourage the successful operation of public service companies.

A further remedy may be found in the modification of the existing contract so as to give the public a more obvious and direct financial interest in the success or failure of the public service companies and in the revenues derived from their operation through some profit-sharing scheme. Self-interest is a most potent factor in human action, and if some plan were devised by which the public would share directly in the profits and losses from the operations of such properties, it would go far to restrain the unwise or unjust exercise of the power of regulation and control.

I believe that one of the most important duties confronting those interested in public service companies is to devise some fair and judicious means by which this result may be accomplished, not only as a remedy of existing conditions, but in order to offset a growing tendency toward schemes for public ownership and operation which, if not economically unsound, are wholly unsuited to the political and other conditions existing in this country. We cannot stand still in any field of human endeavor. If you whose interests are at stake and who are students of the questions involved do not open the way by which progress may be attained along sound lines, then the public will make its own experiments, often under ignorant or selfish leadership, and at your cost.

But of course the fundamental source of error and injustice on the part of the public in dealing with public service companies and in the exercise of the powers of regulation and control is ignorance and prejudice.

It could hardly be expected that a partnership would be successful or co-operation would be secured where one partner having the power of control and regulation of the business was ignorant of its conditions and requirements, or was prejudiced against or suspicious of the other. The same would be the case if we regard the relation as that of principal and agent.

This condition is due to some extent to a general indifference of individuals to public affairs and obligations, but more largely to the mistakes or omissions of the companies themselves. The company furnishes the capital and is the managing partner in the enterprise, or, if you please, the agent of the public for achievement of the purpose of its organization. It is therefore its duty not only to render the service for which it was created, but to see that the powers granted and the capital employed are used and applied only to this purpose and to keep its partner, the public, fully informed as to the affairs of the partnership not only that it may know that the business is being honestly and fairly administered, but to the end also that the powers of regulation and control may be intelligently exercised.

Frankness compels the admission that in too many instances the powers granted for public purposes have been used to promote private ends, that instead of striving to keep the public informed the companies have too often contested every effort on the part of the public to secure information as to their affairs. Many of the controversies in the courts and elsewhere to which I have referred have resulted from this attitude on the part of the companies.

Such conduct on the part of a managing partner or an agent in private enterprise would result in ignorance of the business and prejudice and suspicion in the mind of his partner or of his principal. Naturally, it has created these results in the minds of the public, especially when this ignorance has been played upon and this prejudice and suspicion cultivated by the activities of demagogues and grafters.

Happily the last few years have witnessed a great improvement in these conditions and a clearer realization on the part of managers of public service companies of their essential obligations to the public as a partner in the enterprise. But the education of the public mind, ignorant of the conditions and requirements of a complicated business, and the removal of prejudice and suspicion once created, is a slow and difficult process. The task must be performed by the companies themselves, not only because they are in a large measure responsible for these conditions, but for the reason that it is essential to their successful existence. It can only be achieved by a full and complete recognition of the rights of the public not only to an adequate service at reasonable rates, but to that information and consideration which is due to a partner in a common enterprise or to a principal by an agent.

SELF-EDUCATION IN PUBLIC RELATIONS A NECESSITY

When once the source of the trouble is appreciated the remedies are obvious but their application is sometimes difficult. I submit only a few suggestions to this end among many which will occur to you.

In order to inform the public we must begin by educating ourselves. The entire organization of a public service company, from the board of directors to the least important employee, should realize that they are public servants and that they owe to the public a duty as direct as that which they owe to the company.

This applies with special force to those officers and employees who are constantly in touch with the public. We hear a great deal about the "man higher up," but in public service companies much of the difficulty is with the "man lower down." The public fails to discriminate between the unwise, unjust and inconsiderate action of an agent or employee and the action of the company itself, and the company is held responsible.

The companies have been successful in rendering a good service at low rates, but have been unsuccessful in their public relations. They should, therefore, place strong men at the points of weakness and strive to provide intelligent, efficient and courteous employees at every point of contact with the public.

The technical side of the business has been fully developed, but the public side has been neglected, and here there is urgent need of reform and improvement.

The companies having thus brought themselves to a proper appreciation of the importance of public relations and of their duties and obligations to the public, and having strengthened their organizations where they come in contact with the public, should encourage all efforts to secure and disseminate accurate information, and co-operate with governmental agencies established for that purpose.

RELATIONS WITH AND DUTIES OF REGULATING BODIES

Public service commissions with legislative, executive and judicial powers are not entirely consistent with our theory of government, but they are born of necessity and have come to stay. The companies should realize that it is better for them as well as for the public that some agency of this kind should be established through which accurate and complete information can be obtained as a basis for the regulation and control, and that such regulation and control should be exercised by trained men after judicial inquiry, than that this end should be accomplished by indiscriminate legislation, often passed without correct information or in response to the appeals of demagogues or to meet the exigencies of a political situation. A properly organized and conducted public service commission is an effective instrumentality, not only for the regulation of public service companies, but for the prevention of injudicious and ill-considered public action.

It is the duty of the public to see that proper men are appointed to such commissions, and the duty of the commission to recognize that it is not a prosecuting body, but that it represents and must protect the companies as well as the public. This should be strongly emphasized.

These commissions have made mistakes which have been costly, both to the companies and the public, but this is to be expected in all human institutions. Upon the whole, as in my own state, they have been helpful, and, even where they have been radical or unjust in the exercise of their power of regulation and control, they have been better, both for the public and the companies, than constantly changing legislative bodies seeking to exercise the same powers.

If the companies will give to such commissions sympathetic co-operation and support, furnish them full and accurate information and recognize the rights of the public in the premises, they can greatly facilitate the proper discharge of the duties of such commissions and make them important instrumentalities in the protection of public service companies and in overcoming public ignorance and prejudice.

PERFECTED PUBLICITY

With the management of the companies thus alive to their duties and obligations to the public and their organizations perfected with special reference to the points of public contact; with the companies working in harmony and co-operation with the public service commissions and other agencies for their regulation and control, the task of educating the public to an appreciation of its duties and obligations to the companies and its interest in their success or failure should not be difficult.

The numerous instrumentalities—the press, the court room, the forum, and every other legitimate channel for conveying to the public the information to which it is entitled and which is necessary to a proper appreciation of the problems involved—should be used. These vary with the conditions existing in the different communities. But care must be taken in every instance to give to the public the whole truth on the subject discussed. The half truth is often worse than falsehood and only increases public prejudice and distrust.

There are now evidences of improvement in sentiment with regard to public service companies. This is due to some extent to a clearer understanding on the part of the companies themselves of their duties to the public and of the obligations growing out of their contract relations, but the public has also learned an important lesson through experience. The withdrawal of capital from public service enterprises and the resulting business depression has taught the public that economic laws cannot be violated with impunity and that harsh and unjust regulations of public service companies lead to public disaster. The time has now come to press the campaign for the overthrow of ignorance and prejudice.

My appeal to-night is for a broader statesmanship on the part of the managers of public service companies. Technical knowledge they have displayed, but it has been demonstrated that this is not sufficient. Democracy moves forward, not backward. In its natural development we are destined to see many changes in the prevailing ideas with respect to the rights of property and community interests. It is therefore incumbent upon those charged with the duty of serving the public and with responsibility for the successful administration of public service companies to anticipate these changes, to study public questions, to gather from past experience the light to guide them in the solution of future problems. By this course they may be able to direct public sentiment into safe channels and to effect these changes with the least injury to property interests and to the public, and to battle successfully with the forces of ignorance and prejudice, remembering always that it is as true to-day as it was nineteen hundred years ago that "the truth shall make you free."

MEETING OF EXECUTIVE COMMITTEE OF MANUFACTURERS' ASSOCIATION

The executive committee of the American Electric Railway Manufacturers' Association met on Jan. 29, Cornell S. Hawley, president, being in the chair.

The other members present were: Charles R. Ellicott, Westinghouse Traction Brake Company; S. K. Colby, Allen & Peck, Inc.; Edwin H. Baker, Galena-Signal Oil Company; W. L. Conwell, Transportation Utilities Company; F. A. Elmquist, Sherwin-Williams Company; Henry C. Evans, Lorain Steel Company; Thomas Farmer, Jr., Consolidated Car-Heating Company; B. A. Hegeman, Jr., U. S. Metal & Manufacturing Company; James H. McGraw, McGraw Publishing Company; Charles C. Peirce, General Electric Company; D. W. Smith, the Peter Smith Heater Company, and H. G. Connaughy, Dearborn Chemical Company.

Several standing committees reported. It was announced that Thomas Finigan, chairman of the local committee for the San Francisco convention, had appointed the following members on his committee: W. E. Amman, Galena Signal Oil Company; J. H. Steiger, American Brake Shoe & Foundry Company; C. E. Heize, Westinghouse Electric & Manufacturing Company; H. S. Crocker, Westinghouse Air Brake Company; A. V. Thompson, General Electric Company; H. R. Hoack, Pierson, Roeding & Company.

Messrs. Baker, Conwell and others then spoke of the several plans which had been proposed for increasing company membership in the Manufacturers' Association.

Mr. Colby reported for the efficiency committee, and the executive committee discussed several details of organization procedure which were suggested by Mr. Colby's committee. The chair announced that, in addition to the four vice-presidents, the president and the secretary-treasurer, who under the by-laws make up the convention location committee, he would appoint Charles C. Peirce, General Electric Company, as a member of the location committee for the 1914 convention.

Proceedings of the Midyear Meeting

The Fifth Annual Midyear Conference of the American Electric Railway Association Was Held in New York City on Jan. 30—An Account of the Proceedings Is Published Together with Abstracts of the Papers Which Were Presented Before the Association

The fifth annual midyear conference of the American Electric Railway Association was held at the Engineering Societies Building, New York City, yesterday. The president, Charles N. Black, of San Francisco, called the meeting to order at 10.50 a. m. and asked Mr. Schreiber, member of the committee on company sections and individual membership, to present his paper entitled "An Appeal for the Support of Company Membership." This paper is published in abstract on another page.

At the conclusion of this paper the president read a letter to Mr. Schreiber from Mr. Mortimer of The Milwaukee Electric Railway & Light Company. It said in part:

"Our two years' experience in Milwaukee with the local company section has indicated that it possesses fields of activity which were not contemplated at the time the section was formed. We are confident of the opinion that the local company section movement is capable of doing a great deal of good work throughout the country, and from our standpoint it serves three general functions: (a) educational, (b) development of company spirit, (c) improvement of public relations.

"With an organization such as a local company section, it is possible to add features to the programs other than those falling within the above classification, and it gives fruitful opportunity for the development of good fellowship among all the employees of the companies represented in the association."

Farley Osgood, Public Service Electric Company, Newark, N. J., said that there was one feature which Mr. Schreiber had not brought out in his paper which was interesting, because the Public Service Corporation operates not only a railway system, but also an extensive lighting system. The Public Service Electric Company, the lighting company, had its branch section of the National Electric Light Association, and the company made a point of having the lighting members of the organization join hands with the railway members of the railway organization, in order that the work of the two companies and the engineering features of the two companies might be harmonized. This kind of association work could be well carried on by interchange of membership, particularly on properties operating more than one kind of service.

JOINT USE OF POLES

The president then called for the report of the special joint committee on the joint use of poles. This report was presented by W. J. Harvie, chairman. This report is published in abstract elsewhere in this issue. The report was approved.

REGULATION AND PROFIT SHARING

The president then introduced Halford Erickson, of the Wisconsin Public Service Commission, who was to read a paper on "The Economic Aspects of Regulation Compared with Profit Sharing with Municipalities." In introducing Mr. Erickson the president said that Mr. Erickson was peculiarly fitted to treat this subject as he had been an accountant with the Omaha Railroad before he entered political life. Prior to his appointment as a member of the Railroad Commission in Wisconsin in 1905 he had been a commissioner of labor, an office which involved the compilation of statistics of employment in the various industries. His then associates were Prof. B. H. Meyer, now of the Interstate Commerce Commission, and the Hon. John Barnes, now of the Wisconsin Supreme Court. The high standing of the Wisconsin Commission and the frequency with which it has been quoted, the speaker said, had been largely due to the comprehensive knowledge and views of Commissioner Erickson. Mr. Erickson's paper is published in another part of this issue.

At the conclusion of the address General Harries proposed a standing vote of thanks to Mr. Erickson for his sound and valuable paper. This was given with applause.

ADDRESS OF MR. BRADY

Arthur W. Brady, Anderson, Ind., first expressed his appreciation of the excellent paper presented by Commissioner Erickson. Mr. Brady stated that the debt of gratitude owed to Commissioner Erickson for his work as a member of the Wisconsin commission was a debt not owed solely by the electric railway industry but by all public utility industries of the country and that Mr. Erickson had done more to establish proper relations between the public and the utilities than any other member of any State commission, past or present.

Mr. Brady said that Commissioner Erickson treated his subject as one of "regulation by commission," as contrasted with that of "regulation by franchise contract," but that to himself the matter of profit-sharing was the same whether the system of regulation was that by a regulating body or by franchise contract. According to Mr. Brady, the question of profit-sharing was one that was involved in all questions of franchise creation and regulation, whether or not there were any profits to be shared. On the question of profit-sharing public utilities might be classified in three divisions. The word "profit-sharing" as ordinarily used meant the giving of profits in the form of some lump payment to the public authorities, probably into the general fund to be used for the general purposes of the community. This form was probably seen in this country in its fullest flower in Chicago, where large sums were being paid into the city treasury under the franchise terms there existing. Under another form of profit-sharing, exemplified in Cleveland, what would be a profit was distributed to the patrons of the company by a reduction in the rate of fare. Still another form, the common one, provided that what might be profits, in the sense of something more than the mere cost of the capital, was returned to the public in the form of increased service, extensions of lines, etc. This last form existed whether the regulation was by franchise contract or by a commission.

As to the merits of the three, Mr. Brady felt that there might be differences of opinion. Chicago appeared to be satisfied with its system; Cleveland appeared to be satisfied with its system, and the trend among commissions was toward the third form of profit-sharing. It would not do, however, to say that the patrons of the industry were entitled to all of the profits arising from the industry and properly belonging to the public, for part of these profits, in some cases, might very well go into the general treasury. The reduction in fares was often so slight that to the individual it meant nothing, and yet when millions of fares were considered, some large sums might be created, even with a very low rate of fare, which could properly, at least in part, be paid into the city treasury. The last form of profit-sharing, however, that of increasing service, making it more luxurious, extending lines into the undeveloped portions of the municipality and the outlying districts, was the form of profit-sharing that was entitled to the especial favor not only of the industry but of the public itself. The other forms, the reduction in the rate of fare and the payment into the corporate treasury, as pointed out by Commissioner Erickson, in the long run were likely to be a burden upon, instead of a benefit to the public. They were likely to have the effect of throttling the local industry or restricting its growth, for it was impossible to improve the service or the plant in any way without the cost being replaced in some manner by the earnings of the property. If the payment into the corporate treasury under a profit-sharing system was such as to burden the industry, the public would have to pay the bill.

Upon this question of local regulation as compared with state regulation, it would appear the present system of state regulation was probably here to stay for some time; at least, it would have a long and thorough trial. There could be little doubt that the preponderance of advantages was in favor of the system advocated by Commissioner Erickson. The question whether the present system of regulation should prevail or whether there should be public ownership of public utilities was one that would have to be met fully and frankly within the next few years. The tide in favor of local municipal ownership had sensibly abated, but the campaign in favor of public ownership on a larger scale appeared to be gaining force. The last report of the Postmaster-General recommending the taking over of telegraph and telephone systems of the country, the action of the United States Senate in passing the bill for the building of a railroad in Alaska, the speech of Senator Kenyon of Iowa advocating the taking over of the entire 250,000 miles of the railroads of the United States by the national government, all these were evidences of this tendency toward national ownership. Instead of deprecating the discussion of this question it should be threshed out thoroughly at this time.

So long as the fair value of the property was returned and no repudiation and confiscation on a grand scale was made, stockholders, officers and operating men in the electric railway field had, it is believed, from the standpoint of their individual interests, no objection to public ownership. No class of men in the country, however, was better capable of forming a dispassionate conclusion as to what public ownership of the railroads and other public utilities would mean than those who are actually concerned in these properties, whether as owners, investors, stockholders, bondholders or officers. They saw the inability of the government to operate these properties as they should be operated without destroying the economies that had been effected, increasing the cost of operation enormously and thereby adding to the burden which the people of the country might be subjected to, and also injecting into the political system a hazard far greater than ever before.

As to the question of economy under government operation, the speaker suggested, it was necessary only to go to Washington and see the departments there turning out their thousands upon thousands of employees at the late hour of 4.30 p. m.; employees who had been at work, hard and long, from 9 a. m. with a half-hour for rest, a seven-hour day. He remarked that one had only to think of the actual work that these people were doing at the very center of our government, and then consider whether it was possible for the government to effect economies in the operation of the railroads of the country, as some people were proposing.

If the question of the day was whether there should be public ownership or regulation by commissions, had anyone found anything better than regulation by commissions? There were dangers in regulation by commissions, just as there were dangers in any form of government. Some of these dangers had been pointed out by Commissioner Erickson, but when the people should have a chance to consider the question thoroughly he had no doubt what the final answer would be. He believed the best thing which could happen in this country would be to have the matter threshed out so that the different specters which had frightened those interested in public utilities would vanish and the managers would be able to secure the capital required to develop these industries to the fullest extent.

There was no government in the world which up to this time had attempted to regulate the railroads and the other public utilities in the comprehensive way in which this country was now undertaking to regulate them through state commissions or federal commissions. It was peculiarly an American system, but time would be required to work these things out.

The indeterminate franchise had been referred to, but Mr. Brady said that while he understood the theory of the indeterminate franchise he did not understand its application or how it was regarded by the courts.

It was to be hoped that through the indeterminate franchise a method would be worked out placing these utilities, so far as their franchise features were concerned, in a state of absolute permanence, with fairness to the public, but that was something which evidently was going to take time to accomplish. Up to the present there unquestionably had been a feeling of distrust. That was evidenced in Wisconsin by the fact that only a comparatively small number of the utilities there had taken advantage of the law allowing them to convert their local franchises into indeterminate permits, and the Legislature had therefore converted all the local franchises into indeterminate permits. That was permissible under the constitution of Wisconsin, but probably would not be generally permissible under the constitutions of a large number of the states. Until one knew exactly what the indeterminate franchise was in practice, whether it was something that accomplished what it was expected to accomplish, there would naturally be a certain amount of distrust regarding it. In conclusion, he expressed his appreciation of the paper of Mr. Erickson.

ADDRESS OF MR. ROSECRANTZ

Clarke M. Rosecrantz, counsel The Milwaukee Electric Railway & Light Company, said that as a resident of Wisconsin for many years he took great pride in the Wisconsin commission. He said that he was familiar with the history of the present Wisconsin commission law and the personnel of the commission had always been of the highest. Nevertheless, it was evident, looking at the country as a whole, that some people felt that they were not getting everything they wanted in the way of rate reduction, and there was a somewhat widespread feeling in favor of municipal control as distinguished from state control.

An example of the relative merits of state and municipal control was illustrated by two instances in Wisconsin. Shortly after the commission was formed a petition was filed for the reduction of rates upon steam railroads. The rates were 3 cents a mile in Wisconsin. The commission carefully investigated the question and decided that the lowest rate which should be ordered was 2½ cents a mile. The ink was hardly dry on the report which the commissioners made when a senator, angry because he had difficulty in checking his trunk from some point in Wisconsin to Chicago, on account of the fact that there was a 3-cent rate and a 2-cent rate, introduced a bill within the last six or seven days of the session, without any investigation, and the bill was acted upon by men who had never had anything to do with the operation of a railroad or with the financing of a railroad and of necessity could not inform themselves in the few days left before adjournment, and a statute was enacted reducing the rate to 2 cents a mile. That was a fair sample of the manner in which rates are fixed by legislatures. The roads acquiesced in it, and it may be thought that that was indicative that the commission's ruling was improper. But the public has had to bear the inconvenience necessarily following this drastic legislative action, because the railroads were obliged, in order to comply with the law, to reduce the service which the public had theretofore been receiving. Municipal regulation was often equally arbitrary and unwise.

There had been, of course, very little experience with municipal ownership in this country. The people who advocated it were always talking about the marvelous results of municipal ownership in other countries. There was always a pot of gold at the end of the rainbow. The climate was always fine at the other side of the globe, but when the situation was investigated one of two things would be found present: either the method of operation as pursued by the foreign country was not in accordance with American practices and demands or the roads did not give good service.

Those gentlemen who sought municipal regulation did not represent the great mass of the people, merely those who were influenced by the haranguing of the demagogue, who wished only to get something for nothing. It therefore became incumbent upon this association and similar associations so to conduct their business that they would not give material for such gentlemen as desire to assail the present condition of affairs. The speaker emphasized the statement that it was of the utmost importance to this industry, of the utmost value, that this paper of Commissioner Erickson's presented that morning—because coming from him as a high authority on this subject—should be widely disseminated, as it would be believed by all thinking people and would be a convincing argument against the claims of any one who was insisting that they should return to the old order of things.

The question of exacting tolls by inserting provisions in the franchises in which certain percentages of gross or net returns shall be turned over to the public had a most attractive sound, and it was one which these gentlemen who desire to get into or stay in public office were very eager to seize upon, as Commissioner Erickson said, that they might go down into history as shrewd bargainers with public service corporations in the public behalf.

Much had been said about a model form of franchise, and much had been written about it. The articles on them seemed to have been written by gentlemen who spent their time in the cloister rather than out in the world engaged in the conduct and operation of railway utilities. They provided all sorts of fanciful things. They went into detail as to what should be in the franchise so that the municipality could control the company, and those model franchises were most dangerous in that while they contained provisions to safeguard the utility, such provisions would not be included in the proposed model franchise, while all the conditions for harassing of the utility would be there. As an illustration, in a recent publication where a long discussion of a model franchise appeared, the author in all seriousness said there should be a provision in the franchise which should prohibit the utility from settling any claim against it out of court. Such a clause, of course, would be absolutely contrary to public policy. Everything should be in favor of settlements out of court.

A model franchise, it seemed to the speaker, should not be very long. There was no occasion for it. When a street railway engaged in business, it assumed a public duty and the Railroad Commission had full authority over it, no matter in what terms the franchase might be couched. But a street railway franchise should properly contain a provision that in the event the municipality should desire to purchase, it might do so. It should not be entitled to purchase overnight; a certain period of notice, say five years, should be required. Furthermore, so that the public might not suffer, it might not be improper to put in a provision that the road might be turned over to another operating company in the event that the utility would not or could not perform its public service properly. Otherwise, the speaker said, the franchise should be without date of expiration, indeterminate, because, whether the franchise was for ten, twenty, thirty, forty, seventy or 100 years, some portion of the gross returns must be set aside in order to take care of the possible loss in value at the time the franchise expired. And whenever such a sinking fund should be set up the public would not be getting what it should get, and what it wants—that is, adequate service at the lowest possible rates.

The morning session then adjourned.

AFTERNOON SESSION

President Black called the afternoon meeting to order at 2.50. In the absence of F. W. Hild, general manager Portland Railway, Light & Power Company, his paper, entitled "The Effect of Rate of Fare on Riding Habit," was read by Professor Richey. It is published on another page.

RATE OF FARE AND RIDING HABIT

The first one called upon to discuss Mr. Hild's paper was Luther R. Nash, of Stone & Webster, whose remarks in the main are published elsewhere in this issue. During his discussion, however, Mr. Nash said that since his remarks had been prepared an increase had been reported in the fares for the Cleveland service to take effect very soon. Mr. Nash said that he understood that this increase was to cover a charge for scrapping and abandoning certain equipment so that the new 4-cent fare would provide for past depreciation as well as for current operation. In the understanding of the speaker, however, there would be no provision in this increased rate for current depreciation on the facilities in Cleveland, which, as Mr. Hild had shown, were far below the average in comparison with cities where the full 5-cent fare obtained.

The next speaker on the program to discuss Mr. Hild's paper, S. G. McMeen, president Columbus Railway & Light Company, was absent, and the discussion was continued by R. B. Stearns, vice-president and general manager Milwaukee Railway & Light Company, whose remarks are published elsewhere in this issue.

F. R. Coates, president Toledo Railways, next presented a few facts concerning conditions in Toledo.

According to Mr. Coates, each of the four political parties in Toledo has as one of its principal planks the 3-cent fare. An ordinance was enacted in March, 1911, compelling the company to operate the straight 3-cent fare. In January, 1912, a temporary fare arrangement was begun and at that time another drastic ordinance was put through the council. A compromise was made by giving 5-cent cash fares, six tickets for a quarter, and four hours a day, from 5.30 to 7.30 in the morning and 4.30 to 6.30 at night, 3-cent fares with transfers. There was also a 1-cent fare for children under one year of age.

At the time the temporary rate was instituted, in January, 1912, an agreement was made with the city officials that accountants in whom they had every confidence should be appointed, to be paid by the company. These accountants were to go over the company's books for a period of one year, and at the end of that time the city was to reopen the franchise negotiations and base the rate of fare on what the report of the accountants would show. The city, stated the speaker, was then under an independent administration. An accountant was selected who had been one of the auditors for Tom Johnson. For the year 1912, according to their report, the company averaged 3.13 cents per passenger; 44,000,000 paid passengers and 55,000,000 total passengers were carried. The expenses for taxes, maintenance and operation were 2.82 cents; 0.18 cent for taxes, 0.82 cent for maintenance and 1.82 cents for operation. If the 3-cent fare had been applied and the same proportions used as in Cleveland to-day, there would have been a return of 2.39 cents per passenger, or a loss of 0.43 cent tor each passenger.

Asking his hearers to bear in mind that the temporary arrangement went into effect on Jan. 1, 1912, Mr. Coates then presented additional figures from Toledo reports. The population of Toledo is 200,000, and there are 116 miles of track, with 300 cars operated in rush hours.

COMPARATIVE EARNINGS IN CENTS AND CAR MILES OF TOLEDO SYSTEM

	1910	1911	1912	1913
Earnings per pay passenger	4.76	4.76	4.00	3.93
Earnings per passenger	3.74	3.75	3.15	3.05
Car miles	7,257,114	7,488,026	7,582,233	7,701,584

PERCENTAGE OF FARES COLLECTED ON TOLEDO SYSTEM

Year	Transfers	5-Cent Fares	3-Cent Fares	1-Cent Fares	11 Tickets for 50 Cents	6 Tickets for 25 Cents	5 Tickets for 15 Cents
1910..	25.65	65.09	0.52	0.38	23.11	9.15	1.75
1911..	25.25	65.35	0.52	0.39	22.94	9.09	1.71
1912..	25.70	26.95	3.46	2.02	0.52	42.19	24.86
1913..	28.05	21.67	2.95	2.09	....	46.60	26.69

The paid passengers for the year 1910 were 35,204,090; the total passengers carried, 44,845,108. For the year 1911, paid passengers were 37,199,889; the total passengers carried, 47,234,917. For the year 1912, the paid passengers were 43,464,546; the total passengers carried, 55,235,734. For the year 1913, the paid passengers were 47,877,673; the total passengers carried, 61,686,164. The fact seems to be, stated Mr. Coates, that where a company puts in lower-fare tickets the 5-cent cash fare breaks down, for these cause a material reduction of the 5-cent cash fares. Based on what Detroit is doing with seven tickets for a quarter, the company would receive only 2.95 cents per passenger. On the Cleveland basis, where they charge a cent for the transfer and do not redeem it, the company would receive 3.1 cents per passenger. According to the speaker, the action of President Black in appointing the committee on publicity was one of the best things that the association could have done to combat the continual talk about low rates of fare.

LABOR LEGISLATION

Following these remarks Mr. Tingley, second vice-president of the American Railways Company, then presented his paper on "Present-Day Influence of Labor on Legislation." It is published in abstract on another page. There was no discussion.

The president then suggested that a vote of thanks should be extended to the committee on subjects and to its able chairman, James D. Mortimer, who had furnished such an excellent program for the convention. He also suggested a vote of thanks to those who had presented papers. After these had been voted the meeting adjourned.

HEARING ON INTERSTATE BILLS

Members of the committee on federal relations of the American Electric Railway Association spoke at a hearing before a sub-committee of the House of Representatives committee on interstate and foreign commerce at Washington on Jan. 23. The meeting was called to consider bills providing for steel cars and other bills which would affect electric carriers engaged in interstate commerce.

Statements in regard to the bills were made by Arthur W. Brady, chairman of the committee and president Union Traction Company of Indiana; Charles L. Henry, president Indianapolis & Cincinnati Traction Company; Bernard B. Weadock, Detroit United Railway; A. E. Potter, Rhode Island Company, and L. E. Fischer, Illinois Traction Company. Several others attended the hearing but did not make statements. These included Robert I. Todd, president Terre Haute, Indianapolis & Eastern Traction Company; J. M. Barrett, president Fort Wayne & Northern Indiana Traction Company, and Albion E. Lang.

NOVEL CAUSE OF POWER INTERRUPTION

A heron recently caused the electric lighting and railway service of the British Columbia Electric Railways Company, Ltd., Vancouver, B. C., to go out of commission. The heron was flying over the peninsula between the Fraser River and False Creek one night and came in contact with the three high-tension wires of the company along the line of the Lulu Island railway. A short-circuit resulted, about 1 ft. of each of the three wires at the point being burned away. The resulting surge put the substation supplying energy for Vancouver out of business. The cause of the short-circuit was not known until the following morning when the lineman discovered the dead heron lying at the side of the track. The company made good use of the dead bird from a publicity point of view. It was roughly mounted and displayed in the window of a newspaper office on the principal street of the city with a placard hanging from its bill on which was printed, "Why the Lights Went Out Last Night." This exhibit was seen by thousands during the afternoon and evening, the burned leg and body of the bird telling at a glance the cause of the interruption of the company's street-car system, and thereby showing without further explanation the difficulties of the company in maintaining uninterrupted service over a large territory. Pictures of the bird were also printed in the daily newspapers of Vancouver, accompanied by explanations of the accident.

The *Bulletin Commercial*, Brussels, states that it is proposed to construct electric tramways in several important towns in Turkey. The places where matters are at present most advanced are Adana-Aleppo and Jaffa-Jerusalem.

Papers at the Midyear Conference

Abstracts Are Given of the Shorter Papers Presented at the Midyear Conference of the American Electric Railway Association—The Report of the Committee on Joint Use of Poles Is Included

At the midyear conference of the American Electric Railway Association held in New York on Friday, Jan. 30, a number of papers were read and the report of the committee on joint use of poles was presented. These are given below in abstract form.

REPORT OF JOINT COMMITTEE ON JOINT USE OF POLES

BY W. J. HARVIE, CHAIRMAN

At the October convention the report of your committee on joint use of poles was followed by a resolution suggesting "that the report be referred back to the committee with instructions that it ascertain the sentiment of the association members with respect to the agreement and specifications and report at the midyear conference."

Following those instructions, a circular letter inclosing a copy of the report was sent to each of the member companies with the request that the report should have the attention of all departments concerned in order that criticism and suggestions might be offered which would assist the committee in further investigation of the entire subject. It was especially asked that each member offer any criticism or suggestions which occurred to it along the line of public policy and legal phases of the contract and engineering details of the specifications.

The nature of most of the replies received should be gratifying to the association, as well as the committee, in showing a general desire to assist in the production of a suitable agreement of this kind and a general appreciation of the fact that a suitable agreement will be useful and advisable.

In answer to our inquiries, replies were received from 109 member companies, of which seventy-seven either expressed approval or made no specific suggestions at all. The remaining thirty-two member companies replying offered 148 suggestions, some of which were very timely and some of which were entirely influenced by the local situations obtaining in their territory. Many of these replies did not come in until after follow-up letters had been written, so that it has not been possible for the committee thoroughly to discuss and analyze the criticisms at this time.

A general analysis of the 148 criticisms made shows that seventy-six relate to the agreement and seventy-two to the specifications. A further analysis shows that certain particular sections were the subject of a large portion of these criticisms, while a few were scattering.

Of the seventy-six criticisms on the agreement portion:

Section 5 (relating to the method of division of expense in making changes) was criticised by....14 members
Section 6 (removal of attachments) was criticised by................. 4 members
Section 7 (maintenance of rented poles) was criticised by............ 5 members
Section 9 (attachment rentals) was criticised by ....17 members
Section 11 (accounting for attachments) was criticised by............ 4 members
Section 19 (liability) was criticised by...16 members

The remaining sixteen criticisms were scattering.

Of the seventy-two criticisms on specifications:

Sections 2 and 3 (relative to voltage limitations) were criticised by......12 members
Section 6 (size of line wires) was criticised by .... 7 members
Section 12 (ground wires) was criticised by .... 5 members
Section 13 (terminal box locations) was criticised by .... 2 members
Section 16 (guying) was criticised by....13 members

(Seven of the last thirteen referred to insulators used in guying.)

The remaining thirty-two criticisms were scattering.

In addition to the above, six companies sent in copies of existing agreements for joint use, and one a pamphlet containing the state law now in force in one of the Western States. The Pennsylvania Street Railway Association sent in a general protest against the form of agreement but without specific criticisms. Some of the criticisms were very clear and ample; others left the committee very much in doubt as to the intent of the criticism which it was desired to present. Several of the companies replying did not seem to have clearly in mind that the proposed agreement and specifications were at best intended to be a suggested form, and not one seemed to realize that the entire use of the specifications would not be obligatory upon their company.

Your committee could not hope, since the date of receiving the later criticisms, to give all of the suggestions received the attention required in time to analyze them thoroughly and revise, if necessary, the report presented at the last convention. Your chairman, therefore, was instructed to present this general analysis of the suggestions received. Your committee will be in session about Feb. 18, at which time it will carefully analyze the suggestions made and get out for circulation such revisions as in its judgment are advisable, these to be in the hands of the member companies and others interested not later than May 1. Two months will then be available in which to place before the committee expressions of approval or disapproval of the agreement and specifications as then submitted.

During July the committee will meet for its final action and will have its final judgment in your hands in ample time for distribution before convention.

It is necessary that three phases of the situation be kept firmly in mind by the members of this association:

First—That the committee cannot do full justice to this subject without having criticisms from the prospective users in writing before it, together with their suggestions on the point under criticism.

Second—That the proposed agreement and specifications are merely suggested forms, and the use of these is not binding upon the members of the association.

Third—That any agreement and specifications such as the one proposed are essentially a compromise and must be treated as such. Any section may be rewritten to meet the requirements of any company or community without destroying the value of the agreement.

These points are brought to your attention at this time for the reason that a number of the letters received either indicate or show distinctly that the above points are not clearly understood by those replying to our circular letter.

Details will always be subject to individual interpretation or revision for any specific existing condition.

A PLEA FOR COMPANY SECTIONS

BY MARTIN SCHREIBER, MEMBER COMMITTEE ON COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

It may properly be said that one of the greatest considerations with which the American Electric Railway Association has to deal is the importance of increasing its membership. This is a subject that many of us have treated too lightly in the past. Indeed, some assume that our campaigns for increasing membership are simply to enlarge the financial resources of the association, when the fact is that to-day we are giving the individual material value substantially equal to the amount which the member actually subscribes. We should realize that the more members we have, the more representative our association is of the railway industry and the greater effect we may hope for in molding public opinion and policy. Our very existence, success and progress depend on individual members—they are the "heart blood" of our association.

When you stop to think that there are 406 company members in the association (these companies employing some 400,000 men) and that our individual membership is only 3428, we certainly must recognize a weakness. A conservative estimate would be 10,000, and we have a logical right to plan forward to a reasonable representation of the industry.

Now, assuring ourselves that an increase in individual membership is necessary, let us see if it justifies the individual or the electric railway that employs him. The fact is that the interests of the company and the employee are so closely interlocked it is difficult to separate the advantages accruing to each. But below are some of the rewards that should be claimed.

One is the receipt of the yearly *Proceedings* of the association, which contains the established rules and policies, with important data carefully thought out and formulated for the use of the men engaged in the actual operation of electric railways. Last year the *Proceedings* covered 2375 pages and represented the efforts of 394 committeemen, specially trained in the subjects with which they dealt.

Another is the official monthly publication of *Aera*, which contains the live and important topics in connection with the electric railway industry, from the broad general questions of policy to the smallest details of operation that are to be found in the Question Box. *Aera* also fills the gap between our annual conventions.

Then there are the Engineering Manual, System of Accounts and other rules. The Engineering Manual in itself is a treatise which required a tremendous amount of work, in that the entire proceedings of the Engineering Association since its origin had to be gone over, item by item. The essence of all these deliberations will be a large practical assistance to the designer and operator of an electric railway. The Engineering Manual already contains twenty-two standards, eleven recommended practices and thirty-three other recommendations, and will continue to grow more valuable from year to year.

The advantage of special data pertaining to the electric railway industry that is filed at the central office is significant to those making reports, investigations or comparisons. And even if information desired is not readily available from the secretary, in most cases he will be only too glad to obtain what you want from the most reliable source. In this connection it might be well to bring to your attention the new Rate Research Bureau recently organized.

Identification with the association through committee work, discussion of reports or at conventions, gives the individual poise and confidence in expressing his views. The importance of this fact is not generally appreciated. It matters not how much one knows in any profession or business, it is equally important to market his goods, even if a mediocre success is anticipated.

Again, you have the opportunity to attend the annual conventions, where the most influential and able railway men in the country assemble to exchange their views of the industry, also the opportunity to examine the latest appliances that are in the market for operation of electric railways.

Several years ago it devolved on the writer to show how the company with which he is identified got its money back for the men in his department who attended the annual convention. The particular convention to which I refer was at Atlantic City in 1911. After receiving the approval of the general manager, the following plan was inaugurated: Each representative was instructed to make a special report on the convention, noting anything that in his judgment was worthy of investigation, looking to the adoption of the method or device on our property. So, after returning home, each man received a method or device to investigate that had been suggested by the conventional letters, and he was instructed, after making a careful study of the case (in some instances trial apparatus was purchased), to make final recommendations of just how the device was to be applied on the Public Service Railway property to effect actual economy. Some eight devices and seven methods were thoroughly investigated. Six of the devices were reported upon unfavorably, and two were adopted. I am glad to say that these two devices saved the company, in a single year, the expenses of the departments attending the convention. This same plan of making the convention "pay" is still in vogue, and there is no reason why all companies shouldn't obtain similar results.

I merely mention these facts to convince some that demand their "pound of flesh" before they take any action and do not consider the indirect advantages that sometimes are claimed by association advocates.

The good of individual membership to the company employing the members is that from the members who are eligible to join the American Electric Railway Association or its allies the public, to a large extent, forms its opinion of the industry and what it is actually doing to give proper service. The better the company's employees are trained and educated along the lines of the industry they represent, the more able the men are to think, to talk for themselves, to defend the railway's position and to assist the general manager in satisfying the public and operating the railway.

The advantage of a railway company promoting individual membership through the company section movement, in my opinion, is even more marked. The discussion may be had of the local problems which are a matter of vital importance and concern to the company. It is not possible to bring one of these operating problems that are met with day by day to the attention of a body of men who are directly interested without gaining some knowledge or new thought that may be capitalized by the railway company.

I think we are able to prove clearly the advantage of individual membership through the company section on the Public Service Railway. The organization has been in existence since May 10, 1912, and at its first meeting had an attendance of 140 members. It now has an enrolment of 350. I should be glad to have any one present examine the bound proceedings of the Public Service Company Section that I have here. It includes a report of the meeting of October, 1913, containing 396 pages of reading matter upon practically all branches of the electric railway industry with which we have to deal. The plan of the monthly meetings was to have one principal paper, with discussions, that brought out the viewpoints of all departments as well as the department directly interested.

Our record shows that eighty-two members have appeared before the section, from our president down to the man in the ranks. Then we have had occasional guests to talk to our members on appropriate subjects. The business co-operation and good-fellowship that has been created in these meetings is almost beyond description. Everyone seems to do all in his power to support the meetings, and I am sure that this underlying spirit would not exist unless beneficial results were so clearly apparent. We even look forward to our program a year ahead. The following is the list of subjects for 1914:

January—"Maintaining the Way."
February—"Keeping the Company's Department Store."
March—"Inspection of Rolling Stock."
April—"Developing the Timetable."
May—"Training the Train Men."
June—"Panama Canal."
September—"Reducing Accidents."
October—"Newark Terminal."

One of the principal developments that have been shown as a result of the Public Service Company Section meetings was the exceptionally large amount of knowledge which seemed to come to the surface that otherwise we would have no way of knowing existed among us. This fact impressed me so much, shortly after the section started, that I personally offered to give a medal to the man producing the best paper of the year. The prize was awarded to A. F. Thompson and D. H. Rozzel, division engineers, for a joint paper on "Car Derailment and Its Prevention." It was a signal honor to the company, as well as to these two young gentlemen, that when consideration was given for the awarding of the gold medal by the American Association, their paper was a close second to the prize winner, who was a high official in a large railway company, with a long experience in the industry.

It was only during this past week that our general manager had occasion to assign the task of an important report to one of our engineers. When this report was submitted the "earmarks" of education in the Public Service Company Section were readily apparent by the excellent and intelligent manner in which it had been prepared.

It appears that if there were more company sections in the industry many railway officials would not have to look so much outside their own property to obtain good material to run the railway. Everyone knows it is good business to build up an organization from your own ranks, as it prompts a fine *esprit de corps*, the value of which is difficult to estimate.

I regret that there is not sufficient time to talk further on the results of the public service company section with which I have had actual experience, but I assure you that our entire committee feels that the benefits, direct and indirect, derived by the individual and railway companies and proved by the company sections now in existence, cannot be challenged. Any company that can get together forty or fifty association members would not go amiss by inaugurating company sections, and the present number of three company sections might be well increased to fifty.

In summing up, it should be admitted that there are few properties that would not present a continuous field for improvement. The employee of a railway may be greatly assisted in the work of increased efficiency by keeping in touch with the American Electric Railway Association. Indeed, it seems hardly possible for anyone to know the best practice of the day without identifying himself with it; otherwise one would be compelled to travel around the country and spend considerable time and money for experimental research.

PRESENT-DAY INFLUENCE OF LABOR ON LEGISLATION

BY C. L. S. TINGLEY, VICE-PRESIDENT AMERICAN RAILWAYS COMPANY

What is the influence of labor on legislation? Who can say? How is its influence exerted? By the lobby? Perhaps. At home in the constituency? Surely! We have the word of no less a person than the President of the United States that the lobby exists, and those of us who have kept in touch with legislative affairs are assured of it of our own knowledge. And why not? The first amendment to the Constitution of the United States provides:

"Congress shall make no law . . . abridging the freedom of speech or of the press or of the right of the people to assemble and to petition the government for redress of grievances."

The lobby, properly conducted, is the exercise of the right of petition guaranteed by that amendment. Furthermore, those of us, again, who have been in touch with legislative affairs, and who have been at times denominated "lobbyists," know that the labor organizations do maintain, both at Washington and in the state capitals, an efficient and energetic lobby.

Personally, I look upon the lobby as the "dress parade," so to speak, of legislative influence. It makes considerable noise and makes considerable show, but of its direct influence upon legislation I have serious doubts, for I have seen legislation backed by a well-organized, energetic and vociferous lobby effectually and efficiently beaten by well-organized work in the constituency. The work in the constituency is the work of the army in the field and is the work that wins battles. Therefore we are not able to judge of the influence of labor upon legislation by the dress parade or activities of the lobbies at the various seats of legislation.

We are told in Holy Writ that "By their fruits ye shall know them." We are, therefore, compelled to seek for the influence of labor upon legislation in the legislation which is ultimately written upon the statute books.

We have become very familiar of late years with the cry of "conservation." It has a very taking sound and its gospel was preached by one of the most effective and energetic campaigners this nation has ever seen. That catchword has been taken up by the labor organizations and they preach the gospel of the conservation of men. John Mitchell, one of the most conservative and best known of the labor leaders, has toured the country preaching this gospel. As the result, at least in part, of this crusade there has been enacted the federal law "To provide an exclusive remedy and compensation for accidental injuries resulting in disability or death to employees of common carriers by railroads engaged in interstate or foreign commerce, or in the District of Columbia." Following in the wake of this legislation have come the workmen's compensation acts of Arkansas, California, Illinois, Kansas, Massachusetts, Maryland, Michigan, New Hampshire, New Jersey, New York, Nevada, Ohio, Rhode Island, Wisconsin, Washington and West Virginia. A number of other states have attempted to pass legislation along the same lines, but for one reason or another the bills have failed of passage.

A notable instance was in the State of Pennsylvania, where, as the result of the introduction of a number of bills into the Legislature in 1911, the Governor appointed a commission, composed of lawyers, manufacturers and labor leaders, with a professor of the University of Pennsylvania as the secretary. This commission, known as the Industrial Accidents Commission, presented an elaborate report and recommended the enactment of six acts and a joint resolution to amend the constitution, which amendment would be necessary before the full scheme of compensation could become effective. The joint resolution passed the Legislature, but the compensation bill failed of passage, largely, I believe, by reason of amendments which were made to it in committee which would have made the compensation in some cases very excessive.

DIFFERENCES IN LAWS

The scope of these laws varies very much. In most cases they are made practically compulsory by depriving the employer of his common-law defenses of "contributory negligence," "fellow-servant" and "assumed risks of the business." They vary in scope from compensation paid directly by the employer to the employee or his heirs to state insurance. As the earliest of these acts were passed in 1911 and as many of those have since been amended, it is too early to pass judgment upon which is the better method.

They also vary from all employees absolutely to those employed in dangerous occupations or especially dangerous occupations; or, as in New York, to all except employees of railroads; or, as in two states where they have attempted to exempt domestic servants and farm labor, by applying it to all industries employing five or more workmen.

In 1911 Illinois passed its first workmen's compensation act, which, while practically compulsory upon the employer, left the employee free, and it is worthy of note that as soon as the company with which I am connected posted its notice of acceptance of the act all its union employees promptly filed with the commissioner of labor their rejection thereof. In 1913 this law was amended so that it is practically compulsory on both parties.

There is an organization which can hardly be classified as a labor organization, namely, the American Association for Labor Legislation, officered largely by college professors and social workers. It carries a list of distinguished names among its officers and executive committee, including that of the President of the United States, who is a vice-president. This organization has prepared the draft of a model bill entitled "An act to promote the public health by providing for one day of rest in seven for employees in certain employments."

This brings us to the consideration of another phase of labor legislation, namely, that of limiting the hours of work—a very commendable purpose and one which undoubtedly appeals to the humanitarian instincts of every right-thinking man. It has, however, its limitations; and if the statement be true that at the last meeting of the American Federation of Labor a serious effort was made to commit that organization to a six-hour day, one can readily see that our friends of the labor unions are seeking to establish a real "leisure class."

HOURS OF LABOR

We have been for many years familiar with the factory laws limiting the hours of labor in factories, and more particularly the hours of labor of women. The federal government has enacted a law restricting the hours of continuous labor on interstate carriers by rail and fixing the maximum of sixteen hours, to be followed by ten hours off duty. The State of Ohio last year enacted a law which required that all employees of electric railways shall have eight consecutive hours off duty. The State of Illinois attempted to pass a law at the last session of the Legislature fixing a nine-hour day to be completed within twelve consecutive hours. This law would have applied to interurban electric railways. It, however, failed of final passage.

Massachusetts passed a law requiring one day's rest in seven in factories and mercantile establishments, which exempts, however, employees who care for machinery, who are engaged in the preparation, printing, publishing, sale or delivery of newspapers, or those engaged in any labor called for by an emergency which could not reasonably have been anticipated, employees of hotels, restaurants, drug stores, livery stables or garages and employments for manufacturing or distributing gas, electricity, milk or water. The law regulating the hours of work of street car employees is amended to include guards, drivers, gatemen and brakemen, as well as motormen, conductors and trainmen employed on street or elevated railroads and to limit the hours to nine a day, to be performed within an eleven-hour day, but an employee may work overtime for extra pay.

In New York employees in factories and mercantile establishments must have at least twenty-four consecutive hours of rest in every seven consecutive days. The law does not apply to janitors, watchmen or superintendents or firemen in charge, or to employees whose duties include not more than three hours' work on Sunday in setting sponges in bakeries, caring for live animals, attending to fires and making repairs to boilers or machinery. The regulation of hours on steam and elevated railroads has been extended to include electric and subway roads. Hours of labor for employees on roads 30 miles or more in length are limited to sixteen consecutive hours and must be followed by ten consecutive hours off duty. An employee who has been on duty aggregating sixteen hours in any twenty-four must be allowed eight consecutive hours' rest before beginning work again, except when an accident or unexpected delay of a train prevents his reaching his terminal.

Ohio and Texas have been added to the twenty-four states and the federal government which have enacted laws limiting hours of labor on public work to eight a day. A number of the states have also enacted the so-called "full-crew" law. This does not affect very many of the electric carriers, but it has added a burden of many hundreds of thousands of dollars to the steam carriers.

A review of labor legislation of 1913, issued by the American Association for Labor Legislation, states:

"An important feature in the railroad legislation of this year is the requirement of full crews in nine states, making a total of nineteen states with such laws.

"Other legislation relates to the qualification of trainmen, headlights on engines, covered sheds for employees on repair tracks, construction of caboose cars, keeping tracks free from obstructions, and requiring street cars to be provided with wind shields, heated vestibules, air brakes and seats for the carmen.

"In Wisconsin mail, express, baggage or passenger cars made principally of wood may not be used between the engine and two or more cars made of steel or similar material.

"In those states where railroad or public service commissions exist there is a marked tendency toward giving the commissions power to require all practical safety devices and to inspect for compliance with their rulings.

"In Indiana the law requiring the Railroad Commission to call an annual convention of railroad officers and employees to consider accident prevention is amended to allow the convention to be called once a year or at such times as the commission may decide.

"In Massachusetts the street railway companies must equip their cars with 'other safety devices' as the Board of Railway Commissioners may require.

"In New Jersey electric passenger trains with three coaches and baggage car must carry four persons, a motorman, a conductor, a flagman and a baggageman; with four or more coaches and a baggage car, the same with a brakeman or guard added."

LABOR UNIONS AND SHERMAN LAW

A notable fight has been made by the American Federation of Labor to nullify the effect of the decision of the Supreme Court of the United States in the Danbury hatters' case by amending the so-called Sherman anti-trust act to exclude from its operations labor and agricultural associations. This fight has been so far successful that Congress included a provision in its appropriation bill for the Department of Justice providing that no part of the appropriation to the Attorney-General should be used to prosecute labor organizations. This, of course, is legislation by indirection, but shows that the federation has been making some headway, and doubtless it will not rest content with this but will push for a direct amendment of the act itself.

A number of years ago there was created in the State of Pennsylvania a small but efficient body of state constabulary, composed of about 250 officers and men, divided into four troops, stationed two in the eastern portion of the State in the anthracite coal region and two in the western portion of the State in the bituminous coal region, portions of the State which have been notorious for their turbulence and lawlessness, particularly in times of labor disputes. These men have been most carefully selected and are, I do not hesitate to say, the most fearless and efficient body of men in this country to-day. They have been notably successful in preserving the peace and have been used solely for that purpose.

At every session of the Pennsylvania Legislature since this body has been created there has been an insistent demand from the labor organizations that it be abolished, and in every session there has been a bill introduced to abolish it, so far unsuccessfully, but at the session held in 1913 the appropriation for its maintenance was reduced. This compels the concentration of the constabulary into the four barracks and greatly hinders the men in the performance of their duties.

It is the avowed purpose and, I believe, a cardinal point in the creed of the labor union, and more particularly of the Amalgamated Association of Street & Electric Railway Employees, to create work for more men by the shortening of the working day. About ten years ago—if my memory serves me right—Mr. Mahon, the president of that association, announced as the ideal of that organization a ten-hour day for a two-dollar wage. We—most of us—know that that ideal has since been changed to a nine-hour day and a three-dollar wage; and, I presume, in the not-distant future, if wages continue to advance, the ideal will again be shifted, to an eight-hour day and a four-dollar wage.

I would be the last man to grind the face of labor or to work it unreasonably long hours. I don't believe that it injures any healthy man to work outdoors for nine hours a day or even ten. I believe that every man should have all the compensation that the traffic will bear, but with a ten-mile ride for a nickel you can't keep on boosting wages; and, as the present tendency of labor is to push legislation to attain the ends of higher wages and shorter hours and as that influence is exerted more powerfully in the constituency, it is 'up to' the employer to educate that constituency and to exert his influence at the same spot.

Before closing I wish to call John Mitchell as a witness. In his recent book "The Wage Earner" he says:

"A desired rate of wages is enforced by statute on public works. In railroad and mining work, maximum legal hours are, in instances, prescribed. Militant labor in these cases adds to its own bargaining abilities the powers of the law.

"All union wages are the results, not of laws, but of the cohesive power of union members exerted in the labor market.

"A step further was taken when commissioned organizers became a regular factor of the unions and assisted the international officers, together forming a corps equipped for their duties as men for a profession, familiar with the labor laws, experienced as negotiators with employers, acquainted with the markets for the output of industries and accustomed to watch legislators.

"They [the unions] enter a field not touched by philanthropy when they shrink the workday and expand the wage bill they present to the employer."

Trade unionists every day overcome Mr. Kirby's "natural law of supply and demand" by a method equally natural—they refuse to sell their labor in competition.

One of the most notable achievements, if not the most notable, of labor in recent years was the creation of the Department of Labor with a labor leader seated as a member of the President's Cabinet.

DISCUSSION ON MR. HILD'S PAPER

BY L. R. NASH, STONE & WEBSTER

The paper which Mr. Hild has prepared for this conference contains arguments and statistics which are not only convincing but also particularly opportune. The quotation which he gives from a commission decision, in which an increase in riding habit is predicted from a proposed reduction in street car fare, is illustrative of the opinion of many regulative bodies, municipal officials and others who are interested in public service matters. Lower fares enter into a large proportion of the important franchise renewal negotiations; they are the ground for many commission investigations, and, as the author has pointed out, they are the perennial stepping stones of ambitious politicians. The financial condition and problems of the street railway industry are of such serious moment that strong, concerted, intelligent action is necessary to combat these and other economically unsound tendencies.

We are in a period of rate reductions in public service, although other commodities have with few exceptions steadily increased in price. The most noticeable reductions have been in electric lighting and power and gas services. To the credit of the industry be it said that a very large proportion of these reductions have been the voluntary result of broad-minded business judgment rather than a yielding to commission mandate. Many of these reductions have been widely advertised and contrasted with other cost tendencies. It may be stated in a general way that from the time the electric lighting industry was first definitely established to the present time there has been a reduction in its maximum lighting rates of approximately 50 per cent. One hears comparatively little about similar reductions in street car fares. The popular impression prevails that they have remained generally stationary at the original nickel. That such an impression is grossly misleading and unfair is clearly shown by the statistics which the author presents from the excellent system of which he has charge. Rightly assuming that the fair basis of comparing rates is the passenger mile, he shows that there has been a reduction in charge for the maximum ride from 3.1 cents in the early horse car days to 0.24 cent at the present time.

This reduction of over 90 per cent in the unit charge has been accompanied by an almost immeasurable improvement in comfort and speed of travel. It is not contended that any considerable number of passengers take the maximum possible ride, thereby securing the minimum fare per mile, nor that such passengers can be carried without serious loss. It is, however, believed that no other industry can show a proportionately greater increase in the service which it renders for its hire, or a greater reduction in its unit charge. In spite of or in ignorance of this fact the agitator continues his activity for still lower fares and will probably so continue until a general campaign of education has eliminated the ignorance on which his ambition feeds. No politician would dare to launch for personal prestige a low-fare campaign if he suspected his constituents might know it was founded on an economic fallacy.

STIMULUS FROM REDUCTION

In considering possible reasons for stimulus to riding the author has laid down a general principle of importance, namely, that stimulus from reduction in price is proportional to the degree of reduction, with the limitation that in the case of single low-priced units the percentage reduction must be large to produce any noticeable stimulus. This principle, with emphasis upon its limitation, is particularly applicable to street railway service where the price unit is low, and it is believed to offer the fundamental and unanswerable argument against lower fares.

While proponents of the 3-cent fare undoubtedly still exist in spite of its obvious failure, the usual plea is for six tickets for 25 cents, a saving of less than 1 cent per ride. While such a repeated saving is of moment to some people, the existence in our large Eastern cities of 1-cent, 2-cent and 3-cent newspapers, all in prosperous condition, and the general charge of 5 cents in Western cities for such papers, is an argument against the controlling importance of such small variations. It appears from Charts I and II in the paper that in this country, where street car riding is the most highly developed in the world, there are only two cities where the rides per capita average as high as one per day. The average for the large cities shown is less than 300 rides per year. At this rate the average saving per capita from six rides for 25 cents instead of a straight 5-cent fare is slightly more than 20 cents per month. Granted that an average includes many who do not ride, it is still true that a regular rider to and from his daily work would save less than 50 cents per month.

A study of Charts III and IV shows clearly that reduced fares mean relatively poorer service, evidenced by less frequent and more crowded cars, less track with consequent longer walk to the home or work and, by inference, correspondingly poor track and unsatisfactory equipment. It is submitted that the average street car patron spends more than 50 cents per month for comforts and indulgences of less consequence to him than adequate transportation facilities. It is also urged that transportation should be adjusted to the needs of the average patron, neither curtailed for the part of the minority which would be satisfied with cheaper service nor expanded for another part which could afford to pay for better.

A public official who urges a measure in the interests of a few of his constituents and thereby sacrifices the interests of a majority is unworthy of his trust. Our officials are in large majority working for what they believe to be the public interest. They establish parks, playgrounds, museums, libraries, schools, hospitals and charitable institutions, conducting them with funds derived from taxation. The approximate annual per capita expenditure in the city of Boston for parks and recreation is $2.40, for hospitals and public health $2.30, for libraries and education $9.50 and for protection of life and property $6. As compared with such large voluntary public expenditures, the $2.50 per year which may be saved in street car fares for the average person is too trivial for the frequent and prolonged attention given the matter by city officials and commissions The time and expense also devoted to opposition to fare reductions by company officials might better be directed to improvements in service. When our officials deliberately place upon their constituents a burden of taxation for recreation and amusement alone amounting to $2.40 per capita, why should they assume that 5-cent car fares cannot be afforded by the same citizens and, through reduced fare ordinances, force a personal saving of a similar amount in transportation costs, which inevitably means increased discomfort and possibly risk from curtailed service? A liberal policy of civic improvements and reduced street car fares are inconsistent and should not be found together in a normal self-governing community.

BETTER SERVICE AT EXISTING COST

One other reason for lack of increase in the riding habit from lower rates, as compared with the stimulus found in other kinds of public service, may be emphasized. It is the very general experience in the electric lighting field that a reduction in rates occasions a proportional increase in consumption, the customer being satisfied to continue paying the same amount for the convenience or advertising value of the additional light obtainable. Is it not safe to reason from this example that the average patron of street cars would also prefer better service at the existing cost rather than pay a lower price for the same service if the company which serves him has surplus profits to share with him in one way or the other? Street railway business is different from other forms of public service in that it does not offer similar inducements or opportunities for added patronage with decrease in price. The paper clearly points out that the ride is a definite means to an end, a time and energy saver between home, office and shop. The opportunities for saving car fares by walking or otherwise are limited and the use of street cars for pleasure riding is correspondingly small.

Turning now to the statistics of "riding habit" given in the paper, it is quite clear that no evidence of stimulus from reduced fare is discernible. At the same time it should be pointed out that a comparison of the riding in different cities is not conclusive. The author discusses a number of factors other than rate of fare to which he attaches greater weight, such as facilities, topography, climate and temperament. These and temporary conditions must all be considered before the effect of rate of fare is determinable. It is believed that more definite conclusions can be drawn from a comparison of riding before and after a change in rate in a particular community, and the paper includes some data of this kind.

Aside from other influences there is always an increase in per capita rides with increase in population. Engineers have expressed this increase as the nth power of the population, the value of n lying between one and two, approaching the latter figure in large, expanding cities. It should be pointed out that n cannot be greater than two unless territorial expansion leads to a reduced density of population, and that any such high rate cannot continue indefinitely.

Reserve financial resources of public utilities, particularly street railways, are assets which are rarely appreciated in programs of municipal development and expansion in which they are very important factors. Such resources may be of vital importance in such calamities as the floods which last year devastated the Central States, in which a considerable proportion of the large reduced fare cities are located. The remarkable energy and liberal public spirit with which some of the utilities whose resources had not been curtailed attacked the general problems of relief and rehabilitation after the 1913 flood should long remain an object lesson to those who would deprive such companies of all except the bare immediate necessities of their existence.

In support of the general contention that slight changes in rate of fare do not affect riding, the experience of some companies which have raised their rates may be of interest. Not long ago a comparatively small company in the Middle West abolished its six tickets for 25 cents. There was no perceptible reduction in riding and no public outcry against the change. About six years ago a number of suburban and interurban railways in Massachusetts received authority to increase their fares from 5 to 6 cents, the former rate being unprofitable. This increase also, which is still in effect, was attended in the case of one company particularly examined by no loss in patronage.

The figures given in the paper with reference to the Portland reduced fare agitation are of particular interest in showing the practicability of demonstrating definitely in advance the impossibility of securing sufficient additional riding to offset the loss in earnings from the reduction in rate. It may be pointed out that something more than this increase would be necessary. If the estimated 40 per cent was added to the company's traffic, a very large, although probably not proportional, increase in investment would be necessary. The charges on this additional investment would require a further increase in riding. This riding would in turn call for still further investment, then more riding, more investment, until the pyramid would rival the products of antiquity except in stability. Unfortunately it would differ from them in being the other end up.

No further comments are necessary on Figs. 3 and 4, which substantiate our general impressions and experience that low fares do not permit adequate service in the larger cities. Such cities have always before them the problem of crowded tenement districts with their toll of disease and wasting vitality. This problem is most acute in European cities where, as shown in the charts, low fares have led to inadequate service. It is beyond dispute that our American cities have no more potent factors toward reduction in congestion of population than their admirable transportation facilities which encourage suburban homes and healthful environment.

Some smaller cities may get fair results from reduced fare service if they are satisfied to forego a safe provision for their future development. The question for each community to decide is as to the kind of service it is willing to pay for in the long run. If it wants good service—and Americans are rarely called stingy—it should pay not less than the faithful nickel. The "not less" cannot be passed over lightly, for the inadequacy of the nickel is the real problem of the large street railway to-day. It is indeed unfortunate that our energies and attention are so often distracted from this problem to its antithesis, the subject of our present discussion.

DISCUSSION ON MR. HILD'S PAPER

BY R. B. STEARNS, VICE-PRESIDENT THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Mr. Hild's paper properly undertakes to define the principal of the various factors that affect the street car riding habit. He designates five principal factors, viz:

(1) Facilities.
(2) Topographical conditions.
(3) Climatic conditions.
(4) Temperamental characteristics.
(5) Rates of fare.

No one of the foregoing factors appears adequately to account for the well-recognized increases in riding habit accompanying increases in population. Some students of the subject have endeavored to show from statistics that riding habit increases as the square of the population, and such an assumed law has in a number of instances been used for prognosticating street car riding in the future, arising from increases in population.

That the relative geographical distribution of housing and amusement facilities and commercial and other industrial activities of importance is affecting riding habit seems certain and evident from every-day observation. The density of population and its geographical distribution are without doubt of importance. A city of elongated rectangular shape, with residence territory constituting the northern half, manufacturing the northern quarter of the south half and commercial the southern quarter, would for the same population probably show a larger riding habit than a city in which the same activities were distributed in concentric ring form around the commercial center. The presence of detached business centers originally designed in the main to serve particular nationalities making up the population also has an important effect on riding habit. In general, any distribution of population that tends to shorten the distance between the places of residence and the places of labor and trade will reduce riding habit, and similarly an opposite tendency will increase riding habit. In fact, the walking habit will decrease as the riding habit increases.

The effect of tributary population not counted in the census enumeration of the city in question and of a transient population participating in the commercial life of the business center is also important in determining riding habit.

Industrial activity—that is, value of business—has its effect on the riding habit of the community. A rapidly growing city may show a higher riding habit than one where the growth of population is small or nothing.

All the factors mentioned appear to affect riding habit and contribute to an explanation of the differences in the figures shown in Fig. 1, accompanying Mr. Hild's paper. There might properly be added to the five factors enumerated in the paper the following:

(6) Relative geographical distribution of residence, commercial and manufacturing districts.
(7) Tributary and transient population.
(8) Industrial activity.

Fig. 1 shows that for the cities selected a large riding habit figure is not necessarily associated with low rates of fare. It appears to be a proper statistical conclusion from the data submitted by Mr. Hild that there is no correlation between riding habit and rates of fares and that other factors must be the determining ones in explaining high and low figures for riding habit in various cities.

The Glasgow data are interesting and indicative but not conclusive. In the halfpenny and penny zones there was an increase of 25 per cent in the number of zone fares when the two periods are compared. The lengthening of the halfpenny zone from ½ mile to 1 mile resulted in a reduction in the walking habit in the zones so affected. Walking is the principal competitor of street car riding. Competition is naturally keenest in short distances and gradually vanishes as distances increase. To develop an increase in riding habit car service must divert travel from its competitor. This field of competition lies in the short-distance travelers. When the fare is reduced to the point for such travelers that the comparative sacrifice of money on one hand and effort and time on the other is less in the first instance, the travelers will be diverted to the cars.

That measures of this comparative sacrifice will vary according to the standards of value of the travelers affected seems certain. Since personal standards of value depend largely upon wage or income, the comparative sacrifice depends upon the wage or income of those so to be affected. Thus the rate for short distances would have to be lower for the laborer than for the merchant and lower for the mechanic in Glasgow than for the mechanic in America. If these considerations be true, it follows that the Glasgow fare change produced a larger proportional effect in Glasgow than the same change would have produced under a similar fare scheme in America. In fact the differences in the scheme of fares and the wage standards are so great as to make it impossible to apply Glasgow experience to America or to draw any significant conclusions therefrom.

EFFECT OF REDUCED FARE IN MILWAUKEE

As illustrative of the effect of rate of fare on riding habit, there are given in the accompanying table data for the city of Milwaukee which show the development of the riding habit over a period of years in which the rates of fare were changed two times.

Year	Rides per Capita	Rate of Fare
1897	100	5 cents cash
1898	110	5 cents cash
1899	120	5 cents cash
1900	134	5 cents cash: 6 tickets for 25 cents and 25 for $1, good during two morning and two evening rush hours.
1901	141	
1902	153	
1903	161	
1904	160	
1905	179	5 cents cash: 6 tickets for 25 cents and 25 for $1, good during all hours.
1906	195	
1907	208	
1908	205	
1909	218	
1910	235	
1911	240	

The table discloses the fact that with the introduction of commutation tickets the riding habit increased from 120 in the year 1899 to 134 in the year 1900. This is not a large increase and was probably due to industrial conditions and growth of the city rather than to reduced rate of fare during rush hours. Comparing the years 1904, 1905 and 1906, it will be noted that the riding habit was 160, 179 and 195 respectively.

Recollection of industrial conditions during these years indicates that the increase in riding habit was no doubt again largely due to the great industrial activity that obtained during the years 1905, 1906 and the first half of the year 1907. The effect of an industrial depression is shown in the year 1908, when the riding habit fell from 208 in the year 1907 to 205. While it is true that the riding habit increased from 160 in the year 1904, when reduced rate commutation tickets were good during the rush hours only, to 179 in the year 1905, when the commutation tickets were good during all hours, an increase of nineteen, it is also to be noted that there was an increase of sixteen rides between the years 1905 and 1906 and an increase of seventeen rides between the years 1909 and 1910.

From a study of these figures we have come to the conclusion that the effect of the introduction of commutation tickets did not necessarily increase the riding habit in the city of Milwaukee. The increases which the facts disclose were accompanied by other conditions which are well known to have a very marked effect on street railway traffic.

It is to be hoped that other similar data will be submitted in this discussion or otherwise become available in order to permit a more general conclusion than seems justified by the figures that are shown in this one instance.

The other charts contained in Mr. Hild's discussion, showing cars operated or owned per 10,000 inhabitants and miles of track per 10,000 inhabitants, are not conclusive in demonstrating that facilities are less adequate in low-fare American cities than they are in cities where the standard fare prevails. The layout of the transportation system, method of car operation and all the various factors previously defined as affecting riding habit, have an important bearing on the track mileage and on the number of cars required to accommodate the rush hour travel.

A great many of the cities of this country have still in operation many miles of car routes that came into existence in the early days of street railway development when competition was prevalent and which now serve no useful purpose, and the abandonment of which is regarded as either unwise or impossible on account of adverse statutes or ordinances. The maximum number of cars required during rush hours on any system can be reduced by the more accurate fitting of car capacity to the passenger distribution. It may be true that the necessities of economy brought about by low fares in certain American cities and the absence of adverse municipal regulation have resulted in greater accuracy in fitting the car capacity to the passenger distribution.

CONCLUSIONS FROM DISCUSSION

The conclusion of all this discussion seems to be the following:

(1) Riding habit depends upon a number of factors, among which is rate of fare.

(2) The effect of rate of fare on riding habit in urban communities is limited to short-distance travel.

(3) The reduction in rate of fare possible under the American flat rate is not sufficiently large to induce any appreciable extra riding.

(4) If a zone system of fares should be developed and applied to American street railways involving a substantially lower initial payment than is now common, we cannot say with any confidence that no extra short-haul traffic would be developed.

While Mr. Hild's paper in this discussion dealt so far only with the influence of rate of fare on riding habit developed in urban railway systems, the matter of interurban riding habit is of great importance to many of our railways. Individual experiences could no doubt be cited and the conditions generally affecting the ratio of passengers to tributary population defined, but in view of the relatively small rate of growth shown by passenger earnings of interurban railways, the economic aspects of fare changes should be studied, and it is to be hoped that in the not far distant future someone will assemble and present before this association data and conclusions derived therefrom, bearing on the influence of rate of fare on interurban travel.

Regulation or Profit-Sharing?

In This Paper, Presented Before the Midyear Conference of the American Electric Railway Association, the Author Discusses the Economic Aspects of Regulation Compared with Profit-Sharing with the Municipality

BY HALFORD ERICKSON, MEMBER RAILROAD COMMISSION OF WISCONSIN

To touch upon the high points of some of the many vital problems involved in the mild-sounding title of this paper is all I shall undertake to do. The subject is not of my choosing. It was suggested to me by J. D. Mortimer, the able executive of the Milwaukee street railway. It is a subject that is much too big for adequate discussion in one short paper. In fact, if Mr. Mortimer had deliberately set about to box the compass, so to speak, by selecting from the whole circle of problems pertaining to the development and regulation of public utilities the one which presented the greatest number of knotty questions he could hardly have succeeded better.

It will be assumed here that the regulation referred to means state regulation through a commission; and that profit-sharing with the municipality is municipal control through franchise under which the utility pays to the city for the privileges obtained a percentage of the earnings or a stipulated sum in the form of a rental, in addition to the regular taxes. The latter is comprised in what is coming to be known as the "home-rule" program, which some cities are now advocating. In another sense the whole subject can be said to be included in the question of state regulation through commission by local regulation through franchise. State regulation to-day means something far removed from the state regulation of forty years ago, or even from that of fifteen years ago. It would make a highly interesting paper in itself to trace the development of public utility regulation in this country for the past few decades, if for no other reason than to note the relation of the action each upon the other of modern economic thought and the trend of court decisions. Such a paper would do much toward dissipating the fallacy so often repeated in one form or another, that all the courts of the country are mired in the bog of precedents. The Supreme Court of the United States may or may not always, as Mr. Dooley humorously charges, follow the election returns, but it and many of the courts of the different states are generally guided by recognized economic principles known to be sound.

By regulation through a state commission I have in mind such regulation as that which is embodied in the work of the Railroad Commission of Wisconsin and of similar commissions of many other states. By local regulation I have mostly in mind such regulation as is ordinarily provided in local franchise and other ordinances. It has been clearly asserted in the English common law, and earlier in the Roman law, that because certain occupations had a very direct and close relation to the public welfare the right to carry them on could only be granted by the sovereign power of the country, and must be subject to certain restrictions.

Under the common law, however, the operation of the principles of regulation was rather one-sided in character. They touched only the power of the crown or of the Legislature to prevent extortionate charges on the part of enterprises and callings affected with public interest. There was little, if anything, to indicate that those who served the public were also entitled to protection. To-day the situation is different. In the Wisconsin and other public utility laws and in the decisions upon them it is recognized that the truest protection of the public also involves proper protection of the instrumentalities which serve the public; that arbitrary and unjust treatment of those instrumentalities or interests by which the public is thus served is in the long run quite as injurious to the public as to those interests; that after all there can be no justice to the public which means injustice or wrong to those who serve it. And thus has now grown up a public sentiment and legal provisions which have given us, so to say, the newer and more equitable doctrine that those who serve the public should for such service, when adequate, receive reasonable compensation.

POWER OF THE LEGISLATURE

It is essential to clear thinking upon this subject that we comprehend first that a state regulating commission, whatever its form, possesses only such powers as the Legislature specifically grants to it. It is equally essential to understand that the Legislature cannot delegate a power which it does not possess. The power to regulate public utilities is inherent in the Legislature, and a commission created by it cannot exercise at any time any powers which it is not entirely competent for the Legislature itself to exercise. Likewise, when a municipality undertakes to exercise regulating powers it is but acting as the specifically authorized agent of the Legislature. Clearly, then, the state through its Legislature is always paramount in authority to either a commission exercising delegated authority or a city exercising delegated authority. The United States Supreme Court has very plainly set forth this principle in 196 U. S. 548.

Again, the Legislature is restricted in its power to regulate public utilities by the state and federal constitutions. In its widest stretch, then, state commissions and local authorities exercise only those powers which the courts construe as not in contravention of constitutional provisions.

The commission being clothed only with the power delegated to it by the Legislature, and the municipality in its relation to public utilities being possessed only of the power delegated to it by the Legislature, and the power in each case being adequate to secure justice to the private consumer, and the Legislature not having divested itself of any of the power inherent in it by its selection of agents, the question that naturally arises is, which of the three instrumentalities can most efficiently serve the public through the exercise of the regulative power? Can the Legislature itself do it as well as either a state commission of the municipality? If it cannot, then it should delegate its power of regulation to the one or the other of these two agencies that can perform the best and the most equitable service in this respect.

Some light as to which one of these agencies is the best adapted for such duties may be obtained through the analysis of the functions of such regulation and the work it involves. Laws for the regulation of public utilities and the administration of the same are chiefly concerned with the protection of the public against unjust practices and methods in connection with the furnishing of such service as these utilities render. The people ask for adequate service at fair rates. To this they are entitled in law and in equity. It is the duty of the utility to furnish such service at such rates. To furnish service for compensation is also the purpose of a utility. The public thus desires that which it is both the duty and the purpose of the utility to furnish. The sole reason for granting rights and privileges to a utility is to administer to or promote the convenience, comfort and welfare of the public. There is no other ground either in law, economics, or morals upon which franchises should necessarily be granted.

PROPER USE OF MONOPOLIES

Now, the public in its desire for this service should not be made the victim of injustice in any form. Its needs for this service and its willingness to pay for it must be fairly met. In other words, such utilities being monopolistic in their nature with great powers and furnishing services that in fact are necessities must not in any way use their position to the detriment of the public. It is largely to prevent this that regulation has come about.

The work involved in such protection is comprehensive in its nature and far-reaching in its effects. Adequate service for instance involves the regulation of the voltage and of the equipment used in the electrical field, the prevention of lower than a reasonable heating value and pressure in the gas field, the avoidance of the introduction of impurities in the water supply and of too low pressure for fire protection in the case of water works, the promotion of promptness and accuracy in furnishing telephone calls and of seeing to it that the telephone service is up to the standard in other respects, the securing of proper routing, headways, cars and other equipment in the street railway field and much other work of this kind. The services needed in this work cover the mechanical, electrical and chemical sciences and the scientific equipment that is needed in connection therewith is expensive and, being often difficult to operate, requires skilful handling.

The establishment of reasonable rates requires the appraisal of the plants, the auditing of accounts and records, the collation and analysis of all sorts of financial and operating data, the installation of proper accounting systems, the passing upon operating conditions of all kinds, sound judgment upon financial and industrial conditions, and much other work that is of a complicated and difficult nature.

The facts and conditions by which regulation must largely be guided are in fact of such character as to differ not only from plant to plant but from one time to another for the same plant. They are in fact of such nature that they cannot often be either adequately or safely covered by general rules or fairly passed upon except after full investigation in each particular case. The telephone service, the power transmission service, the electric railway service extend from one municipality to another and have become state rather than local propositions. Political and other local conditions are also of importance.

FUNCTION OF THE STATE COMMISSION

It would seem quite obvious that in a field as complicated and as changeable as this the Legislature itself cannot accomplish much in the way of direct regulation. No general law can be made to cover specifically each of the numerous and diverging conditions that are met with. Even if this was possible the laws themselves could be of little value unless proper provision were made for their enforcement. About all the Legislature can do therefore is to delegate this power to a commission and to make adequate provisions for the proper administration of the duties involved. What is thus true of the Legislature in this respect is also true for municipal councils where they are charged with such regulation. Such councils are in no better position for dealing directly with such matters than legislatures. For effective regulation or for the enforcement of their ordinances they also must depend upon commissions of some sort. As a commission seems to be necessary in either case the question is whether a state or local commission is preferable. From the point of view of the cost alone a state commission has great advantages. For it is almost too obvious to mention that such regulation can be carried on at a much lower relative cost on a large than on a small scale. But there are other and equally important reasons in favor of a state commission often.

The jurisdiction of local commissions, for instance, is restricted to the municipality they serve. This is a serious objection to such regulation, especially to-day, when so many utilities operate in more than one municipality having common as well as divergent interest. Again, the experience of and the data obtained by local commissions, being restricted to the place they serve, would also be much more limited and of much less value than would be the case for a state commission. Many other reasons in favor of a state commission might also be given, but those mentioned illustrate the situation.

What has thus been said about the relative merits of state and local regulation also seems to be supported by experience. One instance in point might be cited. In Wisconsin the local municipalities have about as much power in the way of public utility regulation as the state commission. These powers, however, the municipalities seldom or never exercise. Not only do they fail to do much of anything in this respect for the public directly, but in cases where the municipality itself as such is concerned as is the case when the street lighting situation is involved, they usually prefer to submit their cases to the state commission.

COMMISSIONS ARE HUMAN

While holding that state regulation through a commission is preferable to local regulation through franchises, I do not mean to say that the former has been found wholly satisfactory, either to the public or to the utilities. The public often feels that the state commissions do not go far enough either in their rate reductions or in their service requirements. Local politicians are often vigorously voicing this sentiment. The utilities, on the other hand, often think that the state commissions go much farther in these respects than they should. It is also a fact that state commissions, like all other institutions, sometimes make mistakes. The Wisconsin commission, for instance, has at times erred in both directions. Some of these shortcomings are due to the fact that the commission was not able to estimate correctly in advance the important increases in the cost of operation that have taken place during the past few years. Occasional mistakes, we all know, creep into all human activities. There seems to be no field from which they can be wholly eliminated. With our best efforts, however, they can be reduced in number and importance. They can also in most cases be corrected as soon as discovered and willingness to make such corrections is one of the necessary qualities in a commission. State regulation is also somewhat costly. While this cost is much lower than would be the cost of like regulation through local commissions it is nevertheless used as an argument against state regulation. When everything has been said, however, the fact remains that state regulation, except perhaps for a few of our larger cities, is more effective and less costly than like local regulation. In the long run it also is likely to be found to be the best kind of regulation not only for the public but for the utilities as well.

SO-CALLED PROFIT-SHARING

This brings us to that feature in local regulation which often finds expression in a rental charge or a toll upon the earnings of the utility over and above the regular tax assessment. Such rental or toll is sometimes spoken of as a sort of a profit-sharing plan with the municipality and is often pointed to as an example of wise local regulation and as something to take the place of other regulation. Closer analysis of the facts from an economic and social point of view indicates quite clearly that this toll is in effect a tax levied upon other than sound principles of taxation and that it is an unwise burden upon the service of the utilities.

Before considering these aspects of such profit-sharing with the municipality it is well to give recognition to the fact that this profit-sharing, whether in the form of a rental or a stipulated annual or monthly payment or a percentage of the gross or net earnings, has uniformly the sanction of the courts. When a municipality grants a franchise to a utility it is competent for it to exact payment for the grant in any reasonable form. The courts uphold this right of the city on the ground that such an exaction is not a tax, but a toll. It is not a franchise tax but a rental. "A tax," says the United States Supreme Court in one case, "is a demand of sovereignty; a toll is a demand of proprietorship."

FRANCHISES FOR PUBLIC INTEREST

The primary reason why franchises are granted by cities to public utilities is to promote the welfare and comforts of the public as users of utility services, rather than the subservance of the interests of the public as taxpayers or because these utilities may become a source of revenues to the municipality. These propositions appear to be sound. If this is the case, and it is here assumed that it is, then it follows that the operation of the utilities and the regulation of the same should also be in the interest of their patrons rather than in the interest of taxpayers.

While the interests of the municipality or taxpayers as such on the one hand and the interests of the users of the service as such on the other may not be antagonistic when viewed in their broadest light, they may be and often are divergent upon many single points. Thus there may easily arise in almost any city the question whether it is better public policy to strengthen the revenues of the city by the levying of a toll upon the utilities, or to secure in place of such toll either some improvements in the service or lower rates. Those who favor the levying of a toll would probably argue that this toll would go a good way in supporting the police and fire departments or in maintaining the parks. Those who held the opposite view would no doubt point out that a better and more widely extended service or lower rates would not only benefit the greater number but it would benefit those for whom the service was established and who are entitled to such benefits. The latter may also say that such extensions of the service or such lowering of the charges would tend to increase the use of the service and that this increase, owing to the law of increasing returns, would tend to decrease the cost per unit of service which might mean not only higher profits to the utility but still lower rates to its patrons. If the taxpayers and the users of the service were the same persons, and if there also was a close relation between the amount thus paid as taxes and the use made of the service, then it would make but little difference whether the toll was levied or not. But this is not often the case. In the street railway service, for instance, the patrons or users are largely made up of wage and salary earners and this is also true in other utilities. It is therefore exceedingly important that the service should not be burdened by unnecessary charges.

PART OF THE COST OF SERVICE

It is assumed here that the toll in question is in the nature of a tax and that it enters into the cost of the service. It is true, as stated, that the courts, because this toll is imposed by the city as a contractual and not as a taxing power, do not call it a tax. This ruling, however, is largely based on a fiction of law and does not change the effect of the toll. Such tolls become as much a part of the cost of the service as taxes levied in the ordinary way. While this toll is in effect a tax it is levied on a basis that is contrary to all sound principles of taxation. Taxes are based on the ability to pay and this ability is measured either by the value of the property controlled or by the income. The toll in question is levied without reference to these principles. It is placed in a lump sum upon a service where it must be borne by those who use this service in proportion to the use they make of it. Where, as in the street railway field, the users are largely made up of workers this toll also falls upon those who are the least able to bear it.

A toll of this kind upon the earnings is also likely to be inequitable between the several branches of the service furnished by the same utility. This fact may be illustrated by what would be the situation of a certain company under such toll which operates a railway and electric business. If the gross revenues of the two departments or branches were about the same, then it is also likely that the toll would also fall equally on each branch. But on account of such differences in the cost of the service in the two cases as are often found, especially outside of the larger cities, the amount available for interest and profits is only half as much for the railway as for the electric business, while the investment for the railway business is about three times the investment for the electric department. It is manifest that in this case the street railway branch would have to bear more than a fair share of this toll. What is thus true in this respect for the different branches of the service of the same utility is also likely to be true as between different independent utilities.

Such increases in the cost of the service as those caused by extra tolls of this kind is seriously felt by the consumer because it tends materially to restrict the amount he can afford to use. It causes him, in fact, at least in many cases, to reduce his demand for service. Prospective customers also find that the cost is higher than they can afford to pay for the quantity needed, and hence resort to substitutes. In this way the proper development of the service is hampered, the consumer uses less than he needs, and the plant is deprived of business. The effect of such charge may be further seen from the fact that for one company a toll that is equal to about 4 per cent on its gross earnings would amount to an increase of 5 per cent in its operating expenses and reduce the amount that is available for interest and dividends by about 1½ per cent.

PUBLIC POLICY IN STREET RAILWAYS

On account of the particular objections to such tolls as here outlined, the application of the same to a street railway is especially inadvisable. Public policy plays a large role in the planning and management of street railways. Such policy often demands the continued construction of outlying extensions so as to relieve congestion in the centers of population and enable people to live in the outskirts under more sanitary and wholesome conditions. Street railways should therefore be encouraged by all legitimate means to make extensions into sparsely settled regions and to charge as low rates of fare as possible therein. And yet the very nature of such a toll as that in question is to discourage this policy, for it demands as much relatively of the total revenues of any outlying extension, which probably pays little or no profit, as it does from the total earnings of the most profitable part of the line.

Thus, for one company a toll equal to about 4 per cent on its gross earnings would amount to 11 per cent of the net earnings for its city service, to about 103 per cent of the net earnings for its suburban service, and to about 17 per cent of the net earnings for its interurban service. Again, such a toll would increase the cost per passenger about 0.18 cent, and the cost per car mile by more than 1.1 cents. Further, it reduces the paying car and passenger haul by 0.33 mile. In this case, a toll of this kind would thus absorb 3 per cent more than the entire net earnings of the suburban traffic, while on the rest of the line it is enough of a burden to be a material drawback in the proper development of the service.

What is thus true of street railways is also true for other utilities. Thus, if a gas company or a water company were considering the extension of mains for which the earnings would, to start with, be entirely offset by the operating expenses, it is quite evident that the management would postpone construction still longer if expenses were still further increased by a toll upon the earnings. Consumers entitled to service consequently would be denied it until the revenues from them were sufficient to overcome the influence of such additional and artificial expenses as a toll of this kind.

Utilities are often subjected to a form of competition over which there is very little or no control. This competition comes from isolated lighting, power and heating plants, which sometimes make severe inroads in the utility business, reducing the volume of service supplied by central station and decreasing, therefore, the efficiency at which the service can be supplied. This competition is greatly enhanced when the central station is burdened by such tolls as those in question here, while the isolated plants are relieved therefrom.

A. R. Foote, formerly president of the National Tax Association, says: "If the purpose of those who advocate franchise taxation is to secure the best possible results for the people from the operation of the franchise granted, their proposition is unsound, because a franchise cannot be taxed without adding the amount of the tax to the cost of the service rendered. On exercising its reserved right to regulate rates, the state must take into consideration this tax addition to cost. as the rates it fixes or approves must cover all costs of ownership and operation and yield a reasonable profit. For this reason a tax on a franchise is not a tax on a corporation, it is a tax on the users of the service it renders. A franchise tax is paid by users, not by a corporation. It is a method of plucking feathers from a goose without exciting a perceptible squawk. In fact, by reason of being inadequately informed, or by being misunderstood, a franchise tax is a popular demand made by users, or rather by political vote seekers; it is a form of indirect taxation that has no proper place in the economic policy of intelligent, honest-minded, self-governed people." Whether Mr. Foote's analysis of the situation applies to the regular tax levy or not may perhaps be disputed, but it is very much in point when it comes to such extra tolls as those under discussion.

TAX FOR RENTAL

It is not surprising that the governing body of any city should first lean toward the license fee or rental system, in dealing with public utilities. It can thus provide a prompt and material revenue to meet the expenses of the city which ostensibly operates to reduce the general tax rate. It furnishes an attractive advertisement for the business judgment of the men who compose the Common Council. There is also, growing out of the fact that privately owned public utilities are the natural and inevitable target of public criticism, a certain amount of *éclat* to be gained by filling the city's treasury through the depletion of that of the utility. It would be a rare city council in the days that are not so long past that could forego such an opportunity to glorify itself. It is so easy a matter to awaken the interest of the taxpayer in this way. He is not likely to figure closely as to the incidence of a tax.

Much might be said upon the purely political complications growing out of the city's levy upon a utility for city purposes. Perhaps in the whole history of municipal mismanagement in this country there has been no more fruitful source of scandal than the negotiations connected with the securing of franchises by public utilities. Conditions in this respect have generally improved in the past few years, but so long as the people do not see the unwisdom, from an economic and social point of view, of the city exacting fees or tolls or rentals from public utilities in addition to other taxes, there will remain the danger of unfortunate political complications and corruption.

One thing, I believe, which impels to aid the profit-participating plan is the wrong conception held of the value of franchises. It is no exaggeration to say that the average alderman in the average city has a grossly inflated idea of the real value of a franchise. Hence, whether impelled by motives of personal gain or the more worthy desire to increase the city's apparent revenue, he considers a utility corporation holding a franchise as a legitimate subject to exercise his schemes upon.

Under the indeterminate franchise law such as is in operation in Wisconsin there is less temptation than in cities of other states for the city authorities to try to increase the city's revenues by this rather indirect way of placing a tax upon its citizens. The indeterminate franchise under state regulation takes away the trading value of a franchise.

How it would ever be to the interest of the public to replace proper regulation by such a toll or levy on the earnings as that discussed herein is indeed difficult to understand. There is nothing in such a toll that tends to bring about either adequate service or reasonable rates. On the contrary, such tolls are more than likely, because of their effect upon the cost, to cause the service to deteriorate and the charges to be excessive. At any rate the latter assumption would at least seem to be more probable than the former.

I do not hesitate to say that from an economic standpoint and from the standpoint of the higher advantage of the people of any given community it is very much better that a utility be so regulated as to keep its service up to a high standard and its charges at a reasonable level, than that the city should, by its power to contract, make a deal for increasing the city's revenues by a rental or a levy upon the utility's earnings.

INDETERMINATE PERMIT

I should like to add a few words about what seems to me to be the proper sort of a franchise, the kind of regulation by which it should be accompanied, and the system of profit-sharing, if any such system is needed, that would seem to be in line with public interest. In dong this I will refer briefly to what is known as the indeterminate permit or franchise. It is recognized by the railroad and the public utility laws of Wisconsin that public service corporations are in their nature monopolies, and that the interests of the public are best subserved by protecting the monopoly in those industries, at the same time supervising and regulating them in the public interest. To carry out this purpose competition among public service companies in the establishment of new lines and plants is prohibited except under conditions that make its existence a benefit to the public. By virtue of the State's constitutional power to amend or repeal franchises, the State of Wisconsin has changed every municipal franchise into an indeterminate permit, which in effect is merely a substitution of the provisions of the public utilities law itself in so far as rates, service and other matters of this kind are concerned for the extinguished franchise. Without the consent of the commission no competing utility company can enter a territory served by a corporation operating under the indeterminate permit. But whenever the commission finds that public convenience and necessity require the admission of such competition, a certificate so stating may be issued and a new company be permitted to enter the field.

An indeterminate franchise or permit differs from other franchises mostly in this, that it can in effect be revoked when the commission finds that the corporation is not properly serving the public and cannot be made to do so, or whenever the municipality sees fit to purchase the plant. Such franchises frankly recognize that both the public and the investors should be protected; that the former should have adequate service at reasonable rates, and that the investors are entitled to fair compensation for the services they render.

An indeterminate franchise of this kind coupled with a public utility law, the provisions in which are at least as broad as the best now in effect and which are also properly or wisely administered by a state commission, would seem to furnish about as satisfactory a system of regulation as any that has yet been suggested. In fact, where it has had a fair trial and where it also includes the supervision of the securities issued, it has materially contributed in placing the utilities upon a sound investment basis. This proposition is not only supported in reason, but it can be substantiated by facts.

INCENTIVE TO ECONOMY AND EFFICIENCY

But even if we assume that state regulation and the indeterminate permit is superior to local regulation under the franchise and to such tolls or profit-sharing with the municipality as has been explained, and if we further assume that, as Professor Taussig says, reasonably successful regulation is more easy to attain than reasonably successful public management, there yet remains to be solved a problem which, while not very serious to-day, may become so later on. Regulation of public utilities, well founded as it is on economic and legal principles, can, no doubt, be so administered as to take away much of the incentive to economical operation and to the adoption of efficient methods and equipment. If, for instance, the rates are to be reduced so as to wipe out all savings from efficiencies and improvements as soon as such savings appear, then it is not easy to see how in the long run there is to be stimulated and kept up that incentive to improvement that is as desirable in the public utility field as in other lines of human endeavor. If the effect of improvements in the service, the application of new and better devices, the adoption of new arts and methods in production which lower cost and increase efficiency is to mean only the lowering of the charges to the public without any corresponding benefits to owners and managers of utilities, how long can effective regulation, on the one hand, and progress in operation, on the other, run parallel, or how long can it then be expected that such economies will continue? This may become an important question. Investigators tell us that under government ownership this incentive to progress is largely lost. That there is foundation for this will hardly be disputed. May not this also become the situation under regulation? That in some instances at least public regulation may be so unwisely carried out as to lead to results of this kind is easily possible. Should this come about then it would also become necessary to adopt measures by which it could either be prevented or remedied.

One way in which this danger can be prevented is so to adjust the rates as to preserve all reasonable inducements to the adoption of the best and most effective methods. That it is possible to make such rates as this will hardly be denied by those who have given some thought to the matter. The problem is largely a question of facts. The facts that are necessary to make such rates do not differ very widely from the other elements that should enter into every sound rate schedule. They are no more complicated and may be obtained in very much the same way. They are in fact disclosed when the conditions as a whole are more fully analyzed. The fact alone that, under regulation, the adjustments of the schedule are as a rule several years apart constitutes an important safeguard in this respect, for the intervening periods during which the rates are thus not disturbed offer many opportunities for the profitable employment of improved methods and other economies.

Another way in which it would seem that the danger in question might be overcome is through the adoption of a system of profit sharing under which the savings from efficiencies in operation are shared by the utility as well as by its patrons. While systems of this kind have not been very fully developed or generally tried, enough is known about them to justify the belief that they are feasible should they be found to be necessary or advantageous. Valuable suggestions in this connection may be had from such experiments in this line in other places as are available.

You are all familiar with the so-called London sliding scale under which the gas companies in that city are profiting to the extent of from three-quarters to one-third of 1 per cent on the investment for each 2 cents reduction per 1000 cu. ft. in the price of gas to the customers. This system has been in effect for more than a quarter of a century.

You are doubtless familiar, also, with the experiment of the Boston Consolidated Companies with the reciprocal or so-called sliding scale of profits. That company in 1900 started at an initial price of 90 cents for gas and a standard dividend of 7 per cent on its capital, it being stipulated that for every 5 per cent reduction in the price to the consumer the company might add 1 per cent to its capital returns. The legislative act authorizing the adoption of this profit-participating plan provided also for an insurance fund to equal one-twentieth of the capital of the company which might be used by the company to meet burdens in time of extraordinary drafts upon the treasury or for such expenses as those occasioned by strikes or the destruction of a portion of the plant.

It is undoubtedly true that such profit-sharing plants as those outlined contemplate and presuppose a degree of efficiency and conditions of stability which some utilities, especially in the smaller towns, may not as yet have attained. While it is not as yet clear that such profit-sharing as this is necessary to encourage efficiency, it can, I think, be said that should the need for it arise, it is possible so to develop a system of this kind that it will meet all reasonable requirements.

CONCLUSIONS

In closing a few of the conclusions may be summarized:

State regulation of utilities by commission, where fairly tried, has been reasonably successful in improving conditions for the customer as well as in protecting the interests of the owner. It has also been effective in removing such regulation from the field of partisan politics.

Profit-sharing with the municipality as such in the form of extra tolls or rentals in addition to the regular tax is not a fair substitute for regulation from the point of view of the best interest of those who depend on the utility for service. Such tolls unduly increases the cost of this service and thereby retard its development. Under such systems of tolls the interests of the municipality or taxpayers as such are likely to be held paramount to the interests of those who are using the service.

Profit-sharing with the patrons of the utility under state regulation, if shown to be necessary to promote efficient operation, would seem to be based on sound principles and can probably be so developed as to be found feasible from a practical point of view. It would seem possible, however, so to adjust the rate schedules of the utilities under the ordinary methods of rate-making that through the rates thus made alone the necessary stimulus to efficient operation is afforded the management.

BUSINESS PROSPECTS FOR 1914

Additional letters received from manufacturers of electric railway apparatus indicate that the optimistic attitude evidenced in the letters published in the ELECTRIC RAILWAY JOURNAL of Jan. 17 and Jan. 24, 1914, is prevalent throughout the entire field. It will be noticed from the letters which follow that some of the optimism is based upon the probability of steam railroad electrification and upon the spread of the "safety first" movement:

ARCHBOLD-BRADY COMPANY, SYRACUSE, N. Y.: "Our business for the last few years has turned almost entirely to transmission-line construction. Part of this has been in connection with electric railroads, but most of it has been directly for power and lighting purposes. We have followed all the electric railway prospects we could get hold of, but most of the work has been along the other line. So far as we have been able to observe, I do not see for this year much chance for interurban work. There does seem to be coming, however, a considerable amount of steam railroad electrification which may lead to some rather extensive contracts."

THE CINCINNATI CAR COMPANY, CINCINNATI, OHIO: "At the present time we have the most optimistic feeling regarding the car-building business for 1914. This feeling is based on the orders we now have booked for delivery during the first six months of this year and the large number of inquiries for new equipment which are coming almost daily. From the present outlook our output will be materially increased over that of last year, which was about the average production."

THE CURTAIN SUPPLY COMPANY, CHICAGO, ILL.: "In our estimation the year 1914 opens with prospects of better business than was the case in 1913. We do not believe, however, that the improvement will be sudden but rather gradual, and therefore much more permanent.

Fundamental conditions are sound, and undoubtedly there is better general business sentiment. A very strong factor for improvement in business, in our opinion, would be the granting of the slight increase in freight rates asked for by the different railroads of the country.

Our own business during 1913 was surprisingly good in view of general conditions. We attribute this partly to an increased effort to perfect our output and push our sales and partly to the fact that we have added considerably to our line of manufactured articles. To curtains, curtain fixtures and curtain materials we have added such articles as Rex rollers, diaphragms, Rex vestibule curtain shields, Rex steel rollers and a number of other specialties which we are submitting to the trade with gratifying results."

W. J. JEANDRON, NEW YORK, N. Y.: "The past year was the largest in the history of my business. An increase of almost 100 per cent was made over the year previous and the outlook for 1914 is very bright. Of course, carbon brushes are required whether the times are good or not, and as the high quality of 'Le Carbone' product becomes better known the demand becomes greater. I am very optimistic and believe that this year will be one of the best in the history of the electrical business."

FONGER FENDER COMPANY, CHICAGO, ILL.: "We are looking forward to the coming year with renewed hope. It is gratifying indeed for us to learn that the railways throughout the country are showing that they can receive a new and promising device with the proper spirit. This fact is evidenced by the increasing numbers of trial orders on our lists. Our tip-tilting automatic fender was introduced on the market a little over a year ago at the electric railway convention in Chicago, and was demonstrated at that time on live persons to convince railway officials of its absolute safety.

Our fender was seen to possess many new and original features that tend to make it a real benefit to a railway rather than a burden. During the past year our fender has been in service and has been strengthened, simplified and improved in many ways, enabling us to offer better quality at a very greatly reduced price.

The tip-tilting or overturnable shield, the unique and original feature of the Fonger fender, has also enabled us to adapt the fender to the automobile truck with great success. This tripping shield makes it possible to carry a very short basket behind it without sacrificing safety, and thus makes the fender practicable for use on automobiles as well as street cars. The chances for increased business for the company during the new year are very promising, not only because of the broader field covered and the liberal spirit being shown by the railways, but also because of the general and widespread 'safety first' movement that is now gripping the country."

NACHOD SIGNAL COMPANY, PHILADELPHIA, PA.: "We anticipate a large demand during 1914 owing to the fact that electric railways are now able to distribute new securities on a fair basis. This means expansion, new equipment and the purchase of such apparatus as will insure safety and facilitate traffic. In anticipation of a large increase in our business, we have perfected manufacturing arrangements with the Hall Switch & Signal Company which insure us unparalleled facilities for prompt manufacture and efficient service. It would appear from the first four weeks of this year that our surmise is probably correct, as we have received an unusually large number of inquiries and orders. This we ascribe mainly to our achievements in the past, the fact that our apparatus is well and favorably known, and that we are able to adapt our apparatus to meet the individual requirements of practically any signal situation."

Midyear Committee Meetings

Reports Are Published of the Meetings of the Committees of the American Electric Railway Association and Its Affiliated Organizations Which Were Held in New York, Jan. 26-30

During the midyear session of the American Electric Railway Association a large number of committees held meetings. Reports of these are given in the following paragraphs. The former report of the committee on joint use of poles is not included as this is published with the abstracts of the papers presented at the midyear conference on another page of this issue.

EXECUTIVE COMMITTEE AMERICAN ASSOCIATION

A meeting of this committee was held on Thursday afternoon and two on Friday. Those present included President Black, Vice-presidents Allen, Henry and Storrs, M. W. Glover representing the Accountants' Association, J. H. Hanna representing the Engineering Association, W. F. Weh representing the Claims Association and H. A. Nicholl representing the Transportation & Traffic Association. Ex-president H. H. Vreeland, ex-President Arthur W. Brady, James H. McGraw, ex-Secretary H. C. Donecker and the secretary, E. B. Burritt, were also in attendance.

The secretary presented a report on the progress and finances of the association. He then stated that invitations had been received from the following cities for the 1914 convention: New Orleans, Galveston, Buffalo, Cleveland, Los Angeles, Boston and Columbus, Ohio. On motion, the president was authorized to appoint a committee of three members to confer with a similar committee representing the Manufacturers' Association, such joint committee to have the power to fix the time and place for the 1914 convention. The president was also authorized to appoint a committee of five to confer with a similar committee of the Manufacturers' Association to arrange the plans and details for the 1915 convention, to be held in San Francisco, Cal.

President Hanna of the Engineering Association then explained the desire of that association to change its method of procedure in adopting standards. The present method is by letter ballot, but, as the results had not been satisfactory, it was proposed to change the approval of these standards, first, by the standards committee of the Engineering Association, then by the association itself, and finally by the executive committee of the American Association. This change was approved by the executive committee, which thereupon approved a number of standards and recommendations which had previously been adopted by the Engineering Association under the procedure formerly in effect.

At this point the former secretary, H. C. Donecker, was presented by President Black, on behalf of the officers of the association and a few of his other friends, with a gold watch and chain, a gold fob with an A.E.R.A. emblem on a gold medallion and suitably illuminated resolutions, expressive of the appreciation of the officers of the association of the work which Secretary Donecker had performed during his term of office as secretary-treasurer.

The Engineering Association was then voted an appropriation of $4,000 and the Transportation & Traffic Association $2,750. An appropriation of $1,750, and in addition the expenses of the committee on classification during its present session, was then voted to the Accountants' Association. The sum of $1,250 was appropriated for the Claims Association.

The list of new members presented by the secretary was then approved, and the applicants for membership were elected.

Mr. Allen, as chairman of the *Aera* advisory committee, then stated that the outlook for the future of the publication is encouraging, that an advertising solicitor had been employed and it was expected that the publication would soon be self-supporting. Mr. Storrs, as chairman of the committee on individual membership, then presented a report which appears in abstract in another column. Mr. Storrs further said that he believed that all the members of the committee felt that the individual membership was a very desirable thing to further, but that it has been held back to a certain extent by the attitude of the executive heads of the large member companies. It was the intention of the committee to make an appeal to them to acquiesce in the application for individual membership by the persons connected with their corporations. He appreciated that it was not desirable to ask them to approve individual membership, as that might imply an instruction to the members of their organizations to take membership, but the committee intended to prosecute an active campaign for such individual members.

Mr. Nicholl, as a member of the committee on compensation for carrying mail, then presented the report of that committee. Prof. H. H. Norris and H. A. Bullock then made a report for the committee on education. In this connection Mr. Glover referred to a movement which is on foot in the Accountants' Association, by which an agreement is under consideration to be made with a public accountant located in New York City to carry on a correspondence course in accounting at a charge of $10 for the course for each student, the charge to be paid by the individual who takes the course. The starting of the course is contingent, however, on 400 students taking it up. On motion the committee on education was instructed to communicate with the committee of Accountants' Association having charge of the matter referred to and to report at the October convention.

Reports from committees on the following subjects were then presented: federal relations, joint use of poles, and public relations. The meeting then adjourned until Friday morning.

At the session on Friday morning, President W. F. Weh of the Claims Association presented the following resolution, which had been adopted by the Claims Association:

"Whereas, it is deemed advisable that the Claims Association, A. E. R. A., take some positive and concerted action toward the prevention of accidents; therefore

"Be it resolved, that there shall be constituted and ordained a committee consisting of the ex-presidents of this association, the present officers of the same, together with the executive committee, all of whom shall comprise a Board of Accident Prevention, from whose accumulated and various experience shall be drafted ways and means for the uniform dissemination of information to the individual members of the association toward the prevention of accidents."

On motion, the course proposed by the Claims Association was approved.

A. B. Guigon, attorney Virginia Railway & Power Company, Richmond, Va., then appeared before the committee and urged that another affiliated association, to be made up of the attorneys connected with the various electric railway companies in the country, be formed under the auspices of the American Association. He said that there were many matters upon which the attorneys connected with the members of the association could confer to their own mutual benefit and the advantage of the member companies. These included methods of handling public questions, suits in courts, the drawing of contracts and agreements. The matters dealt with by the Claims Association concerned one branch of work engaged in by the attorneys of the railways, namely, the settlement of accident claims and the conduct of suits for damages. But while this work was most important, there were many other questions which were dealt with by the attorneys of great importance but were not considered by the claims departments. He believed that the best results could be procured by a separate organization of attorneys rather than to enlarge the field of the Claims Association and possibly interfere with the principal work for which that association was formed.

On motion, the president was authorized to appoint a committee to investigate the matter and ascertain from the heads of the legal departments of the member companies just what co-operation and membership could be expected in an association composed exclusively of the heads of such departments, and what effect it would have, if any, in reducing the membership of the Claims Association, such committee to report back to the executive committee.

Mr. Hanna, for the committee on subjects, then reported that the following subjects had been selected for consideration at the 1914 convention of the American Association:

"Mooted Principles in Valuation."

"The Organization and Functions of a Valuation Staff."

"Electric Securities from the Standpoint of the Corporation."

"The Milwaukee Zone System in Practice."

"Aspects of Workmen's Compensation Acts."

The committee then adjourned with the expectation of holding a meeting later in the day.

The closing session of the executive committee was held on Friday afternoon. The matter of the revision of the scale of dues was considered but no conclusion was reached. President Black announced the appointment of Messrs. Guigon, Weh and Drown as a committee to consider the advantages of a separate organization for attorneys as compared with a combination with the claims association. Messrs. Allen, Storrs and Donecker were appointed a committee on arrangement for the 1914 convention and Messrs. Mortimer, Henry, Donecker, Handlon and Gregory as the committee for the 1915 meeting.

PUBLIC RELATIONS

There were in attendance at the meeting of the committee on public relations Thomas N. McCarter, chairman; Arthur W. Brady, C. Loomis Allen, Col. T. S. Williams, James H. McGraw, Guy E. Tripp, F. R. Ford and J. H. Pardee. After a discussion the following resolution was adopted: "That a sub-committee of five be appointed by the chairman to draft a set of principles for the association setting forth the association's view in general terms on the problems confronting us and outlining a comprehensive plan of educational publicity along the lines suggested tentatively by Chairman McCarter and to prepare a plan for raising a publicity fund of $50,000 or more, all of which is to be submitted to the full committee, it is hoped within a month's time." Chairman McCarter then appointed the following sub-committee to carry this resolution into effect: James H. McGraw, chairman; Guy E. Tripp, C. Loomis Allen, Frank R. Ford and Col. T. S. Williams, with Chairman McCarter a member ex officio. This sub-committee has already arranged for a meeting to take place early next week and proposes to draft a plan of action to be approved by the full committee. Later the committee expects to get in touch with the public policy committee of the National Electric Light Association and a similar committee in connection with the gas interests and possibly other national organizations.

FEDERAL RELATIONS

The committee on federal relations of the American Association discussed matters of current importance. The following were present: Arthur W. Brady, chairman; J. N. Shannahan, L. S. Storrs and Frank R. Ford. Horace Clark, Washington representative of the association, was also present.

COMPANY MEMBERSHIP

The chairman, Frank Hedley, was present and reported progress. A thorough canvass of the field has been and still is being made. This field, as far as city and interurban roads are concerned, has been thoroughly covered in the past, many of the roads still remaining outside the fold, being represented indirectly through affiliation with member companies. The others are being systematically presented with the reasons for joining the association. The committee is working under a district plan, each member being responsible for one particular district which he can reach most conveniently.

The committee has not as yet been able to secure the steam railroads for membership. In the opinion of the committee they are in a position to profit even more than companies which have been in the electrical business for a long time. The salient reason for this is believed to be as follows: The public is demanding more and more that terminals in particular be electrified; hence the railroads should prepare themselves by utilizing all existing sources of information. There is no better source than the experience of the street and interurban roads. The association is the natural clearing house for this experience. On this basis the committee hopes in the near future to interest several of the leading steam roads.

"AERA" ADVISORY

The meeting of the *Aera* advisory committee was attended by C. Loomis Allen, chairman; H. C. Donecker, J. C. Collins, C. G. Rice and C. S. Hawley. The chairman reported that on Sept. 30, 1913, the deficit from publishing the magazine was $7,000 and that after the December, 1913, issue had been published this deficit stood at $11,000. Beginning with the issue of January, advertising had been resumed, and the committee plans to wipe out all the deficit and have the magazine on a self-supporting basis.

JOINT USE OF POLES

A meeting of the special joint committee on joint use of poles was held on Wednesday morning, Jan. 28.

The committee members present were W. J. Harvie, Hagerstown, chairman, and Albert S. Richey, Worcester; W. S. Twining, New York; E. G. Allen, New York; Farley Osgood, Newark; Percy H. Thomas, New York; F. B. H. Paine, New York, and W. T. Oviatt, Providence. The others present were S. L. Rhodes, New York, in place of F. H. Bethell, committee member; H. S. Warren, New York, and H. C. Donecker, Newark.

Professor Richey presented a detailed statement of the number of suggestions and criticisms which had been sent to the committee. On motion, the chairman was authorized to report to the general conference on Friday, Jan. 30, that the replies indicated the need for a joint pole agreement, that the changes proposed were under consideration by the committee and that a revision would be sent out to all member companies about May 1 for the purpose of securing further suggestions which will be considered in the preparation of the final report to be presented at the October, 1914, convention.

COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

At the meeting of this committee Chairman Storrs announced that the committee had already held two preliminary meetings during the past month and had outlined an aggressive campaign for the increase of the number of individual members and the formation of company sections. He also said that through the efforts of the committee 500 individual members had been secured since the last Atlantic City convention, and a company section organization had been practically perfected in Washington. The opening gun of the next part of the campaign was the paper by Martin Schreiber, presented before the general meeting on Friday. This paper is designed to secure the co-operation of the officials of the member companies in promoting individual membership. The committee is also prepared to give its assistance where desired in the organization of company sections.

EDUCATION

Those in attendance at the meeting of the committee on education were Prof. H. H. Norris, chairman; H. A. Bullock and Martin Schreiber. This committee plans to utilize the experience gained in the past four years to encourage the preparation of courses suitable for electric railway employees by successful existing educational institutions engaged in correspondence and extension work. This work is to be conducted from association headquarters.

COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL

The following attended the meeting of the committee on compensation for carrying United States mail of the American Association: Joseph K. Choate, H. A. Nicholl, P. N. Jones, A. R. Piper, H. B. Potter and C. E. Learned. It was decided that the committee should go to Washington at some future time to present the claims of the electric railways for larger compensation.

COMMITTEE ON SUBJECTS

At the meeting of the committee on subjects of the American Association several subjects for discussion at the October convention were approved. The following were present: James D. Mortimer, chairman; Calvert Townley and J. H. Hanna. E. C. Foster approved the subjects by letter.

SECTIONAL ASSOCIATIONS

The attendants at the meeting of this committee were C. L. Henry, chairman; R. P. Stevens, S. K. Colby, H. C. Donecker, E. S. Wilde, J. W. Hancock, Roanoke, Va.; H. M. Stine, Harrisburg, Pa. Mr. Wilde represented the New England Street Railway Club and the Massachusetts Street Railway Association, Mr. Hancock the Virginia Public Service Association and Mr. Stine the Pennsylvania Street Railway Association. After discussion the committee decided not to suggest to the association any modifications in the plan adopted at the Atlantic City convention by which any sectional association could join the American Electric Railway Association, namely, that all of its members were members of the American Association. At the same time the committee believed that this question should continue to receive consideration. It also decided to request the executive committee to set forth the advantages of becoming sections of the American Association to the various associations in different parts of the country and to urge them to join.

EXECUTIVE COMMITTEE TRANSPORTATION & TRAFFIC ASSOCIATION

The executive committee of the Transportation & Traffic Association held its meeting Thursday morning. Those in attendance were J. K. Choate, H. A. Nicholl, R. E. Danforth and E. B. Burritt, secretary. Mr. Burritt read a letter from Mr. Hegarty, president of the association, stating that he had retired from railway service and offering his resignation for this reason. Upon motion the secretary was instructed to take a letter ballot of the members of the executive committee to decide whether this resignation should be accepted. The committee also decided to ask for a ballot of the entire committee whether a new joint committee with the Accountants' Association should be appointed, to be known as the committee on transportation accounting. The members of this committee to be appointed by the Transportation Association would be three in number, and the committee would take up such subjects of mutual interest between the transportation and accountants' associations as should be assigned by the executive committees of those organizations.

EXPRESS AND FREIGHT TRAFFIC

This committee held a meeting on Thursday afternoon at 2 o'clock. The following committee members were present: F. D. Norviel, chairman; C. T. Battey, George H. Harris, F. W. Watts and T. C. Cherry. The committee fully discussed the following assigned subjects for the purpose of making definite recommendations in its next annual report: (a) making a compilation and digest of franchise and ordinance requirements; (b) making a study of systematic promotion of this business; (c) taking up recommendations of the 1913 committee for further consideration, including Question 18 (committee's report), and (d) submitting types of organization of freight departments as used by various representative roads. The ultimate purpose of the committee is to formulate a uniform method of compiling rates, divisions, classifications, weights and inspection for the interchange of traffic between electric lines, and to bring about its adoption, as far as possible, by all lines for local use.

FARES AND TRANSFERS

The fares and transfers committee met on Thursday at 10 a. m., with J. V. Sullivan, chairman, and J. M. Learned present. The committee had invited manufacturers of transfer-issuing devices to be present at the meeting and the morning session was spent in an examination of the apparatus of the Automatic Appliance Company, Boston, Mass., and the Ohmer Fare Register Company, Dayton, Ohio. The afternoon session was taken up with reading communications from absent members of the committee and with discussing points about which the committee intends to question member companies, such as the following: the extent to which fare boxes have been perfected; their cost of maintenance; the question as to whether increased receipts result from their operation; the use and original cost of metal tickets; transfer-issuing machines; the practicability and advisability of bodily transfer of passengers in controlled areas; methods of accounting for free transportation, particularly persons with badges or uniforms.

A sub-committee composed of G. K. Jeffries and P. Dohrman was appointed to look into the question of interurban operation, with particular reference to the registering of fares and transfers.

TRAINING OF TRANSPORTATION EMPLOYEES

A meeting of this committee was held on Thursday morning at 10 o'clock. Members of the committee present were J. T. Crabbs, chairman, and E. E. Strong. The committee discussed the following assigned subjects preparatory to making its next annual report: (a) "safety first" movement; (b) bringing up to date the digest of state and municipal regulations affecting employment, as covered by the 1912 committee; (c) recommended practices of handling bulletin boards; (d) study of the various methods of paying wages, that is, the disbursement to the men, and (e) recommendations regarding the standardizing and use of training schools, instruction cars and apparatus for properties of various sizes. It was decided that if the committee found it possible and expedient its report should also include some recommendations based on the constructive work of the committees of previous years.

SCHEDULES AND TIMETABLES

The meeting of the committee on construction of schedules and timetables was held Thursday morning, Dec. 29. The committee members present were J. J. Dempsey, chairman, Brooklyn; Alexander Jackson, Newark; J. W. Howden, Toronto, and J. P. Barnes, Syracuse. The committee first discussed the question of improving running time in city operation through such devices as the skip-stop or limited car service. Of the uncompleted subjects of the 1913 committee, the present committee will take up only that of obtaining individual car mileage. The question of "turn-backs" was then taken up, after which the committee considered the compilation of a list of individual features covering the construction of timetables. The meeting was then adjourned.

COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

The meeting of the joint committee of the Accountants' and Engineering Associations on the life of railway physical property was attended by the following: Robert N. Wallis and Martin Schreiber, co-chairmen; Robert B. Rifenberick and Edwin Gruhl. The committee decided that its most important work for the coming year would be to co-operate with the committee of the American Society of Civil Engineers now considering the subject of valuation for rate-making purposes and also with commissions and any other bodies or societies engaged in valuation work. It will also bring the bibliography submitted by the committee at the 1912 convention up to date.

EXECUTIVE COMMITTEE CLAIMS ASSOCIATION

The meeting of the executive committee of the Claims Association was called on Thursday at 10:30 a. m., with President F. Weh in the chair. There were also present W. Tichenor, R. E. MacDougall, B. B. Davis, P. C. Nickel, F. J. Whitehead, S. B. Hare, J. S. Kuba, proxy for C. B. Proctor; H. K. Bennett, proxy for George Carson, and H. B. Brown, ex-president and ex-officio member of the committee. The report of the subject committee was read by the chairman, M. P. Spillane. The following subjects were approved: (1) How claim investigations should be conducted from the legal point of view, with defense as well as adjustment borne in mind; (2) claims department policies and principles, this subject being divided as follows: relations of claim department to the public, the psychology of the claims department, the efficiency of claims department work, and office kinks in the claims department; (3) the question of the benefit of publicity in claim department work and the extent thereof. The motion was made by Mr. MacDougall and passed that the work at the annual convention should be extended to include Thursday morning, and that Wednesday should be devoted to the subject of accident prevention and a general discussion thereon. Heretofore the session of the Claims Association has been terminated on Wednesday.

In the afternoon a joint meeting of the Accountants' and Claims associations' executive committees was held to discuss the subject of the classification of damage accounts. A committee composed of H. K. Bennett and P. C. Nickel was appointed for the Claims Association to meet with a similar committee of the Accountants' Association and to report at the next convention. Resolutions of regret at the resignation of Mr. Donecker as secretary were passed.

TRANSPORTATION ENGINEERING

The meeting of the transportation engineering committee was held on Friday morning at 10:30, with R. N. Hemming, co-chairman, of the Engineering Association, and C. N. Wilcoxon, of the Transportation & Traffic Association, present. Owing to the fact that four members of the committee were unable to be present, only a general discussion was made of the topics assigned to the committee by the executive committee, namely, (a) two or more car operation, covering passenger service and express and freight service, and (b) effect of car and equipment design on the duration of stops. It was stated that a meeting of the committee will probably be called early in the spring in some city of Ohio or Illinois in order that all the members of the committee may find it more easily possible to attend.

CAR EQUIPMENT

The meeting of the committee on car equipment was held on Thursday, Jan. 29. Those present were: F. R. Phillips, chairman, Pittsburgh; L. M. Clark, Indianapolis; J. P. Barnes, Syracuse; W. R. McRae, Toronto; R. N. Hemming, Anderson, and F. J. Doyle, Schenectady. Edgar G. Deis represented W. G. Gove, vice-chairman, Brooklyn.

The first subject considered was wires and cables for car equipment. The committee will elaborate last year's report up to the point of making specifications for wire.

The next matter was that of air-brake hose specifications. It is possible that the committee will take up this matter with the Master Car Builders' and Air Brake associations, which have been very active in this work.

Following this subject the committee discussed the lighting of electric street cars, with particular reference to the application of high-efficiency lamps to semi-indirect and indirect lighting systems.

The committee then considered an outside suggestion for a proposed specification for gears and pinions. The communication was referred to the sub-committee on steel wheels for attention as soon as convenient.

Lightning protection and its best location in the wiring circuit were next considered. In this connection conduit methods, grounded or insulated controllers, shocks to passengers and like questions will be taken up. An extensive data sheet will be prepared to cover numerous features which affect the behavior of lightning protection equipment, even to the insulating qualities of ballast and the influence of steel in car construction.

Mr. Barnes then offered for discussion the minutes of the meeting of the sub-committee on steel wheels as held at New York Jan. 6, 1914. An account of this meeting was published on page 86 of the ELECTRIC RAILWAY JOURNAL for Jan. 10, 1914. No important changes were made in this report. At Mr. Barnes' suggestion, also, the matter of gages was postponed.

POWER DISTRIBUTION

The committee on power distribution met on Thursday, Jan. 28, with the following members present: G. W. Palmer, Jr., chairman; Prof. A. S. Richey, Gaylord Thompson, Charles Rufus Harte, R. H. Rice, F. H. B. Paine and C. F. Woods.

The first matter to be discussed was that of revising the specifications for trolley wire. Professor Richey, as chairman of the sub-committee covering this subject, reported that the sub-committee met in November with the sub-committee of the American Society for Testing Materials and had continued the consideration of the specifications, embodying therein recommendations on elongation and torsion tests. The specifications included not only round wire but also grooved wire and figure-eight wire, the latter being included at the request of the American Society for Testing Materials on account of its use in mine work. There was a general discussion on the matter of omitting the torsion test on figure-eight and grooved wire and on the possibilities for substituting some other test to take its place. The torsion test could not be satisfactorily used with the latter two forms of wire on account of the small cross-section through the body of the wire so that the tensile and elongation tests were the only ones available at the present time.

Mr. Rice, as chairman of the sub-committee on specifications for rubber-insulated wire and cable, gave an account of the work of the sub-committee, and this was followed by an extended discussion on the revision of the details of the proposed specifications as published in Appendix A of the 1913 committee's report. In the discussion it was brought out that these specifications could be harmonized in all essential features with the specifications of five other technical societies. The report was approved subject to such minor changes as had been brought out in the discussion.

In the matter of specifications for overhead construction it was decided to leave the suggested revisions to the sub-committee on overhead construction. The sub-committee on specifications for concrete poles, of which Mr. Rice was chairman, reported progress, stating that an account of the experiences of the New York State Railways had been obtained in detail, together with a mass of other data. It was expected that this information would be collated for the next meeting. Mr. Thompson spoke of the formulas for strength and deflection of concrete poles and said that there was a possibility of deriving simple equations for hexagonal poles in case they were desirable. After a general discussion on weights, methods of handling and proper cross-sections, it was decided that there was necessity for having experiments made on actual poles of the design given by the proposed formulas, and it was left to Mr. Rice to make the necessary arrangements. The committee was also to continue its elaboration of the theoretical considerations.

Mr. Harte, as chairman of the sub-committee for standard overhead-line construction and material, reported progress and outlined plans for the 1914 report. These included the consideration and making up of specifications and establishing standards for different classes of material.

The matter of revision of such previous standards or recommended practices as have been recommended by the power distribution committee was then taken up. Professor Richey read a letter from the Bureau of Standards stating that minor changes had been made in that organization's specification for copper wire tables for the purpose of allowing for the variations in length and size of wire which would accord with the listed changes in temperature. After a general discussion it was decided that Professor Richey should report on these revisions. It was also decided that Professor Richey's sub-committee should obtain and discuss the A. S. T. M. specifications on hard-drawn, semi-hard-drawn and soft copper wire, not including trolley wire.

In the matter of electric wire and cable terminology, Chairman Palmer read a letter from the Bureau of Standards calling attention to minor changes which had been made in its nomenclature, and he stated that he would report in full upon these matters. Chairman Palmer also suggested a revision of the specifications for galvanizing on iron and steel so that they would cover either sherardized or galvanized metal, and it was decided that he should make a report on this matter.

BLOCK SIGNALS

The joint committee on block signals of the Engineering and Traffic & Transportation Associations met on Thursday, Jan. 29. There were present from the Engineering Association J. M. Waldron, co-chairman; Gaylord Thompson and C. H. Morrison. From the Transportation & Traffic Association there were present C. D. Emmons, co-chairman; J. W. Brown, J. J. Doyle and H. A. Nicholl.

Mr. Waldron, after opening the meeting, submitted a letter from the executive committee of the American Electric Railway Engineering Association giving the following subjects as assignments for the work of the committee during the coming year: (*a*) to bring up-to-date the digest of block signal law, and rulings on block signals and safety devices; (*b*) to make a further study of installations made subsequent to the 1913 report; (*c*) to consider the design of standard signal apparatus.

It was decided that subject *a*, as proposed by the executive committee, should be assigned to Mr. Doyle as a sub-committee of one, and that subject *b*, as proposed by the executive committee, be assigned to Mr. Nicholl as chairman of a sub-committee, with Mr. Emmons acting on this sub-committee in co-operation with Mr. Nicholl. In the discussion on this subject it was decided to include in the scope of its work the matters of efficiency of signal systems and cost of signal operation and maintenance. Mr. Brown suggested that in submitting the data sheet for information from the various member companies a definition of "signal failure" should be included, and it was decided to follow this suggestion, using the definition which appears in the Signal Dictionary.

Mr. Waldron pointed out the desirability of bringing the bibliography up to date and offered to act on a sub-committee to cover this work. The suggestion was approved with the recommendation that Mr. Cloud should be requested to act with Mr. Waldron.

Mr. Waldron also suggested that the matter of rules for signaling, including interlocking plants and cab signals, should be considered, completing the report of last year. The suggestion was approved, and Messrs. Brown, Thompson and Waldron were assigned as a sub-committee to cover this subject.

Messrs. Waldron, Leisenring and Morrison were then assigned as a sub-committee to take up subject *c* as proposed by the executive committee.

The necessity for further consideration of light signals was brought up and Messrs. Morrison and Nicholl were requested to take up this work. Messrs. Waldron and Morrison were then assigned to act as a sub-committee on automatic stops, bringing the information contained in previous reports of the committee up to date.

After a general discussion it was decided that the next meeting should be held in Chicago at the time of the American Railway Engineering Association's convention in March. The members are to meet on Tuesday morning, March 17, at 10 o'clock in the Congress Hotel, Chicago.

COMMITTEE ON STANDARDS

The meeting was attended by Martin Schreiber, who presided in the absence of Chairman H. H. Adams, and G. H. Pegram, W. H. Roberts, Norman Litchfield, F. R. Phillips, E. B. Katté, G. W. Palmer and J. Lindall. The committee considered and approved the recommendations referred to it by the executive committee of the association as covered in the 1913 *Proceedings*, pages 313 and 314. These referred to specifications for 600-volt d.c. overhead construction, the use of continuous track circuits for the control of automatic signals for high-speed service, and light aspects for car-spacing signals operated by trolley contactors or other forms of end-set device.

In the discussion attention was directed to the proper height of trolley wire at steam railroad crossings, on which there is no agreement among the steam roads. The standard adopted is the minimum, it being understood that in many cases higher elevation will be demanded. The standards for signal aspects were adopted after suggestions from signal manufacturers had been considered. No change was made, however, as there were no fundamental data presented which had not already been considered by the joint committee on block signals for electric railways.

The joint use of track by steam and electric railways in relation to signaling was considered in connection with the adoption of signaling standards, especially in view of the fact that these are the first signal standards to be adopted. While it was realized that steam and electric railway signals are at present radically different, no confusion is anticipated on roads carrying both kinds of traffic, as, for the present at least, electric cars operated over steam track will be in charge of trained steam enginemen.

President J. H. Hanna expressed for the committee his gratification that the executive committee of the American Association had formally approved the standards and recommendations of 1912 and 1913 and the revised rules for adopting standards. This puts the work of the Engineering Association's standards committee and those who have contributed to it on a new and official basis.

WAY MATTERS

The meeting of the committee on way matters was scheduled for Wednesday, Jan. 28. Those present were: C. S. Kimball, Washington, chairman; E. H. Berry, Cincinnati; C. H. Clark, Cleveland; E. P. Rounday, Syracuse; W. F. Graves, Montreal; R. C. Cram, Brooklyn; C. W. Gennet, Jr., Chicago, and J. B. Tinnon, Joliet.

The discussion on the first subject, "Proper Foundation for Tracks in Paved Streets," was opened by Mr. Cram. The speaker did not believe that a track should be constructed on the basis of more than twenty years' life, and this was one reason why he did not favor the general use of a heavy concrete sub-base. After a general discussion on soils, sub-base and ballast, the committee decided to send out a circular letter to find out what railways had done to determine the bearing values of different soils.

The companies will also be asked to explain why they are using specific kinds of rails. In addition to this, the committee will study the rail reports of the American Society of Civil Engineers and the American Railway Engineering Association. Mr. Cram will make a separate report on this subject for the committee.

The "Use of T-Rails in Paved Streets" and "Pavement for Use in Connection with Girder and High T-Rails" were next considered. Study will be made of the report of the previous committees, and members will take photographs of different types of track as used for given periods and conditions. Messrs. Clark and Cram will submit figures on the comparative costs of T and girder rails, detailed maintenance figures on T-rail will be obtained from a large city of the Middle West and comparison will be made of liability of both classes of rails to corrugation.

As the result of a general discussion on paving, several members promised to prepare notes on traffic studies and their relation to paving life. The committee then worked out a data sheet on T-rail paving and foundation.

The members then discussed the question of paving in connection with the use of girder and high T-rail. Paving was classified for study under the following heads: granite block, Medina pressed sandstone block, creosoted wood block, slag block and vitrified paving brick. Mr. Clark will write a report on this subject which will be submitted to each member for suggestions and referred to the chairman for summary and comment. The subject of "alloyed steel rails," including special work, was next taken up. After discussion, Mr. Gennet agreed to prepare a report on this subject.

A supplementary session of the committee to discuss details was held on Thursday with President Hanna present.

COMMITTEE ON ELECTROLYSIS

The committee on electrolysis held two meetings during the week. The first was held on Tuesday, Jan. 27. Prof. A. S. Richey, chairman; G. W. Palmer, Jr., and E. J. Blair being present. At this meeting the committee talked over in a general way the discussion on the report of last year and the comments which had been made since the convention regarding both the report and the discussion.

The committee also discussed in general the tentative scope of the report for the current year. This will, in all probability, be along lines of last year's report, but will go into considerably greater detail regarding the engineering features of the subject.

On Thursday, Jan. 29, a second session was held, the committee from the Engineering Association meeting with Calvert Townley, representing the electrolysis committee of the American Association, in order to arrange a definite program for the new work. It was decided to follow the plan outlined above.

HEAVY ELECTRIC TRACTION

A meeting of the committee on heavy electric traction was held on Friday afternoon, Jan. 30. Those present were E. R. Hill, chairman, New York; E. B. Katté, vice-chairman, New York; J. M. Bosenbury, Peoria, and C. H. Quinn, Roanoke. The first subject considered was overhead clearances. It was decided to co-operate with other associations interested in this subject and also to comply with the suggestion of the American Railway Engineering Association that a fifth diagram covering minimum 600-volt d.c. clearances be added to those given in the committee report of last year. The second question taken up was that of third-rail clearances and train stops. This matter, as well as a reconsideration of third-rail gages, will be taken up with associated bodies including the American Institute of Electrical Engineers. After a general discussion of the operating conditions which affect locomotive design, the committee decided it would be opportune to make a series of drawings showing the drives of modern electric locomotives and the conditions for which they are used.

EXECUTIVE COMMITTEE ACCOUNTANTS' ASSOCIATION

The executive committee of the Accountants' Association had a large attendance at its meeting. The following were present: M. W. Glover, president; W. G. Nicholson, H. D. Vickers, Robert N. Wallis, M. R. Boylan, Thomas P. Kilfoyle, H. B. Cavanaugh, Walter Shroyer, E. L. Kasemeier, H. S. Swift, P. S. Young and C. S. Mitchell.

President Glover announced that H. B. Cavanaugh, Cleveland, Southwestern & Columbus Railway, has been appointed a member of the committee on interline accounting. He also announced that, on account of inability to give time to the work, J. H. Neal, Boston Elevated Railway, had resigned from the committee on education, and that John L. Conover, Jr., Public Service Railway of Newark, N. J., had been appointed to succeed him.

In accordance with a suggestion of W. F. Ham, Washington Railway & Electric Company, the committee to attend the 1914 annual meeting of the National Association of Railway Commissioners was appointed. Following are the members of this committee: W. F. Ham, H. J. Davies, Cleveland Railway, and C. L. S. Tingley, American Railways Company.

It was decided to change the name of the committee on prepayment car operation to prepayment car accounting, and that the members of this committee should become the accounting members of a joint committee on transportation accounting, should the executive committee of the Transportation & Traffic Association agree in authorizing the appointment of such a committee.

President Glover read a letter of invitation to attend a meeting of the Central Electric Railway Accountants' Association, which is to be held probably in February to discuss the new system of accounting which will be issued tentatively in the near future by the Interstate Commerce Commission. It was decided that the association should be represented at this meeting. The members of the committee on a standard classification of accounts have been asked to attend the meeting. It was decided that the secretary should ask members of the association to send their criticisms of the new classification directly to the classification committee.

The Accountants' Association will have a joint committee with the Claims Association to prepare a classification and distribution of expenditures for claim department operations.

W. H. Forse, Jr., Union Traction Company of Indiana, has resigned from the committee on education. G. G. Whitney, Washington Railway & Electric Company, was appointed to fill the vacancy.

It was decided to appoint a committee on accounting definitions. The following were appointed: Frederic Nicholas, ELECTRIC RAILWAY JOURNAL, chairman; W. B. Brockway, Ford, Bacon & Davis, and Robert N. Wallis, Fitchburg & Leominster Street Railway.

The following subject for a paper to be presented at the 1914 condition was approved: "Accounting Treatment of Bond Discount."

STANDARD CLASSIFICATION OF ACCOUNTS

The committee on a standard classification of accounts of the Accountants' Association held sessions each day from Jan. 26 to 29, inclusive. The following members of the committee were present: H. L. Wilson, chairman; W. B. Brockway and W. F. Ham. The Interstate Commerce Commission was represented by George Geekie, examiner.

The work on which the committee has been engaged for some time is the preparation of a form of general balance sheet, income account and profit and loss account, and a revision of the classification of operating expenses and operating revenues and road and equipment accounts. A little later these will be submitted to all electric carriers for suggestion and criticism. There will be a little delay in the issue of the circular, including the new classifications, which is to be sent out by the Interstate Commerce Commission. It is hoped, however, that the circular will be ready for submission to electric carriers in about thirty days. It is hoped that the new system will become effective on July 1, 1914.

COMMITTEE ON EDUCATION OF THE ACCOUNTANTS' ASSOCIATION

The committee on education of the Accountants' Association met on Jan. 29. Those present were F. J. Pryor, Jr., chairman, and John L. Conover, Jr. The committee has made a tentative arrangement with Prof. John R. Wildman, of the New York University School of Commerce, Accounts and Finance. The plan is to offer a course of sixteen lectures, to be presented by correspondence during a period of two years, or at the rate of eight lectures a year. The course will cost $10 a year for each subscriber. Examinations will be held and the answers of subscribers will be marked. The arrangement is contingent upon acceptance by 400 subscribers.

The committee also will prepare circulars calling the attention of member companies to the advantages the plan offers to their employees and urging acceptance. These circulars, according to the conclusion of the committee, will be issued from the office of the secretary of the American Association. One of the suggestions received by the committee is that the course of study offers an opportunity for companies to pay part of the expense for the benefit of the employees if they wish to do so.

COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING

The committee on express and freight accounting of the Accountants' Association outlined plans for the preparation of the report for the 1914 edition. The meeting was attended by E. L. Kasemeier and Walter Shroyer.

JOINT COMMITTEE ON ENGINEERING ACCOUNTING

The joint committee of the Engineering and Accountants' associations met on Wednesday afternoon. The Engineering Association was represented by J. P. Barnes, co-chairman; J. P. Ripley, F. A. Bagg and Lee H. Parker. The Accountants' Association was represented by M. W. Glover, J. C. Collins and J. M. Joel. The committee discussed definitions and plans in connection with the subjects of interdepartmental and overhead charges and cost accounting assigned to it by the executive committee. Motions were passed that the co-chairmen should appoint a sub-committee to gather data and formulate a report on the subject of cost accounting, to be presented at the next meeting of the committee, and also that since the subject of overhead charges had been referred to the joint committee a sub-committee should be appointed by the co-chairmen to investigate the subject in consultation and co-operation with the committee on overhead charges of the Accountants' Association.

Plans have been approved in Chile for the construction of an electric railway to connect Villa Alegre station with Villa Alegre town, in the province of Linares, and an electric railway in Valparaiso. The Buenos Aires, Villasana and Lo Prado Districts Tramway & Electric Light Company, Ltd., has secured a concession to construct an electric railway and also lighting facilities in the districts named.

Equipment and Its Maintenance

Short Descriptions of Mechanical and Electrical Practices from Every Department of Electric Railroading

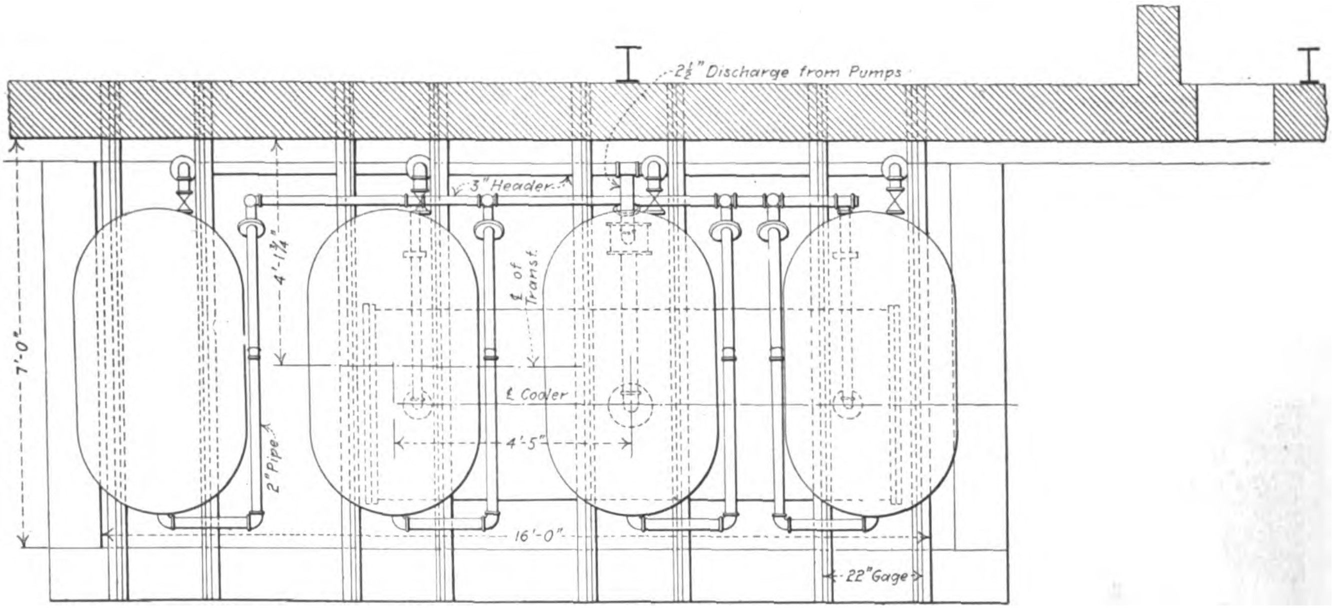
(Contributions from the Men in the Field Are Solicited and Will Be Paid for in Accordance with Our Regular Rates.)

SURFACE CONDENSERS FOR COOLING TRANSFORMERS

BY H. ROOT PALMER, GENERAL SUPERINTENDENT OF LIGHT AND POWER, VIRGINIA RAILWAY & POWER COMPANY

As a result of the construction of a new power station by the Virginia Railway & Power Company, Richmond, Va., four 750-kw, 2300-volt to 13,200-volt, water-cooled, oil-insulated, indoor-type, single-phase transformers which had been used at the old station as step-up transformers for transmission to substations became available for other purposes. When it was first decided to use these transformers in a substation where additional step-down capacity was required, several methods of cooling were considered.

Owing to the lack of available space, it was necessary to place them outside. To provide new cases of outdoor type for straight oil cooling would have cost, approximately, $1 per kw, with a reduction in capacity of 33 1/3 per cent. If cooling with city water had been continued, the cost would have been approximately $400 a year. It would also have been necessary to provide new tops with outdoor type bushings. External radiation was considered, but the cost of operation was so high that the plan was abandoned. Finally, we worked out the following scheme by which the transformers are operated continuously at rated capacity, and with the use of only a small amount of city water, at loads 50 per cent above rating during the peak periods and at temperatures no higher than the original guarantee.



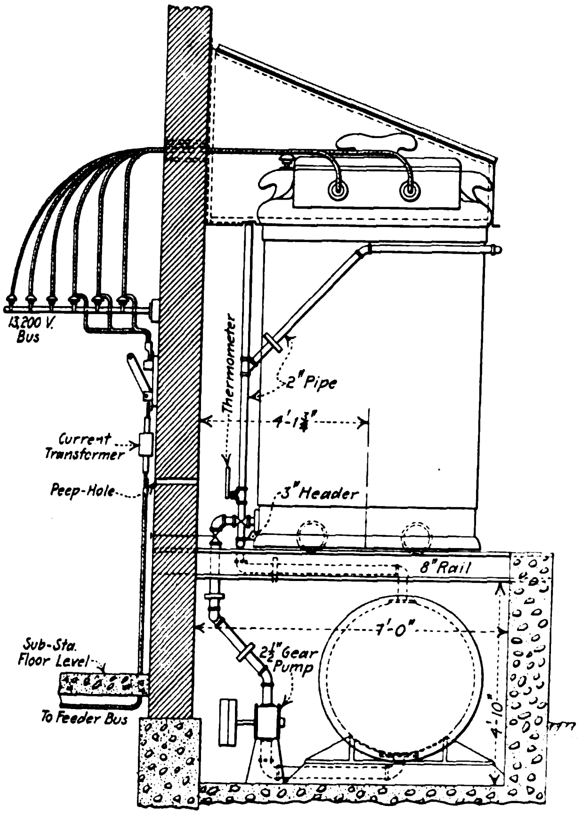
Plan Showing Cooling System for Bank of 750-Kw Transformers

A surface condenser of approximately 2000 sq. ft. cooling surface was installed below the transformers and was equipped with a 48-in. Davidson propeller fan. This fan was bolted directly to the end of the condenser, the water boxes on both ends having been removed in such a manner as to give a circulation of air through the condenser tubes of approximately 15,000 cu. ft. per minute. A 2½-in. electric-driven geared pump was used to circulate the oil through the condenser and transformers.

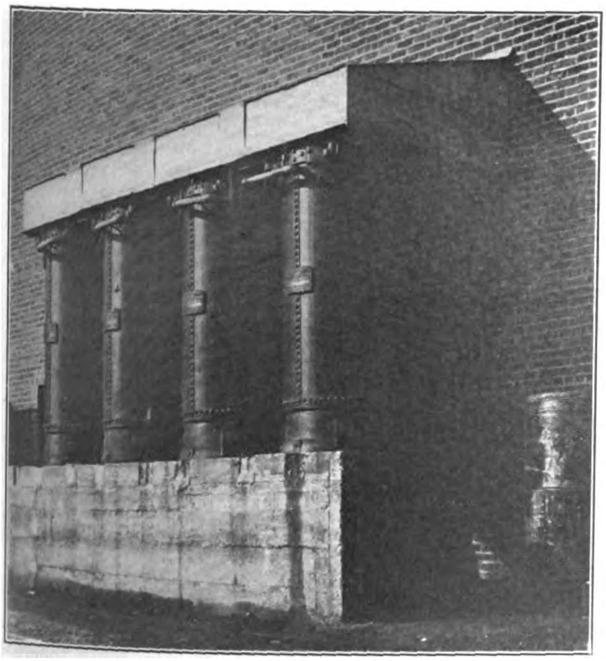
Oil is pumped from the condenser to a 3-in. header, connections being made from this header to the bottom of each transformer. An overflow is provided at the top of each transformer, the oil returning to the condenser by gravity. The water coils are also connected with the city mains, and, in cases of emergency, city water may be circulated through the coils, giving rated capacity without the cooling system in operation.

To install these transformers outside of the station brought up the question of making them waterproof. The transformers were fitted with galvanized iron hoods, supported from the transformers and bolted against the station wall. The leads from each transformer were taken through wall bushings underneath the galvanized hoods and connected to the buses inside. Lugs were placed on the end of the buses and also on the end of the leads from the spare transformer, so that connections could be quickly made to any phase in case of transformer trouble. The accompanying drawings and halftone show the details of this arrangement.

Peepholes were cut in the substation walls opposite thermometers placed in the oil discharge from each transformer, and incandescent lamps are placed conveniently for reading the thermometer. The oil to each transformer is controlled by a valve with an extended stem and handwheel inside the station. This enables the operator to control the temperature of each transformer from the inside of the station.



Section of Cooling System for 750-Kw Transformers



Outdoor Installation of Indoor Transformers

As these transformers are outside, they can be operated continuously in cool weather at about 900 kw each, with the oil-circulating system alone, and over peak-load periods at capacities up to 1250 kw. In the latter case both oil and water-cooling systems are used.

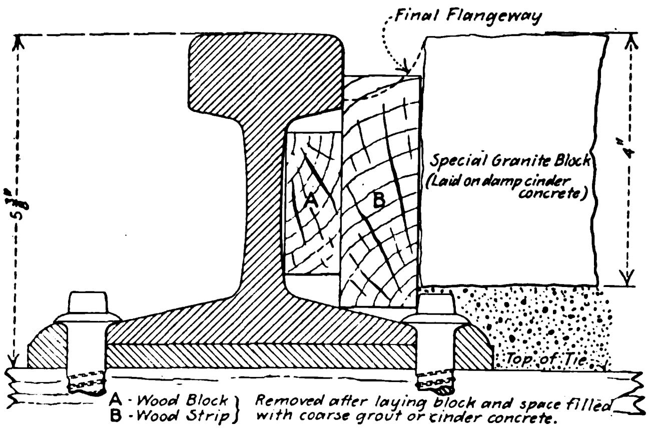
This plan and the details were worked out by W. C. Bell, assistant to the general superintendent of light and power, and at a cost considerably less than 50 cents per kw rated transformer capacity.

GRANITE-BLOCK PAVING FOR SHALLOW T-RAIL ON PARKED STREETS

BY E. L. MATHEWS, BROOKLYN RAPID TRANSIT SYSTEM, FORMERLY ENGINEER OF WAY AND STRUCTURE, CONEY ISLAND & BROOKLYN RAILROAD

The following method of paving crossings on a parked street, where the travel is at right angles with the tracks, has proved quite successful with the Coney Island & Brooklyn Railroad Company on its reconstructed Coney Island Avenue line. This line was laid with 80-lb. A. S. C. E. rail which necessitated shallow granite blocks.

A strip of wood of the thickness desired for the wheel groove was laid on edge against the gage line of the rails sufficiently below the rail level to allow the passage of car wheels over it. Small wood blocks were inset beneath the head of the rails to keep the strips in position. The blocks were then laid, using the planks or wooden strips as headers. After laying the pavement, the strips were carefully lifted from along the rails and the space thus left was filled with concrete to the level of the rail and pavement, thus allowing the car wheels to make their own groove in the moist concrete. In the first concrete mixture cinders were used, but afterward a cement grout was substituted, using a little more sand than was required for the joints between the paving blocks. This change was made merely as a matter of a working convenience. A strong cement grouting of one part cement and two parts sand was used for the joints in the pavement. On account of the shallowness of the pavement, the blocks were laid on a layer of moist cinder concrete instead of a cushion of sand.


Final Flangeway
Special Granite Block (Laid on damp cinder concrete)
A
B
5⅝"
4"
Top of Tie
A - Wood Block
B - Wood Strip
Removed after laying block and space filled with coarse grout or cinder concrete.

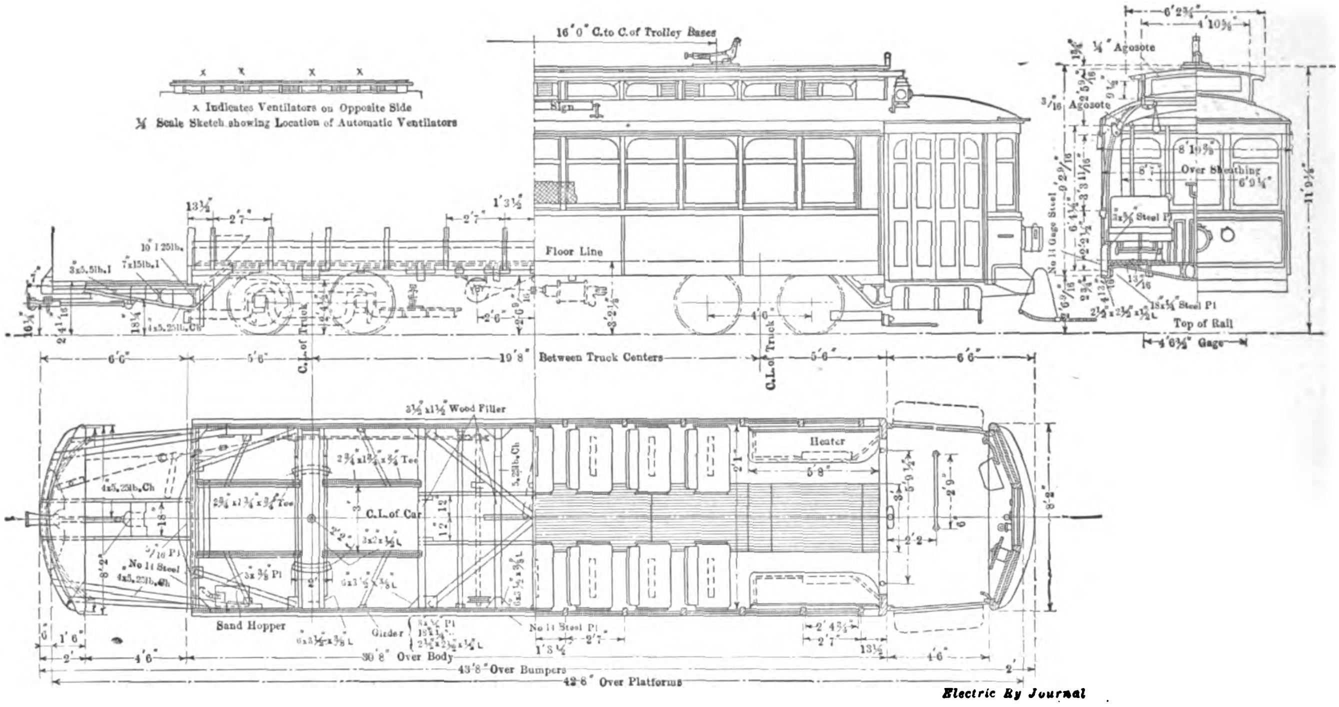
Cross-Section Showing Method of Granite Block Paving in Shallow T-Rail

The first crossings installed have been in place for about three years and are in practically the same condition as when originally laid.

Purdue University has issued its December, 1913, Bulletin, which contains an annual report by the officers of that institution. Statistics show that out of the total enrolment of 2191 students in the college year 1912-1913, 348 were enrolled in the regular four-year electrical engineering course. Out of the total number of 312 graduates who received degrees in 1913, sixty-nine received bachelors' degrees in electrical engineering and five advanced degrees in electrical engineering.

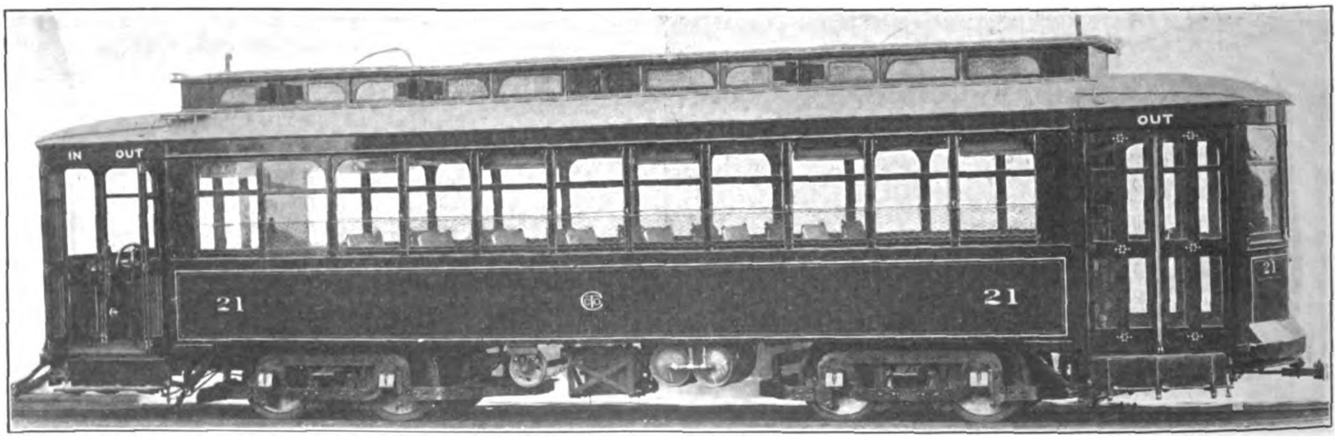
CAPITAL TRACTION COMPANY'S SEMI-STEEL PAY-WITHIN CARS

The Capital Traction Company, Washington, D. C., has recently added for service on its Chevy Chase suburban line five semi-steel cars of the type illustrated. Like its earlier prepayment cars, this design is for pay-within operation. However, experience with the cars first used has led the company to make several changes in construction, and, in addition, the latest rolling stock embodies such innovations as light signals for the motorman and illumination with 36-watt tungsten-holophane units.


x Indicates Ventilators on Opposite Side
¼ Scale Sketch showing Location of Automatic Ventilators
16' 0" C. to C. of Trolley Bases
Sign
Floor Line
C.L. of Truck
19' 8" Between Truck Centers
¼" Agasote
3/16 Agasote
No 11 Gage Steel
Over Sheathing
Top of Rail
4' 8½" Gage
3½" x 1½" Wood Filler
Heater
C.L. of Car
Sand Hopper
Girder
No 11 Steel Pl
30' 8" Over Body
43' 8" Over Bumpers
42' 8" Over Platforms
Electric Ry Journal

Capital Traction Company—Plan and Elevations, Showing Construction and Seating Details

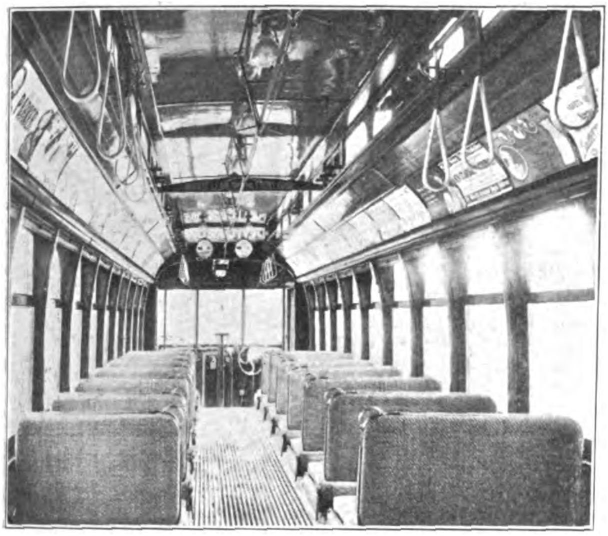
Like their immediate predecessors, the present cars are 42 ft. 8 in. over the platforms, 30 ft. 8 in. over the body and seat forty-four passengers in a combination of cross-seats with short longitudinal corner seats. The inside width of 8 ft. 3 in. permits 37-in. cross-seats with a 25-in. aisle between them. This is a gain of 4 in. to 5 in. in clearance as compared with the earlier cars, and this was obtained by choosing roof instead of drop sash. The side construction of these cars has been simplified still further by the use of hand-operated folding doors to inclose the vestibules. The door pockets which are necessarily required for sliding doors mean greater car cost and inconvenient shortening of corner seats. Folding doors also reduce the operating cost and weight as contrasted with a motor-operated sliding door. Wood was selected for the framing of these doors because of the difficulty which the company has had in securing replacement material for steel doors. In accordance with modern practices, all door panels are of clear wired glass.


IN OUT
OUT
21
21
21

Capital Traction Company—New Near-Side Cars with Hand-Operated Folding Doors

As for the general construction materials of the car, the important members of the underframe are of commercial steel shapes of the sizes indicated on one of the accompanying drawings, the body is of wood except for a sheathing of No. 14 steel up to the window line and the roof has an agasote headlining. The monitor design has been retained, but it has been fitted with Automatic ventilators.

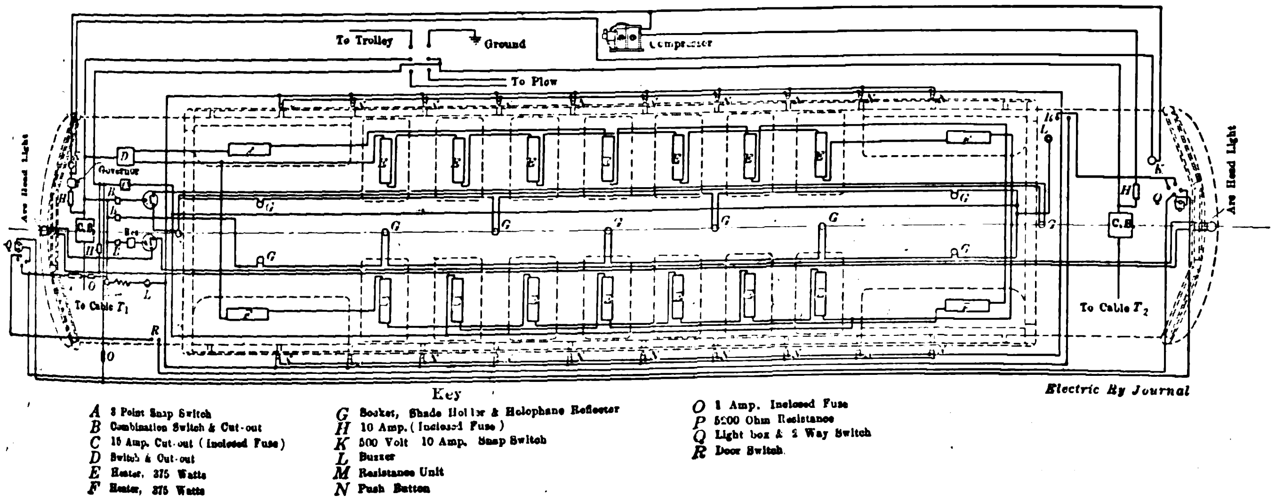
The cars, which were built by The J. G. Brill Company, are carried on Standard 0-50 trucks owing to their use for high-speed suburban service. The braking and motive equipment comprises Westinghouse air brakes, four GE-200 motors and K-29-B platform controllers with two auxiliary contactors. This form of control was described in the ELECTRIC RAILWAY JOURNAL, page 120, Jan. 15, 1910. Its chief purposes may be summarized as follows: When the controller is moved to the off position and also when it passes from the series to the parallel connections, the power circuit is broken in the contactors and not in the controller. The contactors also open if excessive current passes through the overload coil of the tripping switch.



Capital Traction Company—Tungsten-Holophane Lighting in Latest Pay-Within Cars

The Consolidated Car Heating Company furnished the buzzers for the push-button system, the heaters with thermostatic control and the light signals for the motorman. The last-named device was first installed by the Capital Traction Company in 1912 and has given satisfactory results. The signal is displayed before the motorman as soon as the doors close. It has proved a most desirable operating feature because it saves time for the conductor just when he is busiest collecting fares, makes it impossible for the conductor to signal the motorman before the door is closed and obliges the motorman to face forward at all times. Standard registers of International R-7 type are used for the separate registration of fares and transfers.

An interesting novelty for Washington is the system of tungsten lighting with holophane shades and reflectors. The lamps are of 36-watt capacity and are wired on two independent circuits located as shown in the wiring diagram. Several of the interior lamps are so placed as to illuminate the inside route and destination signs. The wiring diagram mentioned also shows the location of the wiring and switching equipment of other auxiliary circuits.


To Trolley
Ground
Compressor
To Plow
Arc Head Light
Governor
To Cable T_1
To Cable T_2
C.B.
Electric Ry Journal
Key
A 3 Point Snap Switch
B Combination Switch & Cut-out
C 15 Amp. Cut-out (Inclosed Fuse)
D Switch & Out-out
E Heater, 375 Watts
F Heater, 375 Watts
G Socket, Shade Holder & Holophane Reflector
H 10 Amp. (Inclosed Fuse)
K 500 Volt 10 Amp. Snap Switch
L Buzzer
M Resistance Unit
N Push Button
O 1 Amp. Inclosed Fuse
P 5200 Ohm Resistance
Q Light box & 2 Way Switch
R Door Switch

Capital Traction Company—Wiring of Tungsten Lighting, Heating, Door and Buzzer Circuits with Key to the Several Details of the Equipment

SINGLE-PHASE LOCOMOTIVE OF RHAETIAN RAILWAY, SWITZERLAND

An article by Hans Engel in the January issue of the *A. E. G. Journal* describes the locomotive furnished by the Allgemeine Company for the Rhaetian Railway, Switzerland. The machine is designated 1-D-1, which signifies that it is equipped with pony axles at each end and four intermediate driving wheels. The locomotive will be used between the famous winter resort of St. Moritz and Schuls and on a branch line between Samaden and Pontresina. The line is of 1-meter (39.37-in.) gage. It is operated by single-phase current at a pressure of 10,000-11,000 volts, sixteen and two-thirds cycles. It was stated in the order that the locomotive must be capable of drawing a train having a total maximum weight of 200 metric tons. It was particularly specified that a train having a total weight of 180 tons must be able to start on the grade of 2½ per cent and attain a speed of 17.4 m.p.h. in fifty-two seconds; further, that these trains must travel backward and forward over the entire line from St. Moritz to Schuls four times consecutively—that is, a total distance of 281 miles—without excessive heating of the electrical equipment. The maximum speed is 27.9 m.p.h. The type of brake specified was the Hardy vacuum brake.

The locomotive is constructed to run easily on curves in accordance with the nature of the track. It has two rigid and two movable coupled axles and two Bissel bogie trucks. The upper portion consists as usual of a closed machine compartment and two cabs.

The drive is accomplished by two motors, each having an hourly rating of 350 hp, with gear wheels on both sides which work on to a common gearing shaft. To equalize the pressure each of the gear wheels mounted on one shaft is provided with teeth set at an angle, this angle being opposite on each wheel. The gearing shaft drives the jackshaft lying between the third and fourth axles by means of coupling rods which are also set at an angle, and the jackshaft in turn drives the coupling axles.

Both motors are connected up in accordance with a method known as the double-feed system. On starting up, the rotor is short-circuited. The control is effected by electromagnetic contactors operated from the controller which, like the reversing controller for the motors, is fed with alternating current at 300 volts. Owing to the fine graduation of the voltage led to the motors, starting and speed regulation while running can be carried out smoothly and without any shock. Each motor can be separated from the other electrically in a very simple manner, so that if one motor becomes defective the locomotive can be satisfactorily operated with the other alone.

The electrical equipment further comprises two pantograph current collectors, the electro-pneumatically operated high-tension oil switch, the oil-cooled transformer, a motor compressor which generates the compressed air required for raising the current collectors and for the operation of the oil switch, the sander and the signal whistles, also a converter which provides the direct current for the lighting and oil switch release. Finally, the equipment for the vacuum brake, consisting of a motor pump and two brake controllers combined with air valves, should be mentioned.

The energy for heating the trains is taken directly from the transformer; 100 kw can be supplied for this purpose.

All current-carrying parts are inclosed in special compartments in order to insure the safety of the attendants. In all cases where the apparatus is under high tension these compartments are so interlocked that they can be opened only when the current has been cut off by lowering the pantograph collector. This safety feature is common to European electric locomotives.

The locomotive has covered a total distance of approximately 8680 miles during the first three months in which it has been running without developing any appreciable defects. No wear of the commutators was noticeable and the wear of the brushes was very slight. Similarly, the contactors have not required any overhauling whatever.

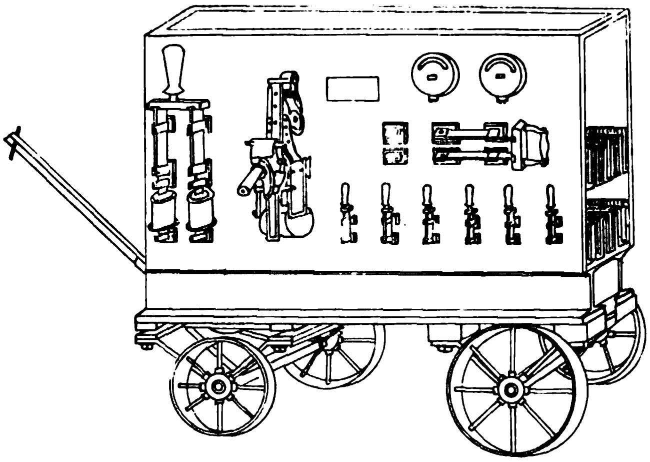
At the trial runs the locomotive complied with all the specified conditions.

ELECTRIFICATION OF MELBOURNE RAILWAYS

The abandonment because of insufficient condenser water of the Yarraville site originally selected for the power house for the electrified suburban railways of Melbourne will mean a considerable delay in the initiation of electric traction. The new site is ideal from the condenser point of view, and the foundations are also better. At present 300 men are engaged in making the necessary excavations for the foundations. None of the machinery is expected to arrive until the middle of 1914, when the power house steel work and equipment will be landed from England.

PORTABLE OUTFIT FOR SHOP AND TRACK WORK WITH ARC METHOD

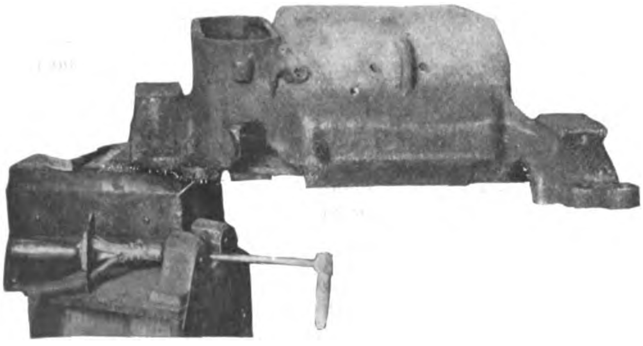
The Welding Materials Company, New York, in addition to its present single unit arc-welding equipment, has now brought out a compact, portable arc welder which is especially designed for electric railways. The welder may be operated from any source of direct-current voltage. The machine, which is called the "Wemco" portable arc welder, is shown in the accompanying line drawing. Its over-all dimensions are as follows: height, 53 in.; length, 48 in., and width, 24 in. Attachment to the trolley wire is made by means of a hooked pole and cable.



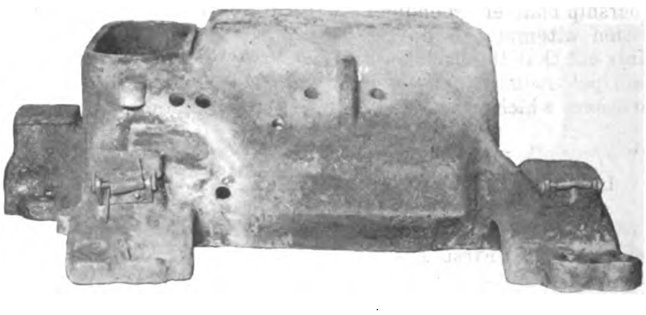
Portable Welder with Cover Removed to Show the Switching Apparatus, Meters, etc.

It is asserted by the manufacturer that by means of this method of arc welding manganese steel can be welded to the worn surface of open-hearth or Bessemer steel track work with the same ease as one would weld ordinary steel. In general, the outfit is adapted for welding rail joints, disintegrated and cupped joints and for rail bonding; also for shop use in welding broken and worn axle buttons, brakeshoe holders and many other items of electric railway equipment. When operated from the shop circuit the equipment may be used for cutting as well as for welding.

The apparatus is furnished with or without a truck and with a welded steel cover for protection against the weather for outside work. The approximate weight of the equipment without the truck is 1000 lb. The accompanying halftones show an old motor case with a lug broken off and afterward welded in position. The time occupied in making this repair was one hour and thirty minutes and the cost $2.80. This figure includes labor, electrical energy and material, and is based on unit prices of 1 cent per kw-hr. for energy and 30 cents per hour for labor.



Motor Shell with Lug Destroyed, Also Showing the Style of Arc Holder



Appearance of the Motor Shell After the Lug Had Been Arc-Welded to It

News of Electric Railways

Decision by Michigan Supreme Court on Verdier Act

Whether or not the amendment to the Detroit city charter providing for the municipal ownership of street railways adopted last April is constitutional was not passed upon by the Michigan Supreme Court in the decision handed down on Jan. 16 affecting the validity of the Verdier bill, an act designed to give Michigan cities the right to amend their charters piecemeal. Justice Brooke, whose opinion was concurred in by the majority on the municipal ownership question, says it is not determined whether any constitutional provisions were contravened in the municipal ownership amendment and "it should rest in abeyance until the matter is determined in proper proceeding." The court sustained the right of the city to increase its bond limit from 2 per cent to 4 per cent of the city's assessed valuation to acquire public utilities. Although the actual question of the municipal ownership amendment of last April was not taken up by the court, the decision gives the city the power to amend its charter in such manner as it deems advisable to acquire the street railway lines. Of course, every step taken by the city along this line is open to challenge, inasmuch as the court did not determine the validity of the present municipal ownership plan.

The decision has divided the city into two camps, due to the fact that a new charter has been prepared by a charter commission for submission on Feb. 10. Mayor Marx, who was elected on a municipal ownership platform, and many of his supporters have announced themselves as against the new charter on the ground that its municipal ownership provision will endanger what has already been accomplished. The supporters of the new charter point out that if it is adopted all question as to the validity of the charter amendment adopted last April will be removed because the new charter will, they believe, stand the constitutional test in so far as the municipal ownership section is concerned.

The principal effect of the court's decision is that it gives the city the right to amend any section of its charter so long as the amendments conform with the act. Heretofore it has been necessary in Michigan to adopt an entirely new charter before any amendments were valid. The decision does not pass upon the legality of the street railway commission, which was appointed several months ago by the Mayor and has asked the Detroit United Railway for an inventory of its property with a view to its purchase.

Corporation Counsel Lawson, of Detroit, in commenting on the court decision, stated that "it was made evident that the court did not intend to pass judgment on Detroit's most perplexing problems at this time." Allan H. Frazer, special attorney for the city in street railway matters, says that "further contest may be made against the municipal ownership charter amendment when the street railway commission attempts to do certain things under it," but he points out that the decision gives the right to any number of municipal ownership amendments to overcome any invalid provisions which may exist.

Methods Followed in Letting Rapid Transit Contracts in New York

Alfred Craven, chief engineer of the Public Service Commission of the First District of New York, adopted the plan of placing under contract first the most difficult work, in planning the rapid transit system now under construction. Preference was also given to the lines which would be necessary to enable both the Interborough Rapid Transit Company and the New York Municipal Railway Corporation to begin operation by Jan. 1, 1917, as contemplated by the dual system agreements. As far as Brooklyn is concerned, the New Utrecht Avenue elevated railroad has been placed under contract; the Gravesend Avenue elevated line would be under contract except for the failure of the commission to get the necessary consents of property owners and the necessity for applying to the Appellate Division for legalization of the route; plans for the Canal Street subway, to connect the Manhattan Bridge with the Broadway subway in Manhattan, will be ready for advertising within two or three weeks; the Broadway subway in Manhattan is under contract as far north as Twenty-sixth Street, and the remainder, between Twenty-sixth Street and Seventh Avenue, would be under contract except for the controversy which has arisen in regard to the Times Square station.

Plans for the extension of the Broadway subway through Fifty-ninth and Sixtieth Streets to the Queensboro Bridge will be ready for advertising by March 1. Plans for the Whitehall-Montague Street and Old Slip-Clark Street tunnels will be ready for advertising about Feb. 15. Plans for the Flatbush Avenue section of the Eastern Parkway subway will be ready for advertising about Feb. 1, and the plans for the remaining sections to Buffalo Avenue, about Aug. 1. Plans for the Nostrand Avenue branch of the Eastern Parkway subway will be ready by July 1, and those for the Livonia Avenue extension by Aug. 1. Mr. Craven reports that contracts for the reconstruction of existing lines in the Brooklyn system have already been let for the Broadway-Myrtle Avenue connection, the Lutheran Cemetery extension and the Sea Beach line.

The commission in now in communication with the federal government with the view of getting its consent to the construction of the Whitehall-Montague Street tunnel, under the East River. There is a difference between the commission and the War Department in regard to the conditions under which this consent shall be given, but it is expected that an agreement will be arrived at in time to prevent delay in the construction of the tunnel.

Petition to Determine Exact Status of Kansas City Company

A petition will be filed in the Supreme Court of the United States at Washington, D. C., to determine the exact status of the Metropolitan Street Railway, Kansas City, Mo., and to pave the way for a reorganization of the company. The court will be asked to outline a general plan of reorganization that will be both legal and fair to all parties. The intervening petition to be filed in behalf of the company will say in part:

"The undersigned, practitioners in this court, William R. Begg, New York; C. R. Clapp, Boston, and W. W. Gurley, Chicago, present these suggestions, *amici curiæ*, and thereupon they respectfully say:

"'1. The Metropolitan Street Railway is now in the hands of receivers in three consolidated causes pending in the District Court of the United States for the Western Division of the Western District of Missouri and the First Division of the District of Kansas. These consolidated causes consist of a creditors' and stockholders' bill and two bills to foreclose mortgages.

"'2. The street railways have outstanding $12,752,000 in mortgage bonds held by the investing public, of which $7,492,000 are past due. They also have outstanding $14,221,043 of mortgage bonds and notes which, with bonds and notes of the Kansas City Electric Light Company, aggregating $2,000,000, are deposited as collateral to these notes and bonds, aggregating $15,678,000, of a holding company known as the Kansas City Railway & Light Company, which are held by the investing public. The property of the latter company consists of the stocks and bonds of the street railway and electric light companies, against which it has issued its own bonds and notes, now past due, aggregating $15,678,000, and its own stock, aggregating $25,000,000.

"'3. Three bondholders' committees have for some time been acting under the advice of their counsel, Byrne & Cutcheon, New York, of which firm the petitioner, W. R. Begg, is a member, and Ropes, Gray & Gorham, Boston, of which firm the petitioner, C. R. Clapp, is a member. These committees consist of: (a) James J. Storrow, Boston, and Daniel M. Ewing, Boston, and Frederick W. Stevens, New York, being a committee for the issue of $7,242,000 of bonds of the Metropolitan Street Railway; (b) James J. Storrow, Boston, and Paul M. Warburg, John B. Dennis, and Acosta Nichols, New York, being a committee for $10,200,000 of bonds of the Kansas City Railway & Light Company, secured as hereinbefore stated; (c) James J. Storrow, Boston, Paul M. Warburg, John B. Dennis, and Samuel L. Fuller, New York, being a committee of the remainder of the bond or note holders of said railway and light company.

" '4. There is also a committee of stockholders, consisting of George M. Reynolds, Chicago; Oscar Fenley, Louisville; George W. Bacon, New York, and H. T. Abernathy, Kansas City. Of this committee the petitioner, W. W. Gurley, is counsel.

" '5. It is essential that the street railway properties at Kansas City be reorganized and placed upon a sound financial basis. It is important that there be no doubt as to the legality of such reorganization. The question here involved seems to be such that a final decision thereof is essential to guide those engaged in such work. The petitioners therefore deem it proper to join, *amici curiæ*, in this application for a certiorari, to the end that this court may determine whether the doctrine laid down in its opinion in Northern Pacific Railway vs. Boyd, 228 U. S., 48, applies to the extent decreed below.' "

New Toronto Purchase Plan Advocated

W. P. Gundy, the new president of the Toronto (Ont.) Board of Trade, in his speech before that body at the annual meeting on Jan. 19, 1914, advocated a new plan for solving the transportation problem in Toronto. He suggested that the province co-operate with the city and purchase not only the Toronto Railway, but also the radial lines of the MacKenzie-Mann Company, and that the Provincial Hydro-Electric Commission take over the Electrical Development Company. Mr. Gundy dealt at length with the question and announced that he would bring the matter before the members at the earliest opportunity. He said that he was opposed to the purchase of the street railway and the electric light plant from the MacKenzie-Mann syndicate on the terms now offered.

Mayor Hocken has announced that he will hereafter devote practically the whole of his time to the transportation question. He is quoted as follows:

"I will spend all my mornings, as much as possible of my afternoons and my evenings, too, if necessary, toward clearing up this proposition. I do not propose to let the negotiations drag. My principle task will be to bring the draft agreement for the purposed purchase of the Toronto Railway into final shape at the earliest moment."

The Mayor stated that several new points have developed in the course of the negotiations which were not detailed in the original agreement and the amendments thereto and that the elucidation of these points to the satisfaction of the city and the company is at present occupying the attention of the lawyers for both the company and the city.

Plan for Extension of Seattle Municipal Line Proposed

Councilman Oliver T. Erickson recently outlined a plan to the city utilities committee of the City Council of Seattle, Wash., which has for its object the construction of 38.4 miles of double track or 84.25 miles of single track as an addition to the municipal street railway, which now consists of a line 4 miles long extending from Third Avenue and Stewart Street to Salmon Bay. He estimates the cost of the proposed improvement at $1,218,220 with an additional amount of $787,000 for equipment, making the total $2,005,220. A bond issue of $800,000 for the construction of a municipal street railway from Salmon Bay to Ryan Street in the extreme southern section of the city was adopted by the voters several years ago, and half of this amount remains unused. Mr. Erickson's bill provides for expending the remainder toward constructing the line authorized by the voters.

Robert B. Hesketh, president of the City Council of Seattle, recently introduced an ordinance before that body providing for the loan of $75,000 from the garbage fund to the municipal street railway fund, the money to be used in completing Division A of the line, for which $300,000 of street railway bonds were sold to the State nearly two years ago. The line has cost nearly $400,000 and it is proposed to borrow $75,000 from the garbage fund to be repaid whenever the remainder of the $500,000 of street railway bonds are sold. The bill has been referred to the finance committee.

By the payment of claims against the Highland Park & Lake Burien Railway, amounting to nearly $40,000, the city of Seattle has received a deed to the right-of-way, tracks and equipment of that company which cost more than $140,000. The line is approximately 9 miles long and extends through a fertile and well settled community. In all likelihood the city will extend the line to Tree Point, from which a ferry will be operated to Vashon Island. The Highland Park & Lake Burien Railway was organized in 1910 and the line was built in 1911.

New City Administration at Toledo Defines Its Position

The new city administration at Toledo, Ohio, has defined its position with regard to the public utilities in that city in part as follows:

"The citizens of Toledo know, or should know, that this administration is pledged to 3-cent fares and universal transfers, and it is our opinion that such a fare is obtainable, but we are also pledged to the submission of the question to the voters of Toledo, in conjunction with that of municipal ownership, and, in due course, it will be for them to decide whether or not they wish a 3-cent fare and universal transfers by a privately owned corporation, or whether they desire the city to own the traction property.

"This administration believes that the Toledo Railways & Light Company, if it asks a franchise, should give the citizens an honest and impartial statement of who are the people interested in the corporation, their financial responsibility, and the financial responsibility of the company.

"If it is not financially responsible, or is unable to furnish a 3-cent fare, the matter should be put before the people in such a way as to give them an opportunity to choose the company that they desire to have use their streets, and if dissatisfied with all of them to choose municipal ownership. Another element that enters into the situation is the advisability of leasing the streets at a fixed and definite rental, on a fixed fare basis. In other words, if the city is able to obtain a rental for its streets and obtain a 3-cent fare, it should do so.

"No action will be taken by this administration until the entire matter is put into concrete form and submitted to the people. Before very long we hope to be able to present facts and figures relative to the conditions which exist. At present the Toledo Railways & Light Company is using most lines without franchise and only on sufferance."

B. J. Arnold on Chicago Subways and Terminals

Before the meeting of the electrical section of the Western Society of Engineers and the Chicago section of the American Institute of Electrical Engineers on Jan. 26, 1914, Bion J. Arnold gave an illustrated talk on "Subways and Railroad Terminals." He described his 1911 plans with the aid of lantern-slide pictures and explained the general subway situation in Chicago. A vital question is the amount of rental to be paid by the companies for the use of the subways. The original expenditure ought not to be less than $30,000,000 or more than $50,000,000, considering the initial project. There should be no grade crossings in the subways, and this safety measure necessitates double-deck subways at intersecting points. Public-utility galleries should be provided in any system of subways which is adopted. All subway schemes must, in the end, provide for a comprehensive service with high-speed, ten-car trains. It seems clear that Chicago cannot support a comprehensive, city-wide subway system from the start. It is a fact, however, that a subway for surface cars can be justified only on the ground of relieving congestion. A subway for single-unit surface cars will not pay from a financial point of view. Ultimately such a subway must become part of a comprehensive high-speed system.

Mr. Arnold explained briefly the plan he has worked out for railroad terminals and his proposed system of through-routing of suburban traffic by the steam railroads. There was a brief discussion, in which James Lyman, E. N. Lake and others took part. In answer to a question Mr. Arnold said that the two-track "initial subway," recommended for

Clark Street by the Board of Supervising Engineers, was not planned as a four-track subway at the beginning because the money to build it was not available. The subway, however, has been planned so that it could be extended to accommodate four tracks later. Mr. Arnold expressed sympathy with the idea of defraying the cost of subways by special assessments on the property benefited and mentioned the rise in the value of real estate along the line of the subways in New York north of 125th Street.

New Road Opened in Florida.—The East Florida Traction Company has completed and placed in operation its line connecting Daytona, Seabreeze and Daytona Beach.

Municipal Ownership Referendum Recommended.—The City Solicitor of Toledo, Ohio, has recommended that the Council proceed to secure by referendum an expression of opinion in regard to municipal ownership before any new city franchises are granted.

New Road Opened in Minnesota.—The Electric Short Line Railway has been completed and placed in operation between Minneapolis and Wayzata, a distance of 14 miles. It is expected that the road will be ready for operation from Wayzata to Long Lake, an additional 14 miles, by Feb. 15.

Service Resumed in Oskaloosa.—The Oskaloosa Traction & Light Company has resumed service suspended since Nov. 8, 1913, following a strike riot. The men operating the cars have the authority of police officers. Former employees have returned to work and the company is operating on the "open shop" basis.

The Strike at Hazleton.—Up to Jan. 28 there had been no change from the conditions noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, page 201, in connection with the strike of the employees of the Lehigh Traction Company, Hazleton, Pa. The company had not up to the time previously mentioned attempted to run any cars and there were then no immediate prospects of resumption.

Suit to Remove Chicago's Loop in Supreme Court.—A suit against the elevated railways of Chicago, filed by States Attorney Hoyne, in the form of quo warranto proceedings to annul the charter of the Union Consolidated Railway, the owner of the Chicago elevted loop structure. Action was started in this suit in July, 1913, and the case has just been taken to the Supreme Court, being filed in the form of an appeal from the Circuit Court.

Committee Approval of Philadelphia Subway Plans.—The comprehensive plans committee of the Councils of Philadelphia, Pa., has approved the subway and elevated transportation system devised by Transit Commissioner A. Merritt Taylor. Following the meeting of the comprehensive plans committee Director Cooke, of the Department of Public Works, said: "Commissioner Taylor explained his subway and elevated railway scheme at length to the comprehensive plans committee. As approved, the system comprises a tube in Broad Street north from the City Hall to Pike Street, where elevated spurs, running north and northeast, begin. The South Broad Street plan includes a tube to Oregon Avenue, with an open subway to the entrance to the Philadelphia Navy Yard."

Subway Committee to Report in Providence.—It is generally agreed that nothing but a system of subways will relieve the surface congestion in down-town Providence, R. I., and at the same time furnish a means of rapid transit to the suburbs. For months a special committee of the City Council, assisted by a Boston engineer who participated in the work of supplying the new system of subways for the city of Boston, has been at work studying the situation. Certain points have been selected as the most desirable between which underground lines might run, and borings have been made to determine the character of the soil through which the tubes would have to be laid. It is now expected that this committee will submit its report to a special session of the City Council on Feb. 2.

Further Subway Discussion in Cleveland.—At a meeting of the County Commissioners, contractors and city officials at Cleveland, Ohio, on Jan. 23, the propriety of building a subway and terminals to connect with the new Superior Avenue bridge was discussed. The business men and residents of the West Side favor the immediate construction of the bridge and advise that the subway project be left for a later date. The fact that a subway at the west end of the bridge, or rather two subways, would carry the cars some distance underground caused business men on West Twenty-fifth Street and a portion of Detroit Avenue to oppose the plan on the ground that it will depreciate property values in the locality where cars will be taken from the surface. One of the contractors for the bridge suggested that the piers be so constructed that a subway may be built later. He estimated the additional cost at about $25,000.

Plan for General Reorganization of Brooklyn Transfers Agreed Upon.—Counsel to the Public Service Commission for the First District of New York has issued a statement to the effect that a committee, composed of representatives of the commission and representatives of the Brooklyn Rapid Transit Company, which has been studying the transfer situation, has about agreed upon a plan for a general reorganization, by which transfers upon transfers will be eliminated, and yet the opportunity to transfer between any two points on a journey in the same general direction for a single fare will be preserved. The proposed arrangement will include the lines of the Coney Island & Brooklyn Railroad, now owned by the Brooklyn Rapid Transit System, as well as all the surface lines of that system. The report in detail, with maps showing the transfer points, will be on public exhibition at the offices of the commission for a week beginning Feb. 10, and on Feb. 17 the commission will hold a public hearing thereon.

Bill for Municipal Ownership in Washington, D. C.—Representative Crosser of Ohio, chairman of the sub-committee of the House District committee, has prepared a bill which provides for the District of Columbia taking over the electric railways in the District. Briefly, the Crosser bill stipulates that the commissioners of the District shall take over the railroads, issue thirty-year bonds at 3½ per cent to pay for the property and operate the roads. The commissioners are authorized to deal with the railroads in an effort to reach an agreement as to the price to be paid. If they fail within six months to reach such an agreement the commissioners are to institute condemnation proceedings in the Supreme Court of the District of Columbia. The court is to appoint a jury of three disinterested men to ascertain the damages each railroad would sustain by the change. The court is also to hear exceptions and will be empowered to vacate or set aside any verdict, in whole or in part, and may, if necessary, appoint an entirely new jury. One paragraph provides that any "party aggrieved by any final order of the court may prosecute error proceedings to the Court of Appeals."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

KENTUCKY

Representative Myers has introduced a bill in the Kentucky Legislature to create a public utilities commission by giving the Railroad Commission jurisdiction over the public utilities of the State. A bill has also been introduced in the Legislature providing for fixing a flat rate of 2 cents to be charged by all railroads and passenger-carrying companies.

NEW JERSEY

The New Jersey Inter-State Bridge & Tunnel Commission announced on Jan. 26 that it had completed the draft of a bill to be presented to the present Legislature which would authorize the construction of a bridge or a tunnel across the Hudson between New York and New Jersey and across the Delaware at Camden and Philadelphia. The commission states the problems presented are not engineering difficulties but those of finances. The commission estimates the cost of a tunnel or two tubes between Jersey City and lower New York City at $11,000,000, and that a bridge from about Fifty-seventh Street, New York, to the opposite New Jersey shore would cost approximately $42,000,000.

NEW YORK

The following bills have been introduced in the Legislature recently: an act to amend the railroad law in relation to the rate of fare on railroads operated by steam in cities of more than 1,000,000 inhabitants; an act to amend the railroad law in relation to the establishment of stations and the stopping of trains thereat; an act to amend the railroad law in relation to persons employed as drivers, conductors, motormen or gripmen; an act to amend the code of criminal procedure in relation to the payment of expenses of prosecutions of crimes committed on railway trains. The proposal to amend the railroad law in relation to persons employed as drivers, conductors, motormen or gripmen provides that all applicants for any of the positions mentioned shall be placed on a car with "a competent instructor for a period of fifteen days, such instructor to be a driver, conductor, motorman or gripman who is regularly operating on the lines of the corporation that the applicant intends to operate cars upon, and when the instructor is satisfied as to the applicant's capability for the position of driver, conductor, motorman or gripman, he shall so certify to the officers of the corporation, and if appointed, the applicant shall be placed in the shop or power house where he can be made familiar with the power and machinery he will control."

OHIO

The Mills public utility bill will probably be taken up by the Ohio Legislature at an early date. The original plan was to take up the bill later in the special session. Representative Herbert S Bigelow, Cincinnati, has succeeded in having the measure reported out of the committee and placed upon the calendar. The bill provides that bonds may be issued by municipalities to construct or acquire public utilities, without reference to the limitations imposed by the Longworth municipal debt act. Perhaps the most important question involved is whether the bonds so issued shall be a lien against the general credit of the municipality or the liability rest merely against the railway property and the income from it. As drawn, the bill would make the bonds a lien against the credit of the city, but an amendment has been offered to limit the liability to the property constructed or acquired.

RHODE ISLAND

Several additional bills of interest to the steam and electric roads in Rhode Island have been introduced in the Legislature. One is a measure which proposes an extension of the present transfer system on electric railways so as to make it possible for a passenger to travel from any point within the limits of a 5-cent ride to the end of any other route on which a single fare is charged, by means of a transfer. For some time residents of the suburban sections bordering Providence have complained that they could not obtain a transfer even in the heart of the city which would entitle them to ride to their homes. The bill stipulates that the provisions of the transfer measure shall be effective only from 5:45 a. m. until 8 p. m.

Another measure which has been introduced and is now pending in the files of the House judiciary committee provides that all street railways which operate in the State shall equip their cars with fenders, wheelguards, electrically heated rail sanders, and such other tools as may be required in emergencies, within six months of the passage of the act. The bill provides a penalty of $25 for each day that any car remains unprotected. Still another measure provides for a flat rate of 2 cents a mile on all lines operating within the State, and not more than 1 cent a mile for children under twelve years of age. A bill which has caused considerable discussion since its introduction in the House is an act prohibiting the erection of billboards along the line of any public highway within 300 ft. of any place where a railroad crosses a street at grade. In Providence and the territory contiguous to it many signs completely block the view at crossings.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association will be held at the Hollenden Hotel, Cleveland, Ohio, on Feb. 26 and 27, 1914. The annual meeting of the Central Electric Traffic Association will be held at the same place on Feb. 25. It is expected that the programs for the meetings will be completed soon.

Financial and Corporate

Stock and Money Markets

Jan. 28, 1914.

The volume of trading on the New York Stock Exchange to-day was greater than on Tuesday, but the dealings were at a somewhat lower level in prices. Under renewed pressure New Haven declined 1¼ to 73¾. A generally stronger tone prevailed in the afternoon trading. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½@3 per cent; four months, 3@3½ per cent; six months, 3½@4 per cent.

The Philadelphia market was broad and the total of transactions was quite large. The demand for bonds was exceedingly good, transactions totaling $61,800, par value.

In Chicago the market was broad. The feature of the trading was the activity in Chicago Railways Series 2s, the sales totaling 2555 shares. The bond transactions totaled $99,000, par value. The sales of City Railway 5's totaled $27,000, par value.

The Boston market opened steady but was narrow. It reacted near the close of the day in sympathy with New York.

The market for stocks in Baltimore to-day was broad. No transactions in bonds were reported.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 21	Jan. 28
American Brake Shoe & Foundry (com.)....	90	93
American Brake Shoe & Foundry (pref.).....	131	139
American Cities Company (com.)...........	36	36
American Cities Company (pref.)...........	64¼	68
American Light & Traction Company (com.)..	328	350
American Light & Traction Company (pref.)..	105½	106
American Railways Company	39	39⅝
Aurora, Elgin & Chicago Railroad (com.)....	37½	81½
Aurora, Elgin & Chicago Railroad (pref.)....	80	*80
Boston Elevated Railway	88½	84½
Boston Suburban Electric Companies (com.)..	7	7
Boston Suburban Electric Companies (pref.)..	60	60
Boston & Worcester Electric Companies (com.)	*6½	*6½
Boston & Worcester Electric Companies (pref.)	39	39
Brooklyn Rapid Transit Company...........	91¼	91½
Capital Traction Company, Washington......	112⅝	112½
Chicago City Railway	140	160
Chicago Elevated Railways (com.)...........	20	20
Chicago Elevated Railways (pref.)...........	70	70
Chicago Railways, ptcptg., ctf. 1............	96¼	92½
Chicago Railways, ptcptg., ctf. 2............	32½	33
Chicago Railways, ptcptg., ctf. 3............	7	7⅞
Chicago Railways, ptcptg., ctf. 4............	2½	2¼
Cincinnati Street Railway..................	106	107½
Cleveland Railway	104	105⅛
Cleveland, Southwestern & Columbus Ry. (com.)	5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	26	*26
Columbus Railway & Light Company........	18	18
Columbus Railway (com.)	62	75
Columbus Railway (pref.)	80	90
Denver & Northern Railway	70	70
Detroit United Railways	71	71
General Electric Company	147¾	147
Georgia Railway & Electric Company (com.).	120¼	120⅞
Georgia Railway & Electric Company (pref.).	83	83½
Interborough Metropolitan Company (com.)..	15⅝	15⅝
Interborough Metropolitan Company (pref.)..	61⅞	61½
International Traction Company (com.)......	*3	*3
International Traction Company (pref.)......	*90	*90
Kansas City Railway & Light Company (com.)	15	*15
Kansas City Railway & Light Company (pref.)	30	*30
Lake Shore Electric Railway (com.).........	*6	*6
Lake Shore Electric Railway (1st pref.)......	*92	*92
Lake Shore Electric Railway (2d pref.)......	*24	*24
Manhattan Railway	130	132
Massachusetts Electric Companies (com.)....	12	12½
Massachusetts Electric Companies (pref.)....	68½	65
Milwaukee Electric Ry. & Light Co. (pref.)...	95	95
Norfolk Railway & Light Company..........	*24¾	24¾
North American Company	72⅝	72
Northern Ohio Light & Traction Co. (com.)...	70	62
Northern Ohio Light & Traction Co. (pref.)...	101½	98½
Philadelphia Company, Pittsburgh (com.)....	41¼	41½
Philadelphia Company, Pittsburgh (pref.)....	42½	42½
Philadelphia Rapid Transit Company........	20	18⅞
Portland Railway, Light & Power Company..	48	48
Public Service Corporation.................	107	107
Third Avenue Railway, New York..........	43¼	42¾
Toledo Traction, Light & Power Co. (com.)...	20	30
Toledo Traction, Light & Power Co. (pref.)...	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	107¾	107
Union Traction Company of Indiana (com.)...	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore).	25¼	26½
United Rys. Inv. Company (com.)...........	21	21½
United Rys. Inv. Company (pref.)..........	41½	43
Virginia Railway & Power Company (com.)..	53	52½
Virginia Railway & Power Company (pref.)..	95	95
Washington Ry. & Electric Company (com.)..	89	89¾
Washington Ry. & Electric Company (pref.)..	89	89¾
West End Street Railway, Boston (com.)....	73	72½
West End Street Railway, Boston (pref.)....	90	91
Westinghouse Elec. & Mfg. Company........	69⅛	70
Westinghouse Elec. & Mfg. Co. (1st pref.)....	117	116

*Last sale.

ANNUAL REPORT

Lehigh Valley Transit Company

The corporate operating report of the Lehigh Valley Transit Company, Allentown, Pa., for the years ended Nov. 30, 1912 and 1913, follows:

	1913	1912
Passenger receipts	$1,431,395	$1,242,007
Operating expenses	740,280	650,079
Net earnings from railway operation	$691,115	$591,928
Sale of power, etc	333,602	280,243
Net earnings applicable to fixed charges, rentals, taxes, etc	$1,024,717	$872,171
Interest, rentals, taxes, etc	578,144	497,844
Surplus	$446,573	$374,327
Discount on bonds	$14,132	$12,678
Dividend on preferred stock	99,566	99,566
Depreciation reserve	141,660	117,360
Total deductions from surplus	$255,358	$229,604
Net surplus	*$191,215	$144,723

*There have been charged against this surplus construction and other items aggregating $111,645, leaving the total accumulated surplus as of Nov. 30, 1913, $292,717.

Beginning with the fiscal year 1911, there has been credited to an account called "maintenance, renewals and depreciation" an amount equal to 22 per cent of the gross earnings of the railway lines. To this account are charged all items of maintenance and renewal, the balance being applicable to depreciation. This account as of Nov. 30, 1913, showed a credit of $128,109.

H. R. Fehr, president of the company, says in part: "The rolling stock of the company consists of forty-one open cars, 108 closed cars and forty-three service cars, making 192 cars in all. Of this number twelve are modern interurban cars equipped with all the latest safety and controlling devices; twenty-four convertible cars of the pay-within type; thirty-seven cars of the St. Louis type, equipped with HL control, Westinghouse brakes and Baldwin trucks, and twenty of the semi-convertible type. Of the service cars nine are snow plows, ten sweepers, five work cars, four line cars, one wreck car, four express cars, two sprinkling cars and seven miscellaneous cars.

"The company purchased ninety-one acres of land in South Allentown, on part of which is being built a concrete carhouse, of two bays, each 400 ft. long and containing four tracks. The building will include offices for the superintendent and dispatcher; locker, recreation, wash and toilet rooms for employees; also boiler rooms, storage for coal and sand, etc. The work is about half completed, and occupancy is expected about April 1, 1914.

"A 6000-kw Westinghouse turbo-generator, with its auxiliaries; a transformer substation, and a large brick smokestack have been added to the main power station.

"On July 1, 1913, the company purchased 27,600 shares, the controlling interest in the stock of the Easton Consolidated Electric Company, paying therefor $851,000 in collateral trust bonds of the Lehigh Valley Transit Company. This gives the company control of all the trolley roads in the Lehigh Valley from Slatington, Pa., to Phillipsburg, N. J. A through service has been established between Easton and Allentown, doing away with the change of cars at Bethlehem and thereby materially increasing the receipts of both companies.

"The Allentown Bridge was completed and opened for public travel on Nov. 17, 1913. This bridge makes available for residence purposes a large area hitherto inaccessible. It is the largest structure of its kind ever erected by an electric railway, being 2650 ft. long and 138 ft. in height. All the Philadelphia, South Bethlehem and Macungie cars enter and leave the city via this new bridge, thereby eliminating the severe grades and railroad crossing on the old South Sixth Street line. A material saving is expected in power and wear and tear on the power station apparatus and cars by reason of this improvement.

"New light companies have been organized and charters secured during the year covering the Borough of North Catasauqua and Allen Township in the County of Northampton; the Borough of Coplay and Upper Saucon Township in the County of Lehigh; the Townships of Doylestown, Hilltown, Richland, Springfield, East Rock Hill and New Britain in the County of Bucks, and Hatfield in the County of Montgomery. With one minor exception all franchises are without time limit.

"In summarizing the year's work, especial attention should be called to the Allentown Bridge; the limited service giving quick, economical traveling accommodations from Philadelphia to the towns and cities of the Lehigh Valley; the installation by the Adams Express Company of agencies at all important points on the lines of the Lehigh Valley Transit Company; the increasing efficiency of the company's freight and express service; the addition of six first-class, high-speed interurban cars and three freight cars; the installation of additional power equipment; a new carhouse to facilitate the handling of cars, with added comforts for the men, and important improvements in removal of tracks from the highways to private rights-of-way with consequent elimination of sharp curves and heavy grades."

The United Properties Purchase

The following statement has been issued by J. K. Moffitt, chairman of the United Properties trustees, and Frank B. Anderson, chairman of the F. M. Smith advisory committee, in regard to the conclusion of the negotiations by which George C. Moore, Detroit, representing the Investment Registry, Ltd., and B. Fitzgerald, representing Basil Montgomery, Fitzgerald & Company, both of London, Eng., will take over the San Francisco-Oakland Terminal Railways, referred to briefly in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, page 206:

"The United States Properties Company trustees and the F. M. Smith advisory committee have completed the legal formalities whereby they have sold to George C. Moore and associates the control of the San Francisco-Oakland Terminal Railways. Mr. Moore will immediately take over the control, management and operation of these railways. We believe that the consummation of this transaction will not only prove of great benefit to the communities served by these properties, but will have a wholesome effect on the local financial situation. To accomplish this, it was found necessary to separate the railroad properties from the United Properties Company.

"Both committees are satisfied that the complete financing and rehabilitation of these railroad properties will greatly benefit the communities dependent upon their service. The two committees wish further to inform the public that the settlement of the transbay railroad situation is coincident with an arrangement whereby Mr. Moore and his associates undertake the refinancing, development and advancement of the United Light & Power Company and the Union Water Company as soon as these corporations can be segregated and detached from the United Properties Company of California. This settlement disposes of all disputes existing among the three principals who consolidated these properties."

The statement issued by Mr. Moore follows:

"George C. Moore, having read the announcement of the United Properties Company trustees and the F. M. Smith advisory committee of bankers, said, on behalf of himself and his associates, that the same was correct. He did not like to say in advance what he expected to accomplish, as he always preferred to have the public judge results for itself rather than to depend upon promises."

It was the misunderstandings that arose between Mr. Smith and Messrs. Tevis and Hanford during the summer and fall of 1912 that led to the trust agreement of Jan. 25, 1913, under which Herbert Fleishhacker, W. S. Reams and J. F. Carlston were named as trustees with control of the properties and their disposition, as well as the power to arbitrate the differences between the principals. While these trustees were in office Mr. Hanford secured from George C. Moore a proposal for financing or purchase, but the negotiations were not successful, and in May these trustees were succeeded by the five who have since conducted the negotiations as far as the United Properties are concerned. These are J. K. Moffitt, Vanderlynn Stow, William Bissell, W. I. Brobeck and Gavin McNab.

At the same time, May 5, 1913, the Smith advisory committee was named, consisting of Frank B. Anderson, John S. Drum, Mortimer Fleishhacker, C. O. G. Miller and W. W. Garthwaite. This committee represented the creditors of Mr. Smith. Its problem was to collect the collateral which Smith had given for various loans and to assemble it in the hands of the Mercantile Trust Company under an agreement with the creditors. Both committees undertook to provide for the Halsey and Key Route Basin notes, which were about to become due, and which constituted the most pressing debts incurred by Mr. Smith. Arrangements were made for continuing both these loans.

Mr. Hanford appeared before the United Properties trustees asking for an option on the Smith holdings in the United Properties Company, which was given him in August, with the added condition that he find a purchaser for the traction stock held by the Smith advisory committee at a valuation of $50 a share. He stated in October that it would be necessary to modify the terms of this option. In December negotiations were resumed with the two boards of trustees and the principals. The negotiations were then completed and the contracts signed.

Trustees Proposed for Rhode Island Properties

In an interview in Providence, R. I., on Jan. 28, 1914, with a representative of the ELECTRIC RAILWAY JOURNAL, Duff F. Sherman, vice-president of the Rhode Island Company, admitted the possibility of the property of the company being turned over to a board of trustees to manage pending the sale of the property by the New York, New Haven & Hartford Railroad. Mr. Sherman, however, would not say positively that this plan would be the one followed out to separate the company from the control of the New Haven Road, although he seemed inclined to believe that at present, at least, the plan appeared to be the most feasible for carrying out of the requirements of the Department of Justice at Washington. He said:

"There is a possibility that the Rhode Island Company will be turned over to a board of trustees for management, pending its sale by the New Haven Road, but such a plan has not as yet been definitely determined upon. The property is a large one and the separation of it from the parent company is not the work of a minute. A plan of separation is being worked out, and I think may soon be ready to be put into effect, but considerable study of the situation is necessary first. I am going to New York on Jan. 29. There I shall meet Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad. There may be something definite to give out upon my return to Providence."

While no limit has been set in regard to the time in which the New Haven Company must dispose of its properties, it is understood in Providence that the transfer of the Rhode Island Company is to be carried out with as little delay as possible. It is for this reason that A. E. Potter, president of the Rhode Island Company, and Mr. Sherman are leaving for New York. Mr. Potter, Mr. Sherman and Robert W. Taft, the latter a director of the company, constitute the committee upon which will devolve the burden of working out the plan to be used in complying with the government's demands. With regard to the plan to turn the property over to a board of trustees Mr. Sherman said that while it might appear a possible solution of the problem, it could not be said just how such a plan would appeal to the people of Rhode Island and to the government. Any plan suggested in Providence will have to go before the officers and board of directors of the New York, New Haven & Hartford Railroad for approval, after which it will be submitted to the government for its sanction.

Financial and Legal Questions in New York

Efforts are being made by Swartwout & Appenzeller, New York, N. Y., to have Joseph H. Choate chosen as an arbiter in the dispute between holders of the New York Railways 5 per cent adjustment income bonds and the directors of the company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914. The firm mentioned, representing certain holders of the bonds, contends that unexpended amounts set up in accident reserves should be turned back into surplus earnings, which would permit payment of the full interest on the income bonds. In a letter to the five directors of the company appointed to represent the bondholders, the suggestion is made that a friendly suit be instituted to establish the rights of the income bondholders. It is reported that the company will probably not arbitrate but will welcome a suit to establish the point at issue.

In the deficiency judgment suit brought by bondholders of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad the Central Trust Company, New York, N. Y., one of the defendants, recently asked that the transfer of the assets of the old Metropolitan Street Railway to the New York Railways be adjudged null and void as against it and such bondholders of the Crosstown Railroad as shall elect to share the expenses of the action. The Central Trust Company further asks that the franchises, assets, etc., of the New York Railways, formerly owned by the Metropolitan Street Railway or acquired pursuant to the plan of reorganization, be declared subject to the lien of the judgment, $1,745,344, obtained against the Metropolitan Street Railway, and have priority over all other claims against the New York Railways except mortgages placed thereon for a valid consideration at the time of the reorganization. Furthermore, a petition is made for a receiver to be appointed for the property, franchises and assets of the New York Railways and a foreclosure sale to take place under the judgment obtained in the bondholders' suit.

Dividend Increases and Reductions in 1913

The issue of the *Wall Street Journal* for Jan. 17, 1914, contained an interesting summary of the history of dividends during the calendar year 1913. Dividend reductions were of more importance than dividend increases although they were not so numerous. Forty-seven companies reduced or passed their dividends, while fifty-five increased their rate. Initial dividends were paid by fifty-six companies, most of which were on new issues of preferred stock. Stock dividends were paid by twenty-six companies, and extra cash dividends by sixteen. Fully two-thirds of the companies that increased their rate in 1913 were public utilities. Only one steam railroad was included in the list. Thirty-three public utilities increased their dividend rate, and twenty public utility companies started initial payments. This is exclusive of many minor public utility companies whose dividends were not recorded. On the other hand, the list of companies that passed or reduced their disbursements to stockholders included ten important steam railroad systems. Reductions in dividend rate by these railroads alone means an annual loss to stockholders of over $20,000,000. The following table shows the total dividends paid and the last dividend declared in 1913 and 1912 of the more prominent public utilities in the electric railway field that increased their rate the past year:

	When Increased	Total Paid		*Last Declared	
		1913	1912	1913	1912
American Gas & Electric Co...	Mch.	8%	7%	2%	1¾%
American Public Utilities......	Sept.	2¼	1½	¾	½
Brooklyn Rapid Transit Co....	May	5¾	5	1½	1¼
Cape Breton Electric Co......	Apr.	$6	$5	$3	$2
Cincinnati, Hamilton & Dayton Traction Co.	Mch.	4	3½	1	⅞
Cities Service Co.............	Dec.	4 5/6	4	½	1/3
Detroit United Ry.............	Feb.	6	5	1½	1¼
Galveston Houston Electric Co.	†Feb.	5½	3½	3	1½
Havana Electric Railway, Light & Power Co...............	‡Apr.	$5.25	$4.50	$2.50	$2.25
Manila Electric Railway & Light Co.	Mch.	7	7	1¾	1½
New Hampshire Electric Rys., pfd.	Jan.	4	2	2	1
Northern Texas Electric Co....	Aug.	6½	6	1¾	1½
Omaha & Council Bluffs St. Ry.	Jan.	5	4	1¼	1
Public Service Company of Northern Illinois	Oct.	5	4	1¼	1
Railway & Light Securities Co.	Jan.	6	5	3	2½
Virginia Railway & Power Co..	Feb.	3	2	1½	1
Washington Railway & Electric Co.	May	5½	4	1½	1
York Railways, pfd...........	Jan.	5	3	2½	1

*Last dividend declared in 1913 and 1912.
†Increased one-half of 1 per cent in February and September.
‡Increased 50 cents in April and reduced 25 cents in October.

The holders of the following electric railway stocks received their initial payments in 1913: Illinois Traction System, common, three-quarters of 1 per cent; Central Arkansas Railway & Light Company, preferred, 1¾ per cent; Montreal Tramways (interim), 5 per cent; United Light & Railways Company, common, 1 per cent; Union Railway, Gas & Electric Company, common, 1 per cent; J. G. White Corporation, 1¾ per cent.

The stockholders of the Boston Elevated Railway and the Electric Bond & Share Company received the right to subscribe to additional stock during the past year.

The principal companies that passed up dividends during 1913 were the New York, New Haven & Hartford Railroad and the Federal Utilities Company. The largest example of reduced dividends among electric railways was the Portland Railway, Light & Power Company, which cut from $5 to $4.

Boston Elevated Railway Reduces Dividend

The directors of the Boston (Mass.) Elevated Railway have declared a semi-annual dividend of 2 per cent, a reduction from a 6 per cent annual basis. The 6 per cent rate had been in effect since 1902. In 1901, 5¾ per cent was paid, and in 1900, 4½ per cent. The dividend is payable on Feb. 16 to stock of record Feb. 2. The following statement, signed by President Bancroft of the company for the board of directors, is being sent to stockholders:

"The recent award of the board of arbitration which arbitrated the question of wages and working conditions of the employees of the company will increase the operating expenses by a substantial amount, and will be so serious a financial burden in the immediate future that your board of directors does not feel warranted in declaring a dividend at the present time of over 2 per cent. It is hoped that this reduction will be temporary, and it should be, provided the public realizes that investors in public service corporations such as yours are entitled to a fair, just and reasonable return, and consequently does not in the future force burdens on the company which it cannot afford."

Federal District Court Declares Michigan "Blue Sky" Law Invalid

The Michigan "blue sky" law is unconstitutional, according to an opinion filed in the Federal District Court at Detroit, Mich., on Jan. 29, 1914. The opinion is the result of a judgment recently rendered by Circuit Judge Dennison, of the Appellate Court, and District Judges Arthur J. Tuttle and Clarence A. Sessions. It was held that the Michigan law would act in restraint of commerce of all kinds and be a burden on the Interstate Commerce Commission, which the government would not permit. Attorney-General Fellows is reported to have said that the case will be carried to the Michigan Supreme Court and to the Supreme Court of the United States if necessary. The decision was rendered in an action brought by several plaintiffs, including the Continental & Commercial Trust & Savings Bank and N. W. Halsey & Company, Chicago, Ill.; A. B. Leach & Company, New York, N. Y., and Lee, Higginson & Company, Boston, Mass.

Financial America published in its issue for Jan. 30, 1914, a statement made by Caldwell, Masslich & Reed, who as counsel for the Investment Bankers' Association, directed and argued the suit attacking the Michigan "blue sky" law. This statement follows in part:

"This decision by three federal judges applies in effect to the 'blue sky' laws of Arkansas, California, Florida, Georgia, Idaho, Iowa, Kansas, Missouri, Montana, North Carolina, Ohio, Vermont, Oregon, South Dakota, North Dakota and West Virginia. It is most important in connection with the legislation pending and proposed in other states.

"These laws, in effect, give a state officer or board an absolute control over the buying and selling of securities. The Investment Bankers' Association has found it necessary to oppose these laws in order to maintain the freedom of business now existing between the states, and also to protect investors against possible fraud and loss from securities which happen to pass the scrutiny of the state officials under these laws. Few investment dealers can afford the burden of complying with the varying requirements of a great number of state officials, and the tendency of these acts has been to give the investment market to local dealers of promotion securities. The association favors more effective laws against fraud in the sale of securities.

"The laws of the state should be made at least as effective as the federal postal law. As an instance of the extreme character of the Michigan and other similar laws, the Attorney-General of Michigan was compelled to concede in open court that under that law it would be difficult, if not impossible, to finance by the sale of securities a business venture similar to that of the original Ford Automobile Company, that is a venture which involved a decided element of risk.

"We believe the present decision will be sustained by the United States Supreme Court, but regardless of this, the legislative and public attitude has changed materially toward such legislation. The association has co-operated wherever possible in the framing of just laws and will continue to do what it can both in the framing of such laws and in the detection and prosecution of fraudulent dealers in securities."

American Water Works & Guarantee Company, Pittsburgh, Pa.—The stockholders' protective committee of the American Water Works & Guarantee Company has fixed March 1 as the limit of time for receiving deposits of common and preferred stocks under the protective agreement of July 27, 1913. A considerable amount of both classes of stock has been deposited and stock will be accepted after March 1 only on such terms as the committee may see fit to impose.

Brooklyn (N. Y.) Rapid Transit Company.—The *Wall Street Journal* says that the bulk of the refunding mortgage 4 per cent convertible bonds of the Brooklyn Rapid Transit Company will probably be exchanged into stock, par for par, before the conversion privilege expires on July 1, 1914. Until 1913 practically none of these bonds had been converted, but the increase in the dividend rate from 4 per cent to 5 per cent and then to 6 per cent during the last quarter of the 1913 fiscal year stimulated the first outburst of conversion, with the result that, as of June 30, 1913, some $4,177,000 of the bonds had been exchanged into stock. There were, as of that date, $28,901,000 bonds in the hands of the public. At present the amount unconverted has been reduced to about $21,400,000. Conversion of all the bonds would create $78,000,000 of stock, against the old-time figure of $45,000,000, on which share profits were always calculated up to 1913. The conversion of $33,000,000 of these bonds into an equal amount of stock will increase the amount required for dividends by $660,000 per annum and would probably bring the balance for the shares down from a fraction above 9 per cent to 7 per cent for the year to June 30, 1914. Frederick L. Allen has been elected a director of the Brooklyn City Railroad to fill the vacancy caused by the death of Theodore F. Miller.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—The Buffalo & Williamsville Electric Railway has accepted the offer of the Railway Storage Battery Car Company, New York, N. Y., for the purchase of the line in Batavia. Efforts have been made for some time to dispose of the line because the officers stated it was not making expenses. The price agreed upon is less than $10,000, but at the request of the officials of the line the committee will not make the price public. The city of Batavia will subscribe for part of the stock in a new company to be organized to operate the road.

Chicago (Ill.) Railways.—General Counsel Gurley of the Chicago Railways has asked the State Public Utility Commission for permission to issue bonds to cover about $1,400,000 interim certificates issued for repair and construction work this fiscal year and $4,000,000 to $5,000,000 to be issued similarly during the coming fiscal year.

Cleveland (Ohio) Railway.—The report of the Cleveland Railways for December, 1913, shows a deficit in the maintenance fund of $48,781, which brings the total deficit in that fund up to $1,250,863, according to the view taken by the company officials. Peter Witt, street railway commissioner, claims that $750,000 of this amount is to be charged off for the abandonment of old power houses and does not belong in the maintenance fund. In case the maintenance allowance were increased to take care of the large deficit shown, the present interest fund of $375,000 would soon dwindle and this would call for an increase in fares.

Georgia Railway & Electric Company, Atlanta, Ga.—C. C. Harrison, Jr., & Company, Philadelphia, Pa., have purchased from the Georgia Railway & Electric Company between $700,000 and $800,000 of its refunding and improvement mortgage 5 per cent bonds due 1949 and are offering these at 96½ and interest to pay about 5.2 per cent. The Pennsylvania State tax is to be refunded on this block of bonds.

Idaho Railway, Light & Power Company, Boise, Idaho.—Judge Dietrich of the United States District Court at Boise has set March 16, 1914, as the date for the foreclosure sale of the properties of the Idaho Railway, Light & Power Company. The appointment of a receiver for this company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914.

Interborough Rapid Transit Company, New York, N. Y.—Lee, Higginson & Company, Boston, Mass., and N. W. Harris & Company and Kissell, Kinnicutt & Company, New York, N. Y., announced on Jan. 22, 1914, that all the $30,000,000 first refunding mortgage 5 per cent bonds of the Interborough Rapid Transit Company purchased by them have been sold and the syndicate closed. William A. Read, of the banking firm of William A. Read & Company, has resigned from the directorate of the Interborough Rapid Transit Company. No successor has been elected to Mr. Read. There are now two vacancies in the board. Mr. Read also has resigned as a director of the Subway Realty Company and the Rapid Transit Subway Construction Company.

Ithaca (N. Y.) Street Railway.—H. W. Fitz, New York, chairman of the committee representing bondholders of the Ithaca Street Railway, bid in the property of the company under foreclosure recently for $100,000.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—The Kansas City, Clay County & St. Joseph Railway has been authorized to issue bonds to the extent of $135,000 by the Missouri Public Service Commission. As stated in the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914, page 96, the proceeds of the issue will be used to install a block signal system on the road.

Los Angeles (Cal.) Railway.—The hearing by the California Railroad Commission on the application of the Los Angeles Railway to issue $23,544,000 of its recently authorized $50,000,000 bonds has been postponed until the company and the city can get nearer together on an estimate of the value of the street railway lines. The city estimated $14,782,112 as the present value and $19,762,389 as the reproductive value of the line and on this showing protested against a bond issue of $23,544,000 on the property. The company estimated the present value of the properties at $24,288,400 and the reproductive value as $26,030,865. It is reported that the bonds to be issued will probably bear 6 per cent interest, although the rate on these bonds, as well as on those reserved for future corporate purposes, is left to be fixed by the commission. The term of the bonds will be twenty-seven years. A sinking fund of three-quarters of 1 per cent a year on the bonds is to be provided, which will retire 4 per cent of the issue before maturity.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Lee, Higginson & Company, Boston, Mass., are offering at 98½ and interest to yield about 5.8 per cent first consolidated refunding mortgage 5 per cent bonds of the Mahoning & Shenango Railway & Light Company, dated 1905 and due 1916, and redeemable at 105 and interest on any interest date. The company now has outstanding $4,746,000 of these bonds.

New York, Auburn & Lansing Railroad, Ithaca, N. Y.—The property of the New York, Auburn & Lansing Railroad will be sold under foreclosure at Ithaca on March 6, 1914.

Northern Ohio Traction & Light Company, Akron, Ohio.—The annual meeting of the stockholders of the Northern Ohio Traction & Light Company was held on Jan. 24. F. H. Goff, president of the Cleveland Trust Company, was elected a director to succeed the late Louis E. Beilstein. The other directors were re-elected. The board organized by re-electing the old officers. The issue of $2,000,000 of new preferred stock was approved by the stockholders.

Ocean Shore Railroad, San Francisco.—An issue of $5,000,000 of 5 per cent bonds has been authorized by the stockholders of the Ocean Shore Railroad to provide for the improvement and development of the company's lines in San Mateo County.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—C. W. Lyman, one of two trustees of the Barton estate, has been elected a director of the Omaha & Council Bluffs Street Railway to succeed the late K. C. Barton.

Pekin & Petersburg Interurban Railway, Pekin, Ill.—J. A. Melick has filed objections with the court to the confirmation of the sale of the property of the Pekin & Petersburg Interurban Railway as "junk" recently by the master in chancery to Walter A. Lautz. The court has the appeal under advisement.

Philadelphia Company, Pittsburgh, Pa.—Ladenburg, Thalmann & Company, New York, N. Y., recently offered at 89⅛ to yield about 6.75 per cent $2,000,000 of 6 per cent cumulative preferred stock of the Philadelphia Company. The Union of London & Smith's Bank, Ltd., also received subscriptions in London for the issue at 92 per cent, London terms. Of this stock there is authorized $25,000,000 and outstanding $6,102,000, including the present offer. This preferred stock is protected by an agreement of the company not to increase its mortgage or secured indebtedness requiring authorization by its stockholders or to create any class of stock ranking with the 6 per cent cumulative preferred stock without the consent of the holders of two-thirds of this stock outstanding. Application to be made through James Capel & Company to list the stock of the Philadelphia Company on the London Stock Exchange.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—The Portsmouth Street Railroad & Light Company has applied to the Ohio Public Utility Commission for authority to distribute as a stock dividend $250,000 of 6 per cent preferred stock and at the same time issue $500,000 of first mortgage bonds. The stock dividend is to be paid from accumulated surplus. This is the first application of the kind that has come before the commission. The proceeds of the issue of new bonds are to be used to extend the electric line from Sciotoville to Hanging Rock, about 20 miles, where it will connect with the Ohio Valley Electric Railway, which operates through Ironton and to Hanging Rock. The cost of construction of the new line is estimated at $400,000. Part of the proceeds of the bond issue will be used in double-tracking the street railway in Portsmouth and in making other extensions and improvements.

South Bend & Logansport Traction Company, South Bend, Ind.—Gabriel R. Summers, South Bend, Ind., who purchased the property of the South Bend & Logansport Traction Company at receiver's sale some time ago, is reported to be negotiating with representatives of an English syndicate with the end in view of securing funds with which to resume construction and complete the road.

Stark Electric Railroad, Alliance, Ohio.—At the annual meeting of the stockholders of the Stark Electric Railroad W. H. Purcell and S. L. Sturgeon were elected directors, one to fill a vacancy and the other to take a new place, the board being increased from eight to nine members.

Third Avenue Railway, New York, N. Y.—On an opinion rendered by Commissioner Milo R. Maltbie, the Public Service Commission for the First District has authorized the Mid-Crosstown Railway to issue $150,000 in capital stock, and has authorized the Third Avenue Railway to purchase that stock by issuing its own 4 per cent bonds to the extent of $187,000. The Mid-Crosstown Company owns the Twenty-eighth and Twenty-ninth Streets crosstown lines in Manhattan, which are now operated by storage battery cars supplied by the Third Avenue system. The Third Avenue Railway asked for permission to issue $500,000 in bonds to acquire the stock of the Mid-Crosstown Railway, but the commission found that the fair value of the property of the latter was only $150,000, and limited the capital stock issue to that amount. Therefore, it refused to authorize an issue of bonds by the Third Avenue Railway to purchase such stock in excess of the value of the stock. The opinion points out that if the Third Avenue Railway wishes to pay more than this for the stock, the excess so paid must not be charged against capital account.

Twin City Rapid Transit Company, Minneapolis, Minn.—Edmund Pennington, president of the Soo Line, and George Partridge, Minneapolis, have been elected directors of the Twin City Rapid Transit Company. One of the new directors was elected to fill a vacancy and the other to take the place of Clinton Morrison, deceased.

United Railways, St. Louis, Mo.—At the annual meeting of the stockholders of the United Railways A. C. Brown and Henry H. Hillard were elected directors to succeed Charles H. Hutting and A. D. Brown, deceased.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has sold to the Continental & Commercial Savings Bank, N. W. Halsey & Company and Russell, Brewster & Company, Chicago, $500,000 of its first and refunding 5 per cent twenty-year bonds, due June 1, 1932. The bonds are being offered at 86 to yield 6.25 per cent and are redeemable at 102½ and interest on any interest date on sixty days' notice.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Binghamton (N. Y.) Railway, 2 per cent.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

Harrisburg (Pa.) Traction Company, 3 per cent.

Illinois Traction System, Peoria, Ill., quarterly, 1¾ per cent, common.

Monongahela Valley Traction Company, Fairmont, W. Va., 2½ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

United Power & Transportation Company, Philadelphia, Pa., $1.52.

West Penn Railways, Connellsville, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.						
1m., Dec.,	'13	$461,719	......	......	......	......
1" "	'12	431,492	......	......	......	......
6" "	'13	2,862,315	......	......	......	......
6" "	'12	2,638,117	......	......	......	......
ATLANTIC SHORE RAILWAY, SANFORD, MAINE						
1m., Dec.,	'13	$24,608	$20,715	$3,893	$662	$3,230
1" "	'12	23,407	17,756	5,651	465	5,186
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.						
1m., Dec.,	'13	$100,378	*$60,774	$39,604	$26,114	$13,490
1" "	'12	95,454	*57,085	38,369	23,963	14,406
12" "	'13	1,204,928	*717,625	487,303	298,082	189,221
12" "	'12	1,064,674	*634,616	430,058	266,029	164,029
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.						
1m., Dec.,	'13	$50,916	*$30,232	$20,684	$12,542	$8,142
1" "	'12	49,723	*27,980	21,743	12,542	9,201
12" "	'13	576,618	*348,307	228,311	150,500	77,811
12" "	'12	533,538	*315,928	217,610	152,752	64,858
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE.						
1m., Dec.,	'13	$50,420	*$37,118	$13,302	$15,338	†$2,036
1" "	'12	47,359	*32,286	15,073	14,400	673
12" "	'13	675,554	*427,715	247,839	179,575	68,264
12" "	'12	618,030	*389,543	228,487	173,074	55,413
PORTLAND (MAINE) RAILROAD						
1m., Dec.,	'13	$79,897	*$51,057	$28,810	$23,498	$5,312
1" "	'12	76,693	*60,247	16,446	10,253	6,193
12" "	'13	1,036,316	*689,476	346,840	180,881	165,959
12" "	'12	981,052	*675,594	305,458	121,167	184,291
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., Dec.,	'13	$607,476	*$275,872	$331,604	$175,483	$156,121
1" "	'12	586,857	*278,683	308,174	151,403	156,771
12" "	'13	6,723,742	*3,298,310	3,425,432	2,008,601	1,416,831
12" "	'12	6,642,308	*3,328,911	3,313,397	1,760,991	1,552,406
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1m., Dec.,	'13	$282,301	*$176,848	$105,453	$43,299	$62,154
1" "	'12	264,561	*164,783	99,779	44,085	55,694
12" "	'13	2,997,670	*1,843,964	1,153,706	536,264	617,442
12" "	'12	2,655,682	*1,610,571	1,045,031	528,935	516,196
ST. JOSEPH RAILWAY, HEAT & POWER COMPANY, ST. JOSEPH, MO.						
1m., Dec.,	'13	$117,830	*$60,351	$57,479	$20,194	$37,285
1" "	'12	110,874	*57,373	53,501	19,710	33,791
12" "	'13	1,252,904	*712,228	540,676	241,365	299,311
12" "	'12	1,179,839	*669,023	510,816	236,060	274,756

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*Includes taxes. †Deficit.

Traffic and Transportation

Recommendations in Regard to Service in Albany

The following recommendations are contained in a report which Charles R. Barnes, electrical expert for the Public Service Commission of the Second District of New York, has made to the commission in regard to the service of the United Traction Company in Albany:

The improvement of the power supply so as to avoid in the future such interruptions in the service as occurred on the coldest day of the coldest spell this winter.

Additional service in the South End section.

The extension of the tracks on Arbor Hill.

The purchase of additional "modern" cars.

The retirement of the obsolete cars now in use, and the repair of other cars still capable of giving proper service.

The substitution of hot-air or hot-water heat for the present electric heaters.

The abolition of the practice of swinging the Troy cars around at the junction of State Street and Broadway, and the re-routing of these cars.

The installation of better car service between the railroad station and the Capitol.

The installation of a telephone system along the United Traction lines in Albany, so that instant communication would be possible under all conditions.

The substitution of Mazda lamps in all cars for the low-powered electric lamps in use on some of the lines.

Mr. Barnes will also investigate the operation of the generating station at Spier Falls, which is the source of most of the power used by the company.

New Double-Deck Car for Columbus.—The new double-deck car for the Columbus Railway & Light Company, Columbus, Ohio, ordered some time ago, has been promised for delivery by Feb. 1, 1914, by the builder, The J. G. Brill Company.

Punching the Line in Detroit.—Under a new transfer regulation issued by the Detroit (Mich.) United Railway conductors must punch the line to which the passenger intends to transfer. Exception to this rule is made in the rush hours of the morning and evening.

Inquiry into Increase in Commutation Fares in Ohio.—The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, has been called before the Public Service Commission of Ohio on the question of increasing commutation fares between Berea and Cleveland, Ohio. Heretofore the rate on commuters' tickets has been 21 cents a round trip. This has been increased to 25 cents, and the books of tickets limited to thirty instead of sixty days.

Crusade in Buffalo Against Spitting.—N. H. Brown, superintendent of the International Railway, Buffalo, N. Y., has ordered conductors to hand a card bearing the following notice to passengers who spit in cars: "To spit upon the sidewalk or other prohibited places will subject you to a fine or imprisonment, or both. Dr. Francis E. Fronczak, Health Commissioner." Police officers have been instructed by the superintendent of police to enforce this law strictly.

Suit of Trespasser's Relatives Dismissed.—A person who walks down the middle of an electric road's track does so at his own peril and relatives have no ground for damages, according to a recent decision of the Kansas Supreme Court at Topeka in the case of Margaret Jones against the Pittsburg & Joplin Railway. David Jones, the woman's husband, was killed by a car of the company. Evidence showed that he had deliberately walked between the rails.

Winter Traffic Advertising Resumed in New Albany.—The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, New Albany, N. Y., which did a considerable amount of newspaper advertising during the summer months for the purpose of encouraging passenger traffic on Sunday, has decided that business of that kind can also be developed by the right kind of advertising in the winter, and has resumed its "Take the Big Red Car" announcements.

Increase in Wages for Coney Island & Brooklyn Employees.—Following the transfer of the stock of the Coney Island & Brooklyn Railroad to the Brooklyn (N. Y.) Rapid

Transit Company the management of the latter announced an increase in the wages of the employees of the Coney Island & Brooklyn Railroad, affecting all the motormen and conductors and other transportation employees. The new rates will start at $2.40 a day for the first year of service and increase to $2.80. The latter rate applies to those who have been in service more than ten years.

Philadelphia Rapid Transit Company Subject to Commission.—According to an opinion expressed by Public Service Commissioner Ewing in the course of John H. Fow's argument for the continuation of free railroad and street railway passes for firemen and policemen, the City Councils of Philadelphia no longer have authority over the Philadelphia Rapid Transit Company in the matter of free transfers, rates of fare or the routing of cars. Jurisdiction over such matters, Mr. Ewing said, is now vested wholly in the commission, under the public service commission law which became effective on Jan. 1.

Terminal and Office Building Proposed for Buffalo.—The International Railway, Buffalo, N. Y., has bought the Garden Theater property in Pearl Street between Church and Niagara Streets and running through to Franklin Street in front of the City and County Hall, and will erect a large passenger terminal on the property with upper floors for the executive offices of the corporation. The station will be a terminal for the Buffalo & Niagara Falls Electric Railway, the Rochester & Lockport line, the Lancaster line, and probably the Buffalo & Lake Erie Traction Company and the Hamburg, Orchard Park & Armour line. The executive officers of the International Railway are now on the eighth floor of the Ellicott Square building.

New Tariff of Queens County Line.—The Manhattan & Queens Traction Corporation was granted special permission by the Public Service Commission for the First District of New York to put into effect a new tariff to cover the extension of its line to Jamaica, which opened on Jan. 26, 1914. The tariff provides for a 5-cent fare generally and a special school rate of 3 cents for school children under eleven years of age to certain schools in the Borough of Queens. The company now operates an electric railway from Manhattan over the Queensboro Bridge and through Thomson Avenue to Broadway. The extension runs from Broadway through Hoffman Boulevard, Jamaica Avenue and other streets to the Long Island Railroad station in Jamaica.

Passenger Traffic on United Railways of St. Louis.—According to an annual report filed with City Register R. H. Witter, the United Railways of St. Louis, St. Louis, Mo., carried 8,180,373 more passengers in 1913 than in 1912, while its cars made only 254,874 more trips. During the last quarter of the year the average number of cars Sundays and holidays was 717, on Saturdays 1163, and on week days 1216. During this period a total of 1,619,928 trips were made and 62,787,202 passengers carried (1,145,309 half-fare passengers), as against 1,514,094 trips and 60,581,293 passengers carried during the corresponding quarter of the previous year. During the entire year 6,259,908 trips were made and 240,976,404 passengers carried, as compared to 6,005,034 trips and 232,796,231 passengers in 1912.

Recommendation Regarding Routing in Kansas City.—The recommendations of L. R. Ash, engineer of Kansas City, Mo., and Philip Kealy, engineer for the Metropolitan Street Railway, that cars of the company to the new Union depot in that city be routed temporarily through Twenty-fourth Street from Main Street to Grand Street have not as yet been acted on by the franchise committee. The new depot, according to a recent announcement, will be put into commission on May 15. The city engineering department is awaiting the conclusions of the franchise committee regarding the use of the streets named, and as the committee is inactive, there is a likelihood that the Metropolitan Street Railway will not be able to complete work in time to handle the depot crowds as originally planned. It is believed that the routing of cars to the new depot will have to await the result of the city election in April.

"Safety First" on San Francisco-Oakland Terminal Railways.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., has published a small booklet giving the details of the "safety first" organization effected in that company as of Jan. 1, 1914. In organizing the work every employee is given a problem requiring time, thought and energy for its solution. The book contains the list of appointments for the following committees: executive, advisory, central district, western district, eastern district, northern district, key division, marine, shop, line, way and structures department, general offices and ferry terminal. The first two committees have a permanent tenure of office; the others, four months. Meetings are held twice a month for all committees except the executive committee, which meets only once. A safety suggestion box, a roll of honor for accepted suggestions and bogie charts to create competition will be utilized in the safety work.

Organization of Ontario Safety Board.—The Lieutenant-Governor of Ontario, John M. Gibson, has accepted the honorary presidency of the Ontario Safety League, which was formed a short time ago at the suggestion of the Ontario Railway Board, with a view to reducing accidents on the streets. The president is Dr. James L. Hughes. The vice-presidents are H. M. Pellatt and J. C. Eaton. The executive committee is composed of representatives from the Ontario Railway Board, the City Council, the Board of Education, the Separate School Board, the Ontario Motor League, the Toronto Railway, the Trades & Labor Council and the Toronto Automobile Sales Association. Numerous other organizations have identified themselves with the work and all have representatives on the general council of the league. An educational campaign will be started at once with lectures, literature, newspaper advertisements, etc., all dealing with the dangers of the street and pointing out the advantages of "safety first." The league will direct its efforts to the school children first.

Standard Rules for Michigan Roads Discussed.—At a meeting on Jan. 21 of the members of the Michigan Railroad Commission and officers of the electric railways which operate in that State it was decided to unify the rules governing the conduct of motormen and conductors so that they will be the same throughout the State. A committee of five representatives of the railways was appointed to consult and report to the commission. The following roads were represented: Benton Harbor-St. Joe Railway, E. C. Mason, general manager; Detroit United Railway, Harry Bullen, general superintendent; Grand Rapids, Grand Haven & Muskegon Railway, W. K. Morley, general manager; Grand Rapids, Holland & Chicago Railway, Charles A. Floyd, general manager; Houghton County Traction Company, Gardner Rogers, manager; Michigan United Traction Company, C. E. Morgan, general superintendent; Saginaw-Bay City Railway, A. D. Furlong, general manager; Saginaw & Flint Railway, Charles Arnold, superintendent. The committee on rules will hold weekly meetings in various cities and will use as a basis the standard rules adopted by the American Electric Railway Transportation & Traffic Association. The meeting between the commissioners and the officers of the companies on Jan. 21 was held at Lansing.

Transporting Letter Carriers in Seattle.—The ELECTRIC RAILWAY JOURNAL for Jan. 10, 1914, page 103, contained an item in which it was erroneously stated that the Puget Sound Traction, Light & Power Company and Edgar Battle, postmaster of Seattle, had reached an agreement whereby the order of the company requiring all employees of the post office to pay car fare would not be enforced until March 1. The agreement heretofore existing between the company and the local post office department, whereby the transportation of mail carriers over the company's lines was paid for by the government at an annual figure based on the assumed necessary riding of the carriers was canceled by the company on Jan. 1, 1914. Since Jan. 1, 1914, mail carriers and all employees of the local post office, with the exception of some sixteen or eighteen special delivery boys, have paid regular fare when riding upon the lines of the company. No distinction is made between mail carriers and other patrons. Each mail carrier pays his fare when he rides the same as any other patron does. Special delivery boys, under an agreement with the postmaster, will be allowed to ride without payment of fare within the period of sixty days from Jan. 1, payment to be made at the expiration of this time in accordance with the number of trips made by these boys as furnished by the post office. At the expiration of this period delivery boys will be required to pay regular fare the same as other patrons.

Personal Mention

Mr. L. C. Nash, has resigned as secretary and treasurer of the Omaha & Council Bluffs Street Railway, Omaha, Neb., to go into mercantile business.

Mr. R. S. Rolley, general claim agent of the Chicago (Ill.) City Railway, has been made assistant general claim agent of the Chicago Surface Lines.

Mr. W. G. Nicholson, auditor of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been elected secretary of the company in addition to his duties as auditor.

Mr. C. A. Newton, superintendent of insurance of the Chicago (Ill.) City Railway for the past two years, has been made superintendent of insurance of the Chicago Surface Lines.

Mr. John M. Kinkel has been reappointed to the Kansas Utilities Commission by Governor Hodges for a term of four years. Mr. Kinkel has just completed one year's service with the commission.

Mr. George Spencer, Winnipeg, Man., who for some time has been on the staff of the Dominion Railway Board of Canada at Winnipeg, has been appointed chief operating officer of the commission.

Mr. J. D. Perry Francis has been elected vice-president of the Alton, Granite & St. Louis Traction Company, Alton, Ill. Mr. Francis succeeds Mr. F. E. Allen as director and vice-president of the company.

Mr. N. M. Thorrson, purchasing agent of the Chicago (Ill.) Railways, has been made assistant purchasing agent of the Chicago Surface Lines. He has been in the company's service twenty years.

Mr. A. S. Widenor, cashier of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been elected treasurer to perform the duties of that office, heretofore cared for by Mr. L. C. Nash, who has resigned to enter mercantile business.

Mr. Benjamin Phillips, assistant superintendent of transportation of the Chicago (Ill.) Railways, has received the same title with the Chicago Surface Lines. Mr. Phillips entered the service of the Chicago Railways in May, 1884, as a conductor.

Mr. Samuel Riddle, superintendent of transportation of the Louisville (Ky.) Railway, has been elected vice-president of the Engineers and Architects' Club of that city. Mr. Frank H. Miller, superintendent of motive power of the company, has been elected a director of the club.

Mr. Joshua Burgee, general manager of the Calumet & South Chicago Railway, Chicago, Ill., has been appointed assistant superintendent of transportation of the Chicago Surface Lines. He has been in the service of the Chicago City Railway and the Calumet & South Chicago Railway for the last twenty years.

Mr. J. V. B. Duerr has been appointed an assistant engineer of the Pennsylvania Railroad, to succeed Mr. B. F. Wood, who as previously noted in the ELECTRIC RAILWAY JOURNAL has been appointed chief engineer of the United Gas & Electric Engineering Corporation, New York, N. Y.

Mr. William T. Cobb has been elected vice-president and managing director of the Rockland, Thomaston & Camden Street Railway, Rockland, Me., a newly created position with the company. He will have full charge and complete authority in all matters relating to policies, operation and service.

Mr. S. W. Huff, formerly president of the Coney Island & Brooklyn Railroad and now vice-president of the Brooklyn (N. Y.) Rapid Transit Company, which has taken over the Coney Island & Brooklyn Railroad, had a dinner tendered to him on Jan. 22, 1914, at the Crescent Club, Brooklyn, by the heads of the departments of the Coney Island & Brooklyn Railroad. Those present in addition to the guest of honor were Messrs. Elwood T. Baker, Duncan B. Cannon, James M. Downey, William N. Dykman, George M. Kirchmer, George C. Killeen, John J. Kuhn, Henry B. Lingeman, Edward L. Mathews, James E. Mathews, Jr., Isaac R. Oeland, Robert A. Paine, William E. Thompson, John A. Thake, Stonewall Tompkins and Charles A. Wilkinson.

Mr. Arnold von Schrenk has resigned as general superintendent of the United Traction Company, Albany. Mr. von Schrenk was formerly general superintendent in charge of the Troy division of the United Traction Company. Before that he was general manager of the Plattsburg (N. Y.) Traction Company. He was graduated from Columbia University, New York, in June, 1901, and in August, 1901, he entered the testing department of the General Electric Company, Schenectady, N. Y. He was transferred to the construction department of the company in July, 1903, and in July, 1905, became connected with the New York Central & Hudson River Railroad as draftsman and inspector. He was promoted to be chief draftsman in December, 1906, and to be assistant engineer in December, 1907, in connection with the electrification work of the company in New York and vicinity. He spent the summer of 1908 studying the leading European railway systems and other examples of foreign engineering. In 1909 he entered the engineering department of the United Traction Company, Albany.

Mr. John F. Uffert has been appointed general superintendent of the United Traction Company, Albany, N. Y., to succeed Mr. Arnold von Schrenk. Mr. Uffert was born in Newark, N. J., in 1880. In 1893 he went to work for the Consolidated Traction Company of New Jersey, now included in the system of the Public Service Railway, Newark, N. J. At the age of seventeen he accepted a position with the Union Railway, New York, N. Y., as shop foreman. After a few years' service with that company he went West and worked for several companies in various capacities. Previous to entering the employ of the United Traction Company at Albany, Mr. Uffert was connected with the Portland Railway, Light & Power Company, Portland, Ore., from which company he resigned in 1912 to become master mechanic of the Hudson Valley Railway, a subsidiary of the United Traction Company. He served so efficiently in this position that on May 27, 1912, he was in addition made master mechanic of the United Traction Company. On Jan. 22, 1914, he was appointed general superintendent of the United Traction Company. He still continues as master mechanic of the Hudson Valley Railway.

Mr. R. W. Reynolds, secretary and general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., has been appointed general manager of the Springfield (Mass.) Street Railway, succeeding the late George F. Reed. Mr. Reynolds was born at Mattoon, Ill., in 1882, and was graduated from the Armour Institute, of Chicago, in 1900. After two years' work in the electrical engineering department of Purdue University, Lafayette, Ind., he joined the staff of the Indianapolis & Northern Street Railway, now a part of the Terre Haute, Indianapolis & Eastern Traction Company's system. He became superintendent of this road in 1905, and in 1907 joined the Chicago, South Bend & Northern Indiana Railway, with headquarters at South Bend, also having charge of the operation of the Southern Michigan Railway. In 1910 Mr. Reynolds was elected vice-president of the American Light & Water Company, Chicago, and devoted his attention for two years to the construction of central station and waterworks systems. He succeeded Mr. H. S. Newton as general manager of the Hartford & Springfield Street Railway on Aug. 1, 1912.

Mr. S. G. McMeen has been elected president of the East St. Louis Railway, the East St. Louis & Suburban Railway and the East St. Louis Light & Power Company, East St. Louis, Ill., to succeed Mr. C. M. Clark, of E. W. Clark & Company, Philadelphia, Pa., as president of the first two companies and Mr. L. C. Haynes as president of the East St. Louis Light & Power Company. During the last year the E. W. Clark & Company Management Corporation was organized with headquarters in Columbus, Ohio. Of this corporation Mr. C. M. Clark is president and Mr. M. S. Hopkins and Mr. S. G. McMeen are vice-presidents. This corporation will have charge of the general management of the East St. Louis properties and in the line of carrying out this policy Mr. McMeen has been elected president of the operating companies in East St. Louis. Mr. C. M. Clark is president of The East St. Louis & Suburban Company, the new Delaware corporation, which has been formed to take over the property of the East St. Louis & Suburban Company, of which Mr. Clark has been president since its organization ten or twelve years ago. The election of Mr. McMeen as president of the East St. Louis companies will not in any way change his relations to the Columbus Railway & Light Company, Columbus, Ohio, or, as it is now known, the Columbus Light, Heat & Power Company.

Mr. C. E. Carson, whose appointment as superintendent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, was born at Portsmouth, Ohio, on Jan. 9, 1866. After attending common school he entered Carlton College, Ohio, and was graduated in 1882. He entered the service of the Kansas, Fort Scott & Memphis Railroad at Kansas City, Mo., in 1883, as a switchman and filled successively the positions of conductor, chief clerk to division superintendent and general yardmaster. In 1893 he was appointed chief clerk and assistant superintendent of the Terminal Railroad Association of St. Louis, Mo., serving in this position until 1897, when he was appointed superintendent of the Missouri Pacific Railroad at Kansas City, Mo. In 1902 he was transferred to the Missouri Pacific Railroad and the Iron Mountain Railroad as division superintendent with headquarters at St. Louis, Mo. In 1903 he was appointed superintendent of the Northern division of the Colorado & Southern Railroad and served in this capacity to June 1, 1906, when he accepted a position as superintendent of the Kansas City division of the Missouri Pacific with headquarters at Kansas City. On April 1, 1908, Mr. Carson was appointed superintendent of the Mexican Central Railway and National Lines of Mexico, with headquarters at Tampico, Mexico, in which capacity he continued to Jan. 1, 1910, when he was appointed manager of the Mexican Fuel Company at Tampico, Mexico. On Feb. 15, 1911, he was appointed superintendent of the Chicago Great Western Railroad, Western division, with headquarters at Clarion, Ia. He was transferred to the Northern division as superintendent with headquarters at St. Paul, Minn., on Aug. 1, 1911. He resigned from the Chicago Great Western Railroad on Oct. 15, 1913.

Mr. E. T. Munger, who resigned about a year ago from the office of general superintendent of the Hudson & Manhattan Railroad, New York, N. Y., has accepted the position of general manager of the Cumberland County Power & Light Company, Portland, Maine. This company operates the local railway system in Portland and several interurban lines and electric lighting properties. Mr. Munger will take office immediately. Up to his connection with the Hudson & Manhattan Railroad, which took place in 1909, Mr. Munger had been largely identified with the engineering department of electric railways, but as head of the transportation department of the Hudson & Manhattan Railroad he achieved great success as an operator. One of his most important duties was to give personal attention to "the public be pleased" policy of the company, and he personally engaged all of the transportation employees on the system and paid special attention to securing such help as would be courteous and attentive to the public. Previous to his work on the Hudson & Manhattan Railroad, Mr. Munger had held a number of responsible engineering positions, such as master mechanic and later superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago, and superintendent and later president and general manager of the Havana (Ill.) Telephone Company. He was graduated with the degree of bachelor of mechanical engineering at the University of Wisconsin in 1892. On Jan. 27, 1914, a farewell luncheon was tendered to him at the Railroad Club by the Deportation Club of New York. Between thirty and forty of Mr. Munger's most intimate friends were present and wished him all success in his new venture. Mr. W. C. Fisk of Harvey Fisk & Sons, New York, was toastmaster, and before the conclusion of the luncheon a handsome silver loving cup was presented to Mr. Munger.

Mr. Harry B. Ivers, general manager of the Cumberland County Light & Power Company, Portland, Maine, for the last three years, has resigned to take effect Feb. 15. He has purchased an interest in the Frank Ridlon Company, Boston, Mass., and will become connected with that company. Mr. Ivers has long been connected with street railway and lighting interests in New England. His experience dates from the spring of 1893, when he entered the employ of the Hyde Park (Mass.) Electric Light Company. During that year the Norfolk Suburban Street Railway was built, and during the two following years the West Roxbury & Roslindale Street Railway and the Norfolk Central Street Railway were built. Mr. Ivers was connected with the railways and the lighting company in different capacities in and about the power station and the carhouse and in the treasurer's office. The companies were later acquired by the Massachusetts Electric Companies, and Mr. Ivers assisted in consolidating the accounts and in operating the railways, which were organized as a division of the Old Colony Street Railway. He subsequently acted as superintendent of what was known as the West Roxbury division of the Old Colony Street Railway. Later he was transferred to Brockton in the interest of the consolidation and assisted in consolidating and systematizing the accounts of the separate companies in and surrounding Brockton. His headquarters were subsequently transferred to Taunton, in the general superintendent's office, which developed to be the general office of the Old Colony Street Railway. After being connected with these properties for nine years he was elected treasurer and manager of the Westerly Railway & Lighting Company, Westerly, R. I. Four years later he accepted the position of assistant to Mr. John R. Graham, president and general manager of the Bangor Railway & Electric Company, Bangor, Maine, and a few months thereafter was elected treasurer of that company and of the Bar Harbor & Union River Power Company, which constructed the famous water-power plant upon the Union River at Ellsworth, Maine. In March, 1908, Mr. Ivers was appointed general manager of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine. In June, 1912, he was appointed general manager of the Cumberland County Power & Light Company, which controls and operates the Portland Railroad, the Portland Electric Company, the Portland Lighting & Power Company, the Consolidated Electric Light Company and the Lewiston, Augusta & Waterville Street Railway. Mr. Ivers is an ex-president of the Maine Electric Association, and is now a member of the executive committee of that association and vice-president of the New England Street Railway Club and the New England section of the National Electric Light Association. He is vice-president of the Lewiston Chamber of Commerce, and chairman of several important committees of other boards of trade and business men's associations. At the last annual meeting of the State Board of Trade at Bangor he was appointed on a committee to study and report to the State board at its next meeting as to advancing the agricultural development of Maine.

A. W. McLimont

Mr. A. W. McLimont, who from May, 1910, to March, 1912, was vice-president and general manager of the Michigan United Railways, Jackson, Mich., now the Michigan United Traction Company, which operates 251 miles of electric railway in Michigan, has been elected vice-president and general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., which operates 241 miles of electric railway in Oakland and vicinity and has been taken over by new interests, as noted elsewhere in this issue. Mr. McLimont is a Canadian by birth. He entered business with the New England Telephone & Telegraph Company in 1885. On Sept. 29, 1889, he became connected with the Thomson-Houston Electric Company, Boston, Mass., and later entered the Chicago office of the company, where he served until the latter part of 1903. During that period he assisted in building, organizing and operating railway properties at Dallas, Houston, St. Joseph, Cedar Rapids, Rockford, Springfield, Marquette, Nashville, Chicago and New Orleans and in installing electric light plants. Subsequently Mr. McLimont became general manager and resident engineer of the Dubuque Light & Traction Company, Dubuque, Ia. In 1905 he resigned from the Dubuque Light & Traction Company and supervised the construction of 70 miles of the overhead work at New Orleans. Upon the completion of that task he joined the foreign department of the General

Electric Company, for which he organized and operated the Petropolis (Brazil) Electric Light Company, and designed, built and operated two monocycle electric light and power plants in Costa Rica, C. A. He next supervised the construction of a long-distance transmission and hydroelectric plant at Cordova, Argentina, for the Cordova Light & Power Company. Returning to the United States, Mr. McLimont took charge of the construction of the high-tension transmission line of the Hudson River Power Transmission Company between Mechanicsville and Albany. Later he built and operated seven electric light plants for the Guanajuato (Mexico) state government and did considerable electric-light power installation work for the Guanajuato Mining & Milling Company. Mr. McLimont next reported for Sperry, Jones & Company, Baltimore, Md., upon a plan to consolidate and electrify the street railways at Monterey, Mex., after which he designed, built and operated an interurban electric railway for W. R. Grace & Company at Lima, Peru, and also built 40 miles of city railway at Lima and operated the system for two years. Returning to the United States again, Mr. McLimont accepted the position of electrical and operating engineer with the Public Service Commission of the First District of New York. In March, 1909, Mr. McLimont resigned from the Public Service Commission to become general manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., and in May, 1910, he was elected vice-president and general manager of the Michigan United Railways.

OBITUARY

George H. Babbitt, formerly a member of the Public Service Commission of Vermont, died on Jan. 24, 1914, at his home in Bellows Falls, Vt., aged fifty-two years.

George Voight, for more than fifteen years superintendent of the electrical repair department of the Chicago (Ill.) Railways, is dead. He was forty years old.

Byron E. Merwin, general superintendent of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., died on Jan. 23, 1914. Mr. Merwin was born on Aug. 25, 1863, at Jewett, N. Y. He commenced railroad work in 1894 as a conductor with the Lake Street Elevated Railway, Chicago, now the Chicago & Oak Park Elevated Railroad. In 1895 he was promoted to train dispatcher, and in 1899 was made assistant superintendent. In May, 1900, he was transferred to the Northwestern Elevated Railway to take the position of trainmaster, where he remained until the end of that year, when he returned to the Lake Street Elevated Railway as superintendent. In June, 1902, he resigned to become general superintendent of the Interurban Railway & Terminal Company, Cincinnati, Ohio. He held that position until November, 1907, when he was appointed superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill. Three years later he was promoted to the position of general superintendent of that company.

William Cooper, director of buildings and equipment of the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company, is dead. Mr. Cooper was born near Watertown, N. Y., on Nov. 24, 1861. He attended Cornell University. At the age of twenty-five Mr. Cooper engaged in building automatic screw machines at Ottumwa, Ia. Soon after he started a shop in Minneapolis and subsequently entered the employ of the Twin City Rapid Transit Company, Minneapolis, as master mechanic and chief engineer. In 1894 he entered the employ of the General Electric Company at Schenectady. Three years later he became associated with Blood & Hale, Boston, Mass., consulting engineers. On Sept. 1, 1897, Mr. Cooper was appointed general superintendent of the Bullock Electric & Manufacturing Company, Cincinnati, Ohio, in charge of engineering and manufacturing. About a year later he entered the employ of the railway engineering department of the Westinghouse Electric & Manufacturing Company. His first work with this company in the railway field consisted of an active participation in the design and manufacture of the equipment furnished the New York, New Haven & Hartford Railroad, the St. Clair Tunnel, the Pennsylvania and other roads which have been electrified by the Westinghouse Company. When the works department of the Westinghouse Company was organized two years ago Mr. Cooper was made director of buildings and equipment.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) denotes a project not previously reported.

RECENT INCORPORATIONS

***Gulf & Pacific Railway, Sweetwater, Tex.**—Chartered in Texas to build a 125-mile electric or steam railway from Sweetwater to Comanche. Capital stock, $125,000. Incorporators: J. V. W. Holmes, Thomas Trammel, Benjamin Anthony and others. Headquarters, Sweetwater.

FRANCHISES

Porterville, Cal.—The Southern Pacific Company has received a fifty-year franchise from the Council in Porterville.

San Diego, Cal.—The Railroad Commission has ordered the Los Angeles & San Diego Beach Railway to ask the City Council of San Diego for an extension of the franchise on the La Jolla line, and then to apply for authority to issue bonds to electrify the railway.

San José, Cal.—The San José Railway has asked the Council for an extension of time on its franchise in which to rebuild its line to Toyon Station in San José.

Milton, Fla.—H. S. Laird, Milton, has asked the Council for a franchise in Milton. This is part of a plan to build an electric railway from Milton to Bagdad. [E. R. J., Jan. 17, '14.]

Hutchinson, Kan.—William S. Thompson and associates have asked the Council for a franchise in Hutchinson. This is part of a plan to build an electric railway from Burrton to Hutchinson.

New Orleans, La.—The New Orleans Railway & Light Company has received a franchise on Broadway and Claiborne Street in New Orleans.

Cincinnati, Ohio.—The Cincinnati Traction Company has accepted the franchise granted by the Council for the extension of its Avondale Street line to Bond Hill.

Lawton, Okla.—The Lawton Railway & Light Company has received a twenty-one-year franchise from the Council in Lawton.

Seattle, Wash.—The Puget Sound Traction Light & Power Company has received permission from the Board of Public Works for the extension of the Beacon Hill line on Beacon Avenue from Hanford Street to Spokane Street in Seattle.

Tacoma, Wash.—The City Council has granted a franchise authorizing the issuance of $75,000 worth of utility bonds for the construction and equipment of a 1-mile municipally owned electric railway across the tide flats in Tacoma.

TRACK AND ROADWAY

Edmonton (Alta.) Interurban Railway.—Arrangements have been made by which this company will connect its lines in Edmonton with the lines of the Edmonton Radial Railway.

Little Rock Railway & Electric Company, Little Rock, Ark.—Plans are being made by this company to build two extensions in Little Rock—one to the Rock Island station and another on Markham Street to the Union Station.

Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.—Work will be begun at once by this company on its line to connect Little Rock, Altheimer, Sturrgart, Helena and Pine Bluff.

***Healdsburg, Cal.**—Arthur D. Bowen, Santa Rosa, and associates are considering plans to build an electric railway from Healdsburg through Dry Creek Valley and Alexander Valley to Geyserville.

Marin County Electric Railway, Mill Valley, Cal.—This company has asked the State Railroad Commission for a certificate of public convenience and necessity and for authority to issue $50,000 in stock and $50,000 in bonds. The company proposes to construct an electric railway in Mill Valley, with a branch from the Northwestern Pacific depot to the Old Hill and Cascade Reservations and to the base of trails leading to points of interest. B. F. Ames, president. [E. R. J., Jan. 24, '14.]

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Improvements are being planned by this company for its line between Oakland and Sacramento.

San Francisco-Oakland Terminal Railway, Oakland, Cal.—This company is asked to consider plans to double-track its Oakland line on Twentieth Street from Macdonald Avenue to Portola Avenue in Oakland.

Geary Street Municipal Railway, San Francisco, Cal.—Plans are being made to begin work soon on the extension to the exposition grounds and other projected points in San Francisco.

Waterbury & Milldale Tramway, Waterbury, Conn.—During the year it is planned to build 3.6 miles of new track between Hitchcock Pond and Milldale.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Arrangements are being made to extend the Washington Street line in Wilmington along the Boulevard to the Concord Heights section. The terminus of the extension has not been determined, but it will probably be Twenty-sixth Street.

Waycross Street & Suburban Railway, Waycross, Ga.—About 1½ miles of new track will be built during the year in Waycross.

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—Preliminary arrangements are being made to begin construction soon on the section of this line in Lewiston. This is part of a plan to build an 18-mile electric railway between Lewiston, Idaho, and Clarkston, Wash. F. L. Strum, Lewiston, president. [E. R. J., Dec. 6, '13.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—About 1 mile of new track will be built by this company during the year.

Quincy & Western Illinois Railway, Quincy, Ill.—Plans are being made to begin work soon on the belt line around Quincy. Henry F. Dayton, Quincy, president. [E. R. J., Aug. 9, '13.]

Evansville & Olney Traction Company, Evansville, Ind.—Illinois stockholders in this company have purchased the interests of Elmer Q. Lockyear, Evansville, Ind., and other stockholders there, and plan a reorganization of the company. Plans are being made to begin work soon on the line from Evansville to Olney, Ill., via Mount Carmel. At Mount Carmel a bridge will be built over the Wabash River. [E. R. J., May 11, '11.]

Evansville (Ind.) Railways.—Plans are being considered by this company to build a 7-mile electric line from a point in Indiana opposite Owensboro, Ky., to connect with the Evansville and Rockport line. A new substation will have to be built, if the plans now formed are carried out.

Keokuk (Ia.) Electric Company.—Plans are being considered to extend this company's lines in Keokuk through the lower end of Rand Park and along the proposed new boulevard to the baseball grounds.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—It is planned to build 22 miles of new track during the year between Urbana and Cedar Rapids.

Manhattan City & Interurban Railway, Manhattan, Kan.—About 10 miles of new track will be built by this company during the year.

***Frontenac, Mulberry & Arcadia Electric Railway, Pittsburg, Kan.**—This company, which plans to build an electric line to connect Frontenac, Mulberry, Arcadia and Pittsburg, has elected the following officers: J. S. Patton, president; Frank Markowitch, vice-president; Antone Mengini, treasurer, and P. J. McGinley, secretary.

Joplin & Pittsburg Railway, Pittsburg, Kan.—About 1 mile of new track will be built by this company during the year.

Arkansas Valley Interurban Railway, Wichita, Kan.—Work will soon be begun on the extension from Halstead to Hutchinson.

Central City, Ky.—Plans for an electric railway to connect a number of towns in western Kentucky have developed at Central City through the application for a franchise for the operation of a local line. The Council is now considering the franchise, which, it is said, has been asked for by Eastern interests. The proposed plan is to operate a line in Central City, and to build in Drakesboro, Greenville, Hillside, Brownsville, Mercer, Powderly, Cleaton, Bevier and Graham. A large power plant will be built at Central City, and plans for the purchase of the plants at Drakesboro and Greenville to be used in that connection are also being considered. [E. R. J., Jan. 24, '14.]

Quebec Railway, Presque Isle, Maine.—It is reported that during the present year work will be begun on the construction of this railway, which will extend across the northern part of Maine to connect the existing lines at Quebec and New Brunswick, and across New Brunswick to the Quebec border, a distance of 111 miles. A. R. Gould, president of the Aroostook Valley Railroad, is interested. [E. R. J., Jan. 10, '14.]

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—The 8-mile extension from Middlechurch to Stony Mountain has been completed and will be placed in operation during the summer. Plans are being considered to build a branch line to Balmoral.

Bay State Street Railway, Boston, Mass.—Plans are being considered by this company to double-track its line between Lawrence and Lowell.

Muskegon-Casnovia Land & Development Company, Muskegon, Mich.—Preliminary arrangements are being made to build this electric line to connect Muskegon, Saginaw, Egelston, Moorland and Casnovia. Norman B. Lawson, Muskegon, is interested. [E. R. J., Aug. 16, '13.]

Twin City Rapid Transit Company, Minneapolis, Minn.—It is planned to build about 19.50 miles of new track during the year.

***Helena, Mo.**—J. H. Kimmett, Helena, Mo., and J. T. Wagers, King City, Mo., plan to build an interurban electric line from St. Joseph to Pattonsburg. The St. Joseph Commerce Club favors the railway and will assist it financially.

Grand View Railroad, St. Louis, Mo.—During the year this company plans to build about 5 miles of new track in St. Louis.

Missoula (Mont.) Street Railway.—About 4 miles of new track will be built in Missoula during the year.

Red Lodge (Mont.) Electric Railway.—More than one-half of the $100,000 necessary to build the proposed 10-mile line between Red Lodge, Washoe and Bearcreek has been subscribed. C. C. Bowlen, president. [E. R. J., Dec. 13, '13.]

Fallon (Nev.) Electric Railroad.—It is planned to build between 20 and 30 miles of new track from Hill to Sand Springs during the year.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Improvements and extensions of its lines in Omaha to cost approximately $400,000 have just been ordered by the board of directors of this company.

Cape May, Delaware Bay & Sewell's Point Railroad, Cape May City, N. J.—About 1 mile of new track will be built by this company in Cape May City during the year.

New York, Auburn & Lansing Railroad, Auburn, N. Y.—About 3 miles of new track will be built during the year by this company.

Manhattan Bridge Three Cent Line, Brooklyn, N. Y.—During 1914 this company plans to build about 1 mile of new track.

International Railway, Buffalo, N. Y.—About 12 miles of new track will be built by this company during the year between North Tonawanda and Lockport. It is also planned to build 1 mile of new track in Buffalo.

Hornell (N. Y.) Traction Company.—Extensive track improvements in Hornell are being planned by this company in the near future.

Manhattan & Queens Traction Company, New York, N. Y.—During the year this company plans to build between 5 and 6 miles of new track in Greater New York.

Suffolk Traction Company, Patchogue, N. Y.—It is planned to build about 9½ miles of new track between Holtsville and Port Jefferson and between Bayport, Sayville and West Sayville during the year.

New York State Railways, Rochester, N. Y.—During the year this company plans to build about 2.84 miles of new track in Rochester.

***Lancaster, Ohio.**—James M. Dollison, Lancaster, James Sharp, Nelsonville, and associates plan to build a 33-mile electric railway between Lancaster and Nelsonville to connect Athens and the Hocking Valley district if they can succeed in leasing the old canal property between these cities from the State.

Western Ohio Railway, Lima, Ohio.—Plans are being made to build extensions of several of this company's interurban lines in the near future.

Ardmore & Western Interurban Railway, Ardmore, Okla.—Financial arrangements have been made and work will soon be begun by this company on the line which will extend from Ardmore north to within 1 mile of Springer and west via Woodford, Milo and Oil City. From Oil City one branch will extend 25 miles north to Elmore via Graham and Pooleville. Citizens of Elmore will give a bonus and donate 10 miles of the right-of-way. Another branch will extend south from Oil City to Leon via Cornish and Orr to the oil fields. F. B. McElroy, Ardmore, president. [E. R. J., Jan. 3, '14.]

Sarnia (Ont.) Street Railway.—Plans are being considered to build an extension south along the river bank in Sarnia.

Toronto, Barrie & Orillia Electric Railways, Toronto, Ont.—A provisional agreement has been made between this company and the Council in Barrie. The first section of the railway is to connect Barrie with a point on the Canadian Pacific Railway at Midhurst. Work on this section will begin not later than April. [E. R. J., Dec. 20, '13.]

***Waterdown, Ont.**—At a meeting of the citizens of Waterdown on Jan. 23 plans were considered to build an electric railway from Hamilton to Waterdown through Guelph to a point on the Georgian Bay. It was decided that the line should be built and that the project should be taken up with the Hydro-Electric Power Commission of Ontario.

Portland & Oregon City Electric Railway, Portland, Ore.—Plans are being considered to build an 18-mile branch from Milwaukee to Logan.

Southern Illinois & St. Louis Railway, Harrisburg, Pa.—Preliminary arrangements are being made to begin work in April on the construction of this line to connect Marion, Harrisburg, Benton, Johnson City and Herrin. All the cities through which this line will run have granted franchises to the company. W. H. Schott is interested. [E. R. J., Jan. 24, '14.]

Saskatoon (Sask.) Electric Railway.—The 3-mile extension between Saskatoon and Sutherland has been placed in operation.

Middle Tennessee Traction Company, Franklin, Tenn.—Surveys have been completed for this 70-mile line to connect Nashville, Franklin, Shelbyville and Fayetteville, Tenn., and Huntsville, Ala. P. E. Cox, Franklin, general manager. [E. R. J., Sept. 13, '13.]

Jackson Railway & Light Company, Jackson, Tenn.—Surveys are being made for a 2-mile line extension in Jackson.

Shelbyville, Petersburg & Decatur Railroad, Shelbyville, Tenn.—Surveys have been completed for the first 20 miles of this line to connect Shelbyville, Petersburg and Decatur. G. B. Howard & Company, Franklin, Tenn., engineers. [E. R. J., Jan. 3, '14.]

Eastern Texas Traction Company, Dallas, Tex.—There are forty-three trestles to be constructed on this company's line between Dallas and Greenville. Eleven have been completed between Dallas and East Fork and several are now being built from Greenville west to East Fork. J. W. Crotty, general manager. [E. R. J., Sept. 27, '13.]

Houston (Tex.) Electric Company.—Work has been begun laying additional track on the Harrisburg Road between Milby Street and the old city limits of Houston.

Utah Light & Railway Company, Salt Lake City, Utah.—This company is asked to consider plans to extend its Ninth East Street line from its present terminus at the Country Club to Fifteenth South Street, continuing the route on Ninth East Street in Salt Lake City.

Puget Sound Traction Light & Power Company, Seattle, Wash.—Plans are being considered by this company for an extension between Everett and Mount Vernon.

SHOPS AND BUILDINGS

Fresno (Cal.) Traction Company.—This company has moved its offices from Fresno to Los Angeles.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—A new depot will soon be erected by this company on the site of the present depot on Third Street and I Street in Sacramento. Plans are completed for a two-story structure which will cover the entire lot, covering an area of 75 ft. x 150 ft. The building will be of stone and steel construction. The second story will be used for the offices of the company.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—Plans are being made to begin work soon to build a new passenger station in Sebastopol.

Geary Street Municipal Railway, San Francisco, Cal.—Plans are being made to begin construction soon on the enlargement of this company's carhouse in San Francisco.

Waterbury & Milldale Tramway Company, Waterbury, Conn.—Plans are being considered by this company to build a new carhouse in Waterbury.

Savannah (Ga.) Electric Company.—Preliminary arrangements are being made by this company to rebuild its carhouses at Gwinnett Street and Harmon Street in Savannah. The new structure will be of brick construction. It will contain eighteen sets of tracks and accommodate 160 cars.

Tri-City Railway, Davenport, Ia.—Plans are being prepared and contracts will soon be awarded by this company to build an addition to its new carhouses at Thirty-fifth Street and Moline Avenue in Rock Island. The structure will be of brick, cement and iron construction and will be two stories in height. The second floor will be used for offices and a club room for the employees.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has purchased a site on Collinsville Avenue and Main Street in East St. Louis on which it plans to build its new four-story office building at once. Bids will be opened on Feb. 2. The structure will be of brick and reinforced concrete. The cost is estimated to be about $70,000.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—Arrangements are being made by this company to build a new carhouse at Lisbon Falls to replace the one destroyed last fall.

Niagara Gorge Railroad, Niagara Falls, N. Y.—Plans are being made by this company to build new carhouses and repair shops in Niagara Falls during the year.

Pennsylvania & Ohio Railway, Ashtabula, Ohio.—This company's carhouse at Conneaut was destroyed by fire on Jan. 22. The loss is estimated to be about $30,000.

Toronto (Ont.) Railway.—Preliminary arrangements are being made by this company for the construction of two new carhouses in Toronto.

POWER HOUSES AND SUBSTATIONS

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—This company has installed a new rotary converter at its power house in Brunswick and will install a similar machine at Lisbon Falls.

Holyoke (Mass.) Street Railway.—Work preliminary toward increasing the facilities of this company's power house at Holyoke is under way. New engines and machinery will be installed, and an addition to the power house will be constructed. The cost of the improvements is estimated to be about $150,000.

Eastern Pennsylvania Railways, Pottsville, Pa.—A new addition will be built in the near future by this company at its power plant at Palo Alto to supply power for its Tamaqua division. It is estimated to cost about $350,000.

Rutland Railway, Light & Power Company, Rutland, Vt.—The Pittsford Power Company, a subsidiary of the Rutland Railway, Light & Power Company, plans to build a new hydroelectric power house at the Chittenden reservoir. This new plant will have a capacity of 2000 hp and the current will be sold one-third to the Colonial Power Company and two-third to the Rutland Railway, Light & Power Company.

Manufactures and Supplies

ROLLING STOCK

Evanston (Ill.) County Traction Company has purchased ten city cars from the St. Louis Car Company.

United Railways, St. Louis, Mo., is expecting to purchase sixty-two center-entrance trail cars during 1914.

Michigan United Traction Company, Jackson, Mich., has purchased ten city cars from the St. Louis Car Company.

Pennsylvania & Ohio Railway, Ashtabula, Ohio, on Jan. 22 lost four cars in a fire which destroyed a carhouse at Conneaut, Ohio.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., has been building one electric locomotive in its own shops.

United Traction Company, Albany, N. Y., is remodeling several of its larger single-truck cars into the prepayment type. Three such cars are already in use.

Jamestown, Westfield & Northwestern Electric Railway, Jamestown, N. Y., has purchased from the Cincinnati Car Company through W. R. Kerschner six 53-ft. 6-in. all-steel car bodies.

Houghton County Street Railway, Houghton, Mich., on Jan. 12 lost one of its passenger cars by fire. The body of the car, including the wiring, was entirely destroyed, but it is believed that the trucks and motors can be rehabilitated and used again.

Aurora, Elgin & Chicago Railway, Wheaton, Ill., is just putting into service six new high-speed passenger motor cars built by the Jewett Car Company. These cars are 53 ft. 10 in. long and will be operated in trains. The trucks have 7 ft. wheelbase, and quadruple elliptic springs. They were built by the Baldwin Locomotive Works, according to designs made by the purchaser. The heating equipment of the six cars is the Peter Smith electric forced ventilation system.

City Railway, Dayton, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, as having ordered twenty 29-ft. 6-in. single-end prepayment car bodies from the Cincinnati Car Company, has specified the following equipment for these cars:

Trucks	max. tr., Std. Motor Truck Co.	Trolley catchers	Keystone
Motors	West. 306 2-motor equipments	Signs	Keystone
Air brakes	Type a-3 Nat'l Brake & Elec. Co.	Headlights	Elec. Serv. Sup. Co.
Heaters	Peter Smith	Lighting fixtures	Dayton
Seats	Hale & Kil.	Ventilators	Dayton
Push buttons	Consol.	Sash locks	Dayton
Sand boxes	Keystone	Curtain fixtures	Barney & Smith Car Co.

TRADE NOTES

Cortlandt Engineering Company, New York, N. Y., has transferred its office from 146 Liberty Street to 42 Broadway.

Pathé Frères, Jersey City, N. J., have discontinued the words "Pathéplay" and "Pathé Frères" in speaking of their productions or in advertising them, and henceforth the wording will be only "By Pathé," or "Produced by Pathé."

Electric Railway Improvement Company, Cleveland, Ohio, announces the election of the following officers, who are also the directors, for the coming year: President, F. H. Neff; vice-president, W. S. Gilkey; treasurer, H. S. Stebbins; secretary, R. B. Tewksbury; general manager, W. E. Huber.

R. M. Campbell, for several years connected with the sales department of the Ohio Brass Company, has accepted a position with the Detroit Graphite Company, paint maker, as special representative of its railway department in the Eastern territory. Mr. Campbell's headquarters will be at 135 Broadway, New York.

Nisbet Engineering Company, Inc., New York, N. Y., has recently been organized to engage in general electrical contracting and electric railway construction work, with offices at 146 Liberty Street. George A. Nisbet, formerly construction engineer of the Cortlandt Engineering Company, is president, John N. Gerken treasurer, and J. F. O'Reilly secretary. The company states that it is prepared to undertake all branches of electric railway construction, and with other work is now engaged in erecting the trolley and feed-wire system for surface lines under the new elevated structure at Woodside, Astoria and Corona, Long Island.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., reports the recent shipment to a large railway company in the Middle West of a twenty-six-panel switchboard in record-breaking time. On Nov. 28 the contract for the board was signed, calling for delivery in twenty-six days, with a bonus and penalty clause. On Dec. 10, or twelve days later, the entire switchboard was shipped complete from the works, and it was done without employing any overtime. The board is designed to control one 800-kw, 250-volt d.c. generator, two 37½-kw, 250-volt d.c. generators, two exciters and two 850-kva, 480-volt, three-phase a.c. generators, the remainder of the panels being devoted to a.c. and d.c. feeders.

King G. Kellogg, who has been chief engineer for the E. E. Brownell Engineering Company for the past four years, has tendered his resignation, to take effect March 1, 1914, and will thereafter devote his entire time to consulting work, specializing in matters pertaining to the electrolytic corrosion of underground metallic structures from stray electrical currents. Mr. Kellogg has had a wide experience in electrolysis work, and has made many electrolysis examinations and tests in more than fifty different cities in this country. He formerly held various positions in the engineering department of the People's Gas Light & Coke Company, Chicago, where he was employed for sixteen years. Mr. Kellogg has announced that he will retain his office at 1836 South Fifty-fifth Street, Philadelphia, Pa.

Hale & Kilburn Company, Philadelphia, Pa., has appointed Charles H. Schlacks as president, with headquarters in Philadelphia, succeeding D. W. Call, who resigned to go into private business. Mr. Schlacks has been connected for many years with western steam railroads. He started his business career by working up through the mechanical and operating departments of the Illinois Central Railroad. In 1891 he became associated with the Denver & Rio Grande Railroad. In 1894 he was appointed assistant general manager of this road. From 1900 to 1904 Mr. Schlacks was general manager of the Colorado Midland Railway. In 1904 he was made vice-president of the Denver & Rio Grande Railroad. Since that time he has served in the positions of president of the Globe Express Company, vice-president of the Utah Fuel Company and vice-president of the Western Pacific Railroad.

ADVERTISING LITERATURE

Phoenix Iron Works Company, Meadville, Pa., has issued a catalog describing its various types of steam boilers, including horizontal return, internal furnace, portable and vertical tubular boilers.

Universal Trolley Wheel Company, Northampton, Mass., has issued a catalog on its self-lubricating composite trolley wheel, which contains testimonials from some of its users.

Pawling & Harnischfeger, Milwaukee, Wis., have issued Bulletin 401, describing their Type H crane. Important features of this crane are its rugged construction, absence of overhung gears and pinions and entirely inclosed gears.

Electric Service Supplies Company, Philadelphia, Pa., has issued a leaflet illustrating its F. & P. car replacer and St. Louis trolley pick-ups. Another folder describes in detail its portable Keystone lamp guards. A conduit box type is also shown.

Redmond & Company, New York, N. Y., have issued a booklet entitled "Investments—1914," which contains detailed information concerning various railroad bonds, convertible bonds, short-term notes, guaranteed stocks and public utility bonds. In the front of the pamphlet there is placed an interesting chart of bond prices from 1907 to 1913, showing that the average price of twenty-five representative bonds is within a point or two of the low 1907 figures. Announcement is made of the establishment of a special department to assist clients in solving income tax problems.

Electric Railway Journal

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DO IT, AND DO IT FIRST

While it is true enough that public utilities in general and electric railways in particular often do not get a square deal from the public and the newspapers, this is due in many instances to delay in correcting causes for legitimate complaint. To wait until such complaint reaches the stage of public outcry and indignation is one of the surest ways to become so unpopular and so distrusted that there is no chance for a fair hearing even when the utility is clearly in the right. Once condemned by public opinion for neglect of actual and curable faults, the condemnation is indiscriminately applied and a good understanding is almost impossible to establish. Any railroad manager who finds these observations trite is invited to think whether or not there are causes for complaint on his system—say about some detail of his service—that he could have removed but has neglected. The really popular railroad managements are those who anticipate faultfinding. To do the right thing and to do it first—not under the compulsion of agitation or as the result of an order from a public service commission—is one of the shortest roads to a good understanding with the community.

BUREAU OF STANDARDS

An example of the opportunities for helpful co-operation between the federal government and the state governments is afforded by the proposed relations between the Bureau of Standards, Washington, and the public service commissions of the different states. These were outlined by Dr. Rosa, of the bureau, at the last meeting in Washington of the Association of Railway Commissioners in a paper describing the facilities of the bureau and referring to the work in the way of establishing standards which it could undertake. The bureau has not only already conducted important scientific research along railroad lines for the Interstate Commerce Commission but it has also acquired a very high international reputation in the establishment of physical and industrial standards in the electrical and other industries. Its equipment and organization are such that work of scientific investigation can be conducted along very much more thorough lines than would be possible for any individual state, and its conclusions should carry a correspondingly greater weight. Such a plan, of course, would give the bureau no legal authority over the utilities, but it would act in a sense as a clearing house for technical information desired by the state commissions. For this reason, and because disregard of its work would give rise to diverse, inconsistent and confusing conclusions in the different states, the plan seems to be directly in the line of business efficiency and economy.

PROPOSED INCREASE IN FREIGHT RATES

The prevailing opinion among traffic men throughout the United States is that the Interstate Commerce Commission will ultimately grant the 5 per cent increase in freight rates. In case such action is taken by the commission, it is doubtful whether further general increases will be allowed for some time. In view of this fact and that there is a possibility of the grant of an increase in freight rates in the very near future, the electric interurban lines engaged in interstate commerce should not lose sight of the fact that they, too, can profit by it. Consequently they should be prepared for concerted action along with the steam railroads. In fact, they should now have filed with the Interstate Commerce Commission their tariffs urging a proportionate increase. It is believed that the commission will postpone action for some time on any further requests for general increases in rates after it has rendered its decision in the present case because of the sentiment in some quarters that future decisions on rates ought to be based largely on the valuations determined by the Interstate Commerce Commission, which is just beginning its task of valuing all the interstate carriers.

THE POWER OF SUGGESTION

In a thousand instances, in factory and office, the principles of psychology have in recent years been turned to increasing advantage in obtaining predetermined results. The use of the power of suggestion has been particularly effective, and we note with pleasure a concrete example of its application to the electric railway field. To be specific, the title of James Harmon, claim agent of the Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company, was recently changed to "safety agent." This change was made for the express purpose of showing the public that it was the desire of the railway to make its main effort toward safety of transportation and not to suggest the necessity of handling claims growing out of accidents. The words "claim agent" connote not only severed limbs and bruised bodies but also legal wrangles between company and injured passenger, whereas the title "safety agent" keeps first before the mind of the public the fact that the paramount duty of the company is to avoid killing and maiming people. Claims still have to be settled and the company must be protected therein; but when the public grasps the idea that a claim award is secondary and comes only after the company has failed in its safety work, there will, we believe, be less difficulty encountered in the settling of claims. An interesting variation along this same idea of safety suggestion is the practice followed by the Washington Railway & Electric Company and the United Railroads of San Francisco of apportioning among the platform employees a premium based upon the decrease experienced in damage awards during an operating year. There is no reason for doubting that the germ contained in these two ideas will by its suggestiveness, if properly fostered, result in much better public relations in regard to the vexatious question of damage claims.

DEVELOPING YOUNG MEN FOR RAILWAY WORK

In an address recently delivered before the New England Railroad Club George M. Basford deplored the lack of provision for recruiting the ranks of the trained workers in railroad work. As the same general principles apply in the electric railway field, their statement by one who has had as much to do with training young men as Mr. Basford should prove suggestive to electric railway managers.

As an illustration of perfect organization, Mr. Basford cites an orchestra, in which each player performs his part perfectly, and the result is harmonious co-operation. This is due to training and is analogous to the condition which should exist in railroading if systematic provision was made for it. He contends that as a rule such provision is not made, and as a result railroad work does not attract young men of ability of hand or head because they see no opportunity to make systematic progress in the industry. Equipment representing enormous investment is intrusted to men but poorly prepared for such responsibility, and even if their work is well done it is not appreciated by their superiors.

The railroads are suffering to-day from their failure to establish effective apprentice systems twenty years ago; hence they do not now have a supply of men ready for advancement. Even in the trades essential to the successful maintenance of rolling stock, "skilled" workers have to be made over night, and their ignorance and clumsiness are sources of expense to their employers.

Another feature of steam railroading emphasized by Mr. Basford is the lack of sympathy between the operating and the mechanical departments. There appears to be between them a great gulf over which the mechanical men cannot pass. This is the reverse of what should be the case. Where a mechanical man has shown executive ability in the conduct of his affairs he is particularly well fitted for promotion in the operating department because of his knowledge of equipment and maintenance problems. There should be provision for promotion to all grades in each department until each man occupies the position which he can fill most effectively. And there should be no barrier against a transfer from one department to another to promote efficiency of men and organization. It is the future which is held in prospect rather than the immediate job in hand that makes it possible for a company to retain men for a reasonable time in disagreeable work, and good organization must provide this future. The lack of it is driving railroad men into industrial positions, where they are rewarded by better salaries and by opportunity for advancement limited only by their ability.

Mr. Basford paints a dark picture of the present conditions in railroad work on the human side. While attention is being lavished on materials and methods, men have been left to shift for themselves. And never were loyal, capable men more needed than now. As a cure for the trouble, he advocates training such as is now being inaugurated by a conspicuously few pioneers. This training must be thorough, well-planned and continuous through the educational period. It must be given through night and day classes under systematic guidance by skilled instructors. Apprenticeship has succeeded when it has had a chance. The fear that the unions will hamper the inauguration of systematic instruction is not well founded. The question of opposition should not be raised until the amount of instruction already agreed upon has been provided.

Having before us in outline some of the salient conditions in steam railroad work, we may well compare these with their electric railway parallels. The electric railway differs only in detail from the steam road. The power is generated in central power plants and is distributed direct or through substations to many small units of rolling stock, but the general transportation problems are the same. In the small roads there is necessarily closer co-operation among departments, as there are comparatively few employees, and the interrelation of the work of all is clearly appreciated. While many roads have too few employees to warrant the installation of elaborate training methods, no road is so small that it can afford to neglect the subject in its entirety.

Co-operation among the roads in a given community should make classes for instruction of various sorts possible, and if there is no one available who is capable of handling the educational situation it is high time that changes should be made in the upper ranks of the electric railway organization. Certain large individual electric railways and the combinations of smaller ones are giving this matter of training careful consideration, but even here, where the opportunity and the necessity are so great, the methods in use seem to be largely of an experimental character. Oversight of the educational work falls to already overburdened officials who, while realizing its importance, cannot give it the requisite attention. Has not the time arrived when skilled, special supervisors should be appointed for this duty? The steam roads have found it necessary. Why not the electric roads also? Such men will be difficult to find at first, but if they are needed and can be assured of a fair chance to "make good" and to receive a reasonable recompense for doing so, they will be forthcoming.

EXPLICIT DIRECTIONS FOR PUBLIC UTILITY ACCOUNTING

An analysis of the fundamental reasons underlying the installation of prescribed public service accounting in various states discloses the fact that there have been at least three definite objects in view in the mind of legislators—first, to establish uniformity in accounting between all corporations of the same class; second, to establish an accounting system that would show clearly and accurately the specific sources of all incomes and the exact purpose of every expenditure, and, third, to state the fundamental principles according to which accounts should be kept so as to prevent the charging of items to wrong accounts. The first two objects involve the theory of public service accounting, and with the great improvements made in accounting classifications and financial statements they have been largely realized. The last point, however, is the one in which the accountants and bookkeepers of public utility corporations are primarily interested, for it is most closely associated with the daily practicability of the accounting system. Legislators and their agents, public service commissions, have in the past endeavored to state clearly the proper principles to be followed in the accounting practice of the field, but the fact is that their instructions have nearly always lacked the specific details and careful illustrations that were necessary for their successful carrying out.

A striking commentary upon this shortcoming is contained in a paper on "Depreciation" read before the Wisconsin Electrical Association by Halford Erickson, of the Wisconsin Railroad Commission, published elsewhere in this issue. Much emphasis has been laid on the necessity of depreciation provisions and the choice of the proper determinative method, but concerning the actual devices for recording depreciation on the books much less has been said. Repairs, renewals, betterments, improvements, alterations, replacements, depreciation, provision for reserve for depreciation, depreciation reserve, depreciation fund, depreciation reserve fund—all these terms have been placed before the public utility accountant and no small part of the resulting confusion can be traced to a lack of proper explanation and examples in regard thereto, when the system was installed.

The prevalent misunderstanding as to the distinction between the depreciation reserve and the depreciation reserve fund is particularly mentioned by Mr. Erickson, but it deserves even greater emphasis than he placed upon it. It is probable that more confusion exists with regard to reserves and funds than with any other nomenclature, yet to the scientific accountant there is an absolutely clear-cut line of demarkation between them. A reserve is a portion of proprietorship (supplies, undivided profits, profits) which has been set aside for some specific purpose; it is an accountability and should always appear only on the liability side of the balance sheet. Funds (general funds not being here considered) represent assets that have been set aside out of the general assets to be devoted to some specific purpose and must always appear only on the debit side of the balance sheet. The confusion between these terms is probably due to the fact that often a fund and a reserve are set up to cover the same thing, such as depreciation. That portion of the assets corresponding to profits cannot, as a rule, be identified as such, although the profits are indisputably vested in the assets. Disbursements, therefore, cannot be made out of profits, but only out of cash in amounts equal to certain measurements of profits. Hence, when the intention of a corporation to provide for a certain inevitable outlay, such as depreciation expense, is signified by setting up a depreciation reserve out of the proprietorship to be deducted automatically before a figure representing the amount available for dividends is obtained, this reserve is often strengthened by the withdrawal from the general assets of an equal amount of actual cash or money values to be set aside and used only for actually meeting the depreciation expenses. Public service commissions understand this theory, but why do they call such a fund a "reserve fund"? This mixture of terms serves no purpose; they would better remember Kipling's familiar line: "East is East, and West is West, and never the twain shall meet." When a reserve, the bookkeeping device, and a fund, the actual segregation of assets, have been set up to cover depreciation, for example, it is far preferable to place "depreciation fund" and "depreciation reserve" on opposite sides of the balance sheet and let the common word describing their purpose show their relationship.

The lack of this proper terminology has been sufficiently confusing to public service corporations, but the accounting difficulties have been increased many fold because of the omission of explicit directions as to how these and other accounts should be constructed. When a depreciation reserve alone is used, when it is also supported by a depreciation fund, when property is discarded, scrapped or renewed, when charges due to depreciation are not carried through the construction accounts—in fact, in every contingency that may arise in accounting for depreciation—a set of specimen entries should be made in order to show the exact working and interrelation of all accounts that might be concerned. Mr. Erickson's paper contains some valuable information concerning the proper debit and credit entries to be made for depreciation that well illustrates the direction that instructions to public utility accountants should take.

Public service commissions occupy in public utility accounting work a position analogous to that of the systematizer in the business world. Two of the chief duties of the latter in installing an accounting system are to see that short, explicit and non-technical instructions are given for its use and then to watch its operation and explain instructions that are not clear. Needless to say, efficient systematizing demands a proper explanation in the first place rather than extensive corrections later. From observations made on several visits to bureaus of accounting and statistics of different public service commissions, we are led to believe that these public bodies might well follow the example of the private systematizers. It is notorious in this country that public organizations are negligent in working according to the principles upon which the success of private enterprise is based; but if other public service commissions will adopt the frank corrective attitude of the Wisconsin Railroad Commission there will be improvement at least in the practical success of the accounting systems promulgated in the field of commission work.

WHAT IS THE CLAIM DEPARTMENT DOING?

Do electric railway managements know enough about what their claim departments are doing? This question is suggested by the discovery by the president of one of the large systems that the ambitious young men in his claim department were doing things of which he highly disapproved but of which he had had no idea until he found them out by chance. The question asked has a very important bearing on the efforts of electric railways to set themselves right with the public.

Of the two cases that came to the notice of the railroad president referred to, one was that of an accident in which an automobile had been struck by a car under circumstances which placed the blame upon the railroad. There was no question of personal injury involved and the owner of the automobile was in no way inclined to mulct the railroad. The obliging representatives of the claim department who promptly called upon the former owner assured him that there would be no opposition to paying a fair repair bill, which, as it finally developed, amounted to less than $50. When, however, this bill was sent to the railroad, a curt letter was received stating that further investigation had shown that the company was in no way in fault, that no representative of the claim department had been authorized to promise settlement, and, in fact, no settlement would be made. What had happened was that the claim department decided that the owner of the automobile would not bring suit for the small amount involved, so it was perfectly safe to turn down the claim altogether. This assumption on the part of the claim department representative was justified. No suit was brought, but the company had turned a friend into an enemy who could not be convinced of its fairness or honesty by any amount of argument.

The other case was that of a young woman whose foot had been caught in a splinter 9 in. long projecting from the edge of a badly worn rail. The young woman's face was seriously cut by her fall, but she took no action except to report to the company the dangerous spot where the accident had happened. Almost immediately she was visited by a representative of the claim department, who asked her if she was going to do anything about the accident. Her reply was that no action against the company had been thought of, but that if it would pay the doctor's bill that had been incurred as a result of the accident payment would be accepted. After a delay of three or four months payment of the bill was finally refused.

In the latter case, however, the injured person was indisposed to let the matter drop and brought suit, mainly at the instigation of friends, who urged her not to allow the company to evade its responsibilities. In this case if the company had done the decent thing to start with it would have escaped with the payment of a doctor's bill of a few dollars, whereas now it has a suit on its hands and has made at least a score of bitter enemies among those who know the circumstances of the case.

The position taken by the company in these cases was unquestionably due to the ambition of claim department representatives whose idea apparently was to defeat every claim that might be made, justly or unjustly—a disposition fostered, no doubt, by their experience in dealing with hundreds of claims from people who have little or no just grounds upon which to base their demands for damages. When these cases were reported quite unofficially to the president of the company concerned, he expressed prompt agreement with the statement that if that sort of thing was going on all the time it was no wonder that the company had so many enemies. The incident seems worth reporting for the suggestive value it contains for other railroad executives who are trying to establish good relations with the public, and whose efforts are, perhaps, being defeated by unfairness, not to say imbecility, on the part of claim agents.

SOMNOLENCE IN CAR DESIGN

Judging by descriptions of recently built cars, either the railway company designers or the manufacturers are suffering from what might be called painful conservatism. Apparently the possibilities of saving weight by means of the so-called "side-girder construction" are, in the majority of cases, being completely overlooked, and designs are being turned out daily which retain to all intents and purposes the moss-grown principle of construction whereby a car is supposed to consist of a light superstructure imposed upon an entirely separate floor framing. The idea underlying such a design is simple. Carried out to the final analysis, it amounts to a flat car with a house upon it.

In the days when wood was the only material available for car construction there was, perhaps, some justification for this method. Even then, however, it was by no means a necessity, and the 1910 committee of equipment of the American Electric Railway Engineering Association explained in detail how a side-girder effect could be produced with wood. At that time, of course, the availability of steel overshadowed the construction as outlined, but the comment at least showed the desire of the committee to point out the way toward rational methods of design. Certainly, no design can be called rational if it involves the use of shallow, heavy sills—crowded between the floor above them and the wheels below—when the work of supporting the load can be done equally well by making the whole side of the car into a deep and light girder.

Obviously the old principle of design necessitated "taking two bites at the cherry," because the car siding had to be installed under any circumstances, and if it was made to do no work it amounted in the end to just so much extra weight to consume power, to wear out the track and to make more expensive repairs. It is, of course, true that longitudinal sills, especially center sills, have a certain value in the absorption of buffing strains, but in street railway service, where the operation of single cars is practically the universal rule, this consideration can hardly be taken seriously. Indeed, some fifteen years ago, when the side-girder type of construction came into use on a large scale on steam roads, it was introduced on the 50-ton coal and ore cars, which, when handled in heavy tonnage trains, were subject to the most terrific abuse through coupler strains.

A modification of this design has been used to some extent in both interurban and city cars. This consists in the use as a beam to carry the load of the car siding between the sill and the belt rail, the side posts being designed only to support the roof. Undoubtedly this scheme is infinitely superior to the old scheme of carrying all the weight upon heavy sills, and it permits, obviously, a lighter and more rigid construction and a lower car floor. However, it cannot be said to be more than a makeshift, designed for a combination construction of steel and wood.

In the all-steel cars which have become so common of late the retention of the old idea of the house on a flat car is doubly harmful. Not only does it involve extra weight but, as pointed out by a prominent and very successful designer of electric railway cars, it involves also a lack of co-ordination in resisting stresses that inevitably causes rapid deterioration. This point is obvious enough when one considers that the side of the ordinary street car between trucks must act as a beam with a height equal to about 40 per cent of its length whether it is intended to do so or not. If this beam does not act as a whole—in other words, if it is carried upon a shallow sill at its base—any deflection of the sill will either buckle the plate at the top part of the beam or else spring the side posts out of the vertical by an amount roughly equal to the deflection.

With wooden constructions these distortions can be successfully absorbed because of the inherent elasticity of the material, but with the solidly riveted steel sheets and framing there exists no opportunity for play except by actual loosening of the rivets. Once a rivet becomes loose there are no means for making it tight again unless the car body is rebuilt, and the inevitable results are leaking roofs, working side posts and rapid deterioration by both wear and corrosion. On the other hand, if the whole side of the car from roof to sill is designed to act as a girder or truss in carrying the load, with the posts capable of resisting the horizontal shearing strains set up between the top and bottom members, a construction of great rigidity and extreme lightness is obtained. This principle has been in practical use on steam railroad cars for a long time. It is by no means new for electric railway equipment, and its obvious neglect is hard to understand.

EXHAUSTING THE PUBLIC'S PATIENCE

The paper which was read by C. M. Larson before the Wisconsin Electrical Association and published in a recent issue of the ELECTRIC RAILWAY JOURNAL bears the title of "Street Railway Traffic Surveys in Relation to Railway Operation, Management and Regulation." It is not our purpose to comment now on this general subject other than to say that Mr. Larson's excellent presentation and traffic survey suggestions speak for themselves. It is of even more importance to examine at this time the sore spot in public relations on which Mr. Larson has placed a warning finger. Electric railroading is a pretty complicated business, but it is not so complicated that the manager cannot explain to his patrons the reasons for the adoption of certain policies when such explanation is necessary.

Mr. Larson singles out particularly Rule No. 55 of the American Electric Railway Transportation and Traffic Association, which prohibits employees from divulging information on traffic disturbances to any but authorized officials of the company. Of course, there are many good reasons for this rule from the standpoint of discipline and ultimate legal consequences; but is anything more exasperating to passengers than sitting in a stalled car in utter ignorance of the cause of their plight or how long the delay is likely to last? A pin prick is not a stab, but for all that it is enough to make a man bide the time for revenge on his tormentor.

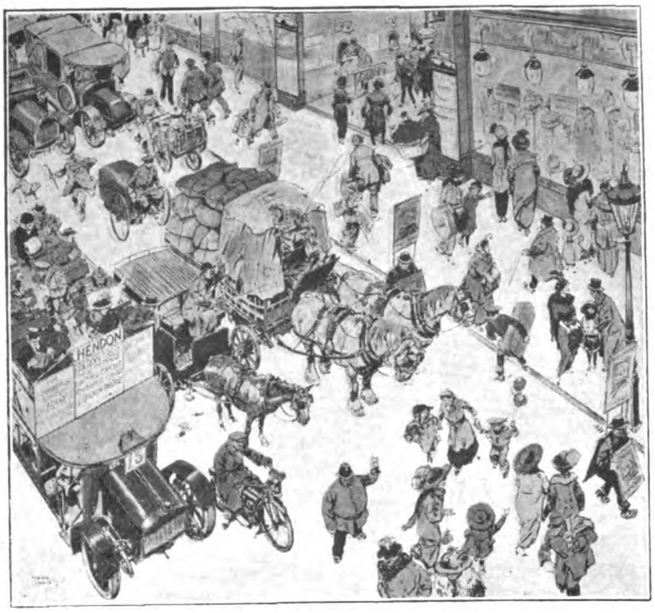
Without doubt, literal obedience to Rule No. 55 has caused thousands of such annoyances, small in themselves but big in their cumulative effect. The plain remedy is to frame rules of this kind so that they may be interpreted with some degree of tact. In the first place, the platform man should be instructed to take a sympathetic rather than an unconcerned attitude toward the marooned patron. He should explain the difficulty of quickly securing exact information and as soon as he does learn the expected duration of delay he should have the authority to give it out.

Of course, there are other petty annoyances besides this. One is the use of small-lettered and badly lighted car signs which are not legible until it is too late for a prospective passenger to stop the approaching car; a second, and a related one, is the use of route names which are similar enough to cause confusion; a third is the absence of shelters at transfer points. But doubtless the greatest infliction is to read a boast about the excellence of the service when an apology for deficiencies would be more in order. Such things as these may excite only a vague, intangible feeling of enmity which does not find concrete utterance until the company comes before the local council or commission for a new privilege. Then the manager will be sorely perplexed to see how many knives have been quietly whetted against his corporation. Publicity without polite and earnest attention to the smaller amenities of transportation life is as worthless as the prayer of Hamlet's uncle, who realized too late that "Words without thoughts never to heaven go."

Rapid Transit Progress in London

This Article Reviews the Progress Made in Recent Years to Consolidate the Transit Facilities of London, Mentions the Betterments Made or in Progress and Describes the Latest Experiments in Center-Door Cars

London is not only the largest city in the world but it is also provided with the greatest variety of means of transportation. The conflicting interests of the original transportation companies prevented a uniform plan of development and later the unhampered growth of the omnibus led to ruinous competition in many sections and annoying gaps on important lines of travel elsewhere. The only form of co-operative action was the joint ticket agreements of the Underground Railways. The importance of this interchange service may be realized from the fact that in 1912 about 142,500,000 through tickets were sold on the lines of the District Railway and the London Electric Railway.



Rapid Transit Progress in London—A Poster Satirizing the Dangers of Too Much Surface Travel

In 1913 the City & South London, Piccadilly, Hampstead and Bakerloo tubes and the District lines were placed under one management, and in the same year all but the last-named company were welded financially by Speyer & Company. The same banking firm also obtained control of the Central London Railway in 1913, and it now shares the common management. As will be noted from the statistics hereinafter published, the Speyer group is by far the most important rapid transit factor in London. In addition, it controls the London General Omnibus Company, this company having been acquired in 1912, and has extensive interests in the London & Suburban Traction Company, which in turn controls the London United Tramways, the Metropolitan Electric Tramways and the South Metropolitan Electric Tramways. The economical co-ordination of these three classes of service—namely, underground, tramway and bus—is in the hands of Albert H. Stanley, managing director, who went to London in 1907 from the general managership of the Public Service Railway, Newark, N. J.

The other underground railways of London consist of the Metropolitan Railway, the Great Northern & City Railway, which was acquired by the Metropolitan Railway on Sept. 1, 1913, and the East London Railway, which is simply an interconnecting tunnel leased jointly by four steam railroads and by the Metropolitan and the District railways.

Among the bus companies the London General Omnibus Company is the largest in London and has traffic arrangements with nearly all the other smaller bus companies, which include Messrs. Tillings, the Associated, the Tramways (M. E. T.) Omnibus Company, the British Automobile Traction Company, the Metropolitan and New Central Company. By these traffic arrangements co-ordination and logical development of the bus business has been secured, and the public has the advantage of a service of omnibuses distributed with a view to catering for the traffic requirements.

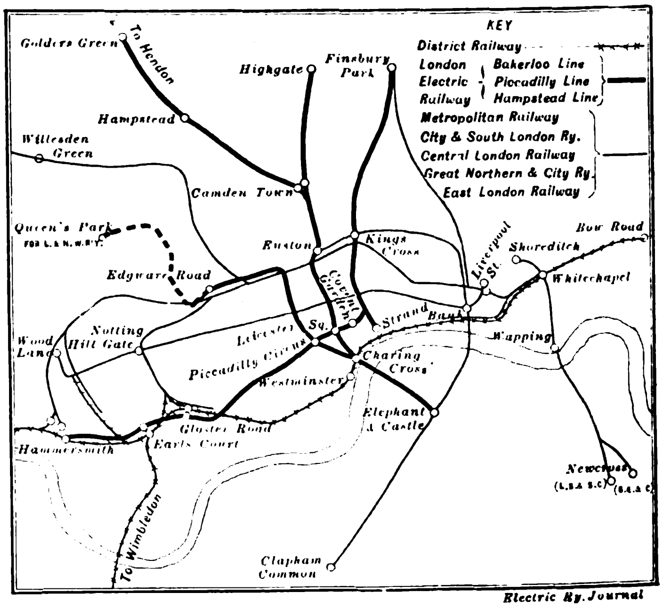
TABLE I—MILEAGE OF UNDERGROUND LINES IN LONDON, DEC. 12, 1912

Road	Route	Single Track
East London	6	12
Central London	7	14
City and South London	7	16
Bakerloo	4	11
Charing Cross, Euston & Hampstead	8	16
Great Northern & City	4	8
Great Northern, Piccadilly & Brompton	9	19
†Metropolitan	26	59
Metropolitan District	29	59
Metropolitan & District Joint Lines	2	5
*North & Southwest Junction	5	15
*North London	14	Unascertained
Waterloo & City	2	4
	123	

*Steam.

†This company also works 43 miles of line which is outside the area covered by this article.

The remaining traction interests of London are the suburban branches of the steam lines, the Brighton Railway being electrified and two others preparing for electrification, and the London County Council Tramways. Unlike the lines of the London United Electric Tramways, the municipal lines have penetrated the heart of London by a route on the Thames Embankment and also by a tunnel to Kingsway.


KEY
District Railway
London Electric Railway
Bakerloo Line
Piccadilly Line
Hampstead Line
Metropolitan Railway
City & South London Ry.
Central London Railway
Great Northern & City Ry.
East London Railway
Golders Green
To Hendon
Highgate
Finsbury Park
Hampstead
Willesden Green
Camden Town
Queen's Park
FOR L. & N. W. RY.
Euston
Kings Cross
Edgware Road
Covent Garden
Liverpool St.
Shoreditch
Bow Road
Whitechapel
Notting Hill Gate
Wood Lane
Leicester Sq.
Strand
Bank
Wapping
Piccadilly Circus
Charing Cross
Westminster
Elephant & Castle
Gloster Road
Earls Court
Hammersmith
New Cross
(L. B. & S. C.)
(S. E. & C.)
To Wimbledon
Clapham Common

Electric Ry. Journal

Rapid Transit Progress in London—The Traffic Heart of the Metropolis

TERRITORY AND EXTENT OF PROPERTIES

The accompanying map shows the territory served by the interconnected underground railways, and Table I gives the mileage of all local underground railways as of Dec. 31, 1912. It may be of interest to contrast the figures in this table with those published on Berlin and New York in the ELECTRIC RAILWAY JOURNAL for Sept. 6, 1913. Omitting steam-operated lines or electrified steam railroads, it will be found that Berlin has approximately 41 miles of rapid transit route in operation or nearly completed and another 13 miles under way; New York has 103 miles of rapid transit route in operation with 211 miles under way or approved, and London, which has no elevated railways except steam railroad entrances, has 123 miles of route in operation and nearly 4 miles under construction.

TABLE II—DATA ON SURFACE RAILWAYS IN LONDON FOR YEAR ENDED MARCH 31, 1913

Line	Route Miles Open	Cars	Passengers Carried
London County Council	142.90	1584	512,652,653
London United Tramways Company	55.25	339	61,139,285
Croydon Corporation	11.00	75	20,504,143
South Metropolitan Tramways Co.	13.09	51	7,385,589
Bexley U. D. Council	5.25	16	2,090,533
Dartford U. D. Council	6.50	12	1,729,640
Erith U. D. Council	4.70	17	2,972,091
Barking U. D. Council	2.67	9	2,176,237
East Ham Corporation	7.26	45	17,775,698
Ilford U. D. Council	6.53	26	7,578,813
Leyton U. D. Council	9.12	60	17,476,453
West Ham Corporation	15.50	118	40,200,347
Walthamstowe U. D. Council	9.14	38	11,807,549
Metropolitan Electric Tramways Co.	52.50	312	91,508,603
	341.41	2702	796,997,724

Table II covers the tramway traffic of London and suburbs. The data for the municipal lines are for the fiscal year ended March 31, 1913, and those for the private lines are for the calendar year 1912. The importance of the power-driven passenger vehicle appears from Table III, which shows that the first motor bus appeared in 1897 and the first motor cab in 1903. It is estimated that London now has 10,000 vehicles of the latter type and 3500 of the former. From a comparison of the total number of horse and motor buses in service every year with that of passengers carried (see Table IV) it is evident that the latter vehicle must carry a larger number of passengers daily. In fact, the London General Omnibus Company estimates that the average daily performance of a horse bus with twenty-six seats was 403 passengers and that of a motor bus with thirty-four seats 738 passengers.

TABLE V—PASSENGER TRAFFIC AND GROSS EARNINGS OF LONDON TUBES

	1906		1907		1908		1909		1910	
Metropolitan	98,384,766	£578,780	96,859,108	£566,085	99,846,735	£606,840	99,961,997	£619,732	102,849,158	£634,987
Great Northern & City	15,898,663	92,124	15,812,609	91,548	12,409,299	79,384	11,694,311	71,575	11,822,943	75,113
Piccadilly	....	......	26,674,658*	217,844*	34,436,978	279,367	37,494,725	295,608	19,973,049†	156,925†
Hampstead	....	......	10,302,823†	70,272†	25,148,002	174,365	29,387,162	200,530	15,264,355†	99,196†
Bakerloo	9,806,171	67,509	20,599,871	128,037	26,277,927	162,362	28,245,086	171,148	14,807,736†	88,383†
London Electric	....	......	....	......	....	......	....	......	46,665,279†	332,563†
District	55,062,424	403,315	51,235,557	406,981	61,130,308	472,649	66,852,301	514,787	72,732,612	560,534
Central London	43,057,997	332,142	36,907,491	295,931	41,898,373	350,150	38,383,394	284,267	40,660,856	290,029
City & South London	18,149,413	144,682	20,780,925	160,970	21,522,871	164,733	22,461,253	168,714	25,158,043	169,514

TABLE V (Continued)

	1911		1912		1913‡		Summary 1906-1913 (Half Year Inclusive)	
Metropolitan	101,620,653	£631,483	100,146,324	£624,985	50,317,143	£308,652	749,986,184	£4,571,544
Great Northern & City	12,442,551	78,492	12,824,138	79,495	6,813,337	42,401	99,808,851	613,131
Piccadilly	....	......	....	......	....	......	118,577,410	948,841
Hampstead	....	......	....	......	....	......	80,102,342	544,363
Bakerloo	....	......	....	......	....	......	99,736,791	617,439
London Electric	101,215,226	711,777	100,882,586	713,629	52,553,551	366,003	301,316,642	2,123,972
District	81,400,892	614,197	86,003,149	652,670	44,347,000	337,070	518,764,243	3,962,203
Central London	38,083,283	262,966	35,939,202	252,100	19,375,279	129,300	294,305,875	2,196,885
City & South London	26,159,461	172,906	24,529,602	160,495	11,561,020	74,534	170,362,588	1,216,548

*Including sixteen last weeks of 1906.
†Beginning with the last half of 1910, the London Electric Railway takes the place of the Piccadilly, Hampstead and Bakerloo Railways
‡One-half year.

Table IV shows the growth of traffic in Greater London from 1903 to 1912 inclusive, these figures excluding all the steam railroad passengers and not including the cab travel.

Table V shows the passenger traffic and earnings in recent years of the two groups of electric underground railways. Beginning with the second half of the year 1910, the London Electric Railway figures replace the Piccadilly, Hampstead and Bakerloo lines.

CONSTRUCTION IMPROVEMENTS ON THE DISTRICT RAILWAY

An extended article on the improvements on the Speyer lines made under Mr. Stanley's direction was published in the ELECTRIC RAILWAY JOURNAL for Aug. 6, 1910, under the title of "Cars, Schedules, Power Consumption, Running Tests and Signals in London Subways." Since this description was written numerous further improvements have been made, especially in modernizing the District Railway, which was formerly operated by steam, in providing connections underground at interchange stations, in improving the passenger elevation lift service and in experimenting with center-entrance cars. On the District Railway a large number of stations have been rebuilt or enlarged; signals, sidings and stairways have been added, and even prizes are given for neatness in station equipment.

The greatest improvement which the District Railway has undertaken is the provision of separate tracks

TABLE III—DATA ON OMNIBUSES AND CABS IN LONDON

	London Omnibuses			London Cabs		
Year	Horse	Motor	Total	Horse	Motor	Total
1899	3,621	5	3,626	11,193	...	11,193
1900	3,681	4	3,685	11,254	...	11,254
1901	3,736	10	3,746	11,173	...	11,173
1902	3,667	29	3,696	11,382	...	11,382
1903	3,623	13	3,636	11,404	1	11,405
1904	3,551	31	3,582	11,057	2	11,059
1905	3,484	241	3,725	10,931	19	10,950
1906	2,964	783	3,747	10,492	96	10,588
1907	2,557	1,205	3,762	9,818	723	10,541
1908	2,155	1,133	3,288	8,475	2,805	11,280
1909	1,771	1,180	2,951	6,562	3,956	10,518
1910	1,103	1,200	2,303	4,724	6,397	11,121
1911	786	1,962	2,748	3,347	7,626	10,973
1912	376	2,908	3,284	2,385	7,969	10,354
*1913	38	3,470	3,508	1,043	5,733	10,776

*On Sept. 30.

TABLE IV—INCREASE IN LONDON TRAVEL

Year	Railway (Local Companies)	Tramway (Approximate)	Omnibus	Estimated Population of Greater London	Annual Trips per Inhabitant
1903	290,722,680	394,356,531	287,386,471	6,710,272	144.9
1904	298,638,750	431,813,839	288,965,214	2,775,645	150.5
1905	305,052,495	477,944,684	290,665,051	6,841,651	157.0
1906	329,521,648	508,700,269	291,563,048	6,908,298	163.5
1907	356,233,666	589,745,792	330,000,000	6,975,593	182.9
1908	399,666,339	636,009,090	340,000,000	7,043,540	195.3
1909	410,741,610	687,138,908	311,000,000	7,112,145	198.1
1910	425,271,861	763,797,856	377,207,555	7,181,415	218.1
1911	436,398,785	821,819,741	400,628,487	7,251,358	228.8
1912	436,492,548	497,451,581	492,855,934	7,321,978	235.5

*NOTE: The London General Omnibus passenger traffic to Oct. 30 amounted to 560,819,222.

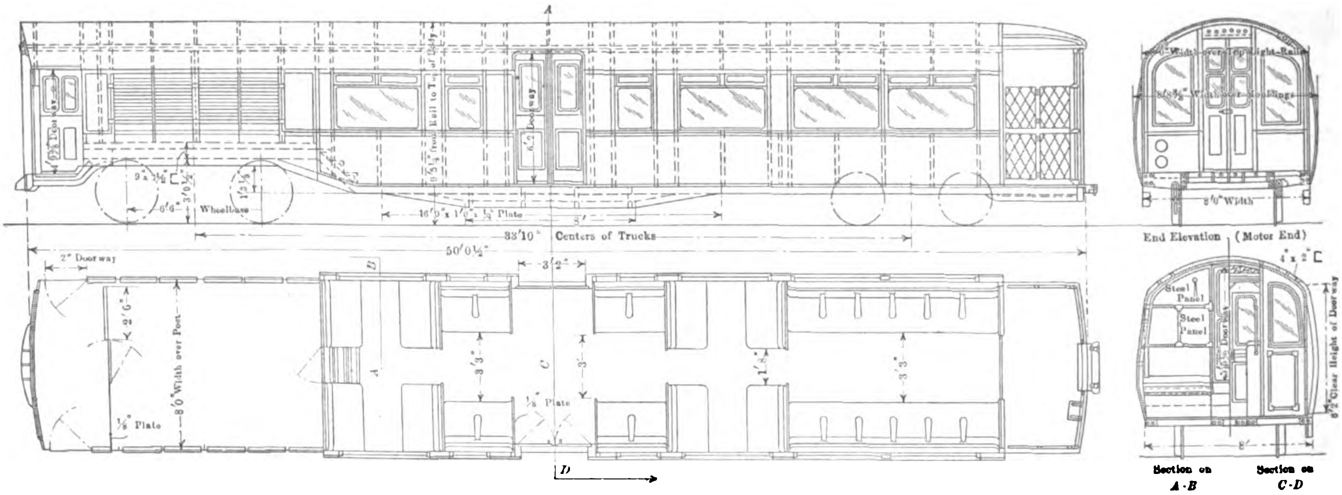
for express and local traffic at Earls Court. The maximum number of trains which can be run through Earls Court Junction in an hour—namely, forty-two in each direction—has been reached under existing conditions. At Warwick Road, which is only a short distance from Earls Court station, the lines cross, and there was only one way of obtaining further facilities, and that was to do away with the crossing. This undertaking has now been completed without the slightest disturbance to traffic, and the number of trains running through Earls Court station in each direction has been increased and will soon reach fifty per hour. Three new short lines were constructed—one approximately ⅜ mile in length on the Ealing Branch, another just a little under ¼ mile, between Earls Court and West Brompton, while the third will provide an extra "up" line for the London & Northwestern steam trains. Both the new Putney and Ealing lines pass under a portion of the Earls Court Exhibition, the first at a depth of about 10 ft. and the other at a depth of 30 ft.

TABLE VI—SHOWING CHANGES IN SCHEDULE RUNNING TIME DURING PAST FOUR YEARS ON LONDON TUBE LINES

	Interval, Minutes	Time, Minutes	Speed, M.P.H., Including Stops	No. of Trains in Each Direction	Seating Accommodation in Each Direction	Interval, Minutes	Time, Minutes	Speed, M.P.H., Including Stops	No. of Trains in Each Direction	Seating Accommodation in Each Direction
Elephant & Castle to Edgware Road—4.26 miles, nine intermediate stops	2½	17	15.0	362	54,300	2⅓	15	16.49	390	73,320
Hammersmith to Finsbury Park—8.89 miles, nineteen intermediate stops	2¾	35	15.24	340	51,680	2⅓	28	19.05	403	75,764
Golders Green to Charing Cross—5.93 miles, ten intermediate stops	10	23	15.4	*140	21,840	2 5/6	15	23.72	307	41,752
Highgate and Hampstead to Charing Cross—4.28 miles, ten intermediate stops	5	16	16.05	*419	65,364	2 5/6	12	21.40	294†	46,452
Camden Town to Charing Cross—2.51 miles, six intermediate stops	2½	9½	15.8	5.59	87,204	1 5/12	8	18.82	601	88,204

*During 1909 alternate trains only ran through to Golders Green, others being reversed at Hampstead during the slack hours.
†Highgate only.

The result of these alterations is that slow and fast trains to Wimbledon can start from Earls Court simultaneously, the fast trains running ahead at West Brompton, and also the running of extra trains between Earls Court and Turnham Green. During 1912 also many trains were added to the South Kensington, Mansion House, Richmond, Ealing and other routes.



Electric Ry Journal

Rapid Transit Progress in London—Plan and Elevations of First Center-Entrance Car for the "Tube" Lines

The variety of service on the District Railway, which has been operating eight-car trains since June, 1910, is illustrated by the fact that of forty trains which pass every hour between South Kensington and Mansion House the destinations are as follows: ten Circle, four Richmond, twelve Ealing, four Hounslow, six Wimbledon and four Putney. As the result of increased business on the District Railway, fifty cars were added in October, 1910, thirty-two in November, 1911, and fifty in 1913. In accordance with the District standard, these cars were 49 ft. 6 in. long over all, weighed 31 tons and were equipped with two GE-69 motors each and Type M control. The new cars have steel underframes, aluminum fittings and fireproofed wood. The trucks are also of wider wheelbase and glass wind shields have been installed at the center doors.

The Speyer interests propose to extend the District Railway 6 miles from Wimbledon to Sutton as an independent company but operated by the District Railway.

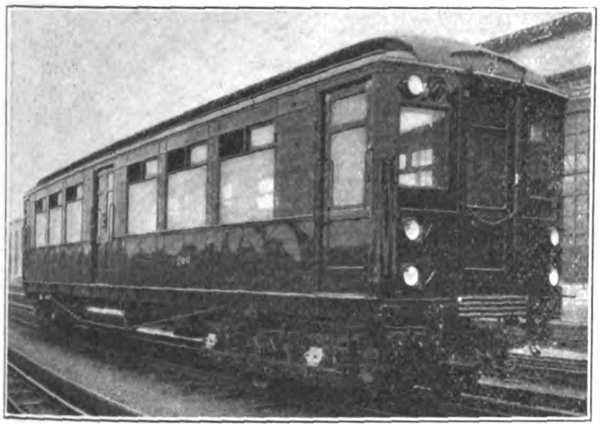
IMPROVEMENTS ON THE TUBE LINES

Some very interesting improvements have been made on the Bakerloo, Piccadilly and Hampstead tube railways, one of the most important being the education of the public in rapid movement. The betterment as a whole is well shown in Table VI, which compares the years 1909 and 1913 as to speed and service. Without any increase in rolling stock, these changes increased the seating accommodation in each direction from 54,300 to 73,320 on one line, from 51,680 to 75,764 on another, etc. The most astonishing increase in schedule speed was on the Golders Green-Charing Cross line, namely, from 15.4 m.p.h. to 23.72 m.p.h. Stops at the ordinary station now average fifteen seconds. Among the experiments to be tried to secure faster loading is that of shifting the guards to the platforms of the station in order to handle the crowd to better advantage. The signal system would permit a headway of thirty to forty seconds, but this has not yet been attained in practice owing to other causes.

The Hampstead line holds the record in frequency of service in running forty-four trains per hour, or a train every eighty-two seconds, on the main line. One special feature of the signal system is an indicator fixed at the stations immediately preceding the junction at Camden Town by which the Camden Town switchman informs the motormen whether they should approach the junction station at normal or half speed. Thus the switchman can call trains into the junction station at uniform intervals and so avoid the checking or stopping of trains by signals on the main line.

Owing to the growth of interchange traffic between the Piccadilly and District lines, an escalator was installed at Earls Court station, the point of interchange, capable of carrying 10,800 people in each direction per hour. This escalator has proved so satisfactory that others will soon be installed at other stations to assist the elevators and in some cases to supersede them. Escalators are being installed at Oxford Circus, Charing Cross, Paddington and Baker Street, and proposals are now forward for several others, particularly at interchange stations.

Several elevators on the system have been fitted with a new electrical device whereby the closing of the elevator gate operates the necessary starting mechanism. This eliminates considerable waste time, and at a busy station like Piccadilly Circus, where there are eight elevators, the new device will permit three additional trips per hour.

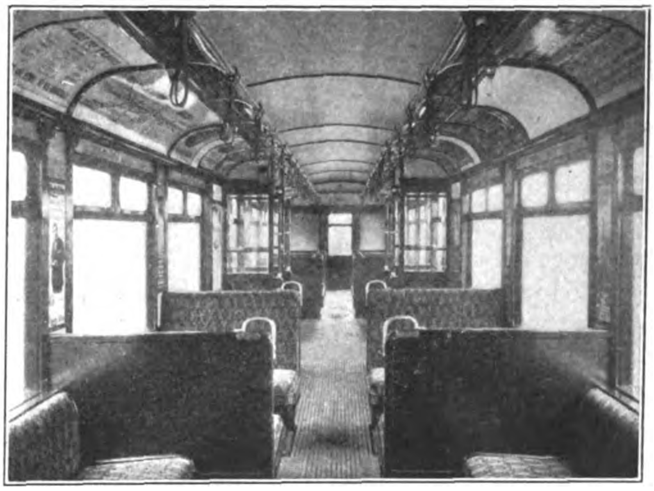


Rapid Transit Progress in London—Recent Type of Center-Door Car for Metropolitan and District Lines

INTER-OPERATION WITH STEAM LINES

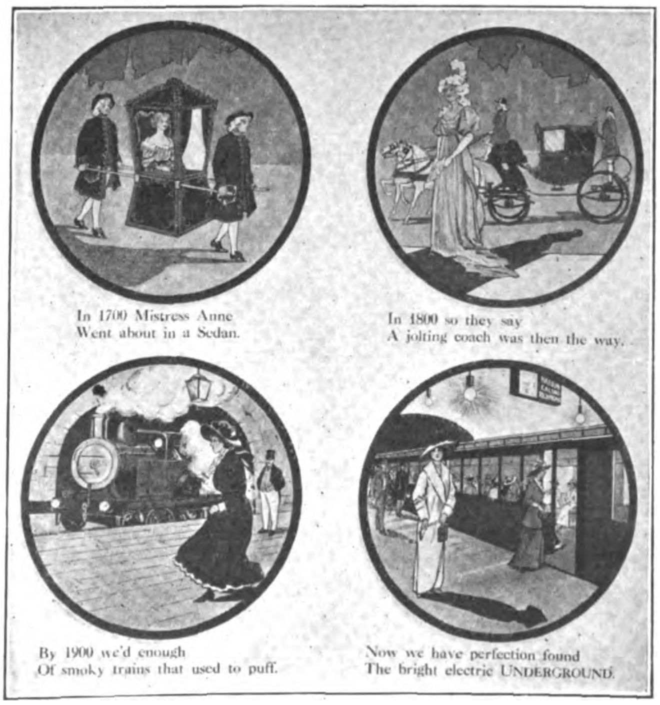
The extension of the Bakerloo line from Edgware Road to Paddington (Praed Street) has been completed in connection with escalators to join the Bakerloo platforms with the station of the Great Western Railway. This extension will be continued through to connect with the London & North Western Railway at Queens Park with running powers over the latter railway's tracks to Watford 15 miles from Euston station. This operation of city cars into the suburbs rather than the opposite policy is all the more interesting in view of the early electrification of the steam line. The contract for this service is on a rental basis. It will save the steam railroad the enormous cost of reconstructing the station at Euston while affording the London Electric Railway the opportunity of extending its service at low cost.

The City & South London Railway, which has been acquired by the Underground Railways and has become part of the general scheme of that company, has obtained powers to widen its tunnels from 10 ft. 2 in. in diameter to the same size as that of the other tube railways, so as to enable the service of trains to be increased from twenty-four per hour with five cars each to forty trains hourly of seven cars each. It is also proposed to make a connection at Euston with the line of the Charing Cross, Euston & Hampstead (tube) Railway so that through trains may be run between Highgate, Hampstead and Golders Green in the north of London and Clapham Common in the south of London.



Rapid Transit Progress in London—Interior of Center-Door Car for Metropolitan and District Lines, Showing Glass Wind Shields

The Central London Railway is constructing a 3¾-mile extension from the present terminus at Wood Lane to make a physical junction with the Great Western Railway at Ealing. The work is being carried out by the Great Western Company and should be completed toward the end of 1914. The Central London also proposes to extend its tube to Gunnersbury and make a junction there with the London & South Western Railway. The speed on the Central London has been increased, and the running time has been decreased


In 1700 Mistress Anne
Went about in a Sedan.
In 1800 so they say
A jolting coach was then the way.
By 1900 we'd enough
Of smoky trains that used to puff.
Now we have perfection found
The bright electric UNDERGROUND.

Rapid Transit Progress in London—The Improvement of Transportation in Two Centuries

from twenty-eight to twenty-three minutes from Wood Lane to Liverpool Street. The Great Northern, Brompton & Piccadilly (tube) Railway is also to be extended.

TRIALS OF CENTER-ENTRANCE CARS

Another important work on the London Electric Railway is the experiment with center-entrance cars which has been under way for the past year. The standard motor cars of the tube lines have entrance and exit at the rear only, owing to the fact that the motorman's cab and the control equipment take up the entire front of the car. The experimental cars are of two types, one with sliding doors and three with swing doors.

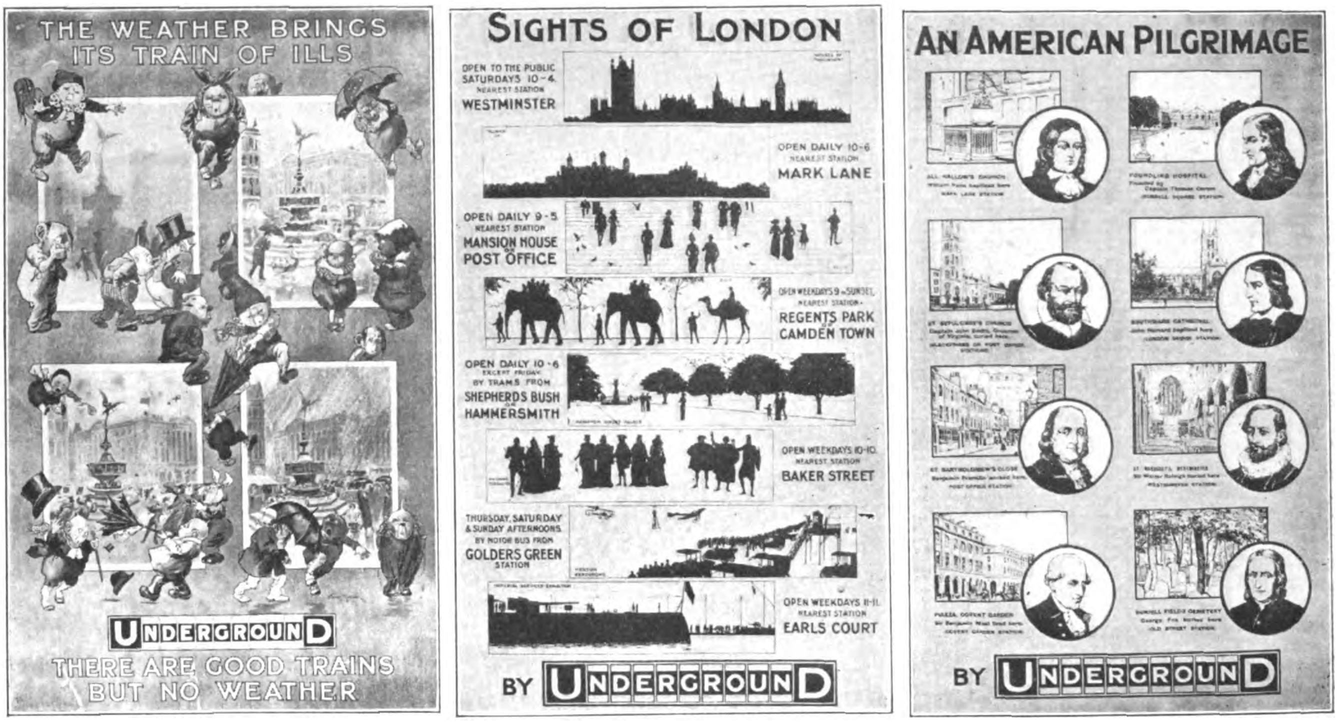
A notable feature of the sliding-type center-door car is that on account of the limited tunnel clearances the roof slides into pockets with the door sections. The vestibule roof on the platform is also arranged to slide with the corresponding door. It is customary for passengers in London to open the doors themselves, but in this instance the conductor can also open the center door by means of a wire rope and sheave transmission from the platform.

The other cars, which were reconstructed at the company's shops, consist of a train of motor car, control trailer and trailer. They have been furnished with inwardly swinging doors which give a clear opening of 2 ft. 4 in. at the knee line. The doors are set back 7½ in. from the tread, but to prevent passengers from standing in the niche thus formed the lower panels of the door are covered with a boss or projection which makes it impossible to stand opposite them. The doors swing against bulkheads and are self-closing and fitted with electric locks operated from the conductor's platforms.

The locks and doors are interlocked so that a red signal lamp glows when doors are open or unlatched and a green light only when doors are shut and locked. At the time of writing only experimental cars are actually working, but twelve motor and two trailer cars of the latter type of center-entrance car are to be introduced on the Queens Park Extension, and these cars are now in course of erection. Details of the car design are shown in an accompanying drawing.

IMPROVEMENTS ON OTHER LINES

Improvements have also been made or are under way on underground lines outside the Speyer group. The Metropolitan Railway has enlarged the station and track facilities at Baker Street and is preparing for a general renovation and for faster service. It has also received franchises for extensions to Lothbury and other places. The East London Railway, which connects Shoreditch and New Cross, has now been electrified. At present this company has no rolling stock, as its line has been used jointly as a connecting link by other railways. The road is 5¾ miles long, of which 1¾ miles is underground. The capital for the electrification has been provided by the Great Eastern Railway, but the South Eastern Railway will take care of the general renovation and maintenance, the Metropolitan Railway will handle the automatic signaling and electric track equipment, while the District Railway will supply power, lighting and pumping facilities. It is proposed to introduce an independent service on this line.


THE WEATHER BRINGS ITS TRAIN OF ILLS
UNDERGROUND
THERE ARE GOOD TRAINS BUT NO WEATHER
SIGHTS OF LONDON
OPEN TO THE PUBLIC SATURDAYS 10-4. NEAREST STATION WESTMINSTER
OPEN DAILY 10-6 NEAREST STATION MARK LANE
OPEN DAILY 9-5 NEAREST STATION MANSION HOUSE OR POST OFFICE
OPEN WEEKDAYS 9-SUNSET. NEAREST STATION REGENTS PARK OR CAMDEN TOWN
OPEN DAILY 10-6 EXCEPT FRIDAY BY TRAMS FROM SHEPHERDS BUSH OR HAMMERSMITH
OPEN WEEKDAYS 10-10. NEAREST STATION BAKER STREET
THURSDAY, SATURDAY & SUNDAY AFTERNOONS BY MOTOR BUS FROM GOLDERS GREEN STATION
OPEN WEEKDAYS 11-11. NEAREST STATION EARLS COURT
BY UNDERGROUND
AN AMERICAN PILGRIMAGE
BY UNDERGROUND

Rapid Transit Progress in London—Three Styles of Posters, One Imaginative and Two Historical

ADVERTISING TRAFFIC

The artistic and clever posters of the Underground Railways have been frequently reproduced in these columns, and those presented in this article prove that the company's high standard is being maintained. One of the accompanying halftones is made from a poster which satirizes the congested surface traffic conditions of London and intimates that the "Underground" is a safe and quick way out of the turmoil and risk of street travel. Another, entitled "Milestones," shows transportation progress from the days of the sedan chair to the clean and fast underground. This poster was especially timely because a play of the same name was then attracting much public attention. A new poster of original design satirizes the winter weather of London by means of brownies which represent the evils of neuralgia, colds and other effects of bad weather, all of which may be avoided by traveling underground. The Americans who visited London last summer were catered to by the poster entitled "An American Pilgrimage," which presented portraits of men and views of places associated with men famous in American history. The silhouettes are also an effective form of poster publicity. A more recent innovation is the use of post cards with miniature reproductions of posters, particularly those relating to places associated with famous writers. These cards carry on the back the names of the localities and the birth and death dates of the authors.

It might be supposed that, having used the slogan "Travel Underground" so long, the London Underground Railways would be embarrassed in advertising the bus service. On the contrary, the traffic routes have been so co-ordinated that the publicity department can make a point of suggesting the best way to reach particular places by combinations of the different facilities. Almost a score of bus-rail connections with through ticket service have been inaugurated within the last year.

The slogan that is applied to this service is "Travel Above Ground." Among the circulars issued in connection with the service are lists of evening classes in scientific, commercial and other studies as given at schools on or near bus routes. The circular gives the name of the institute, the hours and nights when sessions are held, the route numbers of the buses and the most convenient alighting places.

Beginning with May 17, 1913, the publicity department of the company began the fortnightly publication of "T. O. T." (Train, Omnibus, Tram) for general distribution by all conductors "to give news of what is new, to recall to the memory what is old, in the way of traffic facilities." This is a four-page bulletin containing data of the company's traffic and its facilities, descriptions of places worth visiting whether open-air resorts or buildings, lists of events, changes in service, etc.

References to the power house are made in the form of popular essays on water, coal, electricity and other essentials of a power plant. "Automatism" was a particularly clever essay on the automatic features of the system in ticket machines, elevators, train indicators and signals.

INFLUENCE OF TITANIUM IN RAIL STEEL

The progress which metallographic methods have made in recent years is reflected in a characteristic way in four bulletins issued by the Titanium Alloy Manufacturing Company, of Niagara Falls, N. Y., entitled "Rail Reports." In these are shown the results of tests on a number of samples of standard and titanium-treated open-hearth rails which were sent by several different railroad systems to the laboratories of the Titanium Alloy Manufacturing Company in accordance with its standing agreement to publish full reports upon all such samples consecutively as received. All the samples were from "A" rails (the top rail from the ingot, which usually shows the most excessive segregation). In each case both the standard and titanium-treated rails had been rolled by the same mill, under the same specifications, with the single exception of the use of 0.10 per cent titanium in the treated steels.

The four bulletins give in detail the results of chemical and physical and microscopic tests of nine different pairs of samples. A convenient summary of the results of the chemical and physical tests for the nine pairs of samples is given in Bulletin No. 4 in form of a long table from which the following general conclusions are drawn:

"The ultimate strength for the heads of the titanium-treated rails averages 1.4 per cent greater than for the standard open-hearth, while the average elongation instead of being slightly lower, as might be expected, is 29 per cent higher. In the flanges, where the elongation averages 10 per cent higher in the treated rails, the ultimate strength is also slightly higher (0.7 per cent) than in the standard open-hearth rails.

"The average hardness in the webs of the standard open-hearth rails is 24 per cent greater than in the heads and flanges, while in the titanium-treated rails the average difference is only 5 per cent.

"In the heads of the titanium-treated rails the impact resistance averages 35 per cent higher than for the standard open-hearth. The figure is 40 per cent higher in the webs and 60 per cent higher in the flanges.

"In the White-Souther endurance test the number of revolutions of the machine for the titanium-treated rails averages 54 per cent greater than the standard open-hearth, and in the Landgraf-Turner endurance test the average endurance for the webs of the standard open-hearth rails is 37 per cent less than for the heads and flanges, while in the titanium-treated rails the difference is only 16 per cent."

To sum up these points, it seems certain that these treated rails, when laid in the track and subjected to the strains and shocks of service, will form a safer line than would the untreated rails. If excessive segregation is dangerous, the use of ferro-carbon-titanium in open-hearth rail steel would seem imperative.

A series of sulphur prints and microphotographs given in the four bulletins are a distinctively novel feature. The sulphur prints are made by placing photographic paper on the polished cross-sections of rail steels. This paper is moistened with a very weak sulphuric acid solution, and the sulphur in the steel reacts with the acid, forming hydrogen sulphide. This in turn combines with the silver in the paper, producing dark spots thereon. The sulphur print is a rapid and accurate method of determining the quality of steel, and excessive segregation shown by this method indicates a weakness which the detailed physical tests confirm.

Carbon, phosphorus and sulphur segregate under similar conditions, so that the degree of segregation of sulphur as shown by a sulphur print determines the comparative degrees of segregation of phosphorus and carbon as well. Ample evidence is given that this parallelism in the segregation of carbon, phosphorus and sulphur is a reality.

In addition to the prints cross-sections of the rails were also etched with iodine to reveal segregation, and the pictures of these give, on the whole, the same indications as the sulphur prints. The photomicrographs were made of sections taken from the top of the head, center of the head, the web, the bottom of the flange and the end of the flange. Further microphotographs were made of unetched sections as well as of sections under different etching treatments.

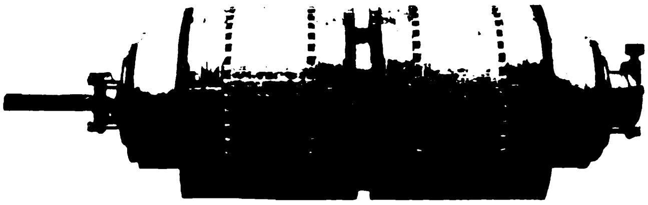
The Swedish railway authorities have worked out a plan for extensions and improvements of the State Railways over a period of ten years. This plan has now been submitted to the government for approval, and it will involve a capital expenditure of about $81,168,290. Of the above-mentioned amount it is proposed to expend $12,856,800 on the electrification of considerable sections of the main lines, among which may be mentioned the line between Jörna, Malmo and Trelleborg, and the lines between Stockholm and Gothenburg and Malmo and Gothenburg. It is further proposed to electrify the railway between the large iron mines in the North and the port of Lubac, in the Bay of Bothnia, which will require a sum of about $2,030,790. The continuation of this line from Kiruna to the Norwegian frontier is now being electrified.

Trial of Booster Control in Paris

The Writer Describes a New Multiple-Unit System in Which a Booster Set Is Used to Control the Building Up of Voltage—Economies in Energy Consumption Are Quoted

BY CHARLES JACQUIN, ELECTRICAL ENGINEER, PARIS, FRANCE

One of the most important problems of electric traction is that of efficiency in acceleration and retardation. If we ignore commercial claims, it must be admitted that very little progress has been made in this field, especially with d.c. equipment. The standard method of combining series-parallel operation with the use of resistances has two important drawbacks—it wastes appreciable energy in starting and stopping, and, in multiple-unit equipment, it leads to great complication.



Metropolitan Railway, Paris—Armatures of Booster Regulator

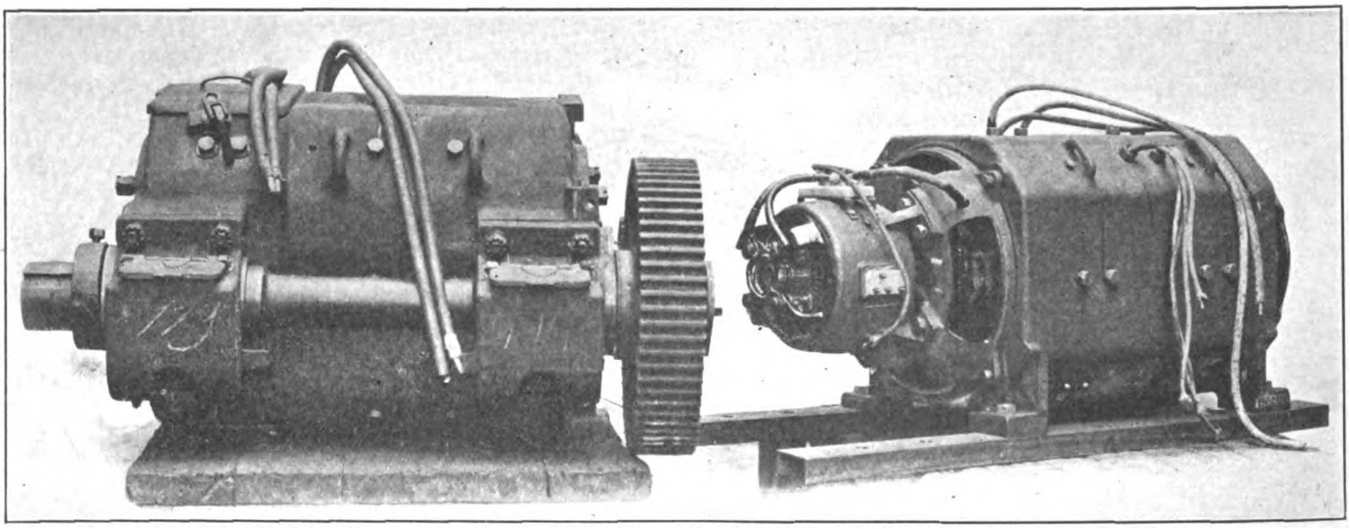
In single-phase equipment the speed can be regulated by the use of an auto-transformer or an ordinary transformer to vary the voltage applied to the motors. This method looks very simple on paper, but those who have had experience know that it is not so attractive in practice. The absence of resistance losses is certainly of great advantage on suburban lines, but it is of little importance on trunk lines with few stops. The "reverse of the medal," as we say in France, is the difficulty in passing from one voltage step to another.

In 1894, just twenty years ago, the Ward-Leonard system was tried on the Heilmann locomotive, which carried a gas engine coupled to an electric generator. On this locomotive the speed regulation of the traction motors was obtained by varying with a small special exciter the independent shunt excitation of the main generator. This method had the disadvantage of weight, but the saving of energy in starting and stopping was incontestably good and the control was very simple. These tests, which were made on the former Western (now State) Railways, were considered a great success.

About 1895 the Western Railway made further tests with the straight Ward-Leonard system, comprising a booster in series with the traction motors instead of a gas-electric set. In this outfit the booster produced an emf which permitted the motor voltage to vary from zero to double the line potential. The tests were discontinued because the starting was not automatic, regeneration was practically impossible and, lastly the system did not allow multiple-unit operation.

It was not until 1913 that any further work of importance was done in this field. Then an important step was taken by the Jeumont company (Ateliers du Nord et de l'Est de la France à Jeumont) in the construction of a new control equipment for the Metropolitan Railway of Paris.

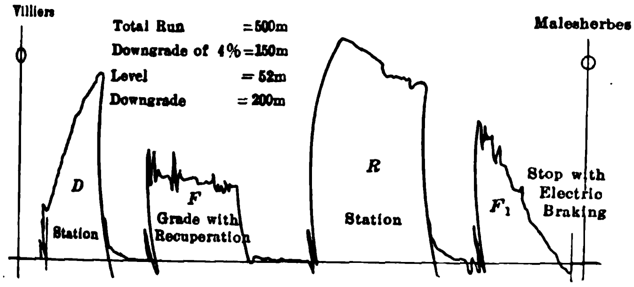
The most curious point about the new control is that it is merely a small modification of a device which has been applied to European mining machinery for the last four or five years. In short, it is the application to electric traction of the Ward-Leonard principle in which the voltage at the traction motor armature terminals is varied by means of a motor-generator set, the currents in the field circuits of the traction motors being independently varied by means of another motor-generator set both mechanically and electrically associated with that just mentioned. The railway apparatus has been developed chiefly by M. Legouez, chairman Société pour l'Industrie des Chemins de fer. The surprising results hereinafter quoted were obtained from a test of several months' duration on a Metropolitan train.



Metropolitan Railway, Paris—One of the Two 175-hp Traction Motors per Car and Regulator or Booster Group, Showing Comparative Sizes

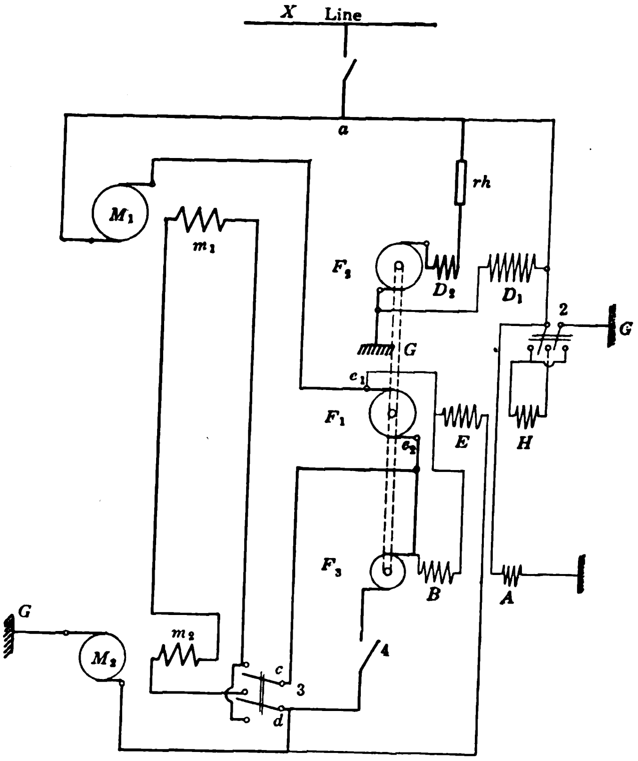
APPARATUS AND CONNECTIONS OF BOOSTER CONTROL

The wiring scheme of the Jeumont company's control system is shown in one of the accompanying diagrams. The letters M_1 M_2 and m_1 m_2 represent the rotors and fields of the ordinary d.c. traction motor, the two armatures being permanently operated in series and the two fields being permanently connected in series. The machines F_1, F_2 and F_3 represent the motor-generator set, the functions of which will now be explained. F_1 and F_2 represent a booster group and F_3 a small regeneration dynamo. The booster group itself comprises two commutating machines F_1 and F_2, the rotors of which are mounted mechanically on the same shaft, one working as a motor and the other as a generator. The functions of these machines are reversible, depending upon operating conditions, but F_1 is always connected in series with the traction motors by a two-way switch "3." By means of switch "4" the armature of F_3, the regeneration dynamo, is joined in parallel with the field coils of the traction motors. This machine serves for varying the excitation of the traction motors. The machine F_2, which operates at a constant speed, is simply a combined dynamo connected across the line, its shunt-exciting circuit being shown as D_1 and its series circuit as D_2. The regulating generator F_1 has two exciting circuits, one being the circuit H which receives a constant current from the line X and the other the circuit E connected in shunt with its own armature and that of machine F_3. The regeneration dynamo F_3 also has two exciting circuits, one, A, connected directly across the line X to produce a constant excitation, the other, B, connected in parallel with the armature circuit of the regulating dynamo F_1 to give an excitation varying in direction and intensity with the emf of this machine; that is to say, the excitation of F_3 depends upon the speed of the traction motors.

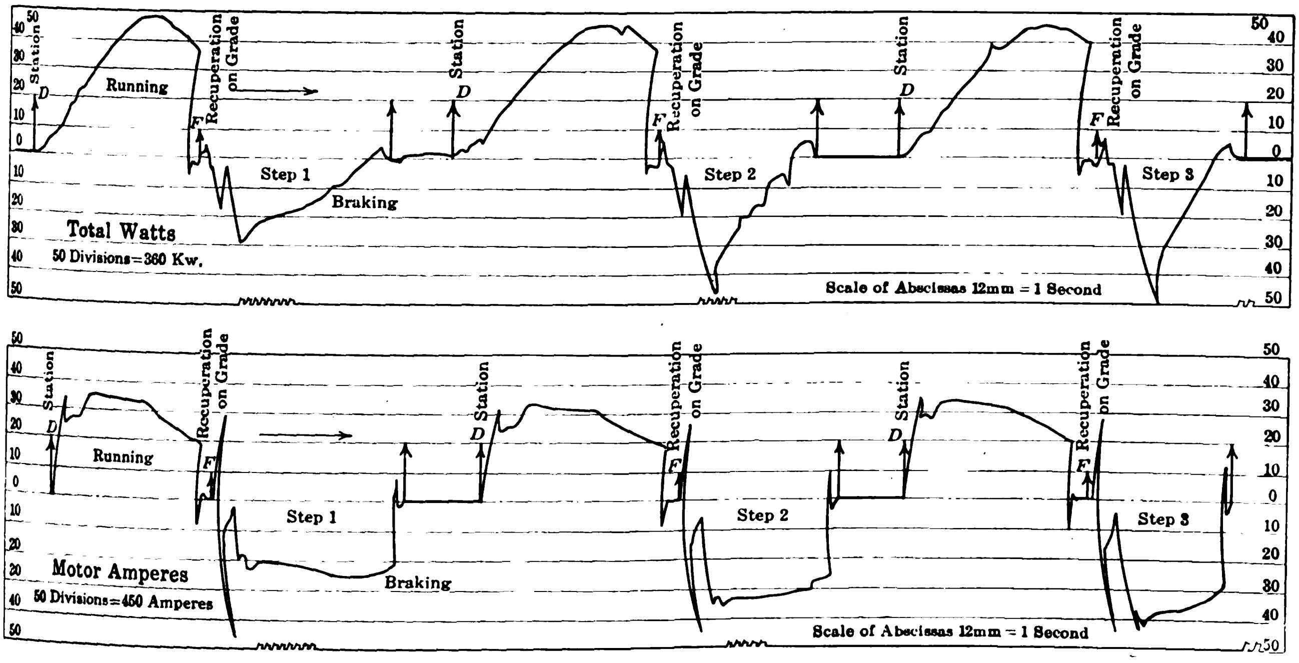


Metropolitan Railway, Paris—Energy-Consumption Curve on Run Indicated

In starting from rest, switch "1" is closed first, the reversing switch "2" of the regeneration dynamo being in the proper position. Then the booster group is brought to normal speed with the small rheostat *rh*, machine F_2 now acting as a motor. Until this moment switch "3" has been kept open to avoid excessive current in the main motor circuit. As soon as the booster group has attained its normal speed switch "3" is closed according to the direction of propulsion. The real starting operations follow next.



Metropolitan Railway, Paris—Circuit Connections of Booster Control System

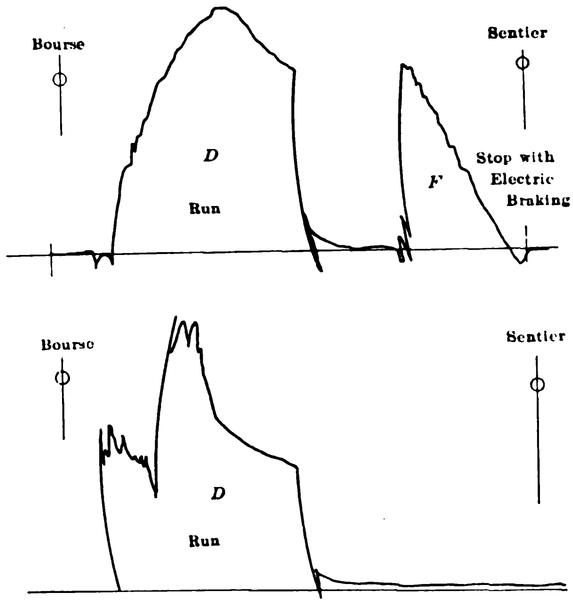


Metropolitan Railway, Paris—Energy and Current Curves of Booster Control System

At first the emf of machine F_1 is in a direction to subtract from the main line voltage and thereby to decrease the voltage impressed on the traction motors. Under these conditions F_1 operates as a motor and drives F_2 as a generator, which therefore returns energy to the line X. Subsequently, as the main traction motors accelerate, the voltage across F_1 is reduced and finally reaches zero, under which condition the two traction motors operate as if in ordinary series connection, receiving the full line voltage. When the higher speed of travel is reached the dynamo F_2 runs as a motor and drives F_1 as a generator to produce an emf which adds to that of the line until the voltage impressed upon each traction motor is equivalent to that obtained during ordinary parallel connection. In this fashion, as the accompanying curves show, acceleration is obtained without waste of energy or discomfort to passengers. The reverse of the foregoing movements occur during retardation, the switch "2" being reversed, thereby altering the excitation of machine F_1, varying the emf impressed upon the traction motors and causing energy to be returned to the line.

ESTIMATED ENERGY SAVINGS

The tests show an energy saving of 20 per cent. For instance, on one run the energy consumption of an ordinary multiple-unit equipment was 60 kw-hr. and of the new Jeumont equipment only 48 kw-hr. In braking it was found possible to regenerate 30 per cent of the energy used in starting. If the Jeumont system was applied to all trains of the Metropolitan Railway, the annual saving would be 20,000,000 kw-hr., or $200,000, at the very low rate of 1 cent per kw-hr. Other accessory but not insignificant advantages of this saving in energy would be less heating of the air in the subway and in the cars. Brake wear and the resulting metallic dust would also be proportionately reduced.



Metropolitan Railway, Paris—Comparison of Energy Consumption, Showing Better Graduation of Voltage During Acceleration of New System Compared with Standard Multiple-Unit Control

During the running period this control acts as a regulator to maintain a constant current automatically despite variation of speed due to grades, curves, etc. This system can readily be applied to multiple-unit trains with great simplification of apparatus. For instance, it would permit on a Metropolitan motor car with ordinary multiple-unit control the elimination of two contactors, of one reverser and of the starting resistances, a total of 990 lb. As the new devices weigh 4070 lb. per motor car, the actual increase in weight due to using a more efficient control would be 3080 lb. The new system can be readily adapted for several maximum running speeds to permit most economical operation over sections with varying conditions. Three such maximum speeds were in service on the test train mentioned.

ELECTRIC RAILWAY REPORTS OF BUREAU OF CENSUS

Preliminary figures of the forthcoming quinquennial report on the electric railways of the following thirteen states have been given out by Director W. J. Harris of the Bureau of the Census, Department of Commerce. The statistics given in the accompanying table relate to the year ended Dec. 31, 1912. The totals do not include reports of mixed steam and electric railroads or railways under construction during the census year which had not begun operations.

Connecticut and Rhode Island railways during the decade 1902-1912 showed general gains. The gross income less operating expenses showed an increase of 102 per cent, while the number of revenue passengers carried increased 91 per cent. The number of miles of track increased 54 per cent during the decade. The operating companies numbered ten in 1912, as compared with thirty-one in 1902.

During the decade 1902-1912 there were general gains in Virginia. The gross income of electric railways in that State showed a gain of 335 per cent, while the net income increased 753 per cent. Revenue passengers carried increased in number 108 per cent and the number of persons employed 234 per cent. The miles of track increased during the decade 56 per cent, while the number of companies decreased from twenty-one in 1902 to twenty in 1912.

Georgia electric railways also showed substantial gains for the decade 1902-1912. The number of operating companies increased from ten in 1902 to fourteen in 1912, or 40 per cent. The miles of track increased from 300 in 1902 to 440 in 1912, or 47 per cent. The revenue passengers carried increased 167 per cent. The gross income, including that from the sale of current for light and power, amounted to $7,421,747 in 1912, as compared with $2,375,224 in 1902, or an increase of 213 per cent. The operating expenses were $3,600,445 in 1912, as compared with $1,232,320 in 1902, or an increase of 192 per cent. The total horse-power increased 191 per cent. The output of stations operated by the railways amounted to 54,510,462 kw-hr. in 1912, as compared with 34,233,902 kw-hr. in 1902, or a 59 per cent increase. The current purchased in 1912 amounted to 71,309,660 kw-hr., figures for the quantity purchased in 1902 not being available.

Electric railways in Florida showed a gross income in 1912 of $1,969,315, as compared with $529,743 in 1902, a gain of 272 per cent. Revenue passengers carried numbered 27,236,240 in 1912, as compared with 8,249,542 in 1902, a gain of 230 per cent. The miles of track increased from 62 in 1902 to 165 in 1912, a gain of 167 per cent. The output of the stations increased from 5,184,495 kw-hr. in 1902 to 25,026,663 kw-hr. in 1912, a gain of 383 per cent.

The gross income of Alabama electric railways, less operating expenses, showed an increase of 214 per cent during the decade 1902-1912, while the number of revenue passengers carried showed an increase of 175 per cent and the number of miles of track an increase of 48 per cent. The power equipment showed an increase of horse-power of 296 per cent. The operating companies numbered twelve in 1912, as compared with nine in 1902.

The number of operating electric railways in Louisiana increased from eight in 1902 to thirteen in 1912, or 63 per cent. The miles of track increased from 199 in 1902 to 285 in 1912, or 44 per cent. The persons employed in the industry increased 90 per cent and the revenue passengers carried increased 70 per cent during the decade. The gross income in 1912 amounted to $6,901,751, as compared with $2,910,244 in 1902, or an increase of 137 per cent. The operating expenses were $3,136,080 in 1912, as compared with $1,758,989 in 1902, or an increase of 78 per cent. The horse-power of the engines increased 223 per cent, and the output of the stations increased 199 per cent.

The number of electric railways in Mississippi increased from five in 1902 to twelve in 1912, or 140 per cent. The miles of track increased from 25 in 1902 to 117 in 1912, or 363 per cent. The number of persons employed showed a 221 per cent increase and the revenue passengers carried an increase of 251 per cent during the decade. The gross income was $910,390 in 1912, as compared with $258,654 in 1902, or an increase of an increase of 420 per cent. The financial report shows that the gross income in 1912 was $2,944,154, as compared with $370,481 in 1902, or an increase of 695 per cent. The operating expenses for 1912 were $1,705,727, as compared with $257,248 in 1902.

The number of Minnesota electric railways increased from five in 1902 to nine in 1912, or 80 per cent. The miles of track increased from 338 in 1902 to 555 in 1912, or 64 per cent. The number of persons employed increased 167 per cent, and the revenue passengers carried increased 155 per cent. The gross income in 1912 was $9,685,158, as compared with $3,727,648 in 1902, or a gain of 160 per cent. The operating expenses were $5,882,755 in 1912, as compared with $1,719,687 in 1902, or an increase of 242 per cent. The total horse-power increased 451 per cent and the output of the stations increased 128 per cent.

OPERATING AND FINANCIAL STATISTICS FOR ELECTRIC RAILWAYS IN THIRTEEN STATES

	Connecticut and Rhode Island	Virginia	Georgia	Florida	Alabama	Louisiana	Mississippi	Oklahoma	Kansas	Minnesota	Colorado	California
Number of companies	20	20	16	10	12	15	12	18	21	9	17	44
Operating	(a) 10	18	14	10	11	13	12	17	21	9	16	35
Lessor	10	2	2	..	1	2	..	1	..	..	1	9
Miles of line	1,087	418	340	140	222	198	107	214	395	328	348	1,766
Miles of single track	1,398	561	440	164	(c)303	285	117	251	452	555	467	2,606
Miles of single track in State†	(b)1,432	561	419	...	(c)305	...	118	...	493	538	...	.....
Cars, number	3,412	946	730	269	596	747	197	300	477	1,139	785	4,652
Passenger	2,799	794	645	228	475	681	155	257	388	1,044	551	2,791
All other	613	152	85	41	121	66	42	43	89	95	234	1,861
Electric locomotives	5	...	...	...	...	...	...	3	...	...	...	49
Persons employed	8,179	3,563	2,652	975	1,973	3,236	507	791	1,367	4,267	2,498	16,749
Salaried employees	446	482	337	113	230	119	63	151	161	485	226	1,748
Wage earners‡	7,733	3,081	2,315	862	1,743	3,117	444	640	1,206	3,782	2,272	15,001
Power:												
Horse-power, total	97,245	100,904	82,881	17,868	48,930	43,745	9,850	9,675	12,280	113,583	48,532	48,311
Capacity of dynamos, kw	67,522	75,894	56,609	12,710	32,800	32,890	6,650	7,630	8,860	79,568	29,692	30,817
Output of stations, kw-hr. (in thousands)	157,634	116,299	54,510	25,026	82,955	86,263	9,954	16,393	17,357	89,236	97,915	11,274
Current purchased, kw-hr. (in thousands)	27,336	6,810	71,309	502	4,795	23,086	3,695	4,082	18,793	64,132	8,458	481,625
Passengers carried (in thousands)	316,749	114,601	103,592	34,041	74,889	117,037	12,849	25,491	41,312	249,490	107,502	683,326
Revenue (in thousands)	266,385	91,980	86,601	27,236	62,493	94,052	10,883	22,120	35,527	186,918	86,597	520,741
Transfer (in thousands)	46,570	20,704	15,180	6,110	10,321	21,355	1,445	2,982	5,156	61,611	18,813	150,298
Free (in thousands)	3,793	1,916	1,810	694	2,073	1,628	520	389	628	960	2,092	12,287
Car mileage (passenger, express, freight, etc.) (in thousands)	47,930	19,902	19,211	6,144	13,313	21,812	3,532	6,142	11,110	32,793	17,202	116,553
Income statement:												
Gross income †† (in thousands)	$14,457	$7,247	$7,421	$1,969	$4,344	$6,901	$910	$1,449	$2,944	$9,685	$6,630	$34,845
Operating expenses (in th'sands)	9,090	3,875	3,600	1,155	2,401	3,136	651	970	1,705	5,882	3,264	21,684
Gross income less operating expenses (in thousands)	5,366	3,371	3,281	814	1,943	3,765	259	479	1,238	3,802	3,365	13,161
Deductions (taxes and fixed charges) (in thousands)	3,439	2,434	2,557	424	1,195	2,295	...	...	874	1,890	2,106	10,696
Net income (in thousands)	1,926	937	1,263	389	747	1,470	...	...	363	1,912	1,258	2,464

†Excluding track lying outside of States of companies within States and including track in States owned by outside companies.

‡Number employed Sept. 16, 1912.

††Includes income from sale of current for light and power.

(a)Operating companies in Connecticut, 8; in Rhode Island, 2.

(b)Miles of single track in Connecticut, 997; in Rhode Island, 435.

(c)Exclusive of 2 miles not in operation.

252 per cent. The operating expenses were $651,866 in 1912, as compared with $192,056 in 1902, or an increase of 239 per cent. In the power plant equipment the horse-power of the engines increased 286 per cent, and the output of the stations increased 230 per cent.

The gross income for Oklahoma electric railways for 1912 was $1,449,278, as compared with $577,957 in 1907, a gain of 151 per cent. Revenue passengers carried increased 133 per cent and the number of persons employed increased 110 per cent. The miles of track increased 151 per cent, and the output of the stations in kilowatt-hours increased 717 per cent. The number of operating companies increased from eight in 1907 to eighteen in 1912, a gain of 125 per cent.

During the decade 1902-1912 the number of electric railways in Kansas increased from twelve to twenty-one. The miles of track increased 201 per cent in this time, and the persons employed increased 348 per cent. The Kansas electric railways carried 35,527,363 revenue passengers in 1912, as compared with 6,832,064 in 1902, or

The increase of operating companies in Colorado reported in 1912 over 1902 was eight, or 100 per cent. Their aggregate gross income showed an increase of $4,402,714 (198 per cent), and their net income increased $867,605 (222 per cent) over 1902. The miles of track increased 233 (100 per cent), and the number of revenue passengers carried increased 104 per cent.

The number of electric railways in California increased from thirty-five in 1902 to forty-four in 1912, a gain of 26 per cent. The gross income amounted to $34,845,771 in 1912, as compared with $9,967,838 in 1902, an increase of 250 per cent. The revenue passengers carried increased 186 per cent during the decade; the miles of track increased 214 per cent, and the number of persons employed increased 208 per cent. The total horse-power increased 27 per cent, but the bulk of the power consumed by the electric railways was purchased as current, 481,625,400 kw-hr of purchased current being reported in 1912. The quantity of current generated by the railways decreased 75 per cent.

Some Problems of Public Utility Accounting

Abstract of Paper Read Before Wisconsin Electrical Association on Jan. 16 on Subject of Depreciation—Need of More Explicit Directions from Public Service Commissions Concerning Accountancy of Depreciation Emphasized

BY HALFORD ERICKSON, MEMBER OF WISCONSIN RAILROAD COMMISSION

The subject of depreciation is one which has gained a great deal of prominence, especially since the introduction of government regulation of public utilities. In discussing depreciation heretofore, however, most of the emphasis has been laid upon the necessity of providing for it and the proper method for determining it. Concerning the methods of recording depreciation upon the books of the plant—or, in other words, the accountancy of depreciation—less has been said. It is true, of course, that technical societies and technical journals have dealt more or less exhaustively with this subject. On the other hand, it is also a fact that in most standard books on accounting the subject is passed over without offering detailed information in the matter.

By depreciation is usually meant the gradual lowering of value of the property and equipment used for industrial and other purposes. In a broad sense it can be analyzed and explained under the following four headings:

(1) Wear and tear, or minor renewals that are ordinarily made up of repairing or replacing minor equipment as well as the smaller parts of the larger equipment as they wear out, break or become otherwise useless.

(2) General decay, or that which cannot be made good through the ordinary minor repairs included under (1). General decay also includes what is sometimes described as decrepitude, or decline in value due to age and the action of the elements.

(3) Obsolescence, or the gradual lowering of the value of property owing to progress and developments in the art which render the old equipment uneconomical, or owing to public requirements by legislation, ordinances, etc.

(4) Inadequacy, or a reduction in value resulting from unexpected developments and growth in business and demands for enlarged service coming from the public.

According to the definition of depreciation as a lessening in value, it includes maintenance or upkeep as well as the general decrease in value usually termed depreciation. In most systems of accounting, however, these two classes of outlays are kept apart. Upkeep or minor repairs are charged directly into the maintenance accounts, while such replacing of the larger parts as must be made from time to time is charged to depreciation. These latter charges are as much a part of operating expenses as ordinary maintenance expenses are. Investors justly insist that such depreciation shall be made good in the rates made for the services rendered. If it were not made good in some such way, the plant would in a comparatively short time be unable to render efficient service and the stockholders' investment would sooner or later be an almost total loss.

When rates are high enough to cover such depreciation, it follows as a matter of justice that the amounts so earned for depreciation should be set aside for the purposes for which they were collected and not withdrawn for dividends or for any other purpose. Without some such reserve to draw on, it is often difficult for plants whose credit is strained to secure money to meet the cost of such extensive renewals as are frequently necessary to keep up the standard of service in the public utility business.

When the amounts earned for depreciation have not been properly set aside both for rate-making and for other purposes, the chances are that the present value, or the cost new less depreciation, rather than the original cost or the cost new, will be used as the basis for the valuation of the plant. There is a marked tendency in this direction on the part of appraisers almost everywhere. They appear to regard depreciation earned and improperly withdrawn in about the same light as capital withdrawn from the business. For many plants such omission of depreciation from the value upon which rates are based is likely to result in rates that are considerably lower than would otherwise be the case. The losses to the plant through the lower rates may then in the long run be even greater than its temporary gains from the withdrawal of the depreciation allowance.

The omission of the depreciation charges from the operating expenses results, of course, in higher net earnings than is the case when the depreciation allowances are included. This omission, in fact, creates false net earnings, which in turn often lead to unreasonably high valuations of the plant for taxation and other similar purposes. The reason for this is that in appraising property for taxation assessors often determine the market value by capitalizing the net earnings on about a 6 per cent basis. If the net earnings are too high, because depreciation has not been included in the expenses, the assessed valuation will also be too high and the plant will have to bear higher taxes than should be levied on it.

The amounts earned for depreciation and set aside in funds constitute valuable assets in the business. They, in fact, represent a source from which money for new extensions can be borrowed and kept until the outlays can be conveniently financed in the regular way. There are also many other purposes for which such bonds may be profitably employed. Thus they may enable the plant to do business on a cash basis and thus to profit by all discounts.

An examination of the books, records and annual reports of many plants cannot fail to show that there are many shortcomings in the methods employed in recording the various transactions connected with depreciation. Whether this is due to the fact that the best practices in such matters have been overlooked or to the fact that the Railroad Commission in its classification of accounts has omitted detailed explanations upon these points is not clear.

Many, for instance, do not seem to distinguish clearly between maintenance and renewal items or between renewals and new construction. The result of this is that these accounts are often either overstated or understated. Many also fail to make proper entries for property discarded and the new property taking its place, and as a result the construction accounts do not show even approximately the original cost of the property. Such errors constitute serious drawbacks in appraisal work, for they deprive the appraisers of some of the most important elements that enter into the valuation.

There also seems to be some confusion as to the respective meanings that are attached to the depreciation reserve account and to the depreciation reserve fund account. The depreciation reserve account, as the term is commonly understood, is an account created by withholding a portion of the revenue for the purposes of renewing worn-out and discarded equipment or plant. The depreciation reserve fund account, on the other hand, resembles a sinking fund account. It is created by the transfer of actual cash to the depreciation fund, which cash, unless temporarily invested, is there held until used for renewals. The distinctions between these two accounts are often overlooked and the one is often used for the purposes of the other.

Shortcomings of the kind described often lead to complications that are out of line with the best practice. It is quite likely, however, that many of these shortcomings can at least in part be traced to the fact that the commission's classifications do not always go far enough in explaining the methods to be employed. For example, no detailed description is given of the various entries that are necessary in order to show the full results of setting aside the depreciation allowance, the taking out of the discarded property, the replacement of it by new property and the treatment of the scrap value. In this case the classifications show that the allowance for depreciation should be charged to a depreciation account in the operating expenses and credited to the depreciation reserve account, but they do not make such further explanations as may be necessary to the best practice of dealing with depreciation. For instance, they do not show very fully that the discarded property should, for its original cost, be credited to the construction account and charged to the depreciation reserve account; that the new property taking the place of that discarded should, for its cost, be charged to the construction account and credited to cash, and that the scrap value of the discarded property should be charged to the material account and credited to the depreciation reserve. With such omissions in the commission's classifications it is perhaps not to be wondered at that there should be shortcomings in the records of many utilities.

Moreover, the classifications do not show as fully as they should the fact that when the depreciation reserve is secured by cash and a depreciation reserve fund account is created it is necessary to draw a voucher check for the amount, charging it to the fund account and crediting it to cash; that when a depreciation reserve fund has thus been created the cost of discarded property should be charged to the depreciation reserve and credited to new construction; that the entire cost of the new unit replacing the one discarded should be charged to the construction account, and there should be credited to the depreciation reserve fund account so much of this cost as may agree with the cost of the property replaced, while the amount by which the new property may exceed the cost of the old should be credited to cash, and that the scrap value of the equipment discarded should be charged to the depreciation reserve fund account and credited to the depreciation reserve account.

Each of the entries described above should be accompanied by such explanations as will give a fairly complete history of the property involved for both sides of the transactions. Such explanations greatly facilitate analyses of the construction accounts that may become necessary from time to time. Especially is this true under the following circumstances: If the changes due to depreciation are not carried through the construction accounts—that is, if these accounts are not credited with the cost of the property taken out and charged with the cost of the property put in, but are simply charged with the amount by which the cost of the new property exceeds the cost of the property discarded—then an analysis must be made not only of the construction accounts but also of the reserve and perhaps other accounts in order to obtain some light on the original cost of the plant. This figure can be readily obtained if the accounts contain the proper data in the explanation columns.

The classifications of the commission also fail to draw as distinct a line as is desirable between maintenance and renewals. The relation between these is so close that it is almost impossible in all cases to outline in advance just what items should go into the one account and what items should go into the other. This is being looked into at present. It is quite possible that it will be found that the best way to deal with the matter will be to determine as best one can the total cost of both repairs and renewals and then to set aside into the reserve the entire amount and charge to it as made not only all the renewals, but all the repairs as well.

Other shortcomings in the classifications might also be pointed out, but the foregoing are sufficient to indicate that the commission may be partly to blame for the fact that many utilities do not keep all of their accounts in accordance with the most approved methods. Some of these omissions in the classifications have already been supplied by supplementary issues, and others will probably be covered in the same way in the near future.

[The latter part of Mr. Erickson's paper was devoted to the subject of rates in the electric lighting and power field. In this portion Mr. Erickson discussed the thesis that the total cost of service should be so distributed that each branch of the service and each class of customers therein would bear as nearly as practicable a just share, and that the cost-of-service basis should be the legal basis for rates.]

GASOLINE TRAMWAYS IN INDIA

The *Times of India*, of Bombay, contains the following editorial note on the advantages of "petrol" or gasoline tramways in India for cheap urban transit:

"One of the mechanical problems which have to be solved in India is the provision of quick mechanical transport in the smaller towns. In the great cities like Calcutta, Bombay and Madras electricity has established itself, and despite low fares and long distances has proved profitable. But there are many lesser towns where the traffic will not stand the heavy first cost of electric traction. In these circumstances the experience of Karachi is most valuble. The London *Times* calls attention to it in an article on the report of the East India tramways. The Karachi trams were laid in 1882 and first operated by steam. This proved a failure and had to be replaced by horse traction. This was little better, the company had to be reconstructed, and it struggled along until the simplex petrol tram was introduced in 1909. In the past four years the profits have increased by 380 per cent and the company is now flourishing. We are not, however, concerned with the financial position of the company—that has no doubt been largely influenced by the growth of Karachi—but with the operating expenses. The average cost of work is 9.8 cents per car mile, after making allowance of 1.6 cents per car mile for depreciation, which is a liberal figure. The lowness of these costs is best understood by comparison. The average cost per car mile on the electric tramways of Great Britain is 13.08 cents and that of motor omnibuses varies between 14.2 cents and 22.8 cents per car mile. The comparison is not, of course, exact, but it is sufficient to indicate the remarkable cheapness of the petrol car in certain conditions and seems to open up a wide field for its adoption in the lesser towns of India."

The Evolution of Railway Motor Lubrication[*]

The Writer Describes the Steps Taken in the Lubrication of Railway Motors Since the Early Days, and Concludes with Data on the Work of the Brooklyn Rapid Transit System

BY ALFRED GREEN, GALENA SIGNAL OIL COMPANY

Ever since the operation of electric cars numerous ideas have been advanced as to the proper method of lubricating the bearings of different motors. In their first efforts the motor designers did not realize the great importance of this subject, for if they had they would never have arranged the lubrication of both armature and axle bearings in the crude and absolutely unmechanical manner which was followed for many years. Thousands of these motors are still in service and will be for years to come, so that methods of improving their lubrication with a view to minimum cost of maintenance are yet in order.

GREASE LUBRICATION

With the design of the first motors of commercial value, it was soon demonstrated that it would be impossible to use oil as a lubricant. These motors were equipped with compression grease cups, but on account of the bad track conditions that existed everywhere at that time it was impossible to maintain the compression cup and a number of them were lost in service. Of course this often meant the loss of an armature.

About 1891 the General Electric Company put on the market the noted WP-30 motor, and soon after that the Westinghouse No. 3 appeared. Both of these designs had a grease receptacle cast as part of the motor shell or frame on which were hinged covers like those in the usual modern motors. The designers of the No. 3 motor realized that it was necessary to heat the grease so that it would continue to feed to the bearing, and they placed a piece of copper wire in the receptacle which extended from the armature shaft to the grease for use as a heat conductor.

FELT, GREASE AND OIL

The next change was the insertion of a felt feeder in an oil well placed beneath the armature bearing and extending to the armature shaft. This method formed a grease and oil combination until the felt became filled with grease, then capillary attraction stopped and the feeder became useless.

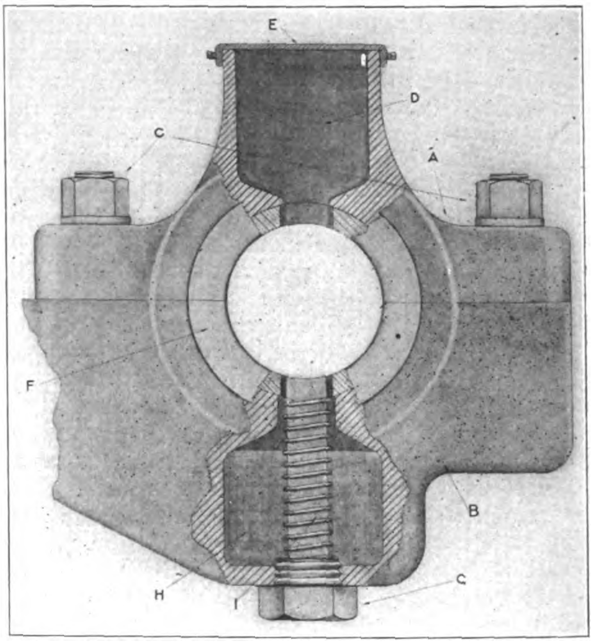
However, all grease-lubricated motors designed after the GE-800 had the same lower feeder feature as the No. 800 with this exception, namely, the felt was secured to a flat bronze spring which was supposed to keep the feeder against the armature shaft or axle. Some bearings had one feeder and others had two. This method proved an expensive failure. The next change was to a motor having a housing with armature bearings and so constructed that a felt feeder extended from the bottom of the oil well in the housing up to the armature shaft. This feeder was held in position by a fork and spring. The amount of oil in the well depended on the height to which it could be carried without overflowing and causing unnecessary loss. The felt pad or feeder is split and is so arranged that the fork cannot cut off the supply of oil to the bearing.

WASTE PACKING

While the split-felt method was a vast improvement over the previous efforts, it did not prove satisfactory. The next change was so to arrange a motor housing that it could be packed with waste packing. While this was more reliable than anything that had been thought of previously, the one necessary feature had been neglected, namely, the oil could not be placed in the bottom of the housing constructed in this way so as to feed to the bearing of capillary attraction. This difficulty was overcome by drilling a hole on the opposite side. Until this change was made the oil was poured on top of the waste, and when the flood reached the armature shaft more or less of it was carried along the shaft into the motor and onto the commutator, thus causing serious trouble.

THE FIRST WELL-LUBRICATED MOTOR

At last, however, the Westinghouse No. 101 motor was brought out with lubrication features that could aptly be termed nearly perfection both as to efficiency and economy: A few minor mechanical improvements now in hand would make it still better. These changes embody the rearrangement of the housing so that the oil which passes around the bearing will be returned to the oil well instead of running into the street as at present designed. Although the oil may have been used once, it has not lost any of its value as a lubricant for re-use because when it returns to the bearing by capillary attraction any foreign matter in it will settle in the bottom of the oil well or be retained by the waste packing.



D—Grease chamber. H—Oil well. I—Felt and spiral spring.

Motor Lubrication—GE-800 Axle Bearing with Grease at Top and Oil Felt Feeder at Bottom

TAPERED BOLT FOR BOTTOM OF MOTOR SHELL

One of the mechanical defects which have caused trouble and expense was the attempt to hold the motor housing with two vertical bolts which were placed opposite each other with a small dowel pin on the side to take the armature thrust. This construction failed and was changed so that the two bolts were set at an angle of approximately 45 deg. and on top of the housing. While this was an improvement it was not all that should be expected to withstand the hammering which a surface railway motor receives in average operation. It has therefore been strongly recommended by at least one large system which utilizes this type of motor that a tapered-end tap bolt be screwed into the bottom half of the motor shell, the tapered end of bolt to extend into a tapered hole in the bottom of the housing.

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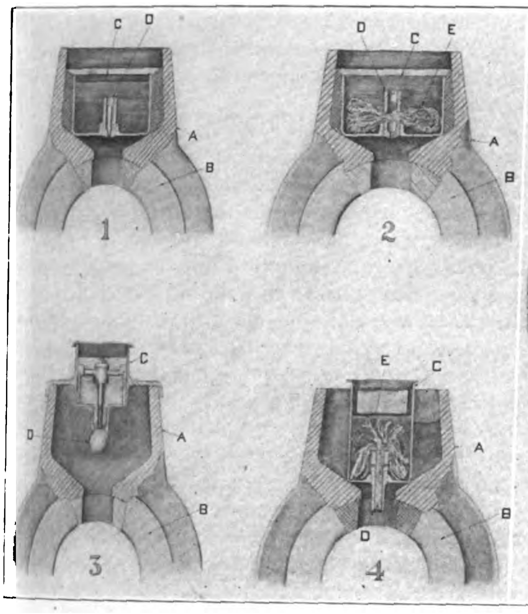
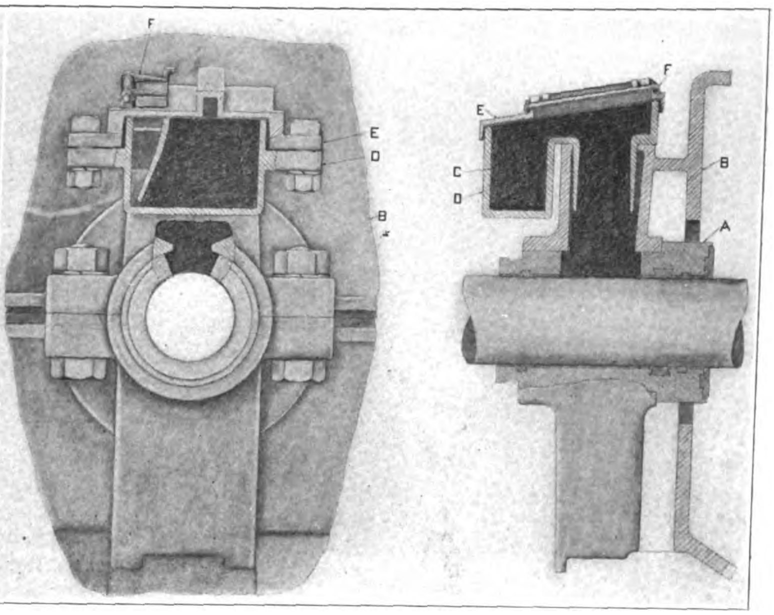
[*] Abstract of a paper presented before a regular monthly meeting of the New England Street Railway Club, Boston, Mass., Jan. 22, 1914.



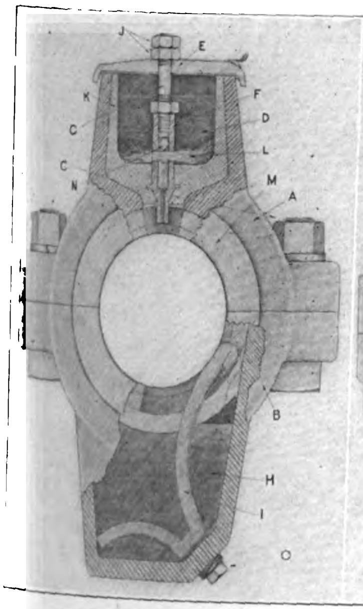
No. 1—C—Placed in grease chamber of bearing.
D—Needle-valve post operated through car vibration.
No. 2—C—Oil cup. D—Post with wick feed.
No. 3—C—Ball-type cup.
D—Ball valve operated through car vibration.
No. 4—C—Wick-feed cup. D—Post with vertical wick.

Motor Lubrication—Four Removable Types of Oil Cups Used on Motors Adapted to Grease Lubrication



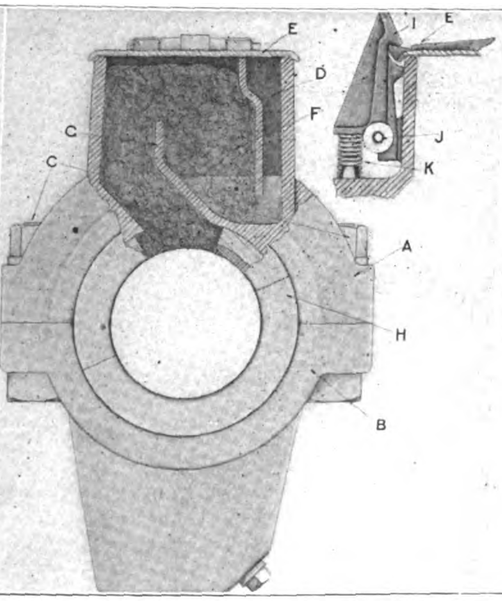
D—New capillary feed-oil box for grease-type motors welded into old grease receptacle.
E—Cover.
F—Lid through which oil supply is replenished.

Motor Lubrication—Capillary-Type Armature-Bearing Oil Cup, Welded to Grease Receptacle Westinghouse 68, 81 and Similar Motors



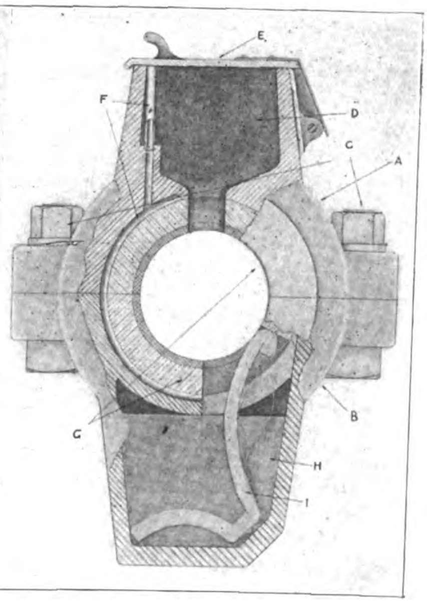
F—Supporting post around which babbitt is cast with thread in top for removable post G, which holds cover E.
K—Babbitt cup molded into grease receptacle. L—Wick feed.

Motor Lubrication—Babbitted Oil Cup for Westinghouse 68, 81 and Similar Motors



A—New axle cap for underhung motors.
F—Capillary waste feed.
J—Cover catch.
K—Spring for cover catch.

Motor Lubrication — New Capillary-Type Axle Cap Replacing Grease Caps on Old-Type Motors



D—Grease chamber.
H—Oil well.
I—Flat felt feeder.
F—Duct for renewal of lubrication in bottom well.

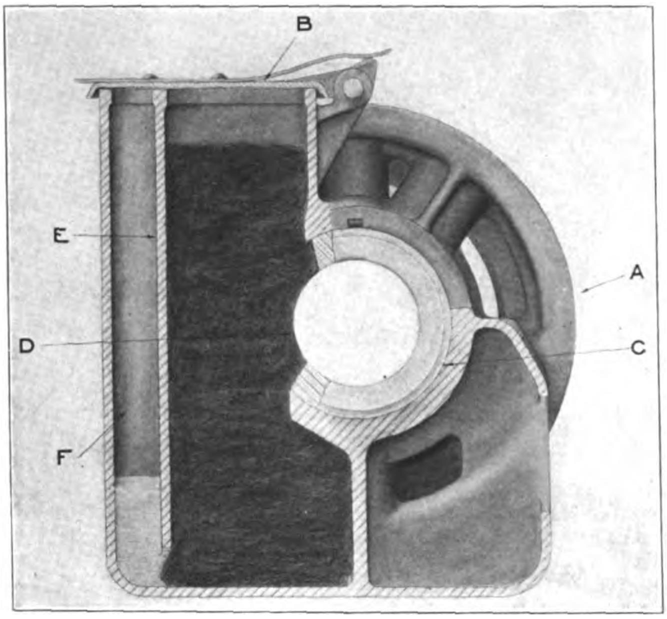
Motor Lubrication—Westinghouse 68 Motor; Original Method of Lubrication with Grease at Top

NEW LUBRICATION OF OLD MOTORS

While the lubrication of what is termed the "waste-fed motor" (which term applies to the type of motor with bearings lubricated by oil, fed by capillary attraction through wool waste) has proved a success, the question as to the best method of lubricating the old-type motors has been and is the cause of considerable study. The conditions to be overcome are rather difficult, and especially because it is so necessary to take the human factor into serious consideration.

The life of all bearings depends largely upon the ability to maintain constantly a film of lubricant between the bearing and the revolving part.

The intermittent flooding of oil onto a bearing is not only poor practice but costly in ultimate results. This condition has existed where many methods have been tried to use oil on motor bearings which had been designed for grease.



B—Cover.
D—Waste feed.
E—Partition between oil well and waste.
F—Oil well.

Motor Lubrication—Waste-Fed Armature Bearing, Westinghouse 101 Type

The failure of these methods brought forth a number of different types of "oil cups" which were designed so to regulate the flow of oil that the bearing would be supplied with an even amount of lubricant during the entire period the car was in service. Operating and track conditions vary upon many of our city and interurban electric railways, and some types have proved more successful than others in attaining this end.

In regard to the removable cups, numerous methods have been tried to secure them in the motor frame, but none has proved entirely satisfactory. It is difficult to impress the average shop man with the importance of giving proper attention to this point upon inspection or when replacing the cups.

One method which has been tried on the axle bearings of a number of equipments is the following:

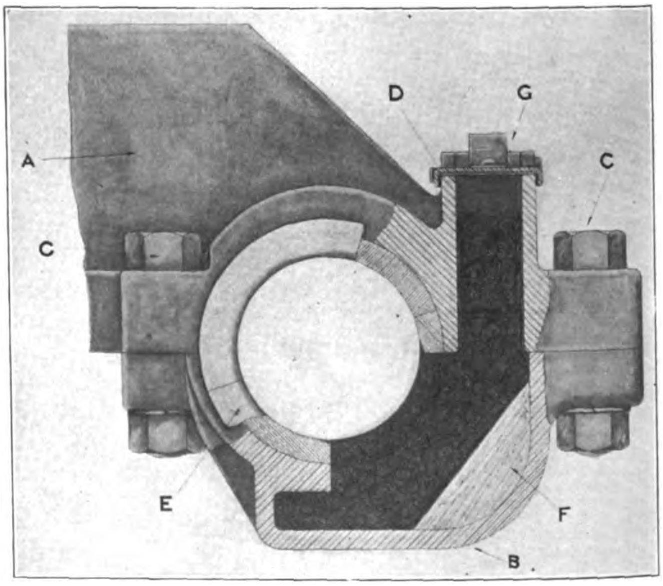
If the motor is overhung, the lower cap can be removed and the partition, which is extended to keep the present feeders separated, is taken out and the space is packed with waste. This packing is supposed to hold enough oil to run between inspection periods, and the packing is changed upon overhauling. Should the motor be underhung, the partition must be cut out of the motor frame the same as the cup. This enables the shop man to pack the receptacle properly and allows a greater surface of packing to be in contact with the axle.

This method has not proved all that was expected of it for the following reasons: The top half of the bearing carries the weight of the motor and therefore the top bearing wears much faster than the lower one. Hence the success of this method depends upon the care given to it, for it can be readily understood that a rapid wear of the upper half of the bearing allows the packing to fall away from the axle, and once the upper half of the bearing becomes dry, the babbitt either breaks or cuts itself out. The consequence of a broken babbit is the scoring and wearing of the axle, making it impossible to get satisfactory results with bearings which are substituted for the worn bearings removed.

TROUBLES WITH NEW MOTORS

The foregoing troubles are not only true of the older motor designs, but even in the newer ones numerous axles have been scored owing to the lack of lubrication which had been brought about by the falling away of the waste packing from the axle itself. The axle cap is also so designed that instead of the waste being jarred toward the axle when the car is in operation it settles into the pocket formed in the back part of the cap. To overcome this trouble it has been necessary to place inside the cap two blocks of wood cut on an angle of approximately 45 deg., upon which blocks a piece of sheet iron is placed. This method keeps the packing against the axle no matter how hard the service is, and if the waste is properly cared for the results will be very satisfactory. The blocks and sheet iron, however, cannot be used in the old-type axle caps or motor frame on account of their construction. The placing of the oil cup or box in the top part of the motor frame gives greater assurance that the bearing will be properly lubricated.

One of the greatest improvements made more recently for the protection of axle bearings, and one which has well proved its worth, is to cover the axle between the motor axle caps with a sheet-iron shield, which is faced with felt on the edges in order to attain dustproof and waterproof construction. Previous to this, the maintenance cost of axle bearings was out of all proportion to the work performed, and the wear on the axles at the bearing points was excessive owing to the working of dirt and sand into the bearings and the consequent grinding.



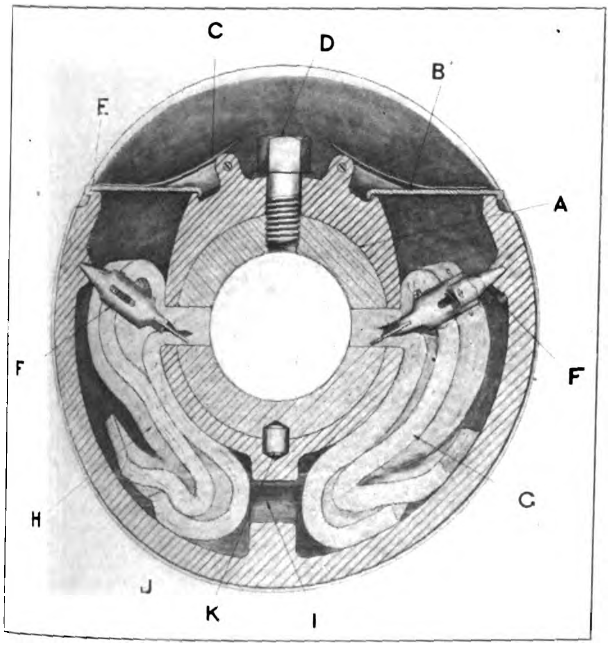
D—Waste feed.
F—Block of wood faced with sheet steel to prevent waste from falling away from the axle.

Motor Lubrication—Waste-Fed Bearing, No. 101 Axle

THE AXLE COLLAR

One of the important parts that have recently received very scant attention until within the past year or so has been the axle collar. The damage that this simple part has caused is beyond all conception of its original cost and duty. Since the initial operation of electric railway cars we have been satisfied to use any kind of metal without regard to size, or oftentimes to proper fit or adjustment.

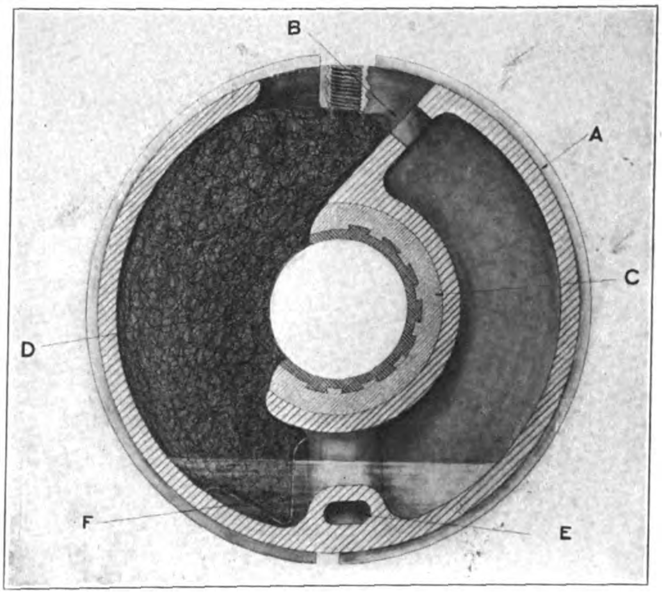
The axle collar is the part that we must depend upon to keep the motor in its proper position so that the alignment of the gear and pinion can be properly maintained. The proper alignment of the several parts means on a large property the saving of thousands of dollars a year. The question is, Have we saved all that was possible by giving proper care to this item? The answer is, We have not. What has been the practice? The axle collar until very recently has been made of cast iron, malleable iron or steel. The end of the motor bearings with which it comes in contact is in most cases an iron or steel shell with ¼ in. or less of hard babbitt on its face and of the supposed proper thickness. This babbitt face is the weakest part of the bearing on account of the construction of the shell, and thousands break off after being in service but a short time. Sometimes the axle bearing is made of bronze, and until the end of the bearing is worn off by coming in contact with the axle collar the general results are excellent, because the gear and pinion remain in a position to run with the least noise possible and to give the best results. Further, the gear case is in such condition that it can be continued in service without patching. However, the trouble returns once more when an attempt is made to face the bronze bearing with babbitt and to bring it back to standard, for no matter how well the casting may be tinned there is not enough metal, or it is not tough enough to give the results that were obtained with the original casting.



B and E—Covers for oil wells.
D—Cap bolt for holding upper half of bearing in proper position so bearing cannot bind the felt.
F—Spring-prong fork holding felt in position.
G and H—Flat-felt wicks feeding oil to bearing.

Motor Lubrication—Felt Feed Lubrication for Armature Bearing, Westinghouse 50-B and E Types

Another method to regain the proper thickness on the end of a bronze bearing is to rivet a brass or bronze piece onto the worn part and to turn this off to the proper thickness. The axle collar as constructed is nothing more than a grinder which is assisted in its destruction of the end of the axle bearing by the wheel wash and dirt of the street. In the later design of motors this trouble is obviated by a casing which covers both the axle collar and the end of the bearing. For the old-type motors, axle collars are being made with a fiber face and the rim of the axle cap is extended as much as possible to protect both the fiber and the end of the bearing. This will mean a saving of material, the keeping of the gear and pinion in proper alignment, and the operation of the car with less noise and saving in gear cases. When the apparatus is thus maintained in a proper condition the gear case will not be ruined by the gear cutting out the side, as is often the case—a condition which ruins the gear in turn.



B—Drilled hole for supplying oil to bottom of housing.
D—Waste feed by capillary attraction.
F—Perforated steel plate for supporting the waste.

Motor Lubrication—Waste-Fed Type of Lubrication for Westinghouse 50-L Motors

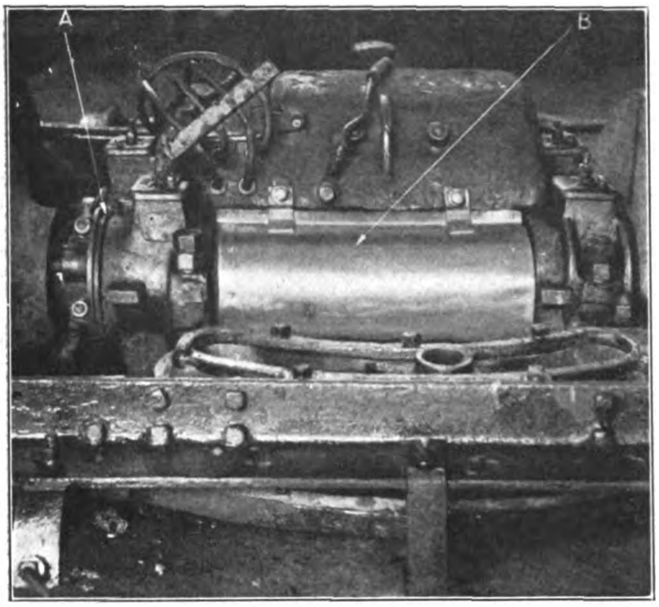
GEAR CASES

The gear case, apparently, is considered of less importance to-day than in the earlier days of the industry. It is not oil-tight, water-tight or dustproof. As a consequence, gears and pinions have been prematurely worn out owing to their having been ground by sand which had got into the case, or because of the lack of lubricant which had got out of it.

Another bad feature of the present construction is the small door placed on the top of the case. This is supposed to be used for the inspection of the gears and the putting in of additional lubricant. As this opening is on a line with the gear, the grease which is thrown from the gear goes through the opening. Eventually nothing is left in the case to lubricate the gears, and, in addition, the outside of the case has accumulated grease and dirt, which costs money to remove at every overhauling. This same opening is so placed as to admit a large quantity of the water and dirt which is thrown onto the gear case by the wheel wash.

More attention than ever is being given to the better quality of gears and pinions. The price paid for what the gear cases are supposed to protect will make it imperative to maintain them in such a manner that the results expected from the gearing will be realized.

Several new gear cases on the market are better in construction than those that have been in service during past years, but the opening in the vital part of the gear case has been left with no protection from the wheel wash and sand of the street. The construction of this cover is so flimsy that it is practically useless. As this is true, will it not be worth while to make the top of the gear case blank? To inspect gears it would certainly be more workmanlike to remove the lower half of the gear case so that a real inspection can be made, and should a loose gear or pinion appear it can be corrected before the keyway is ruined and it becomes necessary to put in a new armature shaft. On the newer type of gear cases the point where the two halves meet has been protected by an overlapping strip which extends the entire length of the gear case. This design is getting back to first principles. The next move that must be made will be to make the gear case practically oil-tight around the axle, and in the future the manufacturers of railway motors will have to design their equipment to make this possible. A further improvement that is recommended for the cases of the latest types is to place a piece of canvas filled with white lead between the case and the bracket which supports it, thus obviating all wear and keeping the gear case tight and in proper alignment.



Motor Lubrication—View of Truck Showing (a) Fiber Washer Between Axle Collar and Bearing, and (b) Removing Bearings

LUBRICATION OF RAILWAY MOTORS ON A MILEAGE BASIS

The lubrication of railway motors on a mileage basis has proved its value beyond all doubt. It has made possible economies which never could or would have been thought of in any other way. While the oil costs have been decreasing under this system, the equipment troubles have also decreased to such an extent that from time to time when it was found possible to increase the overhauling and inspection periods the oiling mileage was also extended, and with absolute safety. Nothing proves the real condition of the apparatus more than the cost per thousand miles for lubrication and the results which are obtained with the equipment in service. It would be folly to attempt to save lubricants at the expense of the moving parts and other parts that would be affected thereby, and it is also the height of folly to attempt to flood oil onto bearings that are absolutely unfit for the purpose for which they are being used, in order to overcome their mechanical drawbacks.

As to the overhauling and inspection of equipment the first mechanical department bulletin of the Brooklyn Rapid Transit System, which was issued under date of July 23, 1909, read as follows:

"Commencing Aug. 2, 1909, the periodical overhauling of passenger equipment will be changed from the present time to a mileage basis on the surface division, and is expected to have better attention and to be most thorough in the future.

"The following statement shows the mileage basis that is to be followed for such overhauling:

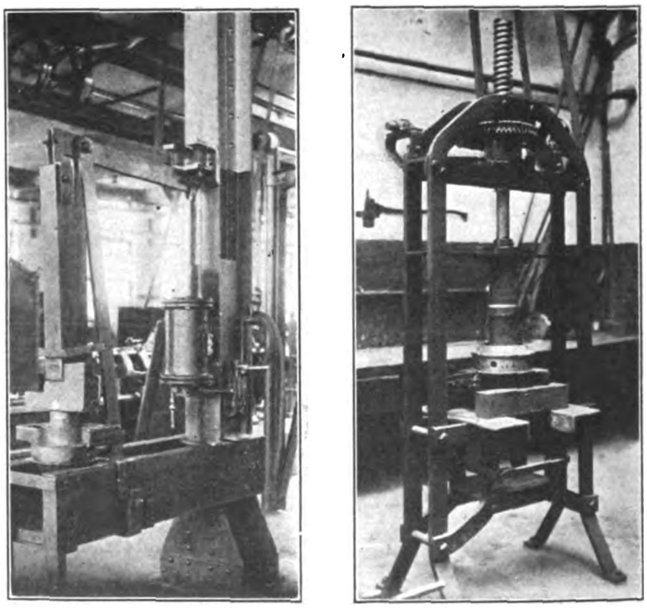
Motor	Mileage Basis
Westinghouse 68	7,000
Westinghouse 81	8,000
General Electric 57	8,000
General Electric 64	8,000
General Electric 80	16,000
Westinghouse 93	16,000
Westinghouse 101	16,000

The system of overhauling on a mileage basis has now been in vogue less than five years, but in that period it has proved to be a practical and efficient means of obtaining results that were never dreamed of before it was brought into existence. During the past four and one-half years the number of miles operated between overhauling periods has been increased from time to time until on Jan. 5, 1914, the following overhauling mileage was made standard, and when compared with that of Aug. 2, 1909, one cannot help but marvel at the improvement brought about in such a comparatively short time:

SURFACE DIVISION

Aug. 2, 1909.		Jan. 5, 1914.	
Motor	Mileage Basis	Motor	Mileage Basis
Westinghouse 68	7,000	Westinghouse 68	10,000
Westinghouse 81	8,000	Westinghouse 81	10,000
General Electric 57	8,000	General Electric 57	12,000
General Electric 64	8,000	General Electric 64	18,000
General Electric 80	16,000	General Electric 80	18,000
Westinghouse 93	16,000	Westinghouse 93	18,000
Westinghouse 101	16,000	Westinghouse 101	18,000

The inspection of the foregoing equipment now varies between 600 miles for the few remaining hand-brake cars and 1000 miles for the nearly 2000 cars which are equipped or are being equipped with semi-automatic air brakes and pneumatic sanders. For the convenience of the transportation department, a leeway of 100 miles either way from these figures is permissible, and this elasticity helps to equalize the number of cars in the shops for inspection from day to day.



Motor Lubrication—Brooklyn Air Press and Screw Press for Removing Bearings

The total number of miles operated by the Brooklyn

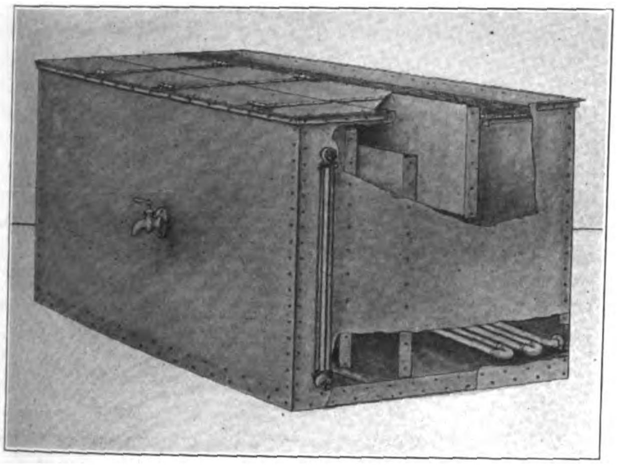
Rapid Transit System with surface passenger equipment, the troubles and cost were as follows:

	1909	1913
Mileage	46,026,625	51,841,146
Total number of surface troubles reported	33,386	21,832
Average cost of lubrication per 1000 miles	$0.192	$0.168

On the elevated division the change in mileage bases has been as follows:

Dec. 9, 1909			Jan. 5, 1914		
	Motor	Mileage Basis		Motor	Mileage Basis
Westinghouse	50-B	10,000	Westinghouse	50-B	20,000
Westinghouse	50-E	10,000	Westinghouse	50-E	20,000
Westinghouse	50-L	10,000	Westinghouse	50-L	30,000
Westinghouse	300	30,000	Westinghouse	300	45,000

The inspection period of the foregoing equipments at the present time is 1000 miles for motor cars and 1400 miles for trailing cars, with a leeway of 150 miles each way for each class of equipment.



Motor Lubrication—Steel Oil Reclaiming Tank

The total number of miles operated with elevated passenger equipment, the troubles and cost were as follows:

	1909	1913
Mileage	33,494,885	36,287,371
Total number of elevated troubles reported in operation	21,166	3,931
Average cost of lubrication per 1000 miles	$0.199	$0.098

The cost per 1000 miles covers the lubrication of motors, trucks and all miscellaneous equipment upon all cars.

A number of factors assisted materially in accomplishing the various improvements in the rolling stock of the Brooklyn Rapid Transit System during the years noted, but among the more important factors were faith in the principles laid down and the consistent determination to obtain the highest efficiency possible in operation. This has been the slogan of the mechanical department: "Efficiency in operation, economy in production." The lubrication schedule prepared by this company[*] made it possible to co-ordinate the practice at all shops and to have the different foremen maintain the same type of motors with a regularity and sameness that could have been accomplished in no other way. In order to have a check on this system, however, a monthly statement is compiled to show the number of cars and car miles operated, the miles per car maintained, the quantity of the different lubricants used and the cost of the same per 1000 miles. By following this statement closely, it is possible to analyze the results at the different shops and carhouses. Should any foreman fail to make a reasonable showing, or should the costs increase over the previous month, the reasons for the increase must be explained.

To obtain the most efficient results from the men who are held accountable for the maintenance of the equipment, it is necessary to provide them with proper facilities. In many instances the breaking down of the equipment soon after being overhauled is chargeable directly to the use of unsuitable tools. This has been exemplified by the methods used to install armature bearings in motor housings. The sledge hammer and block of wood have invariably been the only facilities at hand for this purpose. In view of the importance of the armature bearing and the resultant loss due to its failure, it is essential that its fitting into the housing should be so accomplished that it will not loosen or break the babbitt lining, for if that occurs the bearing becomes faulty and unfit for service. To do this work successfully, the Brooklyn company has developed two presses, one operated by air and the other with a worm gear. The worm and gear press is more elaborate, but undoubtedly has many advantages over the air press.

OIL TANKS, WASTE DRAINAGE, ETC.

Much more can be said on the question of proper lubrication, but before concluding I wish to impress upon you the necessity of giving the preparation of the waste packing serious attention because the successful and economical lubrication of the equipment depends upon the proper soaking and draining of the waste before it is put into use. While the installation of proper soaking and reclaiming tanks means a slight expenditure, the valve received from such tanks will produce savings much beyond their cost.

PROGRESS REPORT OF JOINT COMMITTEE ON INDUCTIVE INTERFERENCE

A. H. Babcock, chairman of the committee on publicity, California joint committee on inductive interference, has submitted a progress report which follows that published in the ELECTRIC RAILWAY JOURNAL for Oct. 11, 1913. Much attention has been given to analyzing the results obtained from the several parallels on which an investigation has been conducted. These parallels have been previously described. The mass of experimental data and the studies concerning these exposures are embodied in some thirty technical reports. Some of the general results and conclusions indicated by a study of these reports are as follows:

CLASSES OF HARMONICS NOTED

The fundamental (sixty-cycle) wave of voltage or current is relatively of little importance in the production of noise in telephone circuits. It becomes of importance, however, if it gives rise to longitudinal voltages of sufficient magnitude to constitute a physical hazard, to interfere with the operation of grounded signaling devices or superimposed telegraph service, or to operate protective apparatus on the circuits. The harmonics of the voltage and current waves are of chief interest as the cause of noise in telephone circuits, particularly the higher harmonics or those within the range of the voice frequencies. The fundamental and lower harmonics are important as disturbing factors in telegraph circuits.

The foregoing facts show clearly the great desirability, from the standpoint of inductive interference, of having wave forms of voltage and current in power circuits free from all harmonics. That this does not obtain in the present state of the art is a basic cause of the disturbance to communication circuits paralleled by power circuits. Further than this, these facts emphasize the desirability that designers and manufacturers should eliminate, as far as is practicable, those features of design favorable to distorted wave forms.

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[*] Printed in the ELECTRIC RAILWAY JOURNAL for Dec. 7, 1912, page 1145.

It has been found in the case of the power lines investigated that the fundamental, fifth, seventh and eleventh harmonics are prominent in the balanced currents and voltages while the fundamental, third and ninth harmonics are prominent in the residual currents and voltages of the power system. By a comparison of the prominent harmonics in the currents and voltages of the power system with those of the induction in the telephone circuit it is evident that the longitudinal induction arises principally from the residual voltages and currents while the transverse induction shows principally the characteristics of the balanced voltages and currents together with some effect from the residual voltage and current.

The effect of the condition of the neutral of the auto-transformers at Salinas, grounded or non-grounded, in so far as the induction from these exposures is concerned, is through the residual currents and voltages of the several high-tension lines connected to these transformers. A representative value of the neutral current at Salinas during the tests conducted at that point is 0.3 amp. It is composed almost entirely of the ninth harmonics together with the fundamental and third harmonics, decreasing in magnitude in the order named. The length of the power circuit between Guadalupe and Salinas is approximately a quarter wave length for the ninth harmonic. This fact may have some bearing upon its large magnitude and is to be further investigated by the committee. Under existing conditions, with the power system in normal operation, grounding the neutral of the auto-transformers at Salinas does not greatly affect the induction in the exposures concerned. Two reasons may be given for this result: (1) the load balance on the power system is such that a relatively small amount of load current flows through the neutral; (2) as three high-tension lines are connected together by the auto-transformers at Salinas, opening the neutral connection to ground of these transformers does not completely eliminate the path for the residual current of any one of the three lines, since it may then flow to earth through the admittance to ground of the other two lines. It is quite evident from these considerations that this case presents special conditions which make it impossible to draw general conclusions applicable to any other case. Further consideration of the effect of grounding this neutral will probably be undertaken by the committee with the idea of determining its effect under abnormal conditions.

The banks of star-connected auto-transformers at Guadalupe and Salinas substations are provided with closed delta secondary windings which supply energy for local consumption. For test purposes the secondary delta of the transformers at Salinas was opened. A large increase in the residual voltage and residual current with a consequent large increase in the induction in parallel telephone and telegraph circuits resulted. In all cases this increase applied particularly to the third harmonic. If star-connected auto-transformers are used, this test indicates, therefore, that from an induction standpoint it is beneficial to provide such auto-transformers with secondary windings connected delta.

On the 8-mile exposure it was possible to measure separately, under different conditions of the telephone circuits, the electromagnetic and electrostatic induction. From this exposure, also, computations of the magnitude of the induction, both electromagnetic and electrostatic, were carried out. In computations of electromagnetic induction experience has indicated that the distances between wires and their images cannot be assumed to be twice the height of the wires above the ground. Special tests were carried out in order to determine the equivalent depth of the image conductors. These tests indicated this depth to be approximately 1000 ft. below the earth's surface. Owing to the electrostatic shielding effect of neighboring objects, it was found, also, that the computed electrostatic induction was greater than that actually observed, indicating that in effect the ground surface was brought nearer to the conductors. Electrostatic shielding of the circuits under test, by grounding other circuits on the telephone lead at one point, reduced the longitudinal electrostatic induction particularly.

PRESENT WORK TRANSPOSITION STUDIES

The field engineering staff is now investigating at Santa Cruz the parallel between the 22,000-volt, three-phase line of the Coast Counties Gas & Electric Company and a toll lead of the Pacific Telephone & Telegraph Company. This parallel is between Santa Cruz and Watsonville and is approximately 17 miles long, the two lines occupying opposite sides of the public highway. The system of the Coast Counties Gas & Electric Company is isolated from ground. The committee plans to conduct on this exposure a series of tests to determine the effectiveness of several different systems of transpositions of the power and telephone circuits. It hopes to be able to determine:

(a) The effect of power transpositions in reducing the longitudinal induction arising from balanced currents and voltages.

(b) The effect of telephone transpositions in reducing the transverse induction arising from: (1) residual currents and voltages; (2) balanced currents and voltages.

(c) The effect of power and telephone transpositions properly located with respect to each other in reducing both the longitudinal and transverse induction arising from balanced currents and voltages.

(d) The relative effectiveness of different transposition systems in reducing electrostatic and electromagnetic induction.

FUTURE STUDY OF EFFECT OF NOISE

In addition to the study of the effect of transpositions the committee will undertake in the near future to determine the effect of known amounts of noise (extraneous current) in the telephone receiver in reducing the intelligibility of conversation over a circuit. Tests will first be conducted to determine the detrimental effect of known amounts of single-frequency extraneous current. This effect will be rated as the equivalent of an increase in the length of the circuit. From such tests with single-frequency extraneous currents the relative detrimental effect of currents of different frequencies will be obtained. This, together with information as to the detrimental effect of currents of complex wave form, will give information by which the law of the combination of the single-frequency effects can be obtained.

Until such time as the committee is prepared to make recommendations to the Railroad Commission it feels at liberty to indicate only in the most general way the results of its investigation. Since its formation, a year ago, the work of the committee has served to emphasize to all members the magnitude of the problem under investigation and the necessity of a thorough consideration of the subject in all its different phases, before the committee, in justice to itself and to the Railroad Commission of California, can make final recommendation to that body for its action.

PROCEEDINGS AT WOOD PRESERVERS' CONVENTION

The tenth annual convention of the American Wood Preservers' Association met in St. Charles Hotel, New Orleans, La., on Tuesday, Jan. 20, with more than one hundred delegates in attendance. Mayor Martin Behrman welcomed the delegates, the response being made by J. H. Waterman, of Galesburg, Ill. The first day was devoted to the reading of reports by the officers, including that of President A. E. Larkin, of Minneapolis, Minn. Some attention was also given to routine matters.

On the second day, Wednesday, Jan. 21, the delegates paid close attention to the delivery of several instructive papers. Clyde H. Teesdale, Madison, Wis., representing the Forest Products Laboratory, spoke on the treatment of ties by the creosote process. Mr. Teesdale said the Forest Products Laboratory had had under way for upward of two years experiments for obtaining data on various conditions in treating plant work. The speaker said that the experiments consisted of a series of runs made on hard maple, red oak, hemlock and loblolly pine cross-ties. The maple, hemlock and red-oak ties were furnished by the Chicago & Northwestern Railroad. The maple and hemlock ties were obtained in northern Michigan, and the red oak in central Wisconsin. The ties had been seasoned about eighteen months before treatment. Five hundred ties, all hewed, divided about equally between the three species, were used. The loblolly ties were furnished by the Illinois Central Railroad and came from Mississippi. After treatment the ties were returned to the companies which had furnished them. The creosote used was purchased by the Forest Products Laboratory from the Semet-Solvay Company, Ensley, Ala.

Mr. Teesdale then explained how the timber was treated in the preserving apparatus. The test consisted of forty-eight runs under various conditions. Eleven ties were used in each run and each species was treated separately. The temperature of the oil, the maximum pressure, draining and weighing the ties were kept as similar as possible in all the runs. The loblolly pine showed the best results, maple ran next in order and red oak and hemlock were on an equal basis.

The paper on "The Protection of Ties from Mechanical Destruction," by Howard F. Weiss, of Wisconsin, was followed by H. H. Gibson's report on "Future Tie Material in the United States." The papers by Messrs. Weiss and Gibson, together with others of electric railway interest, were abstracted in the Electric Railway Journal of Jan. 24, 1914. The convention was concluded on Jan. 22 with the election of officers as follows: President, George E. Rex, manager of treating plants Atchison, Topeka & Santa Fé Railway; vice-presidents, Carl G. Crawford, R. S. Manley and F. B. Ridgeway; secretary and treasurer, F. J. Angier, superintendent of timber preservation Baltimore & Ohio Railroad.

SPECIFICATIONS FOR CREOSOTE

An additional paper at the annual meeting of the Wood Preservers' Association was the report of the committee on preservatives. The committee, like its predecessors, reported that the only preserving oil which has been shown to have sufficient merit as a preservative was creosote oil. The revised definition defines "creosote" as any and all distilled oils boiling between 200 and 400 deg. C. which are obtained by straight distillation from tars consisting principally of compounds belonging to the aromatic series and containing well-defined amounts of phenoloids. The report also described methods of testing, including a thermometer recommended as standard. It also quoted the specifications of several timber-using associations, like the American Railway Association, and recommended that it be instructed to confer with similar committees of such associations with a view of preparing uniform standard specifications. The chairman of the committee did not concur with this recommendation as he believed that the Wood Preservers' Association was the proper one to take the lead in matters of this kind rather than to reconcile the diverse specifications of users.

EFFECT OF RATE OF FARE ON RIDING HABIT

In his discussion of the paper by F. W. Hild at the meeting last week of the American Electric Railway Association, L. R. Nash, of Stone & Webster, presented some curves showing studies which he had made on the effect of fare on riding habit. It was impossible to reproduce the curves in time to use them in connection with Mr. Nash's discussion, which was published on page 253 of last week's issue. Hence they are published below with the accompanying remarks:

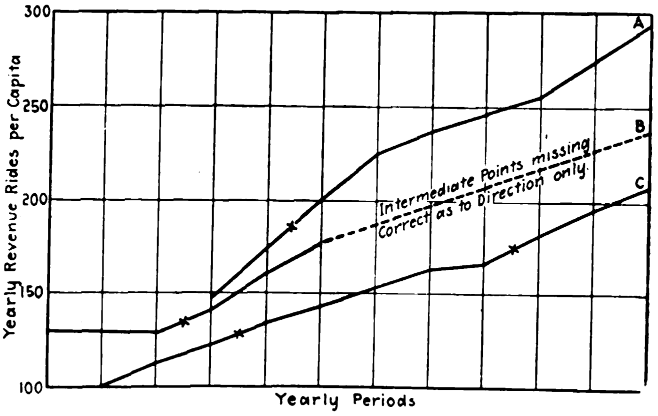


Chart Showing Effect on Riding Habit of Reduced Fares
(Rate reductions, one extra ride for 25 cents, shown by crosses*.)

"It was the writer's privilege not long ago to participate in a study of the effect of fare reductions. Definite information was desired to substantiate an opinion that no appreciable stimulus would result from a fare reduction from 5 cents to six rides for 25 cents, and this information was not at hand. It was found upon investigation that there were not more than fifteen large cities in this country where reduced rates were in effect. Nearly all these cities were visited, local conditions observed, and as far as possible statistics of operation obtained. In nearly one-half the cities reduced rates have been in effect since electrification, or for so many years that prior statistics of value were not available for comparisons. In other cases definite information was secured regarding the riding habit for a term of years before and after the reduction in rate. It was thus possible to determine whether or not there were temporary conditions existing before or after the change which would render the immediate results misleading. Curves of rides per capita per year were plotted on which the effects of competition, business depression, strikes, interurban accessions and other significant conditions of the years plotted were indicated. A careful and repeated study of these curves has failed to disclose any large stimulus which could be attributed to reduction in fare. Increases in riding were shown following some reductions, but in each case there were other known contributory factors. It is significant that where such factors were absent the increase in riding was, to use the author's own words, 'slight even to negligibility.'

"It has been thought of interest to submit with this discussion a few of the curves mentioned above. Conditions in some of the cities studied are discussed in the paper or have previously been so fully presented to the association that they are not included in the plot prepared herewith, from which has also been omitted all information not directly pertinent to the matter under discussion. No riding habit curves from which significant data were obtained except for the cities mentioned above have been omitted. It is regretted that the number remaining is small. An examination of the curves shows only one material departure from a continued straight line of riding following a fare reduction. In the case of city 'B' the reduction was preceded by an evident period of depression and followed by an exceptional development in interurban operations which brought many passengers to the city system. In the case of city 'C' the six rides for 25 cents were first allowed during commutation hours only and later came into general use. At neither time is there any evidence whatever of increase in riding.

"With reference to other companies which have operated with reduced fares for comparatively long periods, it may be stated that some are struggling along with unsatisfactory service and insufficient provision for maintenance and depreciation. Others are apparently successful. A search for the reason usually discloses a restricted territory served, short hauls, extra-fare suburban or tributary lines, unusual noon riding or other similarly favorable factors. As the cities which they serve grow these advantages will tend to disappear and the companies will be confronted with rapidly increasing expenses and charges. They may find themselves financially unable adequately to keep pace with natural city expansion, which will therefore to some extent be retarded."

BOILER TESTS WITH ILLINOIS COAL

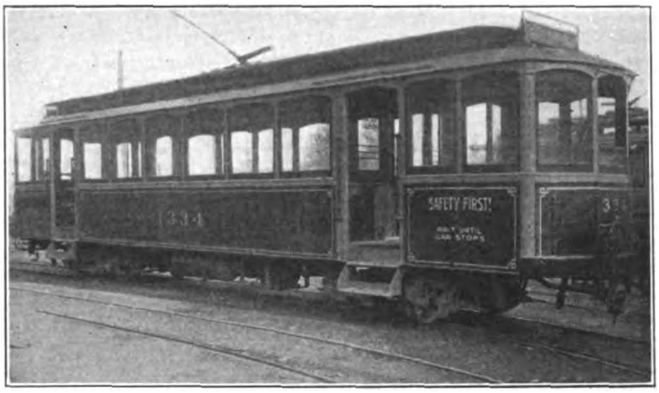
A paper of much interest was read by Bryant Bannister, of Kewanee, Ill., before the Chicago section of the American Society of Mechanical Engineers on Jan. 28. It related to tests made about three months ago at the new boiler house in the Kewanee works of the National Tube Company. The complete boiler plant consisted of four Edge Moor water-tube, four-pass boilers, each having 6132 sq. ft. of water heating surface and 1200 sq. ft. of superheating surface, installed in conjunction with Foster superheaters. The firing was done by a seven-retort Taylor stoker equipped with an air extension grate. Each stoker was provided with a fan and engine. Low-grade Illinois coal in the form of 1.25-in. screenings averaging 11,094 b.t.u. with 21 per cent of ash and 16 per cent of moisture was burned with an efficiency of boiler and grate based on combustible burned of 80.95 per cent, which fact made the report of the tests of considerable importance. Feed water was supplied from a purifying plant and was heated by the exhaust from the auxiliary engine in an open heater.

Much was done to make each boiler setting tight and as free from radiation losses as possible. The setting was first painted with a thick asbestos paint, then covered with 1½-in. coating of 85 per cent magnesia insulation, and finally covered with muslin and again painted to insure no air leakage. The boiler headers were also covered, where exposed, with this same magnesia compound, and the drums were covered with a 3-in. layer of firebrick and cement, and then with magnesia covering. At no point during the test was the setting more than warm, even at the highest loads.

The steam pressure by gage was 117.8 lb., the temperature of escaping gases leaving boiler 412.0 deg., the blast pressure under grate 1.95 in., and the degree of superheat 77.9 deg. The dry coal consumed per square foot of grate surface per hour was 28.5 lb., and the equivalent evaporation per hour from and at 212 deg. per square foot of water-heating surface 3.28 lb.

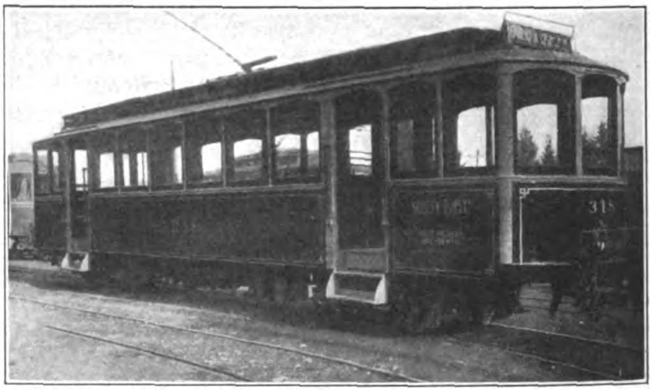
"SAFETY FIRST" SIGNS IN PORTLAND

The Portland (Ore.) Railway, Light & Power Company has been introducing a novel method for advancing its safety-first campaign. On each one of its cars is being painted the slogan "Safety first," and in addition some short expression, such as "Wait until the car stops" or "Help prevent accidents," as shown in the accompanying halftones. The sign on each one of the cars will differ slightly from that on any of the others, so that attention will be drawn to them. It is expected that by this means the interest of the public will be stimulated.



Portland Safety Campaign—Car with Slogan "Wait Until Car Stops" Painted on Body

This idea was developed by F. W. Hild, general manager Portland Railway, Light & Power Company, who has been taking an active interest in the safety campaign inaugurated by the claim department of the railway. The novelty of the scheme, as well as its obvious excellence, has attracted a great deal of local attention, which is shown by the favorable comment made by the public of Portland regarding it.



Portland Safety Campaign—Car with Slogan "Help Prevent Accidents" Painted on Body

The Saxony State Railway authorities have decided to begin work on the electrification of their system. The first section to be converted will be that between Klingenthal and Untersachsenberg, after which the Pirna-Dresden-Meissen line will probably be taken in hand.

Equipment and Its Maintenance

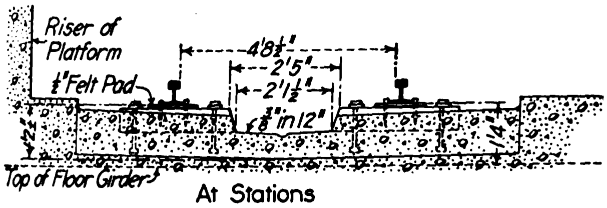
Short Descriptions of Mechanical and Electrical Practices from Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for in Accordance with Our Regular Rates.)

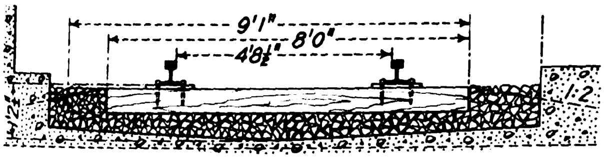
GENERAL FEATURES OF PUBLIC SERVICE COMMISSION'S TRACK SPECIFICATIONS FOR NEW RAPID TRANSIT LINES

BY ELLSWORTH L. MILLS, ENGINEER OF TRACKS, SUBWAY SYSTEM, WITH GIBBS & HILL

The Public Service Commission, First District, New York, has undertaken for the first time to design the details of and buy material necessary for the construction of track work. It contemplates handling this material just as a railroad would, ordering directly from the material contractors such supplies as are needed from time to time, and installing it as the subway and elevated work now under way in New York progresses sufficiently to permit of so doing. It was not deemed advisable to let a general contract for the work, as the construction would have to be carried on sometimes under traffic. Again, in some instances, the city might desire to install a portion of the tracks for temporary operation, and it was appreciated that no contractor could bid on doing work under such uncertain conditions.



At Stations



At Other Points

Cross-Sections of New Subway Construction with Screw Spikes, ½-In. Tie Plates Over Felt Pads, etc.

STANDARDIZATION AND MILEAGE

In order to obtain a standard track construction throughout the dual system (comprising not only the city-built lines, but also the lines now owned and being built by the operating companies, all of which the city has the right ultimately to take over) the commission invited the New York Municipal Railway Corporation and the Interborough Rapid Transit Company to confer with its engineers. The result has been the adoption of a set of standards and specifications which will apply to all new rapid transit lines whether built by the city or by the operating companies. The work will be done under the chief engineer of the commission, Alfred Craven; under the general direction of the deputy engineer of subway construction, Daniel L. Turner, and under the direct supervision of the writer, representing Gibbs & Hill, the consulting engineers to the commission. The draft made for the public hearing of these specifications is now obtainable from the commission. This draft is subject to some minor modifications as noted therein. Bids for part of the equipment will be received by the commission on Feb. 24.

The following table gives the approximate mileage of the dual system:

Interborough Rapid Transit Company	Track Miles
Existing subway	73.0
Existing elevated lines	118.0
Subway and elevated lines for construction jointly by city and company	149.0
Elevated railroad extensions to be constructed by company	10.4
Third-tracking on elevated roads to be constructed by company	10.5
	360.9
New York Municipal Railway Corporation	
Existing elevated lines	105.00
Subway and elevated lines for construction jointly by city and company	110.41
Elevated extensions for construction by company	35.29
Third-tracking and reconstruction by company	9.30
	260.00

The foregoing tabulation shows approximately 324 miles of new single track to be constructed according to the standard specifications.

CHARACTER OF LINE AND STATION TRACK

The floor of the subway will be a concrete invert with a minimum distance of about 1 ft. from the base of the rail to the top of the concrete. The elevated structure will be the usual type of construction with girders on tangents spaced about 5-ft. centers under the tracks.

The track will be of 100-lb. A.R.A. type "B" open-hearth rail on tangents and on curves with a radius of more than 700 ft. and manganese rail of the same section on curves with a radius of less than 700 ft. All curves under 2000-ft. radius will be guarded, using different flangeways for various degrees of curvature. The rails will be secured to 6-in. by 8-in. by 8-ft. untreated yellow-pine ties with 6-in. cut spikes, except at stations. The guard rails are to be fastened to the running rails at intervals of about 3 ft. with a 15-16-in. bolt passing through an adjustable filler block. Spiral spring nut locks are to be used on these bolts. Malleable-iron rail braces will be installed on the guard rail and on the main outside rail on all curves under 700-ft. radius. Rolled open-hearth steel, flat-bottom, shoulder tie plates will be placed on all ties and will be ½ in. thick by 7½ in. wide by a minimum length of 9 in. Owing to the rather small distance between the floor of the subway and the bottom of the ties, trap-rock ballast is ordered, not too large to pass through a 1-in and not too small to pass through a ½-in. ring. This size of ballast permits easy tamping. The base-supported type of splice bar 26 in. long will be used, bolted to the rails with 15-16-in. bolts. The suspended joint is specified.

At the stations the rails are to be secured with screw spikes to 6-in by 10-in. creosoted blocks embedded in concrete. To prevent the track from getting out of alignment, these blocks will be anchored to the foundation by two 15-16-in. bolts. The tie plates in this construction will be rolled with a ridge or boss for the support of the head of the screw spikes. Cow-hair felt pads, ½ in. thick, are called for between the ties and the tie plates. This type of track was adopted to insure more sanitary and sightly conditions at stations.

The section of the subway is usually such that crossovers are very costly; therefore sharp turnouts are used extensively. To keep the radii as long as possible under these conditions and eliminate many of the ill effects of sharp curves, a special design for turnouts has been made to ease the curves as much as possible, obtaining in most cases an actual radius very near to the theoretical radius. Wherever the equipment will permit, the rail will be offset and the switchpoints protected by a cast manganese housing. Rolled manganese rail will be widely used throughout the special work.

PURCHASE AND STORAGE

Bids for the material will be asked for on a unit price basis, and approximate estimates of the amounts required will be furnished the bidders. A sufficient quantity will be ordered to take care of the expected requirements of the city for an extended period. This material will be stored in a yard and requisitioned in a manner similar to that followed by railroads. This method of handling the work is expected to produce very efficient results and do away with a middleman's profit and the large amount of wastage of left-over material. All unused material will be returned to the storeyard, and after all the trackwork is completed it will be turned over to the operating companies for their use in maintenance.

EQUIPMENT DEFECTS—RECORDS OF THOSE CAUGHT IN OPERATION OR AT INSPECTION

BY C. W. SQUIER, ASSISTANT ENGINEER NEW YORK MUNICIPAL RAILWAY CORPORATION

In looking over the records of equipment on different roads a wide variation is found in the defects reported for the same type of equipment operated under similar service conditions. This is due somewhat to the use of different methods for reporting and recording defects so that more are recorded on some roads than on others.

The usual system for obtaining and recording defects is to have the motormen or others of the operating department report the defects, and then to have the troubles repaired and recorded by the mechanical department. This is an excellent method for arriving at the defects that cause trouble in operation, but with a careful system of inspection by far the greater number of defects are found and remedied on inspection before they cause trouble on the road. Of inspection discoveries no record is kept in most cases.

To be of any value for comparison a record should include all defects regardless of whether they cause interruption of service or are found on inspection. Such a record will show just what troubles are encountered with a given equipment, and the excessive ones can be picked out for remedial measures. Such a record would also be of inestimable value to the engineer when the time comes for purchasing new equipment, for he is thus enabled to classify the troubles experienced with each piece of apparatus and to make certain that the new design will minimize all excessive troubles. Such a record will give an accurate comparison of different types of equipment, but it should not be used as a comparison of the shops or of the men who maintain the equipment because this would put a premium on suppressing the correct number of the defects discovered.

MAINTENANCE EFFICIENCY COMPARISON OF SHOPS

For comparing different shops on the basis of efficiency in equipment maintenance, we should use some basis which will indicate accurately the attention given to equipment to prevent delays in operation. Where the service is similar it would appear as though the number of detentions per 1000 car miles operated would be a fair comparison. These could be classified according to the different general divisions of a car equipment, such as motors, controller, air-brake, car-body and truck troubles. Another comparison could be made on individual pieces of equipment which require general repairs, say, the number of armatures of a particular type sent into the armature room for repairs per 1000 car miles operated. In classifying these troubles distinction should be made between troubles caused by improper maintenance and troubles due to improper material or workmanship at the general repair shop. Thus in the case of grounded armatures those grounds due to rubbing, oil, dirt, etc., should be charged against the maintenance shop, while grounds caused by an insulation breakdown should be charged against the shop.

The duty of inspectors is to find defects and to remedy them before they cause sufficient trouble to interfere with the operation of the equipment. The best inspectors are those who find the greatest number of defects. Some roads offer a bonus for finding those defects which if left undiscovered might cause serious accidents, like broken or cracked equalizer bars, loose wheels, broken or loose tires, broken spring-plank hangers and motor suspension bars. This plan provides an incentive toward careful inspection, and the location of such defects before they advance far enough to cause accidents is well worth the additional amount paid.

SUPPRESSION OF DEFECT RECORDS

Where shops are compared on their records of equipment defects the following ways are among those which may be used to suppress the facts:

(1) When a car is run in for equipment trouble and several defects are found only one is reported, for by doing this the number of defects is kept low.

(2) Incomplete information is often furnished regarding the damage caused by defects in order to prevent the possibility of more than one defect being charged against the shop. Thus in one case a grounded resistance caused the burning off of resistance leads and controller fingers. The shop reports stated only "grounded resistance" and made no mention of the other damage.

(3) All defects which occur in service are not reported. In numerous cases it is found that when a car is brought in because of trouble the carmen are told by the repairman that it is not necessary for them to put in a defect slip as he will make repairs at once.

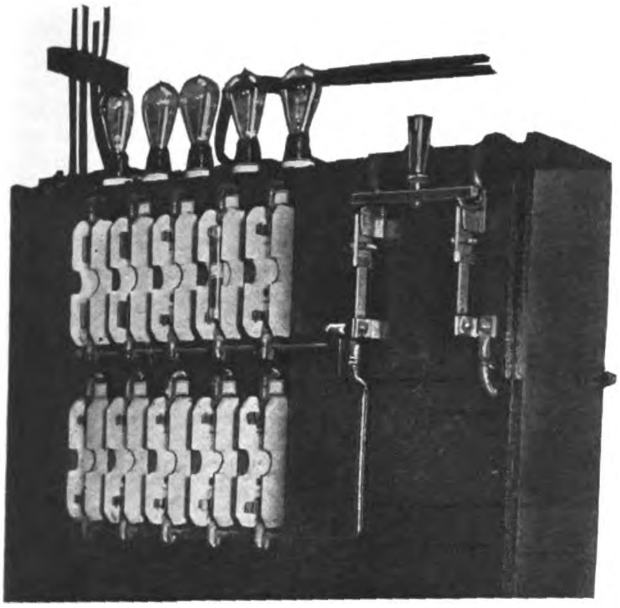
(4) When no trouble of the nature reported by the crew is found the equipment is reported as being O. K. even though the shopmen find defects of another character which undoubtedly caused the trouble. As an example, a car which started with a jerk due to poor contact by the controller fingers was reported by the motorman for motor trouble. The shop report read: "Motors found O. K.," which was correct as far as it went, but as it made no mention of the poor contact on the controller fingers the shop saved itself a defect charge.

These few examples will show the undesirability of charging the shop with defects of this kind where an accurate record is desired. Defects should be charged against the equipment, and comparisons of its maintenance should be such as will give a complete and accurate record of all defects which actually occur.

FUSE-TESTING BOARD OF THE THIRD AVENUE RAILWAY

BY R. H. PARSONS, ELECTRICAL FOREMAN

For some time the mechanical department of the Third Avenue Railway, New York, has been refilling the blown cartridge fuses used in the cars of that company. This practice has proved both convenient and economical, the net cost for the standard sizes of fuses being only 3 cents each.


Fuse-Testing Board, Third Avenue Railway, New York

The only obstacle encountered was the unreliability of the fuse filler. It was found, for instance, that the filler purchased for, and marked, 10 amp would often carry 20 amp indefinitely. To be secure on this point, the department therefore built the simple but effective board hereinafter described.

A frame, 5 ft. 4 in. high and 3 ft. wide, was constructed of 2-in. x 2-in. angle iron, braced by 1-in. x 1-in. angle iron, as shown in the accompanying sketch. An ebony transite board, ¼ in. thick, was mounted on this frame, extending from the top to a point half way down the frame, for use as a panel. Ten standard fuse blocks were mounted on the panel, each for a designated rated fuse, the rating being painted on the fuse block.

The board is equipped to test quickly and accurately fuses of the following ratings: 1, 3, 5, 10, 15, 25, 30, 50 and 100 amp. Two fuse blocks are used for the 100-amp fuse, one to test fuses with blades, and one to test fuses without blades.

For the lower current capacities the resistance is made up of heater coils; for the heavier currents of iron wire wound spirally. However, for the 100-amp fuse the resistance consists of car grids, all of the coils and grids being insulated from the iron frame by the use of porcelain bushings.

The resistance for each fuse is so arranged that by placing the fuse in its proper position, and closing the double-pole switch shown at the right side of the board, there will pass through the fuse the current at which the fuse should blow within the time set by the National Electrical Code standard.

On top of the board are five lamps connected in series and so wired with the board that they burn when current is passing through the fuse but not when the fuse blows, because then the lamp circuit is broken. Hence a man who is standing at the board with a watch can test a fuse quickly and positively. The table used in making up the board and also used for testing fuses is shown below. It conforms to the National Electrical Code standard and gives the ohmic resistance necessary to get the proper current through each fuse and the current used to test each fuse. These figures were checked in actual service with an ammeter.

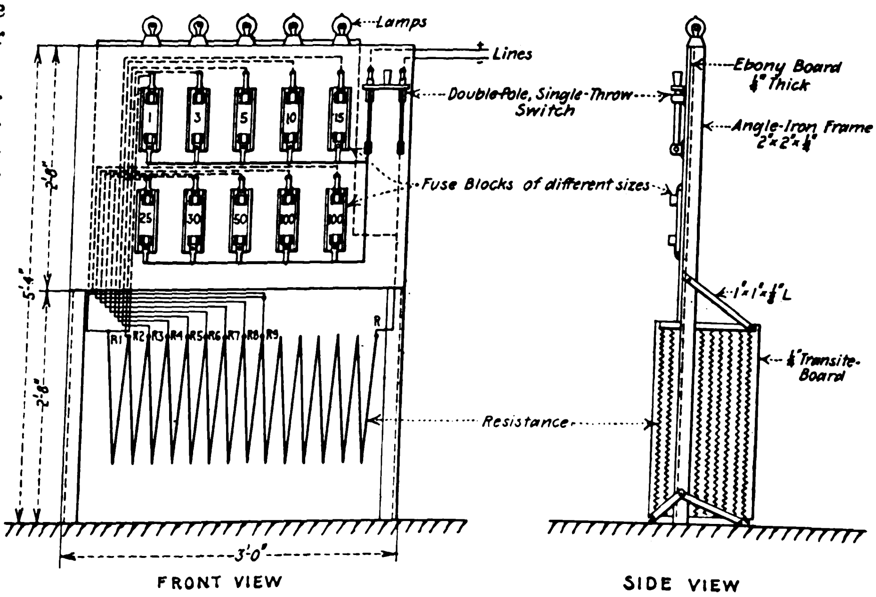
Each fuse block is connected so that it will receive 50 per cent more current than its rating. For instance, the 5-amp fuse block is connected in series with 73 ohms, giving at 550 volts the 7.5 amp current at which this fuse should blow in less than 1 minute.

TABLE SHOWING TESTING CURRENTS AND RESISTANCES

Rating of Fuse, Amp.	Amp at Which Fuse Should Blow	In Less Than	Resistance, Ohms	Between Points
1	1.5	1 min.	366	R and R1
3	4.5	1 min.	122	R and R2
5	7.5	1 min.	73	R and R3
10	15.0	1 min.	37	R and R4
15	23.0	1 min.	24	R and R5
25	40.0	1 min.	14	R and R6
30	45.0	1 min.	12	R and R7
50	75.0	2 min.	7.5	R and R8
100	150.0	4 min.	3.5	R and R9

When refilling fuses a few are made up of each rating and tested. If found to conform to regular specifications the lot is completed, after which a few more fuses are tested. A fuse is considered "O. K." if it blows at the required 50 per cent overload in from one-third to one-half the time set by the Code. In this way one can be certain that a fuse is going to stand up at its rated load and will blow at the required overload.

The board is also used to test each fuse as to its soldered connection, the fuse being placed in the proper fuse block, and the switch closed for an instant only. The lamps on top of the board will show whether or not the fuse is good.



Front and End Elevations of Fuse-Testing Board, Third Avenue Railway

This manner of testing the fuses comes as near to actual service conditions as is possible because the fuse is subjected an instant to a load 50 per cent more than it is rated to carry instead of the common practice of testing the circuit through a set of lamps.

GEAR FITS

BY NORMAN LITCHFIELD, M.E.

The loosening of gears, while not one of the most serious features of railway motor operation, is nevertheless somewhat troublesome, and the more general use of specially treated gears is bringing up the question of proper methods and practices of holding gears on axles.

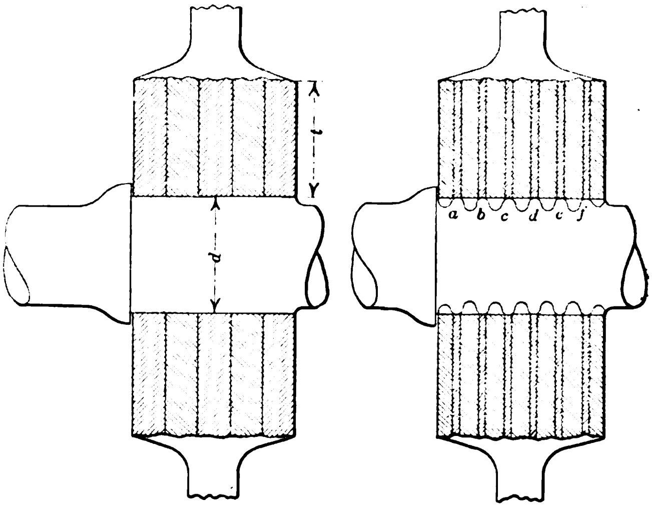
The earliest railway motors were provided with gears made in halves clamped together by bolts and further prevented from rotating by a key, the whole arrangement being similar to that used for holding pulleys on a line shaft. But the hammer blows set up with worn teeth soon proved far different from the gentle pull of a leather belt with its automatic slip feature, and the motor designers were forced to look for other methods.

Very naturally they turned for precedent toward the similar problem of holding car wheels on their axles, for which a standard method had been adopted in the operation of steam trains. This consisted of boring out the wheel slightly smaller than the diameter of the axle and then forcing the wheel on in a hydraulic press, a lubricant, usually white lead, being used on the axle surface during the operation. In addition, there were used keys which, if of rectangular section, were set in place in milled keyways before the pressing operation. If keys of circular section were used, they were forced into a hole drilled after the application of the wheel, half in the axle and half in the wheel hub. The advantage of the square key was that it could be driven out at the time of the wheel renewal, and the same keyway could be used in the axle over again, whereas for the circular key a new hole had to be drilled each time. The circular key, however, was more efficient as its application was independent of the pressing operation and therefore did not affect the reading of the pressure gage, a false pressure being often recorded when a rectangular key was used, owing to the wheel binding on the key.

With regard to both the allowance, or the difference between the diameter of the wheel bore and the axle, and the character of the machine work for the fit, there was some little divergence of opinion, some recommending a very smooth bore and fit, others a rough one, some demanding one pressure, some another. However, the preponderance of sentiment was in favor of a pressure equivalent to approximately 10 tons per inch of diameter of the axle and a fairly smooth class of machine work, the latter being favored. A high pressure-gage reading could, of course, be obtained with rough fits. In fact, unscrupulous workmen would sometimes attempt to cover up poor work by surreptitiously prick-punching or otherwise scoring the axle, the prick-punch marks naturally adding to the resistance of the wheel in its onward march on the axle, thus raising the pressure shown by the gage but obviously not providing a very reliable safeguard when the car rounded a curve at high speed. It is, of course, manifest that if punch marks were not desirable, neither were tool marks left by rough machine work.

So much for the practice which had become generally accepted. A complete analysis of the reasons underlying the failure of one method and the success of another is not within the scope of this article, but a few of them can be brought out for discussion. In studying the matter of press fits, it should first be inquired, "What is the force that holds the wheel to the axle?" It is, of course, the friction between the two surfaces set up by the radial pressure of the wheel on the axle, and this pressure in turn is caused by the resistance of the metal around the base of the wheel against being stretched to the same diameter as the axle. It is evident that the total amount of this radial pressure and the consequent friction will depend upon three things, namely, (1) the extent to which the metal in the hub is stretched in proportion to its original diameter, (2) the thickness of the metal in the hub, and (3) the width of the hub. This does not take into account the effect of different materials, and although this varies largely in different classes of wheels, the general result may be considered approximately constant in each group.

Then, referring to Fig. 1, we may consider the hub as made up of a number of rings each of thickness *t*, internal diameter *d* and unit width. The intensity of the strain in pounds per square inch in each ring will depend upon the amount it is stretched, and the total amount of the strain in each ring for a given stretch will increase as the thickness. It further follows that the greater the number of rings—that is to say, the wider the hub—the greater the total resistance to stretching and the greater the equivalent radial force. It is therefore clear that no mere set allowance of "10 tons per inch of diameter" can be expected to work out satisfactorily for all cases of pressed fitting, because the stretch allowance merely determines the tensile strain put on the metal and is of interest only because this strain must be kept within the elastic limit so that the material does not take a permanent set. It is an important factor, but not the only one, the other being the character of the finish.



Electric Ry. Journal

Figs. 1 and 2—Effective Areas Under Strain with Smooth and with Rough Machined Press Fits

Consider again the hub divided as before into sections, and examine Fig. 2, where each of the sections is shown in exaggerated form as resting on top of the series of ridges in the axle surface. In this case the unit divides itself into smaller sections, of which only the six, *A*, *B*, *C*, *D*, *E*, *F*, exert their radial grip on the surface of the axle. The shearing force exerted by the ridges may cause a high gage pressure, but when the ridges become pounded or ironed out by the heavy hammer blows of service the wheel loses its grip on the axle and works loose. When it is remembered that even with so large an axle as one of 7-in. diameter we are dealing with a stretch in diameter of only 0.007 in. it is evident that very slight tool marks will prove serious. An experience sometimes met with in applying a wheel a second time to an axle from which it had previously been removed is that it goes on at a higher pressure than it did the first time. What caused the increase?

It may be possible that some change has taken place in the structure of the metal, but it is very probable that in the pressing on and off of the wheel the roughnesses were ironed out to the extent that the actual working width of the hub was increased so that the friction increased accordingly. It therefore appears that in press fits the quality of the finish is of paramount importance, and that the smoother it is, the better.

After the question of the preparation comes that of the amount of tonnage necessary to hold the gear securely in place. Here again an allowance based solely on the diameter of the axle is inadequate, as the diameter of the axle is determined largely by the stresses induced in it by the combination of journal load and side thrust when rounding curves at high speed, the torsional stress from the motor being relatively small. What, then, justifies determining the force necessary to prevent a gear turning around an axle by a formula evolved to take care of vertical loads and side thrusts? With car wheels the usual allowance of 10 tons per inch of diameter is reasonable, as experience has shown that this allowance is one which does not over-stress the metal and yet provides, with the hub dimensions generally in use, sufficient margin of holding power to take care of the excessive and complicated forces induced by curving, braking, heating of the wheel, etc.

In a gear, however, the force is applied at the periphery and is without the complications existing in the case of the wheel. It seems proper, therefore, to determine the maximum force transmitted, either by considering the slipping point of the wheels or some other method, and then to fix a tonnage which will give a fair safety factor, say three. Taking a concrete instance of car with weight on each pair of drivers, including maximum passenger load, of 6.5 tons, assuming the slipping point to be 25 per cent and the diameters of wheel and axle to be 30 in. and $5\frac{1}{2}$ in. respectively, then the maximum force that can be applied to rotate the gear around the axle is

$$6.5 \times 0.25 \times 30 \div 5.5 = 8.68 \text{ tons.}$$

A pressure of 30 tons would therefore give a safety factor of 3.4 and should be ample if the work is properly done.

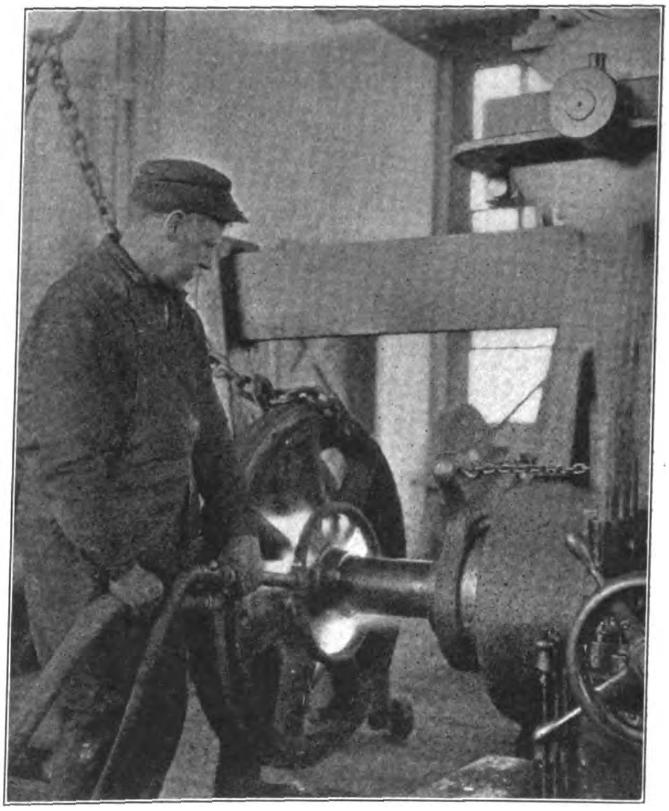
The above formula does not take into consideration the effect of sudden applications of force or shocks, this being considered as covered by the factor of safety, nor does it include the difference between the coefficient of friction of the spongy surface left by the tool after machining the fit and the coefficient of friction of the rolled surfaces of the rail and wheel tread. The effect of this, however, increases the factor of safety, as does also the fact that the tonnage of the pressed fit expresses friction of motion whereas the holding power, once the gear is in place, is friction of rest and is therefore greater.

SHRINK FITS VERSUS PRESS FITS

BY R. R. POTTER, SUPERINTENDENT OF EQUIPMENT NEW YORK, WESTCHESTER & BOSTON RAILWAY

On account of the severe conditions imposed upon car equipment on electric railways, the several parts require especial care, not only in the design but in the maintenance as well. Undoubtedly one of the vital points is the care of wheels and axles. Next in importance to the use of the proper material is the securing of the wheels and gears on the axles. The general practice on most roads appears to be to bore the various parts to such a diameter in relation to the axle that the desired pressure will be obtained when the wheel or gear is being pressed on to the axle in the wheel press. The other method, and that which has been followed on the equipment of the New York, Westchester & Boston Railway, is to bore the parts accurately to a certain diameter in relation to the axle, micrometers being used in measuring, and then to heat the part and place it on the axle without pressure. By this method there is no abrasion on the finished surfaces of the axle, wheel or gear due to the process of application. Also, as heat is applied to the part when it is removed, very little abrasion occurs due to the process of removal. In addition, the parts may be replaced in their original positions a number of times, without loss of holding power.

The axles, at the location of wheel seats, are carefully finished and filed as smooth as possible. Wheels and gears as well as tires are bored 0.001 in. smaller than the axle or wheel center per inch of diameter of bore, and then they are heated and slipped into place. After the wheels have been applied and have cooled, they are tested in the wheel press at a pressure of 10 tons per inch diameter of bore. The gears are heated at center with a home-made torch using compressed air and city gas but the rims are not allowed to go above 300 deg. Fahr., as measured with a thermometer set with the bulb in a special cup which fits between the gear teeth. It is found that this temperature invariably gives sufficient expansion to permit gears to be slipped on without any pressure. Wheels are heated with the same torch until a drop of water at the middle of the spoke will boil freely when dropped onto it. Wheels sometimes require a slight pressure in addition to the heating to move them into place, but this is negligible in comparison with those used in ordinary press fits.



Heat Method for Installing Wheels on Axles, New York, Westchester & Boston Railway

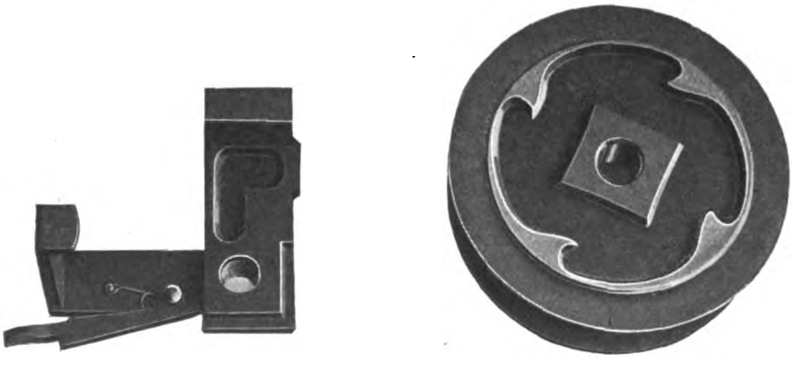
When wheels or gears are thus shrunk onto the axles, the microscopic points of metal are not smoothed down as they are when a wheel is pushed on cold, and the result is that these points interlock and make a very close and secure fit. In fact, the advantage of the shrinking system is shown by the fact that a wheel that is shrunk on will require many times more pressure for removal when cold than one that has been pushed on, the same tightness of fit having been allowed in each case.

Another material advantage derived from shrinking on wheels, especially on motor axles, is due to the fact that the wheel hubs should be very accurately spaced in order to have the proper end play for the motor. When wheels are applied without pressure, the distance between the motor bearing faces of the wheel hubs, or between flanges, is brought to very accurate dimensions. When wheels are pressed on it is generally difficult to stop the action of the press at just the right point, the result being that quite a variation has to be allowed between hubs or flanges, or else it is necessary to machine the parts after assembling.

The matter of end play of motors on the trucks of the Westchester cars has always received great consideration, and remarkable results have been obtained through having the bearing faces of the hubs accurately spaced and burnished with a roller similar to that used on the journal bearings. After two years' service the end play of the motors is unappreciable and no motor bearings have ever needed to be rebabbitted.

BALL-TYPE TROLLEY CATCHER

A new type of trolley catcher, embodying only eleven parts inclusive of 20 ft. of rope with chain and hook. has recently been brought out by the Q-P Signal Company, Needham Heights, Boston, Mass. This catcher operates as follows:



Parts of Catcher, Showing Reel Frame with Latch, Latch Spring and Vertical Ball Groove; Also Ball-Bearing Boss on Reel Hub

THE Q-P BALL TROLLEY CATCHER

Ball-Type Trolley Catcher Hanging on Rope

Should the wheel leave the wire, the tension spring of the base will cause it to rise rapidly toward a vertical position. This action unwinds the rope from the reel with sufficient speed to make a square boss on the hub of the reel throw a ball to the top of a groove, in which position the ball engages the next approaching projection on the reel, locking it against further unwinding and holding the pole in that position until released. To prevent the accidental release of the trolley rope after the locking mechanism has operated to catch the trolley, a downward pull on the rope of not less than 3 in. is required to release the locking ball. This requires no additional effort by the conductor, but releases with the first downward pull made on the rope to replace the wheel.

As no spring adjustment is required for the ball, the parts may be so proportioned that no adjustment is ever needed to make the device operate properly. The Q-P ball trolley catcher is so sensitive that it will stop its upward movement within 6 in. of the starting point. Notwithstanding this sensitiveness, the construction is very rugged.

As already indicated, this catcher has an original mechanism to prevent the accidental rise of the trolley pole into a dangerous position. The detail views show this feature as now described: The outer surface of the back of the winding reel has four inward projections, each of which passes in succession over a vertical groove in the supporting frame by the winding and unwinding of the trolley rope caused by the varying height of the trolley wire from the rails. This vertical groove is just deep enough to permit a steel ball to sink into it half way but without binding on the sides; the other half projects into a circular recess in the back of the winding reel and into which the four projections enter from the outer surface. The hub of the reel has a square boss surrounding its center upon which the ball rides when normally revolving with the varying height of the trolley wire.

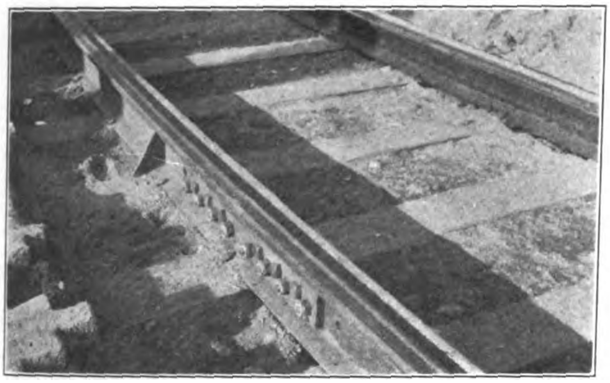
Brief reference may also be made to other qualities of this catcher. It cannot be carelessly dropped when removed from a car without first breaking the trolley rope. If purposely dropped from the dashboard, it will catch itself within 1 ft., no matter what its position may be in falling. The non-drop feature is especially valuable where the trolley has to be reversed frequently, because this not only saves the catcher from possible damage but reduces the labor of pole transfer to a minimum since the catcher may be removed from the dashboard and dropped where it will hang on the trolley rope, balanced by the trolley tension spring. In the latter position the pole may be transferred to the opposite end of the car with the least effort and without danger of having the catcher come into contact with the ground. The reel and frame are made entirely of heavy malleable iron and are practically unbreakable. The strongest trolley base spring will not damage the locking mechanism by violent jamming.

In order to impress the importance of the safety-first movement on the Detroit United lines, the two words "safety first" are being stenciled on all cars as they come from the paint shop. These words appear on both vestibules, inside and out, on the back and front dash and on the side of the car, besides the front and rear entrances. In addition to being painted on the cars, the words "safety first" are being stenciled on the tubular steel poles supporting the trolley at all street intersections, on telephone booths, tool boxes and wreck wagons.

A WELDED MECHANICAL JOINT

G. E. Pellissier, consulting engineer, Springfield, Mass., has recently patented an inexpensive joint for electric railway track, particularly in paved streets. In this joint the attempt has been made to combine the advantages of the mechanical joint with those of the welded joint, and at the same time to make it possible for the railways to install these joints with their regular track force and at a cost comparable with that of the ordinary fishplate joint and bond.

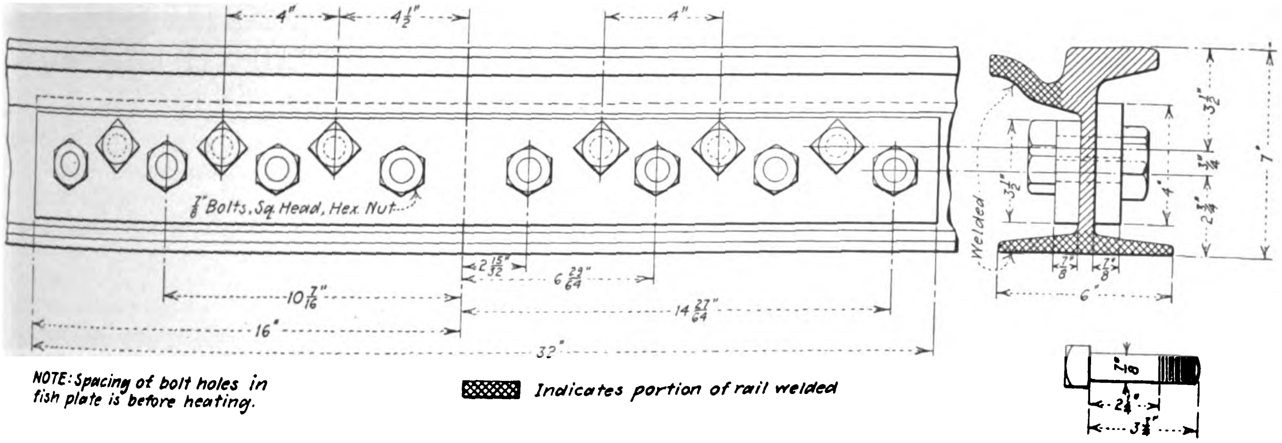
Experience has shown that the purely mechanical joint of moderate price fails, in part, to provide and maintain a continuous rolling surface, to resist all stresses due to temperature changes and to operation of rolling stock and to offer adequate conductivity for the return current. The new joint is designed to eliminate all of the foregoing objections, and the only question which remains is whether the results obtained under service conditions over a long period of years will be as satisfactory as those of other processes.



Joint of Shrunk-On and Welded Type in Place

Making a Joint by Means of Oxy-Acetylene Weld

As will be seen from the accompanying drawing, the mechanical feature of the joint is due to the use of plates which are bolted or riveted to the web of the rail. These plates provide for all tensile stresses. Then the oxy-acetylene torch or electric arc welding process is used to weld those portions of the rail which are not covered by the plate. On new grooved rail it has been found quite sufficient to weld the base and lip, but on old work and T-rail it is the intention also to weld the head.



NOTE: Spacing of bolt holes in fish plate is before heating.

▨ Indicates portion of rail welded

Combination Shrunk-On and Welded Joint as Installed at Holyoke, Mass.

The most interesting feature of this joint is the method of putting on the plates. Instead of making them engage with the head and base of the rail and allowing for expansion by means of slotted holes in the plates, these plates are simple bars of steel 4 in. wide and ⅞ in. thick and are shrunk on. In other words, the holes in the plate are drilled relatively nearer together than those in the web of the rail, and the plates are then heated by means of a suitable torch (buckeye burner or charcoal oven) to such a temperature that the holes in the plate register with those in the rail. The plates are then put in position and fastened either with drive fit bolts or hot-riveted. The welding operation follows while the plates are still hot.

The chief advantages asserted for the shrinking on of the plates are two—first, the pulling together of the heads of the rails at the joint eliminates even the slightest crack at that point and secures the benefit of the support of one rail head on the other through friction, not to mention the direct transmission of compressive stresses; second, practically all tensile stresses are taken off the welded section, the function of which is to provide for shear and electrical conductivity.

In designing the plates the drilling may be such as to correspond with standard rail drilling. Hence in case a joint proved defective through faulty workmanship, a pair of standard plates could be put on with no more cost or inconvenience than would be the case with any type of mechanical joint. The plates can be applied just as rapidly and easily as the ordinary fishplate and with no greater interference with the remainder of the work. A large company would do the welding with its own men, whereas a small one might find it cheaper to have this done by some local welding company.

These joints can be made in small quantities at a cost of about $6 each, divided about $3.50 for the plate and bolts and $2.50 for labor of attaching and welding. This figure may be materially reduced for companies which own welding outfits. Joints made by this method the past two years in Holyoke on about 2 miles of track have given perfect satisfaction on track under very heavy traffic and with temperatures varying from 16 deg. Fahr. below zero to 100 deg. above. These rails were not bonded. It is the intention of the owners of the patent to allow the companies to make these joints on a royalty basis, and information regarding this plan may be obtained by addressing Mr. Pellissier.

FIELD-CONTROL MOTORS AND UNIVERSAL TYPE CONTROL FOR CHICAGO ELEVATED RAILWAYS

The mechanical department of the Northwestern Elevated Railroad Company, Chicago, Ill., is now equipping twenty trail cars with a motor and control equipment of new design. The bodies of these trailers were built with the intention of changing them over to motor cars in the future; consequently, the addition of electrical equipment required only some modifications in the trucks and changes in the air-brake schedule to make them operative for motor instead of trail cars. The new motor and control equipment adopted for the change-over is of the Westinghouse No. 302-B-2 double-motor type with ALF-M control. The motor and control equipment represents the latest development in apparatus for elevated railroad service where mixed cars, equipped with motors and control of different manufacture, are to operate in the same train. Changes in the type of air-brake equipment also were necessary to make it member in with that used as the standard on the other Northwestern Elevated cars.

CONTROL EQUIPMENT

The control of these cars is Westinghouse automatic, line-current-actuated, field control arranged to operate in conjunction with the General Electric type M control on the same train. The field-control feature of this equipment is provided by unit switches. Of the fourteen unit switches, two act as line switches and four as field switches, and the latter also provide additional breaks in the circuit. Other switches are installed in connection with the various resistance steps and the transfers from series to parallel operation of the traction motors.

This type has the usual merits of a unit switch control but contains features of particular interest. The control equipment is comparatively simple despite the fact that it is arranged for automatic acceleration and also for operation in the same train with Type M control. The control apparatus is light in weight, yet all parts are amply large to permit ready inspection and maintenance. Each equipment includes the following apparatus:

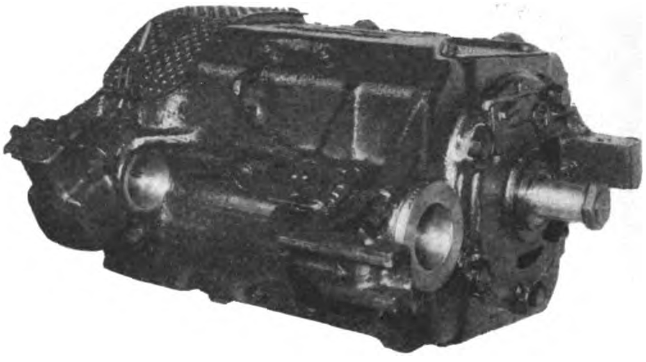
Two trolleys.
One main switch.
One main fuse.
One line switch.
One switch group.
One reverser.
One main cut-out switch.
One set grid resistors.
Two master controllers.
Two control cut-out switches.
Two trip and reset switches.
One set of relays.
One control cut-out.
One control resistor.
Three control junction boxes.
One set train line receptacles.
One train line jumper.

The unit switches and apparatus in general of this equipment are similar to those employed in Westinghouse HL unit switch control.

MOTORS

The field control, commutating-pole, box-frame type motor is shown in the accompanying illustration. It is rated 155 hp at 500 volts and 160 hp at 550 volts and weighs, complete with gear and gear case, 4800 lb. A special feature of this motor is the field control. Each main field coil is made up of two separate coils which are insulated from each other but held intact as a unit. Each coil does not have the same number of turns; therefore all of the four larger sections of the four field coils are connected in series, and the four smaller ones are also connected in series. Two field circuits are connected in series for acceleration, thus producing a strong field which results in high tractive effort. The field circuit containing the smaller number of turns—namely, the weaker field—is cut out of the circuit for running, giving a higher speed at any given current.

Some of the advantages of field control in this motor are as follows: The accelerating tractive effort is increased for any given current because there are more turns in the field coils, which gives a slower speed than with a motor not arranged for field control. When operating on a short field—namely, with the field that has fewer turns cut out of the circuit—the speed is increased for any given current since the number of field turns in series is reduced and the motors thus have weakened fields. Further, whenever field control railway motors are used, these equipments are very flexible, because a car equipped with field control motors may be used in either limited or local service without change of gear ratio, and at the same time a large saving in energy is effected by their use.


Field-Control Motor for Chicago Elevated Railways

PROPOSED ELECTRIFICATION OF LOS ANGELES & SAN DIEGO BEACH RAILWAY

The Railroad Commission of California has rendered a decision under which the Los Angeles & San Diego Beach Railway, San Diego, Cal., is to make application for extension of its franchise, agreeing, if the extension is granted, to apply for permission to issue bonds. The proceeds of the bonds shall be used to electrify the road and provide better service. The company now operates with steam trains and gasoline motor cars. The company stated that it had endeavored to obtain electric storage-battery cars to be used to replace the steam equipment and the gasoline motor-car equipment, but the matter was dropped for the reason that the manufacturers could not guarantee the operation of cars built to comply with the specifications insisted upon by the company. The estimated cost to electrify the road is approximately $300,000. The City Council of San Diego has been unwilling to grant the franchises desired unless electrification is promised. The commission took occasion to investigate as to the probable ability of the company to pay bond interest from the operation of the road on an amount sufficient to electrify. From the testimony introduced H. D. Loveland, the commissioner who wrote the decision, believes that operation would easily pay market interest on an issue of bonds sufficient to electrify.

LONDON LETTER

(From Our Regular Correspondent)

As a result of efforts on the part of the Liverpool Corporation to evolve a scheme to relieve the growing congestion on its tramways, especially on the Dale Street and Church Street routes, which lead to the Pierhead, Mr. Mallins has presented a report advocating the construction of a tunnel from the Old Haymarket to the Pierhead and continuation of the tunnel under the Mersey, between Liverpool and the Cheshire side, with branches to Birkenhead and Wallasey, for the accommodation of tramway and all other wheeled traffic. The estimated cost is £3,000,000, to be borne jointly by the various authorities on a ratable value basis. At present there are excellent ferry accommodations between the Pierhead and Birkenhead and other towns on the Cheshire coast, in addition to the Mersey Underground Railway. It is contended, however, that these are inadequate for the service and that the ferry, at least, only tends to congest the traffic in Liverpool. Mr. Mallins' report also considers the construction of a suspension bridge across the Mersey, but the width of the river is considered to be almost prohibitive. The cost of a bridge such as has been proposed would probably be between £5,000,000 and £6,000,000. The general opinion in Liverpool is in favor of the tunnel rather than the adoption of any temporary measures such as increasing the size of the cars. The various Cheshire ferries carry a total of 30,500,000 passengers annually. More than 15,800,000 passengers are transported by the Mersey Railway, while the ferry boats convey about 850,000 vehicles of all descriptions annually. Mr. Mallins estimates that his scheme would be self-supporting with a yearly traffic of 45,000,000 passengers at 1d. and about 1,000,000 vehicles at 6d.

The directors of the Lancashire & Yorkshire Railway have decided to electrify that portion of the system which runs from Manchester, via Prestwich, to Bury, a distance of 9½ miles. It is estimated that frequent service of trains will effect a saving of nearly 50 per cent in the traveling time of patrons over the tramway service. The trains are to be worked with direct current collected from a third-rail as on the Southport line, and not on the high-tension direct-current system with which the company is now experimenting on the branch line between Bury and Holcombe Brook. If the service between Manchester and Bury is a success, it is likely that the company will adopt electricity on other lines. The Bury-Holcombe Brook line will be the first electric railway out of Manchester.

The Stirling & Bridge of Allan Tramways has placed its new petrol tramcar in service on the Stirling to St. Ninians portion of the route. The new service is a decided improvement on the old horse tramcars, which serve other parts of the district.

Work is to be begun at once on the tunneling for the tube railway which is to be constructed by the post office to facilitate the handling of mail matter in London. The first section of the line for which powers were obtained at the last session of Parliament will be over a distance of 6¼ miles from Paddington to Whitechapel. The plan is to lay two tracks each of 2-ft. gage in a single tunnel of 9-ft. internal diameter, except in the vicinity of stations, where two approach tunnels will be provided each 7 ft. in diameter. At the stations there will be two tunnels each of 21-ft. 2½-in. internal diameter, provision being made for two tracks and a platform in each tunnel. At the Western Central District, the Mount Pleasant and the King Edward Building stations the tunnels will be 25-ft. internal diameter and provision will be made for three instead of two tracks. The trains will have no driver but will be operated automatically on the remote control principle. Control cabins will be provided at each station. The train will render each section dead after passing over it and leave it dead until the succeeding section has been traversed. By this arrangement there will always be a dead section between the trains. On approaching a station the train will pass over a short gap in the conductor rails, and the brakes will be applied automatically when the train motors cease to receive current. Thus if the wagon train is intended to stop at the station, it will be shunted to a section of rail which is normally "dead." A train which has been stopped at a station will be restarted by energizing the section on which it has come to rest.

The experiment of running trail cars on certain of the South London routes has proved so successful that the London County Council proposes to bring this method of transit into more general use. Application is being made to the Board of Trade for permission to run additional trail cars on the southern routes, and, pending the securing of the necessary consent from the government, estimates are being obtained for 150 trail cars and for the equipment of about 200 of the existing electric cars with couplers. The general purposes committee has recommended that the London County Council accept the suggestion of the select committee on motor traffic to create a new traffic branch of the Board of Trade, combining the present traffic duties of the Home Office, the Local Government Board and Board of Trade. This recommendation is made provided the new department "consists of a small number of specially qualified persons selected solely on the ground of their competence, and holding office for a considerable period." The report of the London Branch of the Board of Trade for 1913 appeared recently. It gives statistics of area and population, showing that the influence of the daily movement to and from London extends some 30 miles out, giving a total population of 8,471,146, spread over an area of 2,808 sq. miles. The total approximate number of passengers carried by railways, trams and buses in 1912 was 1,785,602,527, working out on an estimated population of 7,321,978 at 243.9 journeys per capita. The number of passengers in 1911 was 1,658,947,013, and the number of journeys per capita 228.8.

Negotiations are in progress for the purchase of the Gateshead & District Tramways, the Tynemouth & District Electric Traction Company and the Jarrow & District Electric Traction Company by the Northern General Transport Company, Ltd., which has been incorporated to develop transport business in the northern counties, including the carriage of passengers and goods, by motor vehicles, and to acquire undertakings carrying on such business. The Gateshead, the Tynemouth and the Jarrow companies operate tramways in the Tyneside district. The Gateshead company has purchased and is operating a number of motor vehicles in connection with its tramway system in the area adjacent to the Jarrow Company's tramways. The Tynemouth company has decided to acquire and operate a number of similar vehicles.

As the Hastings Tramways has had to abandon the surface contact system, which it has been operating for the past few years on the Front, and as it has failed in its endeavor to get permission to erect overhead wires along the Front, it is experimenting with petrol-driven cars. Trial runs have taken place and an inspection of these cars has recently been made by Major Pringle, Board of Trade inspector. The cars are of the same design in exterior as those now in use and similar in appearance.

The R. E. T. Construction Company, London, has placed at the disposal of the Brighton Corporation a double-deck trolley bus for experimental purposes. Numbers of single-deck trolley buses are in successful operation in various parts of the country, but this is the first double-deck vehcile of the kind. This trolley bus has not been accepted by the Brighton Corporation, but daily excursions are being made with it so as to give it a thorough trial. The bus has a 13-ft. wheelbase and is equipped with two 20-hp completely inclosed interpole motors. The two trolley standards are situated at the back of the vehicle. The present bus has accommodation for thirty-eight passengers, but this capacity can be extended at will. The trials are being made on a road with an extremely bad surface.

The locomotive engineers of the London & South-Western Railway, which is electrifying a considerable portion of its suburban tracks, are concerned about their prospects of employment. Delegates of the engineers have interviewed the directors of the company and are reported to have announced that the general manager and the chairman of directors have stated that the positions of the motormen cannot be guaranteed exclusively for the steam locomotive engineers. At a meeting of the men they urged their executive to use every means to secure the positions of engineers on the new electric trains for locomotive men.

A. C. S.

News of Electric Railways

Franchise Proposition at Toledo with Changing Fare to Provide Fixed Dividend Return on Fixed Valuation

The Toledo Railways & Light Company, Toledo, Ohio, through its president, F. R. Coates, submitted a proposition to the City Council of Toledo on Jan. 28, 1914, for the settlement of the franchise question on a plan similar to that in operation in Cleveland, except as to the dividends on the stock, which are to be 8 per cent instead of 6 per cent. The term of the franchise is fixed at twenty-five years and the city is to have the right to purchase the property at appraised value any time on six months' notice. The rate of fare is to be sufficient to return an income of 8 per cent on the valuation of the physical property at $7,000,000. A sliding scale of fares is proposed, the lowest being straight 3 cents with free transfers and the highest six tickets for 25 cents, with a 5-cent cash fare and universal transfers. The lowest of the four rates mentioned in the scale is to be tried first and if it produces the return needed it will remain in use. Otherwise the next higher rate is to be tried and experiments are to be made until a rate is reached that will yield an income necessary to pay the fixed dividend return of 8 per cent. Mr. Coates' letter containing the proposition follows:

"The Toledo Railways & Light Company desires to make a proposition to the city relative to an extension or renewal of the street railway grants of the company, and submits the following:

"(1) That it is for the great interest of the community that every person should be carried to his destination, within the city limits, at one fare, without extra charge for transfer, with an exception as shown below, by one company owning and operating all street railway lines in the city, subject to the regulation and under the control of the city.

"(2) That the street car riders, who really pay the cost of operation, should not be burdened in addition to the ordinary cost of transportation with any obligation such as street improvements, maintenance and cleaning of streets, bridge tolls, etc.

"(3) That the company is entitled to net earnings, from the operation of its street railway within the city limits, equivalent to 8 per cent per annum on the cost of reproduction of such street railway property.

"The company proposes the following conditions:

"(a) That the lowest rate of fares, within the present city limits, shall be five tickets for 15 cents, or a 5-cent cash fare, both with universal transfers. Our experience has shown that the public prefer to purchase five tickets for 15 cents rather than to pay a 3-cent cash fare, and this plan will save the public and the company much trouble.

"(b) A fare, within the present city limits, of five tickets for 15 cents, with 1-cent fare for transfer, or 5-cent cash fare with universal transfer.

"(c) A fare, within the present city limits, of seven tickets for 25 cents, or a 5-cent cash fare, both with universal transfer.

"(d) A fare, within the present city limits, of six tickets for 25 cents, or a 5-cent cash fare, both with universal transfer.

"(e) That the company, its successors and assigns, be granted the right, under the terms of this proposal, to operate its street railway for twenty-five years.

"(f) That the company will surrender all its present grants for the operation of street railways within the city limits.

"(g) That the valuation of the property used for street railway operation be fixed at $7,000,000, such street railway property to consist of tracks, cars, trolley wires and poles, carhouses and shops, but shall not include any power house, substation, underground conduit, feeders, park property, etc.

"(h) That if said valuation of $7,000,000 is not acceptable to the city, the grant shall contain a provision for determining the reproduction cost of such railway, to the effect that if the company and the city authorities do not agree upon such reproduction cost within ninety days from the time such grant goes into effect a board of appraisers shall be appointed to determine such reproduction cost, said board of appraisers to consist of one appraiser to be named by the city, one appraiser to be named by the company and the third to be John M. Killits, judge of the United States District Court; the appraisal in writing of this board, or any two of them, to be binding upon the city and upon the company as determining the amount on which the company shall be entitled to net earning at the rate of 8 per cent per annum.

"(i) That the city shall at all times have the right to inspect the books of the company. The items to be charged respectively to operation and to capital account shall be determined by standard systems now in use, subject to such modification as may be agreed upon from time to time by the city and the company.

"(j) That all net earnings of the company, derived from the operation of its street railways within the city limits, over and above an amount equal to 8 per cent per annum on $7,000,000 or on the valuation determined as above and such additional capital expenditures as may be made from time to time, as hereinafter provided, shall be held as a special fund to be used only as hereinafter provided, and when said fund shall reach the sum of $250,000 the company shall immediately put into effect the next lower rate of fare.

"(k) If at the expiration of three months the initial fare that is agreed upon shall not produce net earnings equal to 8 per cent per annum on the valuation and capital expenditures as above, then the next higher rate of fare shall become effective.

"(l) In the event that at any time any rate of fare (then in effect) shall not produce net earnings equal to 8 per cent per annum on the valuation and capital expenditures as above, the deficiency shall be taken by the company out of said special fund until such special fund shall have been reduced to $50,000, when the company shall then have the right to and may forthwith put into effect the next higher rate of fare which will produce net earnings equal to 8 per cent per annum on the valuation and capital expenditures as aforesaid, and such rate may be increased from time to time when and if necessary to produce the net earnings as above provided; provided, however, that such rate of fare shall not in any event exceed a 5-cent cash fare and six tickets for 25 cents with universal transfers.

"(m) That in and by the grant the company shall not be required to pay for bridge tolls, separation of grades at railroad intersections, paving or repaving of streets, street cleaning and sprinkling, licenses or other special taxes.

"(n) The city shall at all times have the right to regulate the character of the service; provided, however, that no regulation shall be such as to cause the net earnings of the company, with the maximum rate of fare in force allowed herein, to be reduced to an amount less than 8 per cent per annum on the valuation and capital expenditures as aforesaid.

"(o) That the city shall have the right at all times during the term of the grant, on six months' notice, to purchase the railway properties of the company as above defined, at the valuation as agreed upon or determined plus the capital expenditures as aforesaid.

"(p) That the company shall make such improvements and build such extensions, within the city limits, as may be required by the city, the cost thereof to be added to the valuation as herein provided; provided, however, that the company shall not be required to make such improvements or build such extensions within ten years of the expiration of the grant to operate its street railways or if thereby the net earnings of the company will, with the maximum rate of fare allowed for herein, be reduced to less than 8 per cent per annum on the valuation and capital expenditures as aforesaid.

"(q) That the company shall make such arrangements as to re-routing as the city may authorize, tending to better the service and decrease operating expenses.

"(r) The capital expenditures required, ordered, authorized or approved by the city shall be capitalized to the extent of 80 per cent of their cost, the balance of such cost to be charged to current operating expenses.

"(s) That the company and the city agree as to the price to be paid for electric power for the operation of the railways, and in event of the city and the company not being able to agree as to such price, the price shall be fixed by the above-mentioned board of appraisers, subject to adjustment at the end of each five years.

"(t) That if the city shall not within fifteen years from the taking effect of the grant exercise its option to purchase the railway, the city may renew the grant or make a new grant to the company for a period of twenty-five years on the same terms, which the company shall agree to accept. In event that the grant to the company to operate such railway shall, at any time, have less than ten years to run, the company shall thereafter have the right to charge, until such renewal or new grant is made, or until the termination of its grant, a 5-cent cash fare with universal transfers; provided, however, that during such time all net earnings of the company over and above the 8 per cent per annum of the valuation and capital expenditures aforesaid shall be held and used as a sinking fund for the retirement of the bonded indebtedness and capital of the company; and the city shall, if it elects to purchase thereafter, have the right to purchase the railway properties at the valuation and capital expenditures as above, less the amount in which the bonded indebtedness and capital of the company shall have been reduced through the operation of such sinking fund.

"(u) That the Mayor of the city of Toledo, or such other representative of the city as may be provided by the grant, shall at all times be a member of the board of directors of the company owning and operating the street railways under the grant."

The following letter, signed by Mr. Coates, accompanied the proposal of the company:

"On Jan. 14, 1914, I was called before the committee on railways and telegraph of the Council in reference to the franchise question as it related to the street railway system. At that meeting it was agreed to have a conference or conferences immediately to decide on a policy for settling the franchise controversy.

"As no further action has been taken to date regarding this meeting, we desire to call attention to certain facts taken from the report of the city's accountants, Nau, Rusk & Swearingen, of the operation of the street railway system in 1912, as follows:

(a) Earnings per passenger (in cents) in 1912	3.13
(b) Cost per passenger of operation, maintenance and taxes in 1912	2.82
(c) The above figure is made up of—	
1. Cost per passenger for taxes	0.18
2. Cost per passenger for maintenance	0.82
3. Cost per passenger for operation	1.82
4. Cost per passenger total as shown in item (b)	2.82

"These figures do not include any interest on investment.

"Examining the different items that make up the cost per passenger to see what item or items can be reduced, we have the following:

"(c-1) Taxes neither city nor company can control, as they are fixed.

"(c-2) Maintenance depends on whether or not it is the desire to keep the property in such condition as to give good service.

"(c-3) The major portion of this item is wages. To reduce it materially would necessitate either taking off equipment or decreasing wages. Service would be impaired by decreasing the equipment. This should not be done. As to decreasing wages, we will not do that.

"Valuation experts who have been working on our property for the past several months made their report as of Jan. 1, 1914, advising that the physical value of the street railway property of the Toledo Railways & Light Company is $7,000,000 exclusive of intangible values.

"It has always been our desire to see the street railway franchise question settled. We therefore submit with this letter a proposition which, upon examination, you will find gives opportunity for 3-cent fares and also provides for municipal ownership by the city whenever it may be expedient to take over the street railway property.

"We are ready at any time to take up this question with you, with the idea of settling this long-standing controversy. Our books are open to your inspection, as well as our valuation report if it will be of any service to you. In conclusion, if such a proposition is incorporated into a franchise ordinance we will be willing immediately upon its passage and acceptance to commence the operation at such rate of fare as may at that time be in operation in the city of Cleveland."

City Solicitor Thurston asserts that neither this proposition nor any other will be considered until the company withdraws its suit for a receiver.

Status of Chicago's Proposed Initial and Comprehensive Subway Systems

Under the law of Illinois it was necessary that the signatures of 25 per cent of the registered voters should be attached to petitions for the initial and the comprehensive subway systems which it is proposed to submit to the voters of Chicago at the aldermanic election on April 7, 1914. These petitions must be filed sixty days prior to the election, and the local transportation committee of the Chicago City Council requested that all petitions be turned in to its secretary by Feb. 3. The election board decided that the registered voters signing petitions prior to registration day, Feb. 3, 1914, must have been legal voters at the last date of registration. This decision eliminates the women voters from signing the petition, but it is assumed that it gives them a right to sign additional petitions which may be filed on Feb. 7, on which date the registration is revised. Both the initial and the comprehensive subway system petitions have received a sufficient number of signatures. One hundred and ten thousand names were required and approximately 170,000 names have been attached to each petition.

Serious Interruption of Ontario Hydro-Electric Service

The electric service of the Hydro-Electric Power Commission of Ontario throughout the Niagara district, extending from Niagara Falls, Ont., to Toronto on the north and to London and St. Thomas on the west, approximately 420 miles of high-tension and 20,000 miles of low-tension lines, was interrupted for nearly eight hours on Jan. 31. At about 6 o'clock in the evening a local hurricane swept across the transmission line between Niagara Falls and Dundas in a straight, narrow streak at right angles to the line. The wires were heavily incased in ice owing to a prevailing sleet storm, and thus were also taut and brittle. When the gale struck them two wires snapped and were blown across the others, short-circuiting the line and throwing every city and town in the Municipal Electrical Association's Niagara zone into darkness until nearly 2 a. m. on Feb. 1. The greater part of the delay in restoring service was taken up in locating the break, which when finally found involved the stringing of a considerable length of new wire.

The streets of Toronto are lighted exclusively from the Hydro-Electric system, and many thousand homes are also supplied from that system. The interruption, coming on the busiest night of the week, caused great inconvenience. The service of the Toronto Electric Light Company, Ltd., however, was not interrupted, nor were the street railways of Toronto affected, both being supplied with energy from Niagara Falls by the Toronto Power Company, and having auxiliary steam equipment in Toronto. The civic car lines, of course, were put completely out of business, and residents of the St. Clair, Danforth and Gerrard districts had to walk home through snowdrifts. The street railway in London was kept going from the company's steam plant. The London & Lake Erie Radial Railway, however, was completely demoralized, and passengers from stalled cars were eventually transported to their destinations by buses sent out for them in the middle of the night.

Commenting on the mishap, Adam Beck, chairman of the Hydro-Electric Power Commission, said on Feb. 1 that a second line has been surveyed between Dundas and Niagara Falls, which is 6 miles shorter than the present one. This will be constructed at once.

Elevated Extensions and Third-Tracking in New York

The Public Service Commission for the First District of New York has received the necessary consents, obtained by the New York Municipal Railway Corporation, for the construction of the third-track on the Fulton Street elevated railroad in Brooklyn. The commission has authorized that company to award the contract for the construction of the Liberty Avenue extension of the Fulton Street elevated railroad to the Phoenix Bridge Company, the lowest bidder, for $707,661. This extension runs from the present terminus of the line, at the Brooklyn-Queens boundary, along Liberty Avenue to Lefferts Avenue, Jamaica.

Bids for the supply of track materials for the equipment of the Fourth Avenue subway, in Brooklyn, from the Manhattan Bridge to Eighty-sixth Street and Fourth Avenue will be opened by the Public Service Commission for the First District on Feb. 24. This is the first track materials called for by the commission under the dual system contracts, and is the first time that the city of New York has ever appeared directly in the market as a buyer of steel rails, etc., for subway use. Heretofore the contractor doing the work of equipping a subway has been allowed to purchase the materials to be used. In view of the large amount of such materials to be used in the dual system, the commission decided to purchase direct. The materials needed for the Fourth Avenue subway will include 45,850 cu. yd. of ballast, 6820 cu. yd. of concrete, more than 2,000 railroad ties, more than 4000 tons of steel rails, and quantities of spikes, tie plates bolts, nuts, etc.. The main points of the specifications are published on page 317 of this issue.

According to a count made by the operating companies and reported to the Public Service Commission, the Williamsburg Bridge is now carrying more passengers than the Brooklyn Bridge. The count was made for one continuous period of twenty-four hours in November, 1913, of the traffic moving in both directions. The result showed that the Williamsburg Bridge during that period carried 313,347 passengers and the Brooklyn Bridge 306,845. The Queensboro Bridge total was 78,980, and the Manhattan Bridge 43,820. The total of all bridges was 742,992, an increase of 12.6 per cent of the total for 1912, which was 659,591.

The Public Service Commission has decided to change the new Broadway subway express station, planned for Seventh Avenue and Forty-eighth Street, to Broadway, just south of Forty-second Street.

Annual Meeting of Cleveland Railway

Only the principal figures in the report of J. J. Stanley, president of the Cleveland (Ohio) Railway, read at the annual meeting of the company on Jan. 29, have been made public. The complete report is in the hands of the printer. The local papers at Cleveland have made capital of the statement that the overdraft of $217,444 in the maintenance fund will be deducted from the interest fund on March 1, leaving only $126,218. This, of course, would reduce the fund below the franchise limit of $300,000, and the fare would be increased automatically. In that case the charge of 1 cent each for transfers would be restored. Mr. Stanley said there can be no question as to the meaning of the maintenance allowance provision of the Tayler ordinance or the decision of the board of arbitration rendered some time ago. He said the maintenance allowance has not been large enough to take care of the ordinary wear and tear, without considering the abandonment of worn-out power plants and other equipment. The city should increase the allowance sufficiently to take care of these things. Mr. Stanley says that so long as the dividends on stock are paid and the expenses provided for the city must work out how the funds shall be applied. The physical property can not be rehabilitated, however, until the $1,080,624 allowed for abandoned plants and equipment is charged off. This, the officials say, should not be carried on the books. Peter Witt, street railway commissioner, sent to the City Council recently an ordinance granting the company the right to build a cross-town line on East Thirtieth Street, between St. Clair and Woodland Avenues. This would serve a densely populated section of the city and take some of the traffic from the East Fifty-fifth Street line, but it would not result in much new business.

Iowa Road to Be Electrified.—The line of the Southern Iowa Traction Company, operating 25 miles of standard gage steam railway, is to be equipped with electricity by the Centerville Light & Traction Company, Centerville, Ia., by which it has been taken over.

Power from City Plant for "Owl" Cars.—The city authorities of Jacksonville, Fla., and the officers of the Jacksonville Traction Company have entered into a tentative agreement by which the company will be supplied with power from the city's plant for the operation of its "owl" car service between 11 p. m. and 5 a. m.

Commission's Rate-Making Power Upheld.—That the West Virginia Public Service Commission has power to regulate rates of public service corporations and that the commission's orders in such cases are not reviewable by the courts so long as they are within the constitutional and statutory limitations is the decision of the Supreme Court of Appeals in the case of the United Fuel Gas Company vs. the Public Service Commission.

New Officers of the Colorado Association.—The new officers of the Colorado Electric Light, Power & Railway Association follow: President, W. C. Sterne, vice-president and general manager of the Summit County Power Company, Denver, Col.; vice-president, W. F. Raber, general manager of the Arkansas Valley Railway, Light & Power Company, Pueblo, Col.; secretary-treasurer, Thomas F. Kennedy, of the Denver Gas & Electric Light Company, Denver, Col.

Uniform Accounting for Missouri Public Utilities.—The Missouri Public Service Commission has ordered every corporation in the State under its jurisdiction to adopt a uniform system of accounting, to be prescribed by the commission. It is understood that the public service corporations will be classified and systems adopted to meet the requirements of each group. Each public utility will be required to supply the commission with an annual report of its business and its officers, unless it objects to giving such intimate knowledge. In this case a test case will be brought to determine the power of the commission to require such data.

Chicago's Terminal Electrification Ordinance Temporarily Delayed.—The terminal committee of the Chicago City Council, after hearing the arguments of representatives of the trainmen employed in Chicago's steam road terminals, decided to delay the question of electrification until the report of the Chicago Association of Commerce has been presented. This move indefinitely postpones the proposed electrification of Chicago's steam road terminals. The smoke abatement and electrification committee of the Association of Commerce has been at work for several years on this subject, and in the annual report for 1913 was unable to state just how soon the final report of the committee would be submitted to the association.

Commission Activity in North Carolina.—The North Carolina State Corporation Commission has begun active effort to bring all electric light, gas, water and power companies under direct supervision of the State. The commission has issued a call to all such companies other than those municipally owned to file within thirty days complete schedules of their rates and charges for each class of service, together with any schedules of discounts for quantity of service or prompt payment. All these companies will be called upon at the close of each calendar year to make reports covering their operations and showing capital stock, bonded indebtedness, gross receipts from sale of service, operating expenses, salaries of officers and dividends, surplus or profits.

Inquiry Proposed Into Earnings of Topeka Companies.—A committee of Topeka (Kan.) residents recently applied to Mayor R. L. Cofran for an investigation of the books of the Topeka Street Railway and the Topeka Edison Company, the latter operating the lighting plant. The question arose over a provision in the franchise of the Topeka Street Railway which provides that the company "shall annually pay into the city treasury of the city of Topeka 10 per cent of its annual net earnings over and above 10 per cent earned by said railway on its investment." The earnings of the street railway have not been sufficient since receiving the franchise to leave anything over for the city. The report made by the street railway to the State Public Utilities Commission in June, 1912, shows the cost of the road to be $2,-

790,603, representing actual investment of funds. The paid-up capitalization is $1,250,000, according to the report, with a bonded debt of $1,190,000. Operating expenses for the year were $199,858. The year's revenue was $441,202.

Chicago Surface Lines Begin Unified Operation.—Operation of the Chicago surface railways was commenced on Feb. 1, 1914, in accordance with the terms of the ordinance authorizing the unification of the Chicago City Railway and the Chicago Railways as the Chicago Surface Lines. In accordance with the terms of this ordinance the through routing of lines in addition to those authorized under the 1907 ordinance also became effective. All lines in the city will be through routed as fast as the Board of Supervising Engineers, Chicago Traction, determines to what extent service balances, and what through routes are desired. Probably one of the most important changes effected under the unified operation was the elimination of twenty-two different forms of transfers formerly used by the three surface railways and the substitution of four forms, two for north and south travel and two for east and west travel, similar to the transfers used by the Chicago City Railway. The slips are printed in four different colors, each color indicating travel in a fixed direction.

Modification of Los Angeles Rail Ordinance.—The Board of Public Utilities of Los Angeles, Cal., has approved the proposed revised girder rail ordinance which has been under consideration by the Council for several months. In addition the board has approved two amendments suggested by C. K. Mohler, railway engineer, and the Council will be asked to incorporate the amendments in the proposed ordinance. One amendment provides that in cases of dispute between the Board of Public Works and any person, firm or corporation performing work under the requirements of the ordinance the Board of Public Utilities shall act as arbiter on the question involved. The decision of the Utilities Board shall be binding on both. The second amendment suggested is that the rail to be laid in general shall not be less than 60 ft. long, and that the joints shall be laid even or opposite on all straight track and as nearly opposite as may be without cutting the rails on all light curves. The work of bonding and making ground return connections shall be done under the direction of the Board of Public Works.

Kansas City Union Depot Operating Plan Rejected.—Plans of the Metropolitan Street Railway, Kansas City, Mo., by which the new union depot would be served by it, were rejected by the board of public works because of the fact that the company does not possess a franchise on Twenty-third Street. A. E. Harvey, chief engineer of the company, presented the plans, which called for the use of Grand Avenue, Main Street, Twenty-fourth Street and Twenty-third Street. Members of the board expressed themselves as willing to permit the company to use Twenty-fourth Street from Main Street to Grand Avenue and Main Street from Twentieth to Twenty-fourth Street. Mr. Harvey stated that he would present new plans excluding Twenty-third Street, and the board concurred with this proposition. An interesting point was brought up when the board held that the company must secure the consent of the board, as well as a permit, in order to do construction work on streets on which it held franchises. The mere possession of a franchise, according to the board, does not entitle the road to proceed as it deems best in laying track.

Seattle Accepts Lake Burien Line.—The Highland Park & Lake Burien Railway, which runs for a distance of 9 miles south of the city limits, has been accepted by the City Council of Seattle, Wash., as an unencumbered gift to the city. A. L. Valentine, superintendent of public utilities, estimates that it will cost about $40,000 to equip the line for operation and that $100,000 will be required to extend the line to Fourth Avenue South and Jackson Street to connect with the Seattle, Renton & Southern Railway, which the city plans to acquire and connect with the present municipal line to Ballard. The rehabilitation of the Highland Park & Lake Burien Railway will be considered by the City Council the first week in March. The question of extending the present line operated by the city will be considered at the same time. The plans for the latter work were completed some time ago by A. H. Dimock, city engineer, and call for an expenditure of about $2,000,000. The William Pitt Trimble plan for the construction of both elevated and subway lines in connection with the present surface line of the city will also be taken up by the Council in March.

Duplication of Valuation Work in Portland.—Although the State Railroad Commission has had ten men at work for the last six months on an appraisal of the property of the Portland Railway, Light & Power Company, Portland, Ore., the city commission, by the terms of an ordinance now pending, proposes to obtain additional information on the same subject and present it to the State commission for consideration in its efforts to determine reasonable rates for light, power and transportation services furnished by the company. While the two inventories will cover, to a great extent, the same ground, Will H. Daly, city commissioner of public utilities, says that the additional survey is necessary to procure a proper appraisal from the standpoint of the municipality. The State commission has virtually completed the most difficult part of its work. It has verified the existence of the property that the company previously listed in its own survey. The State's crew is now working on the depreciation survey and next will take up a survey of the unit cost of the various items of property. The company owns approximately $8,000,000 of real estate in various parts of the city and State, segregated into two classes—that actually needed for operation of the business and that held for investment.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

KENTUCKY

The Kentucky Railroad Commission in its annual report urges the adoption of a law which will enable it to extend its authority to electric railways and other transportation companies over which at present it exercises no control. The report shows that during 1913 three trespassers were killed by interurban lines, but that not a passenger was killed on an interurban electric road.

NEW YORK

The Governor has approved the bill which provides that "the time within which the railroads specified in the certificate of incorporation of the Electric City Railroad may be finished and put in operation is hereby extended for two years from Jan. 29, 1914."

The Public Service Commission of the First District of New York has sent to the Legislature the draft of a bill to amend the rapid transit act so as to allow the installation of public telephone booths in the new subways. The rapid transit act, as it stands now, prohibits the business or sale of any commodity except newspapers and periodicals. The proposed amendment authorizes the commission to make contracts for the installation, maintenance and operation of a public telephone system on all the new rapid transit lines.

The Senate on Feb. 3 passed again the workmen's compensation bill in precisely the form in which it was enacted and approved by Governor Glynn last December. The reenactment of the bill is for the purpose of forestalling the anticipated attack on the constitutionality of the law in the courts, owing to the fact that the measure was originally enacted before the constitutional amendment authorizing a compulsory workmen's compensation plan had gone into effect.

The State Conservation Commission has prepared three hydroelectric bills. The measures are the first of a series the commission is projecting with a view to state-wide development of hydroelectric power.

Pending a local referendum the Assembly committee on internal affairs has tabled until March 18 further consideration of the bill providing for the repeal of the law prohibiting the laying of electric railway tracks on the Albany Post Road in Westchester County. This bill was introduced by Assemblyman Walter W. Law, Jr., of Briarcliff Manor. The Burns law excluding the electric railways from the Post Road was passed in 1896. Early in January Mr. Law sent to the presidents of the five villages which are affected a letter requesting them to submit the question to a referendum vote. Tarrytown and North Tarrytown will submit the question to the voters and non-resident property owners on March 17.

A resolution has been introduced in the Assembly by the member from the Nineteenth district of Kings providing for an investigation of the activities and personnel of the Public Service Commission of the First District of New York by a joint committee of the Legislature.

OHIO

The Mills bill now pending in the Ohio Legislature has taken much of the time and attention of Mayor Baker of Cleveland recently, because it provides a means of acquiring the street railway system by that municipality. The bill makes bonds issued for the acquirement of such property a direct lien on the property, but in addition it places the entire credit of the municipality behind the bonds. A plan to amend the bill by making bonds a lien only on the property acquired is opposed by Mayor Baker. Cincinnati municipal officials oppose the bill as it stands.

In a letter to the state budget commissioner, the State Public Utilities Commission of Ohio states that two demands for physical valuation of utilities have been made, one for a valuation of the Cleveland Telephone Company and the other for the Cincinnati Traction Company. The letter adds that if these two reports are to be compiled, funds must be provided for the purpose. John Cowan, chairman of the House finance committee preparing the 1914 appropriation bill, states that no appropriation has been made to cover the cost of either valuation, nor will any be made.

Representative Walter J. Agler of Stark County has announced that the proposed bill giving county commissioners the right to annul the franchise of the Northern Ohio Traction & Light Company between Canton and Massillon has been abandoned.

PROGRAMS OF ASSOCIATION MEETINGS

American Society of Mechanical Engineers

Important improvements in the braking of heavy passenger cars will be described in a paper to be read before the American Society of Mechanical Engineers at the Engineering Building, in New York, on Feb. 10, at 8.15 p. m., by S. W. Dudley, Pittsburgh. These tests were conducted jointly by the Pennsylvania Railroad and the Westinghouse Air Brake Company.

Central Electric Railway Association

As stated in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, the annual meeting of the Central Electric Railway Association will be held at the Hollenden Hotel, Cleveland, Ohio, on Feb. 26 and 27, 1914. The address of welcome will be delivered by Newton D. Baker, Mayor of Cleveland, on Feb. 26, at 9 a. m. At the session on Feb. 26 the committee report "The Joint Weight and Inspection Bureau" will be opened for discussion by J. H. Crall, general freight and passenger agent of the Terre Haute, Indianapolis & Eastern Traction Company, for the committee. The committee report "The Claim Index Bureau" will be opened for discussion by William Tichenor, claim agent of the Terre Haute, Indianapolis & Eastern Traction Company, chairman of the personal injury claims committee. In addition the following papers will be presented on Feb. 26:

Paper, "Repairs and Welds of Track and Rolling Stock by Electricity," by E. G. Price, vice-president and secretary of the Indianapolis Switch & Frog Company, Springfield, Ohio.

Paper, "Track Construction and Maintenance," by L. A. Mitchell, superintendent of track and roadway of the Union Traction Company of Indiana, Anderson, Ind.

At the session of the association on Feb. 27 the following papers will be presented:

Paper, "Taxation," by Peter Witt, city street railway commissioner of Cleveland, Ohio.

Paper, "Railway Motors," by J. F. Layng, railway engineer of the General Electric Company, Schenectady, N. Y.

At this session on Feb. 27 the annual report of the secretary-treasurer and the annual address of the president will be presented. Officers will also be elected. The new executive committee will meet immediately after the adjournment of the association.

Financial and Corporate

Stock and Money Markets

Feb. 4, 1914.

In the early trading on the New York Stock Exchange to-day considerable strength was displayed among the industrial specialties and among some of the standard issues, but stocks were in plentiful supply. Later in the day the market receded, with a net loss in the general average of quotations. The bond market was particularly strong. Rates in the money market to-day were: Call, 1¾@2 per cent; sixty days, 2¾@3¼ per cent; four months, 3@3¼ per cent; six months, 3¼@3¾ per cent.

In the Philadelphia market to-day the local transit issues were weak. Philadelphia Rapid Transit recovered to 18¼ on light trading, and Lehigh Valley Transit preferred changed hands at 27⅛ and at 34.

The Chicago market was broad to-day and the demand for stocks was good. The sales of Chicago Surface Lines bonds alone totaled $46,000, par value.

The Boston market was unusually broad to-day. Profits were taken, but the market absorbed the selling.

The stock market in Baltimore was broad to-day, but the volume of transactions was small.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 28	Feb. 4
American Brake Shoe & Foundry (com.)	93	95
American Brake Shoe & Foundry (pref.)	139	142
American Cities Company (com.)	36	36
American Cities Company (pref.)	68	65¾
American Light & Traction Company (com.)	350	350
American Light & Traction Company (pref.)	106	106
American Railways Company	39⅜	38⅝
Aurora, Elgin & Chicago Railroad (com.)	81½	80
Aurora, Elgin & Chicago Railroad (pref.)	*80	104¾
Boston Elevated Railway	84½	84
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	39	39
Brooklyn Rapid Transit Company	91	91⅝
Capital Traction Company, Washington	112	112
Chicago City Railway	160	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	70	65
Chicago Railways, ptcptg., ctf. 1	92½	92
Chicago Railways, ptcptg., ctf. 2	33	33⅜
Chicago Railways, ptcptg., ctf. 3	7⅞	8
Chicago Railways, ptcptg., ctf. 4	2¼	3
Cincinnati Street Railway	107½	107
Cleveland Railway	105⅛	105⅛
Cleveland, Southwestern & Columbus Ry. (com.)	*5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	*26
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	75	75
Columbus Railway (pref.)	90	82½
Denver & Northern Railway	70	*70
Detroit United Railways	71	71
General Electric Company	147	148
Georgia Railway & Electric Company (com.)	120⅞	119
Georgia Railway & Electric Company (pref.)	83½	84¾
Interborough Metropolitan Company (com.)	15⅝	15¾
Interborough Metropolitan Company (pref.)	61½	61½
International Traction Company (com.)	*3	*3
International Traction Company (pref.)	*90	*90
Kansas City Railway & Light Company (com.)	*15	15
Kansas City Railway & Light Company (pref.)	*30	30
Lake Shore Electric Railway (com.)	*6	6
Lake Shore Electric Railway (1st pref.)	*92	92
Lake Shore Electric Railway (2d pref.)	*24	24
Manhattan Railway	132	131
Massachusetts Electric Companies (com.)	12½	12
Massachusetts Electric Companies (pref.)	65	63
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	24¾	24¾
North American Company	72	72
Northern Ohio Light & Traction Co. (com.)	62	62
Northern Ohio Light & Traction Co. (pref.)	98½	98¼
Philadelphia Company, Pittsburgh (com.)	41½	43¼
Philadelphia Company, Pittsburgh (pref.)	42½	42
Philadelphia Rapid Transit Company	18⅞	18½
Portland Railway, Light & Power Company	48	48
Public Service Corporation	107	109
Third Avenue Railway, New York	42¾	42½
Toledo Traction, Light & Power Co. (com.)	30	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	107	107
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	26¼	26
United Rys. Inv. Company (com.)	21½	22
United Rys. Inv. Company (pref.)	43	44¾
Virginia Railway & Power Company (com.)	52½	52½
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	89¾	90
Washington Ry. & Electric Company (pref.)	89¾	89¾
West End Street Railway, Boston (com.)	72½	73
West End Street Railway, Boston (pref.)	91	92
Westinghouse Elec. & Mfg. Company	70	71½
Westinghouse Elec. & Mfg. Co. (1st pref.)	116	119

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*Last sale.

ANNUAL REPORTS

Northern Ohio Traction & Light Company

The statement of income, profit and loss of the Northern Ohio Traction & Light Company, Akron, Ohio, for the year ended Dec. 31, 1913, as compared with the previous fiscal period, follows:

	1912	1913
Earnings:		
Passenger	$2,502,937	$2,686,606
Light and power	316,558	418,003
Car mileage	5,096	5,742
Freight, etc.	80,723	94,516
Parks	74,555	59,733
Interest and discount	5,688	8,072
Miscellaneous	10,479	11,865
Total earnings	$2,996,037	$3,284,537
Expenses:		
Maintenance way and structure	$233,696	$307,439
Maintenance equipment	243,431	304,612
Operation power plants	375,307	416,416
Conducting transportation	473,222	546,724
General	377,109	444,462
Total expenses	$1,702,765	$2,019,653
Net earnings	$1,293,271	$1,264,883
Interest	523,068	561,815
Net income—profit and loss	$770,203	$703,068
Profit and loss surplus—previous years	1,157,912	1,405,036
Profit and loss—gross surplus	$1,928,115	$2,108,104
Profit and loss charges:		
Dividends, preferred stock	$49,929	$152,738
Dividends, common stock	382,501	450,000
Depreciation	....	100,000
Refinancing costs, including discount on bonds	....	167,724
Extraordinary expenses of flood, etc.	....	59,639
Reconstruction and replacement expenses	....	109,602
Taxes and expenses applicable to prior years	90,649	27,076
Total	$523,079	$1,066,779
Profit and loss surplus—end of year	$1,405,036	$1,041,325

The gross revenue for the year ended Dec. 31, 1913, was $3,284,537, as compared with $2,996,037 for 1912, an increase of 9.6 per cent. The average mileage in operation increased from 216.47 to 233.22 and the gross earnings per mile from $12,378 to $12,291. The net earnings per mile decreased from $5,153 to $4,457, and the operating ratio rose from 56.83 per cent to 61.49 per cent. The total expenditure during the year for additions and improvements amounted to $1,811,155.

H. A. Everett, president of the company, says in part:

"The mileage of the system has been increased 16.75 miles, as follows: New double-track high-speed line on private right-of-way known as the Northfield cut-off, tracks at the new carhouses and shops in South Akron, and substitution of double for single track in Akron and Massillon, making the total mileage 233.22 miles. The Northfield cut-off right-of-way averages 75 ft. in width. The track construction consists of 80-lb. T-rails with oak ties, ballasted with cinders. The overhead line is of catenary type with towers. A maximum grade of four-tenths of 1 per cent, with practically no curves, materially reduces the running time. An addition of thirty-five passenger cars has been made to the service, ten interurban coaches, fifteen semi-convertible cars and ten convertible cars for city use. Equipment has been provided on the interurban cars of the company for the control of trains, which are now in successful operation. Three electric motor trucks for use in extensions and maintenance of lines were purchased.

"Modern carhouses and shops in South Akron were completed and placed in operation in September. The South Main Street shop was then permanently closed. The new carhouses will meet storage requirements for some time.

"The Gorge power station completed during the year gradually assumed the load of the entire Northern division, and the Beech Street, Silver Lake Junction and Bedford power stations were permanently closed. Until this was fully accomplished there was necessarily a duplication of expense. The more economical production of power is now apparent and the hydroelectric plant of the Gorge development placed in service on Jan. 6, 1914, will make for further economy.

"In the commercial division 2600 new consumers of light and power have been added during the year, the power installations representing a total of 8400 hp. Under contracts already secured large additions will be made to these figures early during the current year. A majority of the large Akron rubber factories have entered into contracts for power service.

"Incident to the changing of circuits to the three-phase system and transfer of lines from the old Beech Street station to No. 4 substation, 594½ miles of wire was installed and 2400 new poles set. In connection with required and necessary changes and extensions in Akron, 95,400 ft. of underground cables and 154,700 ft. of fiber conduit were installed.

"The past year brought severe burdens of unusual character. An unparalleled labor disturbance in Akron rubber factories occurred in February and continued for six weeks. The March flood caused considerable property loss and excessive operating charges in addition to the suspension of traffic for several days. On Nov. 9 a snowstorm caused a complete cessation of operation for nearly twenty-four hours, and created a heavy expense in clearing tracks and repairing overhead lines and electrical and car equipment.

"Employees during the year participated in the administering of the pension department, which to date has distributed a total of $15,566. In addition to $2,199 on hand Dec. 31, the pension fund owns 100 shares of the company's preferred stock. Seventeen employees have retired on pension since the inception of the department.

"Reorganization in the claim department has been made to include a vigorous and permanent work along safety lines, particularly among the car men. A marked interest on their part is a certain indication of productive results to be accomplished.

"The operation of interurban limited cars has become an established branch of the service, the volume of traffic increasing steadily. Gross earnings from this service for the year 1913 were $315,616."

Combined Stone & Webster Statement

The combined statement of the electric railway, electric lighting, gas and water power companies under the management of the Stone & Webster Management Association for the year ended Dec. 31, 1913, follows:

CAPITALIZATION	
Bonds and coupon notes outstanding	$86,512,100
Preferred stocks outstanding	38,092,100
Common stocks outstanding	61,911,200
Total	$186,515,400
EARNINGS AND EXPENSES	
Gross earnings	$26,688,521
Operating expenses and taxes	15,583,757
Net earnings	$11,104,764
Income from other sources	93,071
Balance	$11,197,835
Interest charges	4,432,105
Balance	$6,765,731
Bond sinking and mortgage improvement funds	570,390
Balance	$6,195,341
Dividends paid	4,184,476
Balance for reserves and depreciation	$2,010,863
Total disbursements for the year 1913, for interest on bonds and notes and for dividends	$8,616,582
Miles of track owned, measured as single track	1,299
Passengers carried (including transfers)	341,255,000
Total connected electric lighting load, equivalent to 16-cp lamps	2,414,820
Total commercial power load (hp)	179,880
Total combined power station capacity (hp)	289,640
Of which water power is (hp)	109,500
Total gas output (cu. ft.)	1,754,158,300

Tramways and Light Railways in the United Kingdom

According to a report recently presented to the House of Commons, the route length of tramways and light railways on the public roads open for traffic in the United Kingdom has increased from 269 miles to 2662 miles since 1878. The capital expenditure has increased from £4,207,350 to £79,359,758, the number of passengers carried from 146,000,000 to 3,220,000,000 and the net receipts from £230,956 to £5,558,121. For the calendar year ended March 31, 1913, the number of tramways and light railways belonging to local authorities was 171, having 1817 miles open for traffic and involving a total expenditure and capital account of £54,499,784. The number of tramways and light railways belonging to companies and private individuals for the year ended Dec. 31, 1912, was 115, having 844 miles open for traffic and involving a capital expenditure of £24,859,974. Of the total route mileage of 2661 miles represented by these companies, the amount worked by electric traction was 2518, the balance of 4.4 per cent being operated by steam, cable, horse, petrol and gas motor lines. The total number of passengers carried increased from 3,127,318,732 in 1911-1912 to 3,219,857,293 in 1912-1913, and the number of car miles increased from 323,354,389 in 1911-1912 to 334,777,515 in 1912-1913. The percentage of net receipts to total capital outlay decreased from 7.5 per cent in 1911-1912 to 7.04 per cent in 1912-1913, while the operating ratio increased from 60.6 per cent to 62.68 per cent. Passengers carried per car mile decreased from 9.67 per cent to 9.62 per cent, and the average receipts per passenger from 1.079d. to 1.065d. In the case of four local authorities and seven companies the returns for tramways showed an excess of working expenditure over gross receipts. Two trackless trolley systems were also included among the list of companies which showed a deficiency.

American Light & Traction Company, New York, N. Y.—For the year ended Dec. 31, 1913, the American Light & Traction Company earned 25.08 per cent on its common stock after paying all expenses and preferred dividends. Gross earnings from all sources aggregated $4,466,234, an increase of $209,373 over 1912. Expenses of administration of the holding company were $123,107, leaving net earnings applicable to dividends of $4,343,126. Total dividend disbursements were $3,536,507, leaving an accumulated surplus Jan. 1, 1914, of $9,495,832, an increase of $806,590 over the surplus of the previous year.

Binghamton (N. Y.) Railway.—The application of the Scranton & Binghamton Railway for permission to purchase the capital stock of the Binghamton Railway was to come before the Public Service Commission of the Second District of New York on Feb. 4, 1914. As noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, R. W. Day, general manager, and W. L. Connell, treasurer of the Scranton & Binghamton Railway, have been elected directors of the Binghamton Railway.

Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—The Birmingham-Tuscaloosa Railway & Utilities Company has sold $600,000 of 6 per cent three-year notes to bankers, the proceeds of which are to be used to electrify, equip and extend the present Tuscaloosa Belt Railway, now operating with steam; to erect a power generating station, and to complete an artificial gas system. With this work completed the company will have 18 miles of electric line and 14 miles of gas mains under its management.

Boston (Mass.) Elevated Railway.—A hearing was held on Jan. 21, 1914, before the Public Service Commission of Massachusetts for the approval of $600,000 of negotiable bonds, 7000 additional shares of capital stock at $50 a share and a $24,888 premium on an issue of bonds dated Feb. 13, 1913, of the West End Street Railway. The commission has taken the case under advisement. The request of the West End Street Railway Company to issue $2,000,000 of thirty-year bonds, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, has been approved by the Massachusetts Public Service Commission. The proceeds are to be used for refunding outstanding bonds of like amount coming due March 1, 1914.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—The stockholders of the British Columbia Electric Railway, Ltd., have authorized an increase in the capital stock of £400,000 to £5,000,000, in three classes. In addition there is authority to put out £280,000 previously granted, making the total new addition £680,000.

Centerville Light & Traction Company, Centerville, Ia.—W. A. Boland, president of the Southern Iowa Traction Company, with offices in New York, confirms the sale of the property of that company to the Centerville Light & Traction Company. The Southern Iowa Traction Company operates 25 miles of standard gage steam railroad, which it is proposed to electrify.

Chicago (Ill.) City Railway.—The Chicago Stock Exchange has listed an additional $250,000 of the first mortgage 5's of the Chicago City Railway, making a total of $28,950,000.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—At the annual meeting of the Cleveland, Southwestern & Columbus Railway the board was increased from fourteen to sixteen members, and E. W. Moore and Levi Meacham were elected to the new places. Other directors were re-elected, and F. H. Ginn was made first vice-president to succeed A. E. Atkins, deceased.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company recently filed notice of an increase in its capital stock from $1,000,000 to $11,550,000.

Columbus, Urbana & Western Railway, Columbus, Ohio.—On Jan. 29 Emery W. Lattanner, state superintendent of banks, sold the property of the Columbus, Urbana & Western Railway to J. T. Adams and G. W. Meeker, Columbus, for $38,000. It is said these gentlemen represent Columbus capitalists. The sale has been confirmed by Judge Kinkead. On the purchase $1,000 in cash was paid and the remainder is to be paid by Feb. 14. The property was listed among the assets of the defunct Columbus Savings & Trust Company. The total outstanding indebtedness of the company is about $400,000.

Commonwealth Power, Railway & Light Company, Saginaw, Mich.—The annual report of the Commonwealth Power, Railway & Light Company for the period ended Dec., 31, 1913, shows total gross earnings of $2,403,689, an increase of $1,101,228 over the previous year. Net income after all charges was $1,913,425, a gain of $744,375. The balance for the common stock, after $760,000 was paid on the preferred, was $1,153,425, an increase of $344,375.

Federal Utilities Company, New York, N. Y.—The board of directors of the Federal Utilities Company, Inc., on Feb. 5, declared the tenth and eleventh quarterly dividends of 1½ per cent each on the preferred stock, payable Feb. 28, 1914, to stockholders of record at the close of business Feb. 14, 1914.

Galveston-Houston Electric Company, Galveston, Tex.—The directors of the Galveston-Houston Electric Company on Jan. 22 declared a regular semi-annual dividend of 3½ per cent on the preferred stock and also a dividend of 3½ per cent (an increase of one-half of 1 per cent) on the common stock, both payable March 16, 1914, to stockholders of record of March 5, 1914.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Electric Company has sold $541,600 of treasury common stock, subject to being first offered pro rata to shareholders. This brings the outstanding common stock up to the authorized amount, $8,514,600. The property of the Georgia Railway & Electric Company is leased to the Georgia Railway & Power Company.

International Traction Company, Buffalo, N. Y.—The regular semi-annual dividend of 2 per cent, together with an accumulated dividend of 2 per cent for arrears, was recently declared on the $5,000,000 of 4 per cent cumulative preferred stock of the International Traction Company, payable on Feb. 1, 1914, to holders of record of Jan. 24, 1914. The amount due after payment of this dividend on account of accumulations is 42 per cent.

Maryland Electric Railways, Baltimore, Md.—The Maryland Public Service Commission has authorized the issue of $153,000 car trust one to ten-year 6 per cent bonds by the Maryland Electric Railways for the purchase of new rolling stock.

New York Consolidated Railroad, Brooklyn, N. Y.—The New York Consolidated Railroad has made its report of Centre Street loop operation to the Public Service Commission for the First District of New York for November, 1913. The loop was placed in operation on Aug. 4, 1913, and the report covers the period since that date as well as for the month. The gross receipts of the system, the earnings of which are pooled under the dual system contract with those of the loop subway, were $661,251. They fell $55,373 below the amount needed to pay rentals, taxes, operating expenses, maintenance and depreciation, the preferential due the company and the interest on its investment. This is about the same as the record for October, which showed $54,426 short of the amount required to pay the charges previously mentioned. During August and September, when the summer traffic was at its height, the earnings were larger and the deficits correspondingly smaller.

Northern Electric Railway, Chico, Cal.—The Northern Electric Railway has been placed in the hands of F. B. Anderson, Herbert Fleishhacker, J. S. Drum, E. S. Heller and Percy Morgan as trustees. The company is said to be solvent but in urgent need of financing. According to J. S. Drum there is substantially no floating indebtedness, while the secured collateral notes will aggregate $5,200,000 secured by $8,100,000 of bonds and by indorsements of E. R. Lilienthal, E. J. Desable, Jr., Leon Sloss and W. P. Hammon. The purpose of the trusteeship is to enable the deposit of the collateral. The Sloss family, which organized the company, has deposited $6,500,000 of bonds to secure the creditors of the company. The widow and the sons of Louis Sloss have turned over their assets to a new Sloss corporation, the stock of which has been assigned to the Union Trust Company, to be administered by the trustees, who also will administer the Sloss Securities Company, owning $2,500,000 equity in the $5,500,000 of assets of Louis Sloss & Company, bond dealers; Sloss Brothers, bankers, and the Northern Electric Railway.

Ohio Service Company, Dennison, Ohio.—The consent and approval of the Public Service Commission of Ohio to the purchase by the Ohio Service Company of all the assets and physical property of the New Midland Power & Traction Company in Cambridge and in Guernsey County, Ohio, have been withheld by the commission.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has set aside out of its net income the sum of $10,000 in 1913 to redeem its refunding mortgage fifty-year gold bonds. Bids are invited for the surrender of the bonds to the amount of $10,282 in the sinking fund, bids to be presented at the company's office in Los Angeles, Cal., on or before Feb. 28.

San Francisco (Cal.) Municipal Railway.—It is reported that the $653,000 of 5 per cent bonds that the San Francisco Municipal Railway "offered over the counter," to net the purchaser 4.9 per cent, have been sold.

Union Street Railway, New Bedford, Mass.—The property of the Union Street Railway has been mortgaged to the Old Colony Trust Company, Boston, Mass., making the latter the trustee and title holder for the bondholders in order to secure the payment of the bonds. The mortgaging of the property follows the authorization of the issuance of $2,000,000 of twenty-year 4½ per cent gold bonds, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 1, 1913.

United Light & Railways Company, Grand Rapids, Mich.—N. W. Halsey & Company, Russell, Brewster & Company and the Continental & Commercial Savings Bank, Chicago, Ill., have purchased $500,000 of first and refunding 5 per cent twenty-year bonds of the United Light & Railways Company, due June 1, 1932. The bonds are being offered at 86 to yield 6.25 per cent and are redeemable at 102½. With the regular dividends on preferred and common stock the directors of the United Light & Railways Company have declared an extra dividend of 1 per cent on the common stock, payable April 1 to holders of record March 16.

United Properties Company, Oakland, Cal.—Under the arrangement whereby an English syndicate has taken over the control of the United Properties Company, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, it is reported that the traction, lighting and power properties will be separated from the other interests of the United Properties Company and the latter corporation will be dissolved. Arrangements for financing a new company to take over the traction and other electric properties are already well under way. While the price to be paid for the preferred stock of the San Francisco-Oakland Terminal Company is placed in the contract at $50 a share, in reality only $30 a share in cash is paid for this stock, and with it goes enough common stock as a bonus to give the English syndicate and its associates 70 per cent of control of the electric properties. The Tevis-Hanford interests will still be associated with the properties. In all the syndicate has agreed to furnish $9,890,000 in cash for the purchase of 38,000 shares of preferred stock held by United Properties trustees at $30 a share, or $1,140,000; 25,000 shares of preferred stock held by the Smith trustees at $30 a share, or $750,000; N. W. Halsey & Company notes to be paid Sept. 12, 1914, $2,500,000; Key Route Basin notes to be paid Nov. 20, 1914, $1,100,000; floating debt of traction companies, $1,000,000; United Light & Power Company notes, $1,600,000; Union Water Company, $800,000; funds for new work and extensions, $1,000,000. The Smith trustees will still hold 40,000 shares of the preferred stock for the benefit of Smith's creditors. The deal disposes of all disputes between F. M. Smith and his former partners and also will lead to the dismissal of all suits filed by them against him.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—The Washington, Baltimore & Annapolis Electric Railway has sold to a syndicate of Baltimore bankers $200,000 of its first mortgage 5 per cent bonds which the company had in its treasury, making the total issue outstanding $4,838,000.

Dividends Declared

Boston (Mass.) Elevated Railway, 2 per cent.

Connecticut Valley Street Railway, Greenfield, Mass., quarterly, three-quarters of 1 per cent, common.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred; 3½ per cent, common.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, 5 per cent, non-cumulative preferred.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-quarters of 1 per cent, second preferred; quarterly, 1 per cent, common; 1 per cent, common (extra).

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
1m., Dec.,	'13	$161,944	$107,864	$54,080	$34,408	$19,672
1 " "	'12	155,454	97,348	58,105	32,071	26,034
6 " "	'13	1,099,080	676,000	423,079	203,368	219,711
6 " "	'12	1,050,486	594,646	455,840	192,466	263,374
BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.						
1m., Dec.,	'13	$76,248	*$71,253	$4,994	$15,523	†$10,528
1 " "	'12	74,310	*70,587	3,722	12,517	†8,795
6 " "	'13	542,204	*450,954	91,250	90,881	369
6 " "	'12	517,367	*456,005	61,362	75,054	†13,692
CONNECTICUT COMPANY, NEW HAVEN, CONN.						
1m., Jan.,	'13	$654,305	*$472,854	$181,451	$88,374	$93,076
1 " "	'12	617,512	*439,275	178,236	86,494	91,742
6 " "	'13	4,414,313	*3,113,432	1,300,881	537,153	763,728
6 " "	'12	4,094,199	*2,726,313	1,367,886	519,397	848,489
NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.						
1m., Jan.,	'13	$24,905	*$23,759	$1,146	$7,726	†$6,580
1 " "	'12	24,905	*29,512	4,607	7,147	†11,754
6 " "	'13	210,420	*155,594	54,825	46,092	8,733
6 " "	'12	206,008	*180,005	26,003	42,064	†16,061
NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.						
1m., Jan.,	'13	$36,924	*$47,705	$10,781	$8,976	$19,757
1 " "	'12	25,280	*48,513	23,233	13,992	37,225
6 " "	'13	223,842	*296,005	72,164	55,640	127,804
6 " "	'12	146,390	*283,199	136,808	73,950	210,758
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
1m., Dec.,	'13	$259,881	*$150,778	$109,103	$41,506	$67,597
1 " "	'12	295,377	*190,295	105,082	50,283	54,799
12 " "	'13	2,996,037	*1,702,766	1,293,271	523,067	770,204
12 " "	'12	3,284,533	*2,019,654	1,264,879	561,816	703,063
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1m., Dec.,	'13	$282,301	$176,848	$105,453	$43,299	$62,154
1 " "	'12	264,561	164,783	99,778	44,085	55,693
12 " "	'13	2,997,670	1,843,964	1,153,706	536,264	617,442
12 " "	'12	2,655,602	1,610,571	1,045,031	528,935	516,096
RHODE ISLAND COMPANY, PROVIDENCE, R. I.						
1m., Jan.,	'13	$425,286	*$327,952	$97,334	$107,589	†$10,255
1 " "	'12	415,749	*293,367	122,382	102,056	20,326
6 " "	'13	2,895,287	*2,021,454	873,833	638,468	235,365
6 " "	'12	2,832,728	*1,784,917	1,047,812	612,335	435,477
WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.						
1m., Jan.,	'13	$19,347	*$20,154	$807	$1,137	†$1,944
1 " "	'12	17,517	*20,737	3,221	925	†4,146
6 " "	'13	137,156	*128,466	8,689	6,417	2,272
6 " "	'12	128,396	*128,549	153	4,844	†4,999

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*Includes taxes. †Deficit.

Traffic and Transportation

Portland Municipal Fare Ordinance Declared Void

The Daly ordinance, providing that the Portland Railway, Light & Power Company, Portland, Ore., should sell six fares for 25 cents within the city limits, was declared illegal by Robert S. Bean, judge of the United States District Court, in an oral ruling rendered on Jan. 12. The ruling came on the motion of L. E. Latourette, assistant city attorney, to dismiss the suit brought by the company to restrain the enforcement of the ordinance on the ground that the United States District Court was without jurisdiction in the matter.

Judge Bean ruled that his court has the requisite jurisdiction, for four of the contentions made in the company's bill of complaint, if sustained, would make the enforcement of the ordinance unconstitutional. These contentions were that the ordinance would be "confiscatory" in its action, an "impairment of contract by legislation," an "excessive penalty" and the "taking of property without due process of law."

The point designated by Judge Bean as the vital one was that Section 81 of the city charter, under which the six-for-a-quarter-fare ordinance was passed, in so far as it gave the city commission power to regulate rates of public utilities in Portland was void, for that section of the charter and the ordinance itself are in conflict with the Oregon public utilities act, giving to the State Railroad Commission power to regulate public service rates in the State, including those within municipal corporations.

Judge Bean said that the public utilities act had been passed by the Legislature and approved by the people, and that the city could not, by the adoption of any ordinance, or in any manner, assume the governmental power already exercised by the State as a whole. Only such ordinances as are strictly municipal in their character, not including the regulation of rates, may be enacted by cities. Otherwise, Judge Bean said, the people of a community or section could declare void the general laws of the State.

Judge Bean pointed out that if the state law were obeyed, it would be in violation of the city ordinance, while if the ordinance were obeyed the state law would be violated. Under its rate schedule, filed with the State Railway Commission, the company's rates are 5 cents for a single fare, or $2.25 for a ticket-book of fifty fares. Hence the company could not obey the six-for-a-quarter-fare ordinance and alter these rates without being in violation of the law which was passed creating the State Railroad Commission and defining its powers.

Judge Bean suggested that if the people of Portland desired to make a complaint against the rates charged by any public service corporation, the same should be taken before the State Railroad Commission in accordance with the public utilities act, in which event the complaint would be heard by a body having power to investigate the justice of the complaint and to regulate the rates which were in question.

Judge Bean's ruling was on the preliminary injunction when suit to dismiss the ordinance was first brought by the company, but this will stand indefinitely if the city does not decide to carry the case further. Should the city make no answer to the complaint it is expected that attorneys for the Portland Railway, Light & Power Company will go into the federal court and ask an order granting a permanent injunction against the enforcement of the Daly ordinance.

The six-for-a-quarter ordinance was passed by the city commission Nov. 5, 1912, and would have been effective thirty days later but for the filing of the suit by the company.

Before the ordinance was passed the State Railroad Commission had begun an investigation, conducted by experts, to determine the physical valuation of the properties of the Portland Railway, Light & Power Company as the only scientific means for arriving at a proper basis for fixing rates. The city, however, has not taken any interest in the investigation, or made any representation, legal or otherwise, before the commission.

Accident Faker Arrested in New Jersey

Julius Cohen, of New York, charged by George L. Walsh, claim agent of the Passaic division of the Public Service Corporation, Newark, N. J., with obtaining money under false pretenses, was arrested recently in Jersey City. Almost simultaneously Cohen's brother, Frank, was arrested for violation of the laws in Jersey City in much the same manner. On Nov. 22 of last year Cohen ran down Washington Street to the corner of Broadway and jumped aboard a Riverside car which had just started toward Church Street. As he got on the car he fell, and, with the assistance of the conductor, reached a seat inside the car, where he complained of injuries to his left side and left leg. Subsequently Cohen appeared before Claim Agent Walsh and asked for compensation for his injuries. He had with him a certificate from a doctor to the effect that he was being treated for a bruised side and leg. He also produced a witness who declared that the conductor had pulled the bell while Cohen was getting on. At that time Cohen gave the name of Harold Miller and his address as New York City, his occupation being that of a wood carver. Cohen said that he had allowed a lady to step on the car ahead of him and that the conductor, who was standing on the platform, had given the motorman the signal to go ahead just as he (Cohen) had one foot on the first step and the other on the ground. The starting of the car threw him to platform. Cohen said that he could produce three other witnesses if the case went before the courts to prove that his injuries were caused by the conductor's hurry to pull the bell rope.

Investigation proved that four days before this incident Cohen had a similar accident in Elizabeth, where he had given his name as David Weller and his occupation as a jeweler. He was then connected with pretended accidents of the same kind in other cities, where he gave various aliases. Before trying a fake accident of any kind the Cohens would take out an accident policy with one of the large insurance companies, and the man pretending to be injured would, after presenting his claim to the railway, make one with the insurance company, stating that he had been laid up for a period of anywhere from four to six weeks, and collecting accordingly. The trail of Julius Cohen was then taken up at Elizabeth, when he appeared on Nov. 18 at the Public Service Railway claim department under the name of David Weller. The trail took the detectives to Philadelphia. While under surveillance he collected a sum of money from the Philadelphia Rapid Transit Company, and also presented a claim to the Ætna Accident Insurance Company at its Philadelphia office for the accident he had met with in Elizabeth. In all, evidence has been gathered against the two men extending as far back as July 19, 1912. Proofs have been obtained that these men made at least seventeen fraudulent claims against street railway companies, including, besides the Public Service Railway, the Brooklyn Rapid Transit Company, the Third Avenue Railway, the Union Railway, the Interborough Rapid Transit Company, the Philadelphia Rapid Transit Company, the United Traction Company of Albany and the Long Island Electric Railway.

Fatal Accidents in New York in 1913

The National Highways Protective Society reports that 580 persons were killed by vehicles in New York City in 1913. Of these deaths 302 were due to automobiles. Electric railway cars killed 108 persons and wagons killed 170. The street fatalities in New York City for the last three years follow:

	1911	1912	1913
Automobiles	142	221	302
Trolleys	100	134	108
Wagons	172	177	170
Total	423	532	580

The comparative statement of highway killings for the last three years in the rest of the State as made public by the Highways Society follows:

	1911	1912	1913
Automobiles	132	127	149
Trolleys	67	79	79
Wagons	31	28	32
Total	230	234	260

Reward for Apprehension of Car Seat Vandals in Detroit.—The Detroit (Mich.) United Railway has offered a reward of $25 for the apprehension and conviction of anyone found cutting seats or straps in cars.

Rear Entrance Order in Los Angeles.—The Pacific Electric Railway, Los Angeles, Cal., put an order into effect on Feb. 1, 1914, closing the front entrance of all its interurban cars and requiring passengers to board and leave by the rear entrance.

Crusade Against Spitting in Louisville.—The health department of Louisville, Ky., plans to enforce the ordinance prohibiting spitting in street cars. Plain-clothes men will be assigned to the cars, and those who violate the ordinance will be arrested.

Safety at Grade Crossings Discussed in Memphis.—The Memphis (Tenn.) Street Railway was represented at a conference on Jan. 31 at which the city commissioners and representatives of all the railways in the city discussed safety plans for grade crossings.

Increase in Wages by Pennsylvania Road.—The Lehigh Valley Transit Company, Allentown, Pa., has granted a voluntary wage increase of 1 cent an hour to motormen and conductors. Under the new scale first-year men will receive 23 cents an hour, and the rates will range from that to a maximum of 27 cents for the fifth and subsequent years.

"Safety First" Cards in Louisville.—E. O. Holland, superintendent of the Louisville (Ky.) Board of Education, has distributed among the 25,000 school children of the city "safety first" cards, in which the children are warned of the dangers of street traffic and instructed in care in crossing streets and getting on and off street cars.

New Haven Fare Increase Sustained by Court.—The Supreme Court of New York, Appellate Division, third department, in a decision by Justice Kellogg has annulled the order of the Public Service Commission of the Second District of New York issued in January, 1913, ordering a reduction in passenger fares on the New York, New Haven & Hartford Railroad between New York City and the stations on the company's main line within the State of New York.

Public Relations in Kingston.—In an advertisement in the *British Whig*, in which the Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont., wished its patrons a merry Christmas and a happy new year, views were shown of a horse car and an electric car, with the following legend, "What You Had" and "What You Have." To drive home the story of progress a line was added as follows: "You can't grow if you knock. Complaints cheerfully received and dealt with at the office."

Low Step Order in Connecticut.—The Public Utility Commission of Connecticut has ordered the Shore Line Electric Railway, Norwich, Conn., to equip with easy folding steps of the same or practically the same type as are used by the Connecticut Company seventeen of forty-three cars, the first or bottom step to be not more than 16 in. above the top of the rail, the second to be not more than 13 in. above the first and not more than 13 in. below the floor of the car. The cars must be so equipped on or before June 1.

"Go to Church" Placards in Cars.—The management of the Brooklyn (N. Y.) Rapid Transit Company fell in heartily with the movement to have everybody in Brooklyn attend church on Feb. 1. The company donated advertising space in all of its cars and divided with the Brooklyn *Daily Eagle* the cost of printing large placards which carried the following appeal to all riders to attend church on Feb. 1: "Next Sunday is 'Go-to-Church' Sunday for all Brooklyn. This national movement includes everybody. The 'City of Churches' should lead all other American cities in large attendance."

Coney Island Fare Changes.—Under a new agreement which has been entered into between the Public Service Commission for the First District of New York and the Brooklyn Rapid Transit Company, the round trip rates from Manhattan to Coney Island will be 10 cents from 5 a. m. to 9. a. m. instead of from 6 a. m. to 9. a. m., and in the afternoon the round-trip rates will be 10 cents from 2 p. m. to 8 p. m. instead of from 3 p. m. to 8 p. m. All commutation books will contain twelve round-trip tickets for sale at $1.20 per book, and all unused tickets not detached from books will be redeemable. The new agreement will apply on all new books sold hereafter.

Oregon Electric Railway Answers Fare Complaint.—Answer to the complaint made against the passenger rates charged by the Oregon Electric Railway from Portland, Ore., to Tualatin and intermediate points has been filed with the Railroad Commission by the company. The complaint stated that the Oregon Electric Railway and the United Railways were owned by the same interests and the fare between Portland and Linnton, 8.6 miles over the United Railways, was 5 cents, while it was much higher over the Oregan Electric Railway for the same or less distances. The answer says the fares on the United Railways, fixed by the franchise given the company by the county, are unremunerative and no criterion of what the fares should be on the Oregon Electric Railway.

Petition for Rate Reduction.—The attack of the Los Angeles Rate Association on the tariffs maintained by the Pacific Electric Railway, Los Angeles, Cal., failed recently when an effort was made to submit the association's petition to the State Railroad Commission without sufficient evidence. The association sought a 50 per cent reduction to all interurban points. Attorney Oscar L. Horn, representing the association, explained that lack of co-operation among members of the association impelled him to appear without sufficient data to prosecute the case. Commissioner Edgerton said that he did not believe it fair for the commission not to be notified of the true situation. Attorney Frank Karr, representing the company, moved to have the commission dismiss the case. Attorney Horn then withdrew the association's application. The members of the committee appeared before the commission as individuals in an effort to secure a 25-cent limited round-trip fare to and from Los Angeles and Bay points.

Former Employees Arrested for Depredations.—Two former employees of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, have been arrested and other arrests are likely as the result of strike troubles last fall. The men are charged with placing obstructions on the tracks of the company and tampering with the electrical appliances on the night of Oct. 16. C. C. Harris, general superintendent of the company, issued a reward notice as follows: "One hundred dollars reward will be paid for information leading to the arrest and conviction of the person or persons who, on Oct. 16 or 17, 1913, connected the trolley wire to the rail at the Milford Y. or on Nov. 16, 1913, hung iron bars on the trolley wire at Manilla station and a chain on the trolley wire at Smysors Road. The above reward will also be paid for information leading to the arrest and conviction of any person or persons throwing stones at cars, damaging property or interfering in any manner with the safe operation of this company's properties."

Order for Ticket Sale on Seattle Cars Voided.—Judge John R. Mitchell, of the Thurston County Superior Court, on Jan. 23, set aside the order of the State Public Service Commission, directing the Puget Sound Traction, Light & Power Company, Seattle, Wash., to sell tickets on street cars at twenty-five for $1, or six for 25 cents. The company under its franchise is compelled to sell tickets at these rates at certain designated places in Seattle, but the commission ordered the tickets sold on the cars, upon the theory that a question of service and not of rates was involved. Judge Mitchell, however, held otherwise, and said that the order violated the company's franchise. The city of Seattle had previously attempted to force the sale of tickets on cars by ordinance, but was enjoined from enforcing the enactment by the federal courts, which held that the matter was one for the Public Service Commission and not the City Council to handle. R. S. Pierce, assistant corporation counsel, has announced that an appeal will be taken to the Supreme Court.

Scattering Sunshine Along the Way.—In concluding an editorial, "The Kindly Spirit," in which it referred to the general spirit of kindliness manifested in Delaware, Ohio, by one person toward another, a local paper said recently: "If you look around you a little in life as you go along you can readily pick out the kindly people. They are not all men by any means. We have often observed women ministering unto members of their own sex and could see the same manifestation of appreciation on the countenance of the person receiving the attention. Particularly are these facts true on the Columbus, Delaware & Marion Railway. We hear the remark, 'There's a good fellow,' when referring to an employee of this railway. Why is he a good fellow? Because, perhaps, he has caught up the spirit of geniality from his superior officer or perhaps the superior officer picked him out of a large class of applicants and placed him where he is. So you see it pays. We say pays from the standpoint of one's own satisfaction and enjoyment in life. This same spirit has caught hold all along the Columbus, Delaware & Marion Railway and that is one of the reasons that people like to travel. The boys and officials are cordial, genial and helpful to the traveler in many ways. It's a good spirit to get hold of a person. It's this spirit that the brotherhoods, the churches, the clubs, the lodges are fighting for."

Terms Governing the Use of School Tickets in Jackson.—The Jackson Light & Traction Company, Jackson, Miss., is distributing, through the superintendent of schools, teachers' certificates which every pupil wishing to purchase school tickets must fill out before books can be purchased at the office of the company. Each teacher in the public schools will be supplied with a number of these certificates, and pupils must apply to their teacher for one of these. The certificate states that the pupil is in regular attendance at the school and is entitled to the use of school tickets, which will bear the signature of both pupil and teacher. These certificates may be presented at the office of the company between 8.30 a. m. and 5.30 p. m., and will entitle the bearer to a book of thirty-three rides for $1. The books are to be issued exclusively for pupils attending public schools where no tuition fee is made, and coupons will be accepted for fare only between the hours of 8 a. m. and 9.30 a. m. and 1 p. m. and 3 p. m., when the holder is going to and from school, on school days only. Coupons will not be good if detached from cover and book will be forfeited if presented by one other than original purchaser. If book is lost it will not be replaced or any allowance made thereon. The person to whom the books are sold must affix his or her signature in ink. Misuse of the book will subject the pupil to forfeiture of school rate privilege, and the holder agrees for the purpose of identification to write his or her signature upon request of the conductor and to comply with all regulations which may be issued from time to time to prevent misuse of school ticket privilege. Tickets will be accepted on the cars of the company between 8 a. m. and 9.30 a. m. and 1 p. m. and 3 p. m.

Prepayment Operation in London.—The London (Ont.) Street Railway recently added a number of pay-as-you-enter cars to its equipment. In order to secure the co-operation of the public, advertisements were placed in the London papers giving various views of the cars. The following reading notice was also carried: "To secure maximum convenience and comfort of passengers and to minimize the possibility of accidents, patrons are respectfully requested to co-operate toward making the cars a success, viz.: by being prepared to enter and leave the car promptly. Enter at the rear door only. When boarding the car be careful that the conductor is not closing the door at the time you take hold of the handles. Please have the exact fare ready, if possible, so that it may be dropped into the box without your having to stop in the vestibule. Transfers should be requested when the fare is paid. Move toward the front of the car. Safety and convenience were the first considerations in designing these cars; therefore the doors must be closed and the steps folded whenever the car is in motion. Exits are provided at both the rear of car and the front. Use the front exit if it is at all possible to do so. Please do not stand in the vestibule or smoke on these cars. When leaving the car and carrying parcels have the left hand free for use in holding on to the handles. The company is endeavoring to provide a safe and pleasant means of transportation. If passengers will assist by refraining from blocking the passageway at the rear of the car, the success of the P. A. Y. E. car is assured. As the company and the passengers are equally interested in improving the service, your co-operation is earnestly requested."

Chicago Surface Lines Engineering Departmental Organizations

Since President L. A. Busby appointed the heads of the different departments of the Chicago Surface Lines, these department heads in turn have been busily engaged in reorganizing the combined departments of the Chicago Railways, the Chicago City Railway and the Calumet & South Chicago Railroad. The departmental heads were announced in the ELECTRIC RAILWAY JOURNAL for Jan. 24, and the assistants in the department other than engineering were announced in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914. The two engineering departments under H. B. Fleming and J. Z. Murphy have since been reorganized. The departments under Mr. Fleming, which include supervision over track and roadway, shops and equipment, buildings, material, supplies and wreck wagon service of the Chicago Surface Lines, are organized as follows: Department of track and roadway, superintendent, J. F. Rodgers; office engineer, C. G. Powers; assistant engineer of estimates, H. P. Amet; chief clerk, W. F. Pratt; division superintendent of track, Northern, C. Chambers; Western, E. Johnson; Central, H. T. Kelly; Southern, O. G. Talmadge. Department of shops and equipment organization is as follows: Superintendent of shops and equipment, H. H. Adams; assistant superintendent of shops and equipment, Donald McGill; general foreman West Side shop, T. H. Shaughnessy; general foreman South Side shop, Howard Alton; general foreman of carhouses, E. W. Anger, Jr.; assistant general foreman of carhouses, B. Phillips. The organization of the department of buildings and drafting is as follows: Superintendent, Hugo Schmidt; assistant superintendent, W. H. Figg; chief draftsman, F. J. Koza. The department of materials and supplies is under the charge of Superintendent J. F. Henning, whose chief clerk is F. B. Mitchell. Argess M. Evans has been appointed chief clerk and secretary to Mr. Fleming.

The electrical engineering department under J. Z. Murphy, electrical engineer, has been reorganized as follows: Department of electrolysis and electrical distribution is under the charge of H. M. Wheeler, engineer in charge of electrical distribution; the testing department is under the charge of V. E. Thelin, with L. O. Mellor, assistant engineer; William Jones has been appointed superintendent of the department of substations and power houses, with M. Callahan as assistant superintendent; H. Richter has been appointed superintendent of the department of electrical installation of equipment of substations, and William Wurth has been appointed engineer of this department. The head of the department of tunnels remains unchanged, with J. W. Harris engineer in charge. A. A. Thurlby has been appointed superintendent in charge of the line and transmission department of the Chicago Surface Lines with R. M. Patterson as assistant superintendent.

J. F. Rodgers, formerly superintendent of track of the Chicago City Railway, has been appointed superintendent of track and roadway of the Chicago Surface Lines. A biography of Mr. Rodgers was published in the ELECTRIC RAILWAY JOURNAL of July 12, 1913.

H. H. Adams, formerly superintendent of equipment of the Chicago Railways, has been appointed superintendent of shops and equipment of the Chicago Surface Lines. A biography and a portrait of Mr. Adams were published in the ELECTRIC RAILWAY JOURNAL of Jan. 27, 1912.

Donald McGill, formerly superintendent of shops of the Chicago City Railway, has been appointed assistant superintendent of shops and equipment of the Chicago Surface Lines. He was born in Knoxville, Ill., in 1872, and after completing the high school course he began work as a wireman with the Electric Light & Power Company, Kearney, Neb. In 1893 he became a wireman with the Harter Construction Company, Chicago, Ill., electrical engineer and contractor. Mr. McGill entered the service of the Chicago City Railway in 1895 as a car wireman, and three years later was made foreman of the electrical department. In 1905 he was made general shop foreman, and after four years' service in that position he was appointed superintendent of the shops of the company.

E. W. Anger, Jr., who for the last five years has been assistant superintendent of shops of the Chicago City Railway, has been appointed superintendent in charge of carhouses of the Chicago Surface Lines. He was born in Chicago in

1880, and after completing a course in electrical engineering at Lewis Institute accepted a position as electrician in the shops of the Chicago City Railway in 1898. He was subsequently made chief electrician of Sans Souci Park, then owned by the railway company. During the rehabilitation, between 1907 and 1909, Mr. Anger was superintendent of construction in charge of substations.

T. H. Shaughnessy has been appointed general foreman of the West Side shops of the Chicago Surface Lines, his former position as assistant superintendent of equipment of the Chicago Railways having been abolished. A biography of Mr. Shaughnessy was published in the ELECTRIC RAILWAY JOURNAL for June 7, 1913.

Howard Alton, general foreman of the shops of the Chicago City Railway, has been retained as general foreman of those shops for the Chicago Surface Lines. He entered electric railway work with the mechanical department of The Milwaukee Electric Railway & Light Company in 1893, and became connected with the Chicago City Railway in 1904. After two years' service he was placed in charge of the repair shop in one of the carhouses, and in 1902 was made assistant to M. O'Brien, then master mechanic of the Chicago City Railway. In 1907 he resigned to accept the position of general superintendent of the People's Traction, Galesburg, Ill., where he remained until 1909, at which time he re-entered the service of the Chicago City Railway as general foreman of shops.

Hugo Schmidt, who has been superintendent of buildings of the Chicago City Railway for the last four years, has been appointed superintendent of buildings and drafting of the Chicago Surface Lines. He was born in Chicago in 1876. Shortly after he completed his common school education his father died. After a brief experience with a structural iron contractor, he obtained a position in the architect's office of the Chicago Board of Education. In 1898 he resigned to become connected with the Mexican Central Railroad in the City of Mexico. Mr. Schmidt returned to Chicago in 1900, and was appointed resident engineer in charge of the Illinois Central extension to the Thebes bridge across the Mississippi River. In 1901 he entered the University of Illinois and in 1905 was graduated in civil engineering. In the year that he was graduated from the university he entered the service of the Chicago City Railway as a draftsman. He was appointed chief draftsman in 1907 and superintendent of buildings in 1910.

J. F. Henning, formerly assistant superintendent of shops of the Chicago City Railway, has been appointed superintendent of materials and supplies of the Chicago Surface Lines. He was born in Buffalo, N. Y., in 1877, and after completing his education in the Buffalo Business University in 1894, he began work as a timekeeper on public work in Buffalo. In 1900 Mr. Henning was appointed general storekeeper of the St. Louis, Kansas City & Colorado Railroad at Union, Mo., and in 1904 he became an accountant with the East St. Louis & Suburban Railway, where he remained until 1906. During the period between 1906 and 1908 he held the position of assistant secretary and auditor of the Michigan United Railway, and was later appointed assistant to the general manager. In 1908 he accepted a position as chief clerk in the track and roadway, wires and cable department of the Chicago City Railway, and after three years' service was appointed general storekeeper of that company. In 1913 Mr. Henning was appointed assistant superintendent of the Chicago City Railway's shops and placed in charge of all stores and shop accounting, in addition to the engineering department payrolls and distribution.

Herbert M. Wheeler, who for the last five years has been assistant chief engineer of the Chicago Railways, has been appointed engineer in charge of electrolysis and electrical distribution of the Chicago Surface Lines. He was born in Shawano, Wis., in 1876, and following his graduation in electrical engineering at the University of Minnesota in 1896 he began work with the Fort Wayne (Ind.) Electric Corporation. Mr. Wheeler began street railway work in 1899 with the North Chicago Street Railroad as assistant engineer After four years' service he resigned to become an instructor in mathematics and engineering at Lewis Institute, Chicago. In 1907 he was appointed electrical engineer of the Chicago Railways, and was made assistant chief engineer of that company in 1909. Mr. Wheeler served as the Chicago Railways representative on the electrolysis committee which reported to the gas, oil and light committee of the Chicago City Council for Chicago's surface and elevated lines.

Victor E. Thelin, formerly engineer in charge of tests for the Chicago City Railway, has been appointed engineer in charge of the testing department of the Chicago Surface Lines. He was born in Chicago in 1885, and after completing an academic and electrical engineering course at Lewis Institute, Chicago, began work as engineer in the operating department and testing laboratories of the Commonwealth Edison Company, Chicago. In 1907 he accepted a position with the Chicago City Railway in charge of coal, cement, car and meter testing. As head of the testing department of the Chicago Surface Lines he will have charge of miscellaneous testing, substation, metering and power statistics for the company.

William Jones, formerly assistant to the chief engineer of the Chicago Railways, has been appointed superintendent of the department of substations and power houses of the Chicago Surface Lines. He was born in Sweden and came to this country in 1884, where he was employed in lake boat service. He began street railway service installing machinery for the West Chicago Street Railway, then a cable line. When this line was electrified, he continued to work in the mechanical department, and in 1908 was appointed assistant to the chief engineer.

William Wurth, formerly division engineer of substations and power for the Chicago City Railway, has been appointed engineer of the installation of substations of the Chicago Surface Lines. He was born in Switzerland in 1877, and obtained his early electrical education with Brown, Boveri & Company, Baden, Switzerland, as a draftsman and an apprentice in the shops. He completed an electrical and mechanical engineering course at the technical college in Mittweida, Germany, in 1901, and came to America the same year. After two years' service in the designing department of the General Electric Company, Schenectady, N. Y., and the Bullock Electric Manufacturing Company, Cincinnati, he joined the electrical department at the 1903 World's Fair in St. Louis. In 1905 he began work with the Chicago City Railway in electrical design, following which he was successively promoted to chief draftsman and then to division engineer of substations and power, which position he held at the time of his recent appointment.

J. W. Harris, engineer in charge of tunnels, will continue in that position with the Chicago Surface Lines. He was born in Beloit, Wis., in 1863. He completed a preparatory course at the Lawrence Academy, Groton, Mass., and was graduated from the University of Illinois in 1886 with the degree of B. S. in C. E. He engaged in various lines of steam railroad construction and maintenance work with the Chicago & Northwestern Railroad and the Père Marquette Railroad. During the period between 1903 and 1905 he was division engineer with the latter road with headquarters in Canada. In 1909 he joined the engineering staff of the Chicago Railways as tunnel engineer, and was placed in charge of the completion of the Van Buren Street tunnel under the Chicago River. Later had charge of the tunnels built under the Chicago River at Washington and La Salle Streets, Chicago.

A. A. Thurlby, formerly superintendent of wires and cables of the Chicago City Railway, has been appointed superintendent of overhead and underground of the Chicago Surface Lines. He was born in Nottingham, England, in 1860, and came to America in 1868. He began work in 1877 with the Brush Electric Company, Cleveland, Ohio, where he became an erecting engineer. In 1891 he resigned that position to become manager of the Battle Creek (Mich.) Street Railway. The following year he accepted the position of engineer for inside wireman with the Chicago Edison Company. In 1893 he accepted a position with the People's Light, Power & Motor Company, Chicago, as assistant superintendent in charge of overhead lines. He remained with that company when it was absorbed by the Commonwealth Edison Company, but resigned in 1899 to accept the position of manager of the Manistee (Mich.) Electric Railway. In 1902 he became associated with John R. Walsh in his electrical projects, and resigned in 1907 to return to the Commonwealth Edison Company. In 1907 Mr. Thurlby was appointed superintendent of underground and overhead wires and cables of the Chicago City Railway, which position he has held until his new appointment.

Personal Mention

Mr. H. Warner has resigned as chief engineer of the Edmonton (Alberta) Interurban Railway.

Mr. D. C. Clough has been appointed master mechanic of the Oregon Electric Railway and the United Railways, Portland, Ore., vice Mr. G. H. Hopkins, resigned.

Mr. F. H. Ginn has been elected first vice-president ot the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, to succeed A. E. Atkins, deceased.

Mr. C. N. Wilcoxon, who has been general manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has also been elected vice-president of the company.

Mr. H. C. Lang, of Mandelbaum, Wolf & Lang, Cleveland, Ohio, has been elected secretary and treasurer of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., to succeed Mr. A. R. Horr.

Mr. F. H. Goff, Cleveland, Ohio, has resigned as president of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., owing to the fact that the Indiana laws require the president of Indiana corporations to reside in that State. His successor has not yet been elected.

Mr. A. T. Davidson has been appointed superintendent in charge of the Oregon Electric Railway, United Railways and Astoria division of the Spokane, Portland & Seattle Railway, Portland, Ore., merged into one operating division, to be known as the Portland division.

Mr. H. H. Vreeland, vice-president of the Interborough-Metropolitan Company, New York, N. Y., will have the title of director of welfare work and chairman of the welfare committee. The welfare committee will be made up of the heads of the departments, and will serve as the adviser of the head of the welfare department.

Mr. W. E. Boileau has resigned as general manager of the Chattanooga Railway & Light Company, Chattanooga, Tenn. Mr. Boileau was appointed manager of the Chattanooga Electric Company in 1907, and following the consolidation of the company with the corporation operating the street railway system he was made general manager of the Chattanooga Railway & Light Company.

Mr. Howard Patten, who has been superintendent of the Topeka (Kan.) Street Railway for the last year, has been transferred to the Oskaloosa Traction & Light Company, Oskaloosa, Ia.. another McKinley interest, where he will manage the street railway and the electric light and gas plants. Mr. W. G. Miller, operating engineer in Topeka, and Mr. Albert M. Patten, assistant general manager, will divide the former duties of Mr. Howard Patten.

Mr. Henry Clay Hall has been nominated by President Wilson for appointment to the Interstate Commerce Commission. Mr. Hall is president of the Bar Association of Colorado. He was born in New York in 1860. After practising in New York for two years he went to Paris in 1885, where he continued his law practice and was counsel to the United States Legation. In 1892 he left France for Colorado Springs on account of his health. He has been an active practising lawyer in Colorado and has been counsel for railroads and many corporations.

Mr. Winthrop More Daniels has been nominated by President Wilson for appointment to the Interstate Commerce Commission. Mr. Daniels is chairman of the Board of Public Utilities Commissioners of New Jersey. He was serving as professor of political economy at Princeton University in 1911 when President Wilson, then Governor, appointed him to the Board of Public Utility Commissioners of New Jersey for a term of six years. He had held the chair of political economy at Princeton since 1892. Mr. Daniels was born in Dayton, Ohio, in 1867.

Mr. William R. Frederick has resigned as auditor of the Oklahoma Railway, Oklahoma City, Okla., to accept a position as examiner with the Interstate Commerce Commission with headquarters at Chicago, Ill. Mr. Frederick began his railway career as a clerk in the accounting department of the Atchison, Topeka & Santa Fé Railway, Topeka, Kan. He was appointed traveling auditor on station accounts by the company on March 1, 1901, and later was advanced to traveling accountant on joint facility accounts, from which position he resigned in March, 1910, to become connected with the Oklahoma Railway.

Mr. W. H. Bancroft, president of the Utah Light & Railway Company, Salt Iake City, Utah, vice-president and general manager of the Oregon Short Line Railroad and vice-president of the Salt Lake Route, has been relieved of his duties as general manager of the Oregon Short Line, at his own request. He will still continue as president of the Utah Light & Railway Company and vice-president of the Salt Lake Route. Mr. Bancroft is seventy-four years of age. He entered the railroad service in 1856 as telegraph operator and ticket clerk for the Michigan Southern Railroad, and has been continually in that service to the present time, rising through the various grades to be executive head of all the Harriman interests in the intermountain territory. When the Harriman interests acquired control of the Utah Light & Railway Company in November, 1906, Mr. Bancroft was elected president of the company.

Mr. M. S. Sloan has been appointed manager of the railway and electric departments of the New Orleans Railway & Light Company, New Orleans, La., to succeed Mr. D. A. Hegarty, resigned. Prior to 1906 Mr. Sloan was connected with the General Electric Company. On July 1, 1906, he was made chief engineer of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Later he was made assistant superintendent of the lighting and power departments of that company and in 1907 he was appointed superintendent of power of the company. In 1908 he was appointed superintendent of the electric department of the Birmingham Railway, Light & Power Company with jurisdiction over the operation and commercial sales of that department. In 1910 he was made assistant to the president of the company, in which capacity he had supervision over all departments of the company with full executive power. He continued in that capacity until his recent appointment as manager of the railway and electric department of the New Orleans Railway & Light Company.

M. S. Sloan

OBITUARY

Walter Ambrose Pearson, brother of Dr. F. S. Pearson and for many years associated with his brother in his electrical work, died in New York on Jan. 25, 1914. W. A. Pearson was born in Putnam, Conn., in July, 1869. He was educated at Tufts College, Mass., and was graduated with the degree of B. A. in the class of 1890. Immediately upon his graduation he entered the employ of the West End Street Railway, Boston, Mass. In 1893 he became electrical engineer in charge of the electric installation of the Brooklyn Heights Railroad, Brooklyn, N. Y. In 1896 he was appointed electrical engineer for the Metropolitan Street Railway, New York, and was particularly active in the development of the Lenox Avenue underground electric system, the first system of the kind to be developed in this country. Mr. Pearson remained with the Metropolitan Street Railway until 1906. He then took charge of the electrical installation and construction of the power house of the Electric Development Company of Ontario at Niagara Falls. In 1910 he went to Rio de Janeiro, Brazil, where he remained for two years as assistant general manager of the Rio de Janeiro Tramway, Light & Power Company. He returned to the United States in 1912. owing to poor health in the tropics, and became associated as consulting electrical engineer with Bertron, Griscom & Company, bankers, with whom he was connected at the time of his death. Mr. Pearson was a member of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the New York Railroad Club and the Engineers' Club of New York.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

West Helena Consolidated Railway, Helena, Ark.—Incorporated in Arkansas to build an electric railway in West Helena. Capital stock, $650,000. Officers: E. C. Horner, president; R. B. Macon, vice-president, and John C. Horner, sceretary.

***Norfolk & Elgin Railway, Port Burwell, Ont.**—Application for a charter has been made by this company to build a railway to be operated by electricity, steam or other motive power from Simcoe, via Bayham, to Port Burwell, Ont., with branches. Price, Garvey & Company, Toronto, are solicitors for the applicants.

Erie & Ontario Railway, Port Maitland, Ont.—Application for a charter has been made by this company to the Parliament of Canada to build a railway, to be operated by electricity, steam or any other motive power, from Port Maitland, on Lake Erie, to Smithville, in Lincoln County, Ont., and from Port Maitland to Port Colborne, Welland County, Ont., with branch lines. Power is also asked to operate vessels in connection with the railway. W. T. Henderson, Brantford, Ont., is solicitor for the applicants.

***Shefford, Bagot & Missisquoi Railway, Montreal, Que.**—Application has been made for a charter by this company to the Quebec Legislature to build an electric or steam railway through the counties of Missisquoi, Shefford and Bagot from a point on the Quebec and Vermont line in the parish of St. George to a point on the Intercolonial Railway between Bagot and St. Eugene. Capital stock, $1,000,000.

Dallas (Tex.) Northwestern Traction Company.—Application for a charter has been made by this company to build an electric railway between Dallas and Wichita Falls. Capital stock, $500,000. Incorporators: E. P. Turner, B. B. Cain, L. S. Thorne, John T. Witt, E. L. Sargent, R. Fenby, Otto H. Lang, Samuel P. Cochran and others. [E. R. J., Dec. 13, '13.]

***Weston & Glenville Electric Railway, Weston, W. Va.**—Chartered in West Virginia to build an electric railway in Weston and Glenville. Capital stock, $500,000.

FRANCHISES

Clovis, Cal.—The Fresno & Clovis Interurban Railway has purchased a franchise from the Council in Clovis. This is part of a plan to build a 24-mile electric line to connect Clovis, Fresno and Academy. F. S. Granger, Clovis, president. [E. R. J., Jan. 24, '14.]

Stockton, Cal.—The Stockton Electric Railway has received a franchise from the Board of Supervisors to extend its line on El Dorado Street in Stockton north to Castle Street, and west along Castle Street and through Tuxedo Park in Central Court to the western boundary of the park.

Guelph, Ont.—The Guelph Radial Railway has asked the Ontario Legislature for an extension of time within which it may complete a number of authorized branch lines and for authority to build extensions in Guelph.

Morrisburg, Ont.—The Ottawa & Morrisburg Electric Railway has asked the Council for a franchise in Morrisburg. This 47-mile line will connect Ottawa and Morrisburg via Leitrim, South Gloucester, Ormond, Winchester, Greely, Metcalfe, Williamsburg and Glen Becker. J. G. Kilt, Citizens' Building, Ottawa, president. [E. R. J., Jan. 10, '14.]

Sudbury, Ont.—The Sudbury-Copper Cliff Suburban Electric Railway has received a franchise from the Council in Sudbury. This company plans to build an electric line from Sudbury westerly to Copper Cliff, also from Sudbury easterly to Coneston. L. L. Forest, Sudbury, is interested. [E. R. J., Sept. 20, '13.]

Welland, Ont.—The Dunnville, Wellandport & Beamsville Electric Railway has received a year's extension of time on its franchise from the Council in which to build its North Main Street line in Welland.

Pottsville, Pa.—The Eastern Pennsylvania Railway, Pottsville, will ask the Council for a franchise for an extension on Mahantongo Street in Pottsville to connect with the Yorkville line at Dolan's Park at Nineteenth Street in Pottsville.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has awarded a contract to Ledwidge & Cammack to grade the proposed extension to Biddle.

British Columbia Electric Railway, Vancouver, B. C.—A 2-mile extension to Kerrisdale has been completed by this company.

Northern Electric Railway, Chico, Cal.—A branch line through Orangevale is being contemplated by this company.

Fresno (Cal.) Traction Company.—The State Railroad Commission has granted this company a certificate of public convenience and necessity to extend its line a distance of 9½ miles to a point along the San Joaquin River and to construct its tracks across highways at grade in Fresno.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Authority from the Railroad Commission has been received by this company to build the first section of its line to Selma, a distance of 20 miles.

Monterey & Pacific Grove Railway, Monterey, Cal.—It is planned to lay new rails on this company's line from Lighthouse Avenue on Nineteenth Street to the depot in Pacific Grove.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—This company is asked to consider plans to extend its lines to Richmond and to connect with all of the waterfront towns and industries as far east as Martinez.

Crescent City Railway, Riverside, Cal.—This company has completed its extension from Bloomington to Rialto.

Shore Line Electric Railway, Norwich, Conn.—This company is asked to consider plans to build an extension from Chester to Middletown.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—This company has recently filed a mortgage to the Fort Dearborn Trust & Savings Bank of Chicago as trustee, to secure an authorized issue of $2,500,000 of first mortgage thirty-year 5 per cent gold bonds. This company plans to build an electric railway between Marion and Harrisburg, with branch lines to Benton and to Johnston City and Herrin. William Rothman, Chicago, is interested. [E. R. J., Jan. 24, '14.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—Construction on a line to Celina will soon be begun.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—Plans are being made to begin construction of this line in the spring. James Hemenway, Boonville, president. [E. R. J., Dec. 14, '13.]

Evansville (Ind.) Railways.—This company is said to have abandoned the project to build a bridge over the Ohio River at Rockport. It is planned to build an extension of its Henderson line, but to use a ferry to cross the Ohio River instead of a bridge.

Public Utilities Company, Evansville, Ind.—The Northeast Side Development Club, Evansville, plans to give a bonus to this company to secure the construction of an extension of the Bell street line to Woodmere, a suburb of Evansville.

Gary, Hobart & Eastern Traction Company, Gary, Ind.—Work will be resumed by this company on the completion of the line between Gary and Hobart.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Surveys are being made for a line between Charles City and Mason City.

Hutchinson & Northern Railway, Hutchinson, Kan.—Preliminary arrangements are being made by this company to build its 14-mile line from Hutchinson to Burrton. W. S. Thompson, Hutchinson, is interested. [E. R. J., June 28, '13.]

Union Traction Company, Independence, Kan.—It is reported that this company is interested in the plans to build an electric line from Vevay to Aurora and Madison.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the year the line from Manhattan to Fort Riley will be finished.

***Hopkinsville, Ky.**—The Business Men's Association has taken up the project to build an interurban line to connect Hopkinsville with neighboring towns. R. E. Cooper is president of the association.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—Arrangements are being made to finance the construction of the section of this railway between Paducah and Hickman. F. M. Smith, general manager.

Metropolitan Street Railway, Kansas City, Mo.—This company will shortly place in operation a new line to be known as the Argentine-Minnesota division. It will extend from the Western extremity of Argentine, in Kansas City, Kan., across the Kaw River, through Armourdale to Tenth Street, north to the business section of Kansas City, Kan., through the packing house district and over the James Street viaduct to the stockyards.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—Plans are being made by this company to resume work in the spring on the construction of this 12-mile line to connect Randolph Springs, Moberly and Huntsville. Charles H. Dameron, Huntsville, president. [E. R. J., July 19, '13.]

Public Service Railway, Newark, N. J.—This company is asked to consider plans to extend its Mount Prospect Avenue line along Union Avenue in Belleville and into Nutley.

New York State Railways, Rochester, N. Y.—This company will be asked to consider plans to build an extension of the Midler Avenue line through James Street in Syracuse.

Carolina Power & Light Company, Raleigh, N. C.—An extension into Boylan Heights is being contemplated by this company.

Chardon, Jefferson & Meadville Interurban Railway, Cleveland, Ohio.—Application was made on Jan. 29 by this company for permission from the State Public Utilities Commission to issue $140,000 common stock, increasing the capital from $10,000 to $150,000, and also $700,000 5 per cent bonds, both to be sold at not less than 75 and the proceeds used in the construction of a railway between Chardon and Jefferson. C. H. Felton, 735 Williamson Building, Cleveland, secretary. [E. R. J., Nov. 1, '13.]

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—An extension will be built in the spring by this company for a line from New Castle to West Pittsburgh, Wampum, Ellwood City and Beaver Falls.

***Guelph, Ont.**—Plans are being considered by the Council and representatives from various municipalities to build an electric line from Berlin to New Dundee, Plattsville and Woodstock. Another line from Waterloo to Woolwich and Wellesley is being contemplated and one from Guelph to Owen Sound.

Hamilton (Ont.) Street Railway.—Plans are being made to lay new tracks on several of this company's lines in Hamilton. Work will be begun in the spring.

***London, Ont.**—Surveys are being made to build a line between London, St. Mary's and Stratford. The route which it is believed will be selected for the main line from London to Windsor is to join the London & Port Stanley Railway 9 miles south of London. From that point to Windsor, by way of Glencoe and Chatham, the distance is 104 miles. The intention is to reach Petrolia and Sarnia, by means of a branch line from Glencoe. These radials, together with that from St. Mary's, will enter London over the London & Port Stanley Railway and will have access to the city's terminals.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—Construction will be begun within the next few months on a line from Welland to Port Colborne, along the shore of Lake Erie to Fort Erie, and thence along the Niagara River to Niagara Falls. C. J. Laughlin, vice-president. [E. R. J., June 21, '13.]

Bruce Peninsula Railway, Owen Sound, Ont.—Application is being made to the Canadian Parliament to incorporate this company to build a railway, to be operated by electricity, steam or other motive power, from Wiarton northerly to Tobermory, Bruce County, Ont., with branch lines. Power is also asked to operate steamboats and car ferries. E. C. Spearman, Owen Sound, Ont., is solicitor for the applicants.

Sarnia, Ont.—A new railway through Petrolia to Corunna with radials to Courtright, Bridges, Arkona and Sarnia is being projected by London and Petrolia capitalists, in conjunction with the Merchants' Mutual line and other lake package transportation companies. Rights-of-way have been secured in Moore. Hydro-Electric power will be used.

Sarnia (Ont.) Street Railway.—An extension in the southern section of Sarnia will be made by this company.

Toronto (Ont.) Railway.—This company is asked to consider plans to extend its line along Queen Street in Toronto.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being made to extend the Broadway line east on Broadway to East Thirty-third Street and north to Fremont Street in Portland. This company plans to build about 2 miles of new track during the year.

United Railways, Portland, Ore—This company is asked to consider plans to extend its line from Wilkesboro, its present terminus, to Banks, a distance of 2 miles.

Lehigh Valley Transit Company, Allentown, Pa.—The new extension of the Liberty Bell Route from Allentown to Philadelphia is nearing completion. All but one of the new cut-offs are in use.

West Side Electric Street Railway, Charleroi, Pa.—About 5 miles of new track will be laid by this company during the year.

Hershey (Pa.) Transit Company.—It is planned to build 11 miles of new track between Hershey and Elizabethtown during the year.

South Fork-Portage Railway, Johnstown, Pa.—A 7.5 line will be built between South Fork and Portage during the year.

York (Pa.) Railways.—About 1 mile of new track will be built by this company during the year.

Montreal & Southern Counties Railway, Montreal, Que.—An extension to Youville Square in Montreal will soon be built.

Rhode Island Company, Providence, R. I.—During 1914 this company plans to build about 12 miles of new track in Providence and vicinity.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—It is planned to build about 5 miles of new track to complete the line to Fort Oglethorp during the year.

East Tennessee Traction Company, Nashville, Tenn.—Financial backing has been secured and contracts will be awarded in the near future by this company to build the 30-mile line between Chattanooga and Cleveland. J. W. Adams, Chattanooga, is interested. [E. R. J., Oct. 25, '13.]

Nashville (Tenn.) Traction Company.—Work has been begun by this company on its 34-mile line out of the city of Nashville. W. O. Parmer, Nashville, president. [E. R. J., Jan. 24, '14.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—About 2 miles of new track will be built by this company during the year.

Houston (Tex.) Electric Company.—It is planned to build 6.18 miles of new track in Houston during the year.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—This company, which plans to build a 27-mile electric railway to connect Austin, San Antonio, Ktle, Manchaca, Hunter and New Braunfels, elected the following officers at the first annual stockholders' meeting: Vories P. Brown, president; W. B. Tuttle, vice-president; Samuel C. Bell, secretary, and Jesse D. Oppenheimer, treasurer. [E. R. J., Oct. 11, '13.]

Temple, Tex.—Preliminary arrangements are being made for the 30-mile electric railway to connect Temple, Lott and Marlin. No names have been made public of those interested. [E. R. J., Jan. 24, '14.]

Port Arthur (Tex.) Traction Company.—It is planned to build about 1 mile of new track in Port Arthur this year.

Texas City (Tex.) Street Railway.—During the year this company plans to build about 3 miles of new track in Texas City.

Uvalde & Leona Valley Interurban Railway, Uvalde, Tex.—About 22 miles of new track will be built by this company between Uvalde and Batesville during the year.

Ogden (Utah) Rapid Transit Company.—During the year this company plans to build between 2 and 3 miles of new track in Ogden and 65 miles of new interurban line from Bingham City to Logan, Utah, and from Smithfield, Utah, to Preston, Idaho.

Utah Light & Railway, Salt Lake City, Utah.—During the year this company plans to build 4.5 miles of new track from Holliday to Cattonwood Canyon and from Centerville to Farmington, 4 miles.

Virginia Railway & Power Company, Richmond, Va.—It is planned to build 1.306 miles of new track in Richmond during the year.

Yakima Valley Transportation Company, North Yakima, Wash.—During the year this company plans to build 12½ miles of new track between North Yakima and Moxee City, also an extension of its present interurban line for freight business.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—About 5 miles of new track will be constructed by this company during the year.

Seattle (Wash.) Municipal Railway.—The contract to furnish about 57,096 lb. of weatherproof feeder cable for this municipal line has been awarded by the Board of Public Works to the Pierson-Roeding Company.

Grafton (W. Va.) Traction Company.—Plans are being considered to build an extension from Grafton to Fairmont or Clarksburg.

Shenandoah Valley Railway, Martinsburg, W. Va.—Preliminary arrangements are being made by this company to build its electric line to connect Harrisonburg and Winchester, Harper's Ferry, W. Va., and Frederick, Md., via the Shenandoah Valley. A deed of trust, for a bond issue of $5,000,000 in favor of the Safe Deposit & Trust Company, Baltimore, has been filed at Martinsburg. Power will be supplied by an enlargement of the plant of the Martinsburg Power Company. Clarence E. Martin, Martinsburg, is interested. [E. R. J., April 12, '13.]

Badger Railway & Light Company, Milkaukee, Wis.—This company has awarded a contract to the Raulf Company, Milwaukee, to build its 22-mile line from Lake Geneva to Whitewater. Work will soon be begun.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to build two new passenger stations on its line between San Bernardino and Riverside. One station will be built at Mount Vernon Avenue and Colton Avenue in San Bernardino and the other at Colton Avenue and Center Street in Riverside.

Montreal (Que.) Tramways.—This company has acquired a block of land containing 411,200 sq. ft. on the Lachine Canal in Montreal on which it is proposed to build new carhouses. Work will be begun in the spring.

Dallas Consolidated Electric Street Railway, Dallas, Tex.—Among the improvements planned by this company in the near future will be extensions to its carhouses and repair shops in Dallas.

POWER HOUSES AND SUBSTATIONS

Brooklyn (N. Y.) Rapid Transit Company.—This company has placed an order with the General Electric Company for three 3000-kw rotary converters, nine 1100-kva air-blast transformers and switchboard apparatus to be installed at its substations in Brooklyn.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio—This company has purchased a 500-kw, 600-volt rotary converter and switchboard from the General Electric Company.

Nashville (Tenn.) Traction Company.—Plans are being considered by this company to build a new power house in Nashville.

Manufactures and Supplies

ROLLING STOCK

Scranton (Pa.) Railway has issued specifications for ten passenger cars.

El Paso (Tex.) Electric Railway expects to purchase six closed 32-ft. 4-in. city cars.

Maryland Electric Railways, Baltimore, Md., is contemplating the purchase of new cars.

Saskatoon (Sask.) Municipal Railway expects to purchase an automobile and service wagon.

Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y., is contemplating the purchase of six closed passenger cars.

Electric Short Line Railway, Minneapolis, Minn., has ordered a 50-ft. gas-electric motor car from the General Electric Company.

St. Louis Southwestern Railway, St. Louis, Mo., has ordered eight 70-ft. gas-electric motor cars from the General Electric Company.

London County Council Tramways, London, England, is receiving propositions on 150 trail cars, and on couplers for about 200 cars.

Jamestown, Westfield & Northwestern Railway, Jamestown, N. Y., has ordered two baggage cars from the Niles Car & Manufacturing Company.

Minnesota Northwestern Electric Railway, Thief River Falls, Minn., has ordered a 70-ft. gas-electric motor car from the General Electric Company.

Michigan Central Railroad, Detroit, Mich., has purchased for the Detroit River Tunnel four 120-ton, type 404, 600-volt electric locomotives from the General Electric Company.

Port Arthur (Ont.) Street Railway has ordered three double-end, single-truck, double-end control, pay-as-you-enter cars from the Preston Car & Coach Company, for delivery in seventy-five days.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., has purchased three 51-ft. all-steel combination baggage and smoking interurban cars from the Cincinnati Car Company.

Cumberland & Westernport Electric Railway, Cumberland, Md., expects to purchase within a week four double-truck, double-end, combination baggage and passenger cars, with four-motor equipments.

Detroit United Railway, Detroit, Mich., owing to a misunderstanding was erroneously noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1913, as being in the market for fifty single-truck cars. This company is not contemplating the purchase of additional cars.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has ordered six interurban cars from the Preston Car & Coach Company. Three of these will be equipped with baggage compartments and the other three will be entirely first class. Delivery is called for in April and May.

Companhia Linha Circular, Bahia, Brazil, is contemplating the purchase, through Guinle & Company, New York, N. Y., exporters, of thirty double-truck, ten-bench open cars, to be equipped with General Electric motors. The cars are expected to cost approximately $3,000 per car, including equipment.

Michigan United Traction Company, Jackson, Mich., has purchased four all-steel interurban passenger cars from the St. Louis Car Company. This item corrects one which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, and which stated erroneously that the cars ordered by this railway company were ten city cars.

TRADE NOTES

International Steam Pump Company, New York, N. Y., has appointed Stuart H. Patterson a director. Mr. Patterson is associated with the Guaranty Trust Company.

Williams, Dunbar & Coleman, New York, N. Y., have formed a partnership and will continue the business heretofore conducted under the firm name of Williams, McConnell & Coleman, transacting a general brokerage and investment business in stocks and bonds, with particular attention to public utility securities.

Champion Recording Machine Company, Chicago, Ill., has received an order from the United Railways of St. Louis for transfer-issuing machines to be installed on all the cars of its Park Avenue line. This company has recently equipped a plant at Grand Rapids, Mich., where it is now manufacturing the transfer-issuing machines.

Hugh L. Cooper, New York, N. Y., announces that he has completed the water power development of the Mississippi River Power Company at Keokuk, Ia., and that he has opened offices at 101 Park Avenue, where he will engage in the practice of general hydraulic engineering, including the design, construction and management of hydroelectric power plants.

Jesse Coogan Engineering Company, Milwaukee, Wis., has opened up a large establishment in Salt Lake City, Utah, for designing, engineering and contracting for heating and ventilating apparatus exclusively. This company will continue its Milwaukee office in the Engineering Building at 133 Second Street, but Mr. Coogan will devote his entire attention to the Salt Lake City establishment.

Harold Almert, Chicago, Ill., consulting engineer, and for the past five years manager of the department of examinations and reports of H. M. Byllesby & Company, Chicago, Ill., has severed his connection with that firm to engage in consulting engineering practice, with offices in The Rookery, 209 South La Salle Street. Mr. Almert had just completed his twentieth year of active work in the organization, financing, design, construction, operation and management of public utilities.

W. R. Grace & Company, New York, N. Y., have received orders to export to La Paz, Bolivia, six center-entrance cars, built by The J. G. Brill Company and equipped with General Electric motor and controller equipment, and with track brakes in combination with hand and air brakes, necessitated by the 13 per cent grades of this city line. This export company has also recently shipped several double-truck interurban cars, built by The J. G. Brill Company and with General Electric equipment, to Lima, Peru, for use on an extension of the present service of that city.

Esterline Company, Indianapolis, Ind., has recently shipped seventy-five "Golden Glow" headlights to Detroit, Mich. These headlights have been specified for the 100 cars which are being built for the Geary Street Municipal Railway, San Francisco, Cal., by the Jewett Car Company and the six cars being built for the Ogden (Utah) Rapid Transit Company by the American Car Company. Other electric railways which have recently received headlights are the Nevada Water, Light & Traction Company, Pennsylvania & Ohio Railway, Clinton Street Railway, Tulsa Street Railway and Pine Bluff Company.

Duff Manufacturing Company, Pittsburgh, Pa., builder of lifting jacks, has opened an office in the People's Gas Building, Chicago, Ill. Backed by a Chicago warehouse, it will be in a position to give Western customers increased service and prompt deliveries of "Barrett" track and car jacks, Duff ball-bearing screw jacks, Duff-Bethlehem hydraulic jacks and the numerous variations of these main types of lifting jacks manufactured by it. The company has appointed G. W. Parsons district sales agent with offices in the Pioneer Building, St. Paul, Minn. By mutual agreement the Fairbanks-Morse Company has discontinued acting as exclusive steam railway agent for the above company.

Standard Paint Company, New York, N. Y., after a convention of its Eastern sales force and office staff, lasting for several days, held a banquet in New York on Dec. 29, 1913. Ralph L. Shainwold, president of the company, gave an address in which he related some interesting incidents of his early experience. Talks were also given by Herbert Abraham and H. A. Gillespie, assistant managers; J. H. Thomas, manager railroad department; C. E. Smith, manager paint and electrical department; H. A. Collins, Eastern sales manager; W. F. Fairbrother, manager advertising department, and others. The Western division of salesmen convened in Chicago on Jan. 3. At the banquet William F. Pitts, Western sales manager, made an address, the keynote of which was optimism. W. F. Fairbrother, manager advertising department, also addressed the meeting on advertising and salesmanship. Speeches were also made by C. W. Dohm, superintendent Chicago Heights plant; Harry E. Smart, W. H. Mullen, and others.

ADVERTISING LITERATURE

Watson-Stillman Company, Aldene, N. J., has issued a catalog describing its heating, chilling and die presses.

Ohio Brass Company, Mansfield, Ohio, has issued a folder which describes diagrammatically its type C "No Wire Bend" trolley wire splicer.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Catalog No. 18, describing various types of small electric motors and their applications.

National Tube Company, Pittsburgh, Pa., has issued Bulletin No. 18A describing its reamed and drifted pipe and containing information relative to the various accessories necessary for the drilling and pumping of wells.

Simplex Wire & Cable Company, Boston, Mass., has issued through Walter B. Snow, publicity engineer, a ninety-two-page booklet, which describes the wires and cables of this company for all voltages, a.c. and d.c., for inside, aerial, underground and submarine work. The manual contains in addition tables and data for the ready reference of electrical engineers, contractors and wiremen. An unusually complete index is supplied at the end.

Carnegie Steel Company, Pittsburgh, Pa., has issued the sixteenth edition of its well-known pocket book on structural steel shapes and other materials used in construction work. The book has been rewritten throughout and the matter contained in it has been brought up to date so that it is conformable to the present standard practice. Like the previous edition, which was dated in 1903, the book is profusely illustrated and the list of tables in the original edition has been extended, making the work as a whole of inestimable value to the engineer, the architect and the builder.

NEW PUBLICATIONS

Proceedings of the American Electric Railway Association and of Its Affiliated Associations for 1913. Published by the association, 29 West Thirty-ninth Street, New York. 6 vols.

A few sample volumes of the *Proceedings* were on exhibition at the midyear meeting of the American Electric Railway Association, and the regular edition is being sent to members this week. The entire set consists of six volumes, one for each of the existing associations and one which is called a "year book." This, a new feature this year, contains general information about the association of interest to the members, such as an outline of the work and scope of each, history of the organization, lists of committees, list of members, etc. Altogether there are 2375 pages in the six volumes.

Electrical and Lighting Engineering. By Henry W. Spang. New York, 1913. Paper, 77 pages.

In his preface the author states that "the object of this work is to explain why electric light, power and railway engineering is now in its most destructive state." Further on the reader will find that "our college professors and electricians are neither thinkers nor investigators." Still, they seem to be not much worse off than others who have achieved fame in the electrical industry, because in the opinion of the author "neither can the employees of the General Electric, Westinghouse nor other electric manufacturing companies who design and develop electrical apparatus be regarded as expert electrical engineers." The theories of the author, so far as we have been able to understand them from the pamphlet under review, are based upon the discovery of "the great aversion of low-potential electricity for a metallic circuit." This discovery explains many remarkable phenomena. For instance, to quote again from the book, "the great electric heat generated in the New York subway is mainly due to the aversion of the power currents to flow in metallic circuits, and especially while starting the long and heavy-laden trains." But enough has been said to indicate the unreliability of any conclusions based upon such postulates. The book does not contain the imprint of any publisher.

Electric Railway Journal

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Consolidation of Street Railway Journal and Electric Railway Review

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WHY NOT AN A. E. R. A. STANDARD JOURNAL BRASS?

Among numerous communications, of which two are published elsewhere, commenting favorably and otherwise upon our editorial of Jan. 31, in which we recommended discarding the M. C. B. journal brass, there are several that call attention to the fact that we are attacking a time-honored standard of the steam railroads. Nothing could be further from the case, although it may be true that it was not specifically stated that we were not commenting upon steam railroad practice. This hardly seemed necessary. Ever since its inception this journal has been understood to represent the electric railways of the country, and any statement as to the insufficiency of the journal brass now used as a standard applied to their needs and to their needs only. Definite, tangible proof is now available to show the necessity on high-speed electric railways for a brass with ears, or wings, and having a practically full semi-circular cross-section. The fact that the existing standard is generally known as the M. C. B. type, since it was appropriated *in toto* from the Master Car Builders' Association, does not necessitate the conclusion, because we advise its abolition, that our recommendation covers steam railroad work or any other conditions than those mentioned in our editorial of Jan. 31. What we are advocating is the development of an A. E. R. A. standard brass.

BRAKESHOE PRESSURES EXTRAORDINARY

The paper presented by S. W. Dudley at the last meeting of the American Society of Mechanical Engineers, published in abstract elsewhere in this issue, is a remarkably complete discussion on the entire subject of high-speed braking. Based, as it was, upon the Pennsylvania Railroad tests, the author was enabled to present authoritative data from which to develop formulas giving an astonishing insight into braking operation. Possibly the most extraordinary point brought out was that under good rail conditions a nominal braking pressure averaging 470 per cent for a speed of 60 m.p.h. was a theoretical possibility. Of course, as pointed out in the paper, this indicated nothing more than a highly interesting scientific fact, because by the same formula and factors it was shown, immediately afterward, that an extremely bad rail might cause the wheels to slide under a braking pressure of 81 per cent. However, the fact remains that brake design involves consideration of average, not extreme, weather conditions, and with the presentation of these theoretical possibilities the braking pressures far in excess of 100 per cent which are often demanded upon electric railway cars through the necessity for absorption of the kinetic energy of rapidly rotating motors need cause no alarm about sliding wheels under normal rail conditions.

RÉSUMÉ OF RAILROAD VALUATION PROBLEM

Although C. A. Prouty, of the Railway Valuation Board, in his address before the United States Chamber of Commerce, which is published elsewhere in part in this issue, presented no conclusions of the board on doubtful valuation points, yet his outline of the work, of the time and expense required and of the benefits to be derived serves as an excellent starting point from which the interested layman and investor can follow the board's progress. Probably the most interesting statements are those regarding the basis of valuation and the purpose of the work. The completed valuation records will show the extent and the character of each railroad property, the cost of reproduction and the amount of depreciation, but the determination of these "physical" characteristics, according to Mr. Prouty, neither completes the work of the board nor establishes the proper values. The board is required by the valuation act to ascertain also the amount and sources of investment, to note the earnings—in short, to study the complete corporate and financial history of the properties. The establishment of rates is not a question merely of valuation, for, as the speaker says, all the points mentioned must be considered as factors. The physical valuation is, in fact, only the beginning of the solution of the rate-making problem, and when it is considered that this is now only in its inception the procedure of rate establishment from the valuation data to be obtained can hardly be said to be in even a formative stage.

ERRORS IN BUILDING DESIGN

Occasionally in visiting a shop or carhouse one hears just complaints from the master mechanic or his men about some error in building design which interferes with the best performance of their work. These errors are not those of general features, like heating and lighting, but in details which the most clever engineer or draftsman cannot foresee if he depends merely upon his own knowledge of the business. In one instance the cars have to be taken outside of the building because the necessary location of the aisle sprinklers makes it impossible to turn a trolley pole around. Had the question of clearances received more thought in connection with the radial swing of trolley poles, this inconvenience would have been avoided. In a second instance the paint shop could not be used as such because the draftsman had designed it on the assumption that men who paint the sides of the cars have highly compressible bodies. In a third instance a carhouse was built with a great central archway, but the architect's sense of symmetry was so much greater than his knowledge of local car widths that the archways on either side have never remained anything more than ornaments. It would be easy to quote other cases like these, but enough have been given to point a moral. Few companies would dream of buying longer cars until they had made a study of clearances along their lines; but how often is a carhouse or shop designed without regard to the knowledge of the conditions in use possessed by the foreman of the maintenance department? The business of the engineer-architect is to design the most appropriate form of structure and to select the most economical building materials, but his work is not done until every specialist whose work will be carried on in the building has had the opportunity to point out his individual needs.

SHORT-TERM FINANCING AND EQUIPMENT TRUST CERTIFICATES

In a general review of corporation financing during 1913 published in the issue for Jan. 2 of the *Wall Street Journal* and presented in abstract in our issue of Jan. 10 the most striking feature was the great increase in the use of short-term notes as a financing medium. The statement showed a decrease of nearly $300,000,000 in bonds, a decrease of about $194,000,000 in stocks and an increase of $236,000,000 in notes over 1911, figures that are highly illuminating. Not less interesting, too, is the fact that the popularity of the note issues was as greatly in evidence with the public utilities as with the steam railroads and industrials.

Short-term financing has sometimes been criticised on the ground that it is a weak-kneed temporizing expedient that may be used further to increase the capitalization of a company when extended bond issues would never receive authorization. We believe, however, that this method of financing is no more likely to be abused than any other, and that it does possess a well-defined economic basis for its usage. The great demand for capital which in recent years has converged on the principal money markets of the world has in a marked degree raised the interest rate. At the same time, there has been a constant decline in the purchasing power of money, evidenced, for example, by the "high cost of living," and incident to this decline there has been an increasing tendency on the part of investors to shift their investments to those paying higher returns than before, even at the risk of a somewhat lessened security. Coexistent with this search for higher interest-bearing securities there has been a perfectly human desire so to invest that the expiration of the time limit of the investment would not see the return of the original sum highly depreciated as regards its power of exchange. If an investor believed that the future would constantly bring a further decrease in the purchasing power of money, he would prefer a short investment with the chance of later re-investing his money elsewhere rather than a long-continued investment at a fixed rate of return. Indeed, it has been stated as an axiom that in just so far as an investor looks upon the decline in the exchangeability value of money as a factor likely to be continuously felt, just so much on his part will there be a preference for short-term securities. During 1913, for example, these securities were utilized, in the electric railway field, by the Massachusetts Electric Companies, the Cities Service Companies, the Middle West Utilities Company, the Public Service Company of Northern Illinois, the Birmingham-Tuscaloosa Railway & Utilities Company and the Interborough-Metropolitan Company, the total issue being $104,732,500. It must be confessed, however, that belief in the stability of and the preference for short-term securities, as proved by action thereunder, has been manifested in the past in a greater degree by steam railroads than by electric railways even when their relative capitalizations are taken into account.

Thus far we have been concerned with the comparative worth of short-term notes and longer investment instruments. In considering the relative intrinsic value of the various types of short-term notes, however, such as mortgage notes, collateral trusts, debenture notes, equipment trust certificates, etc., the investor must leave behind the question of convertibility and consider the security of principal and the rate of return. In regard to these two points the equipment trust certificate is near the top, if not at the top of the list. But in spite of the fact that steam railroads in 1913 and years previous utilized this instrument of credit extensively, it is only very recently that its high comparative value has received general recognition in the electric railway field.

As the name implies, the equipment trust obligation is issued to pay for the rolling stock of a company. The legal title to this equipment is held, through an intermediary trust company, for the benefit of the noteholders. The attractiveness of this security, of course, depends to a certain extent upon the maintenance of the supporting assets, but the transportation company obligates itself to keep the equipment in full repair and to furnish sworn statements at regular intervals as to its condition. The Investment Bankers' Association now has under way a standardization of these periodic reports which can only add to the strength of equipment notes. It is true that these securities are essentially chattel mortgages and operate to pledge a semi-fixed asset under a short-term obligation that must be met at all hazards, even in the face of other impending fixed charges. A modicum of prudence must assuredly be exercised in regard to the number of such securities issued, but this clear-cut choice of paying the notes or losing the equipment is exactly what constitutes the appeal of these securities to the investor. This appeal is spreading, too. At present the Van Tuyl commission in New York State is even considering a plan for making equipment trust certificates legal investments for savings banks. When one considers, however, that to an almost perfect safety there is added a yield considerably better than that on most ordinary mortgage bonds, it seems that this class of securities could well be used more widely than in the past to attract investors in the electric railway field.

OVERHEAD CHARGES FOR POWER

A correspondent in this week's issue criticises a statement contained in a recent article on electrolysis, published in this paper, that the energy wasted in inefficient return feeders could be assumed to cost the company 1 cent per kw-hr. He says, in effect, that the amount of energy involved, as compared with the total amount generated, is so small that it is impossible to conceive of a case where greater power capacity or more attendance would be required on this account in the power stations and substations. For this reason the only additional cost to the company is that of the extra coal burned, amounting, perhaps, to only one-third of the 1 cent mentioned in the article.

The point brought up by the writer is, of course, not peculiar to the generation of power. It applies equally to manufacturing or other lines of business. Whether all small increases of output should carry their proportion of the overhead charges in individual cases may perhaps be open to argument. In general, however, the hypothesis that any charge can escape its share of the overhead burden is incorrect and constitutes, as we have often pointed out, a dangerous fallacy. In railway repair shops, for instance, it is not uncommon to find that the manufacture of a certain line of supplies is being carried on because the management apparently believes that the cost of the supplies need carry no overhead charges. The argument is used that the space is there, that no additional supervision and very little additional power are required, and that consequently the only cost is that of the materials and labor directly required. The inevitable and logical sequence of the acceptance of this idea is that the manufacture of other supplies may be added, also without overhead charges, until the repair work is crowded out of the shop.

Again, in the case of car weights cited by our correspondent, where he claims that a reduction of 100 lb in the weight of a single car would make no difference in the energy consumption, the acceptance of his statement involves, logically, the acceptance of a corollary that no saving accrues from a weight reduction of 500 lb., or 2000 lb., or 10,000 lb. If the weight reduction on only one car does not effect a saving, neither will it do so on ten cars, nor on 100 cars, nor on 1000 cars.

The only answer to this reasoning is, of course, in favor of the general rule that each portion of the work or output, from an accounting standpoint, should carry its own overhead charges. Of course, we do not mean that with a 1 per cent increase in output an actual increase in power station capacity is necessary. For this reason, in individual cases dealing with amounts of power which are always petty, we believe that the contention of our correspondent is sound. At the same time, in defence of Dr. Rosa's original statement, it is well to remember that the power considered by him is measured on the d.c. side so that the assumed unit price of 1 cent per kw-hr. is conservatively low.

LABOR AGREEMENTS

One of the recent labor agreements—that of the Boston Elevated Railway—contains a clause which is novel, so far as we know. The agreement in general provides for an "open shop." That is to say, the company agrees not to discriminate against any employee because of his affiliation with the union, and the union recognizes the right of any employee to decline to join the organization or to resign from it at any time. The novel feature consists of a clause by which the company agrees that if a member of the union decides to resign and yet remain in the employ of the company he must send in his resignation in writing and pay all of his back dues. This clause has been criticised on the ground that it practically makes the company the collecting agent of the union, while in its defense it is claimed that the rule about the method of resigning is no more than that enforced by practically every club or mutual benefit organization with membership dues. The usual form of "open shop" labor agreement does not contain any clause of this nature, whereas the usual form of "closed shop" agreement requires all men in the employ of the company to become and remain members of the union. This question illustrates the difficulties which a company encounters in its dealings with labor unions.

If union agreements contained clauses of reciprocal advantage and if each party to the contract could be penalized if it did not live up to its terms, there would be less objection to them. In practically all cases, however, the advantages are all on one side; that is to say, they limit the railway but not the employees. We have been charged with opposition to the principle of labor unions. This charge is unfounded. We are opposed only to one-sided contracts. If, for instance, a union agreement meant better men, better service and better discipline as a consideration for the contract, the situation would have a different aspect. Then it is conceivable that a company would often find it advantageous to make such a contract and consequently would do so voluntarily.

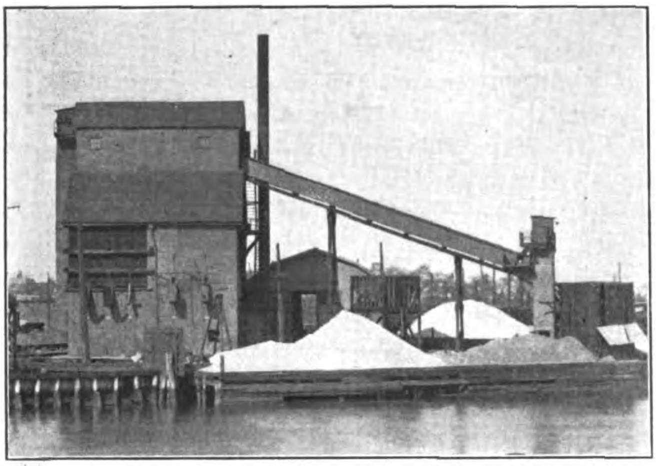
Practically, however, the only arguments presented to a company now to induce it to sign an agreement of this kind are threats of interference with the operation of its cars and destruction of its property if it does not do so. Then, after the contract is signed, it becomes practically enforcible only against the company and not against the union. Such a contract, if made between two individuals, would be void at law because made under coercion and for lack of consideration, and we consider a contract of this kind is equally pernicious when made between organizations. Ex-president Eliot of Harvard emphasizes these points in a letter made public this week and says that the habitual use of violence by unions to attain their ends and their disregard of contracts cannot but be detrimental to labor in the end.

Sand from Tidewater to Rail in Boston

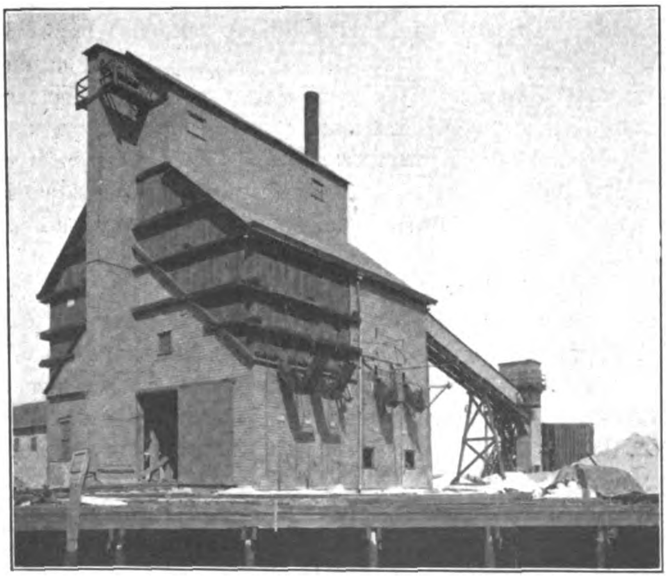
This Article Describes the Method of Obtaining and Handling Sand for the Boston Elevated Railway, as Well as the Operating Equipment, Rules and Report Forms Used

BY EDWARD DANA, ASSISTANT SUPERINTENDENT SURFACE LINES BOSTON ELEVATED RAILWAY

In cities in the northern part of the United States, where during the year wide ranges of temperature occur, bad rail conditions are found to exist during the colder months because of frosts, mud, snow and ice, and falling leaves. In the summer, too, the application of various oils to lay the dirt also causes slippery rails, with the result that the problem is really one of the year around. The result of such conditions has been an ever-increasing use of sand as a protective measure both to assist careful motormen and to prevent careless motormen from having collisions.



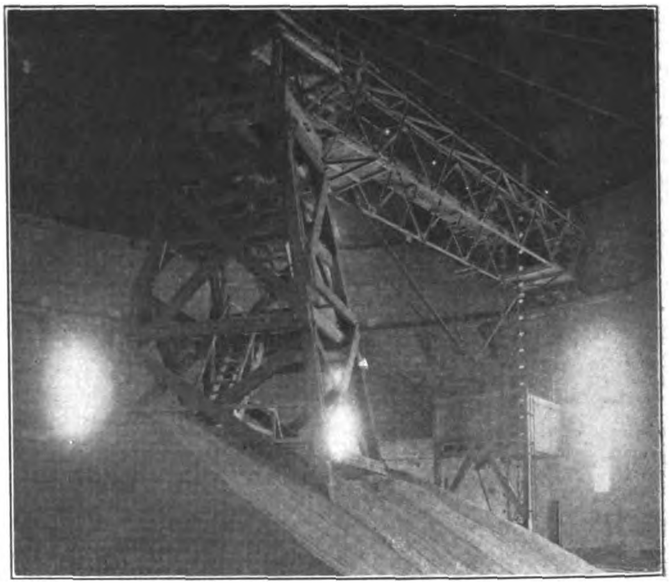
Boston Elevated Railway—Sand-Unloading Plant in Charlestown, Showing Bucket Elevator and Inclined Belt Conveyor Housing



Boston Elevated Railway—Sand-Unloading Plant, Showing Dry Sand Spouts and Loading Track for Cars

In Boston, in particular, the amount of sand used for such purposes during the comparatively short period of eight years has increased from 17,985 cu. yd. in 1905 to 34,871 cu. yd. in 1913, or nearly 100 per cent. The amount of sand required can be better realized if expressed in other terms. Last year the sand deposited on the rails of the Boston Elevated Railway was equal to the amount which would be contained in a cube 100 ft. in height. It would have covered a single track 4 ft. 6 in. wide for a distance of half a mile with a wall of sand 8 ft. high. The annual cost of cleaning and sanding the track in Boston amounts to $76,896.

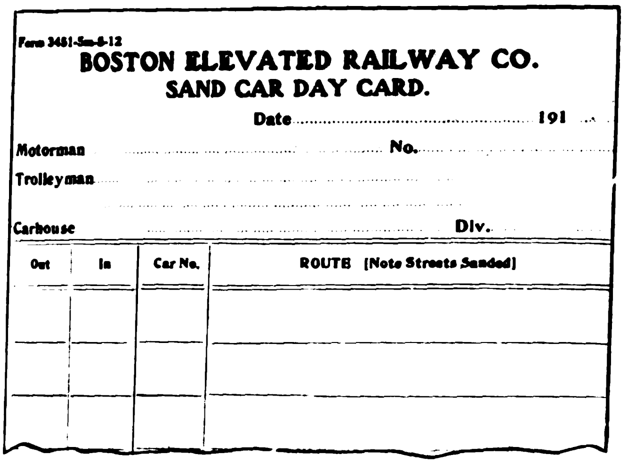
Recently, in order better to take care of such an expenditure, the Boston Elevated Railway has perfected more modern arrangements for obtaining and handling this large amount of sand. The sand is secured by suction from deep water in Ipswich Bay and is carried by steam barges to a plant costing $24,000 in the George Street yard in Charlestown, located at tidewater on the Mystic River. This service requires two vessels, and trips are made every day in good weather and once in three or four days under stormy conditions.



Boston Elevated Railway—Interior of Circular Division Storage Station, Showing Overhead Crane, Vertical Bucket Elevator and Horizontal Belt Conveyor and Pocket Over Circular Car Track

Upon its arrival at Boston, the sand is unloaded by the barge's grab bucket into an elevated pocket on the wharf, from which it runs by gravity into a bucket elevator. This in turn deposits it on an inclined belt conveyor, rising 52 ft. above the wharf level. From this belt conveyor the sand passes through a rotary screen into an overhead wet-sand bin, and thence by gravity through a rotary drier and along a bucket elevator into the dry-sand bin. From this bin the sand can be spouted into cars for direct use on the track or for conveyance to other storage plants. The plant has a capacity of 500 cu. yd. of wet sand and 500 cu. yd. of dry screened sand.

Supply cars averaging seven trips daily are operated from this plant to division storage stations, of which there are at present two. One of these is a circular brick building 116 ft. 5 in. in diameter, originally a gas holder building, with a track running around the inside of the building at a height of 6 ft. 10 in. above the depressed floor. The supply cars merely run into the building and unload by gravity. After the outer part of the building has been filled to such a point that these cars can no longer be unloaded in this way, an overhead crane 44 ft. above the floor, pivoted in the center, with the outer end running on a rail supported by the walls of the building, picks up the sand by means of a vertical bucket elevator and carries it on a horizontal belt conveyor to the center of the building.

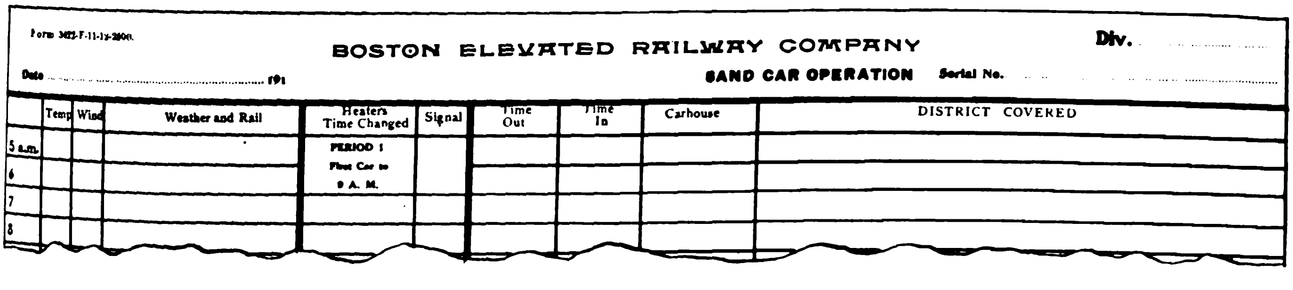

Form 3451-5m-8-12
BOSTON ELEVATED RAILWAY CO.
SAND CAR DAY CARD.
Date .... 191 ...
Motorman .... No. ....
Trolleyman ....
Carhouse .... Div. ....

Out	In	Car No.	ROUTE [Note Streets Sanded]

Fig. 1—Boston Elevated Railway—Day Card Used by Operators of Sand Cars

This vertical elevator is also used to load sand for use on the tracks. It is able to travel along the overhead crane bridge, reclaim the sand from any point and by means of the belt conveyor, which is reversible, deposit it in pockets over the circular car track. From these pockets the sand is loaded directly by gravity into the sand cars. Four of these cars can be loaded at once and that number is always kept filled for immediate use. At present the company has thirty sand cars, which are 20-ft. passenger cars adapted to this use, as shown by the accompanying illustration. Their capacity is 6 cu. yd., sufficient for about 100 miles of track.

Whenever the tracks become slippery, owing to weather conditions or other reasons, the sand cars are sent out. It is the practice under severe weather conditions to operate them over the steep grades early in the morning before the regular service is started. Moreover, whenever a city sprinkler pours oil upon the streets, a sand car follows in order to undo the danger caused to the operating condition of the rail. Inspectors' duties require them to keep on alert watch for all bad conditions and to report them to the division headquarters. Motormen, too, upon arrival at the carhouses are expected to make such reports. When such notices are received a yellow flag is immediately displayed at the carhouses, and notices warning all motormen of the conditions existing are written upon blackboards provided for the purpose.

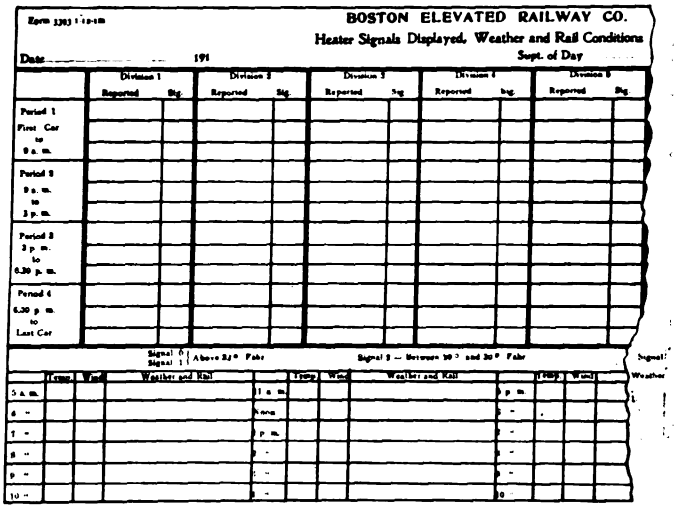

Form 3422-F-11-13-2000.
BOSTON ELEVATED RAILWAY COMPANY
Div. ....
Date 191
SAND CAR OPERATION Serial No. ....

	Temp	Wind	Weather and Rail	Heaters Time Changed	Signal	Time Out	Time In	Carhouse	DISTRICT COVERED
5 a.m.				PERIOD 1					
6				First Car to					
7				9 A. M.					
8									

Fig. 2—Boston Elevated Railway—Record of Sand Car Operation Kept at Division Headquarters

The variation in the use of sand cars during the several months is shown in the table on this page.

Over certain sections, especially in the downtown business section where traffic is heaviest, a sand car becomes cumbersome and loses its efficiency. Under such conditions one-man sand wagons are employed. By this means it is possible to sand the rails very effectively, as the wagon can be constantly pulling in and out of the track. The company has twelve sand wagons of the type shown by the accompanying illustration. The capacity of each is 1 cu. yd. These wagons require frequent loading points, and in order to provide sufficient sand for them as well as for use by street inspectors with pails, there are kept filled by the general supply cars 109 street boxes.


Form 3303 1-13-1m
BOSTON ELEVATED RAILWAY CO.
Heater Signals Displayed, Weather and Rail Conditions
Date 191
Supt. of Day ....

	Division 1		Division 2		Division 3		Division 4		Division 5	
	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.
Period 1 First Car to 9 a. m.										
Period 2 9 a. m. to 3 p. m.										
Period 3 3 p. m. to 6.30 p. m.										
Period 4 6.30 p. m. to Last Car										

Signal 0 / Signal 1 } Above 30° Fahr Signal 2 — Between 20° and 30° Fahr Signal

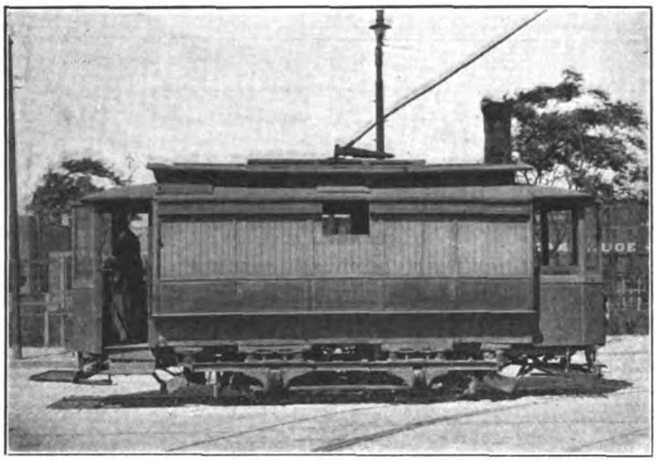
	Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail		Temp.	Wind	Weather
5 a. m.				1 a. m.				p. m.			
6 "				Noon				"			
7 "				p. m.				"			
8 "				"				"			
9 "				"				"			
10 "				"				10 "			

Fig. 3—Boston Elevated Railway—Record of Sand Car and Wagon Operation Kept by Superintendent of Day

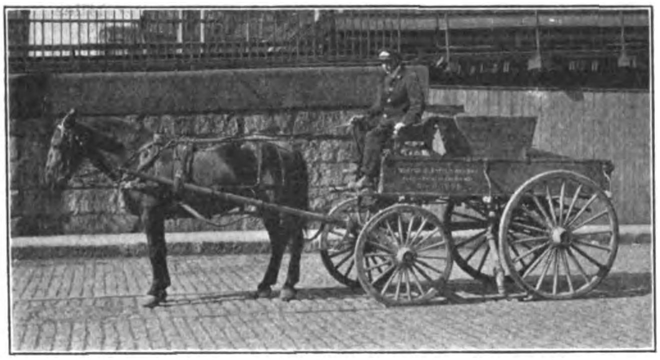
	Car Hours	Car Miles
1912		
July	786	7,171
August	723	5,774
September	1,893	15,144
October	3,136	24,088
November	2,014	16,112
December	1,379	11,032
1913		
January	2,244	17,952
February	1,949	15,592
March	1,541	12,328
April	670	5,360
May	628	5,024
June	812	6,496
Total	17,775	142,073

Besides these facilities for sanding the track each of the company's twenty-four carhouses has an adequate sand bin. Then, too, all box cars are equipped with boxes of a capacity of approximately 1 1/3 cu. ft. These are maintained and filled by the carhouse force and are operated by foot pressure by motormen. Sand is also carried, of course, in the hopper of individual passenger cars and on open cars in pails provided for the purpose, and the motormen are held responsible for testing the operation of the sand mechanism and knowing at the beginning of a trip that the hopper or pail is filled.

In order to keep an accurate record for future reference in case of accidents, etc., the 4½-in. x 6⅜-in. day card reproduced herewith is used by men on sand cars. The division headquarters also keep records of operation on form No. 3422, 6⅛ in. x 12 in., and report this to the superintendent of the day at the company's main office. Here the information is entered on form No. 3393, 6⅛ in. x 12 in., which enables the officials to keep in touch with all the sanding work done. This form, a section of the face of which is shown herewith, contains columns for the nine divisions of the company and also spaces for recording data concerning temperature, wind and weather and rail conditions from 5 a. m. until 4 a. m. the following morning. The reverse side of the record is used for data as to the operation of sand cars or wagons, with reference to time out, in, district covered and division number. When bad rail conditions occur in one division the superintendent of the day is in a position to warn other divisions to watch more carefully, and in this way the whole system has the benefit of the earliest knowledge.



Boston Elevated Railway—6-Yd. Sand Car



Boston Elevated Railway—Sand Wagon, Capacity 1 Cu. Yd., for Use in Downtown Business Section

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The Metropolitan Street Railway Company, Kansas City, Mo., has put into use a coal bunker constructed to allow its coal supply to be kept partly submerged in order to retain its burning qualities, 20 per cent of which are said to be lost by exposure to the open air. The bunker just completed is of concrete, with a capacity of 30,000 tons. Twenty-inch pipes allow the bunker to be flooded or drained, as the operator wishes. The baths also improve the quality of the coal by carrying away much of the foreign matter, such as dirt, sulphur and wood, and prevent fires from combustion. If as successful as expected, other bunkers of the same type will be built.

FUNDAMENTAL PRECEPTS IN SAFETY WORK AND PERSONAL EFFICIENCY

The following is a portion of an address delivered Jan. 14, 15 and 16 to the trainmen of the Cleveland, Southwestern & Columbus Railway by E. F. Schneider, general manager. Several of Mr. Schneider's previous addresses on "Safety First" have appeared in these columns. In these remarks he takes up what might be called the general ethics of safety work and directions for personal efficiency on the part of employees. After stating that platform accidents had increased during 1913, Mr. Schneider continued in part as follows:

"It is time for us to form new resolutions for 1914. It is time for us calmly and dispassionately to bury all feelings of the past and take an optimistic view of the future in order that we, through whose agency nationwide influences have been brought to bear not only to ameliorate but also to prevent the enormous waste of life and limb, may see the realization of our finest dreams, the clearly discernible march of civilization toward the universal brotherhood of all men. This is the goal toward which we are all striving. We may differ in our opinion as to the detailed methods for attaining this end, but the best thought and the best minds of all agree that it is founded and can be founded only upon one great principle, the Golden Rule—'Do ye unto others as ye would have others do unto you.'

"This rule, the sentiment of which is so beautiful, but obedience to which is so difficult, should be the guide of our daily lives. I have sought to be guided by this rule, and I hope that the employees of our company are doing likewise. If you obey this rule, you will have more consideration for the man who works beside you. You will not loaf when approaching a meeting point, for you will try earnestly to get there first so that you can be of help to the other fellow. Under the perfect working of this rule, there will be no need of claim agents, for you will ever have before you the possibility of saving some poor fellow-creature from harm.

"It cannot be said that the Golden Rule is in complete operation under existing conditions. Man's inhumanity to man is daily exemplified. We need but to look around us to see numerous instances where the savage in man gains ascendency, and as a result a heart is crushed, a spirit is broken, a selfish wish is gratified—in short, something is done for temporary gratification of a narrow-minded self, often at the expense of a weaker one. And where can you find man's inhumanity to man more strongly exhibited than in the railroad world? Railroads kill a man every sixty-seven minutes and injure one every nine minutes. Startling figures, and all the more so when you remember that a large majority of these fatalities and accidents can be avoided. I once estimated that the accidents avoidable to railroad men composed 85 per cent of the total, and these figures are becoming truer every day. A recent estimate in a railroad article placed the accidents avoidable by the railroad men at 75 per cent of the total; that is, 75 per cent of all railroad accidents are caused by nothing more or less than the negligence and carelessness of railroad men themselves. This toll levied upon society by the employees of companies whose object is the serving of mankind and the aiding of the progressive influences of civilization by transporting passengers, mail, express and freight is worthy of nothing except the severest condemnation. You have possibly heard of the old sea captain's official report regarding the natives he met on some out-of-the-way islands: 'Manners, none; customs, beastly.' The same thing can be said of ourselves, too; for we have no manners, and our customs are beastly just as long as we collect the heavy toll we do from the ranks of the toiling multitude who place themselves in our care.

"'There is but one temple in the universe, and that is the body of man.' So runs an inscription on the wall in the Library of Congress at Washington. This sentiment was originally written more than 100 years ago by Novalis, a German writer, who, on account of the frailty of his body, died at an early age. With all the sadness that was ever his, with the ever-present desire for relief from earthly troubles, Novalis yet realized the almost divine trusteeship of the soul guarding the body of man, and with the ecstasy of an inspired soul he gave to us those words denoting his feeling of responsibility for even the frail body given to him.

"Novalis simply expressed the feeling that all of us should have in our hearts concerning the human body. We are individually accountable for the use we make of the temple of our bodies and their proper care. But the sacredness in which we should hold our own bodies is increased many fold when we think of the bodies of others intrusted to our care. These should be guarded most zealously and delivered safely to their destination, and only when you have gone through the day without injury to the temple intrusted to you and with proper care of your own bodies can you lie down to a repose truly earned.

"One of the reasons why men do not avoid accidents as they should is that they are not thoroughly imbued with the spirit of their jobs. Get on good terms with your job. You will always work better for something you like. Other men like to deal with and associate with a man who thoroughly enjoys his work. A great many men do not succeed because they dislike their work; they are always wanting to try something else. This unrest is particularly disastrous to railroad men. Those dissatisfied ideas are the ones you have in mind when you get lost in a fog, when you run off a derailer, when you pass a meeting point, when you run into the rear of the first section, when you fail to signal the motorman for the passenger's stop in time, when you fail to know your rear platform is clear before giving the go-ahead signal, when you fail to help some poor woman with arms full of children and bundles off the car, when you do not think of helping the old or the crippled. You do not have these mental lapses because you do not want to help others, but because you are not on good terms with your job. Get into your mind the fact that this is a big, dignified job, just as good a job as you thought it was when you were trying to get it. Appreciate your job and appreciate it now. I venture to say that you men are earning more money than nine-tenths of the people you are serving, so that you need offer no excuses for being railway men. Writers have often tried to explain the 'secret of success,' but the fact is that the reasons for it are neither secret nor new. To become more successful you must simply become more efficient. Do the little things better. Do your work so that you will require less supervision. Aim ever to better the work you are doing, for by so doing you are bettering yourself. Remember that the thoughts you think, the words you speak and the deeds you perform are making you either better or worse. You can be what you will to be.

"Look upon yourself as a manufacturer in business with yourself. Regard yourself as a maker and seller of service, and ever bend your thought and your energies toward the improvement of your product. Just as the wise manufacturer never wilfully does anything to injure his machinery, just so you must preserve proper conditions in your plant; you must, soul and body. Eat and drink only that which will nourish your body, entertain only those thoughts and feelings that will enrich your mind and soul. By so doing you will build up a service factory that will find its products in constant demand, for the world is hungry for 'quality of service.'

"We all blame others for our shortcomings when the trouble lies within us. Whatever we are the world will be to us. Every day we get the reflection of our own natures. If we are cross, it is reflected to us. If we are surly, we get in life's mirror the same picture returned to us. If we are diplomatic, if we are kind, if we are courteous, if we are careful, if we are honest, if we are helpful, if we are cheerful, if we are forgiving, if we are blind to the faults of others, if we are always striving to do our best, not only will we better our own character through being helpful to others, but also the good done will some time return to us in multiplied form.

"The 'Boy Scout' movement, which has attracted much attention, has inculcated certain principles which are most worthy and beneficial to growing boys. They are contained in the 'Scout law,' and I wish that railway men had a similar law. What better testimonial could be given of a railway man than to say that he fulfils every condition of this paraphrase of the 'Scout law?'

"A railroad man is trusty, loyal, helpful, friendly, courteous, kind, obedient, cheerful, thrifty, brave, clean and reverent."

ELECTRIFICATION OF SUBURBAN LINES OF THE LONDON & NORTHWESTERN RAILWAY

The system of conductor-rails adopted for the electrification of the London & Northwestern suburban lines in England is the same as that on the District and Metropolitan railways. There are insulated third and fourth rails, the positive rail being on the outside of the track rails and the negative in the center between them. The conductor rails are of special low-carbon soft steel weighing 105 lb. per yard, and are supported on porcelain insulators of the usual pattern, attached to the ties by malleable-iron clips. Each rail joint is bonded by four copper bonds of the flexible strip type, the four bonds having a sectional area of 1.4 sq. in.

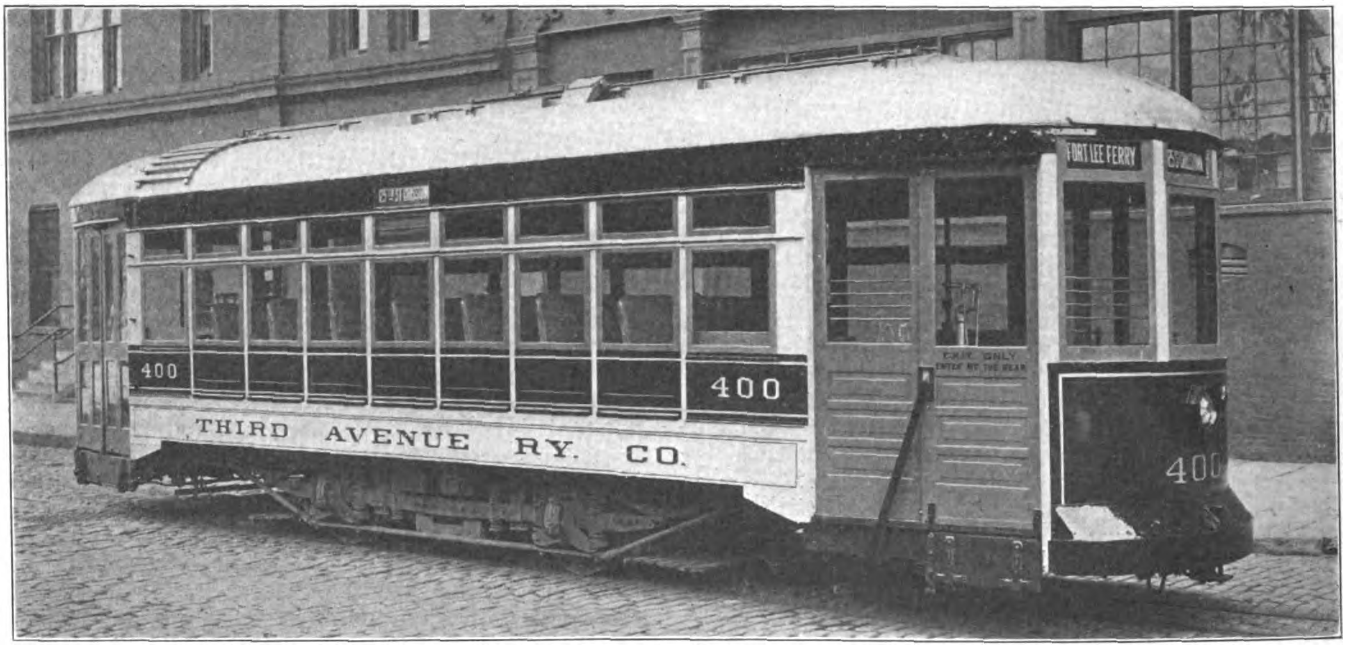
Work in connection with the conversion of the suburban lines of the London & Northwestern Railway to electric traction is now entering a new phase. The construction of the power house buildings at Stonebridge Park is approaching completion, and the first units of the generating plant will be installed during the next few weeks. For the electric service which will soon be in operation between Willesden High Level and Earl's Court a supply of current will be purchased, but it is hoped that the Stonebridge Park station will be furnishing current to the whole of the Euston, Broad Street, Watford and Earl's Court lines included in the conversion scheme by the end of 1914. The power plant at Stonebridge Park will comprise five turbine-driven three-phase alternators having an aggregate normal full-load capacity of 25,000 kw and capable of developing 31,000 kw at the two-hour overload rating. The alternators will generate direct current at 11,000 volts at a frequency of twenty-five cycles per second. The turbines and condensers are being made by the British Westinghouse Electric & Manufacturing Company and the main alternators by the Siemens Brothers Dynamo Works. The boiler house plant will consist of twenty Babcock & Wilcox water-tube boilers, with automatic stokers and Green economizers. The boilers will be arranged in two rows parallel to the turbine room, each row having a separate stack.

A project has been approved for the construction of an electric railway, partly underground, in the town and district of Genoa, Italy.

A Single-Truck Convertible Car for New York Suburbs

This Car Is 34 Ft. 11½ In. Long and Among Other Features Is Notable for the Use of a Non-Oscillating Truck, a New Type of Skeleton T-Iron and Channel Framing and Unusual Proportions of Side Sashes—It Is Equipped with Air Brakes and Automatic Starting and Accelerating Devices

The Union Railway, New York, which operates an extensive network in the borough of the Bronx, New York, and in the suburban sections north of that borough, has lately placed in service one single-truck car of the type shown in the accompanying halftones and drawing. This company's other cars are either of double-truck longitudinal seat or open-bench design, and the present car is the outcome of a belief that a non-oscillating single-truck car with cross seats and suitable for both closed and open service is much more satisfactory and economical for the medium traffic conditions in the territory served. The new cars seat forty-two passengers in a combination of corner longitudinal seats and 34-in. cross-seats with 25-in. aisle, although it is but 34 ft. 11½ in. over the bumpers and 22 ft. 11½ in. over the body. The standard closed cars of 28-ft. body length with longitudinal seats accommodate only thirty-six passengers. Part of the new car's large seating capacity is due to the use of a bench at the motorman's end and of a single seat on the devil-strip side at the conductor's end.



Long Single-Truck Car—Car for Union Railway Suburban Routes in Trial Service on the 125th Street Line of the Third Avenue Railway

FRAMING

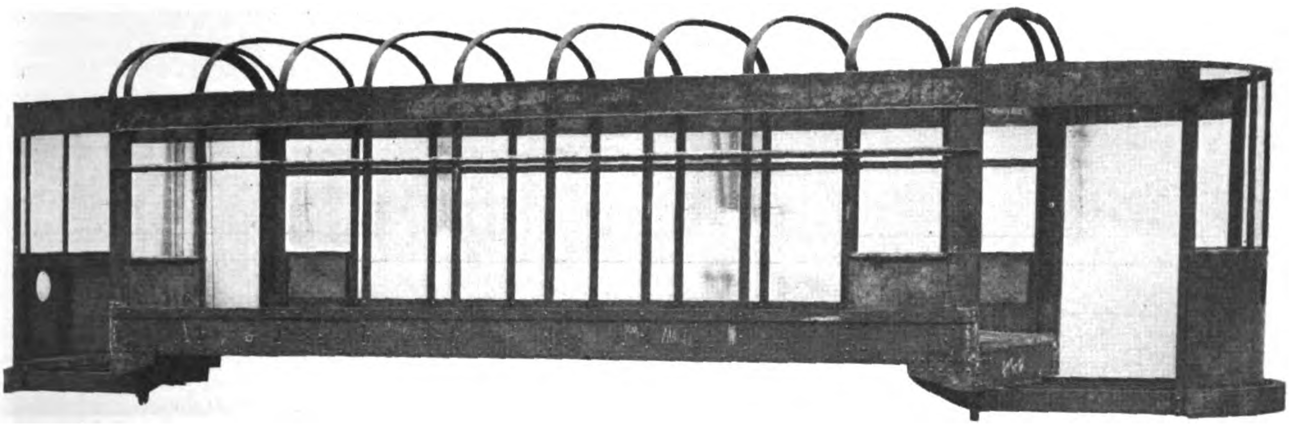
The framing is one of the most interesting features as this has helped to produce a car weighing only 24,000 lb., or 571 lb. per passenger. This weight would be less on future cars as the present one is equipped with old-style motors. The floor framing is a standard combination of commercial angles and I-beams, the variations from common practice beginning above the floor line. The posts and carlines are T-irons which are formed as complete arches at intervals of 2 ft. 5 in. Along the center of the arch the structure is braced by a pair of riveted channels which run from one bulkhead line to the other. These channels also form the framing of the duct for the exhaust ventilators. The roof itself is formed entirely out of agasote. The T-member along each side of the car has two functions, namely, to stiffen the car framing and to separate the removable lower sash from the small upwardly sliding sash. The installation of an upper sash about 10 in. high is novel in American practice, but it is advantageous in making the convertible car more flexible to meet sudden and short changes to warm weather. In summer the lower panels will be replaced by screens. Other framing features of the car are the use of T-members to strengthen the platform from the dash to the corner posts, side sills of 3/16-in. x 15-in. plate, 1/16-in. gage steel to form roof pockets for the top sash and agasote flooring on a Keystone foundation.

TRUCK AND EQUIPMENT FOR TRACTION

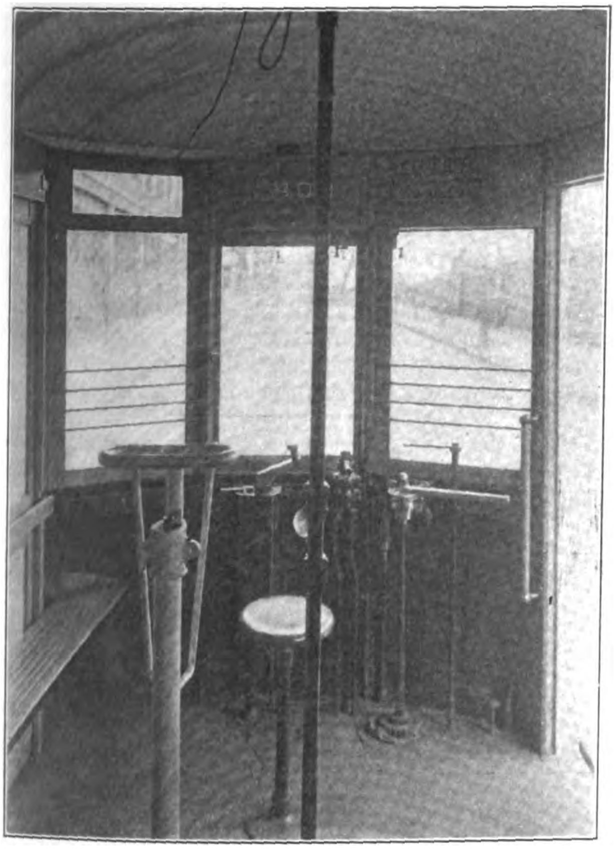
The truck is a modification of the Brill No. 21-E type of 8-ft. wheelbase and 21 ft. over all. The journals have spiral springs while the ends of the truck have long semi-elliptic springs to avoid oscillation. Inside brake rigging is used to give ample space outside the truck for the air brake and control equipments which are installed under opposite ends of the car. Two Westinghouse 68 motors are in use temporarily, but the rest of the operating equipment is modern and includes Westinghouse type 24-A control and National air brakes. The absence of the ordinary K controller gives the platform at least 12 in. more elbow room than others of the same length. The fact that no dividing rails are used on the platforms also adds to their spaciousness. This single-truck car is the only one in the New York metropolitan district which is equipped with air brakes.

SOME OPERATING FEATURES

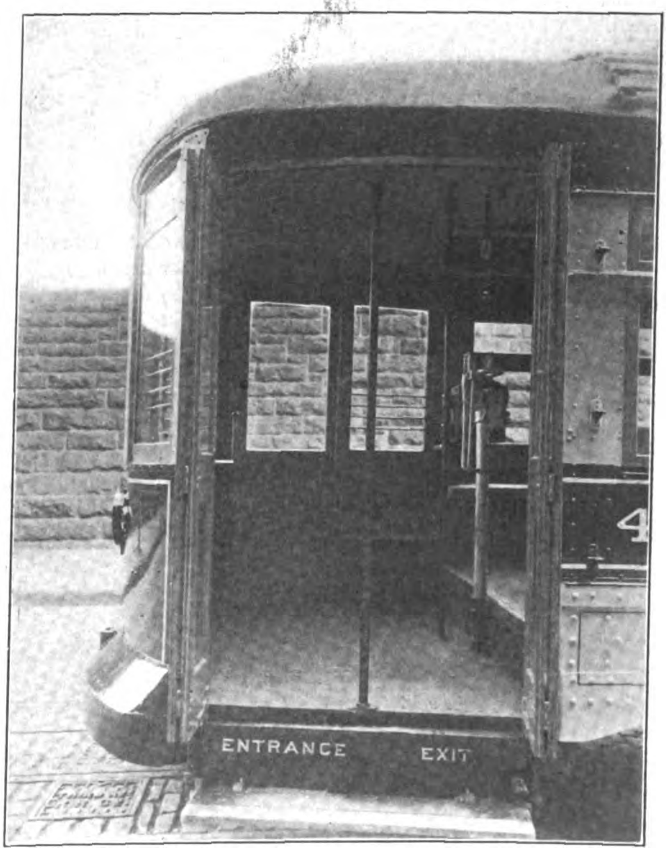
Although the car is mounted on a truck with wheels of 33-in. diameter, the moderate step heights of 13 in., 11 in. and 10 in. from top of rail to bulkhead line have been obtained by building the floor with a ramp of 3 in. in the 7-ft. 6-in. length between the bulkhead line and the center line of the journal boxes. The passenger-handling arrangements are of the standard pay-within type with two pairs of hand-operated folding doors at the conductor's end and a single sliding exit door at the motorman's end. As the conductor is not anxious to operate the doors any more than he can help, he will take advantage of his commanding position to encourage the use of the front exit by calling "Front way out, please," whenever he sees that passengers are ready to leave. The passenger will more readily comply with this suggestion because he does not have to open a body door to get to the platform. As the car is comparatively short, push-buttons have been set only in the panels at the ends so that passengers will be out of their seats and near either exit before they signal for a stop. This feature will eliminate the loss of time which arises when a departing passenger must work his way through a crowded car after he has signaled from his seat. A new feature of the stanchion at the conductor's station is a disk and rod which can be made to slide in a pipe slot overhead. The movement of this device causes the current to be cut off and sets the air brakes at emergency. The control equipment of the motorman embodies such safety features as the deadman's handle and automatic acceleration. In addition, the car cannot be started until all the doors are closed. The last device is a contact and relay, contrived by Mr. McWhirter, which prevents starting on any notch but the first. Thus this single-truck car is also unique in having automatic starting and accelerating features.



Long Single-Truck Car—Steel Framing Layout of Union Railway's First Car



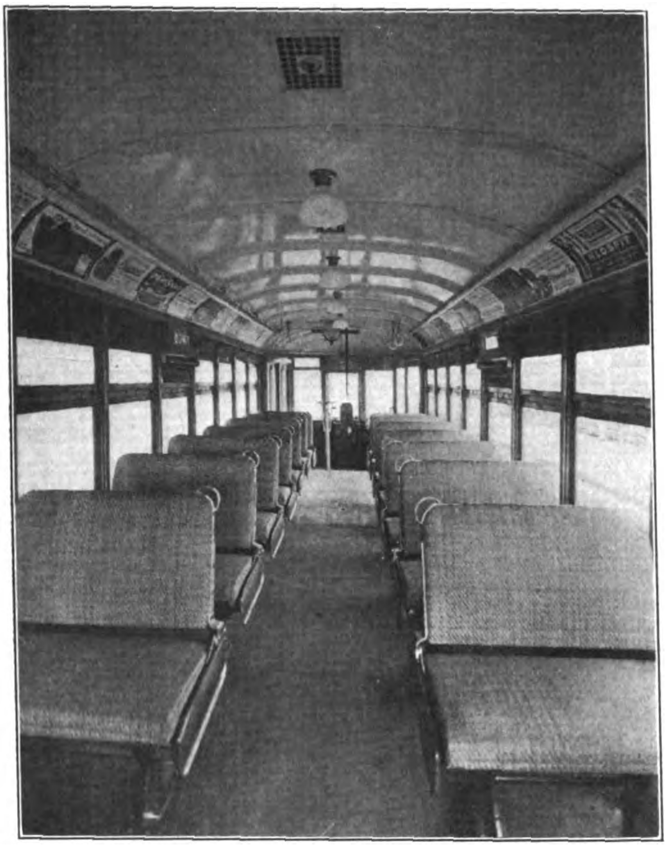
Long Single-Truck Car—Contactor Control Equipment and Disk of Emergency Valve in Pipe at Conductor's Stand



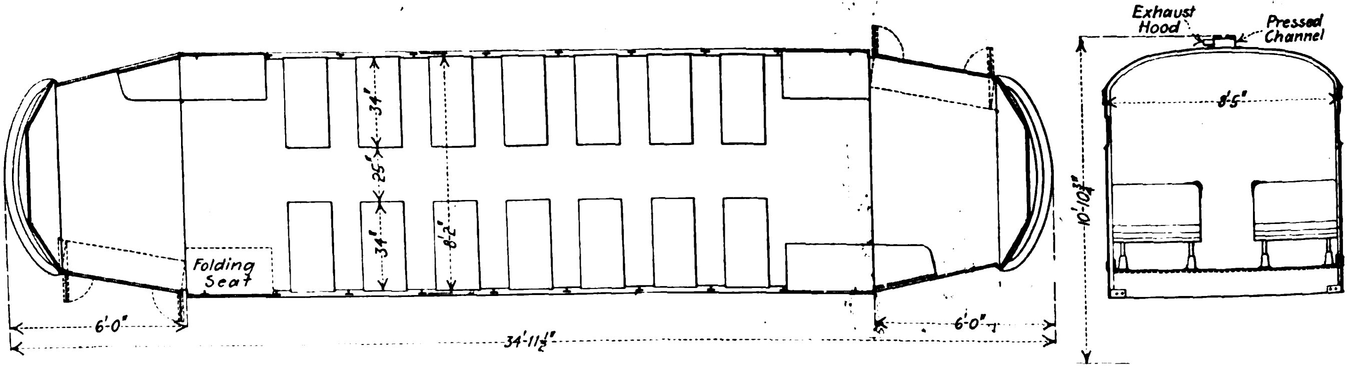
Long Single-Truck Car—Conductor's Platform, Showing Folding Doors and Corner Seat Blocking Sliding Exit Door

LIGHTING AND MISCELLANEOUS EQUIPMENT

The lighting system is of modern character, for instead of the usual naked lamps five 60-watt tungsten units have been placed in Macbeth-Evans "Alba" shades along the center line of the car as illustrated. This semi-indirect system gives a well-diffused illumination which is enhanced by the cheerful interior finish of white. The tungsten lamps form one series circuit, the second being made up of five 2-cp carbon lamps, which are used for the destination signs and headlights. In case a tungsten lamp burns out, equivalent resistance can be cut in by turning the nearest snap switch. These switches are placed in the ceiling within the exhaust register. The company estimates that the lighting cost of these cars is but three-eighths of that of a twenty-five 16-cp carbon lamp outfit, such as is used on other cars.



Long Single-Truck Car—Semi-Indirect Lighting, Exhaust Ventilators and Short Movable Upper Sash



Long Single-Truck Car—Plan Showing Seating and Door Arrangement, and Cross-Section Showing Exhaust Duct and Hoods in Roof

The straps, which are installed only alongside of the corner seats, are fitted with "Rico" sanitary sleeving and are riveted directly to the exposed carlines. Since, also, a Johnson registering type box is used for fare collection, the interior of the car is free from all kinds of register cords, bars and rods. The electric heaters are of Consolidated cross-seat type. The thermostat control and the ventilators were furnished by the Railway Utility Company, Chicago. The exterior view of the car shows that destination signs are used at the sides in addition to the customary vestibule indicators.

This car was designed by and built under the supervision of J. S. McWhirter, superintendent of equipment Union and Third Avenue Railways. Mr. McWhirter now has patents pending to cover the several new features described. The company now has under construction an additional car of this type, but it will differ in having a Brill "Radiax" truck of long wheelbase and 24-in. wheels to permit the use of small high-speed motors. These changes will be made to eliminate the first or folding step.

PENNSYLVANIA RAILROAD HONOR ROLL

The Pennsylvania Railroad in announcing on Jan. 31 the names of its employees who have been placed upon the roll of honor, having reached the age of seventy years, made public the fact that during the past thirteen years it has paid out in pensions the sum of $9,500,000. During that time 7800 men have been placed on the roll of honor. Of that number 3765 have died and on Jan. 1, 1914, there were 4037 employees still on the roll. Of the $9,500,500 paid out by the Pennsylvania Railroad System in pensions, $7,174,129 had been expended by the lines east of Pittsburgh and $2,326,370 by the lines west of Pittsburgh. Among those retired on Jan. 1 was Margaret Ferguson, an employee on the New York Division, who had served the company thirty years and four months. Twenty-seven women are now on the roll of honor. Their average length of active service was twenty-eight years and one month.

That the Illinois Traction System is alive to every source of publicity is illustrated by its use of an enormous sign on the ridgepole of its shops. This sign is 260 ft. long, and its main portion is occupied by the words "Illinois Traction System Shop." At one end is a smaller statement reading "Express service at freight rates," at the other "Use the road of good service."

The Victorian legislative assembly has passed four bills authorizing the construction of new electric tramways around Melbourne, viz., the Brunswick and Coburg, the South Melbourne, the Camberwell, Hawthorn and Richmond, and the Kew lines. The costs are estimated at $175,320, $292,200, $306,810 and $340,900 respectively for the complete schemes, which will add greatly to transit facilities in their district.

Private Versus Public Ownership of Steam Railroads

A Review of Samuel O. Dunn's Book on "Government Ownership of Railways"—Mr. Dunn Shows that State Ownership Is Not a Financial Success in Countries with Democratic Government, and that State-Owned Railways, Even if Successful, Do Not Give General Satisfaction to the Public

In his new work, "Government Ownership of Railways," Samuel O. Dunn, editor of the *Railway Age Gazette*, has presented a clear, sane and fair study of a subject which, by friend and foe alike, has often been discussed with too much recklessness and asperity. After studying the great but well-digested mass of data presented by Mr. Dunn, no one can honestly say that one form of ownership is invariably better than the other when the problem is considered from the proper standpoint of the general welfare. Before discussing the book it is necessary to have a clear idea of the apparent scope which the author has given to the meaning of the term "government ownership." He appears to have in mind that kind of public ownership which is commonly and contemptuously designated by the Marxian socialist as bourgeois, or middle-class, ownership. Mr. Dunn's arguments are therefore addressed to property owners and taxpayers who appreciate business reasoning. He realizes, however, that his discussion does not cover all aspects, for in the chapter on "Condition of Labor" he says: "The reasoning in favor of socialism as a means of improving the condition of the working class in general is supported by entirely different premises from reasoning intended to show that government ownership of any particular concern or class of concerns would benefit working people in general." We may amplify this point by stating that advocates of nationalization fall into four classes, namely, the small capitalist, the socialist, the syndicalist and the communistic anarchist. The first would simply transfer the present railways to the State bodily and manage them much as at present, except that lower rates would be granted; the second would, under universal co-operation, make the railways as toll-free as public highways, but he would have a highly centralized management; the third would treat the railways as a money-making property democratically managed by the employees, while the fourth believes that each section could be managed by the communes through which it passed. It is to be noted as a sharp distinction that of these four classes only the first proposes to purchase at a fair price; the other three plan to seize the railways with little or no compensation, even to the living generation of owners. It is needless to say that comparisons of fixed charges, earnings and profits will not affect the belief of doctrinaires who consider public ownership only from the standpoint of Utopia. As yet, however, this aspect of the question is not a big factor in American politics.

To begin with the book itself: Under "The Question in the United States," Mr. Dunn is decidedly pessimistic as to the outcome of the present tendency toward regulation. It is to him the case of the devil and the deep sea. If liberty to regulate fails, the public will want to cure it with the greater liberty of ownership; if regulation is successful, the public has every reason to feel that actual ownership would be more so. One of the most startling developments noted by Mr. Dunn is that public ownership advocates may soon be found among railway officials and stockholders—the first because regulation "restricts their freedom of action" and the second because regulation limits their profits. We have heard more than one railway man express the opinion that he would feel happier on a State-owned railway with unlimited funds for every department. Again, many stockholders who have seen their holdings depreciate rapidly within the last three years would gladly exchange them to-day for guaranteed government 3 per cents.

Under "Relation of Railways to the State" and "Causes of Government Ownership," Mr. Dunn shows the vastly different ways in which each national railway system has developed. He regards Anglo-Saxon individualism as the main reason why England built its railways without State help, but we are inclined to believe that the abounding wealth of English trade and manufacture in the thirties and later was at least an equally potent factor. There is no lack of individualism among the non-Saxon Greeks and Italians in the United States to-day. As the English roads received the least aid from the State, so have they also been the least hampered by regulation. Yet even in England government ownership is not considered "wholly improbable."

France is apparently the best country for contrasting the two types of ownership, because both public and private lines exist there side by side, and the present public management of the Western State Railways can be compared with their previous private management. As Mr. Dunn shows later, the change was not for the better of the State, of the public or even of the employees. In Germany and Italy ownership of most lines has passed to the State. Although the first railways of both countries were built when each was but a group of separate principalities, the Germans have succeeded in building up a highly profitable system, while the Italian State Railways are unprofitable and give a notably bad service. In general, State ownership preponderates in the other countries of Europe. It must be emphasized, however, that in no case were the motives for nationalization of the kind which are brought forward in the United States to-day. The motive was the military one, as in Germany; the fear of foreign owners, as in Switzerland; competition from private lines, as in Belgium, or the inability of a private road to meet its obligations, as in France.

In "Cost of Capital" Mr. Dunn states his belief that the United States government "can borrow more cheaply than any corporation, and probably more cheaply than any other government." We are likely to see a concrete example of this in the proposed Alaskan Railways. One eminent authority, Mr. Ingersoll, has estimated that the government will be able to sell the bonds for so much more than any private capitalist that the reduction in fixed charges will probably be great enough to make the difference between success and bankruptcy. However, the proposed Alaskan issue amounts to but $40,000,000, and one may question whether the government could issue on equally favorable terms the fifteen to twenty billions of dollars of bonds which would be needed to acquire all of the railroads of the United States. Again, the author points out that when a private road cannot "make good" and receivers are appointed to scale down securities only the owners suffer, but in a State-owned system all failures to meet fixed charges must come from the general revenues and so be a tax on all the people. The charge of overcapitalization is also taken up and shown to be groundless on various bases of calculation, including the capitalization of operating income as worked out for the Interstate Commerce Commission by Prof. H. C. Adams in 1904.

In treating of "Organization and Official Personnel," Mr. Dunn shows clearly the probability that a saving of 17½ per cent in cost of capital would be wiped out by an increase of only 7 per cent in operating cost. The question, therefore, is whether the public management would be more or less efficient. The most important point brought out in this discussion is that our present form of government does not permit the creation of an administrative department which would be free from political interference. On the Prussian-Hessian State Railways permanent employment and promotion on merit are a matter of course. On the other hand, in this country the post office has been used so long for political rewards that the appointment to the New York postmastership of a man who had come up from the ranks was hailed as a miracle. If, after all the years of a public postal service, postmasters are not yet appointed according to merit, what results may be expected from the selection of railway managers on a political basis? If the railways were subject to Congressional control, we should see the same extravagant favoritism which is now shown toward different sections of the country in river and harbor appropriations. In short, the pork barrel would swell to the dimensions of the Heidelberger tun. The only hope for efficiency in government work is in a quasi-military organization like that under which the Panama Canal was constructed. Who believes that a disciplinarian like Colonel Goethals would have been permitted to "stay on the job" if he had depended upon the suffrage of his men?

The following chapter in Mr. Dunn's book deals with "Effects of Consolidation Under Government Ownership on Economy of Management." We agree with Mr. Dunn that the sum saved by lopping off a few executive heads here and there would be a ridiculously small part of the total expense, but we would go further and assert that there is a limit to the amount of territory that one man can supervise ably. Many American railroads are already so big that few economies would result from further standardization, and standardization when applied to too wide a diversity of conditions is a loss instead of a gain. More could be saved by eliminating duplicate train service, by consolidating ticket offices and terminals, by re-routing and by abolishing the publicity expense due to competition. In short, the government might do what the railways tend to do themselves—when the government permits. Savings of this character have been made on the Prussian-Hessian State Railways, but on other State-owned lines, notably in France, the operating expenses have largely increased, thus showing how greatly the results depend on the political conditions.

Succeeding chapters take up such features as economy of management, adequacy, quality and safety of service, rate questions, financial results, condition of labor and political effects. The uncontrovertible statements in these chapters will prove a great surprise to those who imagine that State-owned railways can be or are run successfully on principles different from those which govern a privately owned railway. The most successful State-owned roads also have to encounter complaints about car shortage, preferential rates, crowding, etc. In short, all existing State roads are operated to make money, and consequently they come no nearer to pleasing everybody than does any private road. Furthermore, in a democratic country, they run the risk of being so much less efficient that the government not only loses the taxes which the private roads would pay, but also has the additional burden of greater fixed and operating charges.

Of course, it is not possible to make any very satisfactory comparisons of passenger and freight rates in Europe and in America owing to great differences in density of travel, length of average run, weight of train and other causes. It is shown, however, that American railroads tend to keep down the freight rates, thereby benefiting indirectly all the people, whereas roads like the Prussian-Hessian State Railways maintain a high freight rate but give very low passenger rates to the poorer classes. Much has been made of these low fares in Germany by our State ownership advocates, but we doubt whether the average American would care to ride in a third-class compartment, let alone the fourth-class compartment. The second-class and first-class fares do not differ materially from those for like service in the United States.

It is frequently assumed by labor unions that nationalization would be greatly to their benefit, but experience shows the contrary. In Prussia unions are absolutely forbidden; in other countries, as recently in France, strikes are quickly broken by the expedient of calling the strikers to military duty. In fact, when the railways are privately owned the men always have the opportunity of using any prejudice which the public may have against the management, but when the railways are owned by the State the public looks upon a railway strike as something akin to treason. It is difficult to compare the wages of countries with different standards of living, but it is a fact that the American trainman lives far better and occupies a higher relative standing in the community than his European brethren. From what has been said, one thing is certainly evident, namely, that political practices and ideals in the United States will have to undergo a wonderful change before public ownership of railways has any possibility of financial success.

RATING THE MAN HIGHER UP

In an address before the Efficiency Society, Roger W. Babson urged his hearers not to devote all of their attention to increasing the efficiency of employees but to give some thought to the man higher up. "I believe," he said, "that the greatest inefficiency exists to-day among the boards of directors of our various corporations. Most of these men are indifferent and attend meetings only for their fees, if they attend at all. Moreover, many of them hold their positions simply because of inherited property and are utterly unfitted for their work. In fact, I believe that a knowledge of these conditions on the part of organized labor is one of the reasons for its objection to being 'rated' and 'efficientized.' In other words, it is much better to begin at the center and work out than to try to begin at the outer edges and work in. Of course, I recognize that efficiency engineers who should recommend that the president be fired, that a new treasurer be employed and a new board of directors be chosen would have to starve for a good many years, but if efficiency engineers are honest, this is the advice they will often give."

The Public Service Commission for the First District, acting for the city of New York, has leased from the New York Dock Company a parcel of land at the southwest corner of Furman and Fulton Streets, Brooklyn, to be used as the site for the power house to be erected for the construction of the two proposed rapid transit tunnels under the East River in the lower part of the city, namely, the Whitehall-Montague Street tunnel and the Old Slip-Clark Street tunnel.

Wittenbergplatz-Dahlem Extension of Berlin Subways

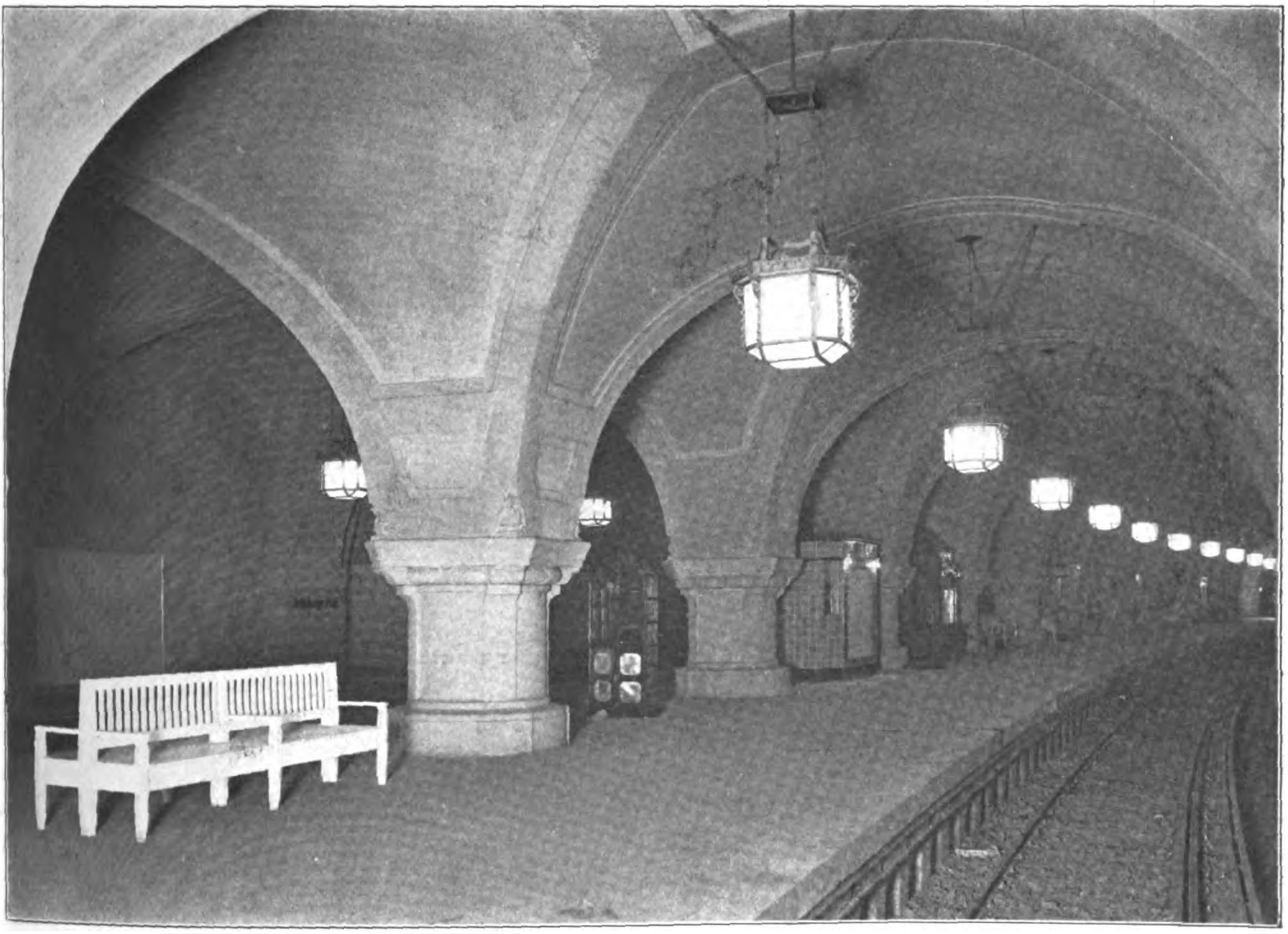
This Extension Through High-Grade Residential Territory Was Opened on Oct. 12, 1913, and Is Notable for the Artistic Construction of the Stations and Stairways

The Berlin Elevated & Underground Railway opened for public service on Oct. 12, 1913, its extension from Wittenbergplatz in Berlin to the fashionable suburb of Dahlem. The cost of constructing this section was borne by the municipalities of Charlottenburg, Wilmersdorf and Dahlem, each of which voted the sum of $625,000, in addition to which about $500,000 was contributed by the owners of contiguous real estate. All of the towns named are in the high-grade residential territory west of Berlin which hitherto has been served only by the Charlottenburg extension of the railway company's trunk line. The right-of-way of the new line is the property of the communities named, and in accordance with the franchise conditions various operating appurtenances will revert to them after a term of years.

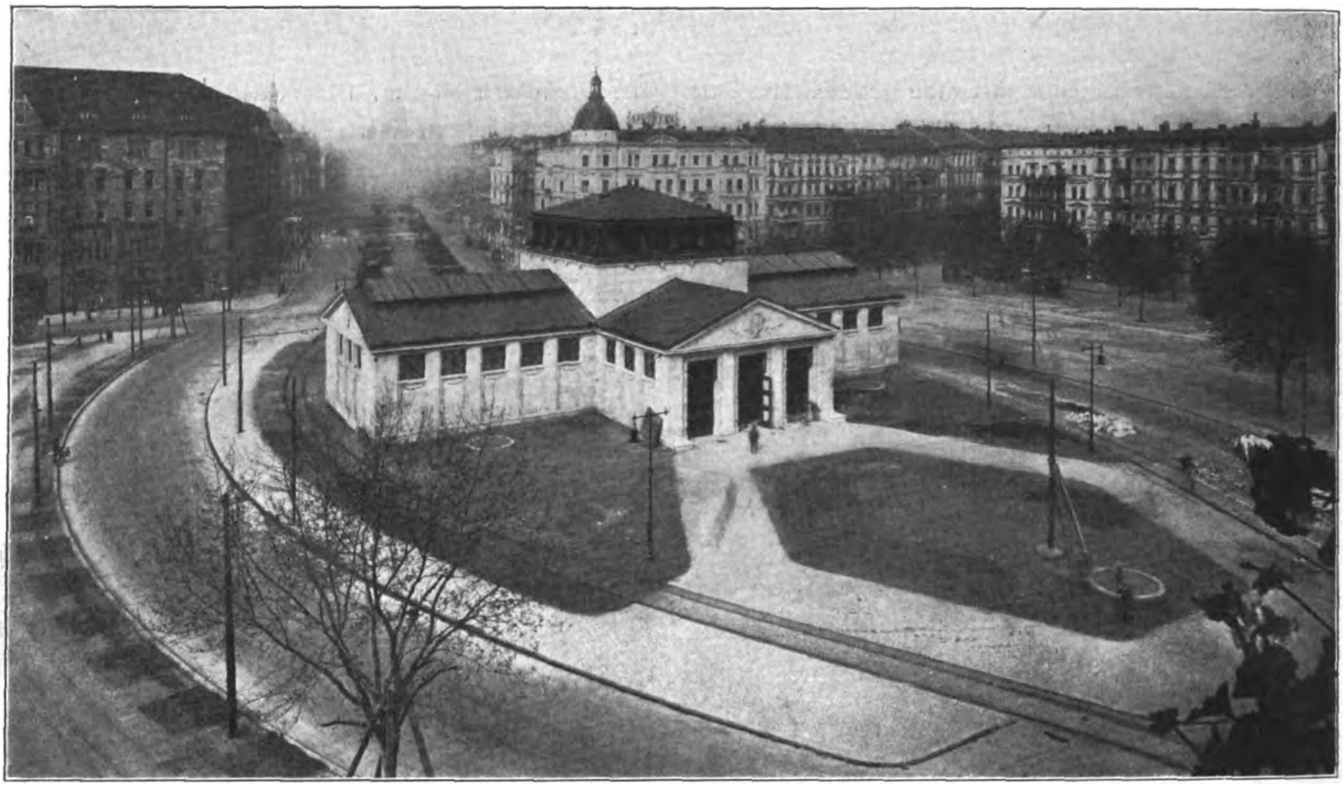
No expense was spared in the design and construction of the stations and station entrances, the strongest incentives being local pride and the desire to attract population, aside from the love for artistic structures so characteristic of modern Germany.

The Dahlem section is the farthest out of the city and is one of the few communities near Berlin where villas are constructed in place of large apartment houses. Therefore the exterior of the stations at Dahlem (not illustrated) are finished to resemble private houses rather than public buildings. The Dahlem section is the only one which is in an open cut, the remainder being shallow subway construction. Examples of the stations on the underground sections are shown in the accompanying views. All of the buildings are very ornate with sculptured granite or sandstone, metal portals and elaborate electric fixtures.

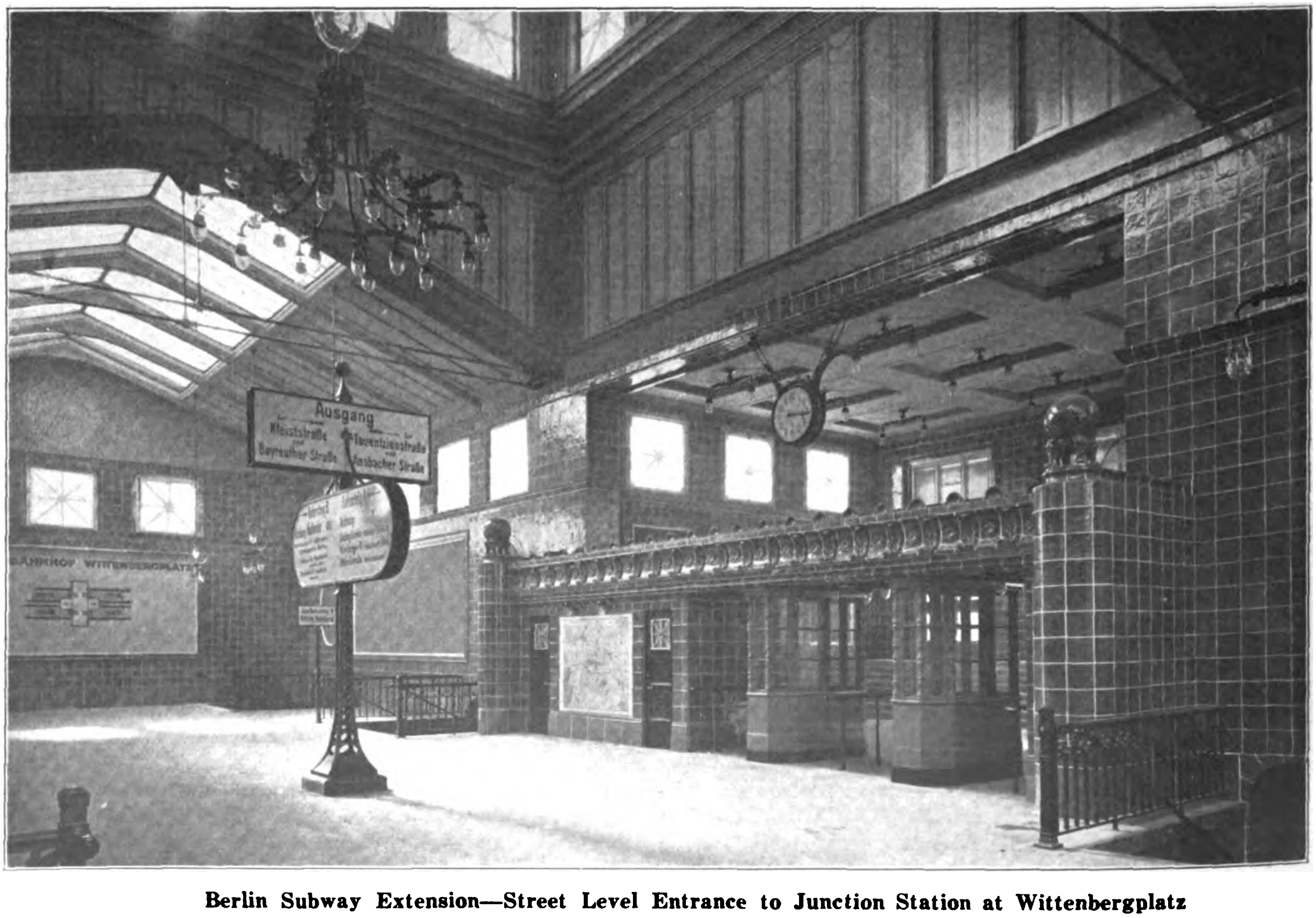
Of the illustrations reproduced, perhaps the most interesting is the entrance to the Wittenbergplatz station in Charlottenburg at the junction with the main line. The picture was taken before all of the debris had been cleared away but shows clearly enough that the building is prominently set off by its location in a small park or gore and that additional perspective is furnished by the very wide streets around it. Directly behind the building are the sodded tracks of the Grosse Berliner Strassenbahn. The interior of the same station illustrates the majolica tiling and the lighting scheme. Two fully glazed ticket offices are provided. The tiling near one ticket office carries a very large map of Berlin while the tiling on the side wall carries a plan of the station platforms with arrows to indicate the western and eastern sides. A post in the center of the station carries directions to the nearest



Berlin Subway Extension—Heidelbergerplatz Station, Vault Construction with Suspended Lighting Fixtures adjoining streets and also a sign which presents the names of the stops in each direction. When this station was used originally as a way station on the parent line it had side platforms only, but now it has six tracks and four platforms, two of which are of the island type. No two stations are alike as may be conceived, for example, from the diverse designs adopted for the Heidelbergerplatz and Hohenzollernplatz portals. The eagles at the latter station are, of course, symbolic of the Hohenzollerns, the family of the German Emperor. The same diversity in design is also common to the interiors of the stations, all of which



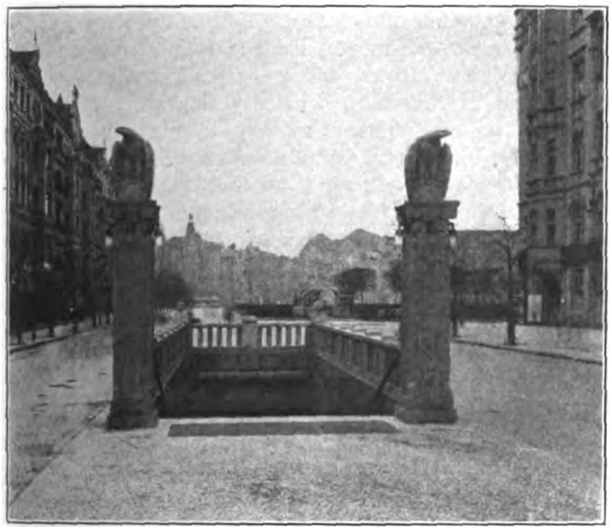
Berlin Subway Extension—Street Level Entrance to Junction Station at Wittenbergplatz


Ausgang
Kleiststraße
Tauentzienstraße
Bayreuther Straße
Ansbacher Straße
Bahnhof Wittenbergplatz

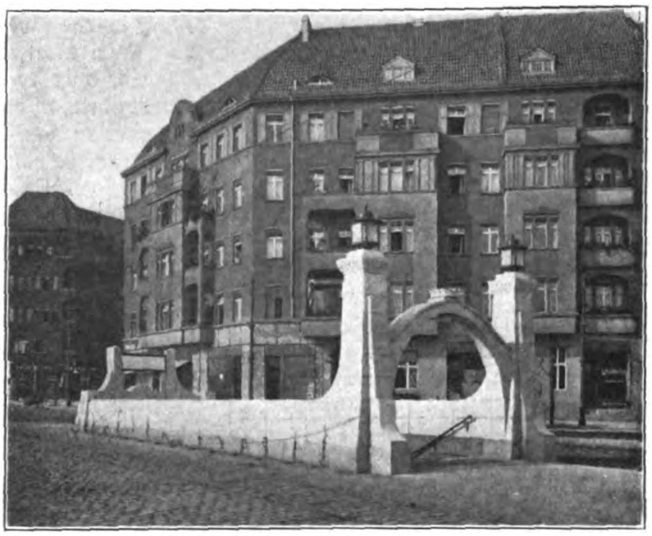
Berlin Subway Extension—Street Level Entrance to Junction Station at Wittenbergplatz

are finished in a different architectural and color scheme. Thus, there is a strong contrast between the plain doric columns and flat roof of the Breitenbachplatz station and the massive vaulted design at Heidelbergerplatz. The lighting fixtures also differ. The view of the Breitenbachplatz interior was taken at a point which shows the daylight gratings generally installed in these stations.

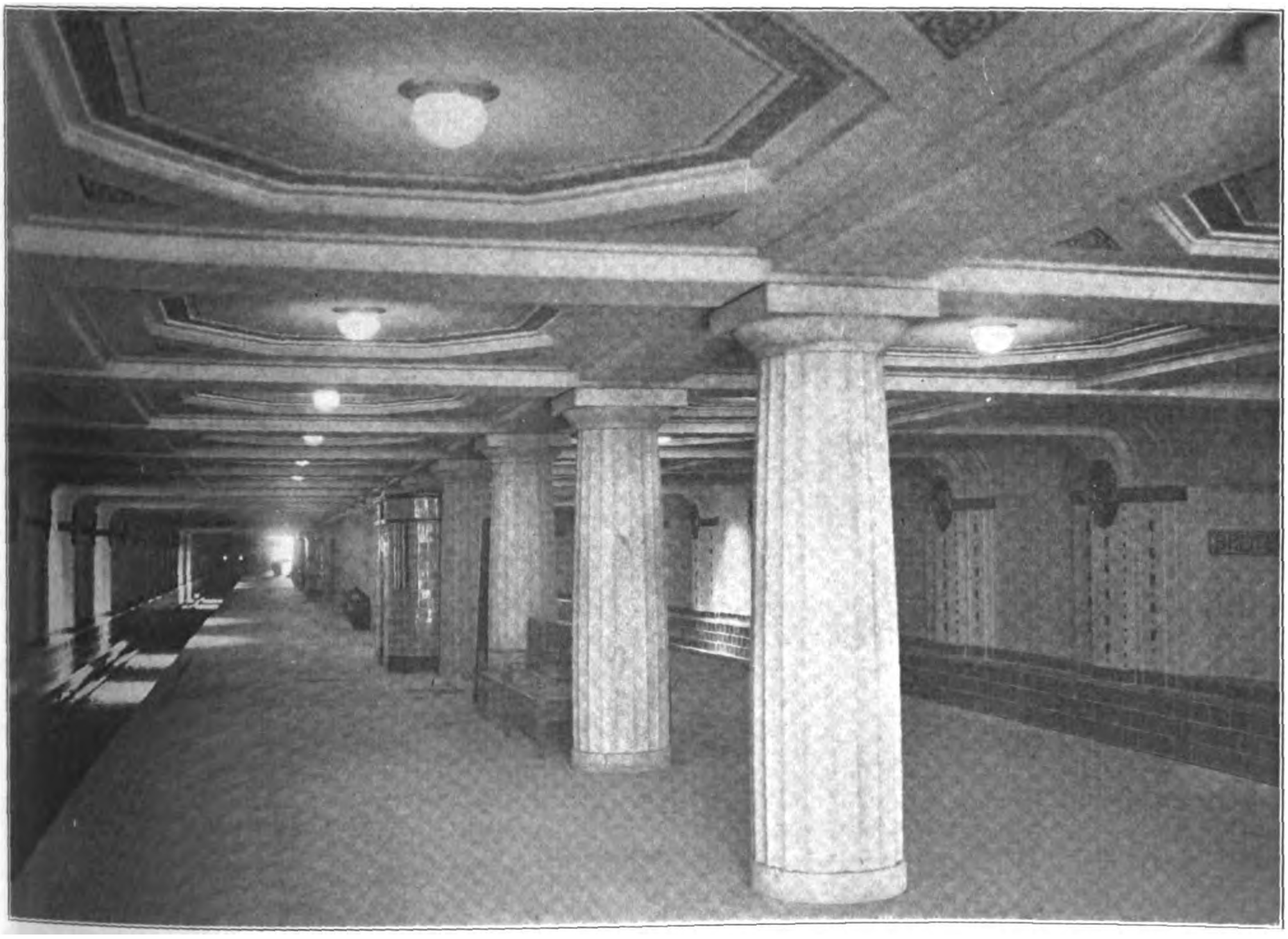
The track and third-rail construction of this subway section does not differ materially from that of the main line of the Berlin Elevated & Underground Railway. The rolling stock is also of standard design with second-class and third-class compartments, zone-fare operation, etc. To permit the eventual operation of eight-car trains, all stations on the new line have island platforms 360 ft. long. At four stations double-loop tracks are provided for through and shuttle service trains. The first train from the Dahlem terminal at Fehrbellinerplatz to Berlin leaves at 5:15 a. m. and the last train in is due at 1:30 a. m. The shuttle service begins at 6 a. m. and ends at 1 a. m. Within the Wilmersdorf territory the service is two and one-half minutes, in the intermediate territory toward Dahlem six minutes, and to the end of the line twelve minutes. The total



Berlin Subway Extension—Portal Carrying the Eagles of the Imperial Family



Berlin Subway Extension—Stairway with Crown on Arch, Harmonizing with Those on Adjacent Trolley Poles



Berlin Subway Extension—Breitenbachplatz Station Built with Doric Columns and Flat Ceiling length of the line, embracing nine stations, is 6.2 miles. All of the work was carried out by the Siemens & Halske Company, Berlin, except that the tunnels and cuts at Dahlem were made by Haberman & Guckes, Kiel.

PRESENT STATUS OF RAPID TRANSIT IN BERLIN

As the original triangular grade crossing of the Berlin Elevated & Underground Railway has been altered into a transfer station with different levels, only one link, namely, from this station to Wittenbergplatz, must be constructed to permit this company's system to be operated as two separate trunk lines from west to center and from west to east respectively. Both lines would have two branches, the former from Wittenbergplatz to Charlottenburg and Wilmersdorf, the latter from Nollendorfplatz (subterranean double-story station still to be built in the missing link) to Kurfürstendamm and the existing Schöneberg line. Negotiations are going to extend the Kurfürstendamm line to Halehsee, the Charlottenburg line to Spandau and the Nordring line to Pankow. Other rapid transit lines in course of construction are the Friedrichstrasse subway belonging to the city of Berlin and the Gesundbrunnen-Neukölln line of the Allgemeine Elektricitäts Gesellschaft. A map of the Berlin rapid transit lines in use or under construction was published in the ELECTRIC RAILWAY JOURNAL for Sept. 6, 1913.

UNITED STATES MAIL SERVICE ON ELECTRIC LINES

The annual report of Joseph Stewart, Second Assistant Postmaster-General, covering the year ended June 30, 1913, gives the following information as to service and expenditure on electric and cable car routes:

Number of routes	569
Length of routes, miles	7,641.12
Annual travel, miles	12,369,969.40
Annual rate of expenditure	$716,195.04
Average rate of cost per mile of length	$93.72
Average rate of cost per mile traveled, cents	5.79
Average number of trips per week	15.56

A comparison with the previous year shows the following changes: Increase in number of routes, twelve, or 2.154 per cent; increase in length of routes, 168.22 miles, or 2.251 per cent; increase in annual travel, 130,331.36 miles, or 1.065 per cent; increase in annual rate of expenditure, $29,639.27, or 4.317 per cent; increase in average rate of cost per mile of length, $1.85, or 2.013 per cent; increase in average rate of cost per mile traveled, 0.18 cent, or 3.208 per cent; decrease in average number of trips per week, 0.19 cent, or 1.206 per cent.

The appropriation for the fiscal year was $728,000; the amount expended to Sept. 30, 1913, was $695,388.56, leaving a balance of $32,611.44, out of which unsettled accounts must be paid. The appropriation for the fiscal year 1914 is $847,400.

The annual rate of expenditure was: July 1, 1913, $722,172.13; Sept. 30, 1913, $720,056.83.

The sum estimated as necessary for the fiscal year ending June 30, 1915, is $756,000, being $91,400, or 10.78 per cent less than the appropriation for the previous year.

The annual rate of expenditure for electric and cable car service authorized at the various rates provided by law was on June 30, 1913, as follows:

At 3 cents a mile	$204,781.35
At 4 cents a mile	30,039.00
Under special provision	6,704.21
At railroad rates	48,583.07
At schedule rates other than 3 and 4 cents a mile	38,859.72
At apartment and independent car regular rates	43,206.30
At apartment and independent car maximum rates	337,692.02
At special-agreement rates less than regular rates	6,329.37
	$716,195 04

Mr. Stewart says in his report: "The appropriation act for the fiscal year 1914 continued the provision in connection with the items for electric and cable cars authorizing the expenditure of not exceeding $100,000 of the appropriation for regulation screen or motor wagon service, which may be substituted in lieu of electric and cable car service. This could not otherwise be done on account of the fact that the appropriation for regulation screen-wagon service is generally no more than sufficient to care for existing contract obligations and increases in service which are foreseen. It has not been found necessary to make use of this authority, but it is a valuable alternative to enable provision for service in cases where the demands of electric car companies in the performance of the service in the large cities cannot be met, and it should therefore be continued."

ELECTRIC RAILWAY EXHIBITS AND TRANSPORTATION FACILITIES AT SAN FRANCISCO EXPOSITION

Work on the buildings of the Panama-Pacific International Exposition at San Francisco in 1915 is being pushed forward rapidly. The official classification of exhibit departments shows that exhibits relating to railways will appear partly among the transportation exhibits and partly among the machinery exhibits.

The Transportation Palace, covering 7¼ acres, and several smaller adjacent buildings will show all possible methods of conveyance, including steam and electric locomotives, repair shops, passenger handling, publicity, accident prevention, train dispatching and, in short, every department of railway activity. The machinery exhibits will include that part of railway equipment which is common to other industries, such as power house outfits, illuminants, machine tools and various forms of electrical apparatus other than strictly railway material. A feature of special interest will be a display of internal combustion motors up to 500-hp.

A standard-gage railroad about 12 miles long has been completed from the docks into the exposition grounds, immediately adjacent, and spur tracks will provide easy approach to all of the main exhibit palaces and to other important points throughout the entire exposition reservation. This main-line track will not be torn up on the opening of the exposition, but it will be buried, traversed by the footpaths and roads of the exposition and uncovered again when the doors of the exposition are closed Dec. 4, 1915, thus providing against the necessity of rebuilding the line and avoiding its exposure, to the scenic disadvantage of the landscape garden scheme.

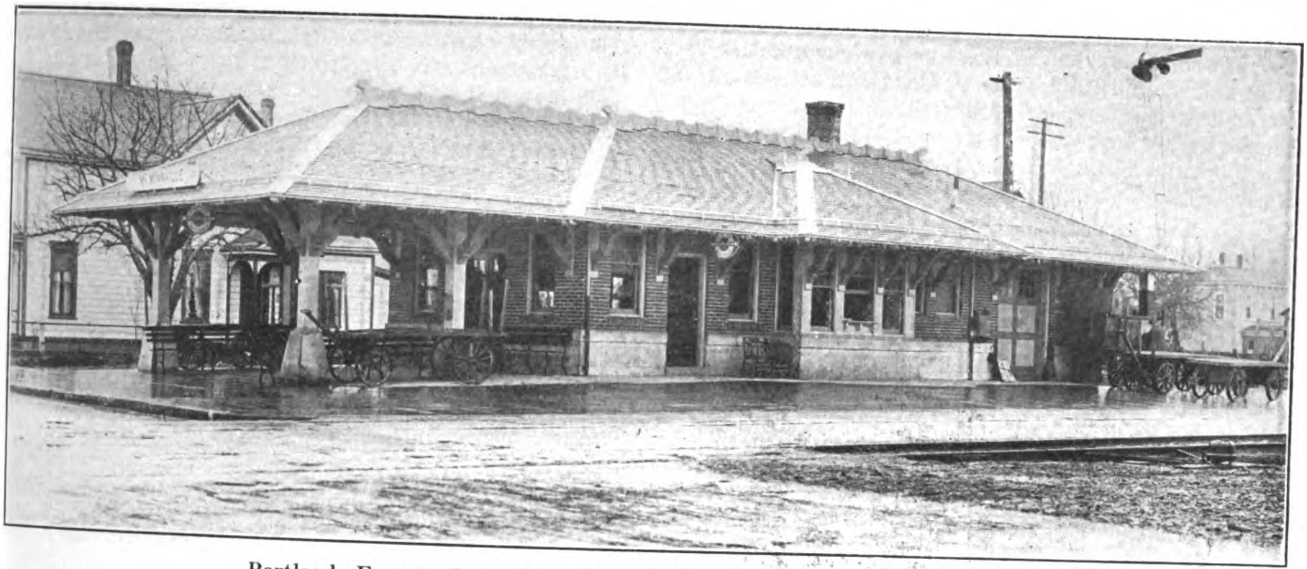
Another element which is peculiar to the exposition arises from the fact that there is no physical connection between the grounds and any railroad (except, of course, the exposition's terminal line already described), and in order that carloads of building material not arriving by water, and later on exhibits which come by rail, could be delivered direct, a freight ferry slip has been constructed. Car barges operated by railway companies whose terminals are across the bay in Oakland are already landing at this slip. Some are equipped with their own motor power, and others are moved by steam tugboats.

Transportation of visitors within the grounds will be provided by (1) forty-passenger gasoline motor buses, already ordered, of which about fifty will be used; (2) a steam-operated narrow-gage, intramural railway with trains run on about a two-minute headway; (3) automobile chairs, run by storage battery, about 150 being planned for, and (4) push chairs and jinrickishas, about 150 of each.

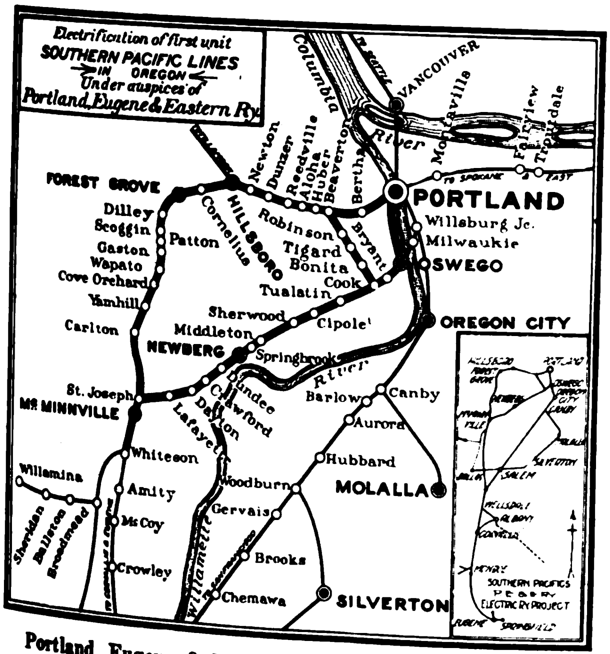
New Southern Pacific Line in Oregon

This Line, Known as the Portland, Eugene & Eastern Railway, Has Just Put in Operation 109 Miles of Track and Will Comprise When Completed 350 Miles—The Trolley Voltage Is 1500

Jan. 18 saw the initiation of interurban service on the first unit of the Southern Pacific Company's electrification in the Willamette Valley of western Oregon, constructed and operated as the Portland, Eugene & Eastern Railway, of which Robert E. Strahorn is president. On Saturday, Jan. 17, the Portland Commercial Club, a noted organization of the Northwest, baptized, christened or consecrated the service by operating a chartered train over the new electric loop, carrying railroad officials, city officials, prominent citizens and newspaper men from the towns served by the new road as its guests. Brass bands and oratory concerning the era of development which is expected to follow the beginning of the rapid transit service welcomed the train at every stop.



Portland, Eugene & Eastern—New Passenger Station at McMinnville


Electrification of first unit
SOUTHERN PACIFIC LINES
IN OREGON
Under auspices of
Portland, Eugene & Eastern Ry.
Columbia
River
VANCOUVER
Montavilla
Fairview
Troutdale
TO SPOKANE & EAST
PORTLAND
Willsburg Jc.
Milwaukie
OSWEGO
OREGON CITY
FOREST GROVE
Dilley
Scoggin
Gaston
Wapato
Cove Orchard
Yamhill
Carlton
Patton
Cornelius
HILLSBORO
Newton
Dunzer
Reedville
Aloha
Huber
Beaverton
Bertha
Bryant
Robinson
Tigard
Bonita
Cook
Tualatin
Sherwood
Middleton
Cipole
NEWBERG
Springbrook
River
St. Joseph
McMINNVILLE
Dundee
Crawford
Dayton
Lafayette
Barlow
Canby
Aurora
Hubbard
MOLALLA
Whiteson
Willamina
Sheridan
Ballston
Broadmead
Amity
McCoy
Crowley
Woodburn
Gervais
Brooks
Chemawa
Willamette
SILVERTON
SALEM
ALBANY
SOUTHERN PACIFIC'S
P. E. & E. RY.
ELECTRIC RY PROJECT
EUGENE
SPRINGFIELD

Portland, Eugene & Eastern—Map of Present Lines
(Scale is approximately 16 miles to 1 in.)

The part of the Willamette Valley line just placed in service is known as the "McMinnville Loop" and covers 109 miles of track. It came into being by the conversion from steam to electric power of the old Yamhill and West Side divisions of the Southern Pacific system in Oregon.

The Union Depot in Portland is the terminal of the system. From that point trains pass south through the city along Fourth Street, one of the important business thoroughfares. At Fourth and Jefferson Streets the Yamhill division of the loop is diverted to the west bank of the Willamette River and parallels that stream to Oswego, thence to St. Joseph junction. The West Side line continues along Fourth Street to Hillsboro, Forest Grove and St. Joseph junction. Thence one line of track continues south to Whiteson junction, 4 miles south of McMinnville, where temporary terminal yards have been established. Operations are now in charge of Southern Pacific officials, D. W. Campbell being the general superintendent, John M. Scott general passenger agent and H. A. Hinshaw general freight agent. Service began with the operation of thirty-six trains in and out of Portland every twenty-four hours.

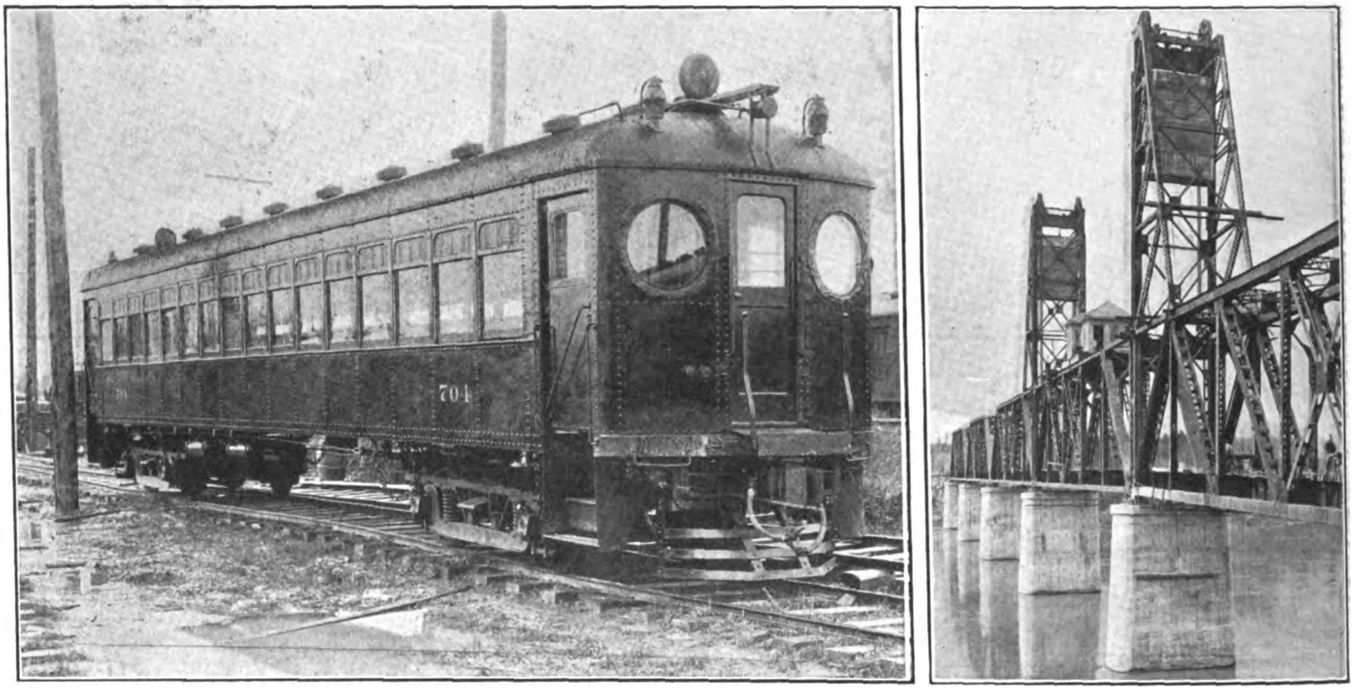
Outside of the city of Portland the new interurban serves a population of 45,000 and a district which in 1913 produced a crop valued at $16,000,000. The territory contains 223,000 acres of land under cultivation and 286,000 acres of non-cultivated arable land, while the average of its bank deposits is $4,300,000. Much of the soil is the famous "beaver dam" land of western Oregon, largely devoted to gardening and small fruit raising. Many of the larger dairies supplying Portland will be served by this line.

When completed, the Portland, Eugene & Eastern Railway will have a compact system of 350 miles in the Willamette Valley, a district 50 miles in width and 125 miles in length, a rolling valley of great fertility. A map of the entire system and of the Oregon Electric Railway, which also operates in this valley, was published on page 1051 of the ELECTRIC RAILWAY JOURNAL for June 14, 1913. The completion of these plans requires that all of the steam lines of the Southern Pacific

Company except the main line shall be taken over and electrified. A number of independent railways will then have been absorbed and a number of new lines constructed. The company now owns and operates the street car system at Salem, the State capital, that at Eugene and that at Albany, and will construct a new street car system at Corvallis, all to be operated in connection with its interurban system. At Salem and Eugene large central passenger stations are to be constructed on blocks of ground which the company has purchased in the center of the cities, and these stations will be terminal and transfer points for interurban and city service.

Among the other properties acquired as portions of the Portland, Eugene & Eastern system are the West Side and Yamhill divisions of the Southern Pacific between Portland and Corvallis; the Salem, Falls City & Western Railway; the Sheridan & Willamina Railway; the Corvallis & Alsea Railway, and the Willamette Falls Railway, the latter being the first electric interurban line ever constructed in the Northwest. A new line has been constructed between Monroe and Eugene, 23 miles, and another between Canby and Molalla, 11 miles, while a 15-mile connection between the Salem, Falls City & Western and the Springfield branch gives a complete cross-valley line near the center of the district for the assembling of shipments south of Portland. A new main line for the operation of electric service is to parallel the main line steam track of the Southern Pacific between Portland and Salem, much of the right-of-way for which has been acquired.

In the construction of new tracks, rebuilding, relaying steel with heavy material and electrification the Portland, Eugene & Eastern Railway has invested $7,130,000, inclusive of a new bridge at Salem.



Portland, Eugene & Eastern—Standard Steel Passenger Car and Drawbridge Across Willamette River at Salem

POWER DISTRIBUTION

The territory immediately adjacent to Portland and comprising what is known as the "McMinnville Loop," being lines from Portland to McMinnville via Forest Grove and from Portland to St. Joseph via Oswego and Newberg, also the Beaverton cut-off from Beaverton to Cook, are served by three substations at Oswego, Forest Grove and Dundee. Energy is received from the Portland Railway, Light & Power Company at Milwaukee, Ore., at 60,000 volts, three-phase, sixty cycles. This energy is then transmitted over the railway company's transmission line to Oswego substation, which is a combined transformer station and substation. In this substation are installed two 1000-kw, three-phase transformers, which transform the energy from 60,000 volts to 13,200 volts. Leaving Oswego substation, there are two 13,200-volt transmission lines, one feeding the Forest Grove substation and the other feeding the Dundee substation. The 13,200-volt transmission line is of No. 0 seven-strand, hard-drawn copper with a 3-ft. spacing and arranged with all three wires in the same plane on the cross-arm. The Forest Grove and Dundee substations are reinforced concrete, fireproof buildings, and each contains two synchronous motor-generator sets of 500-kw capacity. The motor portion of the set consists of a synchronous motor wound for 13,200 volts and operating directly on the transmission line voltage. The generator of the set is a 500-kw, 1500-1575-volt direct-current interpole machine. There is also a 125-volt exciter.

In addition to the motor-generator sets, each substation contains the usual complement of oil switches, switchboards and the other necessary control apparatus. A small storage battery is provided for furnishing control current for the operating of the oil switches and for emergency station lighting. Each substation is provided with tank electrolytic lightning arresters both on the incoming transmission lines and in the outgoing 1500-volt feeders.

The Oswego substation, in addition to being a transformer substation, also contains two 500-kw synchronous motor-generator sets, with provision in the building for a third set when load conditions shall demand this extra unit. These sets are similar to the ones installed at Forest Grove and Dundee substations. There will eventually be nine substations in all. The other substations are to be at Eugene, Lake Creek, Corvallis, Salem, McCoy and Hubbard. The distance between substations varies from 22 to 25 miles. These six substations will be somewhat similar to the ones already described. The motor-generators for the substations were supplied by the General Electric Company, whereas the transformers, switchboards and 13,000-volt switches were furnished by the Westinghouse Electric & Manufacturing Company.

The trolley emf, as before mentioned, will be 1500 volts, direct current. The trolley construction will be what is known as the catenary type with standard spans of 60 ft., 90 ft., 120 ft. and 150 ft., the 150-ft. spans being used on tangents and the shorter spans on curves of varying degrees. Between Oswego and Dundee and between Oswego and Forest Grove the 13,200-volt transmission line is carried on the trolley poles.

The catenary construction consists of a No. 000 grooved copper trolley carried by a 7/16-in. galvanized steel messenger cable of 15,000-lb. breaking strength, the messenger cable being supported on insulators carried on angle-iron bracket arms attached to the poles.

A high grade of cedar poles with 9-in. tops has been used for this work and all pole butts are treated.

On the "McMinnville Loop" lines a 336,420-circ. mil aluminum feeder cable parallels the trolley circuit. Below McMinnville the feeder is 636,000-circ. mil aluminum.

The lines throughout are paralleled by two telephone circuits, one telephone circuit being used exclusively for telephone train dispatching. This circuit is of No. 9 hard-drawn copper. The other telephone circuit is the substation and emergency circuit, tying together all substations and emergency line headquarters. This circuit will be of No. 9 copper-clad steel wire.

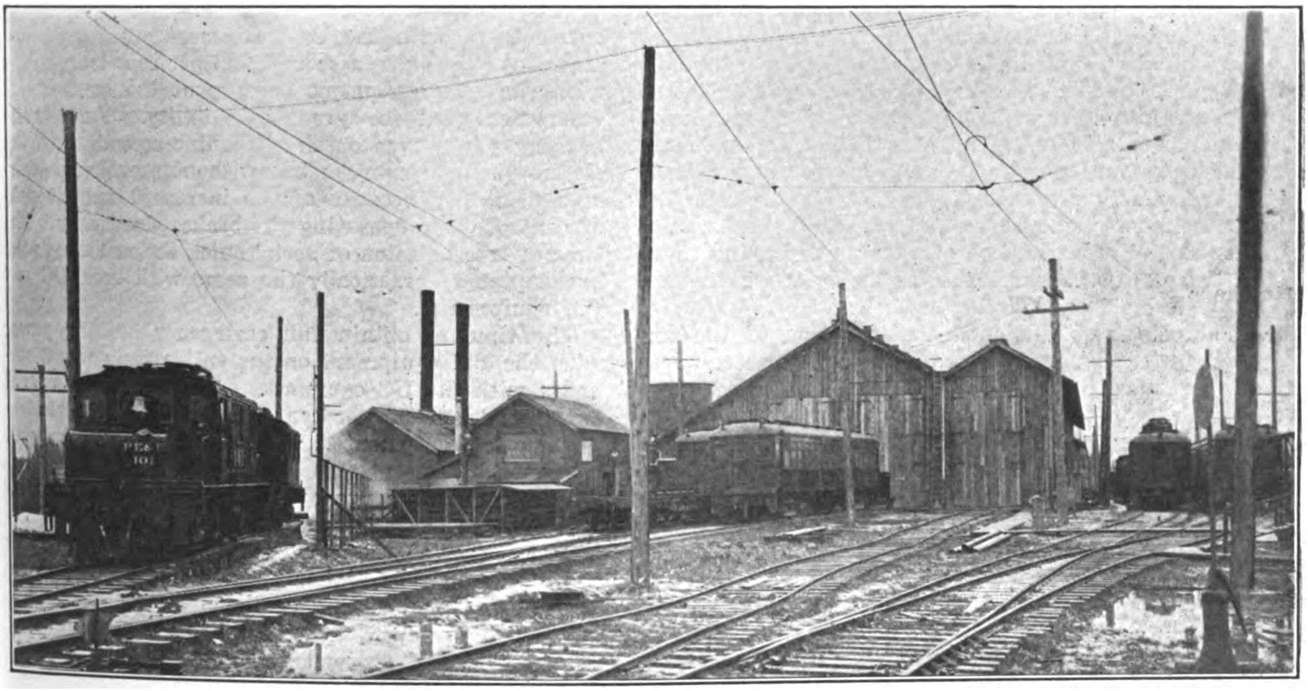
A telephone selector system is installed with selective calling apparatus in the principal stations and with nine telephone sets, one at each siding.

ROLLING STOCK

The cars are of steel construction throughout, approximately 56 ft. in length and seating sixty passengers. They have the arch type of roof and are of various classes, some being straight passenger and smoking cars, others combination baggage, passenger and smoker, and others baggage and express cars. They are mounted on Baldwin trucks. All cars are arranged for multiple-unit operation with automatic control, the trains to consist either of straight motor cars or motor cars and trailers together. The roller pantograph trolley is used and a dynamotor compressor provides pneumatic power for the pantograph operation. All pantographs can be placed in contact with the trolley wire simultaneously by the motorman operating an air-control switch in the cab of the leading car of the train. The lighting and control circuits on the cars are arranged for 600 volts and obtain their power from a dynamotor which also operates the air compressor for the brake system.

The cars are equipped with four-motor equipment, each motor being wound for 750 volts but insulated for 1500 volts. The motors are connected two in series when operating on 1500-volt circuits, but by means of a commutating switch the connections are changed so that when operating on the 600-volt city lines of the railway company each motor may be thrown directly across the trolley circuit. The motors and control are General Electric.

All of the cars were built by the Pullman Company. Altogether there are thirteen straight passenger motor cars, eleven passenger trail cars, seventeen combination passenger and baggage cars and five combination express and baggage cars.



Portland, Eugene & Eastern—Car Shops at Beaverton, Ore.

For freight service there are provided a number of 1500-volt, 60-ton electric locomotives supplied by the Westinghouse Company and equipped with apparatus and motors somewhat similar to that provided for the passenger coaches.

The railway company operates city street car systems in Eugene, Salem and Albany. Operation in the city of Portland will also be on 600-volt current, so that the car equipment is designed for operation on both 600 volts and 1500 volts.

Both St. Louis and Kansas City had street car robberies during the past week. Two negroes held up a street car in the theater section of St. Louis and fled with the conductor's money, but were captured later, after a battle with policemen. Two robbers in Kansas City held up a Fifth Street car at the end of the line and escaped with $12.45 in change after knocking down and severely injuring the conductor before the motorman had time to come to his assistance.

Air Brake Performance on Modern Trains*

The Author, Who Is Assistant Chief Engineer Westinghouse Air Brake Company, Presents Conclusions Drawn from the Results Obtained from a Series of Tests with Different Types of Brakes on High-Speed Trains on the Pennsylvania Railroad

BY S. W. DUDLEY

During the spring of 1913 the Pennsylvania Railroad, in conjunction with the Westinghouse Air Brake Company, instituted on the West Jersey & Seashore Railroad a thoroughly scientific and comprehensive investigation of the different factors affecting the operation of brakes on railroad passenger trains. Only brief mention of the general conclusions to be drawn from the tests will be made in this paper, but the detailed results are available in the official report of the tests compiled by the test department of the Pennsylvania Railroad, copies being obtainable on request from the Westinghouse Air Brake Company.

The investigation included tests of the standard PM type of pneumatic brake designed for high-speed trains and provided with quick-action triple valve and a reducing or blow-off valve that retains the maximum cylinder pressure practically constant for a period of time and then by an accelerating blow-down reduces the brake cylinder pressure as the stopping point is approached, the reduction compensating for the increased effectiveness of the brakeshoes as the speed diminishes, due to the increased friction coefficient.

The tests also included consideration of the improved system known as the UC type of electro-pneumatic brake with which the brakes on each car are electrically controlled from the head of the train, the air for emergency application and for a graduated release being supplied from an emergency reservoir on each car which is charged from the train pipe. This system permits an effective emergency application after a service application has been made and, as shown by the tests, can be operated pneumatically in trains partly equipped with the standard pneumatic brake of the PM type.

In the tests it was found that in service applications with the improved or UC equipment greater flexibility of operation is provided. That is, the braking power per pound of brake pipe reduction is lower, thus giving the operator a greater time in which to use judgment when manipulating the brakes. At the same time, however, the maximum braking power obtainable in a full service application is higher. A more sensitive and prompt release of the brake is insured, tending to improve the releasing action of all brakes in the same train of mixed old and new equipments. The action of the old and the new equipments mixed in the same train is harmonious and free from rough slack action or shock both in service and emergency operation of the brakes.

With the new equipment operating either electrically or pneumatically, there is always available a quick-acting and fully effective emergency brake. This is not the case with the old equipment, in which the relation of the service and emergency functions is such that a quick-acting application cannot be obtained after a service application of any consequence. The following average results indicate the degree to which this difference has an effect on the length of stop.

Considering the ordinary full service stop from 60 m.p.h. with both brakes (say 2000 ft. or 2200 ft.) as 100 per cent, the attempt to make an emergency application with the old equipment does not produce any shorter stop than if only a full service application were made. With the improved apparatus operating pneumatically, an emergency application following a partial service application will shorten the stop about 14 per cent and after a full service application about 10 per cent. With the electro-pneumatic brake these figures are respectively 23 per cent and 15 per cent, a very considerable improvement.

The attainment of full service braking power on the entire train with the UC equipment operating pneumatically was sixteen seconds, 33 per cent longer than with the PM equipment because of the smaller size reservoirs used for greater flexibility. Full service braking power was obtained in nine seconds with the electro-pneumatic brake but without sacrificing desirable flexibility because of the increased sensitiveness of control when operating the brakes electrically. The time of transmission of serial quick action through the brake pipe is practically the same with both UC and PM equipments.

The time to obtain full emergency braking power with the PM equipment on the entire train was 8 seconds; with the UC equipment operating pneumatically 3.5 seconds, or 56 per cent shorter; with the electro-pneumatic equipment 2.25 seconds, or 72 per cent shorter.

The gain in emergency stopping power of the electric pneumatic equipment over the PM equipment results from: (a) the shorter time occupied in applying the brakes; (b) a higher brake cylinder pressure obtained; (c) the holding of the pressure as obtained, without blow-down, as with the high-speed reducing valve of the PM equipment.

Designating the time of equivalent instantaneous application of retarding force by t, and the braking power, corresponding to the brake cylinder pressure obtained, by P, the values of t for emergency applications with the PM equipment twelve-car train range from 2 to 2.5 seconds; for the UC pneumatic from 2 to 2.5 seconds, and for the electro-pneumatic from 0.7 to 0.85 second.

The observed average value of P with the PM equipment (for a nominal 113 per cent braking power on the cars) ranges from 95 per cent to 100 per cent. With the UC pneumatic equipment and electro-pneumatic equipment nominal emergency braking powers of 90 per cent, 125 per cent, 150 per cent and 180 per cent were used, which, owing to locomotive effect, become for the complete train 90 per cent, 117 per cent, 137 per cent and 160 per cent respectively.

With the electro-pneumatic brake a uniform increase in percentage of braking power results in a substantially uniform decrease in length of train stop. An increase of 5 per cent in braking power reduces the length of stop about 2 per cent within the range of braking powers tested.

The available rail adhesion varies through wide limits, or from 15 per cent in the case of a frosty rail early in the morning to 30 per cent for a clean, dry rail at midday.

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*Abstract of a paper presented before the American Society of Mechanical Engineers in New York on Feb. 10, 1914.

WHEEL SLIDING

The amount of wheel sliding depends more on the rail and weather conditions than on the percentage of braking power. Some sliding was experienced with braking powers as low as 90 per cent and 113 per cent where rail conditions were unfavorable, but 180 per cent braking power did not cause wheel sliding with good rail conditions.

The effect of excessive wheel sliding was to make the length of the stop about 12 per cent greater than similar stops without wheel sliding.

A brake power low enough to eliminate the possibility of wheel sliding on a bad rail results in longer stops than could be considered satisfactory for general service. Since good rail conditions prevail a large part of the time, the preferable emergency braking power is that which, considering the installation conditions, will stop trains at all times in as short a distance as can be accomplished without trouble from wheel sliding in such cases as are to be anticipated when emergency stops have to be made under unfavorable rail conditions. Advantage might be taken of this fact to use a higher braking power in summer than could be used in the winter with the same degree of freedom from objectionable wheel sliding.

From a calculation based upon the opposing forces on the wheel when sliding is about to commence it can be shown that a nominal braking power—that is, pressure on the brakeshoe as calculated from the pressure in the brake cylinder and neglecting the friction or binding of the brake rigging—may, under good conditions, be as high as 470 per cent of the load on the wheel without causing sliding. This, of course, is beyond the range of the tests which furnished the data from which the calculations were derived, and consequently the result signifies nothing more than that, under the conditions assumed above, an extremely high nominal braking power would be necessary in order to cause the wheels to slide. As a matter of fact, tests at about 400 per cent nominal braking power are on record in which practically no sliding occurred.

However, under as poor rail conditions as could well be imagined, the allowable percentage of braking power works out to 81 per cent. As a matter of fact, some wheel sliding was obtained during the tests with 85 per cent to 90 per cent braking power when very bad rail conditions prevailed. For practical purposes a conservative value for the coefficient of rail friction would be 15 per cent. If a nominal braking power of 150 per cent is used with as bad a rail condition as is represented by the extremely low value for coefficient of rail friction of 15 per cent, the mean retarding force developed by the brakeshoe is still 14 per cent less than the adhesion of the wheel to the rail.

The amount of wheel flattening when sliding occurs depends upon the weight upon the wheels, the materials in the wheels and rails and the condition of the rail surface. The rail surface may be such that relatively long slides will produce flat spots of a size requiring prompt attention.

BRAKE RIGGING

An efficient design of brake rigging must be produced before the advantages of improved air brakes or brakeshoes can be fully utilized. The use of the clasp type of brake rigging eliminates unbalanced braking forces on the wheels and so avoids the undesirable and troublesome journal and truck reactions that come from the use of heavy braking pressures on but one side of the wheel. This has an important effect not only on freedom from journal troubles but also in enabling the wheel to follow freely vertical inequalities of the track. The clasp brake also improves the brakeshoe condition materially, both as to wear and variability of performance.

Although the clasp brake rigging will produce better stops than a single shoe brake rigging equally well designed (other conditions being equal), its advantage in this direction is of less importance than in the improved truck, journal and shoe conditions mentioned above.

The tests indicated that at least 85 per cent transmission efficiency could be obtained with either single shoe or clasp brake rigging.

BRAKESHOES

The brakeshoe bearing was the most difficult factor to control and at the same time the most potent in producing variations in brake performance.

The tests established the possibility of a variation of 15 per cent to 20 per cent in length of stops from 60 m.p.h. with all factors except brakeshoe condition remaining substantially constant. Continued stopping with moderate braking pressures produced a constantly improving brakeshoe condition and shorter stops. This is evidence that with reasonable attention to brakeshoe maintenance the condition of the shoes on cars in ordinary road service is likely to be more favorable to making short emergency stops than during a series of tests in which the brakeshoes are worked severely.

The difference in the efficiency of the clasp and single shoe rigging may offset the gain which might be expected from difference in coefficient of friction, and vice versa. Consequently, as neither of these factors could be observed uninfluenced by the other, a satisfactory comparison of the mean coefficient of friction under different rigging conditions, or of different types of rigging or air-brake apparatus under variable shoe conditions in road tests, is impossible.

High braking powers from high initial speeds result in a great heating of the working surface of the shoe and a rapid abrasion. This effect is most marked under severe braking conditions such as obtained when heavy cars equipped with one brakeshoe per wheel are stopped.

Shoes of the same type and hardness had a high rate of wear per unit of energy absorbed when a low coefficient of friction was developed and, conversely, a lower rate of wear when a higher coefficient of friction was developed.

Both the road and the laboratory tests confirmed previous tests and conclusions from analysis that the temperature of the working metal is the determining influence in coefficient of brakeshoe friction. The other factors that may be involved become effective chiefly as they affect the change of temperature of the working metal.

The general performance of the shoes as observed during the road tests formed the basis of the program established for laboratory tests, which resulted in the following deductions: (a) The generation of the retarding forces and consequent absorption of the energy of the moving train is dependent upon but a very small quantity of brakeshoe metal. (b) The actual bearing area rather than the total face area of the shoe is the important factor in brakeshoe performance. (c) The magnitude of the bearing area changes throughout the stop and is greatest near the end of the stop. (d) The bearing area shifts continuously from one portion of the surface to another during the stop. (e) The principal factor in producing high friction for any given braking condition is the frequent shifting of the bearing area from the heated to the cooler spots over the face of the shoe. (f) Slotted shoes or shoes that are cracked are more flexible than solid shoes and the bearing area shifts more readily than in the case of solid shoes. (g) With shoes of the same type and approximately the same hardness, the wear per unit of work done is less with the slotted shoe than with the solid shoe. The stops with slotted shoes were always shorter and the mean coefficient of friction higher than with solid shoes. (h) The shifting of the bearing area will tend to be more rapid if the size provides more available area for shoe bearing. (i) The greater the pressure per square inch of bearing area, the lower will be the mean coefficient of friction. (j) Flanged shoes provide more available area for bearing than unflanged shoes, shortening the stops 12 per cent over results obtained with unflanged shoes. (k) The use of two shoes instead of one per wheel will result in a higher coefficient of friction and less wear per unit of work done. (l) A comparison of the values of mean coefficient of friction for standard and for clasp brake conditions indicates a decided advantage for the clasp brake throughout the entire range of braking powers. The gain in favor of the clasp brake with slotted shoes amounts to about 40 per cent at a braking power of 180 per cent and 100 per cent at a braking power of 40 per cent, an average gain for the whole range of braking powers of about 70 per cent.

From a brakeshoe standpoint the advantage of using two shoes instead of one shoe per wheel may be summed up as follows: First, the clasp brakeshoe is associated with but one-half the wheel load and consequently has but one-half as much energy to absorb. Second, the clasp brakeshoe is working at only one-half the shoe pressure at which the standard shoe must work under the same braking power. Third, the available work area is doubled for the same amount of energy to be absorbed.

A possible source of disadvantage when using two shoes per wheel is that a warped or poorly bearing shoe is subjected to less pressure tending to force it into a good contact with the wheel. For this reason, though the available shoe area is doubled when using clasp brakes, the actual amount of working metal throughout the stop may be less than a single shoe, which is less capable of resisting the tendency of the heavier pressure to cause a better fit of shoe to wheel.

This, with an especially good shoe condition due to previous moderate pressure tests in each case, is an explanation why three of the 60-m.p.h., 150-per-cent-braking-power, electro-pneumatic stops with the train with single-shoe brakes were shorter by 50 ft. than the best stops of either of the trains equipped with clasp brakes.

On the other hand, the disadvantage and greater variability of the single-shoe brake is evidenced in the fact that, under the same conditions as cited above, two stops with this train were longer than the longest stops without material wheel sliding made with either of the two clasp-brake equipments.

VARIOUS TYPES OF BRAKESHOES

With plain, solid shoes the durability will be increased 41.1 per cent under clasp-brake conditions as compared with that under single-shoe conditions. With plain, slotted shoes the durability will be increased 33.5 per cent under clasp-brake conditions as compared with that under single-shoe conditions. The superior durability of the plain, slotted shoe as compared with the plain, solid shoe amounts to 11.7 per cent under single-shoe brake conditions and 5.9 per cent under clasp-brake conditions.

The wear of the flanged, solid shoes per unit of work done is 19 per cent less than for plain, solid shoes, and for flanged, slotted shoes 26 per cent less than for plain, slotted shoes, or 30 per cent less than plain, solid shoes. The wear of plain, slotted shoes per unit of work done is 5.4 per cent less than the wear of plain, solid shoes, and the wear of the flanged, slotted shoes is 13.2 per cent less than the wear of flanged, solid shoes.

For the same amount of work done flanged, solid shoes cost 16 per cent less than plain, solid shoes, and flanged, slotted shoes cost 23 per cent less than plain, slotted shoes, or 27 per cent less than plain, solid shoes. Approximately 135 per cent more stops will be required to wear out the flanged, solid shoe than will be required to wear out the plain, solid shoe; 158 per cent more stops to wear out the flanged, slotted shoe than the plain, slotted shoe, and 171 per cent more stops to wear out the flanged, slotted shoe than the plain, solid shoe.

For any given braking condition with cast-iron brakeshoes the indications are that the best relation will exist between shoe wear and mean coefficient of friction when the Brinell hardness of the cast iron is about 190. Machine and road tests show a difference in stopping distance for the same type of shoe under the same braking conditions.

The effect of the difference in wheel surface conditions is one of the leading factors which go to make up the difference between machine and road tests. The difference in braking performance can be established and the factor expressing this difference be applied to laboratory results to predict the performance of a car or train.

LENGTH OF STOP

The stops and observed performance of the air brake, brake rigging and brakeshoe are in agreement with the relation generally assumed to exist between the speed and other variables mentioned and resultant length of stop. This relation for straight, level track, neglecting air and internal friction, on the one hand, and the rotative energy of the wheels and axles, on the other hand, is:

$$S_t = 1.467\ Vt + \frac{V^2}{30\ Pef}$$

in which the terms have the following significance and range of values according to conditions:

S_t = length of stop to be expected in feet.

V = initial speed of train in miles per hour.

t = time in seconds at the beginning of the stop during which the brakes are to be considered as having no effect, to allow for the time element in the application of the brakes. For a twelve-car train this ranges from 2.0 to 2.5 with the PM brake and from 0.70 to 0.85 with the UC brake.

P = nominal per cent braking power corresponding to the average cylinder pressure existing for that portion of the stop after the brake is considered to be fully applied. With a single car or several similar cars, stopping without the locomotive attached, the value of P can be obtained from an average of all brake cylinder indicator cards or taken from one typical brake cylinder

TABLE SHOWING VALUES OF COEFFICIENT OF BRAKESHOE FRICTION BASED ON NOMINAL BRAKING POWER

Kind of Brake Rigging—Type of Brakeshoe		Value of $e \times f$			
		Clasp Brake		Single Shoe*	
Speed, M.P.H.	Braking Power	Plain	Flanged	Plain	Flanged
30	125	0.141	0.169	0.108	0.112
	150	0.129	0.154	0.099	0.103
	180	0.118	0.141	0.090	0.094
60	125	0.103	0.122	0.074	0.090
	150	0.094	0.112	0.068	0.082
	180	0.086	0.102	0.062	0.075
80	125	0.092	0.109	0.070	0.074
	150	0.084	0.100	0.064	0.068
	180	0.077	0.092	0.059	0.062

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*Value of data uncertain owing to non-uniform brakeshoe conditions.

card, provided that all cylinder pressures and foundation brake installations are subsequently alike.

ef = product of efficiency of brake rigging and mean coefficient of brakeshoe friction, in which *e* varies with the type and installation of brake rigging and with the percentage of braking power, though the latter effect can be but slight throughout the range of ordinary emergency braking powers; *f* varies with the kind and initial condition of the brakeshoe bearing surface, the initial speed and the various influences affecting the conditions of the bearing surface during the stop.

As no satisfactory separate determination of *e* and *f* was found possible, the combined factor $e \times f$ is given in the accompanying table, the values being representative of the best performance that might reasonably be expected under conditions comparable with those of this test.

THE VALUATION OF RAILROADS*

BY C. A. PROUTY, DIRECTOR OF RAILROAD VALUATIONS

Considered in its broad aspect, the subject of the valuation now beginning under the direction of the Interstate Commerce Commission naturally divides itself into three heads: first, the thing to be done; second, the time and expense required, and, third, the benefit to be derived.

The commission is required to ascertain and report the cost of reproducing new the railroad and other property of every railroad in the United States and the cost of reproduction less depreciation. As a preliminary step, every railway must furnish maps and plans, and when the valuation work is completed there will be found in the office of the commission at Washington an accurate map and inventory of the property of every railroad engaged in interstate commerce as of June 30, 1914, together with maps and plans showing all later additions to the property.

The valuation work is often referred to as a "physical valuation" of railroads and most people probably understand that the cost of reproduction with or without depreciation determines the value of the railroad, so that, having ascertained and reported these facts, the duty of the commission has been discharged. This is by no means true. At the present time the holding of the United States Supreme Court is that cost of reproduction new or cost of reproduction less depreciation is only a factor entering into the final question of value. Many other things have been enumerated by the board as bearing upon the value of the property. The valuation act itself requires the commission to ascertain and report the cost of construction, the amount of money invested in the property and the sources thereof; in short, to give a complete corporate and financial inventory of the property and from all these facts to determine the value of the property itself. Concerning the question of whether the cost of reproduction or the money investment will be the controlling factor in the cost of reproduction I express no opinion. I simply state that the commission is required not merely to ascertain the cost of reproduction but to state the value of the property, and in attempting to do this many delicate and difficult problems, such as those of developmental expenses, appreciation and the like, will have to be solved.

While it is somewhat hazardous to make an estimate of the time required for the completion of the valuation work, the field survey ought to be concluded in from four to six years from July 1, 1914. It is hoped that the accounting and other work will keep pace with the field service. As regards the cost on the basis of the experience of state commissions, $15 per mile will be sufficient to cover the engineering part of the work and $10 per mile the accounting and other features. This will aggregate for the entire 250,000 miles between $6,000,000 and $7,000,000. On the basis of the experience of railroads, however, which have conducted valuations at a cost of from $40 to $80 per mile, it seems that it will cost at least $50 a mile to complete the work, or at least $12,000,000. This is a large sum, but it cannot exceed over one-tenth or one-twentieth of 1 per cent of the value ascertained—an insignificant amount in proportion to the magnitude of the thing dealt with. Moreover, the difference that the resulting valuation may make in the rates to the public or the railroads may well be for each year five times the entire cost of the valuation itself.

One of the first benefits of the valuation work is that incidentally conferred upon the investing public. It is the duty of the government within reasonable limits to see that a would-be investor is not hoodwinked in the making of his investment and that the value of his investment is not improperly destroyed. When an investor can know from reliable sources, such as a valuation report, the exact character of his investment, cost of reproduction, state of efficiency, etc., there has been injected into railroad securities an element of certainty and permanency that does not now exist.

To the general apprehension the object of this valuation is to determine what rates railroads should be allowed to charge for their services. The relative functions of the legislative and judicial branches in the fixing of rates are not yet clearly defined. All just men can see that the return should be substantially the same as that obtainable from private investment having the same incidents. Manifestly it is not a difficult thing to determine the rate of return. There still remains, however, the valuation upon which this rate is to be computed, and until that valuation is known it is impossible to determine what income the property is entitled to earn and to fix the just charge against the public.

It is much more difficult to solve the problem of rate establishment for railroads than for other kinds of public utilities on account of the fact that competitive conditions, such as cross-country competition and the like, largely control the railroads so that the rates of one are necessarily bound up with those of another. It is impossible to shake a single railroad free from every other and fix its charges upon the basis of a fair return upon its fair value as could be done in the case of a gas or water plant. It is evident, therefore, that if a commission should select a road most advantageously situated, whose business is the largest and upon which the conditions of operation are the most favorable, and should adjust its rates to yield a return of 6 per cent upon its value, every other railroad in competition would receive less than a 6 per cent return and some might receive nothing. On the other hand, if a road laboring under the greatest disadvantage was to be selected, its competitors would receive an undue return upon their investment. Theoretically, it might be possible to take up this slack caused by uniform through rates by an adjustment of rates upon local business, but the effect of this would be to concentrate business into certain localities, whereas the aim should be so to adjust transportation charges as to secure a general diffusion of values and business. The problem of establishing railway rates will not be solved by valuation, but it will be enormously simplified.

The greatest immediate value of the valuation work seems to lie in the fact that from the state of the public mind valuation information is necessary. The work will give some accurate data on the questions whether railroads as a whole are enormously overcapitalized or whether certain individual railroads may not have improved their property out of earnings without corresponding increases in their capital accounts. None of the important railroad questions of the day, such as those concerning the St. Louis & San Francisco system, the Boston & Maine and the New Haven, can be justly dealt with until the exact values of these properties are known. For this reason it is important that the valuation work be pressed to a completion in the most expeditious and most trustworthy manner possible.

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*Abstract of address delivered before the second annual meeting of the Chamber of Commerce of the United States of America, held in Washington Feb. 1, 1914.

BUSINESS TRAINING FOR THE ENGINEER*

BY ALEX. C. HUMPHREYS. PRESIDENT STEVENS INSTITUTE OF TECHNOLOGY

If an engineer is called upon to examine the value of a manufacturing property and in connection with this examination there are presented to him a ledger trial balance, a profit and loss statement and a statement of assets and liabilities, it goes without saying that he must understand how these statements are produced and how they are related to each other in order to make an authoritative report. This he cannot do without a knowledge of at least the principles of accounting. It may be said that the engineer's responsibility is confined to the strictly engineering side of the proposition and that he can be associated with an accountant to take care of this other work. Under such a condition, however, the accountant must have a sufficient knowledge of the practical or engineering side of the business to insure that the report as a whole shall be conclusive, and this puts the engineer in an undesired subordinate position.

There is no doubt that a knowledge of accounting is one aspect of business training that is essential to the engineer. Particularly is this true when there arises the question of differentiating between repairs or renewals and extensions or improvements. If, under the heading of repairs or renewals, extensions or improvements are charged too liberally to operation, the capital accounts do not reflect the true value of the property. On the other hand, if repairs and renewals are charged to extensions, the statement of profits is misleading and the capital accounts are unwarrantably expanded. The ability to discriminate between these items is a necessary qualification in the engineer-manager, especially in his work before public service commissions.

It is also necessary to know the principles of accounting in order to understand the valuation of properties, particularly the one difficult element of depreciation contained in such calculations. No man can be in a position to meet effectively the arguments of others in regard to depreciation, estimated and actual, unless he has a knowledge of the principles of accountancy. It seems to be almost impossible for the man who has little or no knowledge of such principles to appreciate that there is a sharp distinction always to be drawn between estimated depreciation and actual depreciation. Not a few engineers have helped to create the confusion that now exists with regard to the difference between these views of depreciation. Periodic depreciation that accrues—namely, the cost of the final renewal of plant or part of plant which is to be displaced either through the operation of physical decay, obsolescence or inadequacy—should be covered by estimates as far as possible, so that the burden of the loss can be more evenly spread over the years of service of the plant or portion of plant to be renewed. The cost is bound to fall on the business sooner or later, but to enable the determination year by year of what are the actual profits as differentiated from the profits apparent on the surface there must be taken into account all accruing losses and gains, especially the former. Otherwise there may be paid out as profit that which has not been earned, and a financial burden may be accumulated that cannot be met when the day arrives for the final renewal of the plant or of part of it. This accruing loss for the final renewal of plant in addition to the current losses for maintenance is sometimes known as estimated depreciation, but it is my opinion that the word "depreciation" should not be employed in the case of such estimates but that the term "final renewals" should be used instead.

The word "depreciation" should be reserved to refer only to actual depreciation, the calculation of which becomes necessary particularly in valuation work. In valuing a plant the appraisers know the present demands made by the business; they are able to determine whether the plant is adequate or inadequate as to capacity and whether its condition shows obsolescence. In trying to determine the present actual condition of the plant, therefore, with the plant and business records available, no dependence should be placed upon an estimate made perhaps years before (or as of some previous year) as to what would be the condition of the plant in years to come. The actual facts can be determined only by an adequate examination of the plant by those competent as constructors, as operators and as administrators, and the actual amount of depreciation will hardly be the same as the amount shown by the estimated final renewals reserve.

The engineer should also understand overhead charges, for too often he fails to include these in his estimates. By some the items of omissions and contingencies are considered as overhead charges. I consider them items of construction, for while these items of cost cannot be estimated accurately, there will surely be items of cost under these two headings. There never was yet constructed a plant of any size which, when it was finished, did not contain parts not included in the original estimate. Furthermore, preparation must be made for contingencies in connection with almost any construction of magnitude. Hence, whether omissions and contingencies are included as overhead charges or not, they must be provided for, and the engineer should understand the methods for so doing.

There are other items which must be included in the final cost. They may be summarized briefly as follows: preliminary expenses and surveys, interest and taxes during construction, engineering and inspection, business organization during construction, fire and casualty insurance, cost of development and cost of financing. The engineer may claim that he is not responsible for some of these items of cost, but in such a case he must confine himself advisedly to certain specified items of cost. He cannot safely ignore the total cost if he is acting as a general adviser.

The engineer should certainly possess sufficient accounting knowledge to analyze data as presented to him in connection with propositions involving construction or operation or both. He should also be informed as to general business methods and practices, so that he may avoid the pitfalls that surround him on every hand and secure competent legal advice in cases where he recognizes his own incompetence. The students at Stevens Institute not only have to take up the business features of engineering practice as a serious study, but before they can graduate they have to pass an adequate examination in the elements of accountancy, depreciation, the accountancy of depreciation, analysis of data, specifications, estimates, contracts and appraisals. They also have special lectures on the law of contracts, patent law, employers' liability and workmen's compensation, shop costs, the elements of banking and the like. During the fifteen years that this plan has been operating many of the alumni, who as students took up this work under protest, have acknowledged their obligations for being forced to take such work. No such course can give the engineer the complete equipment in the business side of engineering; but a similar remark can be made as to any curriculum. It assists a great deal, however, and through the beginning grasp of business affairs the students are much better qualified to apply their special engineering training.

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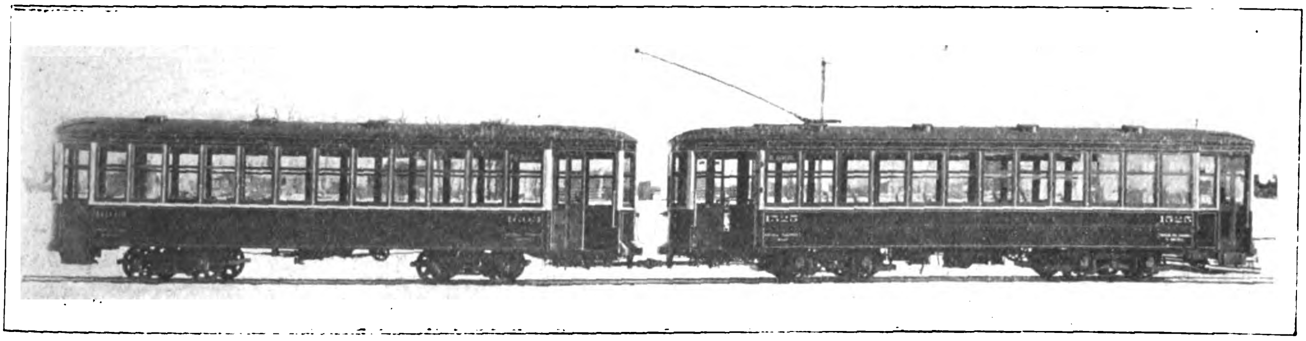
*Abstract of paper presented before Philadelphia Sections of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, at a meeting held on Feb. 9, 1914.

TRAIN OPERATION IN MONTREAL

The Montreal Tramway Company has just begun the operation of trains on St. Catherine Street, the principal shopping thoroughfare of Montreal. These trains are composed of one motor car 44 ft. 9 in. over all and one trailer 44 ft. over all. An interesting operating feature is that all entrance is by way of the rear platform of the motor car and the front platform of the trailer, thereby saving time in loading and also facilitating teamwork between the neighboring conductors on the prepayment platforms. Exits on the motor car, which is of the single-end type, are provided at the front and rear in accordance with the Montreal company's standard practice. The exit of the trailer car is at the front platform only. The vestibule doors of both cars are wired in series in order to give the motorman a light signal when all of the doors are closed. The motor car, of course, can be operated separately during the lighter hours of the day. It differs from the previous type of the Montreal company in having a fully inclosed rear vestibule instead of an open rear vestibule with bulkhead doors. A description of the principal equipment on these cars was printed on page 939 of the issue of this paper for Oct. 25, 1913.



Montreal Tramway Company—New Two-Car Train

RAILWAY CO-OPERATIVE STORES IN NEW YORK

The first six months of operation of the three co-operative employees' stores of the Interborough Rapid Transit Company and the New York Railways, which are respectively at 816-818 Eighth Avenue, 152d Street and Eighth Avenue, and Ninety-eighth Street and Lexington Avenue, has, in the opinion of the officials of these companies, shown the wisdom of their installation. Although no definite figures have been compiled, the progress of the stores is well shown by the steady increase in the volume of sales.

As stated in the ELECTRIC RAILWAY JOURNAL of July 12, 1913, these stores possess no philanthropic or charitable features; neither are they conducted for profit. The railways have simply placed at the command of their employees their extensive credit to be used in the collective buying of foodstuffs in large quantities at wholesale prices, and these foodstuffs are retailed to the employees at wholesale prices plus the exact cost—no more, no less—of delivering the same over the counter. Up to the present time the installation of the stores has meant a 20 per cent reduction in the average price of foodstuffs to the employees. It is the ambition of the companies, however, further to reduce the selling cost by buying in larger quantities, and for this reason they desire even a greater increase in gross sales than has been evidenced in the past.

The article of greatest consumption in the store is fresh meats, which run up to 55 per cent of the gross sales. Next come groceries with 25 per cent, and of the remaining 20 per cent dairy products form the largest part. It has been found that there is not much call for certain vegetables, such as lettuce, celery, etc., but that there is a considerable demand for beets, carrots and the like. The original scope of the stores has been broadened to include toilet articles and candy in response to requests from employees.

The following list shows the range of current prices in the stores:

Bulk or Package Goods	
Quaker oats	$0.08
"None Such" mince meat	0.08
Franco-American "Ready Maid" soups, per can	0.07
Large No. 3 tins solid ripe tomatoes, finest packed, three cans for	0.25
"Jersey Giant" tomatoes (extra tall can), per can	0.12
Procter & Gamble's Crisco, per can	0.22
Van Camp's sugar corn, per can	0.10
Star milk, per can	0.10
Fancy new packed early June peas, per can	0.12
New mixed nuts, per lb	0.19
All National Biscuit Company goods:	
$0.05 packages	0.04
0.10 packages	0.09
Spratt's dog cakes, per package	0.09
Schepp's cocoanut, per package	0.07
Maillard's cocoa, ½ lb.	0.20
Huyler's cocoa, ½ lb	0.19
California asparagus tips	0.11
"White Rose" tea, ½ lb	0.26
Coffee, per lb	0.20
Goods Put Up in Glass	
Sunbeam cider vinegar (attractive jars)	0.09
"Lion Brand" P. R. molasses (glass jars)	0.11
"Sunbeam" flavoring extracts	0.09 and 0.14
"Lion Brand" jams	0.09
Dairy Specials	
Armour's "Empire Brand" butterine, per lb	0.22
Imported Roquefort cheese, "Regal Brand," per lb	0.35
Young American cheese, per lb	0.22
Toilet Goods	
Supercream shaving soap, per box	0.05
Stork castile soap, per cake	0.08
Pure castile soap, per cake	0.07
Smelling salts, per bottle	0.20
Cold cream (large jars), per jar	0.39
Candies	
Turkish paste, per lb.	0.19
Pan-American chocolates, per lb	0.25
Royal gum drops, per lb	0.11
Assorted chocolate creams, per lb	0.12

As an added attraction the companies have adopted the practice of offering a special article for sale. Practically every week a circular describing the special offer is published and posted on all bulletin boards of the companies. During the recent holiday season the stores, for example, sold the finest turkeys, ducks and geese at prices comparatively low. Special gift boxes were also made up for sale in the candy and toilet articles departments.

One of the difficulties encountered in the operation of the stores is the fact that about 80 per cent of the weekly purchases are made on Friday and Saturday. This is due partly to a natural inclination to do the heaviest trading for the week-end period and partly to the fact that the pay day of the companies comes at the end of the week. This excessive trade on Friday and Saturday necessitates the employment of a larger fixed force of clerks than would be required if the purchases were distributed more evenly throughout the week, and thus tends to increase the selling cost. While on account of the date of paying the men it will be impossible to obviate this heavy pressure of purchases on the last two days of the working week, it is believed that a special appeal made to the buyers, with emphasis laid on the effect of such a practice on the selling cost, will reduce this practice to as great an extent as is possible under existing conditions.

Practically all the purchasing is done by the wives of the employees. The percentage of women customers predominated from the opening of the stores, but with the recent granting of passes to the wives of employees over all the companies' lines the proportion of men buyers has decreased even more. This free transportation privilege has also had a marked effect on the gross sales of the stores, for more women at a distance from the stores have thereby found it advantageous to buy their foodstuffs there.

With the beginning of 1914 D. W. Ross, vice-president of the Interborough Rapid Transit Company and New York Railways, issued a circular to the employees in part as follows: "As these stores are your stores and our first and only aim is to run them as you would have them run, it is only right that we consult and advise with you as to the general outcome of their operation. To enable us to accomplish this result not only requires your fullest co-operation but demands that you make known to the management those things in and about the stores which please or displease. This refers not only to the character of goods on sale, but to the general conduct of the stores, including the efficiency of, and treatment accorded you by, the employees of such stores. We expect the clerks to accord you the same courteous treatment that is expected of you in dealing with the public, and we purpose that this shall be the case, but none of us can always be present personally at each sale, and for this reason we want you, as a matter of justice, not only to yourself and fellow employees but to those directly charged with the responsibility of operating these stores, to make known to them everything coming under your observation, no matter how trivial it may seem, which, in your mind, detracts from the general attractiveness of the stores, both as to physical appearance and general treatment accorded its patrons. Any suggestions or recommendations you may have to make looking toward this end are earnestly solicited."

As a result of this appeal Mr. Ross has received many letters, all of which are highly congratulatory as regards both the quality and prices of goods offered and the service rendered. Several suggestions have been received, some of which, such as setting aside certain hours on Saturday for men buyers only and delivering all goods to the employees' homes, are manifestly neither practicable nor desirable. Other suggestions, such as that providing for the withdrawal of employees from other departments to help out in the week-end rush and thus rendering unnecessary the maintenance of a large sales force idle during the first of the week, are very practicable and indicate how the employees are co-operating industriously with the officials for the attainment of the lowest selling cost possible.

ARBITRATION AWARD FOR INDIANAPOLIS TRACTION & TERMINAL COMPANY

The decision of the Public Service Commission of Indiana in arbitration of the grievances of the employees of the Indianapolis Traction & Terminal Company was made public on the afternoon of Wednesday, Feb. 11. The award contains the provisions listed below:

The wage scale for motormen and conductors is, first year 21 cents per hour, second year 23 cents, third year 24 cents, fourth year 25 cents and fifth year 26 cents, and 27 cents thereafter. An increase of 5 per cent was granted to other employees of the company not in car service. The decision is binding for a period of three years.

No extra pay is allowed for overtime. A minimum of $45 per month is provided for extra men. Motormen and conductors are required to be off one Sunday in each month, thus reducing their earning capacity by 3 per cent. The company is not required to recognize the union nor to employ union men but may not discriminate against any employee who may belong to the union.

All runs are to be completed within sixteen hours and no run is to have more than twelve hours' platform time for any one employee. Each employee in car service is to have eight hours off duty in each period of twenty-four hours.

Employees are to be paid for the time occupied in going to take runs at points other than the carhouses after they have reported at the carhouses. Men engaged in sweeper and snow-plow work are to be provided with meals by the company.

Hearings are to be held twice each month by the superintendent of the company and once a month the president is to hear appeals from suspended or discharged employees. Matters which cannot be satisfactorily adjusted between officials and employees and which are of a serious nature may be submitted to an impartial board of arbitration chosen as follows: One member is to be selected by the judge of the federal Circuit Court, one by the chief justice of the Indiana Supreme Court and one by the chief justice of the Appellate Court of Indiana.

The report of the findings of the commission contains about forty-two typewritten pages of decisions while forty additional pages are devoted to citations and references supporting the decisions arrived at by the commission.

The Illinois Traction System in its interurban shops at Decatur is now changing the quadruple equipments on ten of its motor cars from motors of 75 hp to GE-222 Form G motors of 140 hp at 600 volts. Each motor car weighs 90,000 lb. and in a typical schedule hauls two 70,000-lb. trailers. The trains are made up as follows: The head car as the passenger and baggage car is equipped with motors; the second car is a straight passenger coach, and the third is a parlor observation car. Sometimes these motor cars have to pull two sleeping cars. The schedule called for is 30 m.p.h., including stops averaging one every 2 miles. A typical run is 175 miles long.

COMMUNICATIONS

M. C. B. BRASS UNSUITABLE FOR HIGH BRAKESHOE PRESSURES

L. B. STILLWELL, CONSULTING ENGINEER
NEW YORK, Feb. 11, 1914.

To the Editors:

In your issue of Jan. 31 there appears an editorial announcing that "The M. C. B. Brass Should Be Discarded." This is somewhat startling, as the appliance in question has done, and still is doing, honorable service under conditions for which it is suited.

While your criticism of the use of this type of brass on the trailer trucks of the Westchester cars, to which you refer, is entirely warranted, I think that in placing the matter before your readers you should have given an explanation of the conditions which caused the unsatisfactory behavior of the brass, namely, the use of heavy brakeshoe pressure with single brakeshoes, hung high for the purpose of increased brake efficiency and with the desire to retain easy riding qualities during braking.

If the same M. C. B. brasses had been used with clasp brakes, providing two shoes per wheel, probably no trouble would have been experienced. The horizontal pressure exerted against the journals by the action of simple brakes has, of course, a tendency to force the journal from its seat on the brass, as illustrated in the photograph you reproduce. The use of two shoes per wheel, as with the clasp-brake system, overcomes this tendency to displace the journal.

Had your editorial been entitled "The M. C. B. Brass Unsuitable for Use with High Brakeshoe Pressure," I am sure that many of your readers would have received a more comprehensive first impression. However, I fully concur in your opinion that the subject of form of journal brass for high-speed electric service should receive suitable attention from the A. E. R. E. A. committee on equipment.

F. M. BRINCKERHOFF

THE CLASP BRAKE VERSUS THE SEMICIRCULAR JOURNAL BRASS

NEW YORK, Feb. 10, 1914.

To the Editors:

I have read, with considerable interest, your article on the "Maintenance of Mechanical Equipment on the New York, Westchester & Boston Railway," and also your editorial headed "The M. C. B. Brass Should Be Discarded." I am interested particularly in the latter and I desire to take issue with you on the general proposition that the M. C. B. brass should be done away with. This conclusion of yours is based, as I understand it, on the difficulty met with on the New York, Westchester & Boston Railway, as illustrated by the photographs on page 220. I think it is too hard to lay all this trouble on the brass. It is a good deal like the father buying a second-hand coat for his boy which, when tried on, was found to be too large. It was returned to the merchant and the difficulty was stated, but the merchant replied: "Why! The coat is not too large. The boy is too small!" Not that the case is a parallel one, but the conclusion is just as reasonable as yours.

In the first place, the M. C. B. brass was never designed for use as a brakeshoe, and it makes a very expensive appliance to be used in this capacity. The illustration referred to is a magnificent example, as it gives an exaggerated illustration of what is happening in a greater or less degree to all M. C. B. brasses where the brakes are applied to one side of the wheel; and it would seem to the writer that the use of a special brass as noted on the photograph to the right (page 220) is only a makeshift, because the cause is in no way removed. This method should not be considered good practice as it is only a tentative expedient.

It seems to the writer that it would be much better engineering to go to the seat of the difficulty and remove the cause; and it is quite evident that the cause is the application of the brake on one side of the wheel. Obviously the clasp brake would entirely remove the difficulty and would prove of enough advantage in many other respects to warrant the expense of its installation. When such a clear-cut and well-defined case is so manifest it seems very much like begging the question to interpose any "homeopathic" expedient.

The same difficulty has quite recently developed in the trunk-line service of a steam road where the newer type of high-speed brake has been applied to heavy steel cars. Before the cause was definitely located, the only apparent remedy was to change from 5-in. x 9-in. to 5½-in. x 10-in. journals. The larger journal and M. C. B. brass obviated most of the difficulty of heating which had been manifest in the same cars, under the same conditions, when the 5-in. x 9-in. journal was used. Later, this same road began to use the clasp brake, and with clasp brakes on this same type of cars there has been no trouble from heating whatever with a 5-in. x 9-in. axle and appurtenances.

L. R. POMEROY, Consulting Engineer.

CHARGES FOR POWER IN ELECTROLYSIS REPORT

PHILADELPHIA, Feb. 5, 1914.

To the Editors:

The writer has read with considerable interest the article in your issue of Jan. 31 relative to the Bureau of Standards' method of electrolysis elimination as proposed for Springfield, Ohio. While he does not wish to offer any criticism as to the methods proposed, he does wish to call attention to the method of calculating the value of energy saved by the system. This has been assumed at 1 cent per kw-hr. without stating just what is included in the assumed cost. This is a very common figure used in such calculations; but a figure about one-third of this amount is more nearly correct, and even less than 1/3 cent under some conditions ought to be used.

The power station of a road with which the writer has been associated shows a cost per kw-hr. of about 1.1 cents. It is a compound condensing, d.c. plant using high-grade coal costing $1.60 per ton. The cost of power includes 10 per cent interest and depreciation. Roughly speaking, the cost is made up of 3 to 3½ mills for fuel, a similar amount for wages, oil, repairs, etc., and the balance for interest. Now, unless the decreased output of a station is of a comparatively high percentage of the total previous output, the only saving of moment is in the coal pile, and the other costs are practically stationary except as shaded off in fractions. The only possible real saving is somewhere close to 1/3 cent per kw-hr., varying with the individual plants.

The amount proposed to be saved in the article in question is considerably less than 1000 kw-hr. per day, but, assuming this figure, it would be 50 kw-hr. per hour, which would involve less than 200 lb. of coal for its production. If the coal consumption of a plant could be so handled that exactly the correct amount required could be placed in the boiler just as it actually is required, such a saving could be figured on with safety, but when the personal equation of the firemen is considered as well as other features it is a question if half the amount of coal can be saved. In other words, the saving is purely theoretical and it is a question just how much of the expected saving in coal will really be found at the end of the day. In any event, any allowance in excess of 1/3 cent per kw-hr. is highly questionable.

A similar condition exists as to the cost of hauling a pound of material in a car. We find that the commonly accepted sum of 5 cents per lb. is correct for our road, but it would be absurd to say, because we eliminated 100 lb. from an individual car, that we would have $5 less cost in the power plant for the year, that is, cost that can actually be found under such classification. It is only when the saving in consumption runs into a large percentage of the output that it can be counted upon.

Such figures have appeared so often in calculations that it is time to call a halt before we deceive ourselves and are led astray hunting for savings that do not exist.

ELECTRICAL ENGINEER.

APPOINTMENTS TO COMMITTEES

Several additional appointments to committees of the affiliated associations of the American Electric Railway Association have been announced.

Chairman C. S. Kimball of the way committee of the Engineering Association has appointed the following sub-committees of that committee: Proper foundation for tracks in paved streets, R. C. Cram, C. H. Clark and E. H. Berry; use of T-rail in paved streets, E. H. Berry, W. F. Graves and J. B. Tinnon; pavement for use in connection with girder and high T-rails, H. F. Merker, C. H. Clark and C. S. Kimball; alloyed steel rails, G. W. Gennett, Jr., E. P. Roundey and H. F. Merker.

Chairman H. H. Adams of the committee on standards of the Engineering Association has appointed the following sub-committees: Style, Norman Litchfield, E. R. Hill and C. S. Kimball; engineering manual, Martin Schreiber, F. B. H. Paine and F. R. Phillips.

President Hegarty of the Transportation & Traffic Association has appointed H. C. Donecker chairman of the committee on uniform definitions.

President Glover of the Accountants' Association has appointed H. B. Cavanaugh a member of the committee on interline accounting and John L. Conover, Jr., a member of the committee on education.

DEPRECIATION AS AFFECTING VALUATION AND FAIR RETURN

A discussion on the paper by John W. Alvord on "The Depreciation of Public Utility Properties as Affecting Their Valuation and Fair Return," presented before the American Society of Civil Engineers, is published in the January *Proceedings* of the society. Of the contributions abstracted below all but the one by Mr. Floy were by letter.

W. J. Wilgus said that whether or not a depreciation fund is actually set aside would seem to be immaterial. What the public is interested in is the proper upkeep of the property without an increase for that purpose of the capital burden which it is expected to bear through the rate.

J. E. Willoughby said that the method of penalizing the owner suggested by Mr. Alvord—the deduction of the accrued depreciation from the reproduction cost new—is a confiscation of property to the amount of the accrued depreciation because the amount of the accrued depreciation was originally and necessarily put into the property before any depreciation could take place, and whatever has taken place is properly to be regarded as an expense of operation.

Frank C. Boes said that one cannot expect to deduct $3,000 from a ten-thousand-dollar plant in fixing rates and still have a ten-thousand-dollar service maintained. Does one pay less for milk given by old cows or for apples grown on old trees?

Allen Hazen said that it is clearly the privilege and duty of public service corporations to charge rates that will permit marking off a proper allowance for depreciation. When this allowance has been once determined and marked off there would seem to be no equitable reason why the capital thus marked off should be further considered in connection with the question of fair rates.

H. C. Vensano said that the whole question as to whether or not depreciation should be deducted from physical valuations for rate-making purposes would seem to be largely a matter as to whether or not the public utility had been handled correctly. It would seem that no theory of any kind can be made to apply to a property which has not been handled reasonably and honestly by its management and at the same time be made to apply equally to a well-managed property.

William B. Jackson believes that undue importance is placed on depreciation of plant *per se* without due consideration being given to the question whether the property has been kept in such condition as to give substantially as good and economical service as a new property and is fully safeguarded by its reserves from financial breakdown.

Henry Floy said that where a corporation is created and the money of owners is invested, after notice, under conditions prescribed in advance by regulating bodies, there can be no fair or honest objection to the insistence on accumulation of depreciation funds out of revenue and the use of such funds in any reasonable way, but they cannot necessarily be used as a measure of the value of the property on which rates are to be fixed. With respect to corporations that have been in existence for a considerable period of time without commission regulation and have been following certain generally accepted principles with the consent, more or less definite, of public authorities, Mr. Floy takes emphatic exception to the proposition advanced by Mr. Alvord that value for rate-fixing purposes must be determined by deducting the amount of a computed but not accumulated reserve fund from the cost of reproduction new.

Contributions to the discussion were also made by Leonard Metcalf, F. Lavis, Clinton S. Burns, Stuart K. Knox, J. H. Gondolfo and Alexander C. Humphreys.

PACIFIC POWER COMPANY TIE LINE

To provide for the exchange of surplus energy generated by the Pacific Power Company, the Nevada-California Power Company and the Southern Sierras Power Company, a tie line is being erected between Bishop and Lundy, Cal., to connect the three systems. Normally it is not proposed to operate the Pacific system in synchronism with the other pair, the two groups of circuits being segregated except when energy is being transferred. The tie line, a single circuit, is about 65 miles long and is now strung on wooden poles which will eventually be replaced by steel towers. When completed the line will connect six hydroelectric plants and two steam plants having a total rating of over 46,000 hp.

As the Southern Sierras Company now has a distributing system about 225 miles long, an increase in voltage from 55,000 to 90,000 volts will probably be made.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

HARDENED PINS AND SPECIAL BUSHINGS

BY WARREN L. BOYER

One of the questions now uppermost in the mind of the superintendent of equipment is whether it pays to use hardened pins and bushings for brake rigging. The writer has had much experience with such pins and bushings and has followed their performance on many lines. This study has convinced him that their use will bring handsome returns despite their slightly higher first cost. It is true that bushings have sometimes been tried with unsatisfactory results, but usually the failure was due to poor fitting and consequent loosening in service. As in other things, what is worth doing at all should be done well.

In truck construction 99 per cent of the brake-hanger brackets and brake heads are made of malleable iron, which, when good, is soft and wears rapidly under friction. Assume that when the brake hanger brackets were purchased from the truck builders they cost 50 cents each. They are not likely to break, but they must be renewed at least once a year, and for about six months of that time they are responsible for the chattering which follows from the wear of the pin hole in the bracket. The scrap value of the casting is only 3 cents, making the net annual cost of the bracket 47 cents. As there are usually eight brackets per car, the cost would be $3.76 a year, or $22.56 for six years. On the other hand, if the very same type of bracket is furnished with a properly fitted hardened bushing, it would cost only 10 cents more but give at least twice the life. If we assume that two renewals of the bushing would wear so large a hole that a third renewal would be impracticable, the net cost per bracket for six years would be 60 cents plus two hardened bushings at 10 cents each, namely, 80 cents, or $6.40 per car. Thus, in this one small item of car equipment, a saving of $16.10 would be obtained during a period of six years.

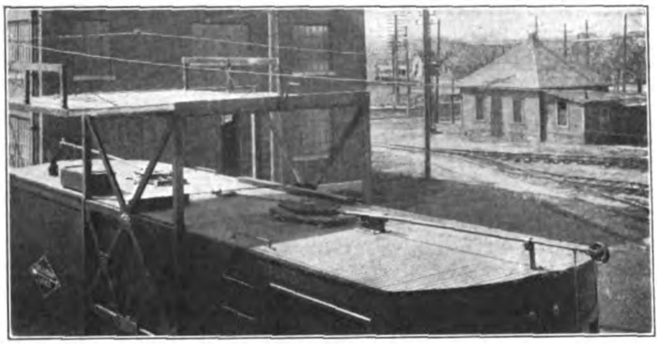
Furthermore, the foregoing comparison is made on the assumption that the user of the hardened bushing has still retained the soft brake pin. A much longer life for both pin and bushing would be obtained if the pin was case-hardened. This statement may seem strange because many people believe that a hardened pin will wear the hole in which it turns much faster than a soft pin and in exact ratio to the degree of hardening. It is true that a rough hardened pin will do this, but as soon as it has been worn smooth the wear on the whole will be reduced in proportion to the hardness. The greatest possible life of the pin is obtainable only with a hardened bushing. The reason why a hard pin causes less wear than a soft one is explained as follows:

When two soft surfaces bear against each other the wear is rapid and varies with the pressure. The products of this wear are minute particles which resemble fine filings. These particles remain between the bearing surfaces, upon which they act as an abrasive and increase the wear in proportion to their number. Comparatively soft materials like malleable or gray iron and common steel never show a very bright smooth surface from wear, and a microscope will betray the abrasions of the fine particles distinctly. The wear also increases in proportion to the amount of play which the pin has in the hole. Except possibly on one-way cars, few brake-rigging pins are under a constant pressure in the same direction. They are either in the release position or under the severe pressure of a braking application. Necessarily, in the change from release to application, the pin moves from one side of the hole to the other. The amount of this play and the suddenness of application add the wear of impact to that of abrasion. It will be readily seen what effect this action must have on soft material. On the other hand, when both the bushing and pin are hardened, the two surfaces soon take on a very high polish, and the abrasive wear is so small that very few particles can be found. The rate of wear is therefore decreased, and the hammer effect due to the gap between pin and bushing is proportionately delayed. In any event, even with the same blow and distance to travel, the hammer effect on hardened surfaces would be less.

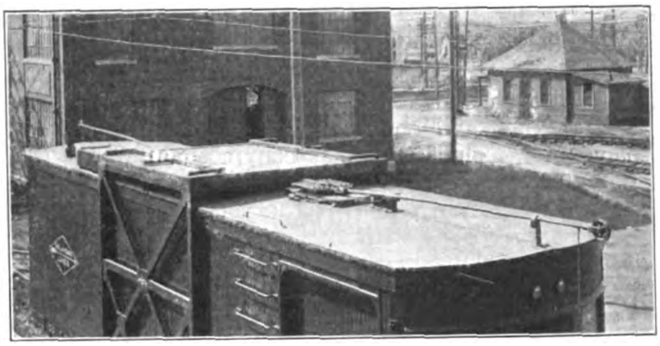
The foregoing discussion has a most important bearing on the "safety first" movement, because the condition of the bushings greatly affects the reliability of the brake rigging. For instance, on brake levers, two of the holes will wear faster than the others owing to higher pressures and longer movements under pressure. Instead of bushing the holes or renewing the levers when the holes are worn, it is a common practice to countersink the worn holes slightly on both sides, weld a plug in them and then drill a new hole through the plug. This practice is bad because seven out of every ten plug welds are poor. It must be borne in mind that the plug is in the center of a lever usually only 4 in. wide. Hence the edges of the lever are often burned while a welding heat is being obtained on the plug. Much hammering on the weld is also necessary, and this reduces the original size of the lever and also lowers its strength through the crystallization of the fibers. On one small road with which the writer is acquainted hand-brake levers have failed several times from this cause within the last few months. This cause for the weakening of brake levers is more general than most people suspect.

The cost when lever holes are renewed in the right way is actually less than when they are renewed in the wrong way. To countersink one lever with two holes on both sides, make and weld two plugs and lay out and drill the holes one must have the services of a blacksmith and helper at, say, $1 an hour. If they do the work in twenty minutes, the labor cost is 33 1/3 cents. On the other hand, the two holes may be reamed as quickly as they are drilled, but 10 cents may be allowed as a liberal extra cost for the better process. Two bushings at 5 cents each would cost 10 cents, and their insertion in two minutes by two men paid 60 cents an hour would cost another 4 cents, making a total of 24 cents. The cost of reaming would be saved at the second and third bushing of the same lever, so that renewals would involve merely the substitution of new for old bushings at a labor cost of 4 cents a pair. Welded plugs wear rapidly and leave a greatly weakened lever, while bushed holes wear twice or thrice as long, do not impair the original strength of the lever and cost only 72 per cent as much as the less effective method.

OKLAHOMA LINE CAR WITH PLATFORM HAVING SIDE ADJUSTMENTS



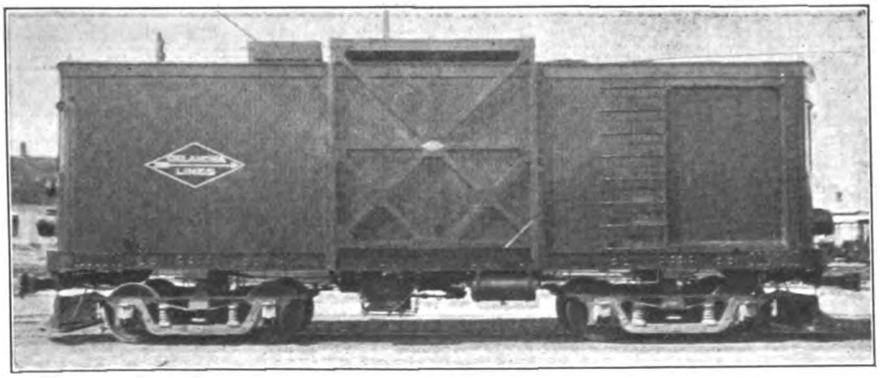
Oklahoma Railways Line Car—Tower Elevated and Extended



Oklahoma Railways Line Car—Tower Is Shown in Its Lowered Position

The Oklahoma (Okla.) Railway Company recently completed a line car embodying features which should offer some valuable suggestions to other companies interested in line-car construction. The general dimensions of the car are as follows: Length of car body, 34 ft. 9 in.; length over bumpers, 36 ft. 1 in.; height of car body, 9 ft. 2½ in.; height from top rail to top of trolley stand, 13 ft.; width over all, 9 ft. ½ in.; total weight, including special equipment, 61,062 lb.

The body was constructed of wood reinforced with steel plates and tie rods and was mounted on St. Louis trucks. It was designed for double-end operation and equipped with K-14 controllers in combination with GE-57 50-hp motors. A single side door, with 4-ft. 11-in. x 6-ft. 9½-in. clear opening, has been installed at the diagonal corners of the car body adjoining the bulkhead, the three windows in each end of the car provide ample natural illumination, and the location of the wide side doors is such as to give maximum wall space and floor space for shelving and the storage of line materials.



Oklahoma Railways Line Car—Side View Showing Wood and Steel Reinforced Frame for the Adjustable Tower

Perhaps the most striking feature in the construction of this car is the method of installing the adjustable tower. The tower and platform are supported on a combination wood and steel reinforced frame set in four steel guides, two attached to each side of the car body. The platform is 9 ft. square but is provided with an extension which permits the width to be increased to 9 ft. x 16 ft. It can be elevated so the maximum height when raised is 20 ft. 5 in. above the top rail. The tower is raised and lowered by an ordinary 5-in. drum compound gear, hand-operated winch connected by a ⅜-in. steel cable which passes over four pulleys supported in the roof of the car. The adjustable portion of the platform provided so workmen can make repairs on the trolley wire of an adjacent track, or work on poles between tracks, is arranged to move outward on either side of the car body. This platform is shifted by means of an ordinary rack attached to the base of the extension and pinion gears. A shaft extends the full width of the platform and pinions are keyed on each end so they engage in the rack under the adjustable platform. This platform extension is guided and held securely in position by angles which are bolted to the tower-supporting frame, and it is manually shifted to either side by means of an ordinary 20-in. crank and handle.

The interior of the car is fitted with a complete equipment of shelving, lockers, work bench and hangers to receive such tools and supplies as are needed in making line repairs. A pair of pedestals arranged to support a reel of trolley wire at all times were installed at the approximate center of the car body. The trolley wire passes from this support through an opening in the roof over an insulated idler pulley. The reel support is equipped with a brake which is attached to the trolley-wire reel so wire may be strung with the current on the line. An emergency tool and supply box with a few tools and supplies used to fasten the trolley wire to spans is installed on the line-car roof. After several months' operation this car has proved most convenient and efficient. The only improvement found necessary was to provide a small door in one end so that a pole can be loaded into the car in case quick repairs are necessary.

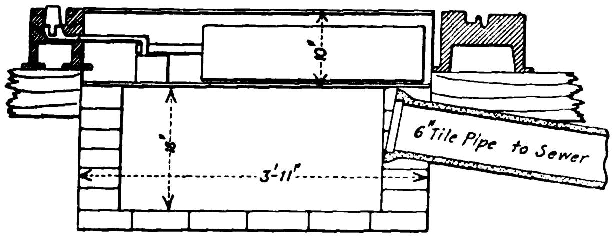
The Pennsylvania Railroad has announced that it will establish schools of electrical instruction for its employees at Conemaugh, Derry, Gallitzin, Cresson, Pitcairn and Pittsburgh, all on the division which extends from Pittsburgh to Altoona, a distance of 119 miles. In this stretch is the big mountain range at the summit of which is the Gallitzin tunnel. At the other side of the tunnel is the big slope down to Altoona, known as the Horseshoe Bend.

PREVENTING THE FREEZING OF ELECTRICALLY OPERATED SWITCHES

BY "CONTRIBUTOR"

The problem of preventing freezing of switches on the lines of the Connecticut Company is a difficult one on account of the wide variation of temperature and weather conditions. The New Haven lines alone have twenty-seven electrically operated switches and sixty patented spring boxes of various designs. Aside from salting, which is a common practice, we find the following procedure very satisfactory:

First—When new switches are installed at any season of the year, the tongue and heel tightening device is removed, oiled and carefully adjusted, and the heel box is filled completely with oil-soaked waste.



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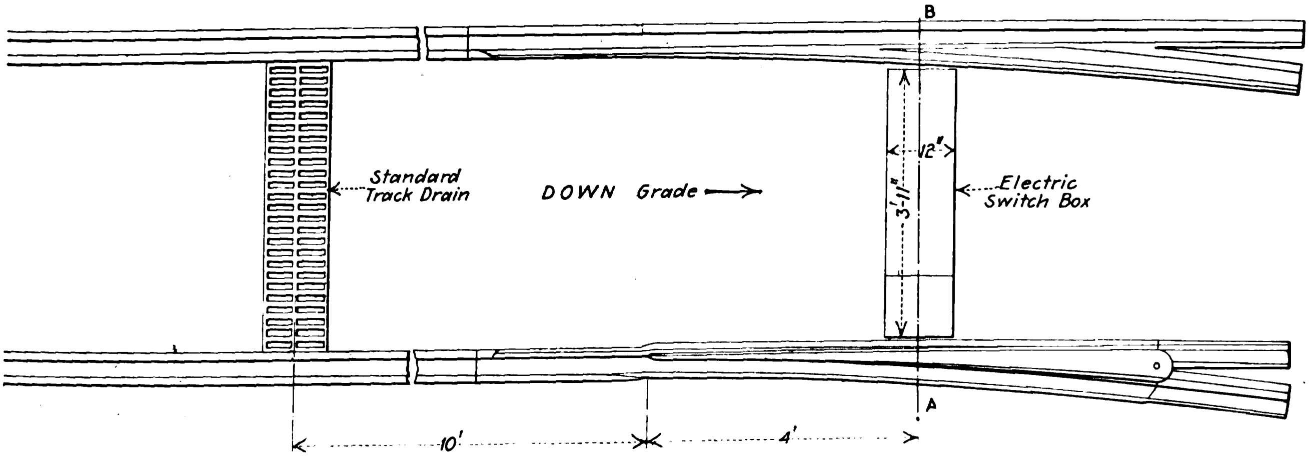


Plan Showing Location of Track Drain and Electric Switch Box; Also Settling Box for Drainage of Electrically Operated Switch

Second—Electrically operated switches require regular inspection and adjustment. A settling box is built under them, connected directly to the sewer. When the switch is installed in a water pocket a track basin is placed so that it will catch sand and dirt before it reaches the switch piece. Salting in snowy weather and oil in dry weather will keep these switches free for satisfactory service.

Third—"Anti-kick" spring boxes not equipped with a stuffing box are cleaned and oiled and then filled completely with oil-soaked waste plus a little salt. The waste is packed loosely around the working parts, and care must be taken that it does not interfere with their operation. This treatment applied twice during an ordinary winter will practically eliminate trouble due to freezing.

Fourth—In all spring boxes in which plunger connections operate through a stuffing box the tight compartment should be kept filled with compressor oil.

Fifth—As to the salting of switches at night, we find that sending one or more cars over the lines is the cheapest and most effective method of keeping the switches free. These cars salt switches, run through all special work not in regular use and operate all automatic switches.

SHOP WORK ON A PIECE-WORK BASIS AT THE THIRD AVENUE RAILWAY SHOPS

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY, NEW YORK

The Third Avenue Railway Company in equipping its 575 convertible cars with prepayment devices adopted the piece-work system on about 75 per cent of the entire job with very good results. In establishing piece-work rates it is very essential that the prices shall be so made that they will not have to be cut. At our shops this undesirable feature has been entirely eliminated by thoroughly checking the proposed prices before they are submitted for approval to J. S. McWhirter, superintendent of equipment. In fact, the prices in many cases have been raised.

In establishing a piece-work rate for any particular class of labor, we select one or more men who are known to be capable of doing first-class work in the shortest time. This time is then checked up and the piece-work rate is made by deducting from 25 per cent to 40 per cent from the amount of time taken at the regular day rate. It is a well-established fact that many employees complain beforehand about the smallness of the price established, but when they are told to go ahead and are assured that they will be guaranteed their regular day's pay at the time rate they are thoroughly satisfied.

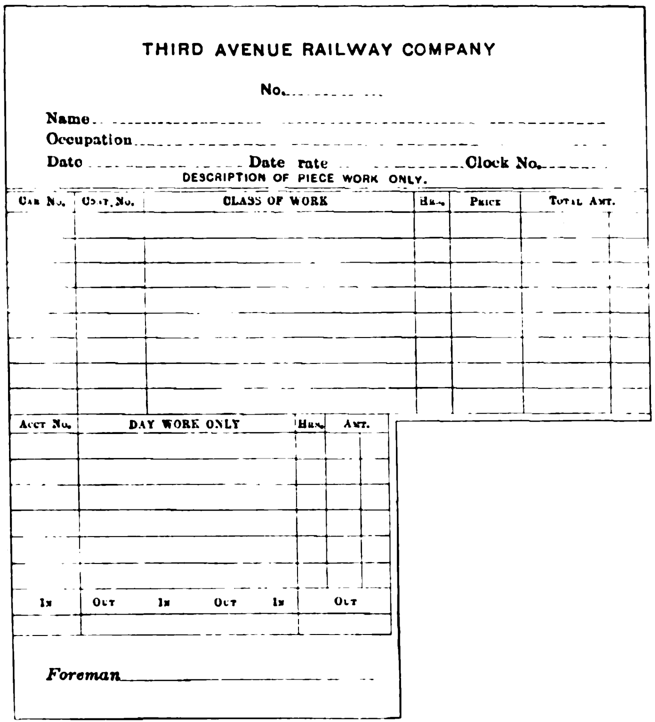
On several occasions the question has arisen as to whether or not the employees whose time for a job establishes the piece-work rate take longer than is necessary for the purpose of making the price larger. We do not think this a fact, as these very men when put on the same work at the established piece-work rate with the ordinary class of men have invariably made but 15 per cent to 25 per cent more than their daily rate, while saving 25 per cent to 40 per cent in time. The accompanying comparison (Table I) shows the saving in piece-work prices over the day rate on work in connection with the installation of prepayment devices on 575 convertible cars.

It may be added that approximately 90 per cent of the maintenance car painting is done on a piece-work basis at the very low average cost of $45 per car for labor and material. We turn out an average of three cars a day with a force of thirty men, who average 27½ cents per hour. This result could be accomplished only with the aid of piece work. Some readers may come to the conclusion that this does not include costs for a complete job, but the figures actually do include a complete job, such as stripping the inside trim, gilding seat brackets, etc., and otherwise keeping the cars in fine condition.

A time card of the type reproduced was devised to take care of all labor throughout the shop, including both piece work and time-clock records, thereby enabling the timekeeper to credit the correct amount due to the employees. In most shops where piece work is a factor it is necessary to have a separate time card for each method of payment, but for the benefit of those who have this condition we desire to say that this combination card is giving us excellent results.

TABLE I—COMPARISON OF DAY RATES AND PIECE-WORK RATES

Class of Work	Day Rate Cost	Piece-Work Cost	Saving	Per Cent
Fitting all conduit, including cutting and threading	$8.46	$5.75	$2.71	32
Bending all conduit for car	1.56	1.10	0.46	30
Stripping car of all woodwork and trim for prepayment doors	4.56	3.00	1.56	34
Putting up all inside trim and repairing mat strips	17.10	13.00	4.10	23
Assembling and installing prepayment doors	19.38	14.00	5.38	27
Getting out all wood trim for inside car	4.00	3.00	1.00	25
Getting out all material for doors, and cleaning same	7.00	6.00	1.00	14
Assembling one controller, rheostat and contactor box complete	1.04	0.90	0.14	13
Assembling one controller, complete with contact-breaking attachment	1.04	0.90	0.14	13
Making up cable and pulling in car	4.45	2.90	1.55	34
Splicing and connecting all wires for door circuit	4.68	3.20	1.48	31



THIRD AVENUE RAILWAY COMPANY

No.

Name

Occupation

Date Date rate Clock No.

DESCRIPTION OF PIECE WORK ONLY.

Car No.	Cont. No.	CLASS OF WORK	Hrs.	Price	Total Amt.

Acct No.	DAY WORK ONLY	Hrs.	Amt.

In	Out	In	Out	In	Out

Foreman

Electric Ry. Journal

Time Card for Both Piece Work and Day Work

EQUIPPING 575 CARS WITH PREPAYMENT DEVICES

Car No.	Job No. 1	Job No. 2	Job No. 3	Job No. 4	Job No. 5	Job No. 6	Job No. 7

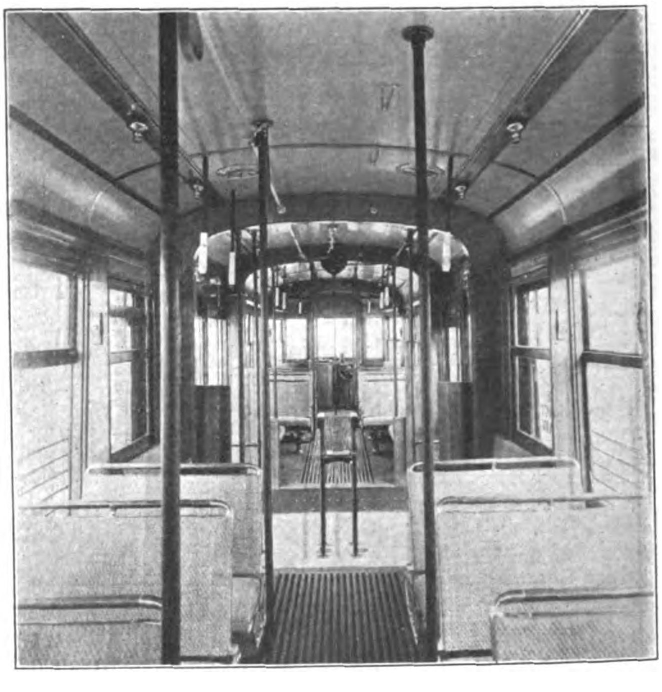
Form to Prevent Two Charges for the Same Job

The piece-work system as compared with any bonus system is considered by this company to be most practicable because it involves far less clerical work, is much more easily checked, makes a greater saving and is much more easily understood by shop employees, who are not expected to have clerical ability. To combat the possibility of any employee getting credit for the same job a second time, we use a sheet like the one reproduced at the bottom of the first column.

This sheet is kept by the piece-work checker, who as the time card is submitted checks off the car number, the job number, the date on which the job was done and by whom. This sheet is always kept before him, so that he can readily discover any wrongly numbered card which may be submitted through an error or through intent by any employee.

CENTER-ENTRANCE CARS FOR NEW YORK SUBURBS

The Manhattan & Queens Traction Corporation, which operates between Fifty-ninth Street, New York, and Jamaica via Queensboro Bridge, Long Island City, Elmhurst and Forest Hills, is now receiving from the St. Louis Car Company twenty-five center-entrance cars of the type illustrated. The general design is very similar to that devised by the Brooklyn Rapid Transit System. The seating capacity is fifty-two and the weight fully equipped 20 tons. The builder could have made the car a little lighter, but certain restrictions in connection with operation over the bridge made it desirable to have a construction with more than the usual factor of safety.



Interior of Center-Entrance Car for New York Suburbs

The general dimensions of the cars are as follows:

Length over vestibule ends	45 ft. 0 in.
Length over buffers	45 ft. 6 in.
Truck centers	22 ft. 0 in.
Height from rail to top of roof	11 ft. 0 in.
Length of center-entrance platform between two compartment bulkheads	7 ft. 1 in.
Width over side sheathing	8 ft. 4 in.
Width over eaves	8 ft. 4 in.
Width over belt rail	8 ft. 5 in.
Width over window sill	8 ft. 5⅝ in.
Width of aisle	26 in.
Length of seat	36 in.
Wheelbase of truck	4 ft. 6 in.

FRAMING

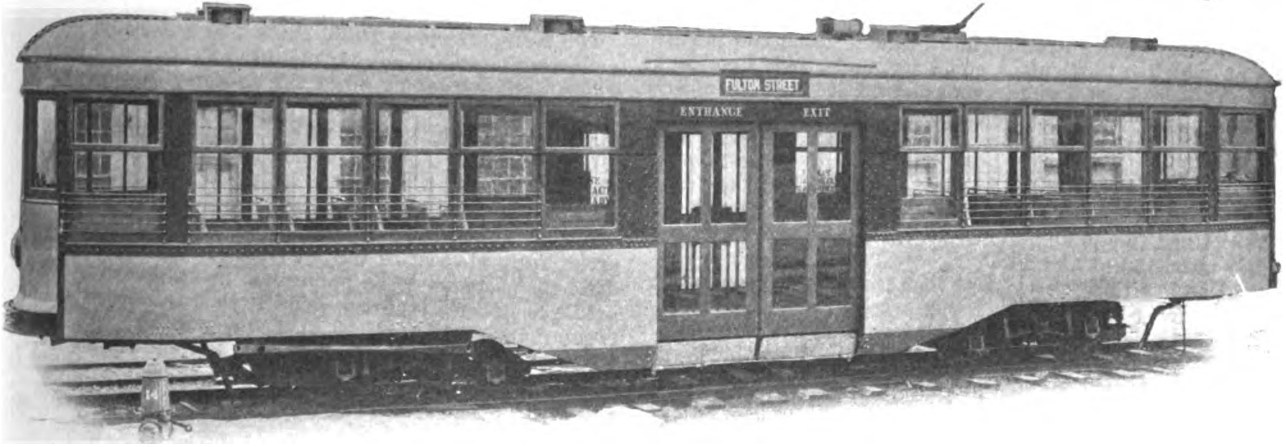
The bottom framing is of steel with a 6-in. 8-lb. channel for the bottom member of the side girder. The side girder is of 29½-in. x ⅛-in. plate with a 3-in. x

½-in. bar for the top member. The 6-in. channel mentioned is made in one piece which is bent down at the center for the platform or well. The sills are 4-in., 7½-lb. I-beams spaced approximately on 3-ft. centers. The vestibule end frame and the center-entrance platform are reinforced with diagonal braces. The buffer is a Hedley anti-climber. The end sill is built up of steel plates and rolled shapes. The vestibule ends are sheathed with No. 12 sheet steel and have a buffer shield. Cast-steel bolsters are used.

All posts of the body framing are made of 1½-in x 2-in. x ¼-in. T's bent around from side sill to side sill and forming carlines and all have post ash strips to serve for sash guides. The upper sash is stationary while the lower sash is arranged so that it can be raised. The center-entrance posts are of tees and pressed channels with a plate and channel over the door to provide compression members in the side-girder construction. The vestibule ends have wooden posts with outside bar reinforcements.

FLOORING, FINISH AND EQUIPMENT

The roof is of plain-arch type. The T-posts which form the carlines have ash roof nailing strips bolted on the top and sides for the attachment of the agasote ceiling. The roof boards are ⅜-in. tongued and grooved poplar. The vestibule end roof is supported on ash carlines bent to shape. Below the sash rest the cars are finished in ⅜-in. mahogany sheathing, which is applied between the posts with an allowance for ½-in. air space between the outside girder plate and this wainscoting. All metal trim is of highly polished bronze.



One of Twenty-five Center-Entrance Cars for the Manhattan & Queens Traction Corporation

The flooring is a single thickness of 13/16-in. x 3¼-in. yellow pine except that Chanarch with composition flooring is used at the entrance platform. The flooring in both ends of the car is sloped downward for 3 in. from the bolster to the center entrance, while the floor of the center well is sloped 1 in. downward toward the door.

The pair of center doors on each side are of the sliding type with glass panels; they operate simultaneously with the steps. Hinged doors for the use of the motorman only are provided in the vestibules. Among the specialties furnished by the car builder are vertical wheel brakes, rattan seats, ventilators, motorman's alarm gong, conductor's signal bell, illuminated signs, air sanders and No. 99-B trucks. Other specialties on these cars are 3-in. Feralun safety treads set flush, Peacock geared brakes (in addition to air), Consolidated Car Heating Company's push-button system and heaters, Rico sanitary strap covers and straps, Earll trolley catchers and HB wheel guards. The air-brake equipment has a special conductor's valve so mounted over each wheelguard that when the guard trips the valve will operate to apply the emergency brakes and cut off power.

OPERATING NOTES ON A CANADIAN LOCOMOTIVE

The Galt, Preston & Hespler Railway, Preston, Ont., placed a 40-ton Baldwin-Westinghouse locomotive in service on Nov. 30, 1910. Since that date it has been in continuous operation twenty-four hours every day except Sundays, averaging about 150 hours per week. This service includes hauling practically every kind of freight in standard steam railroad rolling stock from the Canadian Pacific Railroad at Galt to Berlin and Waterloo, a distance of from 12 to 14 miles north. Although the haul is not very long, there are several 2 per cent to 2½ per cent grades, from 1 to 2 miles long. The maximum number of cars hauled in one train is about twenty-five, the average number being fifteen. The load per train is about 200 tons, or on four trips of road service a day 2000 tons. It is hardly possible to estimate exactly the total mileage as the greater part of the time, sixteen hours a day, the locomotive is in switching service. No record is kept of the tonnage and mileage, but the switching mileage would easily equal half, if not three-quarters, of the road service.

The locomotive is equipped with four No. 308-B-2 commutating-pole 600-volt motors, rated at 120 hp and unit switch control. The locomotive receives one-half hour inspection every twenty-four hours and about five or six every Sunday, when making light repairs, such as applying brakeshoes, changing wheels for tire running and inspection of motors, air-brakes and control equipment. Tires have been turned twice since this locomotive went into service, and the total repair account to date, as quoted by the Westinghouse company, is given below:

Air compressor (principally due to armature and field trouble due to low trolley voltage)	$170
Tire turning	45
Motor axle bearings	30
Unit switch control	50
Trolley parts, wheels, harps, poles and bases	110
Brakeshoes	270
Miscellaneous	30
Total (from Nov. 30, 1910, to July 14, 1913)	$705

The total expenditures—$705—for repairs on this locomotive covering a period of more than two and one-half years is considered a fine record by the operating company in view of the large amount of service.

News of Electric Railways

Toledo Council Refuses to Entertain Franchise Offer

The City Council of Toledo, Ohio, at its regular session on Feb. 4, declined by a vote of seventeen to one to entertain the proposals of the Toledo Railways & Light Company for a settlement of the franchise question. That body also decided not to enter into immediate negotiations with the company on any basis. The receivership suit brought recently seems to stand as the point of objection and City Solicitor Thurston continues to advise the city to do nothing until the suit is withdrawn.

Henry L. Doherty, of H. L. Doherty & Company, New York, was present at the meeting and explained the franchise to members of the Council. He said the new owners of the company were anxious to settle the franchise matter upon a basis that will yield a fair return on the capital invested and provide good service for the people. In discussing the situation after the meeting Mr. Doherty said: "I do not know what our next action will be. I did not expect the action which the Council took. Council has made a mistake and I think the councilmen will see it. They have taken the attitude of declining to see whether our proposal is justified. We will, however, continue to effect a fair settlement with the city."

The vote stood nine to nine on Councilman Harry B. Irwin's motion to appoint a committee to investigate the company's books, obtain a valuation and determine the lowest fare at which a settlement could be made, but President Hassenzahl cast the deciding vote against it.

City Solicitor Thurstin said that until the Doherty interests withdraw their suit for a receivership they are not showing good faith. They should present a concrete proposal, embracing a definite rate of fare, so that the franchise will be taken out of politics for a fixed number of years. Until this is done there will be only one answer and that is municipal ownership.

Mr. Doherty told the Council that the company desires a franchise for a fixed term of years so that it may obtain capital to develop the system in keeping with the needs of the city. With a full understanding on both sides he thought an understanding as to the amount of investment upon which profit should be paid could be easily reached. He was willing to withdraw the proposal if that would facilitate matters. He was willing to submit any settlement reached to the will of the people. Mr. Doherty explained that a fare of 3 cents would not, in his opinion, pay maintenance and operating expenses and leave anything for dividends. He suggested that the Council name a small committee to go into the matter of valuation. Mr. Doherty said that the city was not asked to take into consideration the company's $14,000,000 bond issue in fixing the terms of settlement. The power plant had been omitted from the valuation suggested by the company because it furnished current for commercial purposes. Mr. Doherty said that the plant would have to be operated by the railway or the lighting department of the company and that current would then have to be purchased by the other department. This was the only way in which the accounts of the two departments could be handled properly.

Councilman Mulholland produced the signed agreement entered into before the election by the republican candidates to the Council pledging themselves to 3-cent fare and the submission of the question of municipal ownership to the people.

Public Relations at Newport News

C. Loomis Allen as president recently announced the consolidation of the Newport News & Old Point Railway & Electric Company; Citizens' Railway, Light & Power Company; Hampton Roads Traction Company; Newport News Gas Company, and Hampton, Phoebus & Fort Monroe Gas Corporation as the Newport News & Hampton Railway, Gas & Electric Company, as noted elsewhere in this issue. The process of rehabilitating the properties has been in progress since they were taken over some time ago by Allen & Peck, Inc. The announcement of the consolidation was received very favorably in the territory in which the companies operate. The Newport News *Times-Herald* said in an editorial:

"Allen & Peck, who took hold of these properties about two years ago, found them in wretched condition physically, and the companies owning them were without means or the credit to make the necessary improvements. It was a desperate case, and the patient was in a deplorably rundown condition. But Allen & Peck are good doctors for such patients, and they employed heroic treatment in effecting a cure. In plain terms, the power plant was entirely rebuilt, the old machinery sold for junk and modern machinery put in. The tracks were repaired, new cars were ordered, a large gas holder erected, gas mains and electric wires extended, the ice plant overhauled and enlarged, and the properties generally put in first-rate condition, so that no other city in the State has a better service than the cities of the Lower Peninsula. In making these improvements and extensions, the owners have expended approximately $600,000, and there are bonds of the par value of $175,000 remaining in the treasury to be used for further improvements and extensions. But for all that the capitalization of the new company is $317,000 less than the capitalization of the old company, which, when taken in connection with the money spent for betterments, is equivalent to a reduction of $917,000. That simple statement speaks for itself and needs no commendation."

The Newport News *Daily Press* said editorially:

"Notwithstanding an expenditure of $600,000 in improvements and extensions since the property was acquired by the present owners, the new capitalization is $317,000 less than it was under the former ownership, and the company retains in its treasury $175,000 of the bonds issued, to be used as needed for further improvements and extensions. Besides, the company has made provision in its authorized bond issue for ample capital in the future to keep its properties fully abreast of the progress of the Lower Peninsula. This seems to us to be admirable financing, and is another evidence of the integrity, good faith, public spirit and discreet management of the men who now own and manage these properties. The community, no less than the owners and managers, is to be congratulated on the gratifying exhibit."

Rapid Transit Details Settled in New York

It has been definitely decided that the junction between the existing subway and the new Lexington Avenue subway shall be made at Forty-second Street. The Public Service Commission for the First District has instructed its chief engineer to prepare plans for the construction of what is known as the diagonal station plan for this junction. The existing subway running down Park Avenue will be connected with the Lexington Avenue subway north of Forty-second Street by a diagonal branch running from the existing subway, under the Grand Union Hotel, diagonally across Forty-second Street and under the property of the New York Central & Hudson River Railroad on the corner of Lexington Avenue and Forty-second Street, into the Lexington Avenue line. The express station will be located on this diagonal line and will extend under the greater part of the connecting line. It will connect with the Grand Central Station, with the existing subway, the Hudson & Manhattan Railroad and the Steinway tunnel to Long Island City. The commission has decided to condemn the property of the Grand Union Hotel, which will be needed for the purpose. An easement under the property of the New York Central & Hudson River Railroad on the north side of the street will be acquired either by purchase or by condemnation.

The Public Service Commission has authorized a change in the route of the 162d Street and Eighth Avenue connection, which will connect the existing Ninth Avenue elevated railroad with the proposed elevated railroad on the Jerome Avenue branch of the Lexington Avenue subway. As originally planned, this route curved to the south after leaving Anderson Avenue and continued easterly across Jerome Avenue and through 162d Street to River Avenue and a connection with the Jerome Avenue line. The change involves the continuation of the route from Anderson Avenue in a straight line to the Jerome Avenue elevated in River Avenue, thus eliminating two curves. By this change the stretch of 162d Street east of Jerome Avenue will be relieved of the elevated structure, which will run through the interior of the blocks fronting on that street. An agreement to modify the certificate granted to the Interborough Rapid Transit Company for this purpose has been approved by the commission and sent to the company for its acceptance.

There will be an express station on the Broadway subway in Manhattan at Forty-second Street. This is the subway which is being built for operation by the New York Municipal Railway Corporation. The plans of the Public Service Commission provided for a local station at Forty-second Street, but property owners at Times Square objected and demanded an express station. After considering the matter for several months the commission decided to grant the request for an express station, but to locate the station in Broadway south of Forty-second Street. The property owners wished it located north of Forty-second Street, but there were too many engineering difficulties to be overcome in that location.

The commission will hold a public hearing on Feb. 16 on the application of the Interborough Rapid Transit Company for the approval by the commission of a contract entered into between the company and Artemus Ward for the advertising, news-stand and other merchandise privileges on the subway and elevated railroads to be operated by that company under the dual system contracts. This contract is to run for fifteen years from Jan. 1, 1914. It provides for the payment by Mr. Ward to the company for the privileges conveyed of $600,000 for the year 1914, $700,000 for each year from 1915 to 1918, inclusive, and $800,000 for the year 1919 and every year thereafter plus 10 per cent of the gross receipts after 1919. If new stations are opened Mr. Ward agrees to pay an additional sum of $1,250 a year for each side of such station or $2,500 for the entire station.

New Detroit Charter Defeated

The voters of Detroit defeated on Feb. 10 a new charter, differing in many details from the present fundamental law of the city. Among the more important provisions proposed were the elimination of partisan politics in local elections; the preferential ballot; the separation of municipal from State and national elections; the concentration in the Mayor of responsibility for the acts of city officers; the reduced size of the City Council—one Alderman instead of two from each ward; the abolition of the board of estimate; the establishment of new departments of public safety, recreation, labor, welfare, and arts; an eight-hour work day and minimum wage for city employees, and the initiative, referendum and recall.

Mayor Oscar B. Marx in his recent message to the Common Council said in part in referring to railway matters:

"The year just ended culminated in a temporary settlement of our differences with the Detroit United Railway and witnessed a determined struggle for the acquisition of the street railway system by the city with the submission and adoption of a municipal ownership amendment and the appointment of the first street railway commission.

"During the closing months of the year, the charter commission completed its task, leaving for our approval or rejection a document providing for numerous and vital alterations in our city government.

"Pre-eminent among the problems which now confront us is the completion of plans for acquiring the street railway system. Unless the Supreme Court fails to sustain the decision of the Wayne County circuit judges, progress toward city ownership and operation of the traction system should be most speedy during the next few months. As to whether the company's property should be condemned or purchased, or new lines constructed, I believe we may wtih full confidence rely on the judgment of the members of the street railway commission. Should the Supreme Court decision on the Verdier bill be an unfavorable one, it does not follow that we must abandon all hope. The charter to be submitted to the electorate next month contains provisions for city ownership. The defects in the charter may be eliminated by piecemeal amendment.

"The health, cleanliness and the comfort of our people demand that we take a step forward in seeking to have the railroads passing through the city substitute electric for steam power."

As stated in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, page 275, the Michigan Supreme Court on Jan. 16 handed down its decision on the Verdier bill, an act designed to give Michigan cities the right to amend their charters piecemeal. The court, however, did not pass on the question of whether or not the amendment to the Detroit City charter providing for the municipal ownership of street railways adopted last April is constitutional.

Resolution Passed for Inquiry Into New Haven Finances

The Norris resolution, with slight modifications, to investigate the finances of the New York, New Haven & Hartford Railroad, was passed by the Senate on Feb. 7, 1914. The resolution reads:

"Resolved, That the Interstate Commerce Commission be requested to make public the facts in its possession concerning the financial transactions of the New York, New Haven & Hartford Railroad and, as far as it may be necessary to get additional information thoroughly to cover the subject, to reopen its examination of the affairs of that company and make a further investigation of its financial transactions with a view of ascertaining:

"1. What became of the funds of said company invested in the various enterprises and corporations mentioned in the opinion of the Interstate Commerce Commission, numbered 2384, case numbered 4842, entitled, 'The New England Investigation in the Matter of Rates, Classifications, Regulations and Practices of Carriers,' submitted on May 20, 1913, and decided on June 20, 1913.

"2. Whether the person or persons authorizing such investment of the funds of said company and the person or persons receiving the benefit thereof are liable to punishment under existing laws.

"3. Whether, under existing law, such funds so invested can be recovered on behalf of the stockholders of said company.

"4. What legislation, if any, is necessary to prevent the recurrence of similar transactions."

In accordance with the Senate resolution the Interstate Commerce Commission on Feb. 10 ordered the inquiry into the finances of the New York, New Haven & Hartford Railroad to begin immediately. Hearings may be held, but it was not on Feb. 10 decided when or where, or whether they will be public. For the present, the commission will conduct its inquiry by gathering from all available sources whatever information may throw light on the questions at issue.

Toronto Purchase Complications

Corporation Counsel Geary, of Toronto, Ont., took issue with the members of the Board of Control of Toronto on Feb. 3 on a question of jurisdiction. The difference of opinion is said to have arisen over the question of the advisability of inserting in the railway purchase agreement between the city and the Toronto Railway a clause permitting and defining running rights for radial electric railway cars within the city limits. Mayor Hocken advocated the omission of any such clause in order that radial rights might be secured only through application to the Ontario Railway Board under general legislation. Mr. Geary opposed such a clause being omitted. He held that such a clause was required in his instructions from the City Council and declined to accept any variation of those instructions at the behest of the controllers, contending that the sole right to vary the instructions rested with the Council. D. E. Thomson, who advised Mr. Geary in drafting the agreement, advocated a definition of the running rights, but a majority of the controllers disagreed with him. There will be a further conference at which the lawyers will present statements in support of the contention that the running rights clause should be included. If the controllers remain unconvinced they will have to go to the City Council with a recommendation for new instructions to Mr. Geary.

The *Mail and Empire* published the following editorial on Feb. 5:

"That the task of drawing up an agreement clearly setting forth the terms of the proposed street railway purchase would be a difficult one was foreseen, and an able lawyer was appointed to assist the corporation counsel. Even so, it now seems that the problem was a knottier one than the Council realized. Indeed, it begins to appear as if the Council itself had contributed to the knottiness of it. After long weeks the agreement was submitted to the Mayor a day or two ago, and differences arose at once. The Mayor points out that the draft agreement provides for the concession to the radial railway companies of running rights within the city. The corporation counsel maintains that therein the agreement corresponds with the negotiation documents he was instructed to follow.

"The misunderstanding is unfortunate—the more so because it was avoidable. The question as to radial companies' running rights within the city was raised several times during the discussion of the purchase proposal. It is to be admitted, however, that the counsel engaged on the agreement would not find the discussion to be very conclusive on that point. But the very fact that radial entrance was a matter of controversy, that there were positive affirmations and positive denials that the right of entrance was granted, should have been taken cognizance of by the framers of the agreement, who should have called upon the City Council to instruct them specifically on that matter and clear up all doubt. Valuable time would have been saved. If the counsel for the Toronto Railway were preparing the agreement upon the client's instruction, there is no doubt the same view as to radial entrance would have been taken as the corporation counsel has taken, and, generally, the benefit of all doubts or uncertainties would have been given to the company by its counsel. If the company's drafters found anything that seemed to favor the city as to a controverted point, the company would have been advised and would have been asked for further instructions. It would seem as if the communications which the corporation counsel had to look to for the terms had to be examined with some legal keenness for purposes of interpretation. But instead of proceeding upon the assumption that the radial railways were to have the advantage, counsel ought to have referred to the city government to clear up the point."

The Proposed Depot Line in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., recently protested the ordinance permitting the company to lay tracks in Twenty-fourth Street, from McGee to Main Street; to provide the new Union Depot with service from the north, east and southeast sections of the city. The measure was presented to the Council on Feb. 9. A number of objectionable features are included in the ordinance, which, if passed, will not be accepted by the receivers for the company, it is stated. The receivers believe that the Kealy-Ash plan, recently presented, is sufficient for all purposes. The plans proposed by P. J. Kealy, engineer for the company, and L. R. Ash, city engineer, provide for cars on the plaza at the new station. The receivers state that the plans fit street railway conditions at the station, and that by this routing cars will be taken to every section of the city.

Cleveland Railway Protests Against Tax Assessment

The Cleveland (Ohio) Railway has notified the tax officials of Ohio that it does not intend to pay the taxes on the valuation of $22,500,000 fixed by the state tax commission, and that it will resist all efforts to collect the amount demanded. Some months ago, when the commission announced a tentative valuation of $22,500,000, J. J. Stanley, president; Henry J. Davies, secretary, and other officers of the company appeared and objected to its being made permanent. They told the commission that their books would show that the valuation is less than $19,000,000 and that even this sum would be high.

The company asserts that the Cleveland Railway is valued higher than other similar property. The law, it is pointed out, requires that all properties shall be valued at their true worth. It is left with the courts to determine whether the values fixed by the commission are excessive in comparison with those of other property.

Councilman William Stolte, member of the street railway committee, is endeavoring to have an investigation of the cost of the new station and car yards at St. Clair Avenue and East 129th Street made to ascertain whether it was really necessary to put as much money into these improvements as this one required. The only question brought up is whether cheaper structures would not have answered the purpose. The new station is a model of modern construction. Including equipment, the cost of the yards and other things necessary so far has been about $160,000. The company has planned the construction of a station at the Superior Avenue terminal and Mr. Stolte brought this matter up in anticipation of this later improvement. Peter Witt, street railway commissioner, has approved the purchase of land for the building and has kept track of the expenditures for the construction of the St. Clair Avenue building.

The company has asked Council for permission to relay twelve miles of track the coming year at a cost of approximately $477,415. The expenditure of almost $500,000 for extensions and improvements by the company had previously been allowed. The greater part of the renewal of tracks is to be made on Woodland Avenue, but some of the money will be spent on East Fifty-fifth Street, Lorain Avenue and Superior Avenue between West Ninth Street and the Public Square.

Dr. Eliot on Unions

Charles W. Eliot, former president of Harvard University, wrote a letter in part as follows on Feb. 5, 1914, to one of the members of the local electric railway union in New Haven, Conn., in reply to a letter asking why he objected to trade unions:

"My objections to the trades unions are altogether educational and moral. They seem to me to have had a bad effect on the character and happiness of their members, because of certain methods which they have used and are still using. The first of these objectionable methods is the habitual use of violence against persons and property to gain their ends. The second is the limited output. The third is the uniform wage, alike for all journeymen without regard to age or skill. The fourth is the disregard of contracts—their own contracts, and contracts which employers or managers have entered into with owners or consumers but have not yet fulfilled.

"The first and last of these practices are grave violations of the universal moral sense. The second and third rob the workingman of strong motives for self-improvement and make it probable that he will do no hearty, zealous, faithful work. Under these conditions it is impossible to be happy in the life work, for there is no happy, contented work except that done with good will, generous zeal and loyalty.

"I cannot agree with you that the trades unions have brought happiness to any workingmen. Higher wages, shortened hours, better clothes and more meat do not necessarily contribute to genuine happiness any more than the luxuries of the rich do. Happiness and content are states of mind. Is it not perfectly plain that in our country trades unionists are not really happy as a matter of fact? To my thinking they never will be so long as they get no satisfaction in their daily work. It is the grudging spirit in which they work which prevents them from getting any content out of their work for a livelihood.

"All well-read, thinking people believe that the progress of civilization depends on universal, steady, productive labor; the unions seem to believe that the less one works the better.

"Although profit-sharing is not applicable in all industries, I see in sound methods of profit-sharing one mode of escape from the deplorable effects of trades union teachings; for just profit-sharing will put to employer and employed alike precisely the same motive for faithful, generous, co-operative industry, and for successful productiveness. No profit-sharing method will work which does not turn out to be in the long run profitable alike to employer and employed, to owner and to wage earner, to capital and to labor."

St. Louis Loses Suit Against Company.—The city of St. Louis has lost its suit to oust the United Railways from control of the Jefferson Avenue line.

Increase in Fares on Toronto Municipal Line Advocated.—Fares on the city of Toronto Civic Lines were under discussion at the monthly meeting of the Bathurst Hill Ratepayers' Association on Feb. 6, and a resolution was introduced suggesting that the fare be raised from 2 cents to 5 cents, in order that the deficit in the cost of operation may be reduced. It was pointed out that the cars are used largely by persons who live outside the city limits and pay no taxes in Toronto. The resolution was finally tabled until the next meeting of the association, when representatives of the outside districts which are benefited by the civic car lines will be invited to be present in order to discuss the matter.

Important Improvements in Birmingham.—The executive committee of the American Cities Company has approved the requested appropriations of A. H. Ford, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., for $1,148,000 to be expended in Birmingham during the next twelve months for betterments that are considered necessary. The appropriation provides for the extension of the gas department, the extensions of the street railway service and other betterments. About $400,000 or perhaps a little more will be spent on the gas department. The extensions of the street railway at various points and the double-tracking work will consume the remainder of the appropriation.

Strike in Vermont.—The conductors and motormen in the employ of the Barre & Montpelier Traction & Power Company, Montpelier, Vt., went on strike on Feb. 5, 1914, because their demands for an increase in wages and shorter hours had not been granted. The cars are being operated with special crews secured by the company from among men acquainted with electrical work and the service between the two cities is being continued although the schedule time is not maintained. The company offered to advance wages about 1 cent an hour and grant the men's request for a reduction in working time from eleven to nine hours. The men asked for $2 a day for the first year, $2.25 for the second year and $2.50 a day thereafter. The old rate was 16½ cents to 22 cents an hour, and the rate offered the men was 18 cents an hour for men employed six months, 20 cents an hour the second six months, 21 cents an hour the third six months, 21½ cents an hour the fourth six months, 22 cents an hour the fifth six months, 22½ cents the sixth six months and 23 cents an hour thereafter.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MARYLAND

The changes in the Public Service Law of Maryland recommended by the Public Service Commission in its report to the Legislature have been offered in a bill introduced by Senator Hammond at the request of the commission. The changes contemplate giving the commission control over grade crossings, power to fix certain standards of gas, power to compel corporations to obtain authority from the commission before abandoning any railroad enterprise and permission to change the commission's office hours from 8 a. m. to 9 p. m. to 8.30 a. m. to 5.30 p. m.

NEW YORK

Street surface railways in New York City are required, in a bill by Assemblyman Scheidermann, to place an additional conductor on the rear platform of each car and an additional collector of fares inside where more than ten passengers are allowed to stand within the car and three persons on the rear platform after all the seats have been filled. In the case of elevated or sub-surface railroads in the city not more than fifteen persons must be allowed to stand in any car after the seats provided have been filled. A penalty of $50 for each violation is provided.

A bill has been introduced in the Senate to amend the railroad law in relation to the expiration of the corporate powers of a railroad or street surface railway and to provide for the transfer of the property "when the existence of a railroad corporation ceases." The measure has been referred to the committee on railroads. A bill has also been introduced to extend the time in which the Frontier & Western Railroad is to begin the construction of its road and place the property in operation. Another bill, introduced in the Assembly, would amend the railroad law in relation to the establishment of electric signals at grade crossings outside of cities.

OHIO

Before the adjournment of the Legislature on Feb. 6, 1914, the so-called Mills public utility measure was referred to a conference committee in an endeavor to formulate provisions that will be satisfactory to both the House and the Senate. This is the bill which, in its original form, would have allowed municipalities to pledge the credit of the cities affected as security for bonds issued for the purchase of public utility properties. Some time ago the House passed the bill, with an amendment which provided that the bonds should be made a lien only on the railway. Mayor Newton D. Baker of Cleveland declared he would prefer no law at all to the measure as passed by the House. On Feb. 5 the Senate passed the bill, after re-inserting the provision which the House removed. The vote was seventeen to fifteen. The bill went back to the House on Feb. 6 and the amendment made by the Senate, providing that bonds should be a lien against the city, was defeated. It was then referred to a conference committee. As the Legislature took a recess the same evening, the bill will stand little chance of getting through this session. There will be only one day more for the consideration of unfinished business, Feb. 16, on which day the Legislature will meet and adjourn.

The Legislature, in making up its budget of expenditures, included $25,000 for the Public Utilities Commission, with which to value the property of the Cincinnati Street Railway.

PROGRAM OF ASSOCIATION MEETING

The A.I.E.E. Mid-Winter Convention

The second annual mid-winter convention of the American Institute of Electrical Engineers will be held in the Engineering Societies Building, Feb. 25 to 27. The time is divided into an opening session Wednesday morning, power station session Wednesday afternoon, organization dinner of the International Electrical Congress Wednesday evening, transmission session Thursday morning, power generation session Thursday afternoon, publicity meeting on International Congress Thursday evening, distribution session Friday morning, protective apparatus session Friday afternoon and reception Friday evening. The power station session will be devoted largely to a discussion of the relative advantages of outdoor and indoor substations. The report of the sub-committee on the distribution of electrical energy to be presented Friday morning contains the following appendices among others: Appendix 4, "Direct-Current Distribution for Surface Railways—Urban Service," by R. H. Rice; Appendix 5, "Direct-Current Distribution for Underground and Elevated Railways," by E. J. Blair; Appendix 6, "Direct-Current Distribution for Interurban and Steam Railroads," by W. G. Carlton; Appendix 7, "Alternating-Current Distribution for Interurban and Steam Railroads," by W. S. Murray.

Folowing is the program for the publicity meeting on Thursday evening:

"The International Electrical Congress," by Dr. C. P. Steinmetz.

"The Panama-Pacific International Exposition," by Dr. William Rader.

"The Lighting of the Panama-Pacific International Exposition," by W. D'A. Ryan.

"Scenic Features of a Trip to San Francisco," by James A. Cruikshank.

"Some Electrical Features of a Trip to San Francisco," by P. M. Lincoln.

The topics chosen are of general as well as engineering interest in connection with the congress, the exposition and the scenic and electrical features of the transcontinental journey. Dr. Steinmetz is the honorary president of the congress, and Mr. Ryan designed the illumination for both the exposition and the Panama Canal.

Financial and Corporate

Stock and Money Markets

Feb. 10, 1914.

In the early trading on the New York Stock Exchange to-day a number of issues in which there was speculative interest yielded sharply, but the supply was readily absorbed. The strength which developed later in the day offset the early losses in the more important issues and many of the leaders showed fractional gains at the close of the trading. Rates in the money market to-day were: Call, 1⅞@2 per cent; sixty days, 2½@3 per cent; four months, 3@3¼ per cent; six months, 3¼@3¾ per cent.

The early trading in Philadelphia reflected the tendency shown in New York, being dull and featureless. The market closed strong.

The Chicago market was broad to-day, but the volume of transactions was small. The bond market was dull.

The Boston market to-day was fairly active at times but irregular. The bond transactions totaled only $17,000, par value.

There was a decided improvement in the trading in stocks in Baltimore to-day. The bond market was unusually broad and active, transactions totaling $61,900, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 4	Feb. 11
American Brake Shoe & Foundry (com.)	95	95½
American Brake Shoe & Foundry (pref.)	142	142
American Cities Company (com.)	36	36½
American Cities Company (pref.)	65¾	64
American Light & Traction Company (com.)	350	350
American Light & Traction Company (pref.)	106	106
American Railways Company	38⅝	39
Aurora, Elgin & Chicago Railroad (com.)	80	87½
Aurora, Elgin & Chicago Railroad (pref.)	104¾	81
Boston Elevated Railway	84	84
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	39	39
Brooklyn Rapid Transit Company	91⅝	91⅜
Capital Traction Company, Washington	112	107¾
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	92	91½
Chicago Railways, ptcptg., ctf. 2	33⅜	32½
Chicago Railways, ptcptg., ctf. 3	8	7½
Chicago Railways, ptcptg., ctf. 4	3	2⅞
Cincinnati Street Railway	107	107
Cleveland Railway	105⅛	105
Cleveland, Southwestern & Columbus Ry. (com.)	*5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	*26
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	75	75
Columbus Railway (pref.)	82½	a90
Denver & Northwestern Railway	*70	71
Detroit United Railway	71	71
General Electric Company	148	146¾
Georgia Railway & Electric Company (com.)	119	118
Georgia Railway & Electric Company (pref.)	84¾	85⅞
Interborough-Metropolitan Company (com.)	15¾	15⅜
Interborough-Metropolitan Company (pref.)	61½	61
International Traction Company (com.)	30	30
International Traction Company (pref.)	90	a85
Kansas City Railway & Light Company (com.)	15	19½
Kansas City Railway & Light Company (pref.)	30	35
Lake Shore Electric Railway (com.)	6	5
Lake Shore Electric Railway (1st pref.)	92	82
Lake Shore Electric Railway (2d pref.)	24	20
Manhattan Railway	131	130¼
Massachusetts Electric Companies (com.)	12	10
Massachusetts Electric Companies (pref.)	63	62
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	24¾	24½
North American Company	72	69
Northern Ohio Traction & Light Co. (com.)	62	64
Northern Ohio Traction & Light Co. (pref.)	98½	101
Philadelphia Company, Pittsburgh (com.)	43¼	45¾
Philadelphia Company, Pittsburgh (pref.)	42	42¾
Philadelphia Rapid Transit Company	18½	18½
Portland Railway, Light & Power Company	48	53
Public Service Corporation	109	110
Third Avenue Railway, New York	42½	44½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	107	107¼
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	26	25⅝
United Rys. Inv. Company (com.)	22	22½
United Rys. Inv. Company (pref.)	44¾	47½
Virginia Railway & Power Company (com.)	52½	53
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	90	90
Washington Ry. & Electric Company (pref.)	89¾	87
West End Street Railway, Boston (com.)	73	72¼
West End Street Railway, Boston (pref.)	92	93
Westinghouse Elec. & Mfg. Company	71½	70½
Westinghouse Elec. & Mfg. Co. (1st pref.)	119	115

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* Last sale. a Asked.

ANNUAL REPORTS

Detroit United Railway

The following statement of income, profit and loss is a summary of the business of the Detroit (Mich.) United Railway, the Rapid Railway System, the Detroit, Monroe & Toledo Short Line Railway, the Detroit, Jackson & Chicago Railway and the Sandwich, Windsor & Amherstburg Railway for the years 1913 and 1912:

	1913	1912
Passenger earnings	$11,952,286	$10,932,687
Express earnings	708,473	704,068
Mail earnings	12,031	11,938
Special car earnings	51,038	46,887
Gross earnings from operation	$12,723,828	$11,695,530
Operating expenses	8,694,230	7,730,409
Net earnings from operation	$4,029,598	$3,965,121
Income from other sources	251,937	208,857
Gross income less operating expenses	$4,281,535	$4,173,978
Deductions:		
Interest on funded and floating debt, and taxes:		
Detroit United Railway	$1,553,133	$1,539,974
Rapid Railway System	168,098	166,792
Sandwich, Windsor & Amherstburg Railway	37,534	35,414
Detroit, Monroe & Toledo Short Line Railway	168,633	160,167
Detroit, Jackson & Chicago Railway	223,660	221,166
	$2,151,058	$2,123,513
Credited to depreciation reserve	500,000	500,000
Credited to contingent liability reserve	100,000	100,000
Dividends	750,000	625,000
Total deductions	$3,501,058	$3,348,513
Net income to surplus	$780,477	$825,465

On Jan. 1, 1913, the mileage of the companies was as follows: Detroit United Railway, 438.010 miles; Rapid Railway System, 132.236 miles; Detroit, Monroe & Toledo Short Line Railway, 76.696 miles; Detroit, Jackson & Chicago Railway, 108.052 miles; Sandwich, Windsor & Amherstburg Railway, 38,284 miles. During the year there were added the following: Detroit United Railway, 3.587 miles; Rapid Railway System, 0.490 mile; Detroit, Monroe & Toledo Short Line Railway, 2.814 miles; Detroit, Jackson & Chicago Railway, 0.086 mile; Sandwich, Windsor & Amherstburg Railway, 1.647 miles. The total number of miles in operation by these companies as of Dec. 31, 1913, was 801.902.

The companies' rolling stock consists of 1405 closed passenger cars, 264 open passenger cars, 254 freight and construction cars, 36 live cars, 69 express cars, 16 miscellaneous cars, 2 locomotives, 3913 motors and 3027 trucks. The companies have eleven power houses with a combined capacity of 67,290 hp, two storage batteries with a combined capacity of 4500 amp and twenty-three substations with a combined capacity of 20,850 kw.

There was expended on capital account during the year and charged out under the head of "additions and betterments," in accordance with the classification of expenditures for road and equipment as prescribed by the State and Interstate Commerce Commissions, $905,127 for road and $706,823 for equipment, or a total of $1,611,950.

During the year 1913 liberal expenditures were made for the maintenance of tracks, rolling stock and other properties. On Jan. 1, 1913, the depreciation reserve stood credited with $2,023,627. There was expended during the year for replacement of motor equipment $67,064, of which $27,064 was charged to maintenance of equipment, and $40,000 to the depreciation reserve. This reserve was credited with $500,000 out of the income of 1913, leaving a balance Dec. 31, 1913, of $2,483,627.

The annual report contains the following passenger and mileage statistics for the year 1913:

	Total
Revenue passengers	240,940,133
Transfer passengers	74,830,285
Employee passengers	8,147,219
Total passengers	323,917,637
Receipts per revenue passenger	$0.0496
Receipts per passenger	.0366
Car mileage	46,126,994
Earnings per car mile	$0.2758
Expenses per car mile	.1884
Net earnings per car mile	.0874

The J. G. Brill Company

The J. G. Brill Company, Philadelphia, Pa., and subsidiary companies report sales and expenditures for the year 1913 as follows:

Total sales and other income	$9,154,433
Less material used; operating, general and administration expenses, and depreciation	8,245,290
Net profit undistributed	$909,143
Surplus account, previous year	$1,233,558
Less adjustments	286,684*
	$946,873
Total adjusted surplus	$1,856,016
Less dividends paid during year	320,600
Net surplus	$1,535,416

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*Included in this adjustment is a sum of $207,723, which represents damages and expense found against the company by the United States Circuit Court of Appeals in a case begun over twenty-two years ago, for the alleged infringement by the Brill Company of a small portion of a journal box. This case was tried during this long period in various courts, and final judgment was obtained against the Brill Company, and the award, which covered business done in previous years, was paid early in 1913.

The combined balance sheet as of Dec. 31, 1913, follows:

ASSETS	
Value of properties	$7,987,860
Materials raw and in process	1,887,499
Bills and accounts receivable	1,622,998
Investments	316,795
Cash	436,699
	$12,251,851

LIABILITIES	
Preferred stock	$4,580,000
Common stock	5,000,000
Bonds (John Stephenson Company)	400,000
Bills and accounts payable	736,434
Surplus	1,535,417
	$12,251,851

Samuel M. Curwen, president of the company, in presenting the report to the stockholders on Feb. 11, 1914, said in part:

"The total sales value of the combined output of all the five plants owned and operated by The J. G. Brill Company for the twelve months ended Dec. 31, 1913, was $9,154,433. The amounts of the combined sales of the five plants for the six years prior to 1913 are here given for purposes of comparison: 1907, $9,211,825; 1908, $3,845,173; 1909, $4,261,204; 1910, $5,960,778; 1911, $5,870,907; 1912, $7,842,090; 1913, $9,154,433.

"The combined profit resulting from the operation of the plants owned and operated by the company during the year 1913 amounted to $909,143.

"The regular quarterly dividend on the preferred stock, at the rate of 7 per cent per annum, amounting to $80,150, was declared by the directors at a meeting held Jan. 19, 1914, and was paid on Feb. 1.

"The properties were all maintained during the year in excellent physical condition, and the entire expense of all maintenance and upkeep, amounting to $257,242, was taken from current earnings.

"During the year there was set aside out of earnings, as an addition to the depreciation reserve, the sum of $155,234, in pursuance of the regular conservative policy of your management. This total reserve now amounts to $1,462,580.

"As shown by this report, a large amount of work was obtained and executed during the year, a very satisfactory portion of this work being for export. On Feb. 9 the amount of orders of your combined companies in process of execution amounted to $1,781,000.

"The outlook for the coming year at this time makes your management somewhat uncertain as to how profitable a year may be expected. Conditions, however, seem to show a marked improvement during the last few weeks."

Organization of Newport News & Hampton Railway, Gas & Electric Company

President C. Loomis Allen has issued a statement concerning the operations of the corporations which were recently consolidated under the name of the Newport News & Hampton Railway, Gas & Electric Company. This statement follows in part:

"The consolidation of the Newport News & Old Point Railway & Electric Company, Citizens' Railway, Light & Power Company, Hampton Roads Traction Company, Newport News Gas Company and Hampton, Phoebus & Fort Monroe Gas Corporation, together with the voting of the deed of trust and mortgage, completes the reorganization of the public utilities that render service to the residents of the peninsula.

"During 1911 the service rendered was not satisfactory, interruptions were frequent and long and the patience of the public was strained to the breaking point. The corporations were burdened with debt and had no credit. Large sums of money were required to rehabilitate the property and to make extensions and improvements.

"The present owners of the public utilities early in January, 1912, undertook the work of rehabilitating the physical property, in order that proper service could be given, and to make improvements and extensions to the railway service and the electric light, power and gas distribution system in residential sections that were unserved by these utilities. Over $600,000 in cash has been expended in making improvements, betterments and extensions. At the same time purchases were made of the underlying bonds of the abovementioned companies (the Newport News Gas Company excepted), with the view that when the improvements were completed a conservative reorganization of the finances of these corporations could be accomplished so that not only the present financial needs would be cared for, but that ample provision would be made to pay for improvements and extensions in years to come.

"The Newport News & Hampton Railway, Gas & Electric Company is now prepared to make such improvements, additions, betterments and extensions into new territory as good business judgment will justify.

"The following is a brief statement of the financial condition of the corporation:

	Authorized	Issued
Common stock	$1,250,000	$1,250,000
Preferred stock	1,250,000	1,000,000
First and refunding bonds	7,500,000	2,479,000
Underlying bonds	2,225,000	2,225,000

"Of the $2,479,000 of first and refunding bonds issued, $175,000 are in the company's treasury and the proceeds of the same will be used to pay for improvements and extensions that are contemplated in the near future."

American Water Works & Guarantee Company, Pittsburgh, Pa.—In the United States District Court in Pittsburgh on Feb. 2, 1914, an order was made in the suit of F. D. Glover, the West Penn Traction Company and Elizabeth M. Van Wagener, plaintiffs, and the American Water Works & Guarantee Company, defendant, authorizing the receivers of the American Water Works & Guarantee Company to permit an extension of time for the payment of principal on outstanding bonds of the Arkansas Water Company to Feb. 1, 1916. They were issued on Feb. 1, 1894, and were due on Feb. 1, 1914. A similar order was made covering the payment of the principal on outstanding bonds of the Louisiana Water Company issued on Jan. 15, 1894, and due on Dec. 15, 1914. Payment was extended to Jan. 15, 1915. The order makes provision for the payment of the interest by the borrowing of funds for that purpose.

City of Toronto (Ont.) Civic Lines.—The number of passengers carried and the receipts of the City of Toronto Civic Lines in 1913 were as follows: St. Clair Avenue, opened Aug. 25, passengers, 1,150,426; receipts, $19,672; Danforth Avenue, opened October, passengers, 517,024; receipts, $8,841; Gerrard Street, operating all year, passengers, 1.697,268; receipts, $29,024; total passengers, 3,364,718; total receipts, $57,537.

Columbus Railway, Power & Light Company, Columbus, Ohio.—On Jan. 30, 1914, the Columbus Railway, Power & Light Company filed in Ohio a certificate of increase of authorized capital stock from $1,000,000 to $11,550,000, to consist of $6,340,000 common, $1,143,500 preferred "A" and $4,066,500 preferred "B." On Feb. 1 the company took title to the several leased properties, except the Columbus Light, Heat & Power Company, in accordance with the reorganization plan.

Fort Wayne & Northwestern Railway, Kendallville, Ind.—At the annual meeting of the Fort Wayne & Northwestern Railway, held in Kendallville, Ind., recently, an initial dividend of 1 per cent was declared. The following directors were elected: W. L. Taylor, Indianapolis; J. H. Rose, F. E. Zollars and E. E. Leonard, Fort Wayne; C. J. Munton, Kendallville.

Fort Wayne & Springfield Railway, Decatur, Ind.—Judge O'Rourke at Decatur has decided as special judge in the case of the Fort Wayne & Springfield Railway, which has been in the hands of a receiver for some time, that the road must be sold on May 15 to the highest bidder at a minimum bid of $200,000. A certified check for $20,000 must accompany each bid. Some time ago the court ordered the road sold at a price of at least $250,000, but there were no bidders, so the court lowered the upset price.

Galveston-Houston Electric Company, Galveston, Tex.—In order to pay the $600,000 of three-year 6 per cent notes, due April 1, 1914, and to meet other capital requirements, directors of the Galveston-Houston Electric Company have offered to preferred and common stockholders of record Feb. 4, for subscription pro rata at par, $1,000,000 of the authorized but unissued common stock. This stock, if paid for in full, is to carry the dividend of $3.50 per share, payable March 16. Payment for new stock must be made either (1) in full at $100 per share on or before Feb. 25, 1914, or (2) in two instalments of $50 per share, the first on or before Feb. 25, and the second on or before Aug. 25.

Laredo Electric & Railway Company, Laredo, Tex.—Frank E. Scovill, secretary and general manager of the Laredo Electric & Railway Company, reports the sale of the property of the company on Jan. 25, 1914, to Messrs. Morrison and McCall, St. Louis.

Los Angeles (Cal.) Railway Corporation.—E. H. Rollins & Sons, Boston, Mass., have bought $10,000,000 of Huntington Land & Improvement Company 6 per cent collateral trust bonds, guaranteed by the indorsement of H. E. Huntington. They are being offered to yield 6.15 per cent. The bonds are part of an authorized issue of $14,000,000, the remaining $4,000,000 being reserved to retire a like amount of 6 per cent notes. The issue is secured by collateral having par value of $46,800,000, including the entire capital stock of the Los Angeles Railway. The plans for the incorporation of the Los Angeles Railway as a merger of the Los Angeles Railway Corporation and the City Railway were referred to at length in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, page 1258.

Manhattan & Queens Traction Corporation, New York, N. Y.—Permission has been granted by the Public Service Commission of the First District of New York to the Manhattan & Queens Traction Corporation, the successor to the South Shore Traction Company, to issue $765,000 of capital stock. It had asked for leave to issue $1,500,000 of stock and $1,500,000 of bonds. All this stock must be issued on or before June 30, and the company must report every month how much it has sold and to what purposes it has devoted the proceeds. Moreover, all franchise payments and all expenditures for property to be held only to the end of the franchise must be amortized before the franchise expires. Consideration as to the issue of the bonds was postponed until the form of the $10,000,000 mortgage which the company wishes to make has been settled. McArthur Brothers, New York, contractors for the road, have agreed to accept as payment for their work $1,480,000 of the capital stock and $1,500,000 of the first mortgage bonds of the company.

Monterey Railway, Light & Power Company, Monterey, Mex.—Directors of the Monterey Railway, Light & Power Company have issued notice that the interest due on Feb. 2 on the $6,000,000 of first mortgage debenture stock will be deferred until such time as financial and political conditions improve in the republic. Owing to disturbed conditions in Mexico the State of Nuevo Leon has been unable to settle the claim of the company under the 10 per cent guarantee on the capital investment of the Monterey Water Works & Sewer Company, a subsidiary, although substantial sums have been paid on account of this claim. Notwithstanding this, the directors say that they would have been able to provide sufficient sums from revenue to pay the debenture interest if there had been a normal rate of exchange between Monterey and London; but they were unable to transfer the money without a large loss.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont.—A report was recently made to the City Council of Fort William, Ont., on the question of purchasing the entire system of the Mount McKay & Kakabeka Falls Railway and operating it as part of the municipal electric railway system. The city railway committee will consider the matter.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The California Railroad Commission has issued an order granting authority to the Oakland, Antioch & Eastern Railway to issue $500,000 of first mortgage 5 per cent thirty-year bonds under its mortgage and deed of trust to the Union Trust Company of San Francisco and to pledge the bonds together with other bonds to a total of $1,167,000 as collateral security for an issue of notes under the trust agreement. The funds will be applied to the physical development of the railroad's properties.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—James G. Hasking has been designated by the holders of more than 60 per cent of the outstanding bonds of the Pittsburgh, McKeesport & Westmoreland Railway as trustee under the mortgage and deed of trust dated Dec. 1, 1906, and has qualified in the stead of the Columbia-Knickerbocker Trust Company, New York, N. Y.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Stone & Webster have announced that the entire issue of $2,686,200 of 6 per cent preferred stock of the Puget Sound Traction, Light & Power Company, underwritten by a syndicate of bankers of which Stone & Webster were syndicate managers and offered at 100, has been sold.

Southern Pacific Company, San Francisco, Cal.—The Southern Pacific Company on Feb. 7 made application to the California Railroad Commission and the Corporation Commission of Arizona for authority to issue $55,000,000 of 5 per cent twenty-year convertible bonds. These bonds in the amount of $29,000,000 are for refunding short-time notes and the remainder for betterments and additions.

Dividends Declared

Central Arkansas Railway & Light Company, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1¼ per cent, preferred.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1¾ per cent, common.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1 per cent.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Jan., '14	$429,850	....	....	....	......
1 " " '13	405,091	....	....	....	......
7 " " '14	3,304,831	....	....	....	......
7 " " '13	3,054,573	....	....	....	......
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.					
1m., Nov., '13	$164,572	*$109,799	$54,772	$33,919	$20,854
1 " " '12	155,213	*96,360	58,853	32,050	26,803
5 " " '13	937,136	*568,136	368,999	168,960	200,039
5 " " '12	895,032	*497,298	397,734	160,395	237,339
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.					
1m., Dec., '13	$105,473	$62,915	$42,557	$33,087	$9,470
1 " " '12	97,272	59,564	37,614	32,066	5,648
12 " " '13	1,255,343	759,495	495,849	381,931	113,918
12 " " '12	1,183,332	693,529	489,803	373,113	116,690
DETROIT (MICH.) UNITED RAILWAY					
1m., Dec., '13	$1,016,655	$715,282	$301,373	$177,545	$123,827
1 " " '12	1,037,459	685,795	351,664	177,682	173,982
12 " " '13	12,975,767	8,694,231	4,281,536	2,151,058	2,130,477
12 " " '12	11,904,388	7,730,409	4,173,978	2,123,513	2,050,465

*Includes taxes.

Traffic and Transportation

I. C. C. Accident Bulletin for Year

The Interstate Commerce Commission has issued accident bulletin No. 48, covering the three months ended June 30, 1913, and the year ended June 30, 1913. Some of the figures on accidents on electric railways reporting to the commission were contained in the annual report of the commission and were reproduced in the summary of that report which was published in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1913, page 53. The table of collisions and derailments on electric railways contained in the bulletin follows:

No.	Classes	Number	Number of Persons Killed	Number of Persons Injured	Damage to Road and Equipment and Cost of Clearing Wrecks
	Collisions:				
1	Rear	103	7	816	$35,475
2	Butting	42	9	245	70,177
3	Trains separating	..	..	....	....
4	Miscellaneous	56	2	130	55,446
	Total	201	18	1,191	$161,098
	Derailments due to—				
5	Defects of roadway	23	1	50	$1,539
6	Defects of equipment	12	1	25	8,108
7	Negligence of trainmen, signalmen, etc.	11	2	55	30,685
8	Unforeseen obstruction of track, etc.	7	1	9	7,546
9	Malicious obstruction of track, etc.	2	1	1	......
10	Miscellaneous causes	19	5	70	2,801
	Total	74	11	210	$50,679
	Total collisions and derailments	275	29	1,401	$211,777

The table of employees in the service of electric railways reporting to the commission on June 30, 1913, follows:

No.	Class of Employees	Number of Persons
	Employees specially exposed to railway accidents:	
1	Freight trainmen, road service (enginemen, firemen, motormen, conductors, brakemen, rear flagmen, train baggagemen, train porters performing duties of trainmen)	1,914
2	Passenger trainmen, road service (enginemen, firemen, motormen, conductors, brakemen, rear flagmen, train baggagemen, train porters performing duties of trainmen)	20,736
3	Other persons employed on trains (dining-car employees, train porters not performing duties of trainmen, etc., when actually employed by the respondent carrier)	130
4	Yardmen (all employees in yard train work and switching—enginemen, firemen, conductors, brakemen, foremen, droppers, fieldmen, hostlers, hostler helpers, yardmasters, etc.)	800
5	Switch tenders, crossing tenders and watchmen	602
6	Bridgemen and trackmen	16,387
7	Other employees specially exposed to railway accidents (station and miscellaneous employees, shopmen, etc., excluding all officers, clerks, indoor employees, and others engaged in work in which they are not specially exposed to railway accidents)	8,963
	Total number of employees specially exposed to railway accidents	49,532
8	Employees not specially exposed to railway accidents (includes officers and other employees specifically excluded from item No. 7 above)	12,684
	Total number of persons employed on June 30, 1913	62,216

Front-End Collectors in Kansas City

The facility with which the Metropolitan Street Railway, Kansas City, Mo., handled the immense crowds which turned out for "Go-to-Church" day on Sunday, Feb. 1, 1914, attracted attention to the front-end collectors who have been used by the company with increasing success for the past three years. About 250,000 persons attended church on the date named, it is estimated, establishing a new record in this respect, and probably also for the company for Sunday morning business. While the company installed additional cars for the occasion, the crowds could hardly have been handled so efficiently had it not been for the front-end collecting system. Many compliments were paid the company by the press, ministers and others interested in the success of "Go-to-Church" day.

The front-end collectors were installed by the Metropolitan Street Railway about three years ago, after extensive tests designed to determine whether or not the new plan was practicable and worth while. Stop watches were utilized to determine the saving of time effected by allowing passengers to use the front end of the cars not only for exits but also for entrances. The investigations of the company indicated that the plan was satisfactory and it has been adopted on a steadily increasing scale. At present thirty-five front-end collectors are used in the evening, and a half dozen in the morning. The collectors are pressed into service from 4.30 p. m. to 6.30 p. m. on Saturdays and from 5 p. m. to 6.30 p. m. during the week. They are placed at busy transfer points, and in some instances at large department stores. Several also are placed in the packing house district, where the number of employees runs into the thousands. The front-end collectors also are used extensively on special occasions, such as ball games during the summer and at theaters in the winter.

The front-end collectors are conductors who perform precisely the same duties as the man on the rear of the car. The difference is that the collectors, instead of being on cars, are placed at a given point and remain there during a stated period. They issue and collect transfers, receive cash fares, and punch transfers where the slip is to be used a second time by the passenger. The collectors are equipped with neck registers, which enable them to work with expedition and at the same time keep an accurate record of their transactions. They also keep a tripper card, just as does a conductor in charge of a car. The front-end collectors all served as conductors prior to being appointed collectors.

One test made by the company at a busy transfer point with the front-end collectors working showed that 282 passengers were loaded through both the rear and front end doors in 304 seconds, or one passenger every 1.07 seconds. Of the 282 persons handled, 109 were loaded through the front door, and 173 by the rear. At another busy transfer point, under similar conditions with only the rear door in use and the front-end collectors eliminated, 105 passengers were loaded in 235 seconds, or an average of one passenger every 2.23 seconds. On another date, at the same point, 213 passengers were loaded in 292 seconds, with the front-end collectors working, an average of one person in 1.37 seconds. Under the same conditions, with the exception that the collectors were again banished, 144 passengers were loaded in 319 seconds, or an average of one person every 2.80 seconds.

The public did not take kindly to the innovation at first. This sentiment was overcome, however, when the advantages of the new system were seen, and a general protest would probably be lodged were a return to old methods proposed.

Welfare Program of Columbus Company

The Columbus Railway, Power & Light Company, Columbus, Ohio, has established a new scale of wages for motormen and conductors and inaugurated a system of sick and death benefits and retirement of employees on a pension. This was announced through a bulletin issued on Feb. 5. The new scale of wages is as follows: First three months, 20½ cents; the following nine months, 23¼ cents; second and third years, 25 cents; fourth and fifth years, 26 cents; after fifth year, 27 cents. The present scale for the first year is the same as the new one, and provides for 24½ cents thereafter. The new scale went into effect on Feb. 13.

The company will organize a co-operative beneficial association. It will receive as members white employees of the company eighteen years of age or over who have been in continuous service of the company for three months and whose wages do not exceed $200 a month. Each member will pay an initiation fee of $1 and dues of 50 cents a month and the company will pay into the treasury of the association each month half as much as the members pay that month in membership fees and dues. The company will also pay the expense of management. Sick benefits to the amount of $1 a day will be paid for a term of twenty-six weeks. This, however, is the maximum limit for any consecutive twelve months, and the payments begin after the first seven days' illness. Payments will be made only to those who are not receiving wages during their absence from employment. Funeral benefits amounting to $150 will be paid to beneficiaries of the deceased members. Independently of the association, the company will pay $500 on the death of an employee, the payment being made to actual dependents, if any survive the employee. To be eligible to this benefit an employee must have been with the company at least two years, have reached the age of twenty-one years and be receiving not more than $200 a month. Pensions of $30 a month will be paid to those who have reached the age of sixty-five after having been twenty-five years in the service and whose salary is not more than $200 a month. This payment applies on retirement from the service and the company reserves the right so to retire employees who are eligible to the pension and are unable to perform their regular duties.

"Safety First" in Trenton

The Trenton & Mercer County Traction Corporation, Trenton, N. J., has entered upon a "safety first" campaign. For some time past C. E. Davies, general claim agent of the company, has been distributing in the public schools celluloid calendar cards 2½ in. wide by 3¾ in. high which contain general safety hints and suburban electric railway schedules on one side and safety and sanitation hints and a calendar for the year on the other side. The distribution is made by Mr. Davies, who calls at the schools at the opening and the closing sessions and refers to accident statistics and the great need of the safety campaign. The work has been approved by the Board of Education and the supervising principal of schools and has also received the indorsement of principals and teachers in the schools. The company has also appointed men from its various departments to the "safety first" committee to carry on this work among the company's employees. The "safety first" hints which appear on the calendar cards follow:

"Remember that cars are confined to the tracks. They must run faster than you do. They cannot stop as quickly.

"In boarding be sure the car has stopped. Take hold of the grab handle with your right hand and step up with the left foot first.

"In alighting be sure the car is at a standstill. Take hold of the grab handle with your left hand and step down with the right foot first."

The safety and sanitation hints follow:

"Do your part to keep Trenton clean.

"Don't throw paper or other refuse in cars or on streets.

"Don't spit on the sidewalks, in cars or on the floors of public buildings.

"Don't smoke or carry lighted cigars, cigarettes or pipes in street cars.

"Learn the regulations of the board of health for your guidance."

Plans for Delivering Farm Produce in Philadelphia

Director of Public Safety Cooke, of Philadelphia, Pa., has announced that arrangements have been completed with the Philadelphia Rapid Transit Company whereby farm produce will be delivered cheaper and quicker in any part of the city by a new interurban electric railway freight service now being established by the company. Inauguration of this new freight service promises early establishment of "curb markets" which Director Cooke has urged as a potent factor in decreasing produce prices. Mr. Cooke is reported to have said that if Councils pass the curb market ordinance, it will make it possible to try some further experiments that will undoubtedly yield good results in that direction. As part of the proposed new freight service, Mr. Cooke says the Philadelphia Rapid Transit Company has made plans to build terminals immediately at Eleventh and Colona Streets, north of Susquehanna Avenue, and at the Farmers' Market, Ridge Avenue and Poplar Street. The company will also enlarge its freight station at Wheel Pump, Chestnut Hill, and in addition has expressed its readiness to construct market sidings at Fairmount Avenue and Second Street and Race and Second Streets and a third siding at such new public market as Councils by ordinance may authorize at some other place in the city, not yet designated. Announcement of the location of this new market, the director said, would be made within a few days. Mr. Cooke is quoted as follows: "These tangible results in the campaign to bring the products of the farmers of 'nearby Philadelphia' to our local kitchen doors are very gratifying, and are an indication of the growing importance of the electric railway in this freight business. As a result of our inquiry into the high cost of living, the Philadelphia Rapid Transit Company has decided that it is good business to enlarge its present facilities."

Premiums for Reducing Coal Consumption in Kansas

The Topeka (Kan.) Street Railway effected a material saving in coal consumption during January by means of a prize contest, in which car crews were entered, and by putting into effect a ticket system, by which the amount of coal used on each car is recorded. Owing partly to warm weather, but chiefly to the new system, the company reduced its average daily coal consumption on cars to about 900 lb. daily, a substantial saving in comparison with the corresponding period in 1912, even considering the warmer weather. The motorman who stoked the heaters in the cars with the smallest amount of coal during January received a cash bonus of $6. Nearest competitors received prizes of $3, $2 and $1. A good deal of friendly rivalry was aroused by the contest, which will be continued during the winter. Under the new plan each motorman receives a number of coal tickets, each entitling him to a certain amount of coal. He gives a ticket to the accounting department every time he loads up with coal. The best grade of coal obtainable is used, usually consisting of Pennsylvania anthracite nut, costing around $12 a ton.

"Safety First" Meeting of the Northern Ohio Traction & Light Company.—Meetings of the employees of the Northern Ohio Traction & Light Company, Akron, Ohio, have been held at Silver Lake Junction and other points recently to discuss the "safety first" movement.

Traffic Changes to Relieve Congestion.—The Interborough Rapid Transit Company, New York, N. Y., has agreed to make certain changes to relieve congestion at the 149th Street station of the subway and elevated railroad in the Bronx. These changes include the establishment of three new points for the issuance of transfers to passengers leaving the subway to board the elevated and also a change in the direction of traffic during the evening rush hours.

Storm in Northwestern Ohio.—Traffic over the electric railways in northwestern Ohio was reported on Feb. 7 to be partly disorganized. A severe sleet storm carried down the telegraph and telephone poles along the right-of-way of a number of the electric railways and put the transmission lines out of service. A number of the companies are reported to have offered premiums for extra work by linemen and other employees to rush repairs and open up schedules. On Feb. 7 all traffic to Akron was routed via Findlay and change was necessary at Fostoria.

Five-Cent Fare Into Kansas City.—Persons living on the Kensington branch of the Kansas City & Western Electric Railway, running from Kansas City to Leavenworth, Kan., are to have a 5-cent fare into Kansas City. This agreement was practically reached at a recent meeting between officers of the Metropolitan Street Railway, of the interurban, and R. J. Higgins, city counselor on the Kansas City, Kan., side. Arrangements are to be made whereby the Metropolitan Street Railway will take charge of the interurban cars at Chelsea Junction and also operate other cars over the line. The conductors for the city line now begin taking fares at Eighteenth Street and Central Avenue.

"Safety First" Results in New Albany.—The Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company, associated corporations, with offices in New Albany, Ind., have issued convincing figures showing the results of the "safety first" campaign which they have conducted for several years. In December, 1912, 696,862 passengers were handled, and the number of accidents was nineteen. In December, 1913, the number of passengers handled was 770,308, and the total number of accidents three, a reduction of more than 80 per cent. A significant sidelight on the figures is that the quarterly examination of trainmen held in December, 1913, covering matters pertaining to safety operation, resulted in all of the trainmen securing a passing grade. This was the first time everybody passed.

Commendation for New York Companies.—The New York *World*, commenting editorially on the distribution of $70,000 among the employees of the Interborough Rapid Transit Company and the New York Railways at Christmas, said in part: "It is doubtful if any public service is rendered under more trying circumstances or with better temper and discipline. The crowds that make up a large proportion of the patrons of some of the lines during rush hours are about the rudest and least disciplined in any civilized city. Ill-mannered thousands rush the cars without respect for age or sex. These offenses frequently are little less than assault and battery. That there are not more fights or arrests is due in the main to the patience and tact of the employees. It is well, therefore, to have their merit recognized by the public as well as by the company. They deserve it."

Trolley Freight Terminal Discussed in Pittsburgh.—A committee of 100 citizens met with the City Councilmen and members of the Chamber of Commerce at Pittsburgh, Pa., recently, to discuss plans for establishing an electric railway freight terminal in Pittsburgh. Representatives of all electric railways which enter Pittsburgh attended. The freight and express business on the electric railways in western Pennsylvania has increased enormously and there is a demand for better facilities to and from all shipping points in the Pittsburgh industrial district. The plan is to erect an electric railway freight terminal to which all lines that enter Pittsburgh will have access. The representative of one line exhibited samples of fruit grown within 50 miles of Pittsburgh to illustrate the opportunities for farming and fruit growing provided quick and economical transportation from the place of production is assured. A committee of seven to represent the city was appointed to confer with a committee representing the electric railways.

Electric Railway Enlisted in Campaign Against Smallpox.—The Metropolitan Street Railway, Kansas City, Mo., is taking an active part in preventing a further spread of smallpox, about sixty cases of which are being treated in Kansas City. Placards reading as follows have been placed in all of the cars operated by the company: "To the Public: Vaccination prevents smallpox. Smallpox prevails to an alarming extent in malignant form in many parts of the State. You may contract the disease at any moment by coming in contact with a smallpox patient or a person who has been exposed to the disease, or with clothing or articles of merchandise which have come from infected premises. The experience of a century has taught that vaccination is a safe and positive preventive against smallpox." While it has refrained from issuing any form of positive order, the company has strongly advised employees to be vaccinated at once. In addition, the company has redoubled its efforts to maintain cleanliness and absence of germs in cars. Each car, as it arrives at the carhouse after the day's run, is always swept and disinfected. The proportion of disinfectant to the amount of water used has been increased during the smallpox scare.

Brooklyn Transfer Map.—The Public Service Commission of the First District of New York placed on exhibition on Feb. 10, 1914, in room 310 of the Tribune Building, New York, where the offices of the commission are located, several maps and charts showing the surface railways in Brooklyn and the intersections at which it is proposed to give transfers. This transfer system is a general rearrangement agreed upon by the Brooklyn Rapid Transit System and the commission. After several conferences, the committees made an arrangement whereby a retransfer upon a transfer could be eliminated. At the same time opportunity is given to all passengers to transfer between any two points in the same general direction for a single fare. The maps will be on exhibition for a week, so that Brooklyn people may familiarize themselves with the proposed arrangement. On Feb. 17 the commission will hold a public hearing on the plan. According to the plan, transfers will be given at every intersecting point of the surface railroad system of Brooklyn, including the lines of the Coney Island & Brooklyn Railroad, recently taken over by the Brooklyn Rapid Transit Company. At a few points, the direction will be limited, so as to prevent the holder of a transfer from riding back to the point from which he started without the payment of a second fare.

Personal Mention

Mr. H. O. Caster, Oberlin, Kan., has been appointed attorney for the Public Utilities Commission of Kansas.

Mr. W. L. Taylor, president of the Fort Wayne & Northwestern Railway, Kendallville, Ind., has been elected vice-president of the company.

Mr. Joseph S. Hart, of the Hart Mirror Plate Company, has been elected a vice-president of the American Public Utilities Company, Grand Rapids, Mich.

Mr. Arthur Reid, formerly superintendent of electric railways and electricity in Lethbridge, Alberta, has been elected commissioner of public utilities for that city.

Mr. C. J. Munton, treasurer and general manager of the Fort Wayne & Northwestern Railway, Kendallville, Ind., has been elected president and general manager of the company.

Mr. W. J. C. Wakefield has been elected chairman of the executive committee of the Washington Water Power Company, Spokane, Wash., to succeed the late Henry M. Richards.

Mr. Charles B. Kelsey, president of the American Public Utilities Company, Grand Rapids, Mich., has been elected chairman of the board of directors of the company, a newly created position.

Mr. J. Y. Carithers, who has been first vice-president of the Athens Railway & Electric Company, Athens, Ga., has been elected president of the company to succeed Mr. W. T. Bryan, resigned.

Mr. L. H. Brown, superintendent of the Lynn power station of the Bay Street Railway, Boston, Mass., has been elected president of the New England Society of Superintendent Engineers.

Mr. C. W. Hotchkiss, who has been vice-president of the Staten Island Midland Railway, New York, N. Y., has been elected president of the company to succeed Mr. S. F. Hazelrigg, resigned.

Mr. C. D. Cox, who has been treasurer of the Athens Railway & Electric Company, Athens, Ga., has also been elected secretary of the company, in which capacity he succeeds Mr. John White Morton, resigned.

Mr. G. N. Patterson, claim and purchasing agent and general freight and passenger agent of the Fort Wayne & Northwestern Railway, Kendallville, Ind., has in addition been elected treasurer of the company.

Mr. F. W. Frueauff, New York, N. Y., has been elected second vice-president of the Athens Railway & Electric Company, Athens, Ga., to succeed Mr. C. D. Flanigen, who has been elected first vice-president of the company.

Mr. Hugh H. Harrison, president of the Merchants' Heat & Light Company, Indianapolis, Ind., has been elected a vice-president of the American Public Utilities Company, of which the Merchants' company is a subsidiary.

Mr. Barrett Smith has resigned as advertising manager of the Stone & Webster Engineering Corporation, Boston, Mass., to go into special advertising work for himself. He will still give part of his time to the Stone & Webster advertising.

Mr. T. J. Mullen, formerly general superintendent of the Staten Island Midland Railway and of the Richmond Light & Railway Company, New York, N. Y., has been appointed to succeed Mr. S. F. Hazelrigg as general manager of both companies.

Mr. H. J. Blackham has been appointed general superintendent of the Staten Island Midland Railway and the Richmond Light & Railway Company, New York, N. Y., to succeed Mr. T. J. Mullen, who has been appointed general manager of the companies.

Mr. Joseph H. Brewer, vice-president and general manager of the American Public Utilities Company, Grand Rapids, Mich., has been elected to succeed Mr. Charles B. Kelsey as president of the company. Mr. Brewer will also continue in the capacity of general manager.

Mr. James A. Braden, for the last year advertising and publicity manager of the Northern Ohio Traction & Light Company, Akron, Ohio, operating the Akron, Bedford &

Cleveland, the Canton-Akron, the Canton, Massillon, New Philadelphia & Urichsville and other interurban roads and city lines in northern Ohio, has been appointed general passenger agent of the company. Mr. Braden gained a wide advertising and selling experience through a ten-year connection with the Diamond Rubber Company, Akron, as advertising manager.

Mr. Edward A. Maher, Jr., has recently been appointed assistant general manager of the Third Avenue Railway, New York, N. Y. Mr. Maher is a son of the vice-president and general manager of the company and is a member of the New York bar. He has also had an extensive experience in railway and electric lighting affairs in New York, having been for ten years, or between 1892 and 1902, president and general manager of the North River Electric Light & Power Company. Then he entered the legal department of the New York City Railway and the Third Avenue Railroad, with which he was connected for seven years. He assumed his present duties on Dec. 1.

Mr. W. G. Nicholson, who has been elected secretary of the Omaha & Council Bluffs Street Railway, Omaha, Neb., in addition to auditor of the company, was connected with the accounting department of various steam railroads prior to entering the electric railway field. He was with the Chicago, Rock Island & Pacific Railway, Chicago, Ill., for a number of years. In 1905 he entered the service of the Cincinnati, Hamilton & Dayton Railway at Cincinnati, Ohio. After a brief connection with that company he resigned to become chief clerk to the secretary and treasurer of the Indiana, Columbus & Eastern Traction Company, now included in the system of the Ohio Electric Railway, Cincinnati, Ohio. On Jan. 1, 1910, Mr. Nicholson was appointed auditor of the Omaha & Council Bluffs Street Railway. On Jan. 19, 1914, he was in addition elected secretary of the company.

J. S. Goodwin

Mr. J. S. Goodwin was appointed superintendent and was elected secretary of the Hartford & Springfield Street Railway, Warehouse Point, Conn., on Jan. 30, 1914, to succeed Mr. Ray W. Reynolds, whose appointment to the Springfield (Mass.) Street Railway was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914. Mr. Goodwin was born in Beverley, Mass., in 1877. He entered railway work in 1895 as a motorman on the Gloucester, Essex & Beverly Street Railway, now a part of the Bay State Street Railway. He was subsequently employed as a motorman for a short time with the Rhode Island Company, Providence, R. I. In 1901 he entered the employ of the Hartford & Springfield Street Railway as a motorman. He was later appointed a dispatcher of the company. In 1906 he was advanced to chief dispatcher and served in that capacity until the time of his advancement to superintendent and secretary.

Mr. Adam S. Widenor, whose election as treasurer of the Omaha & Council Bluffs Street Railway, Omaha, Neb., was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, was born in Belvidere, N. J. He entered newspaper work and was connected with the mechanical and business departments of newspapers at Leadville, Col., from 1879 to 1887. He entered the employ of the Cable Tramway, Omaha, Neb., in June, 1888, as a conductor. In 1889 he was appointed assistant superintendent of the Cable Tramway, which was consolidated with the Omaha Street Railway in that year. He was subsequently advanced to assistant cashier and continued in that capacity with the consolidated Omaha & Council Bluffs Street Railway & Bridge Company. In 1902 Mr. Widenor was appointed cashier of the Omaha & Council Bluffs Street Railway and on Jan. 19, 1914, he was elected treasurer of the company.

Prof. H. H. Norris

Prof. H. H. Norris, who has been a special contributor to this paper for several years, has now joined the editorial staff and will give all his time to this publication. Professor Norris is a native of Philadelphia and secured his university education at the Johns Hopkins University, where he was a special student in physics and applied electricity, and at Cornell, where he was graduated in the class of 1896 with the degree of M.E. He was an instructor in Cornell from 1896 to 1900, an assistant professor from 1900 to 1905 and a professor from the latter year to 1913. He was also in charge of the department of electrical engineering during the last four years of his stay there. Professor Norris has also done a great deal of electrical work outside of the college. He was superintendent of the tests conducted by the Electric Railway Test Commission at the St. Louis Exposition and later on the lines of the Union Traction Company of Indiana in Anderson, and with Prof. B. V. Swenson edited the report of the commission. He was also a member of the international jury at the St. Louis Exposition and secretary of the electric railway section. In 1905 his services were secured by the American Electric Railway Association to formulate plans for the reorganization of that association and he drafted the constitution and by-laws which are now in effect. He has also for a number of years been chairman of the educational committees of the American Institute of Electrical Engineers and of the American Electric Railway Association and has just been appointed by the National Electric Light Association to the committee on relations of that organization to educational institutions. He was manager of the American Institute of Electrical Engineers from 1909 to 1913, and since 1909 has been secretary of the Society for the Promotion of Engineering Education. He is also the author of several books dealing with electrical engineering subjects and of numerous contributions to the technical press. For the present Professor Norris will have his headquarters with the New York office of the ELECTRIC RAILWAY JOURNAL.

OBITUARY

James H. Bryan, who was president of the Woronoco Street Railway, now included in the system of the Springfield (Mass.) Street Railway, is dead.

At the midwinter meeting of the Brooklyn committee of public safety, held recently at the Hamilton Club, an address was made by Henry W. Forster, chief engineer of the Independence Inspection Bureau, and Gen. George W. Wingate, chairman of the committee, presented a report on its work since its organization on Nov. 20, 1913. In addition to the daily lectures in the schools, illustrated with large accident drawings and model electric railway cars, approximately 350,000 safety blotters have been distributed to the children —one to every child in the schools—and nearly seven thousand safety calendars have been provided. These calendars, approved by the Board of Education, provide every class room in Brooklyn with a striking picture every month, in addition to specific safety instruction, and letters from many principals indicate that they are warmly appreciated. One hundred safety bulletin boards, with accompanying material for safety reports, have been provided and are being installed as fast as the co-operation of principals can be secured. With the installation of these bulletin boards goes the organization of safety patrols—bodies of ten or a dozen of the older boys in a school, who escort the younger children across dangerous crossings on their way home. The report spoke of lectures in the schools and street traffic regulation. The work of the Brooklyn Rapid Transit Company in this connection was described at length in ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Frontenac, Mulberry & Arcadia Electric Railway, Pittsburg, Kan.—Application for a charter will be made by this company to build a 15-mile line to connect Frontenac, Mulberry, Arcadia and Pittsburg. Officers: J. S. Patton, president; Frank Markowitch, vice-president; P. J. McGinley, secretary; Antone Menghini, treasurer. [E. R. J., Jan. 31, '14.]

Central City, Greenville & Drakesboro Railway, Central City, Ky.—Application for a charter has been made by this company to build an electric railway to connect Central City, Drakesboro, Greenville, Hillside, Brownsville, Mercer, Powderly, Cleaton, Bevier and Graham. Capital stock, $500,000. Incorporators: L. L. Dunham, New York; W. H. Netherland, Louisville; Samuel Cauffield, Wilmington; Hubert Meredith, Greenville; S. J. Gish and James Small, Central City. [E. R. J., Jan. 31, '14.]

***Rapid Transit Company of St. Louis, St. Louis, Mo.**—Chartered in Missouri to build an electric railway. Capital stock, $2,500. Incorporators: James E. Westrich, H. E. Miller and Guy B. Negg.

***Wheeling & Eastern Railroad, Wheeling, W. Va.**—Chartered in West Virginia to build an electric or steam railway from Short Creek to Potomac Creek. Capital stock, $100,000. Incorporators: B. L. Rosenbloom, R. T. Manning, M. E. McGreal, George A. Feeny and B. J. Smith, Wheeling, W. Va.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise for a double-track line to connect its line at Sixth Street and Ceros Avenue with the south end of the proposed new Arcade Depot in Los Angeles.

Mill Valley, Cal.—The Marin County Electric Railway, Mill Valley, has received a franchise in Mill Valley. This company plans to build an electric line in that place, with a branch from the Northwestern Pacific depot to the Old Hill and Cascade Reservation in Marin County. B. F. Ames, president. [E. R. J., Jan. 31, '14.]

Stockton, Cal.—The Stockton Electric Railway has asked the Board of Supervisors for a fifty-year franchise for an extension of El Dorado Street to Castle in North Stockton.

***West Palm Beach, Fla.**—The City Council is asked to grant a franchise for an electric railway in West Palm Beach. This is part of a plan to build an electric line between West Palm Beach and Lake Worth. A company will be organized immediately upon the granting of the franchise. No names are yet given of those interested in the project.

Central City, Ky.—The Central City, Greenville & Drakesboro Railway has received a franchise from the Council on Broad Street in Central City. [E. R. J., Jan. 31, '14.]

Hagerstown, Md.—Henry A. Bester, Jr., representing the Washington County Traction Company, Hagerstown, has asked the Council for a forty-year franchise over East Washington Street in Hagerstown. This is part of a plan to build an electric line from Hagerstown to Security and eventually to Leitersburg, Chewsville, Cavetown and Smithsburg. The Washington County Commissioners have granted a franchise over the county road from Hagerstown to Security. [E. R. J., Jan. 17, '14.]

Springfield, Mass.—The Springfield Street Railway has asked the Council for a franchise for a relocation and double-tracking of its line on the south side of the state highway from a point near Lee's Crossing to the West Springfield town line.

***Newton, N. C.**—The Eastern Carolina Fair Association Company, Newton, has asked the Council for a franchise to build a 3-mile electric line from some point near the center of Newton to the fair grounds.

Brantford, Ont.—The Grand Valley Railway has asked the Council for an extension of time on its franchise in Brantford.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise on Halsey Street in Portland.

***Memphis, Tenn.**—H. D. Brennan, Memphis, who represents a syndicate which owns a subdivision near Memphis, has asked the City Commissioners for a franchise for an electric line ¼ mile long in Memphis. A similar request will be made to the County Commissioners, as part of the proposed line is outside the city limits. This line will not be operated by the Memphis Street Railway. It will run from the intersection of Lamar Avenue and Castalia Street to the subdivision.

Nashville, Tenn.—The Nashville Traction Company has asked the Council for a franchise in Nashville. W. O. Parmer, Nashville, president. [E. R. J., Feb. 7, '14.]

Richmond, Va.—The Virginia Railway & Power Company has received a franchise to build its tracks on the north and the south approaches to Mayo's Bridge to connect with the bridge tracks.

TRACK AND ROADWAY

Birmingham (Ala.) Interurban Railway.—Preliminary surveys are being made for an electric line between Birmingham and Hale Springs, a distance of 9 miles. This is part of a plan to build a 14-mile line to connect Birmingham, Hale Springs and the coal mines. Daniel P. Hale, Birmingham, is interested. [E. R. J., Jan. 17, '14.]

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Improvements and extensions entailing an expenditure of $1,148,000 for the year 1914 were recently ratified by the executive committee of the board of directors of this company. Among the extensions planned will be a line from Vinemont to Fairfield, one from Boyles to Dolomite, and the double-tracking of some of the present lines.

Birmingham-Tuscaloosa Railway & Utilities Company, Birmingham, Ala.—The 45-mile line between Bessemer and Tuscaloosa will be built by this company during the year.

Calgary Street Railway, Calgary, Alta.—It is planned to build 10 miles of new track in Calgary during the year.

Edmonton (Alta.) Radial Railway.—The reconstruction of 7½ miles of track in Edmonton is contemplated by this company during 1914.

Geary Street Municipal Railway, San Francisco, Cal.—Citizens of the Sunset District have asked the Board of Supervisors that this company's Tenth Avenue line be extended across Golden Gate Park into Sunset District to Kirkham Street and thence westerly to Forty-fifth Avenue and southerly along the Ocean Boulevard in San Francisco.

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company, which plans to begin work soon on the 12½-mile section of its line from Dixon south to a connection with the Oakland, Antioch & Eastern Railroad, at a recent meeting of the directors elected George W. Pierce president. [E. R. J., Jan. 17, '14.]

Georgia Railway & Power Company, Atlanta, Ga.—Plans are being contemplated for an extension of the Peachtree Road line via the Capital City Country Club, at Brookhaven, to the grounds of Oglethorpe University on Peachtree Road.

Waycross Street & Suburban Railway, Waycross, Ga.—Plans are being made to begin work in the spring on the extension to Gilchrist Park and Hebardville.

Chicago (Ill.) Surface Lines.—This company contemplates the construction of 20 miles of new track in the territory served by the Chicago Railways Company during 1914. This work includes extensions to existing lines and some new cross-town lines varying in length up to 2½ miles.

Southern Illinois Railway & Power Company, Chicago, Ill.—Work will be begun on April 1 by this company on the extension from Harrisburg to Marion, Whiteash, New Virginia, Johnston City, West Frankfort, Benton and Herrin. Afterward a line will be built from Herrin to East St. Louis, via Carterville, Carbondale and Murphysboro.

East St. Louis & Suburban Railway, East St. Louis, Ill.—About 1 mile of new track will be built in East St. Louis during 1914.

Southern Traction Company of Illinois, East St. Louis, Ill.—Work will be resumed at once by this company on the line between East St. Louis and Belleville.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is asked to consider plans to extend the Salisbury Street line to the Grand View Cemetery north of the corporate limits of Lafayette.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Material is being ordered by this company for its 15-mile line from Kansas City to Bonner Springs. It is planned to extend this line to Linwood during the coming summer, a distance of 9 miles. J. D. Waters, Bonner Springs, president. [E. R. J., Jan. 24, '14.]

Independence, Neodesha & Topeka Traction Company, Independence, Kan.—Altoona, Kan., will shortly hold a special election for the purpose of voting on an issue of $15,000 worth of bonds for the city and $12,000 in addition for the township, the proceeds to be turned over to the Independence, Neodesha & Topeka Traction Company in exchange for an equal amount of stock in that company, provided that the railway from Neodesha to Altoona is in operation by July 1, 1916. [E. R. J., Jan. 24, '14.]

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next six weeks this company will award contracts to build 10 miles of new track. Work will shortly be resumed on the line from Eureka Lake to Fort Riley.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Plans are being made by this company to build a line south from Joplin to Neosho and a connecting line will be built to the lines radiating from Parsons. This extension would best be made by the construction of a line from Cherokee to Parsons.

Topeka (Kan.) Street Railway.—This company will complete the Gage Park extension, on West Eighth Street, in Topeka, during the coming spring. About 1 mile of the work is yet to be done. The South Topeka line also will be extended from Eighteenth Street to Twenty-first Street on Kansas Avenue. The erection of poles and wires and other overhead work will be done during the coming summer, while the track-laying will wait until 1915.

Central City, Greenville & Drakesboro Railway, Central City, Ky.—This company, the incorporation of which is noted elsewhere in this issue, has completed surveys on the section of its proposed line between Central City and Greenville and will begin construction in the spring. It will purchase power from a plant in Central City and will soon build a new water plant on the Green River. James Small, Central City, is interested. [E. R. J., Jan. 31, '14.]

***Shelbyville, Ky.**—Eugene Cowles, Shelbyville, is chairman of a committee of the Business Men's Association which is securing data relative to the construction of an electric line between Shelbyville and Mount Eden.

Texas-Louisiana Traction Company, Shreveport, La.—Plans are being considered by this company to build a line from Mansfield northward to Vivian via Shreveport, Blanchard, Oil City and Mooringsport. Ultimately this line will be extended to Longview. A. B. Blevins, Jefferson, president. [E. R. J., June 28, '13.]

***Boston, Mass.**—Bids will be received until Feb. 17 by the Boston Transit Company (B. Leighton Beal, secretary) to build Section H of the East Boston Tunnel extension, situated in and near Court Street and Cambridge Street, extending from Stoddard Street to Staniford Street and including the Bowdoin Square station in Boston.

Detroit (Mich.) United Railway.—An extension of the Fourteenth Avenue line in Detroit is being contemplated by this company.

Hattiesburg (Miss.) Traction Company.—It is planned to construct about 2 miles of new track in Hattiesburg during the year.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—Plans are being contemplated by this company to extend the Savannah interurban line to Marysville and Tarkio via Fillmore.

Metropolitan Street Railway, Kansas City, Mo.—Plans are being prepared for an extension to the new Union Station in Kansas City.

St. John (N. B.) Street Railway.—It has been decided to extend this company's lines from the present terminus through East St. John to Little River early in the summer. Later the line will be extended to the city of Coldbrook.

New York State Railways, Rochester, N. Y.—Plans are being considered to double-track the Dudley-East Genesee branch on Euclid Avenue from College Place to Westcott Street in Syracuse.

Durham (N. C.) Traction Company.—This company plans to improve and extend its lines in Durham.

Cleveland, Alliance & Mahoning Valley Railway, Cleveland, Ohio.—It has been announced that this company will extend its line from Ravenna to a point 2½ miles northwest of Hudson, where it will connect with the Cleveland-Akron line of the Northern Ohio Traction & Light Company. It is also intended to extend the company's line from Newton Falls east to Warren. Work on these extensions will soon be begun. [E. R. J., Jan. 3, '14.]

Bartlesville (Okla.) Interurban Railway.—Work will be begun on a belt line of 2.4 miles in Bartlesville about April 1. It will connect at Fourth Street with the main line which extends to Dewey.

Berlin & Waterloo Street Railway, Berlin, Ont.—It is planned to construct 2 miles of new track during 1914.

Temiskaming & Northern Ontario Railway, Toronto, Ont.—Plans are being made to electrify this company's line. Surveys have been completed for the divergence of the route in order to overcome the main curves in the line from North Bay to the northern terminus at Cochrane.

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—About 22 miles of new track will be constructed by this company during 1914.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—About 3 miles of new track will be built by this company during the year.

South Fork-Portage Railway, Johnstown, Pa.—During the next six weeks this company will award contracts to build 7.5 miles of new track with 70-lb. rails. This track will be laid upon roadbed built during 1913.

Montreal & Southern Counties Railway, Montreal, Que.—The 15-mile line between Abbotsford and Granby will be constructed by this company during the year.

Regina (Sask.) Municipal Railway.—It is planned to build 8 miles of new track in the city of Regina during the year.

Northwestern Electric Railway, Easley, S. C.—Preliminary arrangements are being made by this company to build its 150-mile railway to connect Easley, Augusta, Anderson, Abbeville, McCormick and Edgefield. James E. Leach, Easley, is interested. [E. R. J., Jan. 17, '14.]

Clarksville & Dunbar Cave Railway, Clarksville, Tenn.—During the year it is planned to build 4 miles of new track in Clarksville.

Jackson Railway & Light Company, Jackson, Tenn.—Material is being purchased by this company to build its 2-mile extension in Jackson in the spring. Rails have been bought, but copper wire, cement, crushed stone, etc., are yet to be contracted for. This company has increased its capitalization from $600,000 to $700,000.

Dallas Consolidated Electric Street Railway, Dallas, Tex.—Work has been begun double-tracking the Knox Street line in Dallas. An extension will soon be built on Abbott Street. About $600,000 will be spent by the company during the year on improvements and extensions of its lines.

Texas Traction Company, Dallas, Tex.—Plans are being considered for an extension from Mansfield to Vivian via Shreveport, Blanchard, Oil City and Mooringsport.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Preliminary arrangements are being made by this company for its 35-mile line to connect Fort Worth and Denton via Keller and Roanoke. William Capps, Fort Worth, is interested. [E. R. J., Jan. 10, '14.]

Northern Texas Traction Company, Fort Worth, Tex.—It is planned to double-track this company's 32-mile line between Dallas and Fort Worth.

Marshall (Tex.) Traction Company.—During the next few weeks this company will award contracts to build an 1800-ft. extension in Marshall.

Ogden (Utah) Rapid Transit Company.—Surveys have been completed and work will be begun as soon as the weather permits on the extension to Logan and Preston Ida.

Petersburg & Columbia Springs Railway, Petersburg, W. Va.—Preliminary arrangements are being made by this company to build its 120-mile line from Petersburg to Franklin via Pendelton and Pocahontas. It will connect with the Chesapeake & Ohio Railway. John Y. Hite, Fairmont, W. Va., is interested. [E. R. J., Nov. 22, '13.]

Appalachian Power Company, Bluefield, W. Va.—During the year this company plans to build about ½ mile of new track in Bluefield.

SHOPS AND BUILDINGS

Union Traction Company, Independence, Kan.—This company has built several new passenger stations on its line between Cherryvale and Parsons.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next six weeks this company will award contracts to build a new carhouse in Manhattan.

Mesaba Electric Railway, Duluth, Minn.—Plans are being made by this company to build a new carhouse in Virginia. The structure will be two stories and of brick construction. The cost of construction is estimated to be about $36,000.

Cleveland (Ohio) Railway.—Plans are being made by this company to spend $80,000 on improvements for special work and new tracks at its repair shops in Cleveland. It is also planned to spend $75,000 for new operating yards at the Harvard repair shops.

Seattle (Wash.) Municipal Railway.—The new carhouse at Third Avenue West and Nickerson Street in Seattle has been completed. It will be used to house the cars on Division A of this municipal railway.

POWER HOUSES AND SUBSTATIONS

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next six weeks this company will award contracts to build a new power house in Manhattan.

Bay State Railway, Boston, Mass.—This company has placed an order with the General Electric Company for a 2500-kw Curtis turbo-generator with a 15-kw exciter, a 1500-kw rotary converter and switchboard.

Omaha & Lincoln Railway & Light Company, Omaha, Neb.—This company has bought 112 transformers ranging from 1 kva to 165 kva, panels, switches, etc., from the General Electric Company.

Richmond Light & Railroad Company, New York, N. Y.—A new 1000-kw rotary converter, two 525-kva transformers and a starting panel will soon be installed by this company at its substation at Livingston, Staten Island. The equipment will be built and installed by the General Electric Company.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—A new 1500-kw Curtis turbo-generator will soon be installed by this company in its power house in Portsmouth. The order has been placed with the General Electric Company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company is installing a new converter station at St. Catharines, Ont., to be equipped with two Canadian General Electric 500-kw converters and the necessary appliances. This station when completed will cost about $35,000.

Charleston-Isle of Palms Traction Company, Charleston, S. C.—This company will install substation equipment consisting of two 300-kw rotary converters, one 150-kva and six 100-kva transformers, switchboard and accessories. This apparatus has been ordered from the General Electric Company.

Jackson Railway & Light Company, Jackson, Tenn.—Plans are being made by this company to improve and enlarge its power plant in Jackson, a rotary converter being among the items of equipment to be bought in the near future.

Manufactures and Supplies

ROLLING STOCK

Indiana Utilities Company, Angola, Ind., expects to purchase one car.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., expects to purchase three cars within the next six weeks.

Slate Belt Electric Street Railway, Pen Argyl, Pa., has ordered two pay-as-you-enter cars from The J. G. Brill Company.

Portland, Eugene & Eastern Railway, Portland, Ore., expects to purchase three 55-ft. baggage, mail and express cars.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., expects to purchase one new single-truck or double-truck interurban car.

Kansas City & Western Railway, Kansas City, Kan., has ordered four center-entrance, single-end cars from the Cincinnati Car Company.

Twin City Rapid Transit Company, Minneapolis, Minn., expects to build in its own shops eighty-six closed passenger cars and six work cars.

Chicago, Milwaukee & St. Paul Railway, Chicago, Ill., will order twelve 200-ton electric locomotives for freight service on the Three Forks-Deer Lodge line.

Manhattan City & Interurban Railway, Manhattan, Kan., expects to purchase several trailers and open bench motor cars, also good single-truck closed cars—all second hand.

Conestoga Traction Company, Lancaster, Pa., has ordered two 28-ft. double-truck closed car bodies and one 33-ft. 4 in. double-truck closed car body from the Cincinnati Car Company.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., expects to purchase during 1914 three gas-electric locomotives, three gas-electric motor cars and twelve steel coaches.

Altoona & Logan Valley Electric Railway, Altoona, Pa., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 27, 1913, as being in the market for five pay-within 28-ft. closed city cars and four 32-ft. 6-in. interurban cars, has ordered these cars from The J. G. Brill Company. The city cars will be equipped with Brill 39-E trucks, the interurban cars with Brill 27 M.C.B. I trucks.

Cleveland (Ohio) Railway, which was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1913, as being in the market for fifty center-entrance cars, has requested the City Council to authorize the following expenditures: $180,000 for center-entrance car bodies, $94,000 for motor equipment, $10,000 for derrick car, $3,150 for fare boxes and $4,800 for pneumatic door openers.

Utah Light & Railway Company, Salt Lake City, Utah, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 1, 1913, as being in the market for twenty-four semi-steel closed pay-as-you-enter cars, with seating capacity of fifty-six, has ordered these cars from The J. G. Brill Company. Eighteen of these cars will be equipped with four Westinghouse 40-hp motors and six with four Westinghouse 60-hp motors for suburban service. Delivery is to be made May, 1914.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, as having ordered ten trailers from the Southern Car Company, has specified the following details for this equipment:

Seating capacity	64
Weight of car body	37,000 lb.
Bolster centers, length,	40 ft. 6 in.
Length of body	51 ft. 3 in.
Length over all	63 ft. 8 in.
Width over all	9 ft. 7¼ in.
Body	steel
Interior trim,	oak and mahogany
Headlining	Agasote
Roof	arch
Underframe	steel
Air brakes	West.
Car trimmings	Wallace Supply Co.
Curtain fixtures,	Cur. Sup. Co.
Curtain material	Pantasote
Hand brakes	Peacock
Journal boxes	railway std.
Paint	Pullman std.
Sash fixtures	Edwards
Seats	Hey. Bros. & Wake.
Seating material	plush
Step treads	Blake steps
Trucks	Baldwin
Varnish	Chicago Varn. Co.
Wheels	railway std.

TRADE NOTES

T. H. Symington Company, Baltimore, Md., has transferred A. H. Weston, for many years mechanical engineer of this company, and stationed for the past two years at Rochester, N. Y., to its sales department, 30 Church Street, New York, N. Y.

Lackawanna Steel Company, Lackawanna, N. Y., has issued Bulletin No. 106, describing and illustrating various applications of its sheet steel piling. This material is designed primarily for use: (1) in temporary construction work where water, earth or other material is to be retained, as in cofferdams, open caissons, retaining walls, foundations of bridges, buildings, etc.; (2) in permanent constructions requiring resistance to water and to the elements and needing great strength to resist pressure from surrounding or superimposed material or both, as in permanent retaining walls, shaft linings, dams, curtain walls, core walls, docks, sea walls, bulkheads, locks, irrigation and reclamation work, levees, sumps, pits, pump wells and the like. There are no rivets, bolts or parts to shear off from the interlock in handling, driving or pulling.

General Electric Company, Schenectady, N. Y., has received orders for electrical equipment from the following electric railways: San Francisco-Oakland Terminal Railways, eleven GE-201 60-hp, four-motor car equipments and air brake equipments with CP-27 compressors; Bay State Railway, seven GE-201 60-hp, four-motor equipments with MK control and straight air brake equipments with CP-27 compressors; Mesaba Railway, six GE-201 60-hp, four-motor car equipments; Chicago & West Towns Railway, seventeen GE-203 50-hp, complete four-motor and ten two-motor car equipments and four trail car control equipments; Cumberland County Power & Light Company, ten GE-201 60-hp, four-motor car equipments and ten straight air brake equipments with CP-27 compressors; Twin City Rapid Transit Company, 100 four-motor equipments, type GE-200, 40-hp, 100 straight air brake equipments with CP-25 compressors, and five GE-73 75-hp, complete four-motor equipments; Chicago City Railway, 100 two-motor car equipments, type GE-242, 60-hp, 100 straight air brake equipments with CP-27 compressors.

ADVERTISING LITERATURE

Stevenson Company, Pittsburgh, Pa., has issued a catalog on the subject of its various metal parts of molded insulation, which are high heat-resisting, non-hygroscopic, impervious to oils, moisture and most chemicals.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued folders describing its No. 896 compact magneto, magneto desk and combination telephones, also new corrected price sheets on its telephone construction, material and supplies.

Curtis Pneumatic Machinery Company, St. Louis, Mo., has issued a comprehensive 80-page catalog on the subject of its air compressors, air hoists, air cranes, pneumatic and hydro-pneumatic elevators, trolleys, trolley systems and sand blasts. The catalog is well illustrated with diagrams showing the details and special features of each apparatus and with photographs showing installations of machinery in actual practice in various plants.

Plank Flexible Shaft Machine Company, Grand Rapids, Mich., has issued a catalog describing and illustrating its portable flexible shaft outfits and shafting for motor-driven rail grinders and drillers and other purposes. The units in the shaft are drop-forged out of chrome-vanadium steel, which are accurately machined and case-hardened. The units are connected to each other in the form of a tenon and mortise, which eliminates the use of all rivets, pins, retainer rings and all complicated connections. A given amount of longitudinal travel is allowed between each unit, which takes care of the various curvatures of the shaft from time to time. The tenon and mortise interlock idea allows the mortise and tenon portions of the unit to retain the greatest strength of the material at the point of leverage.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued catalog section DS 843, describing and illustrating its line of catenary material for high-tension single-phase a.c. systems and for d.c. systems of 500 volts or over, the important features of which are high insulation and smooth underrun. The following catenary materials and subjects are described: spacing of pole hangers, deflection angle and middle ordinate, messenger insulators, steady strains, hangers, clamps, crossings and section insulators.

"Light, Railway and Tramway Journal," London, England, has issued its diary for 1914, which contains besides the usual diary and advertising features articles on topics such as the following: "The Heat Treatment of Leaf Springs," "Extinguishing Fires in Oils and Volatile Liquids," "Digests and Analysis of Legislation Governing Railless Traction and Trolley Buses," "Electrolytic Corrosion of Iron in Soils" and "Standard Involute Gearing." There is also included a table of car-repair costs for thirty-one tramway systems. At the front of the diary there is placed an alphabetical index to specific articles giving the names of the makers or vendors of numerous patented and other articles used in the traction field but not known by the actual titles of the makers or vendors. The back of the book contains an extended directory section giving details of the personnel of British electric and steam lines and electric-lighting plants and other useful information.

Industrial Works, Bay City, Mich., have issued Book No. 103, a large and attractive catalog, describing and illustrating their locomotive cranes for construction, industrial and railroad purposes, with various accessories such as clamshell buckets, lifting magnets, special cars, booms and attachments. The catalog contains a sketch of the forty years' development of these products, in keeping pace with the remarkable progress of railroad and industrial engineering. Interesting and self-explanatory photographs show locomotive cranes in actual operation on various electric railways, including the Detroit United Railway, United Railroads of San Francisco and Boston Elevated Railway, where they are used for assisting the work of concrete mixing, handling ties, rails, crossovers, poles, etc., and for wrecking service. The cranes are also used by the British Columbia Electric Railway, Oregon Electric Railway, Pacific Electric Railway and Portland Railway, Light & Power Company.

NEW PUBLICATIONS

Annuaire pour l'An 1914. Written in French and published by Le Bureau des Longitudes, Paris, France. 1914. 502 pages. Price, 30 cents.

The 1914 edition of this technical almanac has been brought entirely up to date in regard to all tables relating to physics and chemistry. With reference to electrical information the various units of electricity are defined, and tables are included showing specific inductive power of various solids, liquids and gases, electromotive force in volts of standard batteries, electrical resistance of elements and alloys and specific conductivity of solutions of certain electrolytes. The book is comprehensive as a whole and contains tabular information which is invaluable to the technician, the physician and the mathematician.

Annuaire de l'Electricité. Published by *La Lumière Electrique*, Paris, France. 1914. 440 pages, bound in cardboard. Price, exclusive of mailing, 80 cents.

The publishers announce that in response to numerous demands they have brought out a book which will give in handy form all important information on the electrical developments of France. The first part, which is devoted to the distribution of energy for lighting and power, gives the names of all plants, the management, the capacity, type of current and charges per kw-hour. Another list gives, according to geographical location, all the electric railways, showing their length and type of distribution. The third chapter gives a list of all electrical organizations of the country under the headings of construction, traction, exploitation and manufacturing, noting the date of establishment, the capital, the headquarters and the names of the executive officers. A particularly valuable chapter is the résumé of laws affecting electrical service. Other chapters contain a list of all electrotechnical schools, of the electrical press and of miscellaneous electrical industries. On the whole, this work is one which should be in the hands of every one who desires commercial or technical knowledge of electric lighting, railway and power conditions in France.

Electric Railway Journal

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THE CLASP BRAKE VERSUS A NEW BRASS

The two communications published last week regarding our suggestion for a new design of journal brass lay considerable stress upon the value of the clasp brake as a remedy for journals rolling out from under their brasses. In fact, L. R. Pomeroy, in his letter, takes direct issue with us on the ground that it is more logical to use the clasp brake than a new brass, and his extended experience with railroad problems from the practical viewpoint as well as from that of the consulting engineer certainly gives weight to his opinion. It will be noticed that neither correspondent claims that with the ordinary style of brake, or that pressing on one side of the wheel only, the proposed form of brass is not greatly superior to that now standard. We admit that with the use of the clasp brake the necessity for the change from the M. C. B. brass largely disappears. But many existing electric cars are equipped with the older style of brake and cannot easily be changed over, and even for new cars the increased cost of foundation brake rigging is about $400. For those who wish to go to this additional expense for the other advantages possessed by the clasp brake, its adoption is undoubtedly advisable. But the cost of introducing new brasses and wedges is within reach of every one, and in the case of new equipment the additional expense would involve an increased cost only for the slightly greater weight of brass, amounting to a dollar or two. There is no doubt of the efficacy of the semicircular brass in eliminating shifting journals. Can it be neglected on purely scientific grounds? Apparently our other correspondent, F. M. Brinckerhoff, does not think so, and as he is one of the few engineers who have had extended experience with the semicircular brass, he has had ample opportunity to judge its weak points. In consequence, we feel safe in adhering to our original proposal that, for high-speed service, the M.C.B. brass should be discarded in favor of some more suitable design.

ELECTRIC RAILWAY PARKS

There seems to be a renewed interest in the conduct of parks by electric railway companies, and the opinions now held of the benefit which can be obtained from them are more rational than at any time in the past. Some fifteen years ago an exaggerated idea was general in regard to their value. Undoubtedly they did cause a great deal of additional traffic, and because of this many railway companies spent large sums in developing parks of the "White City" order and in other expensive projects. Later there was a revulsion when the managers realized that this traffic was for three months only whereas the interest on the investment in the parks ran during the entire year, that the park was usually near the end of a fare zone so that every passenger was a long rider and that the cost of maintaining the attractions was considerable. However, many parks had then been established and it became practically a business necessity to maintain them. During recent years the sentiment has been turning again more in favor of parks. This is particularly the case where the parks are favorably situated as regards fare zones; that is to say, where they are well within the 5-cent limit, or where a double fare or more can be charged. It has been found that simple attractions draw practically as well as the more elaborate and expensive ones. The development of the moving-picture machine has assisted in this direction. Moreover, many companies have paid more attention to developing parks which would appeal to women and children and so would provide a daylight load on the cars as well as an evening load. Finally, most companies have come to realize that the park itself can rarely be made a money maker. If the income derived directly from it is sufficient to pay the carrying charges or most of them, that is all that can be expected. The profit lies in the receipts from transportation to and from the park. In view of the renewed interest in the subject, we are publishing in this issue an account of a very successful electric railway park and will publish a few other park articles during the next month or so, as this is the time when plans for park operation during the coming year are formulated.

THE VALUE OF ASSOCIATION DATA SHEETS

Now that the committees of the American Eelctric Railway Association and affiliated bodies have completed their organization work and prepared their plans for the coming convention, the open season for the data sheet has definitely begun. We know that the average electric railway man is so busy that, despite his most earnest desire, he cannot always answer the questions on these sheets so fully as he desires. The result is that the answers are sometimes too brief to enable the committees to appreciate the reasons which prompt the member company to favor or dislike certain practices. This drawback, perhaps, is one that can never be fully cured, but for all that we believe that the data sheet has other possibilities for good than that represented by the collection and classification of diverse policies. This special value lies in the fact that the usual data sheet covers questions on matters which may not have been thought of by the recipient. Thus, in the case of an engineering data sheet like that of the equipment committee, the very reading of the questions may be of value to the company which is asked to answer them. For example, many railways are very uncertain about where they should place the lightning protection equipment and what kind they should use. Questions on this subject naturally will tend to awaken their interest in a class of equipment which, possibly, was never properly installed at all or else has been forgotten since the day that it was put in. Furthermore, other subjects which the committees take up may be far in advance of general practice. Thus, the use of specifications for rubber-covered wire is one that has been considered by few railways. The very discussion of this matter has already prompted a number of companies to give it attention, with the result that wire which otherwise would be accepted without question is now carefully scrutinized and sometimes rejected. Again, the subject of air-brake hose specifications for electric railways is also a new one, but there is no doubt that the member companies will value the importance of this equipment item more than they did before it was broached for investigation. In short, the data sheet carries within itself many good hints that should induce the railway to search its own conscience that it may attain to higher ideals in equipment and operation.

COST OF PROGRESS AN OPERATING CHARGE

More than once it has been claimed that "technical and legal subtleties" have been the predominating feature of the United States Supreme Court decisions, and at first glance it seems that the recent decision of this court in the Kansas City Southern case regarding the proper accounting treatment of abandoned property is no exception to this charge. A careful study of the decision, however, shows that it is based on accounting regulations that recommend themselves by their definiteness and clearness to the scientific accounting student and practitioner.

The case arose in the following manner: The Kansas City Southern Railroad, desiring on account of increased traffic and competition to enlarge its capacity by lowering its gradient, accomplished this in six particular cases by diversion and realignment of its tracks. It then desired to capitalize the entire cost, about $600,000, of these improvements. The Interstate Commerce Commission, however, decided that the company could not carry into its property account the full cost but must first deduct the estimated replacement cost, about $400,000, of the portions of track no longer used, the difference of approximately $200,000 being carried to the property account and the estimated replacement cost of the old track being charged to operating expenses for the year.

In sustaining the commission the United States Supreme Court has drawn a clear-cut line of demarcation between the treatment of additions and betterments to the original track, the abandonment of original track accompanied by no replacement, and the abandonment of original track accompanied by the construction of new track off the original line. In regard to the first point, the court states that the full cost of improvements and grade revisions on the original right-of-way should be capitalized as a part of the cost of property in the additions and betterments account. The reasons for this accounting are too evident to be discussed.

On the other hand, when property is abandoned and not replaced, its original cost should be credited to the appropriate property account and charged less salvage to the profit and loss account, to which should also be charged the cost of the abandonment. The accounting theory underlying such treatment is this: When a railroad abandons part of its track without constructing a substitute to serve the same territory, the abandoned section ceases to be an earning instrumentality. The stockholders can no longer derive any profit from it; only past operations are benefited by it. The results of these operations, as far as they have not already been distributed to the stockholders, are contained in the profit and loss account. This account, therefore, is properly chargeable with the cost of such abandonment, unless a special depreciation reserve as a portion of profit and loss has previously been set up in anticipation of some such contingency.

Most men will agree on the treatment of the two points previously given, but in the matter of abandoned property replaced off the line they are likely to claim that the cost of the new construction should be charged to the property account and that the cost of the abandoned property should be retained in the property account or else be charged against profit and loss. The fallacy in this belief lies in treating abandoned property replaced off the line in the same manner as improvements on the line or abandoned property not replaced at all. The fact is that the improvements made off the line are virtually replacements and should be capitalized only to the extent to which they are more valuable than the abandoned property replaced. The discarding of sections of the original road is a loss or depreciation that in correct accounting should be taken out of the property account.

Such abandonment of property as we are discussing is the acme of depreciation, the result of the total inadequacy of the existing property to meet the demands of the future. For the sake of the future it is replaced with stronger and more efficient instrumentalities. The cost of abandonment, therefore, as measured by the replacement value of the abandoned property, should be included among present and future operating expenses, in order that the net earnings, in which are reflected the benefits derived from the improvements, may serve as a proper basis for the declaring of dividends to present and future stockholders. This cost, if very large, should, of course, be held for a long time as a deferred charge and written off periodically so as not unduly to burden the operating expenses of any one year.

We recognize, of course, that in so complicated a matter as the operation of steam railroads and electric railways it is difficult to divide, and more difficult consistently to apply a precise distinction between, capital and expense accounts, but this recent decision of the court makes a close approach to a scientific accuracy of delineation between them. If such regulations are adopted by public service commissions for use in electric railway accounting, there will be an effective means of preventing such a permanent inflation of the property accounts as has proved the downfall of more than one electric railway system in this country.

One critic of the decision has claimed that the replacement cost of abandoned property is "cost of progress" which should remain in the property accounts, and that replacements will come substantially to a standstill if the cost of abandoned property must be met out of present and future earnings. A vast number of improvements must be made within a short time by electric railways, but that fact is not a valid argument against the adoption of this method of accounting. If depreciation reserves are set up, the charge to future earnings will be considerably reduced when replacements do become necessary, and, furthermore, the placing of the excess charge for replacements against future earnings is really a benefit to transportation lines. We say a benefit, for it prevents a piling up of depleted assets and it affords an excellent means for silencing the public demand for lower rates. What more incongruous picture can be found than this: The public crying for vast terminal and ~~service~~ improvements and decreased fares and the courts deciding that the excess cost of such improvements must be met out of present and future earnings? The sooner the public is made to realize the cause-and-effect relation existing between these items the sooner there will come not a suspension of progress but a more legitimate and deliberative demand for it.

THE IMPORTATION OF RAILWAY OFFICIALS

The action of the Great Eastern Railway in seeking and finding a new manager in this country has roused the British public, at least, to a realization of conditions in public utility administration in that country. There are precedents for this appointment, however, notably that of Albert H. Stanley, who seven years ago was made general manager of the London Underground Electric Railways and is now managing director of the vast system of surface and underground railways and bus lines in London under the control of that company. It is true that Mr. Stanley is of English birth, but his railway experience was obtained entirely in this country, and the results accomplished under his management have more than justified his appointment.

Lord Hamilton explains his selection of an American for the Great Eastern Railway in the present instance on the ground that, while there were probably men enough in England fully capable of coping with the serious operating problems of that road, he had no means of knowing who they were. The English newspapers look at the matter in a different way. They call attention to the hampering effect of the social system under which incompetent men are promoted to responsible positions more on account of their family names than of what they can do. Probably more important still is the practice of promotion on basis of length of service rather than on achievement. The mere fact that a man may occupy a position for a long period does not qualify him for advancement unless during this period he is definitely training for it. A higher position is usually a recognition of progress already made. We understand that tradition has saddled this habit on the British railway companies. At any rate, something is wrong with an organization when it is not developing men to fill all of the higher positions through a system of natural selection. No other plan is a safe one.

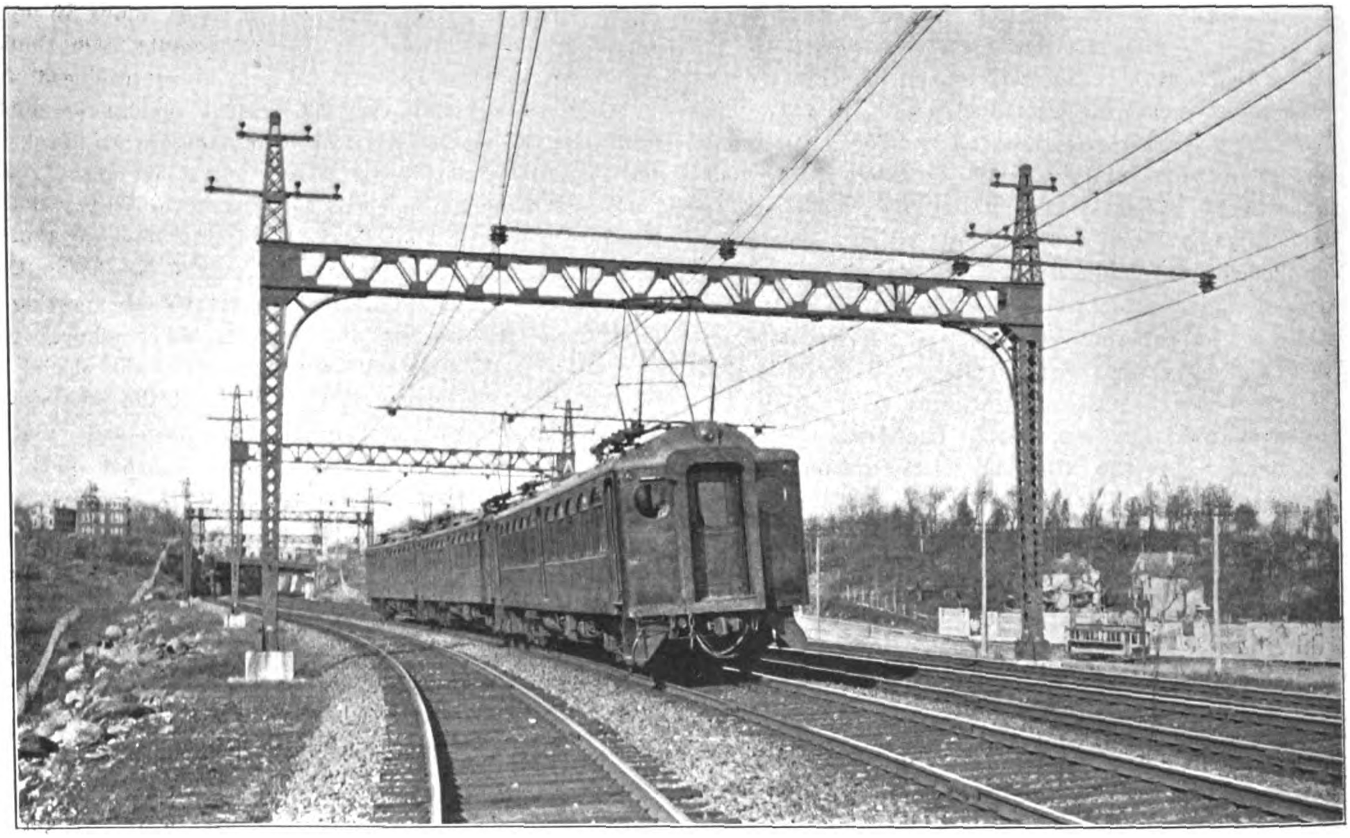
At the moment we have the laugh on our British brethren, but our sense of exultation may be less when we stop and seriously consider to what extent the strictures directed against the British roads apply to our own electric railways. It is undoubtedly true that American electric railway methods have produced a number of pre-eminently successful managers, but what steps are being taken to train younger men to take positions of responsibility when their turn comes? Is there not often too much of a tendency to assume that the best men will come to the top if the whole organization is allowed to take care of itself? Lord Hamilton acknowledged that he had no means of knowing anything of the progress of the men in his company. It is a fair question to ask how much more the officials of our own large companies know about the progress and ability of the men in their employ and what steps they are taking to encourage young men of the right kind to engage in the service. In this connection we might add that it was only two weeks ago that we had occasion to comment editorially upon the apathy with which the apprenticeship system is regarded on most electric railway properties. Considerable interest was expressed several years ago in the apprentice system for young men who are anxious to enter the transportation and engineering department of electric railway companies, and the British episode attracts attention again to the necessity of such a plan.

What is needed is a system of training for the younger men and systematic promotion for all so that there is always a well-prepared, efficient man who is ready to step into any vacancy but is kept alert and satisfied by the "future" in his present position. Every time that a man "higher up" is selected from outside an organization it is a reflection upon the system of selecting men for positions of lower rank and of training them for promotion. It is also a damper upon the ambition and a strain upon the loyalty of the whole force. We are proud that Mr. Thornton was selected for his important task, and we hope that his colleagues in the Great Eastern Railway will co-operate with him in giving the improved service to which the patrons of the road are entitled, in spite of the humiliating circumstances which led to his selection. It is also quite possible that the incident, attracting attention so widely as it has at home and abroad, may assist in the development of a more efficient merit-promotion system in this country.

Maintenance of the Electrical Equipment of the New York, Westchester & Boston Railway

This Article Is a Sequel to One Which Was Published in the Issue of Jan. 31 and Covers the Early Difficulties with the Single-Phase Electrical Equipment of the Cars on This Line, Together with the Means Taken to Overcome Them—A Curve Showing the Total Cost of Maintenance Is Included

In the ELECTRIC RAILWAY JOURNAL for Jan. 31 an account was published of the early difficulties that were experienced with the single-phase car equipment of the New York, Westchester & Boston Railway, together with the means taken to overcome them. The previous article, however, dealt only with the mechanical features of apparatus, such as pantographs, air brakes, trucks and running gear, car bodies and interior fittings, and in the following paragraphs the experiences with the strictly electrical equipment are taken up in detail.


Westchester Equipment—Typical Three-Car Train

TRANSFORMERS

The main transformer, which is placed under the car and which supplies current not only for the motors but also for all the auxiliaries, such as heaters, motor-generator set, lighting, etc., originally gave some trouble, much of which was difficult to trace to its origin. This has, however, been entirely overcome during the last year. A number of cases of burnt-out transformers occurred on account of moisture which entered on rainy days with the air from the forced-draft fan, thus injuring the insulation and grounding the coils. The trouble has been eliminated by putting baffle-plates between the blower and the transformer, with an opening at the bottom of the casing so that the water can be drained out. A distinctly unusual condition was found with these transformers when they were first put in service, namely, that they were running too cool. In order to overcome this the speed of the blower was reduced from 1800 r.p.m. to 1300 r.p.m., thus reducing the supply of cooling air very materially. In addition, the decreased velocity of the air entering the blower eliminated the tendency to draw in with the air the drip from the sides of the car, the intake to the blower being made through louvers in the car side and through ducts to the fan. As the opening in the duct between the blower and the transformer was reduced one-half by the presence of the baffle-plate, the final effect of both changes was to reduce the amount of air passing through the transformer about 60 per cent. Consequently the coils were kept at a higher temperature, and such moisture as was deposited on wet days was quickly evaporated and did not rot the insulation. Since these changes have been made no failures of transformers have occurred.

CABLES

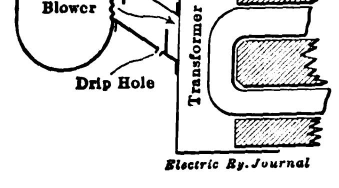
One of the interesting features about the early operation of the cars was that the cables running between the switch group and the transformer were found to develop short-circuits through mechanical damage to the insulation. The cables were about 2 ft. long and were stretched reasonably tight, the only place where they could ground being on the frame of the car immediately above them. They could not be placed in conduit on account of the heating, and it was finally found that the damage to insulation and short-circuiting was caused by the repulsive effect of the alternating current between the various pairs of leads whenever they were used. As soon as this was determined as the cause of the short-circuits the cables were tied firmly in place with heavy rope and thus were prevented from vibrating when the current was turned on them.

Another feature which was impressed upon the management during the early days of operation was that on account of the low voltage of the motors, 322, all connections on the low-tension side of the transformers needed to have especially careful attention. Because the voltage was lower than that which was customary on the ordinary direct-current railways, it was found that the workmen had no conception of the amount of current which had to be handled, and in consequence they displayed a distinct tendency toward making all connections much too light. This difficulty has, of course, been gradually overcome as the electrical repairmen have become familiar with the alternating-current system.

Another unusual feature was found in the fact that, with the alternating current, surges took place, and that the current on bare connections would sometimes jump even at voltages as low as 650, the approximate voltage used for the heater circuit. In consequence, in all a.c. wiring particular care had to be given to the insulation. The recurrence of surges has also required an increase in the capacity of all fuses throughout the car. The air pump has been equipped with fuses as high as 100 amp, although it is normally rated at only 50 amp. The main circuit-breakers on the high-tension side are set at 200 amp, although the normal starting current is but 65 amp.

The ground connections for the motors and for the auto-transformer are made upon the underframing of the car, and this, as originally installed, gave a considerable amount of trouble on account of the enormous currents which were handled. As the ordinary accelerating current in the low-voltage side of the transformer amounts to 2000 amp, it was found necessary to make especially careful grounds by filing the metal where the contacts were made and by bolting the contacts very securely in place. On all future cars, however, it is planned to have the ground leads from the motor returned to the auto-transformer winding. In this way the only ground necessary will be a small one sufficient to handle the 11,000-volt current on the primary side of the main transformer.

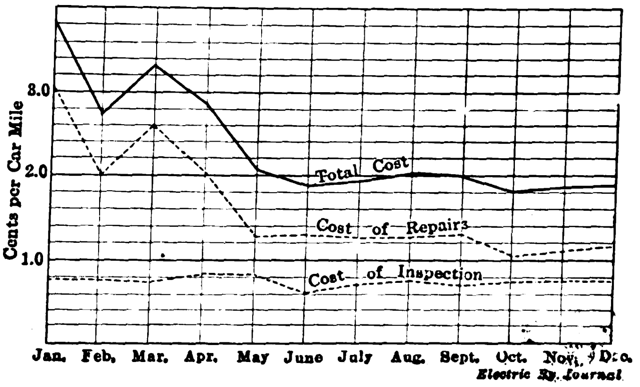
In the high-tension cables only one case of short-circuiting has occurred. This developed in the insulated cable on the roof of the car, the short-circuit jumping through the insulation to the metal conduit. In this connection it is interesting to note that on account of the high voltage used and the consequently small amount of current, a short-circuit is accompanied by practically no arc, the circuit-breakers opening almost instantaneously. Short-circuits have occurred on account of birds lighting on the roof of the car at times when the pantograph was held down by a low overhead wire at a bridge. In such cases there has been only a slight puff of smoke to indicate the short-circuit and a small hole left in the roof where the arc jumped.



Baffles in Transformer Air Duct

DIRECT-CURRENT CIRCUITS AND APPARATUS

The control system is operated by a low-voltage direct-current circuit on which is floated a storage battery operating at about 32 volts. Current for this circuit is supplied by a motor-generator set, consisting of a self-starting, single-phase induction motor mounted upon the same base with a shunt-wound generator. Connected with this battery in multiple are the emergency lights which provide interior illumination in case the power is off or in case the pantograph leaves the overhead wire.



Westchester Equipment—Total Maintenance Costs Including Repairs and Inspection

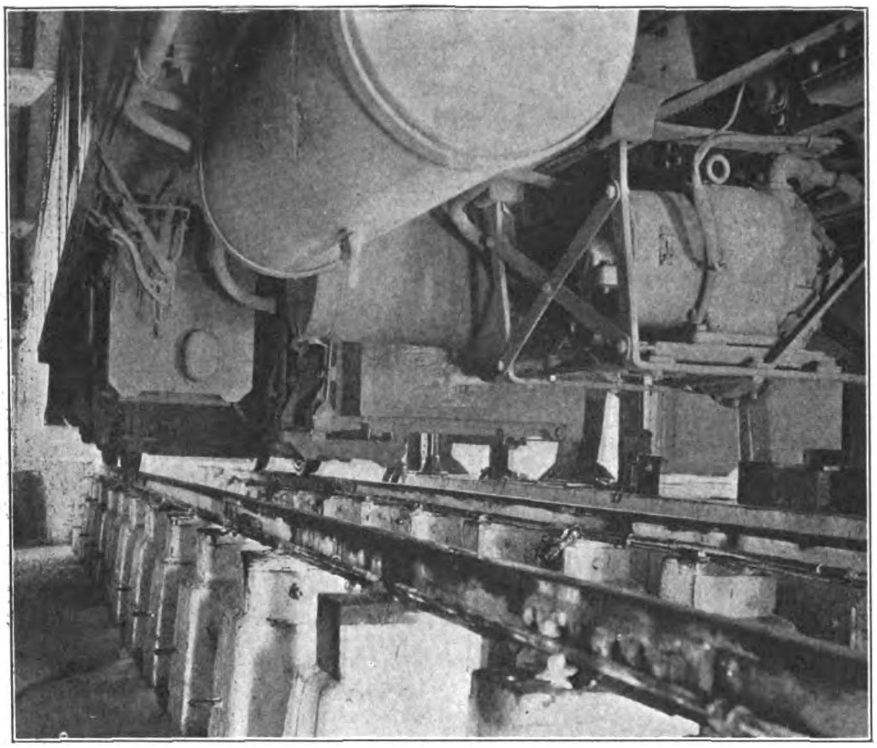
In order to provide headlights at all times, however, the headlight circuits also have been connected to the battery circuits, as the need for a headlight during the time when a car is passing a crossover is manifest. In addition to the headlight, the markers, platform lights and gage lights have been connected to this circuit. In consequence these are kept lighted at all times, regardless of whether the power is on the line or not. The emergency lights in the cars, are, however, lighted only by connections made through a back contact on a main-line relay which opens when power is off the line, so that under ordinary circumstances the emergency lights in the car are not in use. The regular lighting system is arranged with all lamps in multiple, 23-watt tungsten series having been adopted as standard after a trial of 30-watt carbon, 60-watt carbon and 25-watt tungsten lamps. Notwithstanding the fine filaments of the present lamps, little breakage and no blackening has been experienced.

It is found that batteries have to be overhauled about once a year on account of the sediment deposited from the plates, and it has been found desirable not to remove the plates, but to clean out the sediment with a hose and a long nozzle pushed down between the plates, water being supplied at city pressure. After flushing out, each cell is tested for short-circuits, this being accomplished when the charging is started by taking the voltage between adjacent plates. The battery boxes are supported on porcelain insulators to eliminate the possibility of grounds and to keep the battery boxes clean.

The motor-generator is made self-starting by a split-phase coil which is mechanically cut out after the speed has increased. In several cases this cutting-out device has failed to work and the starting coil has in consequence burned out. There has, however, been no trouble on the d.c. side of the generator, although it was found necessary to use brushes with a very low inherent resistance in order to assist the generator in building up voltage when starting. The previously mentioned line relay opens the circuit between the battery and the motor generator whenever power is off, so that it is impossible for the battery to run the generator as a motor. It also opens the switch group control circuit.

MOTORS

A singularly small amount of trouble has been experienced with the alternating-current motors. These, as above mentioned, are occasionally the cause of having a truck held for repair, but in general practically the only periodical work done upon them consists in returning and slotting the commutators at intervals of about one year, or on a mileage basis of about 50,000 miles. The core bands and armature bands have in no case given any sign of failure, and the armatures, in consequence, have not been rebanded during the eighteen months of service. The work of keeping down the mica between the commutator bars and in general maintaining the commutator in good condition is the one important feature, and the fact that this work has been very carefully followed is believed to be the cause for the really extraordinary lack of trouble with the motor equipment. Flash-overs are absolutely unknown, and no resistance leads have yet been burned out, notwithstanding the hard service to which they have been exposed through the numerous stops and starts. Field windings have never given any trouble.



Westchester Equipment—View Underneath Car, Showing Air Compressor, Casings of Blower and Transformer

Four armatures have burned out since the road started operation. Three of these failures occurred in the summer and undoubtedly were due to overwork and excessive external heat. One was due to a grounded commutator bar, which was not properly insulated on the inside from the cone support of the bar. As an illustration of the temperatures at which these motors are normally worked the following table is submitted. These figures were obtained after the six cars tested had been in service for five hours, the outside air being 24 deg. C. or 75 deg. Fahr.:

TABLE SHOWING NORMAL TEMPERATURES (CENTIGRADE) AT WHICH THE DIFFERENT PARTS ARE WORKED

Armature	Field	Commutator	Motor Shell	Transformer Core
59	57	84	39	47
60	60	84	40	46
60	55	90	39	51
70	50	85	36	50
70	60	80	36	50
60	54	72	44	51

The figure of 90 deg. shown for the commutator in the third case was due to high mica on the commutator, but the other commutator temperatures show that this is the point most affected by heat. These temperatures were taken after the previously mentioned reduction had been made in the air supply from the fan supplying the transformer, and they show that the transformers are not running warm even with the reduced blast.

In connection with the motor control the company has been renewing the contacts in the switch group during the last few months. These have been found to have a life of about one year. The fingers on the reversers were found to have been riveted too loosely, and all have been re-riveted.

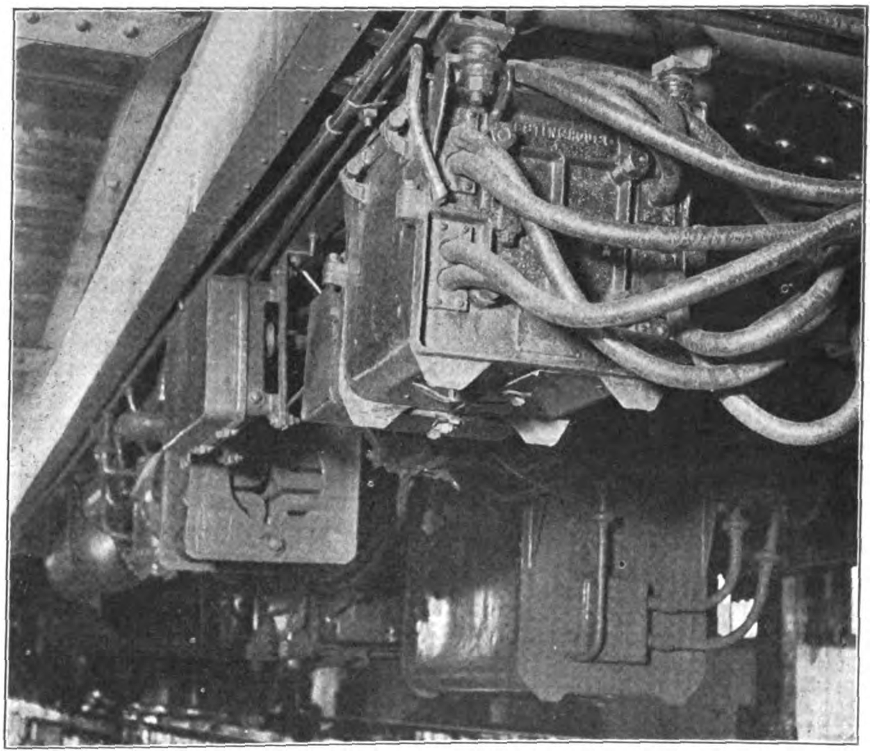
Mechanically, a certain amount of difficulty with the motors has developed on account of the vibration from the intermittent torque. It has been found necessary to heat motor pinions to a temperature of 300 deg. Fahr. with a gasoline torch and then to hammer them in place lightly with a small sledge. The temperature is obtained exactly by use of a thermometer placed between the teeth. There is no shoulder on the tapered fit of the motor shaft. As previously mentioned, flexible gears with rolled-steel, case-hardened rims are to be installed as fast as the solid gears wear out. A great deal of wear on the motor noses also has taken place. Case-hardened steel shoes have been introduced between noses and lugs on the truck transom, but these have not proved equal to the wear, and at present manganese steel shoes are being tried out. Two of the cars on the road have spring-suspended motor noses, but no definite decision has been reached regarding the adoption of this construction at the present time. It is believed, however, that spring-suspended noses will be installed on future cars. The type of spring suspension used includes a leaf spring parallel with and supported on lugs on the truck transom, and upon a block on this spring the nose of the motor is supported.

MISCELLANEOUS ELECTRICAL EQUIPMENT

The difficulties with the miscellaneous electrical equipment on the cars have, strange to say, been of a minor character. Part of this has undoubtedly been due to the fact that the motormen and other employees having to deal with the actual operation of the apparatus have had a very thorough course of instruction, and they have had impressed upon them the necessity for keeping posted on all branches of their work. When the road was first opened, the motormen, after they had received their original instructions, were examined by the superintendent of equipment, and now, after almost two years of operation, they are having another elaborate instruction course consisting of ten lessons, each lesson lasting for about two hours. When this course has been completed all motormen will have another examination, which must be passed successfully by every one who actually operates, or who may be called upon to operate, a car. In this connection it might be said that the present course of lessons is giving rise to a great deal of interest not only among the motormen but among the yardmen and interlocking tower men as well.

Among the minor changes which have been made in the electrical equipment may be mentioned the fact that an inspection cover has been installed in the casing of the motor for the transformer blower since it has been found that this motor should have regular and careful attention and therefore should be easy of access. An oil drain for the inside bearing of the blower motor shaft has also been installed in order to keep any excess oil from going into the transformer coils. Surplus oil is now drained away onto the ground.

As the main propulsion motors are connected permanently in multiple, it has been found that unless the motors are cut out the cars cannot be moved at more than about 4 m.p.h. when they are being switched around in the yard by the switch engine or by other cars. The reason for this is that the motors act as generators working against each other on a closed circuit through the two motor fields and through the rail between the two pairs of wheels. It is planned, in consequence, to install in the control system a separate pneumatic cut-out switch for each motor instead of the present arrangement of a single cut-out switch which controls both motors at the same time. Separate switches, being operated by the control system, would keep the motors separated if the reverser should fail to work on a car in a long train, a possibility which might have serious consequences. At the same time they would eliminate the necessity for yardmen going underneath the car to pull out the hand cut-out switches, as must be done at present, in case they want to move the cars around at a moderately high speed without power.



Westchester Equipment—View Underneath Car Showing Reverser and Grid Resistance at Left and Switch Groups at Right

Another interesting point which may be noted is that it was found that the copper washers installed originally between the cast-iron resistance grids became badly burned on account of holes which were punched through the copper by small arcs between grids. The obvious remedy was to remove the washers, and this was done without developing any trouble.

As previously mentioned, all of the cars are equipped with recording wattmeters. These were originally located on the rods which support the main transformers under the car, and it was found that some of the wattmeters ran as much as 60 per cent too high, none of them giving reliable results. It was finally discovered that this difficulty was caused by the magnetic influence of the transformer windings, and in consequence all wattmeters were moved inside of the car and as far as possible away from the inductive effect of the alternating current. Since this change has been made no trouble with the wattmeters has been experienced. Another peculiarity due to the magnetic action of the single-phase current was found in the blow-out coils in the switch group. Adjoining coils, it was discovered, displayed a strong attraction for each other. Whenever they actually touched they generally became welded firmly together. The difficulty was cured by inserting pieces of fiber board between adjoining coils and thus maintaining them at all times at a reasonable distance apart.

Another minor difficulty was found in occasional failures of the snap switch originally applied to cut out the electric brake, the cars being equipped with both standard air brakes and electro-pneumatically operated brakes for long-train operation. A plug switch was therefore installed instead. This, when pulled out, broke the power circuit to the electric brake and eliminated the possibility of a car in a train which was operated by air getting applications through the electric brake. It might also be remarked that the magnet coils which operate the air valves for the pneumatic switches on the main switch group are designed for a voltage of 20, the auxiliary d.c. system on the cars being charged at about 32 volts. In consequence resistance is installed in the power line to the magnet coils. It was found that the presence of this resistance in the auxiliary circuits caused occasional wrong operation of the various coils through "backing up" of current, when the doors were operated, so that the door-operating circuit was taken off this resistance and was connected direct to the terminals of the d.c. system.

In a later article to be published in this journal a complete record will be given of all maintenance costs for the equipment on this line. However, a curve published on page 395 of this issue shows the total costs of the car-equipment department including the expenditures for inspection as well as for repairs. The high figures of January and March respectively were due to the fact that costs were charged in those months which could justly have been prorated over a considerable period. These were respectively the entire cost of repairs to the four burnt-out armatures mentioned on page 396 and the entire cost of high-priced anthracite coal used for heating the shops during the winter. The average annual cost of slightly more than 2 cents per car mile applies to 70-ft. cars weighing about 60 tons and seating seventy-eight passengers.

The Illinois Traction System is now installing in its cars aisle strips of ⅛-in. linoleum edged with several strips of wood. The use of this linoleum eliminates tripping, the material is comparatively low in first cost, and it is easily kept clean. The softness of the surface is also a feature of this improvement. The wearing qualities of linoleum are so good that it should prove very durable in this service, even though the thickness selected is small.

Arbitration Decision in Indianapolis

Ruling of Indiana Public Service Commission Sitting as Arbitration Board on Wages Dispute in Case of Indianapolis Traction & Terminal Company—Open Shop and Increase in Wages Ordered—Trainmen Not Skilled Laborers

After a number of hearings, which have been reported week by week in this paper, the Public Service Commission of Indiana, which has been sitting as a voluntary board of arbitration in the matter of the grievances presented to the Indianapolis Traction & Terminal Company upon the termination of the street car strike in Indianapolis Nov. 7, 1913, handed down its decision in the case on Feb. 11. The hearings, which commenced on Dec. 4 and continued to Jan. 9, were open to the public and were held in the Senate Chamber of the State Capitol at Indianapolis. The testimony comprised about 5000 typewritten pages of evidence, with ninety exhibits and about the same number of detailed statistical sheets. The officials of the Indianapolis Traction & Terminal Company have agreed to accept the award and endeavor to carry out its provisions. A strong protest was made by the officials of the Amalgamated Association against the award of the commission, particularly in the matter of the rate of wages fixed for the three-year period and the failure to recognize the organization of the employees.

REFERENCE TO STRIKE

In deciding the points in arbitration between the Indianapolis Traction & Terminal Company and its employees the commission cited the agreement of Nov. 7, 1913, by which the street car strike was ended, as its authority for its decision. The grievances of the employees and answers of the company are then set out in full. The commission then discussed the history of the parties prior to the strike. It was shown that the Indianapolis Traction & Terminal Company had been for a number of years operating the street railway system in the city of Indianapolis by non-union labor, and that for ten years at least there appeared to have been little agitation of the union question, and that during August, 1913, non-resident labor organizers, representatives of the Amalgamated Association of Street & Electric Railway Employees of America, entered the city and attempted to organize the train service men of the electric lines. The commission then shows that the attention of the organizers was directed first to the interurban lines and states that "a premature strike of these employees in the latter part of August proved futile." The commission describes the efforts and movements of the organizers directed against the city property after the failure of the interurban strike, which moved rapidly to a culmination. It sets out the heavy demands made upon the company in the form of increased wages, shorter hours and greatly modified conditions of labor, an answer to which was demanded by noon of the following day. "Before the expiration of the time given the company to answer a call for a strike was prepared, and a strike of the employees was precipitated on Hallowe'en night—a most propitious hour. In spite of the fact that it is now manifest that the demands would have been refused, we cannot justify this hurried call of the men from their work." The commission then relates the attempts to operate cars with the regular crews, the lawlessness which prevailed in the city, and the riotous mobs dragging men from the cars and compelling them to join the union. The events leading up to the signing of the so-called "Governor's agreement" are then set out. These events were described in the ELECTRIC RAILWAY JOURNAL for Nov. 8 and 15, 1913.

LEGAL RIGHTS OF BOTH PARTIES

The commission then states that, sitting as a board of arbitration, it finds it difficult, on account of the lack of helpful precedents, to do otherwise than decide the case on the principles of law, as neither organized or unorganized labor nor organized capital would expect an award that would violate a legal right of the other. "The submission in this instance is simply a contract between the parties thereto whereby they have agreed to refer the subjects in dispute to the members of this commission and to abide by their award. Our legislative provisions touching arbitration are but statutory enunciations of the principles of the common law. Under either of these methods of arbitration only controversies between parties which might be the subjects of a suit at law could be submitted. In this controversy there is no question involved that might be the subject of a suit at law. Recognition of the union, rate of wages, the regulation of hours and conditions of labor are not matters of which any court could take cognizance. In this State, at this time, these are all matters of private contract, left absolutely to the discretion of the parties involved in each particular transaction. This is the reason why no compulsory arbitration law has been provided. Under our constitution no such tribunal can be provided. A court of compulsory arbitration can be provided only by overturning the entire fabric of constitutional government. . . . As arbitrators we have power to determine only matters within the submission. Where settled principles of law determine what the conclusion should be, the law must prevail. Beyond the realm of fixed legal principles we must be guided by equity and good conscience. No award should be made that would destroy a legal right of either of the parties. While there are some decisions declaring we are not bound to follow the law, we think the weight of authority and the better reason compel us so to do. Otherwise we could exercise arbitrary power. We have no right to do general equity."

In discussing the legal relations of union labor and employers the commission said in part: "It is so manifestly the right of the employees to join a labor union to promote their own interests that the citation of authorities is absolutely unnecessary. They have the right to join the union with the avowed purpose of bettering their situation by an increase of wages. Acting as a union, they have a lawful right to strike for the avowed purpose of bringing their employer to a situation where he will be necessarily driven to increase the wages of his men, shorten the hours of labor and grant more favorable conditions of labor. They have the right to secure the highest wages, shortest hours and the best conditions that they can peaceably compel. This is a broad general statement, clearly sustained by a great weight of authority. . . . On the other hand, the Traction & Terminal Company had rights as sacred and as clearly defined by the constitution and laws as those herein mentioned in favor of the employees. The company had the right to refuse to employ union labor in the operation of its cars and in the conduct of its business. It had the right to operate its cars by non-union labor if it were able to do so. Union labor had no legal right to interfere by attempting to impede the work of the company in its efforts so to do. . . . In so far as union labor and its sympathizers impeded the operation of the company's business by force or intimidation and by preventing non-union men from engaging in the business from which the union men had struck, union labor was acting beyond its legal right and in defiance of the law."

The commission attaches importance to the case of Adair vs. United States, 52 Law Ed., page 442. The Legislature of Kentucky had enacted a law making it a crime for an employer or his agent to discharge a union man for that cause only. Adair, as the agent of the Louisville & Nashville Railroad Company, discharged a man named Coppage from the service of the company wholly on the ground that he was a member of a labor union. Adair was indicted, tried, found guilty and a fine assessed against him. The Court of Appeals of Kentucky affirmed the judgment. The case was presented to the Supreme Court of the United States, where it was reversed. The commission gives an extract of the decision of the Supreme Court to show that it is "not within the functions of government, at least in the absence of a contract between parties, to compel any person in the course of his business and against his will to retain the personal services of another. . . . So the right of the employee to quit the service of the employer, for whatever reason, is the same as the right of the employer, for whatever reason, to dispense with the services of such employee."

CONDITIONS OF LABOR

The commission then summarized the twenty-three grievances, as presented by the employees, under three general heads, viz: (1) conditions of labor; (2) hours of labor; (3) rate of wages. These were taken up in order and decided upon by the commission as follows:

The grievances under this head demanded:

(1) The recognition of the employees' association.

(2) A shortening of runs on cars.

(3) Abandonment of extra trips on Sundays and holidays.

(4) Decrease of number of times extra men are required to report at carhouses.

(5) Making up of working board for extra men by 4 p. m. of each day.

(6) Registration of requests for privilege of being off duty.

(7) Hearing of complaints of employees by superintendent three days each week.

(8) Appeals by employees from the superintendent to the president of the company and hearing of such appeals on two days of each month.

(9) A board for the arbitration of controversies.

Referring to the question of recognition of the employees' association by the company, the commission stated: "The contract of Nov. 7, 1913, makes no reference to the Amalgamated Association or any other employees' association. It is executed in the name of the employees as a class of men and not as representatives of a labor union. The question of the recognition of the union is not within the submission." After discussing at some length the rights of the men and the company in the case, the commission says: "The evidence of the officers of the company and of some of the barn foremen was that after the men returned to work discipline was in a measure destroyed. Before the large rights demanded in these various grievances should be awarded to the employees' association, it ought to demonstrate that it has sufficient control and discipline over its members to call a strike and conduct it without disorder, destruction of property or violation of law, in which its membership participated. When this association shows that membership in its local means more efficient service and better discipline among the employees it will destroy the competition arising from non-union labor. We are constrained to deny the demand for the recognition of the employees' association for the reason that it is not within our jurisdiction.

"The demand that 75 per cent of all runs should be earlies and lates and should be completed in eleven consecutive hours is presented by the second grievance. There are no facts in this record that enable us to determine the feasibility and practicability of this demand. On this point we feel that it is the duty of the employees to prove the practicability of the demand made. . . . We do not think this grievance can be corrected any more justly than by an application of a principle borrowed from the federal statutes which requires eight hours of consecutive rest in every period of twenty-four hours. We think no run should exceed an aggregate of twelve hours completed within sixteen hours from the time it is commenced. After completing any run the motorman and conductor should be permitted and required to have at least eight hours off duty. We think this plan is practicable and will greatly relieve the car service men and will in no manner embarrass the company. We do not believe that men should be paid for more hours' work than they perform."

Regarding the grievance that the men should not be compelled to make extra trips on Sundays and holidays, the commission decided "that the provision touching the runs and hours off duty hereinabove set out will remove the complaint presented by this grievance."

The commission expressed its opinion that the grievance in regard to extra men being required to report at carhouses several times a day was well founded and entitled to relief, and that while during the month extra men usually made substantial wages, the uncertainty made the men restless. The commission decided that a working board should be provided at each carhouse and marked up not later than 4 p. m. each day, a list of extra men to be made up at the same time and place in plain sight so that the extra men could see their standing for work, and requiring the names of such extra men to be checked as they get a run or miss. The commission also ordered that each extra man be guaranteed a wage of $45 each month, less the amount of runs missed by reason of his own fault.

Regarding the grievance in connection with requests for leave of absence, the commission described very fully its views on discipline and asserted that it believed from the testimony that many of the car service men had a mistaken view of duty. "Absence from duty is the result of a request granted. It cannot be demanded and asserted as a right," reads the report. The commission, however, ruled that a book shall be maintained at each carhouse in which the names of employees who wish to be off duty may be registered, and absence from duty, if permitted at all, shall be granted in the order shown by such registration. Members of a grievance committee of employees shall receive preference on the day or days they are required to meet officials of the company. If all requests cannot be granted, those who have been off duty within the last sixty days shall be first refused.

In regard to the hearing of grievances by the superintendent, with appeal to the president of the company, the commission feels that while it may be assumed that each of the parties will accept in good faith and comply with the awards of the decision, there will probably arise many matters for adjustment. It was ruled, therefore, that on the second and fourth Tuesdays of each month the superintendent of the company shall, on notice, give a fair and impartial hearing to discharged or suspended employees. If the discharge or suspension is found to be unjust, any such employee shall be reinstated with pay at the regular wages for time lost by such suspension or discharge. On the third Tuesday of each month the president of the company shall hear any employee who desires to appeal from the decision of the superintendent. The president shall correct any erroneous decisions of the superintendent. At such hearings before the superintendent or president the discharged or suspended employee may be represented by any employee or employees he may select.

The commission then reviews the possibilities of the interruption of activities in a community by labor disputes which end in disorder and strife, and, seeking to avoid this, provides for an arbitration board as follows:

"That any difficulty or disagreement arising under this award, either as to interpretation or application, or arising out of the relations of the employer and employees during the lifetime of this award, which cannot be settled or adjusted by conference between the officers of the employer and the employee or employees directly interested, shall be referred to a board of conciliation or abitration appointed as hereinafter provided. Said board shall consist of three disinterested members, one of whom shall be selected by the judge of the District Court of the United States for the District of Indiana, one member shall be selected by the chief justice of the Supreme Court of the State of Indiana and one member shall be selected by the chief judge of the Appellate Court of the State of Indiana. Such board of arbitration shall constitute a permanent court of arbitration during the lifetime of this award. Each member of said board shall receive just and reasonable compensation for his services, such compensation to be paid equally by the company and the employees. Necessary stenographic force shall be employed and paid for equally by the company and the employees. Said judges shall confer with each other in making said appointments, and said judges shall have power to fill any vacancies that may occur at any time in the life of this award on said board. Such board thus constituted shall take up and consider any question referred to it by the company or by the employees and shall hear both parties to the controversy and consider such evidence as may be laid before it by either party. At all hearings before this board either party may be represented by such person or persons as they may respectively select. No suspension of work shall take place by strike or otherwise pending the adjudication of any matter so taken up for adjustment by said board. Any award made by said board shall be binding and final during the lifetime of this award. In any proceedings before said board the moving party shall have the burden of proof; provided that if any discharged employee shall institute proceedings before said board of arbitration for the purpose of being reinstated in his employment with the company, said board of arbitration shall not have power to reinstate such discharged employee, if, upon the hearing, there is a reasonable and strong suspicion that such employee was guilty of the offence for which he was discharged."

HOURS OF LABOR

On this subject the commission decided there was little doubt or uncertainty and that the efficiency of the company and standard of citizenship of the men is lowered if they are overworked. The commission's ruling on this point was as follows:

"(1) No run shall exceed twelve hours in length. Split or trip runs shall not exceed an aggregate of twelve hours of platform service. Each run shall be completed within sixteen hours from the time it is commenced. After completing a run no motorman or conductor shall be required or permitted to continue or again go on duty without having had at least eight hours off duty. One period of twenty minutes in each run shall be allowed within which to eat meals. Overtime shall be paid for at the regular rate.

"(2) Each motorman and each conductor shall be permitted and required to remain off duty on the first day of the week, commonly called Sunday, at least once in each calendar month. The company shall designate the particular Sunday in each month that each of such employees shall be off duty.

"(3) Each conductor and each motorman shall be required to report at the proper car barn ten minutes before time for taking his run. Men who are delayed without their fault by reason of accidents or blockades on the line and are thereby prevented from taking out their run shall not be penalized further than to lose their run for that day only. The penalty for missing runs for any other reason than as above stated shall be in the discretion of the company; provided, if the company experiments and finds that reporting five minutes before taking out the runs is sufficient, it is at liberty to reduce the reporting time to five minutes."

WAGES OF CAR SERVICE MEN

In making its award on the wage question the commission goes into the matter at great length, discussing conditions which affect employment and giving statistics concerning the rates of wages in other pursuits. The commission says that in fixing the rate of wage no court could ignore the element of competition, and there is no reason why an employer should pay a higher wage to one man than to another possessing equal skill, integrity and industry. Under such conditions unionism could add nothing either to the necessities of the man or the value of his services. The commission advances the following opinion regarding the car service men:

"There has been in recent years a marked increase in the cost of the necessaries of life in this city. The proof clearly establishes this fact. This reduces the nominal wage. By different processes of reasoning we will endeavor to determine whether the present wages of the employees of the Traction & Terminal Company are just and reasonable. Any man twenty-one years or more of age, of less than the ordinary muscular power, of average intelligence and with but a very limited education, can perform the duties of a motorman or conductor. Such a man with ten days' instructions is assigned to this work. The labors of a motorman are not strenuous at any time. For about two hours of each day a conductor is very busy. At other times his labors are light. These men are seldom exposed to the elements, and there was no proof of any particular hazard arising from the use of electricity as a motive power. The employment is constant, the temptations are such as a man of ordinary moral courage ought to be able to resist. . . . The labor of these men, if it can properly be called skilled labor at all, is not far removed from common labor. When these positions are vacant they are easily filled with recruits from the ranks of common labor. Their necessities are those of the average citizen. The revenues of the company would be but slightly increased, if at all, by requiring men of better education and skill. This means that the work is such that the average man can do it well. From these facts it would appear that the car service men cannot command as high a wage as that paid to the skilled trades."

The commission then makes a comparison with the rates of wages paid in other cities of the United States and points out that the payment of an annual revenue of $30,000 to the city of Indianapolis should in a comparison raise the rate of wages paid by the Indianapolis Traction & Terminal Company 1 cent an hour. The commission denies the demand of the employees for a flat rate of 32 cents an hour and time and one-half for overtime. The report reads: "One of the elements that enters into the determination of the wages per hour is the constancy of the employment. A high hourly wage is usually found where labor is suspended for a part of the season, as in the building trades." The commission cites the testimony of witnesses for the employees regarding the amount of wages received, and shows that one man receiving the maximum rate of 25 cents an hour, averaged for four months, with time off, $86.13 per month, while one man receiving the minimum of 20 cents an hour averaged $52.99 per month for the same period under similar conditions. The commission gives these examples as representing the extremes of the result of the maximum and minimum wage.

The commission then discusses briefly the ability of the company to pay interest upon its own and underlying bonds, provide a proper sinking fund and dividends on its stocks, and decides that as the findings of the commission are to cover a period of three years the car service employees should receive a reasonable increase in wages. The award then gives the following rate:

In continuous service one year or less, 21 cents an hour.

In continuous service one year and less than two years, 23 cents an hour.

In continuous service two years and less than three years, 24 cents an hour.

In continuous service three years and less than four years, 25 cents an hour.

In continuous service four years and less than five years, 26 cents an hour.

In continuous service five years or more, 27 cents an hour. Overtime shall be paid for at the regular rate.

The increase thus granted to the men for a period of three years, dating back from Nov. 8, 1913, is approximately 5 per cent more than the old rate, which graduated from 20 cents the first year to 25 cents the fifth year and thereafter. The requirement of the commission, however, which states that each motorman and conductor must be off one Sunday in each month reduces the possible earning capacity of the men by more than 3 per cent.

EMPLOYEES (EXCEPT LINEMEN) OTHER THAN CAR SERVICE MEN

The commission sets out in the report that it carefully considered the evidence as applied to these employees and their conditions of labor, and had some doubts as to whether there should be an increase in their wages at this time. However, considering the fact that the wages now fixed will prevail for three years unless voluntarily increased by the company, the commission decided to give these employees an increase of 5 per cent.

OTHER AWARDS

On the union question the commission ruled that the company should not be obliged to employ only union men, and no man now or hereafter in the employ of the company shall be required to become a member of any labor organization, but that the company shall not discharge a man solely for the reason he is or becomes a member of a labor organization. The ruling also provides that no discrimination by employees for or against union or non-union men will be permitted.

An award is made which provides that the president and the secretary of a labor organization of which the employees may at any time be members shall each upon his retirement from office in such organization be reinstated in his former position without impairment of his seniority rights. However, for such officers to hold their seniority rights they must deliver to the president of the company on or before Feb. 20 in each year during the lifetime of the award a written request for the holding of such rights, but such statement shall not in any manner be, or be construed to be, a recognition of such organization.

The company is not required to change its method of furnishing transportation to employees and shall give only such transportation as is needed by an employee in going to and from his work. No extra pay is to be allowed to motormen and conductors while instructing students.

Conductors and motormen who take or leave their cars at points other than their carhouses are to be paid at the regular rate for the time necessarily required in transportation from the carhouse to the place of taking or leaving car.

The commission denied the request for double pay for snow-plow and sweeper work, but when such work is completed in less time than employed in their regular runs employees are to receive full pay for the number of hours composing their regular runs. While doing such work meals shall be furnished by the company.

Regarding the grievance that motormen should never be required to work as conductors, or vice versa, the commission ruled that in case of emergency conductors may be required to work as motormen and vice versa. The carhouse foreman in charge of the men shall determine the emergency.

The award closes as follows:

"The findings and awards of this commission shall be effective as of the eighth day of November, 1913, and shall continue in force and effect until the eighth day of November, 1916; provided, that the company shall have a period of sixty days in which to revise its schedules and determine what motormen and what conductors shall be required to remain off duty on each particular Sunday.

"On every point in controversy stated in any grievance or in any part of any grievance and upon which we have not made a specific finding and award our finding and award is for the company."

MILWAUKEE A. E. R. A. COMPANY SECTION MEETING

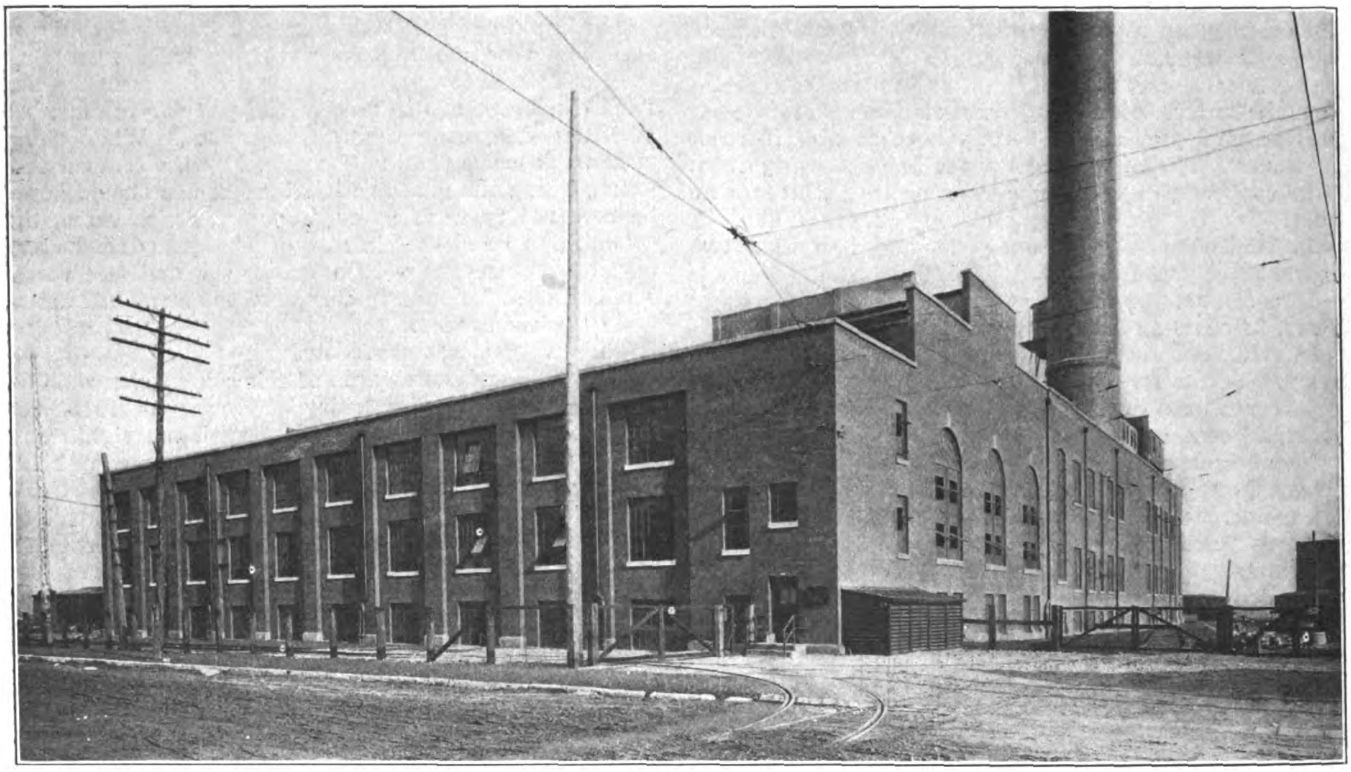
The Milwaukee Electric Railway & Light Company's section of the American Electric Railway Association held its regular meeting on the evening of Feb. 12, 1914. The subject of the evening was "Recent Developments in Electric Traction," presented in a paper by Miles Lambert, of the Westinghouse Electric & Manufacturing Company. His talk was illustrated with lantern slides showing the various stages in the development of modern street railway and interurban motors, as well as views of the most modern types of street railway and interurban cars. The meeting was attended by more than 100 members of the association and a number of out-of-town representatives of electric railways and supply men. In the discussion which followed the presentation of this subject, Mr. Lambert was called upon to give something of the historical development of single-phase apparatus. Other points brought out in the discussion concerned the practicability of employing multiple-unit control on one-car trains, and when and where to use the mechanically ventilated types of motors.

The meeting was attended by several representatives of electric railway lines in Chicago.

The Louisville Railway's New Generating Station

A Railway Power Station Constructed According to the Unit System with an Initial Capacity of 12,000 Kw and an Ultimate Capacity of 48,000 Kw

A thoroughly modern generating station with an initial capacity of 12,000 kw has just been put in operation by the Louisville Traction Company, owner of the Louisville Railway and the Louisville & Interurban Railroad companies. This new station will feed the underground and overhead transmission system at 13,200 volts, twenty-five cycles, three-phase, to two city substations and an old generating station on Campbell Street, Louisville, which has been tied in with the new station, and which in turn feeds six substations on the seven interurban lines radiating from Louisville. The unit system of design was followed in the construction of this new station, which will have an ultimate capacity of 48,000 kw.



Louisville Railway—Exterior of Recently Completed Power Plant

The Louisville Railway and the Louisville & Interurban Railroad companies operate 165 miles of city track and 96 miles of interurban track respectively. Prior to the completion of the new plant this system was supplied with electrical energy from the Campbell Street plant situated on Beargrass Creek in the southeastern part of Louisville. This generating plant contained one 3500-kw, one 3000-kw steam turbine and two 1650-kw reciprocating vertical engine-type units, all generating alternating current at 13,200 volts, twenty-five cycles, three-phase. In addition to these, the old plant was equipped with 550-volt direct-current generators as follows: Two 1650-kw and three 500-kw generators, making a total of 14,600 kw a.c. and d.c., installed in connection with one 3000-amp.-hr. storage battery which was used as a reserve during peak-load periods.

Beargrass Creek, on which the old plant was situated and from which circulating water was obtained, received the discharge from a number of sewers. This did not materially impair the value of the water for use in the condensers, but within the past five years the city of Louisville constructed sewers parallel to the creek, and this resulted in reducing the flow of water to an almost negligible quantity. This situation made it necessary for the railway company to seek a new supply of condensing water or a new site for a power station. It put off the day when it would be necessary to build a new plant and sunk artesian wells and installed a spray cooling system to furnish condensing water. These methods, with the limited amount of water and the amount of pumping necessary, were costly and materially reduced the efficiency of the plant. To eliminate these difficulties and at the same time take advantage of modern generating efficiencies, it was decided to build a new station at a more advantageous location and especially where plenty of water was available.

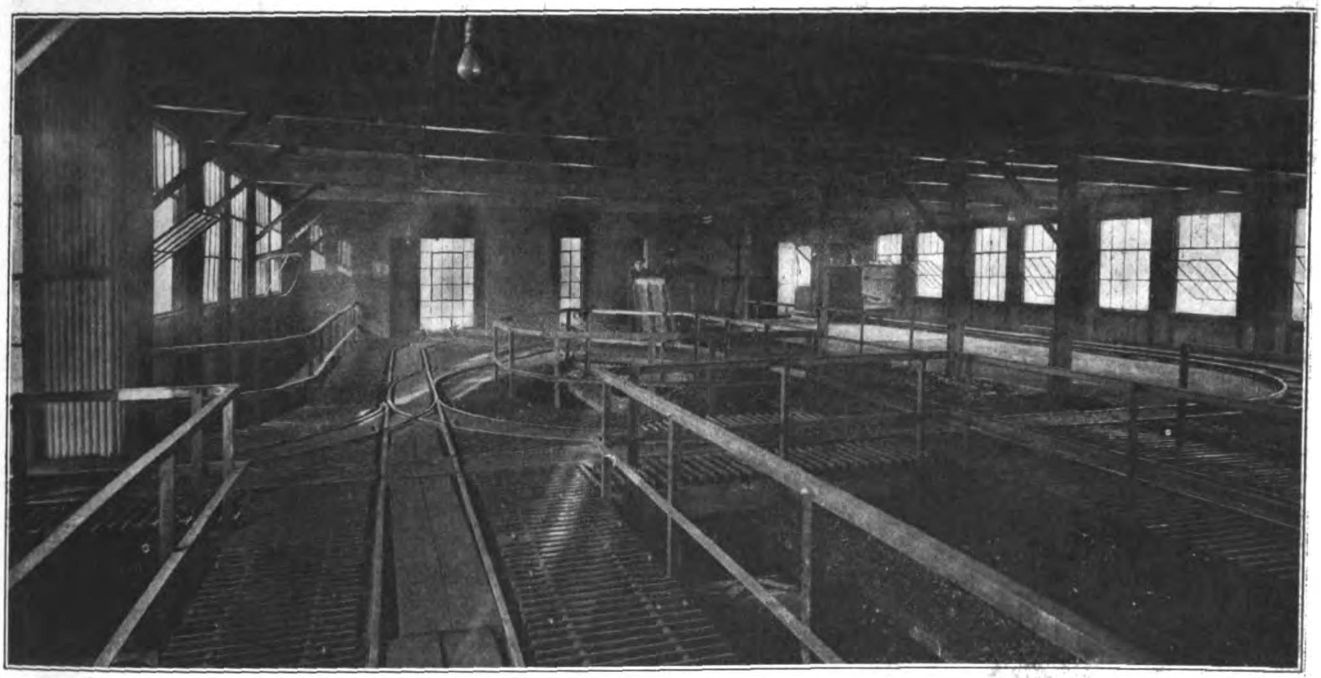
In the meantime other difficulties arose which also tended to give impetus to the building of a new generating station. The average daily output in the existing plant increased from 35,000 kw-hr. in 1900 to practically 150,000 kw-hr. at the close of 1912. At the same time the maximum hourly load demand rose from 3000 kw in 1900 to 15,000 kw in 1912. This rapid rise in the output was due to various causes, namely, increased car mileage, track mileage, car sizes and car equipment. During 1902 the generating station output was 1.5 kw-hr. per car mile; in 1905 this had increased to 2.5 kw-hr. and in 1912 to approximately 3.9 kw-hr. per car mile.

Factors entering into the selection of the new generating site therefore totaled as follows: Ample condensing water supply, ready access to steam road transportation and cheap real estate so as to permit open storage of coal to tide over high-water periods, coal strikes and transportation accidents. To obtain all these necessary requirements the site for the new plant was selected on the Ohio River, the only available source of constant water supply within many miles of Louisville.

At a point in the Ohio River opposite Louisville the federal government has built a removable dam to limit the low-water stage in the Louisville harbor. Rapids in the river opposite Louisville also made it necessary that some means of transporting boats around them during low river stages be provided. This difficulty was removed by the building of a flight of three government locks with a canal leading to serve these. These local conditions of the river determined the location of the new plant, and accordingly property was purchased above the locks where a definite minimum stage of the river could be obtained.

GENERAL ARRANGEMENT OF STATION

The new generating station site fronts 1358 ft. on the Kentucky & Indiana Terminal Railroad Company's right-of-way, which adjoins the Louisville & Portland canal. The transportation facilities offered at this location were especially desirable, because this railroad formed a part of a double-track belt line around one-half of the city and connected with and switched from all the steam roads entering Louisville. In addition to this, the general level of the property on which the plant was to be built, was approximately 5 ft. above the maximum high-water stage reached by the Ohio River. The precise location of the station building was so chosen that all openings into the building could be provided 5 ft. above the maximum high-water stage in the Ohio River. Another advantage of this particular site was that it was underlaid with bed-rock at a depth of about 36 ft.

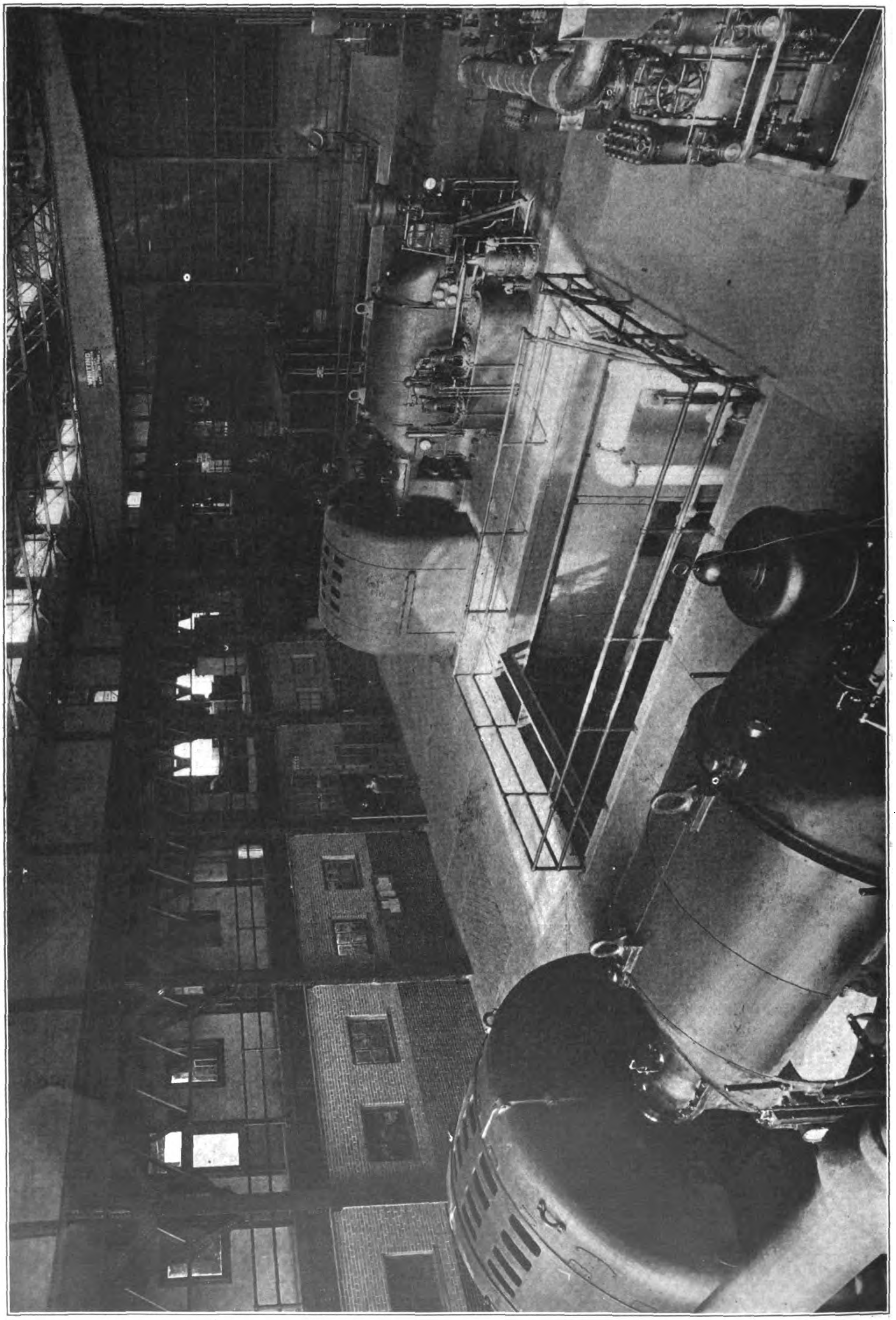


Louisville Railway—Industrial Railway for Handling Coal

Two switches, one at each end of the plant property, were taken off the main track of the steam road, and these connect to a long side track paralleling the steam road's right-of-way. A lead from one end of this side track in turn branches into five tracks, two of which lead over the coal hopper beside the boiler house, one into the boiler house and one into the generating room under the crane. The space remaining between these four tracks furnished sufficient area to store two or three months' coal supply in the open. This open space has been graded so that all surface water drains off readily, and it is well above the high-water mark of the Ohio River. Approximately thirty cars of coal will be required every twenty-four hours for the completed station. In designing the track layout the engineers decided to provide for two days' supply of coal on cars at all times, with extra space for one day's empties. This required about 4000 ft. of track, which was sufficient to set ninety cars exclusive of the main switching track which paralleled the steam road's right-of-way.

The quantity of coal stored in the space provided between the switch tracks is limited only by the height to which the coal may be piled. Fuel purchased for storage purposes will be mine run or a combination of nut and slack coal, and the height to which it will be piled will be limited to approximately 15 ft. By providing a well-drained storage area and limiting the height of coal piles in open storage, it is believed that spontaneous fires will be reduced to a minimum.

The first section of the generating station includes a boiler room, 100 ft. x 180 ft., built with the long axis at right angles to the turbine room, which is 80 ft. x 175 ft. This boiler room is large enough to house the initial equipment of eight 507-hp boilers with spare space for a duplicate battery under the same roof. The turbine room also was designed large enough not only to house the initial installation of two 6000-kw steam turbines, but foundations for one additional unit and space for a fourth were provided. These two buildings were constructed of plain and reinforced concrete, brick and steel, and so designed and incased as to produce a thoroughly fireproof structure resting on concrete caissons taken down to rock or on concrete mats resting on Ransome concrete piling driven to bed-rock or to a refusal. One end of the turbine room and one side of the boiler room are inclosed with corrugated iron so that the ultimate capacity of the station may be had at the least possible cost. In designing the building the engineers made ample provision for natural illumination and ventilation in the turbine and boiler rooms by pro-



Louisville Railway—Interior of Recently Completed Power Plant viding large window glass areas with Fenestra steel sash. In addition to these a double-monitor skylight surmounts the firing aisle of the boiler room and the long axis of the turbine room, and the space between windows in the monitor is inclosed with corrugated asbestos siding.

BOILER EQUIPMENT AND STACK

For the initial installation of eight 507-hp Babcock & Wilcox boilers, a 13-ft. x 255-ft. dark-red radial brick stack has been erected by the H. R. Heinicke Company on a concrete foundation resting on bed-rock. The size of this stack is sufficient to provide a square foot of area for each 36.25 hp, and it was designed to serve only the eight boilers, being installed with two batteries on each side. Foundations for a second stack, as well as that for the other row of boilers on the opposite side of the boiler room, have been provided at this time. The present boiler equipment was designed to generate steam at 200-lb. pressure and 125 deg. superheat. Each boiler is equipped with Babcock & Wilcox chain-grate stokers with a grate 9 ft. 6 in. wide by 12 ft. 3 in. long. It was calculated that this size of grate would produce most economical results with the Kentucky pea and slack coal which will be used at this station.

DANGER
HIGH
VOLTAGE.

Louisville Railway—View in Electrical Operating Gallery

Since operation was begun in this plant, tests have been made to ascertain the draft at the base of the stack and over the grates. The relative location of the stack and the grates provides 253 ft. of stack height above the grate level. With six of the boilers in service, the draft at the base of the stack averaged approximately 1.2 in. of water. Similar tests made over the front of the grates with the main breeching and the boiler dampers open showed 0.45 in. of water, while the draft at the last boiler pass showed 1 in. of water. A preliminary test of boiler and station efficiency during the second month's operation, before the steam pipe work was completely covered, and while some steam was being used for drying out and test purposes, gave a coal consumption per kilowatt-hour of 2.975 lb. with 12.5 per cent ash. The coal used was Western Kentucky pea and slack, testing approximately 12,000 b.t.u., dry.

COAL AND ASH-HANDLING EQUIPMENT

As mentioned earlier in the article, coal is received from the steam railroad connection by way of the two tracks which lead over these concrete coal unloading hoppers at one end of the boiler room. From these receiving track hoppers, 2-ton hand push cars are used to convey the coal to the structural-steel bunkers over the boiler room by way of duplicate electric elevators. An industrial railway leads from the elevator shaft over the battery of bunkers so that these cars may be pushed by hand and dumped at any point desired. This plan was adopted as the most economic one. A view of this industrial railway is shown in one of the illustrations. The two platform elevators are 10 ft. x 10 ft. in size and of 6000-lb. capacity. They were designed to operate at 100 ft. per minute, one being driven by a 550-volt d.c. motor and the other by a 440-volt, three-phase a.c. motor, and both motors are of 30 hp.

Each battery of two boilers is equipped with a coal bin holding 225 tons, which represents four and one-half days' fuel supply for ordinary operation. This large coal-bin capacity was deemed necessary as a precaution against shortage during extreme high-water periods when the tracks of the steam railroad would be inundated. These tracks are 6 ft. lower than the generating plant property, consequently high water would cut the plant off from its source of coal supply other than coal from yard storage.

The ashes drop from the chain grates into two steel ash hoppers lined with firebrick and are dumped into push cars on an industrial railway which passes underneath. One of these hoppers serves to catch siftings from the grates, and these siftings are dumped into the cars and returned to the coal bunkers. The cars loaded with ashes are elevated to a steel ash hopper lined with firebrick and installed over the coal-unloading hoppers. By this arrangement after the coal has been unloaded into the track hoppers the cars may again be loaded with ashes from the hoppers overhead. It is estimated that by means of this industrial railway the cost of handling coal and ash at the new station will show a saving of approximately 20 per cent as compared with the continuous bucket conveyor system.

FEED WATER AND STEAM PIPING

Under normal conditions boiler-feed water will be taken from two 5000-hp Cochrane feed-water heaters placed on the boiler room floor. These heaters are supplied with water from the hot-well condenser pumps with enough make-up water from an overhead tank, which is supplied by the house service pumps. The station is so arranged that the boiler room firing floor is 12 ft. above the turbine floor, and the latter projects 15 ft. underneath the boiler room. In this 15-ft. space the station auxiliaries, such as dry-vacuum pumps, air compressor and boiler-feed pumps, are installed. This allows the boiler-feed pumps to be placed directly beneath the feed-water heater and gives a head for the boiler-feed pumps of 12 ft. plus some 3 ft., the feed-water heater being supported 3 ft. above the floor. The two boiler-feed pumps are Jeansville 4-in., four-stage, driven by General Electric steam turbines.

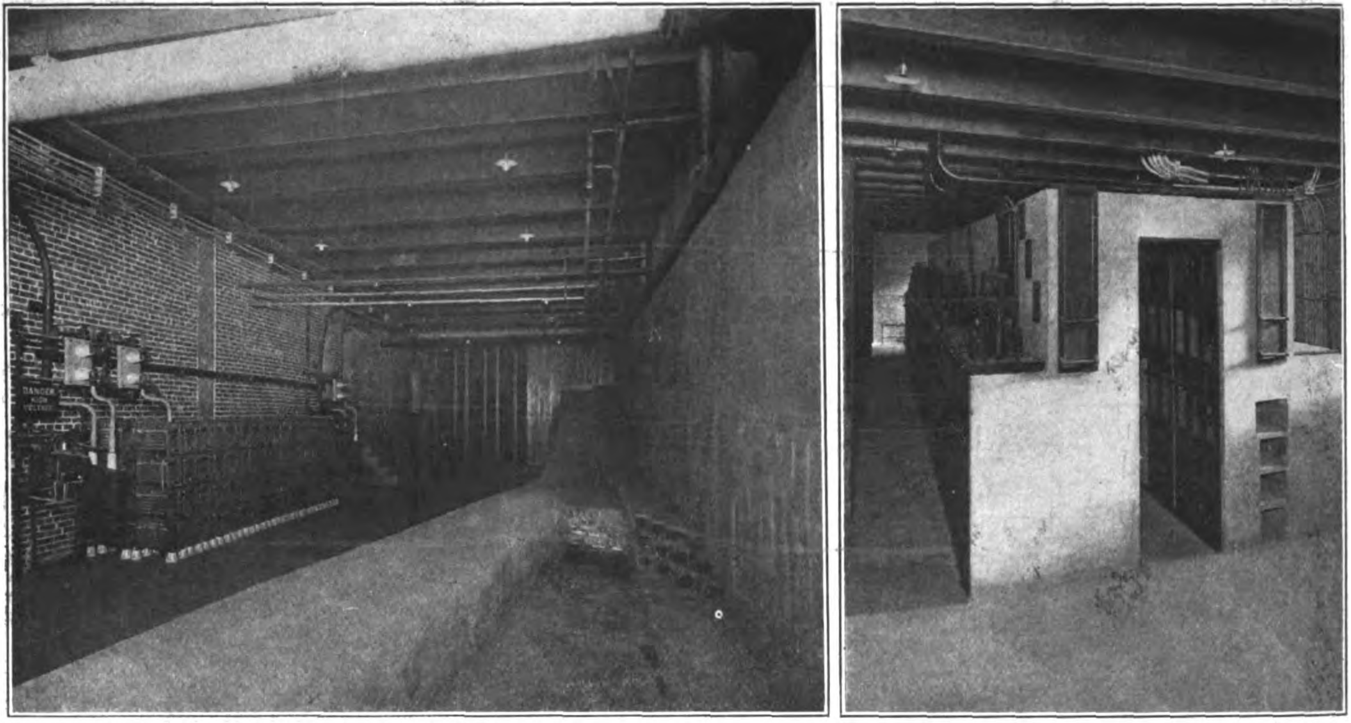
A 20-in. x 12-in. x 15-in. duplex Worthington reciprocating pump has been installed in the pump pit between what will be No. 3 and No. 4 units. This pump is so piped that it may be used for boiler-feed service or house service, or for 300-lb. fire service, the suction of this pump dipping into the two concrete water intakes. All pump suctions are piped so that they may take water directly from the city mains in case it becomes necessary.

A general utility water-supply steel tank manufactured by the Henry Vogt Machine Company, of Louisville, of 35,000-gal. capacity, has been installed on top of the elevator shafts over one end of the boiler room. This tank's overflow is 119 ft. above the turbine room floor, and it is supplied with water from one of two steam reciprocating house pumps which take their water from one of the two main 7-ft. x 8-ft. water intakes. A float valve in the tank closes the inlet when the water rises to within 6 in. of the tank overflow, thereby producing pressure on the service pump discharge which automatically stops the pump.

An elevation gage has been installed over the engineer's desk in the turbine room. It is graduated in feet to indicate the height of the water in the tank so that the engineer may be advised at all times as to its condition. This tank is used to provide a uniform head, against which the service pumps operate, and water from it is also used for make-up water in the feed-water heaters, for water-cooled glands in the main turbines, centrifugal pumps and exciters, and for wetting down ashes and coal, as well as for general washing purposes about the plant. Water from the city mains is used only for drinking and toilet purposes, and eventually filters may be installed so that it will not be necessary to purchase any water from the city.

Essentially, the steam-pipe layout includes one steam header installed over the front of the boilers and at right angles to the turbine room. This header varies in size from 12 in. to 16 in. and is connected to a cross-header in the boiler room running parallel to the turbine room. Out of this cross-header steam is taken to the turbines by way of 12-in. long-radius bends, and two 10-in. long-radius bends take the steam to an auxiliary header in the basement of the turbine room, which in turn feeds all station auxiliaries. When the second row of boilers is installed a ring system of steam piping is contemplated which will encircle the boiler room. In fact, valves already have been installed on each bend and between each battery of boilers, so when the ring system is complete any battery or any steam bend may be cut out of service for repairs without disturbing any other steam unit.

All headers and valves are of cast steel, the headers being furnished by the Crane company and the valves with solid monel-metal seats and stems by the Chapman company. All bands are of extra-heavy steel with Crane lap joints and steel flanges. The connection to each boiler is equipped with a Lunkenheimer automatic cut-off valve.

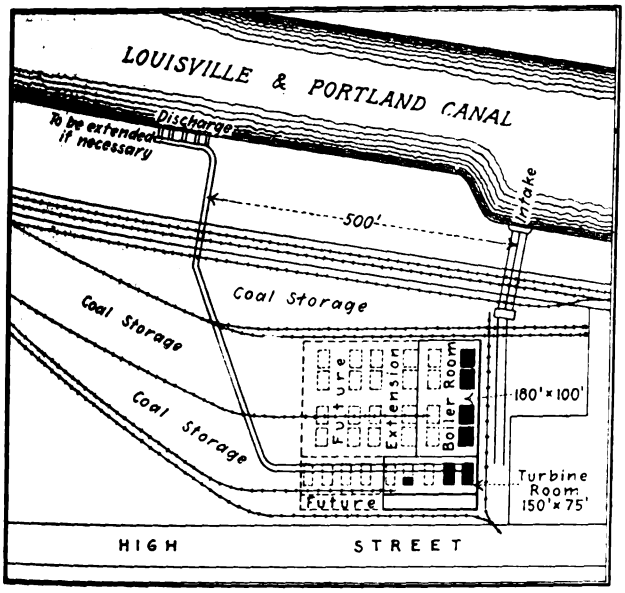


Louisville Railway—Views of High-Tension Switch Compartments and of Conduit Basement

CIRCULATING WATER SUPPLY

Probably one of the most interesting pieces of construction in connection with this railway generating station was that necessary to provide circulating water. This is taken from the canal through eight 4-ft. 8-in. x 8-ft. openings, the bottoms of which are approximately 50 ft. below the generator room floor or 12 ft. below normal water level in the canal. The top of these intake openings is approximately 4 ft. below normal water level, which, it is hoped, will eliminate a certain amount of floating trash from clogging the intake screens. Just inside the intake openings in the canal walls there are four cast-iron racks set at 20 deg. to the vertical and composed of 4-in. x 1½-in. bars with 2-in. openings between them for screening off logs and large trash. Manholes are provided over each of these racks in the intake structure so that any trash collected may be hauled out with a long-handled fork.

A duplicate set of screens is installed in a screen house on the railway company's property, approximately 90 ft. from the intake. Two 10-ft. x 10-ft. concrete conduits which connect the canal intakes and the screen house lead under the steam railroad's right-of-way. At the screen house, which is 18 ft. 6 in. x 30 ft. 4 in. in plan, the intakes flare to provide supports for stop planks and a double row of movable vertical screens. The latter have been installed with four double screens in each of the four channels. In each channel the screen nearest the intake is of ⅞-in.-mesh No. 8 copper wire and the second screen is ½-in.-mesh No. 10 copper wire. Each screen is set in a substantial angle-iron frame 7 ft. ¼ in. wide x 14 ft. 9 in. high, and these frames have slight angle projections which slide in cast-iron vertical slots set in the concrete. A Whiting electric crane installed on runways has been provided in the screen house to facilitate raising and lowering these screens and the stop boards.



Louisville Railway—General Plan of Completed Plant and Part of Grounds

Twin concrete intake conduits, 7 ft. wide x 8 ft. high, lead from the screen house under circulating pumps in the turbine room. These waterways are protected by Chapman sluicegates operated from the screen-house floor. These intake conduits slope from the canal to the turbine room on a 0.22 per cent descending grade, and all the pumping equipment was so designed and installed that water may be taken from either or both intakes. In order to facilitate cleaning, manholes with tops at the property grade have been installed every 100 ft. The complete intake and discharge system has been designed for the future extensions to the station. Construction work on these intake conduits was very difficult, it being necessary to quarry them out of rock their entire length. At one point near where the intakes enter one end of the turbine room the narrow space between the property line and the station building made it necessary to tunnel it through rock for a distance of 135 ft.

Circulating water discharges into the canal approximately 500 ft. below the intakes, and by way of a 9-ft. x 9-ft. reinforced concrete horseshoe-shaped conduit. It was built in an open trench on the top of the rock formation and was designed for the future completed station building, one-half of which has been erected. The flow line of the discharge conduit is 1 ft. above the normal river stage at the turbine building and descends on a 0.22 per cent grade toward the canal. Discharge pits have been built into the discharge tunnel below the flow line to seal the condenser discharge, and the water discharge entrance into the conduit is by means of flanged castings set in the concrete walls. Manholes inside the building at each discharge pit and outside the building at 100-ft. intervals permit the conduit to be inspected readily.

The discharge conduit crosses the steam railroad right-of-way at right angles, then turns parallel to the tracks and canal with eight openings from the main discharge through the canal wall in a distance of 112 ft. 6 in. The tops of these discharge openings into the canal are approximately 5 ft. below normal water stage. The take-off ducts dip sharply from the main conduit to the canal outlet. The extreme end of the main discharge conduit is temporarily closed so that future extensions parallel to the canal, affording additional openings into the canal, may be provided when necessary, or in case it is desired to discharge the circulating water farther downstream from the intake.

The size of the openings both for intake and discharge were figured for a flow of 160,000 gal. per minute, or 20,000 gal. per minute for each of the eight units in the initial station installation. At this rate of flow the openings are sufficiently large to produce a discharge speed of only 1.19 ft. per second, which reduction was necessary in order not to interfere with small boats passing in the canal.

Two 30-in. cast-iron pipes are laid over the outside walls of each intake conduit. These pipes are continuous from taps in the discharge-water conduit to the inlet at the canal end of the intake, and they were provided to protect the intakes from clogging with needle ice. To accomplish this, valves were installed in these cast-iron connections to the discharge system which may be opened and hot water discharged into the canal, at the mouth of the intakes. This method of providing protection against the effect of low temperatures in the circulating water supply is quite novel, and as the hot water is taken from the discharge conduit the only expense attached to the installation and its operation is that of laying and maintaining the pipe line from the turbine room to the intake structure at the canal.

TURBINE ROOM ARRANGEMENT AND EQUIPMENT

The turbine room and basement for auxiliaries are 174 ft. long x 61 ft. 6½ in. wide, with four galleries on one side, 21 ft. 10½ in. in width. The turbine room is served by a 50-ton Whiting crane. In the present building the turbine room is 15 ft. longer than half of the future completed station and will accommodate four units, two of which have been installed. Each turbine foundation consists of two parallel walls resting on bed-rock and extending to within 18 in. of the main turbine floor level. These walls are so placed and spaced that the surface condenser may be dropped in place under each turbine by the overhead crane. The turbine proper rests on an I-beam grillage, supported in turn on the two concrete foundation walls. Special attention was given to the design and installation of these turbine concrete foundations in view of the fact that their bases are below water level in the river.

A novel feature in connection with the circulating pump equipment is that it was installed 45 ft. below maximum high water and only 1 ft. above the low-water stage in the Ohio River. This made it necessary to seal all pipe into the concrete conduit to prevent flooding during high-water, when all the waterways inside the building are under pressure and all the pumps operate under a head.

The 6000-kw horizontal Westinghouse turbo-generators are equipped with 20,000-sq. ft. Worthington surface condensers. The dry vacuum pumps were manufactured by the Laidlaw-Dunn-Gordon Company. Circulating water is supplied to each condenser by a Worthington 26-in. tri-rotar centrifugal pump, driven by a G. E. steam turbine, and with an emergency 30-in. pipe connection to the circulating pump of the other turbine. The units are set in pairs with condensing auxiliaries in a pit between the two foundations. Thus the first two units will be spaced 45 ft. apart and the second and third units will be 30 ft. apart. In this way one operator can take care of the auxiliaries of two units. This arrangement also permits them to be cross-connected more readily and economically. The dry vacuum pumps, the main circulating pumps and the hot-well pumps are so connected and arranged that either generating unit may be used with either of the auxiliaries. A 4-in. two-stage Worthington hot-well pump driven by a 27-hp Terry steam turbine completes the auxiliary steam turbine equipment.

The electrical output of the generator is 13,200-volt, three-phase, twenty-five-cycle current, and all switching and transmission is without transformation. Generator excitation, regulated by a Tirrill regulator, is furnished at 100/125 volts for the main generators, and is supplied by a 30-kw motor-driven generator installed in conjunction with two Westinghouse steam turbine-driven generators, one 100-kw and one 150-kw. These exciter generators also supply energy to the house-lighting circuits and provision is made also for a supply of alternating current to the lighting circuits from a 20-kw, 440/110-volt transformer. As an extra precaution against failure of lighting service other lighting circuits are arranged so that in case of an emergency the 600-volt series lighting connected to the trolley circuits may be used to furnish temporary light.

The first 2000-kw rotary converter has been installed on one of the foundations provided for it beside the auxiliary pit and feeds the trolley sections in the vicinity of the new generating station. This substation equipment is tied in with the two city substations by way of a 600-volt direct-current trunk line. This installation required three 750-kw single-phase oil-cooled, step-down transformers rated at 13,200/440 volts.

Oil for turbine lubrication is furnished from oil filters installed in the basement. From these duplicate Marsh pumps force the filtered oil to a tank installed on the industrial railway platform over the coal bunkers in the boiler room. At this elevation oil may be supplied to all parts of the turbine without pumping, should a breakdown occur in the oil-pressure system supplied by pumps. Oil for the auxiliaries, such as the dry vacuum pumps, boiler-feed pumps, etc., is provided by an individual tank system connected to each unit. Oil for these is stored and filtered in a manner similar to that used in the turbine oiling system.

GALLERY ARRANGEMENT

A four-level gallery adjoins one side of the turbine room. On the lowest gallery, which is below the turbine room floor, the conduit carrying the underground transmission cables is brought in from the street. From the conduit the cables radiate through the necessary cable-end bells, supported from a central concrete wall which also supports the transformer compartments. A view of one end of this lower gallery is shown in one of the illustrations. It extends the full length of the turbine room and is completely separated from the basement under the turbine room floor by a 13-in. brick curtain wall. All openings between this gallery and the turbine room are fitted with doors so that it may be entirely closed and used as an air chamber to supply air to the turbines. An air intake is provided outside of the station at one end of this lower gallery, and air is taken into this chamber by way of louvered openings. After the air passes through the intake into this lower gallery it is screened through ¼-in.-mesh copper screens covered with cheesecloth and set at 30 deg. to the direction of the air current. Galvanized-iron air ducts lead from this lower gallery under the generator end of each turbine.

A machine shop is located on the main floor gallery along with the tool and store rooms and the oil switches controlling the high-tension generator and feeder circuits. The latter are 13,200-volt, three-phase circuits and are installed in a concrete switch and bus structure built in two parallel sections. At the present time these two sections are divided at their mid-point, so that there are four sections of the high-tension bus with an oil switch connecting each end and one in the center of each main section. The bus and feeder arrangement is such that each section of the bus connects one generator and four feeder switches, each generator having two oil switches in series and each feeder a single oil switch. Disconnecting switches are provided in each phase and on both sides of each oil switch in the usual manner so any one may be cut out of service for repairs or cleaning.

The complete high-tension bus structure was built for four generating units and sixteen feeders. The bus was installed for this complete station, but the total number of feeder oil switches were not installed at this time. Until such time as a fifth unit may be necessary a temporary jumper was installed at one end of the high-tension structure. All generator switches are non-automatic and the feeder oil switches and junction bus section switches are automatic and provided with inverse time-limit relays.

Offices, drafting room and laboratory, switchboards and the main desk control board were installed on the first gallery above the turbine room floor. The panels for the control desk and exciters as well as outgoing a.c. and d.c. feeders and the turbine desk control board were placed at one end of this gallery; that is to say, they will be at the center of the turbine room building when it has been enlarged to conform to proposed future extensions. A balcony extends into the turbine room beyond the gallery line just in front of the control board, so that an operator, by stepping on it, may have a clear view of the turbine room floor below. This arrangement obviates the disadvantage that is caused by having the switchboard operator too remote from the turbine room.

The electrical and mechanical features of this new generating station were designed by the motive power department of the Louisville Railway under the direction of F. H. Miller, superintendent of motive power. D. X. Murphy & Brother, of Louisville, were employed as architects, and the Henry Bickel Company, of Louisville, contracted for all excavation, underground waterways and concrete foundations. The electrical and mechanical equipment was purchased under contract for its installation.

Pending Anti-Trust Legislation*

The Author Considers the Five Bills to Regulate Interstate Trade Now Before Congress and Discusses Their Effect on Trade Conditions

BY GUY E. TRIPP, CHAIRMAN BOARD OF DIRECTORS WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

I am very glad to have this opportunity of expressing my views upon the business questions now before Congress, and, while they are the views of one who has given his entire life to business, I hope that I still retain the ability to see also the human and social side of these questions, for I have an uneasy feeling that the neglect of this side explains many of the difficulties we have in understanding the temper of the people.

Whether it is economically sound or not, the public has the belief that practically all business should be roughly divided into two classes, the one comprising the natural monopolies of public necessities—in other words, public utilities—the other comprising the naturally competitive private business undertakings. Personally, I find no fault with such a division, but manifestly these two distinct classes require different legislative treatments. That public utilities should be regulated and not have the free hand that naturally competitive business requires is sound doctrine, but only when such regulation carries with it an obligation to protect such utilities against the menaces which confront competitive business. If we restrict opportunities we must reduce the risks.

Almost nothing has remained unthought of in the way of regulation and restriction, and the cheerfulness with which regulatory burdens have been heaped upon our public utilities is discouraging, when it is remembered that hardly a single voluntary act for protection has been heard of.

Public utilities should be protected against competition, inadequate rates, demands for excessive service, unreasonable and unjust damage claims, federal regulations superimposed upon state regulations and, most important of all, against oppressive demands of labor. Under present conditions the mere threat of a labor strike on a railroad is sufficient almost automatically to produce an increase in wages or cause railway managers to relinquish their right to enforce discipline in the interest of the safety of the public and economy of operation, as instanced by the recent strike on the Delaware & Hudson Railway. The best evidence that our legislators have abandoned their campaign of punishment and have become sincerely desirous of doing the fair thing by our public utilities will be shown when someone has the courage to introduce a bill intended effectually to prohibit strikes and lockouts on railroads.

The various railroad securities bills which have been proposed almost wholly ignore the investigations of the Hadley securities commission, which recommended first of all that publicity be required and pointed out objections to any further regulation of securities until publicity had shown what might be needed. However, we already have state supervision of railroad securities quite generally, and I believe that federal supervision would be found an improvement, provided it supersedes that of the states. I have not heard it suggested, however, that the states' right in this respect could or would be taken from them; therefore superimposed regulation may be imminent, and such a condition is justly to be feared by the railroads.

BASIS OF COMPETITIVE BUSINESS

While, therefore, railroads and other public utilities need special legislation for both regulation and protection, a naturally competitive business (like that in which I am engaged) stands on an entirely different basis, and if competitive conditions are maintained for it, as I believe they should be, neither regulation nor protection of the character just mentioned has any place in its dealings with the government.

If one cannot manufacture his goods and sell them as cheaply as his competitor can he must eventually fail and, if his employees force him to the issue, he can shut up his shop, and both he and his employees will be out of income for a longer or shorter period, but the general public welfare is not vitally affected.

A great deal of the proposed legislation at Washington is directed toward creating or maintaining conditions which, in the mind of the legislators, will tend to insure competition among this class of industries which, as I have said, are to be distinguished from public utilities. In so far as these measures will be effective in the direction of securing sane competition, I believe they are wise.

Monopoly is not in itself objectionable; in fact, it is often the most effective way of dealing with industrial affairs. In Germany it is fostered and protected by the government to a large extent, with the result that the commercial supremacy of that country in the markets of the world has been established within a comparatively few years of the most rapid business growth perhaps that has ever been seen.

But I believe that our political institutions and the temper of our people are not adapted to monopolistic methods that are in restraint of trade, and that fair competition in business will make a more contented public, a more secure government, and in the end give greater protection to property. Therefore I am in favor of all fair and reasonable legislation sustaining that theory.

Fair or sane competition is hard to define. To my mind free competition is not sane competition. The biggest business in the country was founded almost entirely upon the principle of free competition, namely, that of making prices what and when you will and taking all the business from your competitor that you can. If this business is a monopoly, it grew to be so without the aid of interlocking directorates or the alleged money trust; it became a monopoly simply by the practices of free competition.

Therefore, in considering the various business measures now pending, particular attention should be given to the question, Will they or will they not assist in securing sane competition, not free competition?

The five bills now proposed are an interstate trade commission bill, an interlocking directorates bill, a Sherman law definition bill, a trade relations bill and an anti-holding company bill. It is not my purpose to attempt a detailed discussion of these measures, for in the details lie endless differences of opinion, many real and imaginary dangers and much sincere and insincere befogging of the issues. I believe that the safest viewpoints for the busy citizen are:

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*An address made before the Chamber of Commerce of the United States, Washington, D. C., on Feb. 12, 1914.

First, are they based upon the right principles?

Second, is it probable that acts can be framed which will sustain these principles without doing more harm than good?

TRADE COMMISSION BILL

A trade commission seems to me to be needed in a well-rounded plan of business legislation. No other agency can so well collect information, conduct investigations and determine facts for the guidance of the legislature and courts, and that in the last analysis is all the power that the bill gives it.

No great harm can come from elaborate powers given the commission to allow it to get papers and documents except expense and bother to the corporations. It would be a physical impossibility for it to exercise its full powers in this direction, hence it is futile to make statistics as to how many freight trains it would take to convey the papers to Washington.

I object to the provision that the commission may from time to time make public such information in such form and to such extent as it may deem necessary. There is danger of telling our competitors too much and giving half truths to the public. It is unnecessarily harsh publicity, and I hope the bill will finally be toned down in this respect.

THE INTERLOCKING DIRECTORATES BILL

This bill attempts in four short sections to say who shall not be directors in corporations, to the end that competitive conditions shall be created and preserved. In my opinion, as at present drawn, it will wholly fail in its object and will foster the very thing that it aims to prevent.

It will tend to create dummy boards and enable responsible men to exercise as much control as ever without the restraining influence of personal responsibility. It will tend to create one-man power corporations, and thus render more unstable the investments of the public. It is based on a mistaken or exaggerated notion of the Machiavellian activity of the interlocking director.

I have been in business all my life, and I have no hesitation in saying that those terrible charts of control through interlocking directors are worse than worthless. As an instance, enough misinformation has been gleaned from them to bring out the statement that the General Electric Company and the Westinghouse Electric & Manufacturing Company are only alleged competitors. I say that is untrue.

If the whole interlocking directorate bill should be wiped out except the last section, and that should simply provide that the fact of a common director shall be *prima facie* evidence instead of conclusive that no competition exists between two corporations, it would probably be ample to cover the situation. In its present condition the bill is likely to do much more harm than good.

THE SHERMAN LAW DEFINITION BILL

This bill defines certain acts as restraints of trade which now are interpreted by the courts one way or the other as they are more or less small and insignificant.

It is said by the lawyers that under this bill as now drafted no concern could enter into an agreement with any labor union. If this is so, I imagine it will be promptly changed. It is also said that the bill imposes upon every concern, no matter how small, weak or insignificant, the same prohibitions which the Sherman act as now interpreted provides shall be applicable only to concerns so large as to threaten competition.

This is a bill for a lawyer to interpret, but if it defines with precision what a corporation officer may or may not do to escape criminal prosecution it will be an improvement upon the present uncertainty. However, a careful reading of its very short and concise paragraphs leaves one with a feeling that the definitions are fully as vague as the Sherman act itself, and, instead of improving, it further complicates a situation which had begun to be clarified.

TRADE RELATIONS BILL

This bill makes it a violation of the Sherman act to discriminate in price for the purpose of injuring a competitor or to fix a price upon the understanding that the purchaser shall not deal in the goods of a competitor, and it prohibits mines from refusing to sell to responsible people who apply to purchase. The prohibition against discrimination in prices is intended to create sane instead of free competition, and I think may prove to be a good provision. As to prohibiting the fixing of prices upon the understanding that the purchaser shall not deal in the goods of a competitor, I do not view that as revolutionary, although it might cause inconvenience to some to adjust themselves to it. On the whole I think it is fair. The provision concerning mining companies is aimed to do away with price fixing, but I am not sufficiently familiar with that business to say how it would work.

It seems to me that there should be included in this bill a provision such as that recommended in the report of the committee on interstate commerce, from which I quote: "There ought to be a way in which men in such a venture could submit their plan to the government and inquiry made as to the legality of such a transaction; and, if the government was of the opinion that competitive conditions would not be substantially impaired, there should be an approval, and in so far as the lawfulness of the exact thing proposed is concerned there should be a decision, and, if favorable to the proposal, there should be an end to that particular controversy for all time."

Section 13 of this bill, which permits any person to sue out an injunction against threatened loss or damage, might subject a large company to a multitude of strike suits. It should certainly be amended.

ANTI-HOLDING COMPANY BILL

I have never seen a draft of this bill, and I believe none has been printed, so a consideration of it is somewhat premature, but I consider it fraught with more danger than any other of the business bills proposed.

It will be impossible to prohibit all holding companies without financial disaster, and just how the good can be separated from the bad in an act of Congress I cannot imagine. Public utility holding companies, for example, are sound in principle, even though some are not so in practice. Practically all large corporations are holding companies to some extent, and in many cases they are compelled to be so by the operation of state laws. This bill deserves the most careful analysis.

Such a brief summary of these bills is entirely inadequate for any other purpose than to point out the extent to which the federal government proposes to regulate the business affairs of the country, and I have some fear that the impression which will be conveyed by the views which I have expressed will be one of doubt as to whether I am a reactionary or a progressive. I believe no good results can be obtained through wholesale condemnation, and I do not fear the principles which I have outlined, but I do fear the unknown dangers of untried legislation, and should have preferred to see such vital changes tried one at a time; but, if that cannot be, I hope the government will finally resolve all doubtfully dangerous provisions on the side of our intimidated and apprehensive business interests.

Operating Features of Norumbega Park

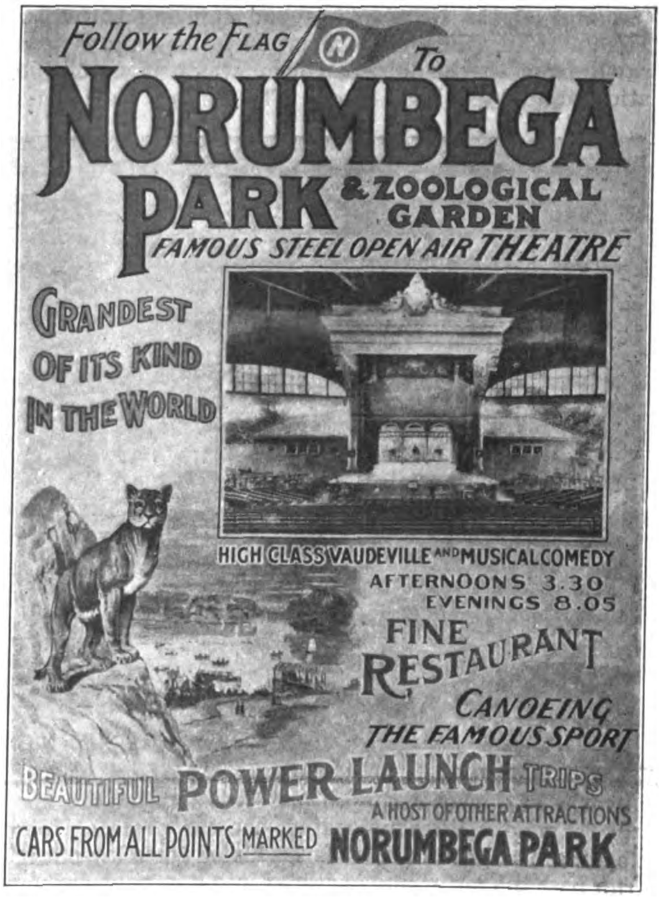
This Article Gives Operating Statistics Regarding a Popular Park Situated 10 Miles from the Center of Boston—Particulars Are Given of the Cost of Installation and Earnings of Some of the Principal Attractions, Which Include a Theatre and a "Zoo"

Norumbega Park, at Auburndale, Mass., on the lines of the Middlesex & Boston Street Railway Company, has been in operation since 1897. Although its area is but 12 acres, it has become one of the most noted street railway pleasure resorts in the East. The park is but 10 miles from the center of Boston and has been conservatively managed from its opening. It represents the intensified development of a property worth about $250,000 and appeals to a class of patronage much superior to that visiting the usual beach resort. The location of the park on the east bank of the Charles River and on Commonwealth Avenue, the finest automobile thoroughfare in Greater Boston; its easy access by through cars from Boston and the Newtons; its discriminating amusement features, and its administration with special reference to refined tastes, have yearly attracted the most desirable class of visitors. No special days are set apart for social organizations. In the seventeen seasons of its service to the entertainment-seeking public about 6,000,000 persons have entered its gates, and the patronage has increased from 287,000 in the opening year to a recent maximum of 413,000. The Sunday patronage averages about twice that on weekdays. The park is operated by the Norumbega Park Company.

The park occupies a hilly tract bordering what is perhaps the most famous canoeing water course in the country, and although the resort is an inland one and about an hour's ride from the sea, its popularity appears little affected by the attractions of Boston's shore resorts. The class of recreation which is available at Norumbega has always drawn adherents from the Greater Boston district, which has a population of about 1,500,000 and a large appreciation of the pleasures of the open-air theater, the "zoo" and the river. The more boisterous amusements of the beach resorts on the Boston North and South Shores have not been found necessary here, and the reputation of Norumbega Park rests upon its satisfaction of more esthetic demands for entertainment than are associated with resorts catering to rough-and-tumble pleasures. The insistence of the management upon the maintenance of an atmosphere at all times congenial to women and children, the high quality of vaudeville presented, the varied attractions of the grounds and the quiet satisfaction afforded by the concessions permitted have all been factors in the financial success of the property. The park is a thoroughly profitable enterprise, and its management is enthusiastic as to the field of such undertakings when carried on by experienced men.

CAR SERVICE

It is noteworthy that the park draws a very large patronage from points on the system of the Boston Elevated Railway Company, although a visit to the property under such conditions costs 25 cents for the round trip, including the park admission. By the terms of its charter the Boston Elevated Railway Company has the right to collect a 5-cent fare from every passenger traveling upon its lines in the same general direction. The regular admission to the park is 10 cents per person, only children in arms being admitted free, but on the Middlesex & Boston system a 15-cent round trip rate is in force which includes admission to Norumbega. The net admission of 5 cents in conjunction with a round-trip ticket on either system affords a desirable revenue to the park, while at the same time it encourages patronage throughout practically the entire Boston metropolitan district. The Boston Elevated system ends at Lake Street, Chestnut Hill, about 6 miles from the Park Street subway station, and at Newton Corner, 7 miles west of the city. Norumbega Park is about 4 miles west of Lake Street and about 3.5 miles from Newton Corner. Through cars are operated at all seasons of the year from Park Street, Boston, to Auburndale, via Lake Street, and at times when the traffic conditions require it through service is given between Newton Corner, Waltham and the Dudley Street station of the rapid transit lines of the Boston Elevated company and the Park. The Newton and Waltham through service is required every afternoon and evening during the park season, and the through service to and from Dudley Street is maintained during the same portion of the year. Last year about fifty parties, of from twelve to 125 each, came in special cars.

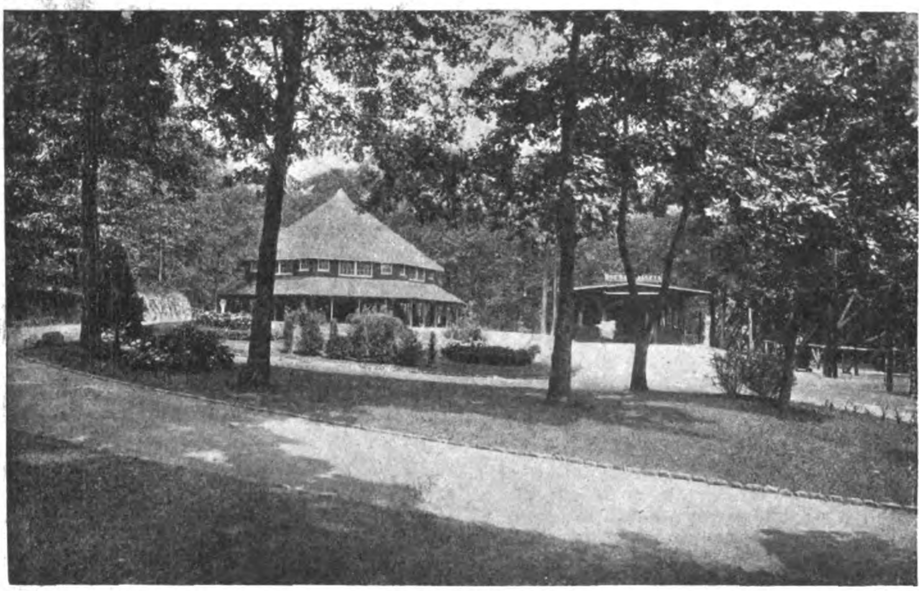

Follow the FLAG To
N
NORUMBEGA PARK & ZOOLOGICAL GARDEN
FAMOUS STEEL OPEN AIR THEATRE
GRANDEST OF ITS KIND IN THE WORLD
HIGH CLASS VAUDEVILLE AND MUSICAL COMEDY
AFTERNOONS 3.30
EVENINGS 8.05
FINE RESTAURANT
CANOEING THE FAMOUS SPORT
BEAUTIFUL POWER LAUNCH TRIPS
A HOST OF OTHER ATTRACTIONS
CARS FROM ALL POINTS MARKED NORUMBEGA PARK

Norumbega Park—Colored Poster

The Dudley Street service provides quick and convenient means of reaching the park from a large suburban area on the south side of Boston, including the South End of the city proper, Roxbury and a considerable portion of Dorchester and Forest Hills. The Boston through car service is maintained on a fifteen-minute basis during the park season, double-headers being run when the traffic necessitates. The round-trip tickets including park admission are sold by conductors on the Middlesex & Boston cars, and crews are changed at the boundaries of each system. This arrangement enables the Boston Elevated Railway to handle its Norumbega Park traffic upon the same basis as its regular local business, and up to the present time no attempt has been made to introduce express service in connection with the handling of this through travel. The elimination of the former change at Lake Street, however, has unquestionably been a decided factor in stimulating travel.

HANDLING TRAFFIC IN THE PARK

The arrangements at the park for handling traffic are unusually effective and occupy but little space. All cars delivering passengers at the park are operated around a loop of about 90-ft. radius and are stopped under a covered platform outside the park proper but within a few feet of the ticket offices and entering turnstiles. The unloading platform is about 60 ft. long and is separated from the loading platform, which is a continuation of it, by a high fence. The loading platform is about 75 ft. long, and both platform sections are about 20 ft. wide. After unloading, the car proceeds to the loading platform, or, if it is scheduled for a lay-off, it is run past the latter and operated into a storage carhouse holding sixteen fourteen-bench cars, the carhouse being situated immediately beneath an attractive restaurant building which is the central feature of the park entrance.



Norumbega Park—East Court

Four spur tracks are run into the storage carhouse from the single-loop track which serves the park entrance, and the building contains a lobby and lavatory for the use of car-service employees. The storage of cars within a few feet of the gates enables fluctuations in traffic occasioned by departing visitors to be promptly handled and eliminates dead mileage. Additional car storage is available, with repair facilities, at the Auburndale shops of the Middlesex & Boston company, situated about an eighth of a mile from the park. The office of the park manager is at one side of the unloading platform, and access to the restaurant may be had either from the platform or from the interior of the park by a bridge spanning the loop track. The office of the division superintendent is in a cottage structure adjacent to the storage carhouse. Each end of the loop is connected with the main-line trackage of the company in Commonwealth Avenue.

THE THEATER

The park is opened daily at 10 a. m. during the season, which begins about May 20 and closes in seventeen weeks, or about Sept. 20. The evening closing hour is 10:30 o'clock. In order to give the concessionaires in the park a reasonable time after each theatrical performance to attract patronage, the theater program is one hour forty-five minutes in length for each performance. The curtain rises at 3:30 p. m. and 8:05 p. m. each week day, and on Sundays no vaudeville performance is rendered, but in its place a concert is given. As forty minutes are left between the end of the evening entertainment and the close of the park, the peak load which would otherwise result on the car service is greatly cut down, and the departure of patrons is fairly regular.

The theater is the chief attraction of the property and is one of the finest open-air structures of its class in the world. It was built in 1910 at a cost of $60,000 and seats 3500 persons. The auditorium is covered by an umbrella-type roof carried on steel trusses, without a single interior column. The floor is of concrete and there are 700 free benches and 2800 folding seats, the latter being sold at 50, 25 and 10 cents according to location. When the park was opened a rustic theater was one of the first attractions, and in the opening season the patronage totaled $2,164. The first covered theater was built in 1904, and the receipts of the theater that year were $12,394. The covered theater was destroyed by fire in 1909 and a temporary theater was built in eight days to enable the season to be finished, the public being invited by advertisements on the Middlesex & Boston cars and in the daily press to visit the park and watch the rapid erection of the temporary structure. Since the completion of the present theater the receipts have risen to a maximum of $23,523 in a single season, and the popularity of the performances is steadily growing. The theater is provided with a stage 37 ft. long and 35 ft. deep, and the property and dressing rooms are equipped with about sixty-five sprinkler heads installed by the General Fire Extinguisher Company, of Providence, R. I., and operated on the water-service system of the city of Newton, the pressure being 100 lb. per sq. in.

In 1913 out of 204 possible performances only four were omitted. The show consists of five or six acts, with a weekly change of program, comedy, singing, acrobatic work, monologues, playlets, moving pictures and other vaudeville being scheduled. Feature films are sometimes run for thirty minutes without a break, the cinematograph equipment being located in a fireproof house mounted in the auditorium near the rear seats. A motor-driven baggage hoist is a feature of the stage equipment, a chute being provided at the rear to facilitate handling heavy trunk and boxes. In addition to the sprinklers, the theater is protected against fire by hand extinguishers and four hose streams are available from hydrants within 50 ft. of the auditorium. About $13,000 a year is expended for stage attractions at present. These are furnished through the office of

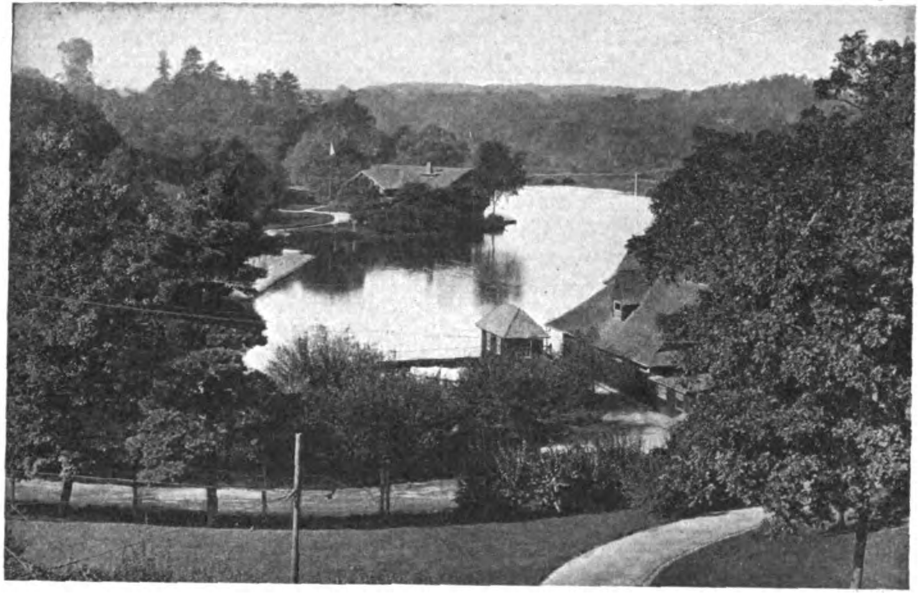
J. W. Gorman, of Boston, Mass. In the winter the interior of the theater is protected by canvas walls.

THE ZOOLOGICAL GARDEN

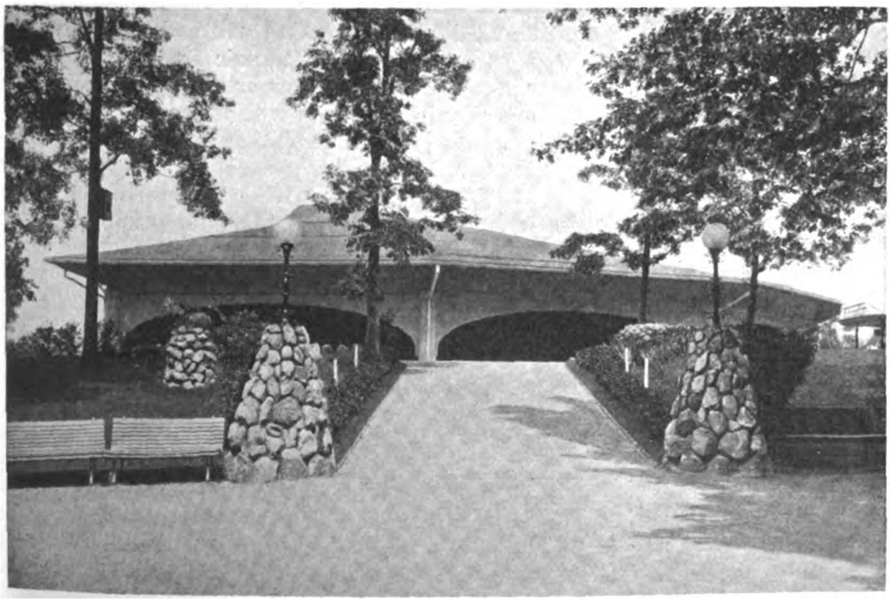
A "zoo," representing an investment in animals of $4,100, is managed by the Norumbega company and is one of the best features of the property. It is situated on the lower side of the grounds near the river and is free to all visitors. On Sundays it is immensely popular. It contains about 150 specimens, including two buffaloes, a lion, a lioness, two leopards, a puma, wolves, lynxes, two bears, a white jackass, monkeys, birds and other small animals. The buildings and "zoo" equipment cost an additional $10,000, but the investment pays well. In one year about 12,000 lb. of meat is consumed, together with 10.5 tons of hay and vegetables in bulk. The bears are maintained in a large open-air inclosure with adjoining den and the exhibits are all kept at the park through the winter. Tropical animals and birds, the former including the lions, puma, leopards and monkeys, are housed in winter in circular quarters heated by a central stove. Pipes from the stove radiate to the various animal drinking water troughs to facilitate the supply of water at the proper temperature. In one winter the principal animals were taken to Cuba and exhibited at Havana, but they are preferably maintained at Norumbega.

OTHER ATTRACTIONS

The concessions include rifle range, box-ball alleys, restaurant, soda pavilion, photographic studio, boat and canoe house and two casinos. All of these are under the strict control of the company, being leased, as are all of the concessions, on a percentage basis. One of the best money-making features operated by the park management is a merry-go-round, 50 ft. in diameter, which holds sixty-five persons and runs at 8 r.p.m. It contains fifty-two "animals" set three abreast and is gear-driven by a 10-hp, 600-volt direct-current motor supplied with energy from the railway feeders. The merry-go-round was rebuilt last year at a cost of $11,000, of which $8,500 represented new machinery. This equipment is one of the best in the country, well lighted and attractive, and its popularity as compared with the former installation is evidenced by the fact that in 1913 the patronage was 179,473 persons compared with 96,000 in the preceding year. The usual length of ride is five minutes for the customary price of 5 cents. When the equipment is in service one ticket seller and two operators are on duty. Six tickets are sold for 25 cents. On holidays the length of ride is somewhat curtailed if the number of waiting patrons is large.



Norumbega Park—River and Boathouses



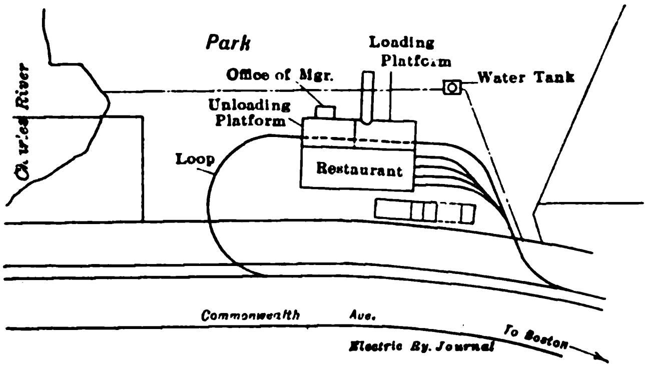
Norumbega Park—Main Path to Theater

About 3000 canoes are kept in livery at the park boathouse and 300 other canoes, including a few boats, are maintained on a rental basis. On pleasant Sundays in the summer the portion of the Charles River lying within about 2 miles on each side of the park is thronged by thousands of canoeists. Two gasoline launches are maintained by the company and round trips down the river toward Waltham, costing 10 cents per passenger, are run frequently. The launches seat twenty-five persons each and the round trip occupies about twenty minutes, the speed being about 8 knots per hour. A great variety of souvenirs are sold by the company at the park, a stock of about $2,000 value being carried in picture post cards, flags, canes, bric-à-brac and other material. Outside the park the company operates a garage where automobiles are checked at 25 cents each and gasoline and minor supplies are sold. Bicycle-checking facilities are maintained, but the patronage has fallen from 36,000 wheels per season in the first year of the park's service to 500 in 1913. The automobile garaging has increased tenfold, however, and last year 3830 machines were garaged at Norumbega. All occupants of automobiles pay the regular 10-cent admission fee if they desire to enter the park. Practically no carriages are checked to-day, although this business used to be a feature. No fireworks or balloon ascensions are given at the park, and the wooded character of the property and its limited area preclude aviation exploits. The entire park is inclosed by a heavy wire fence.

LIGHTING AND ADMINISTRATION

The electrical service of the park is supplied by the Edison Electric Illuminating Company of Boston, Mass. A total of 2192 incandescent lamps is in service, the sizes ranging from 4 cp to 32 cp. Edison alternating service is used in the operation of thirty-five 8-cp lamps in the theater orchestra pit and in supplying 16-cp lamps in the green room, moving-picture booth and ticket office of the theater, and direct current to one 6.6-amp flaming-arc lamp hung over the center of the stage and to ten 6.6-amp inclosed-arc lamps hung from the roof of the auditorium. Forty arc lamps are used about the grounds, besides incandescent lamps in various buildings and on paths. A general policy of replacing carbon-filament lamps by tungstens is now under way.

The summer staff of the park consists of about fifty employees, all of those coming in contact with the public being uniformed. There are five special police, two matrons, fourteen theater attendants, of whom eleven are ushers, six gardeners, two electricians, three merry-go-round attendants, four souvenir clerks, three ticket takers and eleven laborers and caretakers. All these report directly to the park manager, who is occupied with the property throughout the year. In the closed season one watchman and two "zoo" attendants are required. The other employees usually return to the park yearly after spending the closed season in other occupations. Repairs are made under the direction of the park manager and extensive jobs by contract.



Norumbega Park—General Lay-Out of Grounds

The advertising campaign is begun three weeks before the park opens, posters being placed in cars, in elevated and subway stations, in waiting rooms and other public places, with some use of billboards. About two weeks before the opening date small advertisements are run in the Boston and suburban press, and larger advertisements are run during the following week. Throughout the season a ten-line advertisement is run in the Boston dailies and the suburban weeklies. Small folders outlining the attractions of the park are widely distributed, particularly through the Bay State Street Railway Company's Trolley Information Bureau at 309 Washington Street, Boston, and the Information Bureau of the New England Street Railway Club at 12 Pearl Street, Boston. All Norumbega Park cars are provided with triangular blue flags carried on the trolley pole and advertising the park by a "Follow the flag" slogan, and full directions as to reaching the park are posted in the important transfer stations of the rapid transit lines of the Boston Elevated Railway. A striking electric sign emphasizing the route to the park is also operated at the Boylston Street subway station in Boston. Effective advertising is done at the park on a 10,000-gal. water tank used in the operation of sprinklers in the restaurant and park offices. This tank is mounted about 75 ft. above the ground near the entrance, and the top and railing of the tank are outlined by 150 8-cp incandescent lamps, forming a display which can be seen for several miles.

Plans for the coming season include the construction of a swimming pool for high diving, exhibition swimming, diving horses and other aquatic features. The pool will be formed in a reinforced concrete tank, 40 ft. long, 12 ft. wide and 12 ft. high near the river bank.

Careful accounts are kept in the manager's office of the expenses and receipts of the various features of the park. Entries are made daily of the readings of each turnstile entrance, there being four in service, of the total admissions between 10 a. m. and noon, between noon and 6 p. m., and in the evening. Against each day in the season are also listed the various kinds of tickets received, number of automobiles checked, merry-go-round patronage, weather conditions, classification of theater patronage, casino earnings, income from concessions, revenue from the sale of souvenirs, earnings of launches, payments for salaries, temperatures, rainfall, lost performance data, cost of stage attractions, advertising, music and other data. Last year the park expended about $4,000 in advertising in the Boston dailies. The park is under the management of Carl Alberte, who has had direct charge of the property since its opening. George M. Cox is general manager, with headquarters at Newtonville, Mass.

AMERICAN ELECTRIC RAILWAY ASSOCIATION COMMITTEE ACTIVITIES

Chairman W. J. Harvie has called a meeting of the A. E. R. A. committee on the joint use of poles for Feb. 24 and 25. The meeting will be held at the headquarters of the American Electric Railway Association in New York. The very important matters discussed at the meeting held Jan. 28 will be considered further.

Chairman L. H. Palmer of the rules committee of the Transportation & Traffic Association has appointed a sub-committee to confer with a sub-committee of the joint committee on block signals for electric railways in regard to the recommendations of that committee regarding block-signal rules. The sub-committee comprises C. P. Wilson, general manager Indianapolis, Columbus & Southern Traction Company, chairman; F. W. Cohen, vice-president Lake Shore Electric Railway, and Mr. Palmer. The two sub-committees will probably meet in Chicago on March 16 for consultation, just prior to a meeting of the joint committee scheduled for March 17.

J. M. Waldron, signal engineer of the Interborough Rapid Transit Company, states that the meeting of the joint committee is held in March in Chicago in order that the members may have the benefit of studying the elaborate exhibits which form an important feature of the meetings of the American Railway Signal Association and the American Railway Engineering Association. The meeting of the joint committee will be taken up with the discussion of reports from the members prepared in accordance with a schedule laid out at the mid-winter meeting of the American Electric Railway Association.

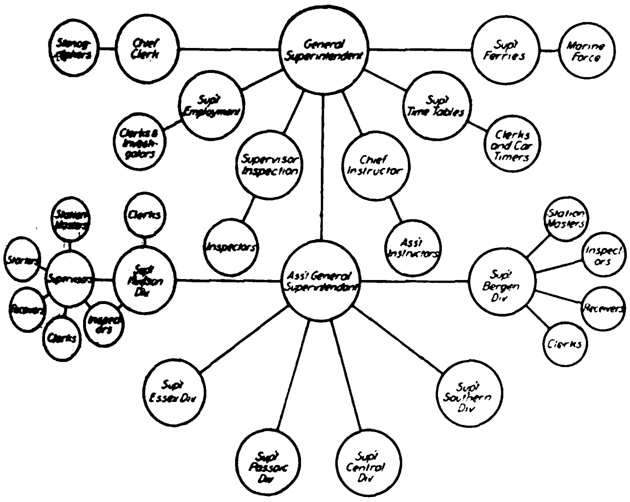
MEETING OF MASSACHUSETTS STREET RAILWAY ASSOCIATION

At the regular monthly meeting of the Massachusetts Street Railway Association in Boston on Feb. 11, Newton W. Bolen, general superintendent Public Service Railway Company, Newark, N. J., presented a paper entitled "Some Features of Electric Railway Departmental Organization." Mr. Bolen also read a paper written by H. C. Donecker, assistant general manager Public Service Railway, who was unable to attend the meeting. The title of this paper was "Welfare Work." President H. H. Crapo was in the chair, and the meeting, which was held at Young's Hotel, was one of the most enthusiastic this season. Abstracts of the papers are given below.

DEPARTMENTAL ORGANIZATION

On the lines of the Public Service Railway of New Jersey, with 5000 men in the transportation department and nearly as many in other branches of the company, it is apparent that departmental organization of a high standard is imperative. The one salient feature of co-operation stands out strongly.

The transportation department organization is shown by the accompanying chart. The ranking officer in the department is the general superintendent. An assistant general superintendent, six division superintendents, a superintendent of timetables, a superintendent of employment, superintendent of inspection, chief inspector and a superintendent of ferries compose his organization of officials. Reporting to the division superintendents are the supervisors, who in turn direct the work of the station masters, inspectors and other members of the supervisory force.



Public Service Railway—Organization of Transportation Department

The property is divided into six physical divisions. Hudson division contains Jersey City, Hoboken and all the territory adjacent to the North River from Bergen Point to Weehawken and west to the Hackensack River. Essex division centers about Newark, the first city in the State and the thirteenth in the United States. From Newark lines radiate in all directions to the densely populated sections of Essex County. The Passaic division contains two important cities in the textile industries field, Paterson and Passaic, with lines radiating to the adjacent suburban sections. The Central division covers a territory of 200 miles, with Elizabeth as its easterly limit and Trenton as its western boundary. The Southern division embraces the territory south and west of Trenton and contains the city of Camden and the Jersey suburbs adjacent to Philadelphia. The Bergen division is composed of the lines radiating from Edgewater, opposite 130th Street, New York City. The traffic of this division depends largely on the ferry service maintained by the company between New York and Edgewater. The principal towns are all residential suburbs of New York. Each division superintendent has in his jurisdiction a mileage and traffic equal to a good-sized system in itself.

The division superintendents are called together frequently by the general superintendent, and such matters as apply to the operation of the system as a whole are discussed. Either the general superintendent or his assistant visits each division weekly or oftener. Division superintendents conduct meetings in turn with supervisors at which matters pertaining to the individual lines are disposed of. The timetable department, reporting directly to the general superintendent, plays an important part in the operation of the system, for in no way can operating expenses get out of proportion to gross earnings more quickly than by means of badly constructed timetables. The work of this department increases as the demand for statistical data in connection with utility commission reports becomes more frequent. The employment and training of men requires daily consultation with the heads of those departments, while the marine department brings up an entirely different set of problems for consideration and disposal.

Through all these closely related branches of the department must run the spirit of co-operation and mutual helpfulness. It is an evidence of the broad-gaged policy of the management that, while the administration of the system is departmental rather than divisional, strictly departmental lines are not observed, and the division superintendent and division master mechanic or the division roadmaster settle to the satisfaction of all concerned many matters of joint operation which arise daily. In this way much red tape is eliminated and interdepartment letter writing reduced to the minimum. The operating officers naturally have no constructive duties.

WORKS COMMITTEE

The size of the property, covering 1077 sq. miles of territory and having 900 miles of track, makes it necessary that departmental organizations be kept in touch with each other by some means that precludes lost motion and crossed lines of endeavor. This need is met by the works committee, composed of the general manager and department heads. The object of the committee is to advance by preparation of reports and discussions the interests of the company. Its members consist of the general manager, assistant general manager, general auditor, general claim agent, general superintendent, superintendents of maintenance of way, distribution and buildings, mechanical engineer and engineer of maintenance of way. The company operates no power stations, purchasing all its energy.

The officers of the committee consist of a chairman, vice-chairman and secretary, the first-named being the general manager of the company. The committee meetings are held at the office of the general manager on Monday at 9 a. m. weekly, unless notice is received in writing from the secretary to the contrary. In the event of any member not being able to be present he delegates an assistant to attend, who has the right of discussion and vote. Standing committees are maintained on accounting, claims, transportation, track and roadway, power and distribution, buildings and structures, equipment, property and right-of-way, and public affairs. The personnel of the committees is as follows:

Accounting: general auditor, engineer maintenance of way, general claim agent, real estate agent.

Claims: general claim agent, general auditor, general superintendent.

Transportation: general superintendent, general auditor, superintendent of distribution.

Track and roadway: superintendent of maintenance of way, superintendent of distribution, mechanical engineer.

Power and distribution: superintendent of distribution, superintendent of maintenance of way, superintendent of buildings.

Buildings and structures: engineer maintenance of way, superintendent of buildings, mechanical engineer, general superintendent, real estate agent.

Equipment: mechanical engineer, general superintendent, engineer maintenance of way.

Property and right-of-way: engineer maintenance of way, general superintendent, general auditor, real estate agent.

Public affairs: assistant general manager, general superintendent, general auditor, engineer maintenance of way.

The personnel of special sub-committees may be decided by the chairman at any meeting.

No subject assigned to a committee is discussed before the works committee unless a written report is made by the chairman of the committee receiving the assignment. The chairman of each committee is responsible for the committee's report. In making reports the chairman of each committee includes the date of each meeting and the names of those attending. Other members are called into consultation when necessary, and information may be obtained from other properties. The committee reports contain analyses of the more important elements, with arguments pro and con, and are as brief as is consistent with the scope of the topics discussed, leading up to conclusions when it is possible to do so.

The effect of obtaining the unbiased viewpoint of the members of the works committee on the various subjects brought up is undoubtedly good, and the need of obtaining all the facts before presenting a report is productive of incisiveness not always obtained when a department head makes a decision hurriedly, perhaps on the recommendation of a subordinate.

WELFARE WORK

Since the inception of the welfare plan of the company on Jan. 1, 1911, the number of trainmen leaving the service by resignation and discharge has dropped from 4153 in 1911 to 2363 in 1913, despite the fact that the number of men required to operate the cars is constantly increasing. As part of the general scheme of welfare, the employees of the combined railway, gas and electric companies are protected by four types of insurance, health, life, old age and accident. The company assumes the entire cost. Accident insurance is provided by the State employers' liability act of 1911, the elective compensation feature of which the company accepted, operating it in conjunction with its own welfare plan and thereby increasing the scope of the act.

Under these insurance plans the employees received through the welfare committee, in 1913, $91,077.71, of which $54,296.36 was paid for disability due to illness or death therefrom and for superannuation, the remaining $36,781.35 having been paid for injury and death from accident. For the two years 1911 and 1912 the employees received $144,662.51, of which $101,123.57 was for illness and death from it and for superannuation, and $43,538.94 was for injuries and deaths from accidents.

Not the least of the agencies for encouraging the interest of the employees in the success of the property are the social and athletic events that for several years have been prominent features of the Public Service Railway. The social features were vigorously continued in 1913. In Essex County alone 114 social gatherings of employees and families were conducted by the social organizations at the respective carhouses. The Southern Division social clubs, with the ladies' auxiliaries, conducted thirty-three entertainments and outings, and similar activities marked the year in the Hudson, Bergen, Passaic and Central divisions. Much interest has been displayed by the wives and mothers of trainmen in the ladies' auxiliaries connected with a number of carhouses, and their influence appears on the side of better and closer relations between the company and the platform men, all of which are secured at little or no cost to the company. The general superintendent and members of his staff were in attendance at a large proportion of the entertainments held in different parts of the property.

A successful baseball season was enjoyed by the two leagues comprising the Public Service Railway circuit. The eighteen teams forming the Northern League, representing a like number of carhouses, played an average of ten games each, while the Southern League finished a successful series of games. The culminating features were the presentation of gold watches by the president and second vice-president to the members of the winning teams, the affair winding up with a banquet at Hoboken. The field day at Hilton Oval was marked by great enthusiasm and was a timely event, coming in the crucial days of the Paterson labor troubles. The pool tournament is now attracting the attention of many trainmen and the contest for the general manager's trophy is spirited. The social and athletic features have repaid several times over all that they have cost in the harmonious relations engendered between the company and its employees.

ADDITIONAL COMMITTEE APPOINTMENTS OF THE ACCOUNTANTS' ASSOCIATION

Members of committees of the American Electric Railway Accountants' Association, in addition to the names made public previously, have been announced by President M. W. Glover as follows:

The accounting members of the joint committee with the American Electric Railway Claims Association, known as the claims accounting committee, consist of H. J. Davies, Cleveland, Ohio, and H. J. Jumonville, New Orleans, La.

G. W. Kalweit, Milwaukee, Wis., has been appointed a member of the committee on prepayment car accounting.

W. H. Forse, Jr., Anderson, Ind., has been appointed a member of the joint committee with the Engineering Association on life of railway physical property in place of H. E. Weeks, Davenport, Iowa, resigned.

W. S. Barker, of Newark, N. J., has been appointed chairman of the committee on overhead charges in place of P. S. Young, Newark, N. J., resigned.

During the severe snowstorm of Feb. 14, which blocked suburban travel about New York for several days, the trains of the New York, Westchester & Boston Railway were operated practically without delay except between 7 a. m. and 9 a. m. on the first day of the storm. No trouble of any kind was experienced with the single-phase equipment. All told there were 101 late trains and 112 on time on the Westchester line on the first day of the storm. Of the delayed trains fifty-four were less than five minutes late and forty-seven were between five minutes and thirty-five minutes late.

ADVANTAGES OF COMPANY SECTIONS

R. B. Stearns, vice-president The Milwaukee Electric Railway & Light Company, has sent to Secretary Burritt a written discussion of the paper by Mr. Schreiber on company sections read at the last midyear meeting of the American Electric Railway Association. That paper was published in abstract on page 250 of the issue of this paper for Jan. 31. An abstract of Mr. Stearns' discussion follows:

"It is difficult to determine the cause of so little apparent interest by member companies in this movement. Certainly if the managers of the street railways could see the amount of interest in the Milwaukee company section of the American Electric Railway Association or the Milwaukee section of the National Electric Light Association there would be no further hesitation in promoting the features of the association. There are only three company sections now organized after a period of two years, namely, those of The Milwaukee Electric Railway & Light Company, the Public Service Railway and the Denver Tramway.

"Where are the others? Is it not time to begin a campaign among your own men—to train them to think of your business, to understand your troubles, to have confidence in the justice of your complaints?

"There has been a great amount of discussion and deliberation over the need of more publicity of the affairs of the street railway business—a campaign of enlightenment, or education if you please, of the public. The expenditure of a large sum of money for such a propaganda has been referred to by your president in his address, and a strong committee has been suggested to consider the subject. This plan contemplates ways and means to enable the industry to put before its patrons and the various municipal and state authorities facts and figures, principles and axioms to indicate that the business is sick, that it needs relief from further onslaughts, that its service now costs more than the price paid, and that when the public understands its case justice will be done, some kind of treatment will be administered and the sick business will recover.

"Now, why not begin the publicity at home among your own employees by taking them into your confidence? Experiment on them if you please; organize a company section; adopt short by-laws and procedure. When you return, announce the plan in detail, together with the purpose of the movement. Appoint a committee from the men who stay at home. Authorize them to begin the work. The men will do the rest. Then watch your company section grow and spread real publicity and education through your business. Give the question of subjects some thought. Assist in outlining subjects of real mutual interest to your supervisory force. Drop in to see the members in action conducting a real street railway convention at home. Encourage it. Why not take the association to your employees and associates if you cannot bring them here?

"Mr. Schreiber in his paper stated that 400,000 employees were engaged in the street railway business. Five per cent, or 20,000, is a low estimate of the probable company section members if the movement is encouraged. Seven hundred and fifty members represent those now enlisted in the three company sections.

"Let this army of recruits start out at an early date filled with your propaganda, and in their daily work they will come in contact with the thousands whom you are seeking to reach. Give your own men a chance to feel that they are doing some real work.

"The Milwaukee company section has been the means of bringing to light many steady men hidden away in the shops, stations and other places, unfamiliar with the views and policy of the company except as they have read them in the daily papers. The class of employees who have joined the section are what is ordinarily termed the supervisory force, but no restrictions prevent any employee in the service of the company joining it.

"There exists no selfish motive in an appeal for the company section movement. Anything which this association undertakes should be done right. It authorized the movement because the street railway business needed it, and an honest effort should be put forth to ascertain the reason for the apparent failure of member companies to respond.

"It is important that we appreciate that only when the problems of the company are fully understood by the employees and by them disseminated to the public can we expect the public to be fair. A good start in educating the employees will be to authorize your company section now. Take your own employees into your confidence."

COMMUNICATION

WHY USE ANY KIND OF JOURNAL BRASS?

FRICTIONLESS METAL COMPANY
CHATTANOOGA, TENN., Feb. 17, 1914.

To the Editors:

The matter discussed in your issues of Jan. 31 and Feb. 14, namely, whether the M. C. B. brass should be discarded, is a subject that has been close to my heart and has had my thought and study ever since the days of link pins, whistling down brakes and hot boxes in all railway service; and while that vision is before me I want to say that it took the best known metallurgical chemist of his day—a man in the employ of America's greatest railway—nearly twenty years to find the real cause of hot-box troubles and to apply the simple remedy of lining the brasses with babbitt metal made from a proper formula. Like many another good man of the past and present, he could not or would not—until absolutely forced to try out the theory—accept the fact that to reduce both friction and wear in the bearings of any kind of machinery it is necessary to use soft metals in contact with hard ones.

Railway employees, officers and passengers of a good many years ago will remember the sudden change from delayed passenger and freight service, with the attendant loss of time and money, to the almost perfect service of M. C. B. brasses lined with softer metals than the brass itself. In the light of that experience, why use brass at all when other and cheaper metals are strong enough for any service and any well-posted mechanic knows how to unite soft metals to malleable iron?

However, assuming that brass is the better metal for the purpose, and perhaps easier for attaching the soft metal lining, why not try out to a finish brasses of the proposed full semicircular cross-section type and thus obtain, if necessary, a standard for electric service, which has its own special requirements different from those of the steam roads? After all, there is too much talk and writing on these subjects and not enough of actual investigation by experiment and practice.

ROBERT H. EVANS, General Manager.

[The question of our correspondent as to the necessity for the use of brass for journal bearings is an interesting one. The basic objection to the use of malleable iron, faced with babbitt, is that when the babbitt wears through the journal is certain to be badly damaged. With brass only a comparatively mild heating takes place. However, the original reason for the brass bearing may be traced back to the needs of practically uninspected freight cars. With closely inspected bearings this need might easily cease to exist.—EDS.]

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

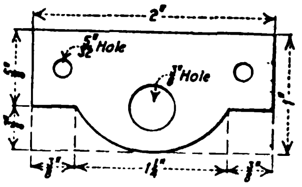
IMPROVEMENTS ON K CONTROLLERS

BY R. H. PARSONS, ELECTRICAL FOREMAN THIRD AVENUE RAILWAY, NEW YORK

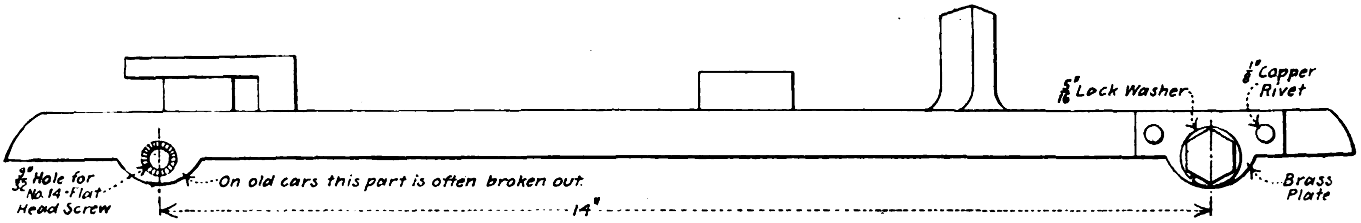
Undoubtedly nearly all readers of this paper have had much experience with the standard K controller. Those whose work has brought them in close contact with that controller therefore may be interested in the means that we have used to overcome the small troubles incident to the K type.

The brass top was loose on a large percentage of the controllers which came into the shop for overhauling. Sometimes the screws were loose and sometimes they were broken; at other times they were missing. Frequently the holes were worn so badly in the top that the screw did not hold. In too many cases, also, the holes were broken out of the tops, the same condition applying to the thumb screw which holds the top of the upper main cylinder bearing cap.

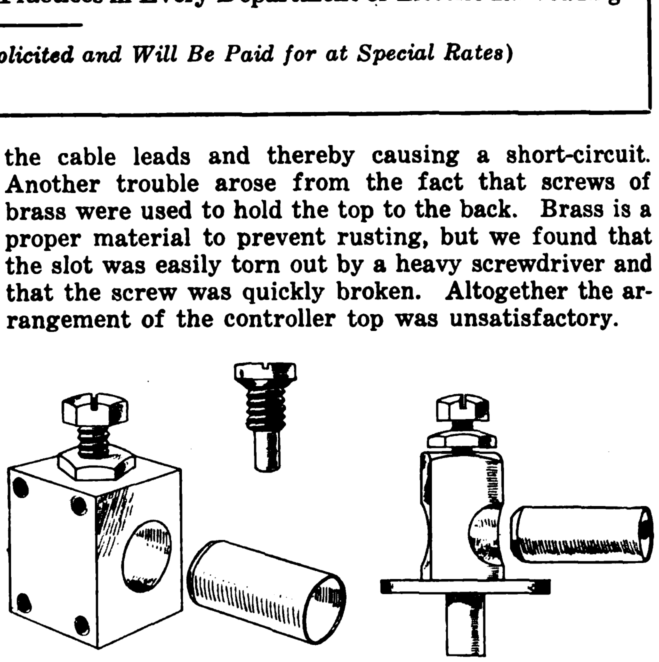
The loose tops were due to many causes. One was that as the controller was close to the vestibule or dash rail, access was difficult to the countersunk screws which held the top to the frame, thus making it necessary to loosen the controller from the dash or vestibule and tip it over toward the front to inspect and tighten these screws. When the controller was new all tops were nicely fitted to each frame, all holes were properly countersunk and all screws fitted; but when the controllers were changed from car to car and the tops removed from one controller to another it was found that the latter were not all standard and interchangeable. First, someone would file a hole out a little, then someone else would file it a little the other way, and so on, until the hole was so much larger than it should have been that even if the screw was tight the top would still be loose. On account of this non-interchangeability it was often found that the tight installation of the tops would bind the shafts of the control and reverse cylinders. Further, on account of worn top cylinder bearings, the bearing could not be properly tightened if the thumb-screw hole in the bearing cap was made to match the hole in the brass top. Soon the cylinder bearing would be loose and the thumb screw would drop out, frequently falling down among the cable leads and thereby causing a short-circuit. Another trouble arose from the fact that screws of brass were used to hold the top to the back. Brass is a proper material to prevent rusting, but we found that the slot was easily torn out by a heavy screwdriver and that the screw was quickly broken. Altogether the arrangement of the controller top was unsatisfactory.



Brass Plate Detail


5/16" Lock Washer
1/8" Copper Rivet
9/32" Hole for No. 14 Flat Head Screw
On old cars this part is often broken out
14"
Brass Plate

Back View of Controller Top, Showing at the Left the Old Countersunk Screw Hole—At the Right the Method Described



T-1 Terminal for Blow-Out Coil of K-27 Controller with Sleeve Removed; Sherardized Round-Head Screw for Water Cap; and T-2 Terminal for Connection Board of K-27 Controller with Sleeve Removed

To remedy these faults we took a brass plate, made in accordance with an accompanying sketch, which we riveted on the brass top, over the old ¼-in. countersunk holes, with a flush ⅜-in. hole. We then redrilled and tapped to 5/16 in. the holes in the controller frames, made them standard as to location, then fastened the top to the frame with a hexagon head sherardized 5/16-in. x ⅞-in. cap screw. We also redrilled and tapped to 5/16 in. the hole in the brass top for the screw which was to replace the old thumb screw holding the top cylinder bearing to the top and drilled the hole in the bearing to ⅜ in. We then applied the same-sized screw as for the back.

As we now had the difference between the 5/16-in. screw and the ⅜-in. hole, we could set the top so that it would not bind the main or reverse cylinder, and by using a light 5/16-in. lock washer we could be assured that it would remain tight. The 5/16-in. x ⅞-in. cap screw used has a hexagon head which is fitted by a wrench attached to the cap screw holding the pole piece to the magnet core. This wrench is in all of our controllers, and the same one is used to tighten the set nuts of the finger-adjusting screws so that one wrench can be used for tightening all of the screws.

When water collars were removed from the control cylinder and reverse cylinder stem it was a common practice to block the cylinder and turn the collar with a Stilson wrench, thus breaking off the set screw, or to split the collar with a chisel. The reason for this was that the collar was held by a special screw which was turned in flush with the former. As these set screws would rust and the slot would break, it was impossible to get them out. To overcome this a screw was designed as shown in the accompanying sketch. This is like the original screw except that it is fitted with a generous round head with a good slot, and it is also sherardized. After the installation of these screws no difficulty was found in removing them with a large screwdriver, thus saving the screws and the water caps. At the same time, the large head will stand a good pressure of the screwdriver, and the collar can be made perfectly tight.

On account of the loosening of cylinder bearing caps, standard 5/16-in. lock washers are used under the heads of the cap screws which hold the reverse cylinder, and a special lock washer is used in connection with the cap screws which hold the main cylinder bearings. The size of this special lock washer is 11/16-in "O" diameter, 7/16-in. "I" diameter and 1/16-in. thick. These washers have stopped loose bearing caps entirely.

Because of the heavy currents which pass through K-27 controllers on our larger cars, the wires soldered into the terminals at the back of the connection board would often melt out from the terminals. As these terminals were not designed to carry heavy currents, the result was a small arc or excessive heating from the high resistance between the set screw and the wire, causing the solder to melt.

The motor lead and resistance terminals were taken care of by tinning the leads well and by tightening the set screws, but this was not sufficient for the two trolley terminals. To overcome this burning a new terminal was designed for the T-1 connection on the blowout coil and for the T-2 connection on the board as shown in the accompanying sketch. These terminals are of ample capacity and are fitted with a sleeve. The wire is soldered full size into the sleeve and the sleeve makes a tight fit into the terminal. This change has entirely eliminated the burning out of wires at the connection board terminals.

The doors of all K-8, K-9, K-10 and K-11 controllers were fitted originally with a permanent hinge on the right side and had bolts with thumb nuts on the left side so that the cover could be opened but not removed. When all of these controllers went through the shop they were equipped on both sides with hinge bolts and thumb nuts, as was formerly the case on the right side only. Hence the cover can now be removed entirely and better inspection facilitated.

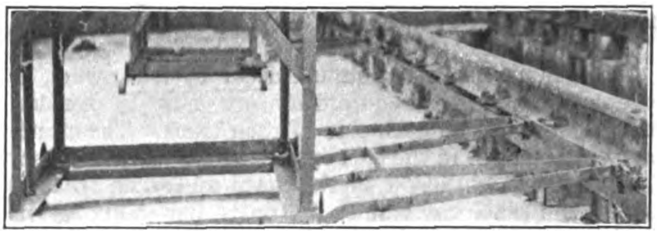
The electric arc-welding outfit used in our shop has been described in an earlier issue of this periodical, although not especially in connection with controller work. However, we use it extensively in repairing broken frames, renewing lugs, etc., and also in building up the worn shafts of controller cylinders, which are then machined to their original size.

The Illinois Traction System, Peoria, Ill., reports that during the past year it has filled or replaced with concrete and steel over 3000 ft. of wooden bridges. During the present year this company expects to continue the good work of replacing temporary structures with permanent ones. At the same time it will profit by past experience either to enlarge the waterways to meet maximum high-water requirements or to reduce their size if the waterways are now larger than necessary.

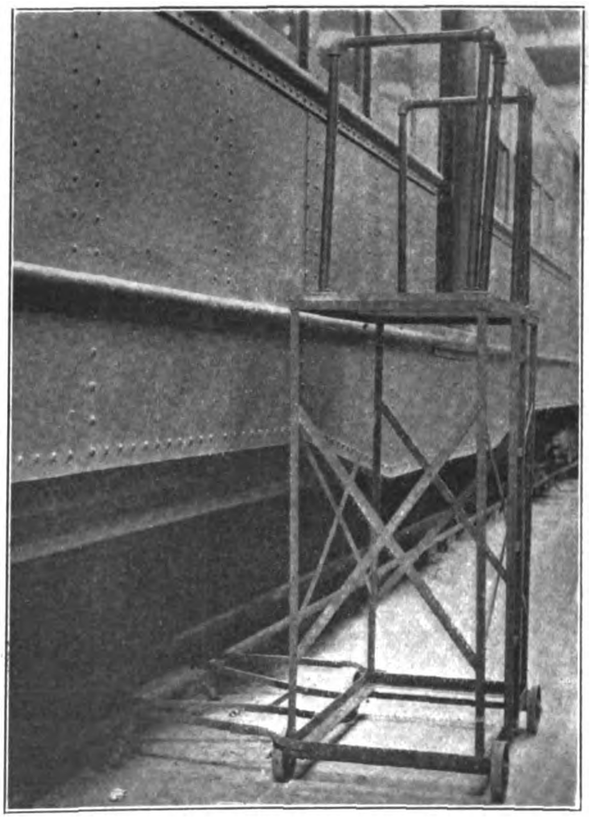
ROLLING CAR-WASHING STANDS REPLACE LADDERS AT BOSTON

BY M. DERMODY, NIGHT FOREMAN ELIOT SQUARE SHOPS, BOSTON ELEVATED RAILWAY

At the Eliot Square (Cambridge) shops of the Boston Elevated Railroad Company a specially designed type of car-washing platform has lately been placed in service, with the result that about one-third more work can be done per car cleaner than by the old method of washing from a ladder. The apparatus consists of a portable platform which is carried in a light frame running on wheels bearing on the shop floor and held in line by a horizontal truss-shaped extension resting at one end on the frame and carried at the other end on a ¼-inch x 2-in. strap-iron bar which is fastened parellel to the track by means of the ties. In using the platform the washer ascends from the floor by a narrow ladder carried vertically against the frame, and as fast as a given portion of the car area is covered pulls himself along parallel to the side of the car by hand, without being obliged to descend to the floor. The saving in fatigue is remarkable as compared with the old process of washing from a ladder. The cars in this shop are 70 ft. long and are used for subway service.



Car-Washing Platform—Attachment to Ties at Base



Car-Washing Platform—Showing Attachment to Ties and Use of Carriage Wheels

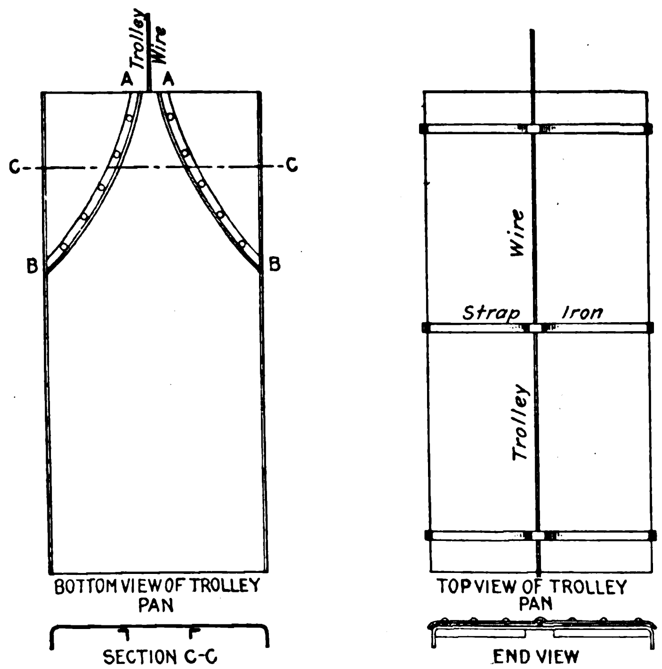
The platform is about 3.5 ft. long and 2 ft. wide, and is set 5 ft. above the floor. It is surmounted by railings 2 ft. 7 in. high, built of 1-in. pipe. The platform is 1 in. thick, and the main frame is built of ¾-in. x ¼-in. angles, with ⅛-in. x 1-in. diagonal bracing as shown. The bottom framing is of ¼-in. x 2-in. iron bars, and the wheels, which are provided with self-lubricating graphite bearings, are each 7 in. in diameter and 1¼ in. in tread. These wheels are set 28 in. apart on the outside. The distance from the top of the car to the floor is 11.5 ft. The guiding truss or forked portion of the frame is 2 ft. wide and is hinged at four points so that the truss will fold back against the main frame when the equipment is not in service.

The frame clears the standard car by 2 in. when in use. Eight of these equipments are now in service, there being one on each side of each track. The standard track length in the carhouse is about 420 ft. In our latest design, we use a special form of forked truss to guide the platform frame, the outer bar being ⅜ in. wide and 1½ in. in height, and running on the guide rail by small wheels carried in the fork ends. The hinges are of ⅜-in. bolt construction. The portable platform equipments were designed by the writer, and cost about $5 each.

TROLLEY PAN WITH ANGLE-IRON GUIDES

BY THOMAS O'HANLON, WIRE SUPERINTENDENT YONKERS (N. Y.) RAILROAD

For some time the Yonkers Railroad was troubled with delays due to the difficulty which its men had when turning the poles of cars at terminals. Sometimes several minutes were lost in getting the wheel on the wire, especially on dark nights. To eliminate this, the writer designed and installed an overhead guiding pan which has now been in successful use for several months without any injury to wheels or harps.



Home-Made Trolley Pan, Yonkers Railroad

As indicated in the accompanying sketches, we took a piece of galvanized sheet iron, about 22 in. wide and 4 ft. long, and bent down each side far enough to make a flange about 2 in. deep. Upon this we found and marked the smallest width of the groove at the outgoing end as at *AA*. Next, points about 18 in. distant from this end were located along the edge as indicated at *BB*, and then 1-in. angle irons were rounded and cut to the proper length to make a converging curve for the trolley wheel between points *BB* and *AA*. The pan was slightly arched and the rounded angle irons bent to fit the arch, the work being done with great care to avoid buckling. The angle irons were next attached to the bottom of the pan with roundhead bolts. Upon this three pieces of forged strap iron were bolted transversely over the pan and made to extend beyond it for an inch or so. Exactly at the middle of each strap an arch was formed to fit tightly over the trolley wire of the size in use. The straps, of course, were placed as near the ends as possible in order to keep the wire in continuation with the center line of the groove. The pan was installed by running the trolley wire through the arch formed in the strap irons, and then the bolts which secured the straps to the pan were tightened to insure a firm hold on the wire. After assurance that the trolley wire was thoroughly grounded on the pan, the standard span wire at this point was attached to the strap irons by means of wood strain insulators, thereby making the pan ready for use.

At first the motorman had some difficulty in stopping the cars at a position where the trolley wheel would be sure to go into the pan groove, but this was overcome by making a prominent "stop" mark on the pavement.

STEEL FREIGHT TRAILER CARS FOR MICHIGAN

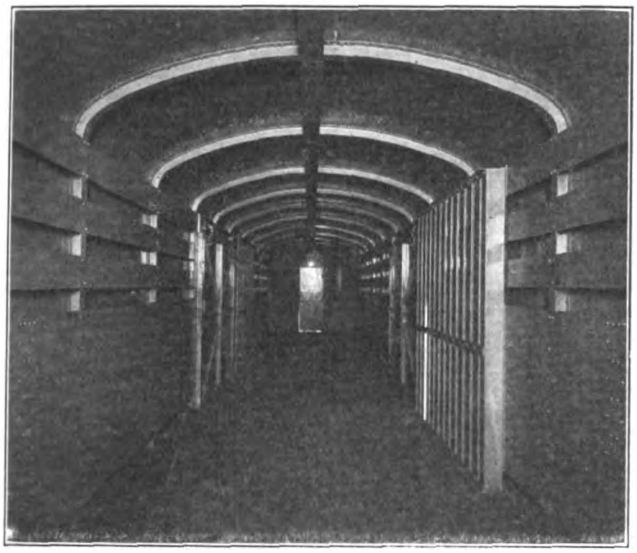
A big step forward in the design of all-steel baggage and freight trailers for service on interurban electric railways is represented by the four cars which have recently been delivered to the Michigan United Traction Company by the St. Louis Car Company. Views of one of these cars, as taken at Jackson, Mich., are reproduced in the accompanying engravings. The view of the exterior shows the use of end doors, while that of the interior indicates clearly the construction of the side posts and carlines as units. These cars were designed by R. C. Taylor, master mechanic of the railway.

The general dimensions are as follows: length of car body over the bumpers, 50 ft.; length over the vestibule sheathing, 48 ft.; width over the sheathing, 8 ft. 11 in.; width inside, 8 ft. 8½ in.; distance between the centers of the Bettendorf solid cast-steel M.C.B. trucks, 30 ft. The trucks are fitted with Griffin F.C.S. wheels of 3-in tread with 1 3/16-in. x ⅞-in. flanges. The bodies are finished inside and out with Sherwin-Williams No. 1 green, while the bumpers, trimmings and trucks are finished with locomotive black.

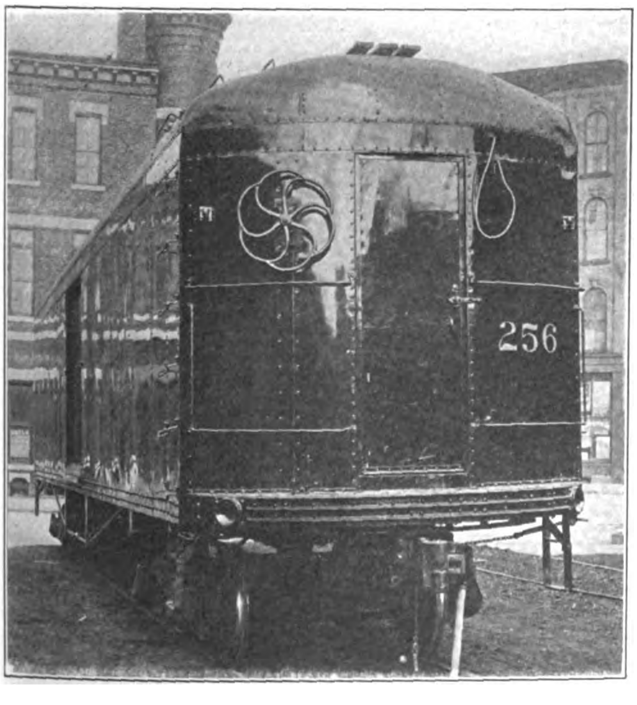
The bottom framing includes side sills of 7-in. x 3½-in., 15-lb. angles, intermediate sills of 7-in., 12.25-lb. channels and center sills of 7-in., 15-lb. I-beams. The bumper irons are 7-in., 12.25-lb. channels bent to a 5-ft. radius curve and riveted to the longitudinal member by double strap irons. Hedley anti-climbers of heavy section are riveted on the outside of the bumper irons. Cover plates of ⅛-in. x 40-in. steel are also riveted to all longitudinal sills and bumper irons at each end. Push-pole sockets are riveted on the four corners of the bumper channel. The cross braces are 5-in., 5.5-lb. channels riveted to the longitudinal sills by angle plates. Needle beams of 8-in., 18-lb. members are spaced 6 ft. 6 in. center to center. The main truss rods are of 1½-in. diameter with 1¾-in. upset ends at the turnbuckles. For receiving the needle beam and main truss rods 16-in. queen posts are used. The body bolsters are box girders with 12-in. x ⅜-in.

cover plates riveted on the top and bottom longitudinal sills and fitted with 7-in. channels which are riveted to the top and bottom plates.

As previously noted, a feature of the body framing is that the side post and carlines are made in one piece, this consisting of a 3-in., 5.5-lb. I-beam riveted to the side sills by double angle plates. The door posts have 4-in., 5-lb. channels riveted to 3-in. I-beams. Two 6-ft. sliding doors at the center on each side and one 28-in. swing door at each end in the center are provided for freight handling and train intercourse respectively. The doors are furnished with seal fasteners. Inside of the car ⅛-in. sheets are riveted to the posts as shown in the view of the interior. The outside sheathing is of 3/32-in. steel with 3/32-in. cover plates riveted to the I-beam posts. A letter panel of ⅛-in. x 8-in. steel extends in one continuous piece from corner post to corner post. A ⅛-in. x 8-in. plate is riveted opposite the outside panel on the inside rivet, extending from corner post to corner post. Similar plates are installed to curve around the vestibules, both inside and outside.



Interior, Showing Unit Carline and Post Construction



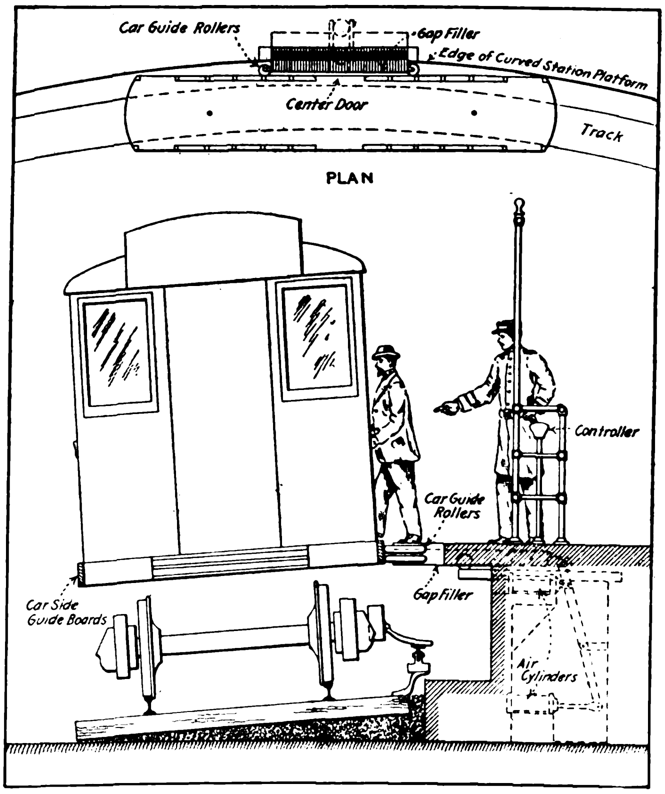
Steel Freight Car in Service

The roof is of 1/16-in. steel sheets with cover plates of the same material curved to conform to the carlines and riveted to the flanges of the I-beam carlines. The running board, which extends the full length of the car, is attached to insulated wooden carlines. The floor is of 1¾-in. yellow pine nailed to longitudinal nailing pieces which are bolted to steel sills. Threshold plates of 3/16-in. thickness are attached at all door openings. Skid racks, ½ in. x 2½ in. x 6 in., are bolted to the side sills under the side-door openings.

The car is wired with steel conduit for ten lights in the center of car. The conduit extends to the outside of each end of the car, with flexible couplings and 5 ft. of weatherproof wire to connect to the other cars of the train. In addition to hand brakes with vertical wheels, all cars have Westinghouse freight-car brake equipment. The brake pipe is attached with a flexible hose to a Tomlinson radial drawbar.

EXTENSIBLE PLATFORM IN NEW YORK SUBWAY

For some time past the Interborough Rapid Transit Company, New York, has been at work on a mechanical device to eliminate dangerous gaps between cars and platforms at those subway stations which are located on curves. The accompanying view presents what has been accomplished so far. The plan view shows a curved track and the position of the gap-filling device at the station, while the elevation shows how passengers may leave or enter the car safely. A station platform man controls the operation of the device. In many cases these objectionable gaps are due to the fact that the subway tracks parallel curved streets overhead, and also to the use of island passenger platform stations. Where the curves are concave the center of the car is at quite a distance from the platform edges, but where the curves are convex the gap exists



Extensible Platform in New York Subway

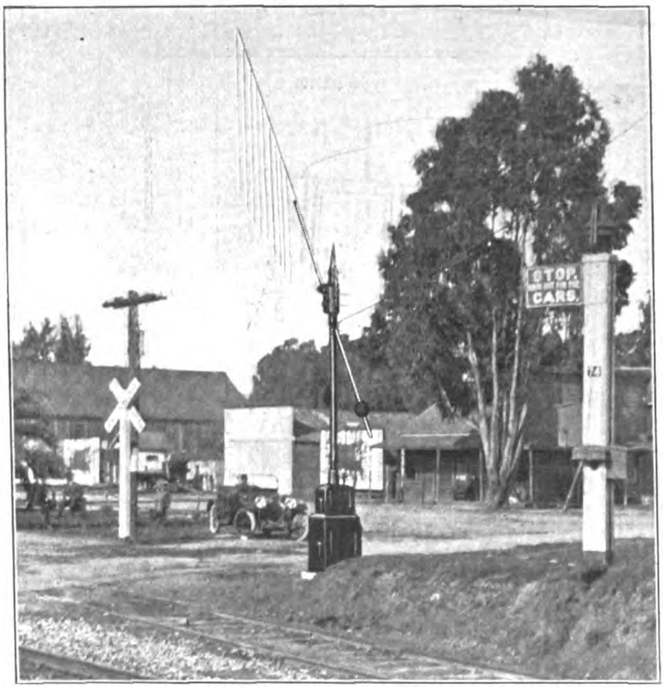
at the end platforms. The extensible platform operates for either case as follows:

When ten-car trains are in service the device operator takes his stand at a point where the forward end of the train is expected to stop, and an instant or two before the first car in the train reaches the stop he moves his controller handle to the operating point. This action energizes solenoids which admit air to the air cylinders, *E*. The operation of these cylinders projects grated segments of the station platform to cover the intervening space to the car before the train comes to a stop. This grating is maintained in a level plane so that its use will not affect the natural movement of the passengers. The grating remains in position until the train has proceeded about 7 ft. to 8 ft. on its outward journey, whereupon it recedes under the station platform through the action of the moving train and an automatic reversal of the electro-pneumatic cylinder. The preliminary tests with this device have been so satisfactory that the company is now installing a trial equipment at the Fourteenth Street station.

REMOTE-CONTROL CROSSING GATE

The Cook Railway Signal Company, Denver, Col., has recently installed for the Southern Pacific Railway the remote-control crossing gate shown in the accompanying illustration. The crossing protected by this gate is on the principal street of Decoto, a small town about 30 miles from Oakland on the main line of the Southern Pacific. About forty passenger trains, some high-speed, and from ten to twenty freight trains pass this crossing daily. At this installation the gate is operated by means of a track circuit, which is the method usually preferred by steam lines.

For electric railways the manufacturer builds special track instruments which leave the rails free for the traction return circuit. This track instrument is located, say, ½ mile from the crossing, and the control of the gate is established through the medium of wires connected with the gate-operating mechanism. Another track instrument placed at the crossing and similarly connected releases the gate when the train passes the crossing.



Crossing Gate, Southern Pacific Railway

In some instances where electric trains run very close together it is necessary to have two or three of these track instruments between the ½-mile distance point and the crossing, for if but one instrument at each end of the zone was in existence and two or more trains were in the zone at the same time, the first train passing the crossing would "clear" the "danger" signal.

The gate-operating outfit consists of a motor-driven worm-gear mechanism so interconnected by means of a magnet clutch as to cause the gate arm to fall to the "danger" or horizontal position upon the cutting off of the current, and to cause the operating mechanism to raise the gate arm to the "clear" position upon the return of current. The device can be modified to meet the individual conditions of any railway.

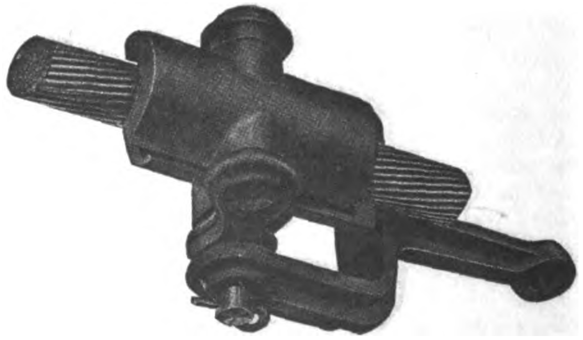
The mechanism which operates the gate is larger than the one which the company uses for its automatic block signal installations, because in some localities it is necessary to provide sufficient energy to operate an arm up to 30 ft. in length, which under snow and sleet conditions must have a more powerful mechanism than would be required in southern countries. The mechanism operates with no sudden jerks or movements and has very few parts, with consequent low maintenance. The absence of dash-pots, hooks, ratchets and dogs make access and adjustments easy.

The fall of the gate arm to the "danger" position is not a sudden drop, as it is controlled by a band brake, which in turn is controlled by a governor. This brake and its governor connection are so constructed that they are adjustable, thus giving a quick or an extremely slow fall to the "danger" position.

During the day the gate protection consists of a bell, a semaphore, a flexible barrier and a moving arm, and at night of a bell, a red light, an illuminated semaphore and an illuminated barrier.

SELF-TIGHTENING CABLE CLAMP

The accompanying illustration shows a new self-tightening cable clamp for dead-ending and supporting feeder cables, made by the Automatic Cable Clamp Company, Donora, Pa. By the ingenious lever construction of this clamp the cable is gripped with a force proportional to the tension applied. As it is boltless, it can be attached in a minute. It holds the tighter the greater the strain imposed, and can be removed quickly as soon as the tension is released. When power cables are dead-ended with these clamps, the insulation is first removed from the cable for a distance of 5 in., after which the clamp can be attached in far less time than the old methods, and without soldering. Sharp turns and difficult adjustments are rendered easy with this cable clamp. The clamp is built to withstand strains of 10,000 lb. and is intended for cables of 250,000 to 1,000,000 circ. mil in cross-section.



Boltless Cable Clamp

SHORT-CIRCUITED TEST OF A LARGE GENERATOR WITHOUT EXTERNAL PROTECTION

Before several central-station men, the engineers of the Westinghouse Electric & Manufacturing Company a short time ago deliberately short-circuited a 16,700-kva, 8800-volt generator, running at full speed and without resistance or any other protection in the circuit. Oscillogram records showed that a current of 21,000 amp, or twelve and one-half times normal, flowed through the generator. With earlier generators such a test would have wrecked the machine, but in the present instance no damage whatsoever was done. The only visible effect was a static flash between the field and the armature.

The test was performed to prove that generators are being built that require no outside protection from outside short-circuits, because the generator itself is designed to be self-protecting. Unless the generator is properly constructed a complete short-circuit tears out the armature coils, which, coming into contact with the revolving field, cause extensive wreckage. Furthermore, the static flash which always occurs under such circumstances will destroy inferior insulation. With generators of the type tested, however, both results are guarded against by firmly securing the armature coils and bracing their ends, on one hand, and by the use of mica insulation on the other.

In connection with this test several others were carried out in order to prove the reliability of circuit-breakers and reactance coils for protecting the feeder circuits. The generator was repeatedly short-circuited through these devices, which stood up admirably under the enormous stresses to which they were subjected.

The practice recommended by the Westinghouse engineers is to protect the feeders and not the generators. If the generators are protected and a short-circuit occurs on any of the feeders, even a poorly designed generator will not suffer, but the voltage will fail on all the feeders, all synchronous motors will be thrown out of step and an overwhelming overload will be thrown on the circuit-breaker of the short-circuited feeder, since it will carry the total current of all the generators in the station. If, however, protective reactances are placed in each feeder circuit, and a short-circuit in a feeder occurs, only that one will be affected, and even then its reactance coil will prevent the current from rising to too high a value. The voltage will be maintained at the busbars and no disturbance will be felt in the remaining feeders. This happens, of course, provided that the generators are self-protective; if not, such an event may seriously injure them.

It is, of course, possible to protect non-self-protecting generators by reactances, but, as the test described shows, such a proceeding is unnecessary since generators can be supplied that are immune to the worst conditions of load that can be imposed upon them.

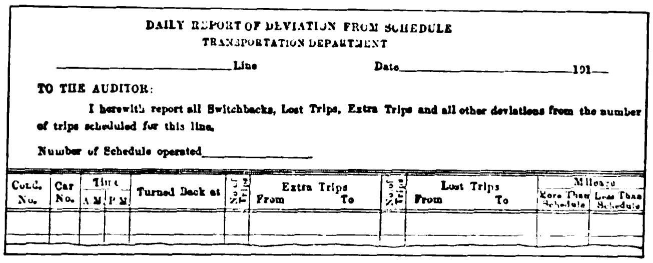
CLEVELAND ELECTRICAL EXPOSITION

Cleveland is planning an electrical exposition to be held May 20 to 30 in the Coliseum. The project is to be given under the auspices of the Electrical League of Cleveland, whose committees have already made an active month of preparation.

For its decorating and lighting scheme the committee has the services of a corps of leading electrical engineers. This is to be the first electrical exposition ever held in Cleveland, and the city is planning to give it in the same manner that characterized its successful Industrial Exposition.

KANSAS CITY METHOD OF KEEPING MILEAGE ON DEVIATIONS FROM SCHEDULE

The Metropolitan Street Railway Company, Kansas City, Mo., has put into effect a new method of keeping the total daily mileage. In the future the mileage will be figured according to the schedule instead of from tripper cards. The new way made necessary the use of two new blanks, one of which will be used for office work and the other by conductors, who will turn it in to the offices. The latter is a special switching, additional and lost trip report. The total of these reports will be made up on the larger blank to be turned over to the auditor's office. The total daily mileage will therefore be figured by the regular schedule, plus or minus extra runs or lost time. The change is effective immediately.



DAILY REPORT OF DEVIATION FROM SCHEDULE
TRANSPORTATION DEPARTMENT

__________ Line Date __________ 191__

TO THE AUDITOR:

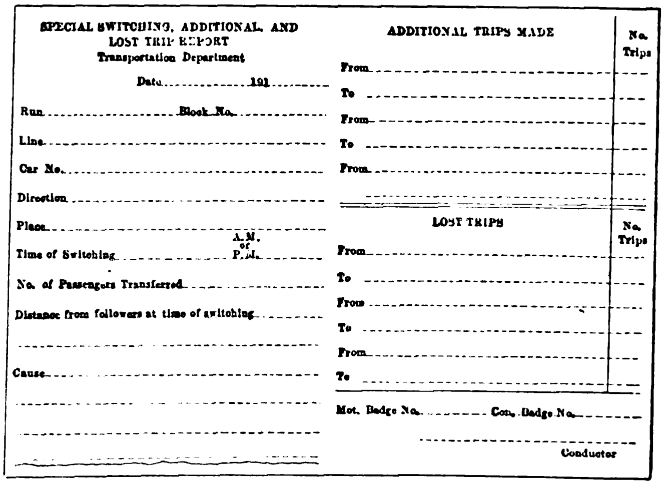
I herewith report all Switchbacks, Lost Trips, Extra Trips and all other deviations from the number of trips scheduled for this line.

Number of Schedule operated __________

Cond. No.	Car No.	Time		Turned Back at	No. Trips	Extra Trips		No. Trips	Lost Trips		Mileage	
		A.M.	P.M.			From	To		From	To	More Than Schedule	Less Than Schedule

Electric Ry Journal

Transportation Department's Report to Auditor on Deviations from Schedule



SPECIAL SWITCHING, ADDITIONAL, AND LOST TRIP REPORT
Transportation Department

Date .... 191....

Run .... Block No. ....

Line ....

Car No. ....

Direction ....

Place ....

Time of Switching .... A.M. or P.M. ....

No. of Passengers Transferred ....

Distance from followers at time of switching ....

Cause ....

ADDITIONAL TRIPS MADE — No. Trips

From ....

To ....

From ....

To ....

From ....

LOST TRIPS — No. Trips

From ....

To ....

From ....

To ....

From ....

To ....

Mot. Badge No. .... Con. Badge No. ....

....
Conductor

Electric Ry. Journal

Conductor's Form for Reporting Lost or Extra Mileage (Original Blank Arranged Vertically)

FIRST NATIONAL EFFICIENCY EXPOSITION AND CONFERENCE TO BE HELD AT NEW YORK

The first national exposition under the direction of the Efficiency Society will be held in Grand Central Palace, New York, from April 4 to 11. Gov. M. H. Glynn will open the conference with an address. Exhibits will be made by the New York State Public Service Commission, the Interborough Rapid Transit Company, the New York Edison Company and many others. The discussions in the conferences will deal with definitions of efficiency and the application of these in various industries. The exhibits will follow the same general plan, showing as far as possible how various household and business operations may be expedited. Among the eighteen names of prominent business men included in the advisory committee are those of E. G. Connette, president of the International Railway Company, and T. S. Williams, president of the Brooklyn Rapid Transit Company.

News of Electric Railways

Charging Off Obsolescence in Cleveland

The city officials of Cleveland, Ohio, and the Cleveland Railway have agreed upon plans for charging off the value of discarded power houses and obsolete cars and overdrafts in the maintenance fund and the matter was presented to the City Council for approval on the evening of Feb. 16. The action on this agreement will probably be favorable, although it will mean an increase in fare commencing some time in mid-summer. The date will be governed by the condition of the interest fund as affected by the deduction of monthly sums to make good the deficits.

The value of discarded power equipment and obsolete cars was fixed at $705,347 and, beginning in March, the company is authorized to deduct $12,000 a month from its gross receipts until this amount is wiped out. It was further agreed that the company should deduct $6,000 a month until the overdraft of $217,444 in the maintenance, depreciation and renewal fund is made good. This total of $18,000 a month will of course decrease the interest fund and bring about an increase in fares when the interest fund is reduced below $300,000. The agreement was referred to the committee of the Council on street railways.

On Jan. 1, 1914, the interest fund was about $363,000. It is thought that this will be increased as a result of the January and February operation, in which surpluses are expected. On May 1 the increase in the regular maintenance allowance will begin and this will still further decrease the interest fund.

The settlement of the value of discarded power and other equipment fixes the sum about $190,000 less than the original estimate. This was due to taking the reproduction value of second-hand machinery in the old Forest City power house of the 3-cent line built under the Johnson administration.

Mr. Witt was invited recently by the street railway committee to accompany the members on a tour of inspection of the carhouses and yards of the Cleveland Railway, especially the new building on St. Clair Avenue. Mr. Witt said that the expenditures so far had been approved by him and that he did not care to accompany the committee. In regard to the cost of the St. Clair building Mr. Witt said he would continue to recommend that all new structures be made artistic.

Council failed on Feb. 16 to take action on the approval of the company's request for the expenditure of $518,000 for track renewal and resurfacing work. Councilman Stolte objected to the estimates on the ground that they are too high. Mr. Witt explained that the company had merely asked for an approval of $40,000 a mile for the renewal work, but that this does not mean that the amount will be actually expended unless it is necessary. The work will all be done under the supervision of his department, and if the full amount is not needed it will not be spent.

A resolution has been adopted by the Council requesting Mr. Witt to investigate the cost of track renewal in the ten largest cities of the country and report to the Council.

Report on Municipal Railway Extensions in San Francisco

In compliance with the resolution of the Board of Supervisors of San Francisco, Cal., M. M. O'Shaughnessy, city engineer, has filed a report covering the exact routes which have been decided upon for the extension of the Municipal Street Railway, the progress made in their construction and the number of persons these roads will be able to carry to and from the Panama-Pacific International Exposition site. His report is dated Jan. 29, 1914. The bond issue authorized on Aug. 26, 1913, provided the sum of $3,500,000 for the construction and purchase of double-track street railways aggregating 16.35 miles in length together with the necessary equipment. The Van Ness Avenue and Chestnut Street lines, which will be the first completed, will probably be placed in operation on or before Sept. 1, 1914, and the Church Street line will probably be placed in operation on or before Feb. 1, 1915. Ninety per cent of the material necessary for the construction and equipment of the lines has been ordered and the contracts for the remainder will be let before March 1.

With the 100 cars which it is proposed to purchase and the forty-three cars now owned by the city it will be possible to transport a maximum of 19,125 persons to and from the exposition an hour. Mr. O'Shaughnessy expresses the opinion that the transportation so furnished will be sufficient during the days of average attendance at the exposition. He says, however, that the service will be inadequate during special days when the attendance is in excess of 100,000 persons.

Contracts contemplating the expenditure of $871,814 were entered into on Jan. 2. The principal items included in these are for rails and rail joints from the United States Steel Products Company, totaling $150,014; for car bodies from the Jewett Car Company, Newark, Ohio, totaling $295,000, and for motors and car equipment from the Westinghouse Electric & Manufacturing Company, totaling $232,600.

The maximum capacity of each of the cars now in use on the Geary Street line is 125 persons. The maximum capacity of each of the proposed new cars is 150 persons. The capacity of the terminal loops at the exposition will be 400 cars an hour, or 50,000 persons an hour. The capacity of the terminal loops and tracks of the proposed street railways is far in excess of the number of cars which it is probable the city will own at the time of the exposition. Mr. O'Shaughnessy estimates 31,125 persons an hour as the maximum number which may be transported to and from the exposition by municipal and private lines combined.

Storage Battery Cars Meet Emergency in Blizzard

The storm which swept up from the South on Feb. 13, 1914, covered the greater part of the North Atlantic States with a mantle of snow on Feb. 14 which reached 10 in. in New York. The snow began to fall about 7 p. m. on Friday in the metropolitan district and continued until about 11 a. m. on Saturday. The wind attained a velocity of 70 m.p.h. at one time and the drifts which followed greatly delayed all traffic and resulted in isolated cases in the complete suspension of operations. Early Monday morning snow began to fall again and continued for several hours. In New York 16,000 men and 1200 cars were put to work at once after the first storm to clear the principal thoroughfares, but it was many hours before the work that they did became apparent to any appreciable extent.

Surface car traffic in metropolitan New York was particularly hard hit by the storms. Outlying lines were in some instances compelled to abandon service temporarily on account of the huge drifts and in the city proper a great deal of difficulty was encountered in keeping the underground conduit lines in operation. The snow drifted into the slots and as soon as the plows and sweepers were sent over the lines all vehicle traffic immediately took to the streets thus cleaned. Service on the Forty-second Street line of the Third Avenue Railway, equipped with the conduit, would probably have been a complete failure except that the management of the company withdrew its storage battery cars from the belt and other lines and operated them on Forty-second Street, perhaps the most important crosstown line in the city. Pressed suddenly into an emergency service by the Third Avenue Railway to replace cars of nearly twice their size and carrying capacity, the storage battery cars relieved a tie-up which had existed for many hours. On the Broadway line of this company service also had to be abandoned from Broadway and Forty-second Street to 162d Street. Service on the lines in the Bronx, Yonkers and Westchester County was only slightly upset by the heavy snowfall.

On lines operated by the New York Railways seventy-five sweepers and thirty cleaners were steadily at work, and in only one instance did slot trouble develop to a degree sufficient to interrupt traffic. That was on the block between 114th and 115th Streets, on Amsterdam Avenue, and there inconvenience was largely avoided by switchback of the cars on both sides of the break during the few hours the slot was being cleaned out.

The cases cited are probably the only ones of actual suspension of traffic on city car lines, but the operation of surface cars was slow and uncertain. This condition was largely due to factors outside of the control of the companies, the most important of which is the tendency of motor-car and truck traffic to stick to the cleared space on the car tracks, when the rest of the street is heaped with piles of snow.

As a climax to the two storms previously mentioned it began to rain during the night of Feb. 18. As the rain continued the temperature fell and the streets became coated with a glaze of ice. Throughout the entire metropolitan district pedestrians were compelled to abandon the ice-coated sidewalks and take to the middle of the street. The ice coated the overhead trolley wires and the third rail on the elevated lines, and traffic on some of the latter lines was seriously interrupted. This was particularly true of the elevated lines in the suburban districts of Brooklyn. In fact service on practically all the elevated lines of the Eastern Division of the Brooklyn Rapid Transit Company and on several of its Southern Division lines was demoralized during the early rush hours.

Differences Over Operating Agreement in Kansas City

The receivers for the Metropolitan Street Railway, Kansas City, Mo., have notified the officers of the Kansas City & Western Railway, running to Leavenworth, Kan., that the Metropolitan Street Railway will not receive the interurban cars after Feb. 23, the companies failing to reach the expected agreement. The Metropolitan Street Railway has been receiving the Leavenworth cars at Eighteenth Street and Central Avenue, Kansas City, Kan. The action by the receivers follows a disagreement extending back about a year. The matter of transferring passengers at Eighteenth and Central Avenue was laid before the Kansas State Public Utilities Commission about a year ago. The commission held that transfers should be given by both lines at that point, and that the Metropolitan Street Railway and the Kansas City & Western Railway should divide the fares equally. The decision was appealed by the Metropolitan Street Railway and the case is now pending in the United States District Court. The order, according to the receivers, is unjust, inasmuch as the Kansas City, Kan., line is only 1½ miles long, while the Metropolitan Street Railway's lines on the Missouri side are far more extensive. The utilities commission took the attitude that under present conditions residents of the Kansas side, or those passing through that section to the Missouri side, are paying 10 cents car fare, and that the fare should be only 5 cents. The Metropolitan Street Railway wished to take over the cars of the Kansas City & Western Railway at the city limits, but the proposal was rejected by the interurban company. The Metropolitan Street Railway's ultimatum followed. After Feb. 23, therefore, passengers arriving in Kansas City, Kan., will transfer to a Metropolitan Street Railway car, paying both that company and the interurban 5 cents.

Alderman Hoffman, of the streets, alleys and grades committee of the upper house of the Kansas City Council, refused his sanction when the committee considered the ordinance requiring the Metropolitan Street Railway to build double tracks on Twenty-fourth Street from Grand Avenue to Main Street by June 1. Mr. Hoffman believed the tracks should be extended through to McGee Street and he reported such an ordinance to the City Council at its meeting on Feb. 16. Attorneys for the receivers of the Metropolitan Street Railway also sent a tentative ordinance to the Council on that date. It provides for a franchise until 1925 for a double-track railway from a connection with the Summit Street line at Twenty-fifth and Summit Streets, east on Twenty-fifth Street to Broadway, north on Broadway to Twenty-fourth Street, east on Twenty-fourth to the new station plaza, and after crossing the plaza to a point where it will be intersected by Twenty-third Street, thence east on Twenty-third to a connection with the Grand Avenue line, together with the right to cross Main Street and make connections with the Main Street line where the tracks on the plaza intersect. Mayor Jost stated he wanted time in which to deliberate on the new measure before lending it any encouragement.

Administrative Committee to Negotiate Toledo Franchise

At the regular meeting of the City Council of Toledo, Ohio, for the week ended Feb. 14, 1914, steps were taken to negotiate for street railway service at once through an administrative committee of seven members. The service must be furnished upon a 3-cent fare basis and any and all legitimate bidders will be considered. The resolution creating the committee follows:

"Resolved by the Council of Toledo that a committee of seven be and the same is hereby created as follows: The Mayor, the president of Council, the city solicitor and four members of the Council to be chosen by the president of the Council. When organized this committee shall act as a standing committee with full powers to enter into any and all negotiations, conduct all conferences, and do any and all things relative thereto in securing terms and proposals for a street car franchise, starting work on the matter immediately, always with a view to obtain information and bids in the open market for the best and most reasonable street car service in and for Toledo, on the basis of a 3-cent fare, and to make a full and complete report of its proceedings to Council not later than March 23, 1914."

Mayor Keller, Vice-Mayor Hassenzahl and City Solicitor Thurstin will, under this resolution, act upon the committee and the president of Council will shortly appoint the other four.

Mayor Keller was not present at the meeting, but the following letter prepared by him was to the members of the Council:

"In view of the expiration of the principal grants to use the streets of the city by the Toledo Railways & Light Company on March 27 next, I would urge the immediate passage of a resolution authorizing the appointment of a committee to enter into negotiations to accomplish an early settlement of the traction question, and to that end to obtain bids and other information in the open market for the best and most reasonable street car service in and for Toledo on the basis of a 3-cent fare and to make a full and complete report at the earliest possible date.

"Every member of your body is pledged to a 3-cent fare with universal transfers, and this should be the basis of negotiations with no deviation from that pledge. The sooner this question is settled the better.

"If the company operating at present does not find it expedient to deal on this basis we will be compelled to seek elsewhere for this service or acquire the properties. Whichever plan is finally determined upon must be to the full and entire satisfaction of all the people.

"I therefore urge immediate action in this matter with every confidence that your efforts will ultimately be successful."

The Toledo Commerce Club has decided to investigate the street railway settlement matter, and, if possible, aid in bringing about an early adjustment. To that end the officers will probably arrange to confer with F. R. Coates, president of the Toledo Railways & Light Company, and with Mayor Keller of Toledo.

Objection to Cincinnati Loop

City Solicitor Schoenle, of Cincinnati, Ohio, has voiced his objections to the city's building the loop proposed by former Mayor Hunt. He said that the plan is good and the city needs the improvement, but that the Cincinnati Street Railway should build and operate it. He is in favor of giving the company a franchise for this purpose, on condition that a certain percentage of the receipts be paid to the city for the privilege.

The Cincinnati Street Railway has brought suit in the Common Pleas Court against A. C. Gilligan, collector of internal revenue, to recover $10,801, which was paid as a special excise tax under protest. The company's property is operated under lease by the Cincinnati Traction Company, and the suit is being brought to test a point that will be of interest to all companies whose property is leased to operating companies.

Rossland Electrification Deferred.—The Canadian Pacific Railway has decided to defer for the present the work of carrying out its Rossland electrification in British Columbia. It was proposed to equip the line for operation at 2400 volts direct current, with four locomotives of the heaviest type.

Uniform Accounting System for Ohio.—The Ohio Public Utility Commission, acting under authority of a new law, has employed a firm of accountants to prepare a uniform system of accounting for all public utilities operating in the State, those owned by municipalities being included with the privately owned corporations.

Accounting Conference in Pittsburgh.—A conference has been called in Pittsburgh of the members of the public service commissions of Ohio, Pennsylvania and West Virginia with the idea in mind of agreeing upon a uniform accounting system for the three states, so that the commissions may co-operate in their rate making and valuations. This is because of the number of corporations which furnish service in all three states.

Partial Operation of Brooklyn Subway Proposed.—The Public Service Commission for the First District of New York has notified its chief engineer and its counsel that it is in favor of the prompt operation of the Fourth Avenue subway from the Municipal Building, Manhattan, to the Twenty-fifth Street station on Fourth Avenue, Brooklyn. The commission favors the preparation of a contract for the installation and equipment of the entire line, so that work may be begun immediately upon the receipt of track materials.

Special Subway Committee in Pittsburgh.—A committee of the City Council of Pittsburgh, Pa., was appointed on Feb. 17 to work with the city law department on an ordinance providing for the construction of a subway in that city. Heretofore it has been impossible for the city and the several subway companies to come to terms mutually agreeable. Another committee was named to confer with the Pittsburgh Railways to secure if possible some concessions in the matter of transfers. Lately the company put in force a rule that transfers would not be issued except when asked for at the time a cash fair was paid.

Winnipeg Hydroelectric Developments.—Sir William Mackenzie, president of the Winnipeg (Man.) Electric Railway, has announced that The J. G. White Engineering Corporation, New York, N. Y., has been engaged by the Winnipeg Electric Railway to complete surveys, explorations, designs, plans and estimates for a large hydroelectric development near Winnipeg. It is understood that the ultimate development will be considerably in excess of 100,000 hp, and that the immediate development for which complete designs and plans are to be prepared will be for 40,000 hp. Work is to be completed as rapidly as possible.

The I. C. C. Investigation of the New Haven.—Formal orders for the investigation of the financial transactions of the New York, New Haven & Hartford Railroad issued on Feb. 14, 1914, by the Interstate Commerce Commission, under the Senate resolution, named the following roads, in addition to the New York, New Haven & Hartford Railroad, as respondents: Boston & Maine, Maine Central, Central New England, and New York, Ontario & Western. The place and date of hearings have not been set. In the meantime, says the commission's order, the investigation will be carried on "by such other means and methods as may be deemed appropriate."

Iowa Blue-Sky Act Unconstitutional.—The State District Court of Polk County, Iowa, has enjoined the enforcement of the Iowa "blue-sky" act. The court expressed itself as satisfied that the object of the law was to prevent fraud, but found the law to be a violation of the fourteenth amendment of the Constitution in that it takes "from the owner of property without due process of law the right to sell and dispose of the same and from the individual, co-partnership or corporation the right and liberty to engage in the business of buying and selling stocks, bonds and other securities." The decision holding the Michigan "blue-sky" law to be unconstitutional was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, page 281.

Franchise Agreement in Newark.—The agreement covering the new franchises to be received by the Public Service Railway in connection with the erection of a terminal and the re-routing of certain lines in Newark, N. J., has been adopted by the Board of Works. The agreement was read twice as an ordinance on Feb. 5, was read again on Feb. 12 and, after being signed by the Mayor, will be sent to the Board of Public Utility Commissioners for approval. By the adoption of the agreement in its present form the company wins its contention that there should be a clause designed to prevent making a round trip on payment of one fare. As the clause stands now in the agreement it provides that a passenger shall not be entitled to a transfer to a car running substantially parallel to and within 2000 ft. of the car on which he paid his fare.

Appraisal of Property in Akron Asked.—At a recent meeting of the City Council of Akron, Ohio, a motion was passed to the effect that the State Public Utilities Commission be requested to value the property of the Northern Ohio Traction & Light Company in Akron. This action was taken in accordance with a recommendation made by A. B. du Pont some time ago. He stated that such a valuation would help to determine whether the company could grant the concessions demanded by the city in connection with the franchise negotiations or whether it would be fair to award a revised franchise with modified conditions. Councilman Whittemore objected to the motion. He contended that it would be better for the city to make its own settlement with the company, particularly as the commission will be engaged for some time in endeavoring to value the properties at Cleveland and Cincinnati.

Savannah River Hydroelectric Development Completed.—The opening of the hydroelectric power plant located on the Savannah River 9 miles above Augusta, Ga., was celebrated on Feb. 16. In the morning there was an excursion to carry the visiting guests and prominent citizens of Augusta to the site of the dam and power house. In the evening the city was left in darkness while power from the new plant was being turned on. The trip from Augusta was made at the invitation of the Augusta-Aiken Railway & Electric Corporation, and some of those on board the special train were F. Q. Brown, of Redmond & Company, president of the Augusta-Aiken Railway & Electric Corporation and of the Georgia-Carolina Power Company; R. Lancaster Williams, of Middendorf, Williams & Company, New York and Baltimore, and a party of friends; J. W. Steel, banker, Philadelphia; the officers and prominent members of the Merchants & Manufacturers' Association of Augusta and J. H. Pardee, president, and J. K. Choate, vice-president of The J. G. White Management Corporation. The party inspected the dam and the power house from which power is carried to Augusta. Power is transmitted at 44,000 volts on a great span of wires across the Savannah River to feed additional mills and industries in South Carolina.

Contract for Additional New York Rapid Transit Section.—The Public Service Commission for the First District of New York has awarded to the Oscar Daniels Company, the lowest bidder, for $914,400 the contract for the construction of Section No. 1 of Route No. 18, the White Plains Road branch of the existing subway. This branch runs from Bronx Park, the present terminus of the Lenox Avenue subway, up White Plains Road to 241st Street, near the northern city boundary. Section No. 1 extends from the subway terminus to Burke Avenue. The contract for section No. 2, extending from Burke Avenue to 241st Street, was awarded about a month ago to Alfred P. Roth. The line on this extension will be a three-track elevated railroad. The commission has also opened bids for the construction of section No. 2 of route No. 16, the Jerome Avenue branch of the Lexington Avenue subway. This is the section from 182d Street north over Jerome Avenue to Woodlawn Road. The lowest bidder is the Cooper & Evans Company, at $1,076,831. The contract for Section No. 1 of this line, extending from 157th Street to 182d Street, has already been awarded to the Oscar Daniels Company. The line from 157th Street to Woodlawn Road will be a three-track elevated railroad, and will be operated by the Interborough Rapid Transit Company with trains from both subway and elevated lines.

Contracts for Third-Tracking New York Elevated Lines.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., announced on Feb. 13, 1914, that the contracts had been let for third-tracking the Second, Third and Ninth Avenue elevated railroads in Manhattan and the Bronx. The work is to be done by a group of three contracting firms, the Terry & Tench Company, Inc., the Snare & Triest Company and the T. A. Gillespie Company. Each will perform that portion of the work which is assigned to it by the chief engineer of the Interborough Rapid Transit Company. The remuneration of the construction companies is to be the actual cost of the work, plus 15 per cent profit. Mr. Shonts explained why the contracts had been let by selection and not after public bidding. The contracts, he said, would cover the use of the plants, tools and machinery which belong to the three firms mentioned, as well as the services of Messrs. Snare, Triest, Terry, Tench and Gillespie, who would give their personal attention to the job. Moreover, there would be no sub-letting of any part of the work, because the firms were equipped to perform the entire work themselves, as they had on hand extensive and expensive machinery adapted to this very kind of construction. The work is very difficult, requiring the laying of additional tracks without interfering with the regular operation of the elevated trains.

New Viaduct in Chattanooga.—The new McCallie Avenue viaduct, in Chattanooga, Tenn., has been completed. Warner Park is at the eastern end of the viaduct and just to the southeast lies the National Cemetery. The old bridge, which the new viaduct supplants, was a weak link of the fine boulevard which leads from the center of the business district through the city to Missionary Ridge and its magnificent Crest Drive, on the road to Chickamauga Park. Twenty thousand dollars of the cost of the new viaduct was contributed by the city of Chattanooga, about $8,000 by the Chattanooga Railway & Light Company and $70,000 by the railroads. The McCallie Avenue viaduct is 735.5 ft. long, made up of twenty-one spans. It is 60 ft. wide, allowing a 40-ft. roadway and a 10-ft. sidewalk on either side. The clear driveway on each side of the double track for street cars is 12 ft. The entire surface, except sidewalks, is paved with brick. Ornamental posts, each carrying a 108-watt Mazda lamp, furnish illumination. The longest span is 30 ft., and the piers are from 12 ft. to 30 ft. high, including footings. The grade of the eastern approach is 5.3 per cent, and of the western approach 5.5 per cent. Twelve railroad tracks pass under the viaduct at an angle of about 70 deg. Over the tracks the viaduct rises to a maximum height of 26 ft.; at either end it is about 18 ft. from the ground, as the street approaches it on a fill.

Change in Ownership of Historic Texas Property.—Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914, page 382, of the sale of the property of the Laredo Electric & Railway Company, Laredo, Tex., to Messrs. Morrison and McCall, St. Louis, and their associates. R. W. Morrison, representing the purchasers, has assumed the management of the company. Added interest attaches to the change in ownership on account of the fact that the railway lines of the company are claimed to be the first operated by electricity west of the Mississsippi River. The Laredo Electric & Railway Company was organized in 1892. Prior to that time the Laredo Improvement Company, organized in 1887, had installed a lighting plant and the same year had built a street railway. The Laredo Electric & Railway Company took over the properties of the Laredo Improvement Company, which installed electricity in 1889. It was the first international electric street railway in the United States, as the line served Laredo and crossed the international bridge into Nuevo Laredo, Mexico, as far as the custom house on the outskirts of that city. The line continued to be operated into Nuevo Laredo for a number of years, but owing to complications between the company and the owners of the bridge, service to Mexico was discontinued. Later a separate system was established in Nuevo Laredo, Mexico, and the power for the operation of cars was furnished by the local company.

Jefferson Avenue Line Decision in St. Louis.—The United Railways' contention of its right to operate the Jefferson Avenue line, St. Louis, Mo., under existing franchises was upheld recently by a decision of Circuit Judge Rhodes E. Cave, as noted briefly in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914. The decision is a defeat of the city's effort, by a quo warranto proceeding, to obtain a writ of ouster, on the ground that the Jefferson line franchise expired Feb. 6, 1912. Judge Cave holds that the United Railways is not entitled to operate the Jefferson line, as contended, under the Central Traction franchise, but that it is entitled to operate it under the St. Louis Transit Company franchise, which will expire March 18, 1939. The opinion of the court sets forth the steps by which the United Railways took over the Jefferson line. The decision reads in part: "Thus heralded into the lists and put to the combat for the right of its existence, in so far as its Jefferson Avenue branch is concerned, the defendant comes both doubly armored, to wit: claiming the right to operate under both Ordinance 19,352, known as the Central Traction, expiring on April 12, 1948, and Ordinance 19,738, known as the St. Louis transit ordinance, expiring on March 18, 1939; and proclaiming that even should its outer armor prove too weak and of no avail, yet in no event can the pointed query—by what right?—of the relator penetrate its inner coat of mail and reach the vitals of its right to continue the operation of the Jefferson Avenue line until March 18, 1939."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

KENTUCKY

W. A. Shawler has introduced a bill in the Kentucky Legislature requiring electric railways to furnish separate coaches for negro passengers. A similar requirement is now imposed on steam lines. The interurban companies are now required to have separate compartments for white and colored passengers in each car, but it is asserted that on occasion white people invade the colored passenger compartment and at other times the negroes overflow into the section intended for the white passengers. A bill introduced by E. D. Stone in the House providing for a maximum charge of 2 cents a mile by public carriers was acted upon unfavorably at first, but the vote has been reconsidered and the bill placed on the calendar.

MASSACHUSETTS

The proposed repeal of the act passed last year giving the New York, New Haven & Hartford Railroad authority to develop electric railway facilities in the Berkshire district has been vigorously assailed before the committee on street railways. Three bills are before the General Court for this purpose. Representative Washburn led the opposition to this repeal, contending that the policy of the federal government in New England transportation matters is vacillating. He strongly commended the unification of the steam and electric railway systems planned by former President Mellen of the New Haven company. Senate Chairman Coolidge urged leaving the law on the statute books until conferences can be had with the federal authorities.

The committee on metropolitan affairs heard recently the petition of Senator Horgan to abolish the Boston Transit Commission and transfer its powers and duties to the Public Service Commission. Prof. George F. Swain, chairman of the board, refuted the contention that the board is a burden upon the city. He stated that the entire cost of its work is ultimately repaid the city by the Boston Elevated Railway in subway rentals. He pointed out that the board has work under way amounting to $20,000,000 outlay.

The Bradstreet bill providing that if a passenger on a street car cannot get a seat the conductor shall give him a rebate check, two such checks being redeemable for another fare, was heard this week by the committee on street railways. The bill is a copy of the Norris bill now before Congress and applicable to the District of Columbia. Arthur A. Ballantine, for the Boston Elevated Railway, and Bentley W. Warren, for the Massachusetts Street Railway Association, who appeared in opposition, pointed out its impracticabilities as an operating proposition. A hearing was also held upon the Cummings bill on the public ownership of street railways. The opposition urged that action be deferred pending further investigation.

Leave to withdraw has been reported by the street railway committee upon the bill requiring the use of an earth, asphalt, brick or wooden block surface between rails and 18 in. outside in the construction of new street railway track.

NEW JERSEY

Two hearings were held at Trenton recently on Assembly bills Nos. 13 and 99, the first of which is known as the "no-seat-no-fare" bill. It provides that where a passenger on an electric railway is unable to secure a seat he shall be entitled to a rebate check, and that two rebate checks shall entitle him to one free ride. Bill No. 99 seeks to establish a minimum requirement for adequate service on street railways. It proposes a plan for arriving at the average number of passengers per line and requires the street railways to supply cars with a total seating capacity equivalent to this average. John J. Burleigh, second vice-president of the Public Service Corporation, said that to enforce the provisions of the "no-seat-no-fare" bill would be impossible. Regarding the bill which defined adequate service he said that this matter was one for the judgment of the Board of Public Utility Commissioners, not a legislative matter. Others who appeared in opposition to the measures were John L. O'Toole for the Public Service Railway, George B. Cade for the Atlantic Coast Electric Railway, Gaylord Thompson for the New Jersey & Pennsylvania Traction Company and J. K. Choate for the Morris County Traction Company.

NEW YORK

A bill has been introduced in the Assembly to amend as follows the railroad law in relation to the qualifications of certain employees of railroads:

"Qualifications of certain employees of railroads. All motormen engaged in operating electric multiple unit trains with one or more cars with high-speed brake or electric engines or gasoline engines or other power must have at least one or more years' experience on steam or electric railroads, must be familiar with train orders, with the standard code of signals, hand signals and book of rules, before operating a passenger or freight train in the transportation service. A record of such experience and of the time of entry upon such service shall be made by the company and furnished to the public service commission in respect to each such employee at the time of the beginning of such employment. Employees taken from different departments of the train transportation service to be made motormen on elevated or subway trains must enter into the yard service for at least one year for the purpose of becoming familiar with the hand signals and book of rules, standard code of signals, train orders, the handling of motor cars and the making up of trains and the nature of the power equipment on such railway, before they are permitted to move a motor car or train on any part of the main track of such railway. Such employees during such probationary period shall be classed, as at present, motor-switchmen. A record as to such employees shall be kept by the company and furnished to the public service commission when they enter such service, relating to the same matters as the record first above mentioned. A violation of the provisions of this section by any railroad corporation, officer or servant thereof, or by any such employee, shall constitute a misdemeanor, punishable by imprisonment for not more than one year or a fine of $500, or both."

An amendment to the railroad law introduced in the Assembly to require toilet facilities to be provided on the passenger cars of all steam, electric or other interurban passenger cars reads as follows:

"Every person or corporation owning or operating a steam, electric or other interurban railroad for the carriage of passengers in the State shall, before Jan. 1, 1915, cause to be erected in every passenger car thereof properly equipped toilets. Every person or corporation failing to comply with this section shall be liable to a penalty of $100 for each day such violation occurs. Such penalties shall be cumulative and more than one penalty may be recovered in the same action in any court of competent jurisdiction. The public service commission of the proper district shall enforce the provisions of this section."

A bill has been introduced in the Assembly to amend the penal law in relation to publicity to be given to strikes and lockouts by requiring employees seeking new laborers to advertise such strikes and lockouts. A bill has been introduced in the Assembly to amend Section 97 of the railroad law in respect to the rate of interest on municipal bonds. Another bill introduced in the Senate would amend Chapter 481 of the Laws of 1910, entitled "An act in relation to railroads, constituting Chapter 49 of the Consolidated Laws," in relation to the completion and operation of certain street surface railroads.

Senator McClelland of New York has introduced a bill to amend the tax law relative to the franchise tax on corporations. It substitutes an entirely new schedule of rates as follows: Three-quarters of a mill on each $1 of the par value of capital stock if no dividend is declared; 1½ mills on any portion of capital stock on which a dividend of less than 6 per cent is declared or made. The stock is to be assessed at not less than its actual value and not less than the average price at which it is sold during the year. But if this would produce a less amount than a tax of three-quarters of a mill on the par value of all the stock issues then the tax is to be at the latter rate. Where a dividend of 6 per cent or more is declared on any stock the tax is to be at the rate of one-quarter of a mill for each 1 per cent of dividends on each dollar of the par value of such stock. A minimum tax of $2 is provided. The bill would make the tax applicable to every foreign corporation doing business in the State except banking corporations, fire, marine, casualty and like insurance companies, co-operative fraternal insurance companies and building and loan associations.

OHIO

The Mills bill, providing for the issue of bonds by municipalities for the acquisition of public utilities, was passed by both houses of the Legislature on Feb. 16, but it contained the Kramer amendment which specifies that the bonds must be a lien against the property acquired and not against the credit of the city. The provision that bonds shall be in the amount of $100 each was retained in the bill.

PROGRAMS OF ASSOCIATION MEETINGS

I. E. C. Publicity Meeting and Dinner-Dance

Announcement is made of the interchange of the dates of the International Electrical Congress publicity meeting and the congress dinner-dance to be held during the midwinter convention of the American Institute of Electrical Engineers at New York. According to the revised program the publicity meeting will be held in the auditorium of the Engineering Societies Building, New York City, on Wednesday evening, Feb. 25, when a number of prominent speakers will tell of plans for the congress and the San Francisco exposition, and of the scenic and electrical features of the trip across the continent. On Thursday evening, Feb. 26, the International Electrical Congress dinner-dance will be held at the Hotel Biltmore.

Gas, Electric & Street Railway Association of Oklahoma

The Gas, Electric & Street Railway Association of Oklahoma will hold its 1914 convention on May 13, 14 and 15 at the Lee-Hutchins Hotel, Oklahoma City, Okla. The program for the meeting as now arranged contemplates the presentation of about a dozen papers. Some of the papers which have already been decided upon follow:

Paper, "The Effect on Revenue and Accidents Resulting from Car Design with Folding Steps, Prepayment Features, etc.," by J. J. Johnson, assistant general manager of the Oklahoma Railway, Oklahoma City, Okla.

Paper, "Motor Drive," by A. P. Little, professor of electrical engineering at the Oklahoma Agricultural and Mechanical College.

Central Electric Railway Association

In conjunction with the annual meeting of the Central Electric Railway Association in Cleveland on Feb. 26 and 27, the Cleveland supply men who are members of the association offer to all of the members of the association and their friends an invitation to attend a smoker in the banquet hall of the Hollenden Hotel on the evening of Feb. 25 at 8 o'clock. Refreshments will be served and entertainment offered in the way of music and vaudeville acts from the theaters. The ladies who come to the convention will be tendered a theater party on the same evening while the men in attendance are at the smoker. The Cleveland members hope that a large number will arrive the evening before the meeting so as to partake of the entertainment.

Financial and Corporate

Stock and Money Markets

Feb. 18, 1914.

The market in New York was extremely sensitive to-day. Early in the day there were sharp price concessions. On advices from Washington that the President favored early action on the railroad rate advances bullish operations followed. Shortly after noon there were further advances of around a point in the railroad issues. Toward the close the market sold off. The final tone was weak. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 2¾ @ 3 per cent; six months, 3 @ 3¾ per cent.

In the Philadelphia market to-day Philadelphia Rapid Transit sold down to 18⅜. Local issues were in light demand.

In the Chicago market the total of transactions was small, but the market range was broad.

The feature of the Boston market to-day was the decline of Boston & Maine to 43.

The trading in stocks in Baltimore to-day was narrow and dull. The bond market continued active. The transactions totaled $74,800, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 11	Feb. 18
American Brake Shoe & Foundry (com.)	95½	96¼
American Brake Shoe & Foundry (pref.)	142	144
American Cities Company (com.)	36½	36
American Cities Company (pref.)	64	61¾
American Light & Traction Company (com.)	350	353
American Light & Traction Company (pref.)	106	106
American Railways Company	39	39¼
Aurora, Elgin & Chicago Railroad (com.)	37	39
Aurora, Elgin & Chicago Railroad (pref.)	81	79
Boston Elevated Railway	84	82½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	39	40
Brooklyn Rapid Transit Company	91⅜	92⅜
Capital Traction Company, Washington	107¾	109
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	91½	92
Chicago Railways, ptcptg., ctf. 2	32½	33⅛
Chicago Railways, ptcptg., ctf. 3	7½	7½
Chicago Railways, ptcptg., ctf. 4	2⅞	2⅞
Cincinnati Street Railway	107	107
Cleveland Railway	105	105
Cleveland, Southwestern & Columbus Ry. (com.)	*5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	*26
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	75	a75
Columbus Railway (pref.)	a90	a90
Denver & Northwestern Railway	71	71
Detroit United Railway	71	71
General Electric Company	146¾	148¾
Georgia Railway & Electric Company (com.)	118	118½
Georgia Railway & Electric Company (pref.)	85⅞	85¾
Interborough-Metropolitan Company (com.)	15⅜	15¼
Interborough-Metropolitan Company (pref.)	61	61
International Traction Company (com.)	30	*30
International Traction Company (pref.)	a85	*85
Kansas City Railway & Light Company (com.)	19½	19½
Kansas City Railway & Light Company (pref.)	35	35
Lake Shore Electric Railway (com.)	5	5
Lake Shore Electric Railway (1st pref.)	82	82
Lake Shore Electric Railway (2d pref.)	20	20
Manhattan Railway	130¼	130
Massachusetts Electric Companies (com.)	10	11¼
Massachusetts Electric Companies (pref.)	62	62
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	24½	24¼
North American Company	69	71¼
Northern Ohio Traction & Light Co. (com.)	64	70
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	45¾	44¾
Philadelphia Company, Pittsburgh (pref.)	42¾	43
Philadelphia Rapid Transit Company	18½	18⅜
Portland Railway, Light & Power Company	53	53
Public Service Corporation	110	112
Third Avenue Railway, New York	44½	43¾
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	107¼	105½
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	25⅝	25¼
United Rys. Inv. Company (com.)	22½	22¼
United Rys. Inv. Company (pref.)	47½	46
Virginia Railway & Power Company (com.)	53	53
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	90	87½
Washington Ry. & Electric Company (pref.)	87	87½
West End Street Railway, Boston (com.)	72¼	72
West End Street Railway, Boston (pref.)	93	92
Westinghouse Elec. & Mfg. Company	70½	70½
Westinghouse Elec. & Mfg. Co. (1st pref.)	115	116

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* Last sale. a Asked.

ANNUAL REPORTS

Twin City Rapid Transit Company

The statement of receipts and expenses of the Twin City Rapid Transit Company, Minneapolis, Minn., for the years ended Dec. 31, 1913, and 1912, follows:

Receipts			1913	1912
Revenue from transportation			$8,818,177	$8,147,199
Revenue from operation other than transportation			52,158	61,768
			$8,870,336	$8,208,967
Expenses				
Maintenance of ways and structures			$394,527	$364,050
Maintenance of equipment			347,453	370,251
Traffic expenses			40,913	39,943
Conducting transportation			2,923,629	2,680,496
General and miscellaneous			794,119	743,261
Total operating expenses			$4,500,640	$4,198,001
Net operating revenue			$4,369,695	$4,010,966
	1913	1912		
Taxes	$586,128	$538,289		
Depreciation and renewals	1,060,000	775,000	1,646,128	1,313,289
Surplus available for fixed charges and dividends			$2,723,566	$2,697,676
	1913	1912		
Fixed charges	$975,311	$990,941		
Dividends:				
Preferred stock	210,000	210,000		
Common stock	1,206,000	1,206,000	2,391,311	2,406,941
Net income to surplus account			$332,254	$290,735

C. G. Goodrich, president of the company, says in part:

"By comparison with the year 1912 the following increases during 1913 are shown:

Gross earnings	$661,368.59 or 8.06 per cent
Operating expenses	302,639.51 or 7.21 per cent
Net operating revenue	358,729.08 or 8.94 per cent

"The following causes increased operating expenses beyond normal:

"1. It was decided in June to increase the wages of the employees in the operating and mechanical departments. This increased rate of pay for the half year caused an increase in the pay-roll of $102,243.

"2. Our normal taxes were increased $30,180 and under the new federal income tax law it was necessary to apportion $17,659, which is an additional tax over that paid for 1912.

"During the year 107 cars were ordered built in the company shops. This entire order will be completed and the cars in service by Feb. 15, 1914.

"There was built and put into operation 10.46 miles of new track and extensions.

"The directors have appropriated from surplus the sum of $1,060,000, which has been added to the depreciation and renewal reserves.

"To provide for new construction during the year 1914 the directors have sold $652,000, par value, of bonds, as follows:

From the insurance fund investment	$107,000
From the renewal fund investment	160,000
Certified but unissued bonds of the first consolidated 5 per cent mortgage, due Jan. 15, 1919	192,000
Certified but unissued consolidated mortgage bonds, due on Oct. 1, 1928	193,000

"The expenditures for new construction follow:

New power	$475,202
New shops and tools	46,348
Car equipment	367,229
Carhouses	16,153
Track and paving	334,461
Real estate, buildings, miscellaneous	65,689
	$1,305,082
Expended for renewals	525,603
Total construction and renewals	$1,830,685

"From the accumulated surplus the directors have appropriated the sum of $1,275,000 to the reserve for depreciation and renewals. This has been deemed advisable on account of insufficient charges for depreciation in past years.

"Regular quarterly dividends have been declared by the directors and paid, aggregating the sum of $1,416,000, being at the rate of 7 per cent on the preferred stock and 6 per cent on the common stock."

Statistics of revenue passengers carried, transfers redeemed, etc., follow:

	1913	1912
Revenue passengers carried	175,895,811	162,407,993
Transfers redeemed	63,914,277	57,584,451
Operating, per cent of earnings, taxes included	57.35	57,71
Operating, per cent of earnings, taxes, depreciation and renewals included	69.30	67.14
Per cent on preferred stock earned and paid	7.00	7.00
Per cent on common stock earned (after depreciation and renewal charges)	7.65	7.45
Per cent on common stock paid	6.00	6.00

Track mileage and passenger statistics follow:

Total miles, single track	62.89
Total miles, double track	161.09
Total miles, special track	27.31
Total miles, all tracks reduced to single	412.38
Average total miles, all track reduced to single, operated during 1913	406.20
Total miles street and right-of-way occupied by tracks	219.06
Average total miles street and right-of-way occupied by tracks, operated during 1913	216.15
Gross passenger earnings per mile, single track	$21,629.66
Gross passenger earnings per mile, street occupied by tracks	$40,647.55
Gross passenger earnings	$8,785,968.00

York Railways

The comparative statement of income, profit and loss of the York (Pa.) Railways for the fiscal years ended Nov. 30, 1912, and Nov. 30, 1913, follows:

	1912	1913
Gross earnings	$710,471	$761,904
Operating expenses	$366,520	$397,530
Allowances for depreciation	15,589	16,735
Total	$382,109	$414,266
Net earnings	$328,362	$347,638
Miscellaneous income	4,229	5,257
Total income	$332,591	$352,895
Fixed charges and taxes	252,328	256,978
Net income	$80,263	$95,917
Dividends	64,000	80,000
Surplus for period	$16,263	$15,917
Surplus Dec. 1, 1912		$60,889
Total surplus Nov. 30, 1913		$76,806

Gordon Campbell, president of the company, says in part: "Gross earnings have increased at a rate somewhat higher than that of the previous year. The influence of improved service continues to be felt. Earnings from the light and power company are augmented by the addition of the business of a section of the county to the southeast of York, having its center about 8 miles from Centre Square, and including the boroughs of Red Lion, Dallastown, Yoe and Windsor.

"Two extensions of the city lines were projected and completed during the year, one from the Prospect Street line via East Princess Street, Yale Street and Prospect Street, forming a loop; the other a branch-off, 2400 ft. long, from George Street on Jackson Street. The extension of the Prospect Street line into Elmwood and Green Hill is calculated to stimulate new growth on this line. A short piece of track on Albemarle Street from East Princess Street to Market Street, 6720 ft. long, was taken up and relaid on the new route. Double track was laid on West Market Street from West Street to Belvidere Avenue.

"Rolling stock was increased by the purchase of three additional passenger cars and one snow sweeper. These cars are designed for suburban use and are of steel underframe, in type semi-convertible, with tandem sash. Their length is 34 ft. over corner posts and 47 ft. over all, and their seating capacity is fifty-two people. The trucks and motor equipment are of the latest type and suitable for high speed.

"The York & Windsor Electric Light Company was acquired by purchase of stock and bonds, and the Edison Light & Power Company was formed by the merger of the Edison Electric Light Company, the York & Windsor Electric Light Company, with franchises in Yoe, Dallastown and Red Lion, and fourteen suburban lighting companies, having franchises in their respective boroughs and townships surrounding and adjacent to York.

"To provide properly for the needs of the newly acquired territory a substation was built in Red Lion in combination with a freight station for the railway; the transmission line was reconstructed, a three-phase line of No. 2 copper wire was installed to replace the No. 4 two-phase line, and 50-ft. poles in Dalastown and Red Lion replaced the old electric light poles and, by combination, many of the railway poles, thus providing equipment to take on substantial power business already partly contracted for in the new territory."

West Penn Traction & Water Power Company

The statement of the West Penn Traction & Water Power Company, Pittsburgh, Pa., for the year ended Dec. 31, 1913, showed gross earnings of $4,705,613, an increase of $1,297,027; expenses and taxes of $2,675,568, an increase of $846,109; net earnings of $2,030,045, an increase of $450,918; and fixed charges of $1,184,118, an increase of $289,370. The surplus remaining was $610,927, an increase of $61,548. A comparative statement for two years follows:

	1912	1913
Gross earnings	$3,408,586	$4,705,613
Operating expenses and taxes	1,829,459	2,675,568
Net earnings	$1,579,127	$2,030,045
Fixed charges	794,748	1,184,118
Balance	$784,379	$845,927
Guaranteed dividends	235,000	235,000
Surplus	$549,379	$610,927

The gross and net earnings of the system for a series of years ended Dec. 31, 1913, show:

	Gross	Net
1904	$909,734	$379,637
1905	1,060,238	480,480
1906	1,409,493	635,516
1907	1,603,100	761,733
1908	1,551,138	691,874
1909	1,767,915	786,575
1910	2,042,002	1,054,360
1911	2,260,287	1,148,006
1912	3,408,586	1,579,127
1913	4,705,613	2,030,045

Scranton-Binghamton Merger Hearing

A hearing was held before the members of the Public Service Commission of the Second District of New York recently on the application of the Scranton & Binghamton Railroad for permission to acquire the capital stock of the Binghamton Railway. The application states, among other things, that the Scranton & Binghamton Railroad is to supply power to the Binghamton Railway. It is agreed that any and all contracts between the Scranton & Binghamton Railroad and the Binghamton Railway for the use of cars, tracks and terminals, as well as all contracts for supplying power and the rates for hauling coal by the Scranton & Binghamton Railroad, shall be submitted to the commission before being put into effect. It is also proposed that for a period of two years the cash assets and securities owned by the Binghamton Railway shall be used only for the benefit of the Binghamton Railway, under the direction of the commission; that for a period of two years the net receipts of the Binghamton Railway shall be applied to the payment of interest on its debt and the improvement of its property, and that no further dividend shall be declared by the Binghamton Railway for two years from July 1, 1914. The application was dated Feb. 7, 1914, and was signed for the Scranton & Binghamton Railroad by T. J. Foster, vice-president.

It is proposed to operate an electric railroad between Scranton, Pa., and Binghamton, N. Y., a distance of about 62 miles, with branches to Montrose and Susquehanna, Pa., and also to Lake Winola, Pa. The road is already in operation to Nicholson, 21 miles from Scranton, and there is a branch to Lake Winola, 6 miles. A section of 18 miles from Nicholson to Montrose, Pa., is now under construction and should be completed and in operation within a year. Cars are run between Scranton and Nicholson every hour between 6 a. m. and midnight and between Scranton and Brookside every half hour, and at intervals cars carrying coal from a mine operated by an individual operator are also run over the road to Nicholson as well as express cars carrying milk and other general merchandise. Until the new construction is formally turned over to the Scranton & Binghamton Railroad it has been deemed advisable to have the line operated on behalf of the contractor by the Scranton & Binghamton Traction Company. The road, as projected from Nicholson to Binghamton, will reach Foster, Brooklyn, Montrose, New Milford, Hallstead and Susquehanna.

The Scranton & Binghamton Railroad has an authorized capital of $500,000, of which $250,000 has been issued. All of the stock is owned by the Scranton & Binghamton Railway, a Delaware corporation, having a capitalization of $6,000,000, the stock of which is being issued from time to time as the road is built and bonds of the Scranton & Binghamton Railroad are sold. The Scranton & Binghamton Railroad proposes to purchase the stock of the Binghamton Railway at $60 a share. More than 90 per cent of the stock has been contracted for and efforts are being made to purchase the rest which is outstanding.

Among those who appeared at the hearing before the Public Service Commission were Lewis E. Carr, attorney for the applicant; G. Tracy Rogers, president of the Binghamton Railway; George E. Green, vice-president of the Binghamton Railway; S. B. Michael, assistant secretary of the Scranton & Binghamton Railroad; T. C. Dougherty, engineer of the Scranton & Binghamton Railroad, and W. C. Bates, chairman of the transportation committee of the Chamber of Commerce of Binghamton.

Adjournment of the hearing by the commission was taken to a date to be fixed by the commission.

Capitalizing Prospects in Reorganizations

Referring to the tendency in the case of reorganizations to placate the holders of the securities of the old company with paper representing frequently nothing more than prospects, the New York *Times Annalist* said editorially in the issue of Feb. 16, 1914:

"It is not uncommon for a railroad to emerge from a receivership with a larger capitalization than before, only so rearranged in form that a smaller proportion draws fixed interest. The remainder is 'something for the old security holders.' It need not have any intrinsic value; it represents what is hoped for. In time the property may grow up to those nominal securities and be able to pay dividends on them. Bankers, on contemplating a reorganization in which bondholders will have to be asked to take subordinate claims and stockholders to put up new money, always have in mind a certain amount of paper over and above intrinsic values, which will have at least the appearance and physical feeling of 'securities.' The old security holders know that the extra paper has no present value, but imagine that it will sell for something, on prospects, and are altogether better satisfied than if the new capitalization had been confined to the actual earning power of the property. Thus, almost invariably, a reorganized company starts out fresh from bankruptcy, with either bonds on which interest payments are deferred, or shares on which dividends for a number of years will be quite impossible, or both—generally both."

American Water Works & Guarantee Company, Pittsburgh, Pa.—The receivers of the American Water Works & Guarantee Company met on Feb. 16, 1914, with H. H. Pierce, a New York attorney, representing the stockholders' protective committee, and plans for the reorganization of the company and its subsidiaries and the ending of the receivership were discussed. After the meeting an officer of the company said that the plans for the reorganization would probably be announced by March 1.

Batavia (N. Y.) Street Car Company, Inc.—A committee has been named to carry on a bond-selling campaign to raise $20,000 with which the city of Batavia proposes to secure an interest in the lines of the Buffalo & Williamsville Electric Railway in Batavia and extend and improve the property, which will be re-incorporated as the Batavia Street Car Company, Inc. The par value of the bonds will be $100 and they will run for twenty years, paying 5 per cent interest. Under the terms of the agreement entered into Batavia must subscribe $20,000 worth of bonds and the Federal Storage Battery Car Company $20,000.

Chicago (Ill.) Railways.—W. W. Gurley, general counsel for the Chicago Railways, explains as follows the application of the company to the Public Utilities Commission of Illinois for permission to issue $1,400,000 of bonds and $4,000,000 in short-term notes: "As we do the work required under the traction ordinance during the year we borrow the money needed and give interim certificates as security. Later we take up these certificates with bonds, but we are not permitted under the ordinance to issue bonds until the work has been completed and only to the extent of the actual value of the improvement. Last year we issued about $4,000,000 of interim certificates for money borrowed. As the work was completed we issued bonds to redeem these certificates, but there still remains about $1,400,000 in certificates to be retired. We will need between $4,000,000 and $5,000,000 to pay for work this year, and we shall have to issue interim certificates the same as heretofore."

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—The courts have been asked to appoint a receiver for the Duquesne & McKeesport Land Company, the Duquesne & Dravosburg Street Railway and the United Development Company. The petition is filled by a committee of the stockholders of the companies.

El Paso (Tex.) Electric Company.—The El Paso Electric Company has increased its common dividend from an 8 per cent to a 9 per cent basis, by the declaration of a quarterly dividend of $2.25 per share, payable on March 16 to stock of record March 4. Dividends at the rate of 8 per cent per annum have been paid quarterly since June 16, 1913.

Gary & Interurban Railway, Gary, Ind.—At the annual meeting of the Gary & Interurban Railway, the board of directors was increased to seven members by the election of Edwin W. Poe, vice-president of the Baltimore Trust Company, Baltimore, Md., and Philip L. Poe, of Poe & Davies, bankers, Baltimore, Md.

Grand Valley Railway, Brantford, Ont.—Judgment was reserved by the Appellate Division at Osgoode Hall, Toronto, Ont., on Feb. 6, on the application made on behalf of the Grand Valley Railway for an extension of time to enable it to raise funds to meet its obligations to the city of Brantford. The company owes the city $7,000 for taxes, and the latter has been authorized to take possession of the railway property. The application was opposed by the Brantford authorities. Counsel for the bondholders of the company supported the application for an extension of time. It was stated that an offer had been made for the purchase of the company's assets, which, if accepted, would enable the company to meet all its obligations.

Idaho Railway, Light & Power Company, Boise, Idaho.—Holders of the $3,212,000 first and refunding bonds of the Idaho-Oregon Light & Power Company are receiving a form of deposit agreement from a committee composed of Alvin W. Krech, chairman; Edmund Seymour, E. J. Emmons and J. E. Ramsey. The committee suggests that it would be well for the holders of the bonds to deposit their holdings with the committee so that advantage may be taken of any feasible plan which may be arranged. The committee explains that the action was brought about at the solicitation of a number of bondholders who did not wish to deposit with the Priest committee. The Fuller committee, recently resigned, submitted a reorganization plan to the bondholders, which provided for the sale of the property to the Idaho Railway & Light Company through the issue of income bonds to the power company bondholders. This was opposed by the Priest interests and following the resignation of the Fuller committee the Priest committee was formed. The property will be sold on March 16, 1914.

Jackson Railway & Light Company, Jackson, Tenn.—The Jackson Railway & Light Company has increased its capital stock from $600,000 to $700,000. The new stock is all preferred.

Joliet, Plainfield & Aurora Railroad, Joliet, Ill.—Minority bondholders of the Joliet & Aurora Interurban Railroad, which was sold recently at a master in chancery sale at Geneva for $250 000 to a syndicate of majority bondholders headed by N. W. Halsey & Company, assert that the majority bondholders refused to let them participate in the pool.

Lehigh Valley Transit Company, Allentown, Pa.—The $1,000,000 of refunding and improvement 5 per cent bonds of the Lehigh Valley Transit Company were purchased by a syndicate, headed by Brown Brothers & Company and Edward B. Smith & Company and composed of other well known bankers and banking houses. The loan will be placed by the members of the syndicate with their own clientele and will not be advertised or offered publicly.

Manhattan Bridge Three-Cent Line, New York, N. Y.—The Manhattan Bridge Three-Cent Line on Feb. 11, 1914, declared a quarterly dividend of 1½ per cent, payable on March 2, putting the corporation's stock on a 6 per cent basis.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Railroad Commission of California has authorized the Oakland, Antioch & Eastern Railway to issue $500,000 of its first mortgage 5 per cent thirty-year bonds under its mortgage to the Union Trust Company, San Francisco, Cal., and to pledge the bonds, together with other bonds to a total of $1,167,000, as collateral security for an issue of $700,000 of notes under the trust agreement. The funds will be applied to develop the property and to liquidate indebtedness.

Pittsburgh & Butler Street Railway, Pittsburgh, Pa.—A hearing will be held on March 3 by the Public Service Commission of Pennsylvania on the application for the approval of the merger of the Pittsburgh & Butler Street Railway and the Butler Passenger Railway.

Schenectady (N. Y.) Railway.—Three new directors have been elected by the stockholders of the Schenectady Railway. A. H. Smith, president of the New York Central & Hudson River Railroad, has succeeded W. C. Brown, who resigned recently from the New York Central Railroad; H. S. Vanderbilt has succeeded F. A. Harrington and W. S. Updike has succeeded W. C. Noyes.

United Light & Railways Company, Grand Rapids, Mich.—The 1 per cent extra dividend to be distributed on April 1, 1914, in addition to the regular quarterly dividend of 1 per cent on the common stock of the United Light & Railways Company is payable in common stock. The regular payment is payable in cash, as usual.

Dividends Declared

Brockton & Plymouth Street Railway, Brockton, Mass., 3 per cent, preferred.

Manhattan Bridge Three-Cent Line, New York, N. Y., quarterly, 1½ per cent.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Tennessee Railway, Light & Power Company, Memphis, Tenn., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
ATLANTIC SHORE RAILWAY, SANFORD, MAINE							
1m.,	Jan.,	'14	$21,997	$20,779	$1,218	$661	$557
1 "	"	'13	22,292	20,064	2,228	466	1,762
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE							
1m.,	Dec.,	'13	$205,547	*$116,063	$89,484	$63,576	$25,908
1 "	"	'12	175,134	*102,012	73,122	56,510	16,612
12 "	"	'13	2,354,797	*1,312,873	1,041,924	714,273	327,651
12 "	"	'12	2,128,388	*1,201,334	927,054	644,774	282,280
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.							
12m.,	Dec.,	'13	$2,329,164	*$1,389,032	$940,132	......	......
12 "	"	'12	2,167,507	*1,253,155	914,352	......	......
GRAND RAPIDS (MICH.) RAILWAY							
1m.,	Dec.,	'13	$121,731	*$71,591	$50,140	$12,421	$37,719
1 "	"	'12	106,978	*65,608	41,370	14,252	27,118
12 "	"	'13	1,294,347	*796,551	497,796	166,633	331,163
12 "	"	'12	1,233,588	*700,230	533,358	175,225	358,133
NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.							
1m.,	Jan.,	'13	$639,544	$310,495	$329,049	$208,338	$120,711
1 "	"	'12	616,657	297,138	319,519	189,527	129,992
12 "	"	'13	6,924,425	3,600,382	3,324,043	2,446,514	877,529
12 "	"	'12	6,652,936	3,420,357	3,232,579	2,233,587	998,992
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY							
1m.,	Jan.,	'14	$2,006,527	$1,202,056	$804,471	$802,682	$1,789
1 "	"	'13	2,002,067	1,228,131	773,936	769,000	4,936
7 "	"	'14	14,246,065	8,338,091	5,907,974	5,598,842	309,132
7 "	"	'13	13,928,192	8,314,906	5,613,286	5,329,921	283,365
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO							
1m.,	Jan.,	'14	$257,978	*$152,278	$105,699	$43,089	$62,610
1 "	"	'13	244,341	*148,566	95,775	45,816	49,959
12 "	"	'14	3,011,307	*1,847,676	1,163,631	533,538	630,093
12 "	"	'13	2,710,158	*1,633,306	1,076,852	529,986	546,866

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*Includes taxes.

Traffic and Transportation

Ruling of the Pennsylvania Commission Regarding Free Transportation

Numerous requests have been presented to the Public Service Commission of Pennsylvania, by railroads and street railways and persons interested, for an administrative ruling upon the questions whether or not the issuance of free passes to officers and employees of railroads to be used for the transportation of dependent members of the families of such officers and employees, and whether or not the according of free transportation by common carriers to policemen and firemen in the discharge of their public duties, are violations of the act of July 26, 1913, known as the public service company law.

A public hearing in this matter was held by the commission at Harrisburg on Jan. 20, 1914, at which representatives of railroad and railway companies and others appeared. After careful consideration the commission is of the opinion that the meaning of the provisions of the law of July 26, 1913, are not such as to require the commission to regard as a violation of the law the practice of railroad companies in issuing free passes to their officers and employees to be used for the transportation of dependent members of the families of such officers and employees. This practice has had the sanction of custom since the adoption of the pass provision of the constitution of 1874, and the act of June 15, 1874, passed to carry that provision of the constitution into effect. The commission has therefore ruled that the granting without unfair discrimination by railroad companies of free passes to their officers and employees, to be used for the transportation of dependent members of the families of such officers and employees, will not be regarded by the commission as a violation of the provisions of the law. The commission is further of the opinion that free transportation, without unfair discrimination, by common carriers, on behalf of the commonwealth, or on behalf of any municipality thereof, of policemen in the performance of their public duties, and similarly, that free transportation, without unfair discrimination, by common carriers, on behalf of any such municipality, of firemen in the performance of their public duties, is not such free transportation as is prohibited by the provisions of the public service company law, and will not be regarded by the commission as a violation of the law.

Plans for Delivering Farm Produce in Philadelphia

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914, page 384, of the campaign which has recently been inaugurated in Philadelphia for reducing the high cost of living and developing a system of municipal markets to bring the producer into closer touch with the consumer, that the farmer may receive more for his product and the consumer buy at reduced cost. The present municipal administration, under Mayor Blankenburg and Director Cooke of the Board of Public Works, has assigned Chief William H. Ball, of the Bureau of Public Properties, to work out the plan. Mr. Ball has enlisted in his work Edward C. Spring, manager of the interurban division of the Lehigh Valley Transit Company, representing the traction interests.

The present City Councils of Philadelphia have a bill before them known as the "interurban curb market bill." This measure, which has been in Councils for nearly a year, has recently been brought forward and will probably be passed by the Councils in the near future. This will give the Department of Public Works the right to establish municipal markets at such objective points as will serve the interests of the city to the best advantage. These markets will be under the direction and supervision of Mr. Ball and his assistant, Miss Lippincott, superintendent of markets. The farming districts outside of Philadelphia will be organized into farmers' associations which will be represented at the various markets in Philadelphia. A common pool among the farmers will defray the expenses of this representative or any assistants that he may have, also the rental necessary at the various market houses. In the future the farmer will load his goods on the electric railway and consign them to his representative in Philadelphia. The representative in Philadelphia will in turn make returns direct to the farmer. This will enable the farmer to dispose of his product direct and eliminate the middleman. At the same time the people of Philadelphia will benefit by receiving better and fresher produce at reduced cost.

Differences Regarding Service in Detroit

Differences have arisen between the members of the Detroit Common Council and the officers of the Detroit (Mich.) United Railway in regard to service. The Council, through a resolution offered by Alderman Bliel, declared the company was overcrowding the cars and that the service had been materially reduced since the seven-for-a-quarter agreement of Aug. 7. He called upon the corporation counsel to take action under such city ordinances as gave him authority to compel a greater amount of service by the company. The company also was cited to appear and explain what changes in the service have occurred since the low-fare agreement became effective. The company had taken no action in reply up to Feb. 16, and it is evident from the Feb. 20 issue of *Electric Railway Service*, which is published weekly in the interest of the company, that the railway proposes to resist any attempts to compel an increase in service where the increase is not justified by the business. The company states officially in its paper that "the people of Detroit are getting all the service the Detroit United Railway can give for the money," and it maintains that a scientific investigation will prove this assertion to be true. The company contends it is physically impossible to operate more cars during the rush hour and insists that more tracks must be built by the city or the company before this can be done.

Although injunction proceedings are pending in the courts to prevent the construction of the Junction Avenue crosstown line, authorized several months ago by the City Council, the Detroit United Railway, the Père Marquette Railroad and the Wabash Railroads will appear before the State Railroad Commission on Feb. 26 to discuss the crossings which will be required for the proposed line. The city has been asked to have a representative present.

Group Insurance for Pittsburgh Employees

J. D. Callery, president of the Pittsburgh (Pa.) Railways, addressed the following communication to the employees of the company under date of Feb. 9, 1914:

"The Pittsburgh Railways is pleased to announce to its employees that it has been able to secure a blanket policy from the Equitable Life Assurance Society of the United States, insuring the lives of its employees over one year in the service of the departments mentioned below.

"The company pays all the expenses of this insurance.

"Upon the death, from any cause whatever, of any of the said employees, of two years' service or more, his family will receive checks from the Equitable Life Assurance Society for approximately his previous year's wages, payable monthly over a period of one year.

"The family of any one of said employees who has served our company for one and less than two years will, in lieu of the above, receive approximately one-half his full year's wages, payable as above. We have thus far been able to effect this insurance for employees in the following departments: maintenance of way, barns and shops, overhead lines department, substations, monthly employees of the transportation department, general office force—from the president down.

"This insurance is now in effect, dating from Feb. 1, 1914. A form to designate the member of your family to whom you would wish the money paid will be furnished you. Please fill out this form and return promptly, that you may receive your individual policy stating the amount and to whom it would be paid."

Special Rates to Charitable Institutions.—The Pittsburgh & Butler Street Railway, Pittsburgh, Pa., has asked the Public Service Commission of Pennsylvania to pass upon the question of the company continuing the practice of special rates in favor of certain charitable institutions located along the railway.

Operating Changes at Bowling Green.—The Southern Traction Company, Bowling Green, Ky., has installed fare boxes and made other alterations in its cars to enable it to put the pay-as-you-enter system into effect. The company has also adopted the plan of having its cars stop on the "near" side of the street.

Transporting Letter Carriers in Tacoma.—On Feb. 1 the Tacoma Railway & Power Company, Tacoma, Wash., withdrew its special rate on commutation city tickets to the post office department of twenty-five for $1, and is now selling regular city tickets to that department at the regular rate of twenty-two tickets for $1.

Serious Accident in Pittsburgh.—Forty persons were injured on Feb. 14 at 11.30 p. m. when an East Liberty express car of the Pittsburgh Railways ran into an open switch at Liberty and Millvale Avenue. The car turned over on its side. All of the passengers were more or less bruised and about forty were taken to the West Penn Hospital to be treated for their injuries.

Decision on Transfer Exchange in Buffalo.—In a decision handed down by a justice of the Supreme Court in Buffalo, N. Y., it is held that the refusal of the International Railway and the Buffalo & Lake Erie Traction Company to accept and interchange transfers will not subject either company to a penalty. A judgment secured in a lower court for $50 is set aside by the opinion.

Short Municipal Road in Oakland.—The city of Oakland, Cal., owns a railroad 390 ft. long in front of the new City Hall. The line is under lease to the San Francisco-Oakland Terminal Railways for a period of ten years. The rental is $1 a foot per year. All the city owns is the roadbed. The municipal road is an extension of the Washington Street line of the terminal corporation.

Smoking to Be Prohibited in Wheeling.—The Wheeling (W. Va.) Traction Company plans to issue an order to prohibit smoking on its cars. At present the company permits smoking on the front end of closed cars, while in the summer the last three seats of open cars are reserved for smokers. There is considerable popular demand for the smoking privilege in connection with suburban traffic handled by the company, however.

Carhouse Signs in Washington.—The Public Utilities Commission of the District of Columbia has prepared a design for a sign to be erected at carhouses to warn drivers of vehicles against the danger of accidents at such places. The commission has prescribed the places at which such signs shall be erected and has issued an order directing the Washington Railway & Electric Company and the Capital Traction Company to erect the signs in accordance with the commission's instructions.

Kansas City Automobile Ordinance Amended.—The upper house of the Kansas City Council has passed an amendment to the traffic ordinance recently adopted, clarifying the definition of the safety zone. By the provisions of the amendment auto drivers must stop 10 ft. in the rear of street cars which have stopped to take on or discharge passengers, and may not run 10 ft. to the right or left. The amendment will prevent differing interpretations of the ordinance by police judges. Violation of the ordinance is punishable by a fine of not less than $1 nor more than $500.

Advertising Schedule Changes in Topeka.—The Topeka (Kan.) Railway resorted to the advertising columns of the daily papers recently in announcing a change of schedule on the Asylum-South Topeka division. Ten-minute service was put into effect. While the daily papers considered the change of enough importance to mention as a matter of news, the railway company further impressed the better service on the public by using 6 in. of space, triple column. It was explained that the schedule, given in full, would prevail between the hours of 6 a. m. and 8 a. m. and between 5 p. m. and 7 p. m.

Stenographers as Assistants to Division Superintendents.—The Metropolitan Street Railway, Kansas City, Mo., has added forces of stenographers to its two largest divisions, those at Forty-eighth and Harrison and Ninth and Brighton. The stenographers, it is believed, will take much routine off the shoulders of division superintendents and make for increased efficiency all around. Heretofore stenographers have been used only at the main offices of the company. Besides doing typewriting, the stenographers will supervise the making of trainmen's accident reports and other reports made by trainmen, will look up tracers for the claim department, etc.

Methuen Service Petition.—The Massachusetts Public Service Commission has received a petition from the selectmen of Methuen asking that transfers be granted on the Haverhill line of the Bay State Street Railway; that turnouts be so placed that the company may be able to run cars at fifteen-minute intervals between Lowell and Haverhill; that additional night car service be given from the Lawrence transfer station to Methuen, and that a fifteen-minute schedule be placed in effect in rush hours in the Methuen district. The petitioners desire one car every fifteen minutes instead of two cars every thirty minutes on the Lowell-Haverhill route.

Hearing at Boston Upon Dewey Square Transfers.—The Public Service Commission of Massachusetts gave a hearing on Feb. 4 upon the petition of members of the Legislature residing in the Suffolk districts for the establishment of surface car transfer facilities at Dewey Square, Boston. C. S. Sergeant, vice-president of the Boston Elevated Railway, appeared for the company, and in response to the suggestion of Chairman McLeod that the granting of transfer privileges is desirable between Atlantic Avenue surface cars running north of Dewey Square and cars operating in Dewey Square and Dorchester Avenue, stated that the company would endeavor to put the desired arrangements into effect.

Public Co-operation Requested in Chicago Safety Crusade.—Co-operation of the public to aid street railway motormen in protecting persons from injury was urged recently by H. L. Brownell, safety inspector of the Chicago Surface Lines, before the Cook County Truck Gardeners and Farmers' Association. He said: "Put lights on your wagons; get clear promptly of street cars; don't take chances, and when you're afoot use the same precaution crossing a street-car track as you would crossing a strange steam railroad track. Know where you are going and keep your eyes open." In closing he stated, "Our motormen are human. They don't want accidents. You don't want them. Let's work together to prevent them."

Re-routing in Buffalo.—As the result of a conference held in Buffalo with members of the Public Service Commission of the Second District of New York by Edward G. Connette, president of the International Railway, and merchants representing various business men's organizations, another re-routing of service in Buffalo will be made on several of the lines which are now operated through the down-town business district. Two of the east side lines will be taken off Main Street and will be routed down a street running parallel to Main Street but three blocks to the east. In the spring as soon as switches and crossovers can be installed another east and west side line will be connected to make a through route from one end of the city to the other. The International Railway is gradually eliminating the division of the city at Main Street by connecting the east and west side lines into through routes.

Arbitration Award in Augusta.—The majority of the board of arbitration which has been considering the question of the wages of the employees of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., reports that "conditions as represented to us do not warrant an increase for the year 1914." The evidence presented by the employees showed approximately twelve hours of work daily, at rates varying from 17 cents to 22 cents an hour, which it was contended were insufficient in view of the high cost of living. On the other hand, the company showed that it was in anything but a flourishing condition financially; that the prevailing hours of labor were not unusual; that the wages were the highest paid in any of nineteen cities which it named in the Southeast and that the gross earnings per car mile were the lowest among all but two of the cities named. During the eleven years from 1900 to 1910, inclusive, the former owners of the property increased the pay of the men an average of a fraction over 1 cent an hour, while the present owners, coming into possession of the property in 1911, increased the pay 4 cents an hour in less than two years' time. In other words, for eleven years prior to 1911 the men received an increase of about 7 per cent in wages, while during less than two years the present owners increased the pay of the men about 30 per cent.

Personal Mention

Mr. Pomeroy Ladue has been appointed purchasing agent of the San Francisco-Oakland Terminal Railways, Oakland, Cal., to succeed Mr. John Wells.

Mr. Frank J. Duffy, manager of the Southern Railway & Light Company, Natchez, Miss., has been elected chairman of the committee of depositors of the First Natchez Bank.

Mr. George W. St. Pierre, master mechanic of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has been appointed superintendent of equipment of the company.

Mr. D. C. O'Dowd, superintendent of the Carrollton carhouse of the New Orleans Railway & Light Company, New Orleans, La., has been appointed superintendent of the railway lines included in the southern division of the company.

Mr. C. C. Johnson has been appointed general manager of the Vicksburg Light & Traction Company, Vicksburg, Miss., to succeed Mr. A. J. Bemis. Mr. Johnson was formerly connected with the Chickasha (Okla.) Street Railway.

Mr. F. E. Scovill, who for more than nine years has held the position of manager and secretary of the Laredo Electric & Railway Company, Laredo, Tex., for the G. Bedell Moore estate, has resigned, following the sale of the property to Mr. R. W. Morrison, St. Louis, Mo., and associates.

Mr. Thomas Penney, former president of the International Railway, Buffalo, N. Y., and now a member of the law firm of Norton, Penney, Spring & Moore, attorneys for the corporation, has been appointed general counsel for the company with supervision over the law and claims departments.

Mr. R. W. Morrison, who with his associates has purchased the property of the Laredo Electric & Railway Company, Laredo, Tex., has been elected president of the company to succeed Mrs. G. B. Moore, and has assumed the management of the company, succeeding Mr. F. E. Scovill, who has managed the company for some time for the G. Bedell Moore estate.

Mr. A. Ludlow Kramer has resigned as vice-president of the Equitable Trust Company, New York, N. Y., to become president of the Electric Properties Company, succeeding Mr. John F. Wallace, resigned. Mr. Wallace will hereafter devote his time to the affairs of Westinghouse, Church, Kerr & Company, all the stock of which is owned by the Electric Properties Company.

Mr. E. C. Sherwood has resigned as general foreman of shops of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to accept the position of general foreman of car equipment with the Manhattan & Queens Traction Corporation, Long Island City, N. Y. Previous to his connection with the Coney Island & Brooklyn Railroad Mr. Sherwood was with the New York (N. Y.) Railways as general foreman of the mechanical department.

Mr. J. Paulding Edwards, who for the last eight years has served the Northern Electric Railway of California in the capacity of consulting, constructing and operating electrical and mechanical engineer, has retired from the construction and operating departments of the company and has been appointed consulting engineer for the company with headquarters at 201-202 Farmers & Mechanics' Bank Building, Sacramento, Cal. In addition to his work for the Northern Electric Railway Mr. Edwards has entered general practice as a consulting engineer.

Mr. Grover Squires, assistant division superintendent at the Thirty-first and Holmes division of the Metropolitan Street Railway, Kansas City, Mo., has been transferred to the Ninth and Brighton division in the same role. The change is a promotion, because of the greater importance of the latter division. He succeeds Mr. George Bogert, who returns to the mechanical department of the company. Mr. Squires is succeeded as assistant division superintendent at Thirty-first and Holmes by Mr. E. H. Holcomb, until recently day clerk at the Forty-eighth and Harrison division.

Mr. George N. Brown, electrical engineer of the New York State Railways, Syracuse Lines, has also been appointed chief instructor in the school of the company for the Syracuse territory. It is planned to increase the efficiency of the school of instruction for men seeking employment. The usual two weeks' training will be given prospective motormen and conductors, and there will be a system by which the work of the new employees will be recorded for a period of one year from their entrance into the service. Mr. Brown will have two assistants in his work and the schoolroom in the Tallman Street carhouse will be equipped with new apparatus for demonstration purposes.

Mr. C. A. Alderman, formerly of Buffalo, and for the last fifteen months vice-president and chief engineer of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., and Ashland, Wis., has resigned and opened an office temporarily in Ashland. Mr. Alderman, who took a civil engineering course at the University of Wisconsin, has been in municipal, hydroelectric and railroad engineering since 1885. Among the works with which he has been connected are the Saxon Falls hydroelectric development on the Montreal River, the electric railway from Ironwood to Bessemer, Mich., and filters and settling basins for the Ironwood waterworks. He is at present making surveys and plans for two small hydroelectric projects in northern Wisconsin.

Mr. I. R. Carson has superseded Mr. J. F. Gregory as superintendent of the Westport & Belt division of the Metropolitan Street Railway, Kansas City, Mo. Mr. Carson formerly was assistant superintendent of the Forty-eighth and Harrison division, perhaps the most important of the company. He is a young man who entered the electric railway business at an early age. Mr. Carson originally was a trainman, and was later made division clerk, finally being promoted to the assistant superintendency of the Forty-eighth and Harrison division and later to the position mentioned. He has been succeeded as assistant superintendent of the Forty-eighth and Harrison division by Mr. Frank Hainline, until recently day clerk at the same division.

Mr. J. Q. Brown, assistant manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has resigned, effective on March 1. Mr. Brown has long been regarded as one of the most able operators on the Pacific Coast. He invented the roller pantograph trolley, used on the Key Route, Southern Pacific and other roads, and also the movable railing now used on the platforms of the prepayment cars in Oakland and San Francisco. He designed and directed the construction of the Yerba Buena power station, one of the most complete and economical plants of its kind in the West. He has had charge of the design and erection of the distribution system, signals, rolling stock, shop and maintenance of all electrical and mechanical apparatus on the San Francisco-Oakland Terminal Railways. He is a member of the American Society of Mechanical Engineers.

Mr. Harry B. Ivers, who has resigned as general manager of the Lewiston, Augusta & Waterville Street Railway Company, Lewiston, Maine, to become connected with the Frank Ridlon Company, Boston, Mass., the control of which he purchased recently, was the guest of honor at a banquet arranged by the employees of the company and held on Feb. 16. About forty employees of the company and a number of personal friends of Mr. Ivers attended. Speeches were made by Mr. John R. Graham, president of the company; Mr. William H. Newell, one of the directors; Mr. E. T. Munger, the new general manager; Mr. G. W. Bowie, general superintendent of the system; Mr. John E. Nelson and Mr. Ivers himself. Mr. William B. Skelton acted as toastmaster. Mr. Ivers was presented with a gold watch, chain and thirty-second degree Masonic charm, which was handed him as a remembrance from the entire organization of the Lewiston, Augusta & Waterville Street Railway. The presentation was made by Mr. Thomas Vaughn, president of the relief association of the company.

Mr. W. J. Grambs, superintendent of light and power of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been promoted to the position of assistant to President Jacob Furth. Mr. Grambs engaged in the electrical business in Seattle in the spring of 1888 and established and organized the Northwest Electric Supply & Construction Company. This company installed the first incandescent electric lighting plant in the Northwest, and successively represented the Edison United Manufacturing Company, the Sprague Electric Railway & Motor Company, the Edison General Electric Company, the General Electric Company and the Northwest General Electric Company. In 1899 Mr. Grambs resigned his position with the General Electric Company to accept the position of purchasing agent of the Seattle Electric Company. In 1905 he was appointed contract agent of that company and two years later sales manager. In November, 1911, he was appointed superintendent of light and power. Between the years 1896 and 1899 Mr. Grambs acted as receiver for several of the street railway and lighting properties in Seattle.

Mr. Henry W. Thornton, general superintendent Long Island Railroad, Long Island City, N. Y., and president of the Northwestern Railway, which is a consolidation of the Meadville & Conneaut Lake Traction Company and the Meadville Traction Company, Meadville, Pa., has been appointed general manager of the Great Eastern Railway of England. Mr. Thornton was born on Nov. 6, 1871, and was educated at the University of Pennsylvania. He entered railway service in 1894 as a draftsman with the Pennsylvania lines west of Pittsburgh. From that time until November, 1899, he was consecutively assistant engineer on construction for the Cleveland & Marietta Railway, topographer attached to the chief engineer's office of the Southwest system of the Pennsylvania lines, assistant in the engineers' corps of the Pittsburgh division of the Pennsylvania lines, assistant engineer in field work attached to the chief engineer's office of the Southwest system, supervisor of yards at Columbus, Ohio; assistant engineer of the Cincinnati division and assistant engineer assigned to special work. From November, 1899, to March, 1901, Mr. Thornton served as engineer of maintenance of way of the Erie & Ashtabula division of the Northwest system of the Pennsylvania lines west of Pittsburgh, and from March, 1901, to May, 1902, he was superintendent of the Marietta division of the Northwest system. From May, 1902, to Dec. 23, 1903, he was superintendent of the Cleveland, Akron & Columbus Railway. Subsequently he served as superintendent of the Erie & Ashtabula division of the Northwest system of the Pennsylvania lines west of Pittsburgh. On Feb. 1, 1911, he was appointed assistant general superintendent of the Long Island Railroad and on Nov. 14, 1911, he was advanced to general superintendent of the company. The Great Eastern Railway is in many ways like the Long Island Railroad, with which Mr. Thornton has been connected. It does a large seaside business. Mr. Thornton would be well qualified by his previous experience on the Long Island Railroad to supervise the electrification of the line, should that change be decided as advantageous. He expected to sail from London on the *Mauretania* for New York on Feb. 15.

Mr. Philip J. Kealy resigned on Feb. 1 as engineering assistant to Mr. Bion J. Arnold, to accept the position of assistant to Mr. R. J. Dunham, chairman of the board of directors of the Kansas City Railway & Light Company, Kansas City, Mo., and president of the Sioux City (Ia.) Service Company. Mr. Kealy will act as consulting engineering expert and will be in charge of the public relations of the several public service corporations of which Mr. Dunham is the executive head. Mr. Kealy is not yet thirty years of age. He is a civil engineer by profession, and after completing his technical training at the University of Illinois, entered the employ of the Board of Supervising Engineers, Chicago Traction, as field engineer. In 1910 he entered the service of the Arnold Company, and has since been employed to carry out the valuation of the property of the Consolidated Traction Company, and subsequently was engaged on traction report work. In 1911 he acted as assistant in charge of the valuation of the property of the Seattle (Wash.) Electric Company and the International Traction Company, Buffalo, N. Y. During the early part of 1912 he was engaged on the details of the reorganization of the International Traction Company, his analysis of that company's capital expenditures for the previous eleven years being subsequently approved in total by the Public Service Commission of the Second District of New York. In July, 1912, Mr. Kealy went to Kansas City as Mr. Arnold's assistant in charge of the valuation of the Metropolitan Street Railway. After completing the valuation work he acted as engineering adviser to Mr. Dunham and Mr. Ford J. Harvey, the receivers, in the franchise negotiations which followed Mr. Arnold's report. In the summer of 1913 he was Mr. Arnold's principal assistant in charge of the report on the value of the Toronto Railway made for Mayor Hocken of that city. The preliminary franchise negotiations were concluded in Kansas City last October, and Mr. Kealy was named in the agreement as the company's representative on a board of control of two men to control the operation, construction and auditing of the proposed new company. The franchise was subsequently withdrawn by the receivers. Mr. Kealy will be located temporarily in Kansas City for the next few months on matters pertaining to the reorganization of the Kansas City Railway & Light Company.

OBITUARY

Jackson Stout, a contractor who built several electric and steam railroads in Kansas, died at his home at Wichita on Feb. 13. Mr. Stout was seventy-eight years old.

William A. Broadhead, formerly connected with the Pacific Electric Railway, Los Angeles, Cal., is dead. The funeral was held from the home of his uncle, Mr. William B. Broadhead, vice-president of the Chautauqua Traction Company and founder of the woolen mills in Jamestown, N. Y. Mr. Broadhead had lived in Los Angeles for the last thirteen years. He was forty-six years old and unmarried.

John W. Callahan, general manager of the Chicago (Ill.) Tunnel Company, died at his home in Chicago, Feb. 12, 1914. Mr. Callahan was born at Salem, Ohio, in November, 1862, and began active railroad work as foreman of a Pennsylvania Railroad section crew when a boy. He located in Chicago in 1882 and, after filling various railroad positions, was made general superintendent of the Indiana Harbor & Belt Line Railroad. In September, 1906, he resigned that position to become general manager of the Chicago Tunnel Company, but in February, 1910, returned to his former position as general superintendent of the Indiana Harbor & Belt Line Railroad. In May, 1912, he re-entered the service of the Chicago Tunnel Company as general manager.

William H. Boardman, for many years president of the *Railroad Gazette*, now the *Railway Age Gazette*, and for eight years its editor, died at his home in Ridgefield, Conn., on Feb. 16, 1914. Mr. Boardman was born in Dixon, Ill., on Aug. 3, 1846, and was graduated from the University of Michigan, where he took the two degrees of bachelor of arts and civil engineer. After working for a time on the Dixon *Telegraph*, owned by his father, Mr. Boardman entered the service of the *Railroad Gazette*, then owned by A. N. Kellogg and published in Chicago. The editorial direction of the paper at that time was in charge of S. Wright Dunning, Chicago, and Matthias N. Forney, New York. Mr. Boardman's principal work at first and for many years after was in the business department. Following the Chicago fire in 1871 and the sale of the *Railroad Gazette* to Messrs. Dunning and Forney, who moved it to New York, Mr. Boardman served as bookkeeper, cashier, treasurer, advertising manager and office manager. In 1883 he bought most of Mr. Forney's holdings, and on Jan. 1, 1887, those of Mr. Dunning, who then retired from active connection with the paper. Mr. Boardman then became president, and from that time until forced to retire by illness he gave his entire time to the paper and to the affairs of what is now the Simmons-Boardman Publishing Company, publisher of the *Railway Age Gazette* and the *Signal Engineer*. In February, 1903, Mr. Henry G. Prout, who for sixteen years had been editor of the *Railroad Gazette*, withdrew, and Mr. Boardman assumed the duties and responsibilities of editor. In the following year the property was enlarged through the purchase of *Transport*, of London, now the *Railway Gazette*, and in 1908 was still further enlarged by the purchase of the *Railway Age*, which was consolidated with the *Railroad Gazette* under the present name. Mr. Boardman was one of the progressive forces in technical journalism in this country. He always had a very broad conception of the functions of a technical paper and of its possibilities in the way of improving the conditions of the industry which it represented. These high ideals, coupled with Mr. Boardman's wide knowledge of the field and his natural ability, enabled him to set a high standard in his chosen profession and to leave a lasting impression upon it. As a man, Mr. Boardman possessed a charming personality, and his enthusiasm in everything which he undertook was a source of inspiration to everyone who came in contact with him.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Atlanta & North Georgia Railroad, Atlanta, Ga.**—Application for a charter has been made by this company in Georgia to build a 50-mile electric or steam railway from Atlanta via Bolton, Roswell, Crabapple, Alpharetta and Cumming to Creighton, Ga. Headquarters: Atlanta. Capital stock, $1,200,000. Incorporators: A. B. Kellog, James N. Ellis, J. H. Drewry, R. W. Underwood, J. N. Johnson, Jr., S. O. Vickers, E. C. Rupley and J. W. Tindall, Atlanta; J. M. Estes and H. P. Hoyt, Kirkwood, Ga.

***Indianapolis & Frankfort Railroad, Indianapolis, Ind.**—Incorporated in Indiana to build an electric railway from Indianapolis to Frankfort, 55 miles. J. J. Turner, Philadelphia, Pa., president.

***Newark, Williamson & Northern Railway, Williamson, N. Y.**—Application for a charter has been made by this company in New York to build a railway to be operated by steam, electric or other mechanical power. Capital stock, $150,000. Incorporators: Adelbert H. Williams, Abram F. DeHond, Chares I. DeZutter, Kingsley M. Davies and Frank S. Wilder, all of Williamson, N. Y.

***Interurban Company, Ltd., Toronto, Ont.**—Incorporated in Ontario to build an electric railway and other public utilities in Ontario. Capital stock, $5,000,000.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has received a franchise from the Council on Avenue F from Twentieth Street to Elmwood Cemetery in Birmingham.

Birmingham, Ala.—The Birmingham, Ensley & Bessemer Electric Railway has asked the Council for a franchise to extend its lines in Birmingham.

***Parker, Ariz.**—W. H. Tharpe, Parker, and associates have received a franchise from the Council for a proposed electric railway in Parker and vinicity. Application will be made at once to the Interior Department for right-of-way through the reservation. Work will be begun within the next sixty days.

Fresno, Cal.—The Fresno Traction Company has received a certificate of public convenience and necessity to construct an electric railway over certain streets and highways in the county of Fresno, to cross certain streets at grade, and to construct an undergrade crossing beneath the tracks of the Santa Fé Railway. Certain specifications are prescribed to be complied with by applicant in the construction of said crossings.

Tama, Ia.—The Iowa Railway & Light Company has asked the Council for an extension of time on its franchise to extend its tracks on McClellan Street and Main Street in Tama.

Hagerstown, Md.—Henry A. Bester, Jr., representing the Washington County Traction Company, Hagerstown, has received a forty-year franchise over East Washington Street in Hagerstown. This railway will connect Security, Leitersburg, Chewsville and Smithsburg. [E. R. J., Feb. 14, '14.]

Orange, Mass.—The Miller's River Street Railway has asked the Public Service Commission for approval of the extension of time on its franchise to Jan. 20, 1915, in which to complete the construction of its railway in Orange and Erving. This railway will connect the lines of the Northern Massachusetts Street Railway and the lines of the Connecticut Valley Street Railway. D. P. Abercrombie, secretary. [E. R. J., May 17, '13.]

Springfield, Mass.—The Springfield Street Railway has received a franchise from the Council to double-track and relocate its line on the south side of the state highway from a point near Lee's Crossing to the West Springfield town line.

Billings, Mont.—The Billings Traction Company will ask the Council for a new franchise in Billings.

Buffalo, N. Y.—The International Railway has asked the Council for a year's extension of time on its franchise to build a line on Bailey Avenue from Clinton Street to Main Street in Buffalo.

Jefferson, Ohio.—Henry Orth, Chardon, representing the Chardon, Jefferson & Meadville Railway, has received a franchise from the Council in Jefferson. This is part of a plan to build a 30-mile line to connect Chardon, Hampton, Fontville, Rock Creek and Jefferson, Ohio, and Linesville, Pa. C. H. Felton, 735 Williamson Building, Cleveland, secretary. [E. R. J., Feb. 7, '14.]

Banks, Ore.—The United Railways has asked the Council for a franchise in Banks. It is planned to build an extension from Wilkesboro to Banks.

Hazeldell, Pa.—The Lehigh Valley Transit Company has asked the Council for a franchise in Hazeldell. This is part of a plan to extend the new Ellwood line to connect New Castle and intermediate cities.

Memphis, Tenn.—H. D. Brennan and associates have asked the Council for a franchise to build a 1-mile extension on Castalia Avenue in Memphis.

Corsicana, Tex.—The Dallas, Corsicana & Palestine Railway has received a year's extension of time on its franchise from the Council in Corsicana. This 150-mile railway will connect Dallas, Corsicana and Palestine. C. R. Hall, Palestine, secretary. [E. R. J., Oct. 18, '13.]

Houston, Tex.—The Houston Electric Company has received a franchise from the Council for an extension through Sunset Heights northwest of Houston. Work on this branch will be begun at once.

Seattle, Wash.—An extension of the Beacon Hill line has been authorized by the Board of Public Works and the Puget Sound Traction, Light & Power Company has received permission to extend the line on Beacon Avenue from Hanaford Street, the present terminus, to Spokane Street in Seattle. Work on the proposed extension will begin in the immediate future, giving transportation facilities to the Jefferson Park district upon its completion.

TRACK AND ROADWAY

Helena (Ark.) Southwestern Railroad.—Work will be begun within the next sixty days by this company on its 20-mile line from Helena southwest to Pillows Hill. E. C. Nelson, Helena, is interested. [E. R. J., Dec. 6, '13.]

Little Rock Railway & Electric Company, Little Rock, Ark.—This company has awarded a contract to Donohoe & Company for the grading of the Biddle Street extension in Little Rock.

Fresno & Clovis Interurban Railway, Fresno, Cal.—Grading will be begun on March 1 by this company for its line between Fresno, Clovis and Academy. F. S. Granger, Clovis, president. [E. R. J., Feb. 7, '14.]

Pacific Electric Railway, Los Angeles, Cal.—This company has placed an order for 4000 tons of girder rails. An extension of the Fifth Avenue line in Pomona into Chino and possibly on into Ontario is being contemplated by this company.

San José (Cal.) Railway.—As the result of an agreement made recently by this company to reconstruct as a standard-gage line its present narrow-gage line from East San José to Linda Vista the State Railroad Commission has made an order extending the company's time. The reconstruction from Twenty-sixth Street to the King Road and the easterly city limits must be completed by August next and that of the line from the King Road to Linda Vista by February, 1915. The new construction ordered will be about 4 miles in length, and work upon it will be begun early this spring.

***Petaluma, Cal.**—Work has been begun on a preliminary survey for a 7-mile electric railway from Taylor station in Petaluma to Graton, Occidental and Camp Meeker. Ultimately this line will be extended to the coast. Among those interested are J. H. Brush, M. C. Meeker and George P. McNeary, Petaluma.

Stockton (Cal.) Electric Railway.—This company is asked to consider plans to extend its line from Stockton Street down Fourth Street to the Southern Pacific station at Townsend Street in Stockton.

East Washington Heights Traction Company, Washington, D. C.—A 1½-mile extension will soon be built from the Pennsylvania Avenue bridge over the East Branch of the Potomac River via Twining City to Randle Highlands by this company.

***Athens, Ga.**—Henry Hadgson, W. T. Bryan and associates are considering plans to build an electric railway from Athens, Ga., to Anderson, S. C., via Hartwell.

Chicago (Ill.) Railways.—This company has awarded a contract to the Lorain Steel Company for 20,000 tons of 9-in., 133-lb., girder rails for its lines in Chicago.

Mattoon, Shelbyville, Pana & Hillsboro Traction Company, Pana, Ill.—President Robert Johns of this company has issued a call for all stockholders to meet in Charleston, Ill., March 5, to vote on a resolution requesting the board of directors to dissolve the company. The corporation was organized several years ago, and obtained a right-of-way for a line between Hillsboro, Pana and Shelbyville, and connecting with the Mattoon, Charleston, Paris & Terre Haute line at Mattoon. The proposition will be abandoned.

Indiana Utilities Company, Angola, Ind.—This company expects to purchase several amusement attractions for parks.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Plans are being made to extend the Lewis Street line to the city limits of Fort Wayne.

***Madison, Ind.**—L. S. Cook, Madison, Ind., plans the construction of an interurban electric line between Madison and Cincinnati. The route proposed is by way of Florence, Vevay, Markland, Patriot, North's Landing, Rising Sun, Aurora and Lawrenceburg, Ind., and Miamitown, Ohio. At the latter point it is proposed to form a junction with a line which has been projected from Rushville, Ind., to Cincinnati via Brookville, Ind., and Harrison, Ohio. A right-of-way for the proposed line has already been secured.

Keokuk (Ia.) Electric Railway.—This company has been asked to consider plans for an extension of its lines in Keokuk from Nineteenth Street to Carroll Street and down Fifteenth Street to Des Moines Street, thence to Fifth Street to join the present West Keokuk line.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Plans are being made for an extension from Cedar Falls to Marshaltown, via Grundy Center and Dyke, a distance of 60 miles.

Hutchinson & Northern Railway, Hutchinson, Kan.—Petitions are being circulated in Hutchinson to hold an election for the purpose of voting $30,000 bonds to aid this company to build its 14-mile line from Hutchinson to Burrton. W. S. Thompson, Hutchinson, is interested. [E. R. J., Jan. 31, '14.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—Plans are being made for an extension from Twenty-sixth Street and Baxter Street in Joplin, Mo., to Shoal Creek, south of Joplin.

Wichita Railroad & Light Company, Wichita, Kan.—A short extension will be built by this company in Wichita during the year.

Louisville (Ky.) Railway.—Plans are being considered for a 1-mile extension of the Chestnut Street line to Shawnee Terrace. Application for a franchise for this branch will be made in the near future.

***Algiers, La.**—Surveys are being made to build a 4½-mile line from the lower terminal of the present electric line in Algiers to the parish line. Local capital is said to be behind the enterprise. Construction will be begun within the next few weeks. This line will be operated independently of the present electric railway facilities in Algiers.

Winnipeg (Man.) Electric Railway.—This company is asked to consider plans for an extension from Gypsumville to the north of Manitoba, to join the government line at Reed Lake, and from Broadview to Sturgeon Bay.

Worcester (Mass.) Consolidated Railway.—Plans are being considered by this company for an extension from West Boylston to Oakdale.

Grand Rapids (Mich.) Railway.—Plans are being considered by this company to extend its Lafayette-Stocking line as far east as Kalamazoo Avenue in Grand Rapids.

Duluth (Minn.) Street Railway.—This company is asked to consider plans to build an extension on Fifty-fourth Avenue east from Superior Street to Glendale Street in Duluth.

Hannibal Railway & Electric Company, Hannibal, Mo.—Final surveys are now being made on the Palmyra Avenue route in Hannibal for an extension to Riverview Park.

Metropolitan Street Railway, Kansas City, Mo.—This company placed in operation on Feb. 11 its new Argentine-Minnesota line. It extends from the western extremity of Argentine, in Kansas City, across the Kaw River, through Armourdale to Tenth Street, north to the business section of Kansas City, through the packing house district and over the James Street viaduct to the stockyards.

Missouri Valley Traction Company, St. Joseph, Mo.—Steps for the dissolution of this company, incorporated in 1907 to build an electric line from St. Joseph to Excelsior Springs, will be taken at a meeting of the stockholders to be held soon in St. Joseph. The company was successfully launched, but the panic of 1907 put an end to the financing of the project, and since then the electric line connecting St. Joseph, Kansas City and Excelsior Springs has been built. The headquarters of the company has been in St. Joseph. The following statement has been made by H. G. Krake, secretary, relative to the company and its proposed dissolution: "This company was organized in 1907 to construct an electric interurban line from St. Joseph to Excelsior Springs, with a branch line from Lathrop to Mirabile. Funds were secured through the sale of capital stock of the company. Active work was carried forward for several months. About the time the preliminaries were sufficiently advanced to arrange for financial aid for construction, the panic of November, 1907, occurred and stopped progress in that direction for the time. Later several unsuccessful efforts were made to interest financial support in the enterprise." [E. R. J., Dec. 13, '13.]

United Railways, St. Louis, Mo.—It has been decided to extend this company's line in Kirkwood from Main Street to Geyer Road in the near future.

Billings (Mont.) Traction Company.—This company has asked the Council for permission to supplant its storage battery system with the overhead trolley system.

Butte (Mont.) Electric Railway.—Plans are being considered for an extension of the Oregon Avenue line of this company from the intersection of Dewey Street and Hill Street across the flat and into the Gilman addition.

New York Consolidated Railroad, Brooklyn, N. Y.—This company has ordered approximately 18,000 tons of rails for completion of the Center Street loop. The American Bridge Company will supply 5000 tons on the above order.

Interborough Rapid Transit Company, New York, N. Y.—This company has placed an order for 5000 tons of standard section rails.

Southern Power Company, Charlotte, N. C.—This company has awarded a contract to the Parker-Brooks Construction Company, Macon, Ga., to build 5 miles of new track in connection with hydroelectric development at Lookout Shoals, N. C.

Newbern-Ghent Street Railway, Newbern, N. C.—A 15-mile extension from Newbern to Trenton, N. C., is being contemplated by this company.

Cleveland (Ohio) Railway.—Plans are being made to build a line on West Sixty-fifth Street from Clark Avenue to Denison Avenue in Cleveland this spring, thus completing a belt line around the city.

Arthur, Ont.—Surveys are being made for the proposed Hydro-Electric Radial Railway route from Hespeler to the Georgian Bay. A line from Hespeler as far as Fergus has already been surveyed, and it is expected to have the survey completed through Garafraxa to Arthur in a few weeks.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont.—It is planned to electrify and extend this company's lines during the year. The power for the electrification will be obtained, for the time being, from the Kaministiquia Power Company.

St. Mary's, Ont.—Citizens of St. Mary's and of the townships of Blanshard, Biddulph and London have passed a resolution to be forwarded to the Hydro-Electric Power Commission requesting a survey and estimates of the proposed radial railroad from London to Stratford, via London Township, Granton, Biddulph, Blanshard, St. Mary's and Stratford, and also a line from St. Mary's through Blanshard westward to join with the Huron line and on to Grand Bend, and to report on the most advantageous route for an electric railway through that district.

Portland Railway, Light & Power Company, Portland, Ore.—About 2 miles of new track will be built by this company in Portland during the year.

Hershey (Pa.) Transit Company.—Preliminary work will soon be begun on this company's line between Elizabethtown and Hershey.

Pittsburgh, Steubenville & Wheeling Street Railway, Pittsburgh, Pa.—This company has awarded the contract to the Nisbet Engineering Company to build this line from Pittsburgh through northern Washington County to Wheeling with a side line to Steubenville. At McDonald the Washington branch will extend through Primrose and Hickory to Washington. It is expected that work will be begun in the spring. W. H. Hildebrand, Pittsburgh, Pa., president. [E. R. J., April 26, '13.]

Moose Jaw (Sask.) Electric Railway.—Plans are being considered for two extensions in Moose Jaw, one from the South Hill district and the other from a section forming a loop along Main Street to Thirteenth Avenue, and thence to Athabasca Street.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Work will be begun at once by this company for an extension of the Missionary Ridge line from Rossville to Chickamauga Park via Green Lake.

Nashville (Tenn.) Traction Company.—Plans are being made to begin work within the next few weeks on this 34-mile line in Nashville. W. O. Palmer, Nashville, president. [E. R. J., Feb. 14, '14.]

Austin (Tex.) Street Railway.—This company is asked to extend its lines in Austin to Waller Street and Chicon Street at once.

Dallas, Corsicana & Palestine Railway, Dallas, Tex.—Arrangements are being completed by this company to build soon its 150-mile line from Dallas to Palestine and Corsicana. L. E. Mitchell, Dallas, president. [E. R. J., Oct. 18, '13.]

Dallas (Tex.) Northwestern Traction Company.—This company, which plans to build a 50-mile electric railway between Dallas, Wichita Falls, Denton and Krum, is making preliminary plans for the construction of its proposed road and has elected the following officers: E. P. Turner, Dallas, president; J. P. Blount, Denton, vice-president; E. J. Fry, Dallas, treasurer; Benjamin B. Crain, Dallas, secretary, and George Williams, Dallas, chief engineer. [E. R. J., Feb. 7, '14.]

Laredo Railway & Light Company, Laredo, Tex.—Extensive improvements of its lines are being planned by this company.

Uvalde & Leona Valley Interurban Railway, Uvalde, Tex.—A 22-mile extension from Uvalde to Batesville is being planned by this company for the near future.

Blaine-Lynden Electric Railway, Blaine, Wash.—The organization of this company to build an electric line between Blaine, Lynden and Bellingham has been perfected. Right-of-way has been secured and construction will be begun in the spring. Capital stock, $250,000. Officers: John J. Pinckney, Blaine, president; Lester Livingston, secretary, and Howard Seabury, Blaine, attorney. [E. R. J., Jan. 17, '14.]

Shenandoah Valley Railway, Martinsburg, W. Va.—Work will be begun in the spring by this company on the line from Williamsport, Md., through Martinsburg, Winchester, Strasburg, Woodstock and southward as far as Harrisonburg. A spur will probably be built to Washington eastward from Winchester through Berryville and thence to Bluemont, the southern terminal of the Washington & Old Dominion Electric Railway. Clarence E. Martin, Martinsburg, is interested. [E. R. J., Feb. 7, '14.]

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—During the next six weeks this company will award contracts to build 4 miles of new interurban track in the vicinity of Eau Claire.

Wisconsin Railway, Light & Power Company, Milwaukee, Wis.—During the year it is planned to rebuild about 2 miles of track in Milwaukee.

SHOPS AND BUILDINGS

Lewiston-Clarkston Valley Railway, Lewiston, Idaho.—Plans are being made by this company to build a new carhouse in Clarkston, Wash., during the year. F. L. Strum, Lewiston, president.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has awarded a contract to the Murphy Construction Company, East St. Louis, for the construction of a four-story building at Collinsville Avenue and Main Street in East St. Louis to be used for the offices and waiting room of the company and the office and salesroom of the East St. Louis Light & Power Company. The structure will be of brick and reinforced concrete. The cost is estimated to be about $70,000.

Tri-City Railway, Davenport, Ia.—Preparations are being made by this company for the construction of an addition to its new carhouses on Fifth Avenue in Rock Island. Two more bays will be added to the carhouse on the East Side, and the old frame structure which was the original carhouse and shops and is now used for a repair shop is to be torn down to make way for the new building. This addition will furnish accommodations for forty more cars. The cost of the improvements is estimated to be about $40,000.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has completed its new depot in Newton.

Bay State Street Railway, Boston, Mass.—The new carhouse located on Middlesex Street near Burnside Street in Lowell has been completed. The structure is 145 ft. x 288 ft. and 40 ft. in height. It contains 2 miles of track and this is divided into ten different lengths.

Springfield (Mass.) Street Railway.—This company is asked to consider plans to build a new passenger station at Ware.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Rose Avenue carhouse has been converted into a car-building plant by this company and a full equipment of machinery has been placed in it.

Toronto (Ont.) Railway.—It is reported that this company plans to build soon two new carhouses in Toronto.

Regina (Sask.) Municipal Railway.—Plans are being made by this company for an addition to its carhouse in Regina.

POWER HOUSES AND SUBSTATIONS

Augusta-Aiken Railway & Electric Corporation, Atlanta, Ga.—This company has completed its new power plant at Stevens Creek and has placed it in operation.

Holyoke (Mass.) Street Railway.—Among the improvements planned for this company's power house at Holyoke will be additions to the boiler and engine rooms so that there will be an additional overload capacity of 3000 hp. A concrete coal pocket will also be built at the plant.

Escanaba (Mich.) Traction Company.—Plans are being considered by this company to build a new dam on the Escanaba River, 2 miles from Gladstone. This will add to the capacity of the company's power plant on the Escanaba River.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—All contracts for equipment for this company's new Lowellville power house addition have been awarded and bids are now being asked for the construction of the new building. About $250,000 is being spent in these improvements to the plant.

Dominion Power & Transmission Company, Hamilton, Ont.—In connection with the new steam plant to be built by this company it is announced that contracts have been awarded to the Canadian Westinghouse Company for the initial electrical equipment.

Charleston-Isle of Pines Traction Company, Charleston, S. C.—This company is now using the power to operate its lines from the power house of the Consolidated Company through the cable recently installed under the Cooper River. The Sullivan's Island power house hereafter will be used only for reserve purposes.

West Virginia Traction & Electric Company, Wheeling, W. Va.—Extensive improvements are being planned by this company to increase the capacity of its power plant 40 per cent.

Manufactures and Supplies

ROLLING STOCK

Charlotte (N. C.) Electric Railway expects to purchase six 40-ft. closed passenger cars.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is in the market for ten cars.

Memphis (Tenn.) Street Railway has issued specifications for about twenty-five passenger cars.

Sunbury & Susquehanna Railway, Sunbury, Pa., is in the market for four double-truck city cars.

Wisconsin Public Service Company, Green Bay, Wis., is in the market for four cars for city service.

Pittsburgh (Pa.) Railways has issued specifications for 225 new steel double-truck passenger cars.

Easton (Pa.) Transit Company has ordered six single-truck cars from The J. G. Brill Company.

Walla Walla Valley Railway, Walla Walla, Wash., expects to purchase one electric locomotive.

New York State Railways, Syracuse, N. Y., is reported to be working on specifications for new cars.

New Orleans Railway & Light Company, New Orleans, La., has issued specifications for about fifty passenger cars.

Philadelphia & Garrettford Street Railway, Upper Darby, Pa., has ordered five double-truck cars from the Jewett Car Company, weighing about 50,000 lb. each.

Pottstown & Phoenixville Railway, Pottstown, Pa., expects to purchase during 1914 six semi-convertible cars, to be equipped with four-motor equipments, brakes, heaters and fenders.

Stone & Webster Management Association, Boston, Mass., has ordered for its subsidiary, the Puget Sound Traction, Light & Power Company, twelve passenger cars from the St. Louis Car Company, through Wendell & MacDuffie, Eastern representatives.

Centerville Light & Traction Company, Centerville, Ia., expects to purchase two passenger cars and one combination baggage and express car for operation on the proposed electrification of the Southern Iowa Traction Company, a steam road recently purchased by the Centerville Light & Traction Company, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, page 332.

Evanston (Ill.) County Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, as having purchased ten double-truck city prepayment cars from the St. Louis Car Company, has increased this order to twelve cars and has specified the following details for these cars:

Seating capacity..........40
Weight of car body.16,000 lb.
Length of body........28 ft.
Length over vestibule..41 ft.
Width over sills....8 ft. 6 in.
Width over all.....8 ft. 8 in.
Body...steel girder "T" post
Interior trim.........cherry
Headlining ....Agasote
Roof ....arch
Underframe ....steel
Air brakes.....National 3-A
Bumpers ....Anti-climber
Car trimmings.......bronze
Control....Gen. Elec. K-51A
Couplers......St. L. Car Co.
Curtain fixtures.Cur. Sup. Co.
Curtain material..Pantasote
Fenders or wheelguards.H.B.
Hand brakes,
  St. L. Car Co. vertical wheel and Peacock.
Heaters.........Peter Smith
Headlights ....Crouse-Hinds
Motors ....West.
Sanders......Ohio brass air
Sash fixtures.O. M. Edwards
Seats, style.St. Louis Car Co.
Seating material....pattern
Step treads.......Universal
Trolley catchers....Keystone
Trucks..........Brill 39E-1
Ventilators ....Peerless
Special devices, etc.,
  Root track scrapers, Consol. flash signal system, St. Louis Car Co. door mechanism.

TRADE NOTES

Carbon Steel Company, Pittsburgh, Pa., announces that having discontinued the office of assistant to the president in charge of sales upon the resignation of H. W. Finnell, it has appointed C. F. Blue, Jr., as general sales agent with headquarters at Pittsburgh.

Keyes Products Company, New York, N. Y., has appointed Raymond H. Pilson, Munsey Building, Washington, D. C., as Southern sales agent for the products of this company.

Mr. Pilson has acted for some time as Southern representative of the Hale & Kilburn Company and of other interests.

New York Air Brake Company, New York, N. Y., has appointed Scott R. Hayes as assistant to the president, effective March 1. Mr. Hayes recently resigned from the position of vice-president of the Railway Steel Spring Company.

Oshkosh Manufacturing Company, Oshkosh, Wis., has appointed the Union Electric Company, Pittsburgh, Pa., as its Pittsburgh agent and has arranged with it to carry a large and representative stock of its construction tools and specialties on hand ready for prompt shipment. This has been arranged so that Eastern jobbers can use this stock to advantage.

Prepayment Car Sales Company, New York, N. Y., announces that it furnished the prepayment door and step control devices for the center-entrance cars of the Manhattan & Queens Traction Corporation, New York, N. Y., and for the single-truck convertible car of the Union Railway, New York, N. Y., which installations were described in the ELECTRIC RAILWAY JOURNAL for Feb. 14, 1914.

American Electric Car Company, Saginaw, Mich., has been organized with a capital stock of $1,250,000. The company is a consolidation of the Argo Electric Company, of Saginaw, the Broc Electric Company, Cleveland, Ohio, and the Borland-Grannis Company, Chicago, Ill. The headquarters and plants of the company will be in Saginaw. C. W. Brand, president of the Broc Electric Company, is president, and Theodore Huss, Saginaw, Mich., is secretary and treasurer.

ADVERTISING LITERATURE

National Tube Company, Pittsburgh, Pa., has issued Bulletin No. 19, containing a complete list of its products manufactured for mecahnical and commercial purposes.

Esterline Company, Indianapolis, Ind., has issued a catalog describing its "Golden Glow" lamps for automobiles, motorcycles, street cars, locomotives, steamships, harbors and industrial uses.

Oshkosh Manufacturing Company has issued a booklet descriptive of its new guy anchor, which can be had upon request of either the company at Oshkosh, Wis., or the nearest jobber.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Section DS 842 of its trolley line material catalog, which describes various bracket arms for direct and catenary construction.

More-Jones Brass & Metal Company, St. Louis, Mo., has issued an attractive folder on trolley wheels. Particular attention is called to the method of getting the best foundry results in the manufacture of the fifty styles of trolley wheels.

Reliance Manufacturing Company, Massillon, Ohio, is distributing a sixty-four-page catalog on its different types of nut locks for every service. This company has recently enlarged its plant at Massillon and has branch selling offices at New York, Detroit, Chicago and San Francisco.

Ohio Brass Company, Mansfield, Ohio, has issued a folder describing its O-B trolley catcher, which is designed to prevent the trolley wheel from jumping and catching on the overhead. The pole is caught after short travel and held, and it will not step up or climb on the rebound. The folder also describes the O-B trolley base.

Esterline Company, Indianapolis, Ind., has issued a folder describing its graphic voltmeters, ammeters, wattmeters and speed recorders for recording line voltage, station curves, consumers' load curves, maximum demand periods, arc light circuit records, electric traction traffic conditions, electrolysis investigations and shop motor tests. This company has also issued new price sheets for its meters and transformers.

Root Spring Scraper Company, Kalamazoo, Mich., has issued a catalog describing its spring life guard. This guard is held from slipping down from the oscillation of the car by a heavy coiled spring which, when released by an object striking the gate, is sprung to the pavement and the guard is held firmly by the same spring. It is impossible for an object to get under, through, or the guard to rise when once in the basket. The catalog also describes the No. 6 scraper. A testimonial statement is given by the Grand Rapids Railway Company and the Michigan United Traction Company.

H. M. Byllesby & Company, Chicago, Ill., have issued a reprint from the *Engineering Record* describing their construction of the Coon Rapids Hydroelectric Development on the Mississippi River, which is owned by the Northern Mississippi River Power Company and leased to the Minneapolis General Electric Company. Otto E. Osthoff was chief engineer, W. R. Thompson manager of engineering and construction, and J. William Link hydraulic engineer. Construction was carried on by the force-account method under W. T. Walker, construction superintendent, and W. B. Saunders, resident engineer.

Niles-Bement-Pond Company, New York, N. Y., has issued a large and copiously illustrated catalog on the subject of its electric traveling cranes, built to operate continuously. Quiet operation is secured by the use of gears with teeth cut from solid stock. After discussing various accessories, such as d.c. motors, cage and controllers, bridge girders, bridge ends, bridge drive for box section girders, standard crane trolley, trolley with independent auxiliary hoist, mechanical load brake, electric brakes, bottom blocks and grab bucket trolley, the catalog concludes with a series of photographs showing installations of electric cranes in the shops of a number of large steel foundries and car and locomotive manufacturing plants.

Asbestos Protected Metal Company, Beaver Falls, Pa., has issued a catalog accompanied with sample copies of a new form of prepared roofing which it has named Aegisroll. The body or base of this roofing is wool felt impregnted by waterproofing and completely enveloped in a coating of asphalt compound. To the upper surface of this base is attached pure asbestos felt, while the lower surface is protected by a coating of crushed quartz. Both the asbestos and the crushed quartz are embedded in their respective surfaces while the asphalt is hot and they are therefore permanently attached. Owing to the advancements made by this company in permanently coloring asbestos felt, the roofing can be furnished in a variety of attractive colors, making possible for the first time artistic combinations between roofs and the color treatment of the building.

NEW PUBLICATIONS

Psychology in Daily Life. By Carl Emil Seashore. 226 pages. D. Appleton & Company, New York and London. Cloth bound, $1.50 net.

This book is the first of the "Conduct of Mind Series," the purpose of which is to provide readily intelligible surveys of selected aspects of the study of the mind and its applications. The volume brings relevant psychological principles to bear upon popular interests and practical concerns. The several chapters deal with topics such as play, the law of illusion, mental measurement, mental health and mental efficiency. The illustrations, liberally provided, are so well chosen that they at once suggest how completely the daily life is conditioned by the psychological basis. The style of direct address has been retained in the book, with the result that it has the character of a non-technical personal message from one in a technical workshop.

The Truth About the Railroads. By Howard Elliott. 260 pages. Houghton, Mifflin Company, New York and Boston. Cloth bound, $1.25.

The several chapters of this book were first written as addresses to be delivered on various occasions and in various places. Mr. Elliott discusses among other topics the following: "Co-operation between the railway owner, the railway employee and the railway user," "The conservation of railway service," "Rate making and the government" and "Public opinion—its effect on business." The writer has taken the public into his confidence and endeavored to counteract the so-called public antagonism to railroads by giving more complete information concerning them. The book is written in an easy, simple, yet logical and well-constructed style, and it should make the public see more clearly some of the practical problems that confront railroad managers.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIII NEW YORK, SATURDAY, FEBRUARY 28, 1914 No. 9

REDUCTION OF THE PASS EVIL

A reform accomplished during the past ten years but not always realized by the public is a reduction in the "pass" evil. Steam railroads used to suffer from this tax on their resources to a greater extent perhaps than street railways, but the latter were subject to a great deal of petty graft of this kind. City, county and even state officials expected, if they did not actually ask for, annual passes on the local transportation lines, and to these requests were added those of local politicians, high and low, daily newspaper men and others who were thought to have, or claimed to have, the power to help or harass the railway. Even at the present day the idea that the common carriers ought to carry certain classes of individuals without charge is far too prevalent. Demands for free railway transportation are made in a great many cities for firemen, policemen, letter carriers and others, and the idea that the railways should be required to transport elected officials of the city or state without charge has not entirely disappeared. We are glad to learn in this connection that the Pennsylvania Railroad intends to secure the highest judicial determination of the right of the New Jersey Legislature to force it to carry specified officers of that State free of charge. The case will come in the form of a charge for the value of the transportation furnished under the present law, since records have been kept by the company of the extent to which these orders for transportation, issued by the Secretary of State, have been used. The action by the railway company seems to have come as a surprise in some quarters, although the Interstate Commerce Commission has always discountenanced the practice of issuing passes and only last week announced that it intends to consider how far the railroads dissipate their revenues by the issue of passes when it is considering complaints concerning their rates.

POLITICIANS AS GRAFTERS

It is not surprising to find that an evil so widespread and of such long standing as this should be difficult completely to eradicate. Nevertheless, it is somewhat of a coincidence to find in another report of the Interstate Commerce Commission just issued examples of the pressure to issue passes put by politicians upon common carriers in Montana, Colorado and Illinois. The cases in Montana and Illinois seem to involve a misuse on the part of the carriers of practices permitted to them by law, while in the New Jersey case mentioned above the practice was forced upon the companies by the State itself. In referring to the Illinois case the commission makes public some correspondence which was alleged to have passed between the Chicago, Burlington & Quincy Railroad and a member of the Illinois Legislature. The name signed to the letter quoted below is that of a man who at that time was a member of the upper house of the Illinois Legislature and apparently chairman of what was then known as the Illinois Legislative Public Utilities Commission, a different body from the present Public Utilities Commission of Illinois. The letter in part follows: "I regret exceedingly to acknowledge receipt of your letter in which you refuse me annual transportation over your lines in Illinois. As I am chairman of the Public Utilities Commission, you can look for legislation that will work hardship to your company, and I wish to assure you when our commission gets through with you that you will find your road in the hands of a receiver." When the authenticity of this correspondence is so well attested that the commission "deems it a duty to make a record of the matter," it is easily conceivable that there may be many steam railroads and electric railways desirous of knowing how long they must furnish undeserved free transportation to public officials.

MERITS AND DEFECTS OF A. I. E. E. PROGRAM

The second midwinter convention of the American Institute of Electrical Engineers was held under the auspices of the electric power committee. This committee divided and subdivided the field among its sub-committees and the members of these sub-committees, all of whom had been carefully selected to represent the many specialties composing electric power engineering. The program was made up of numerous papers which, when assembled, were intended to produce a harmonious mosaic. The plan followed by the committee in making up the program has conspicuous merits and demerits, as shown by the result. It was systematic and hence, *per se*, was better than the hit-and-miss scheme sometimes followed when society programs are made up. The men selected to write papers are leaders in their respective lines and hence are in positions to detect the signs of the times. A thorough survey of the field, such as that planned, is sure to bring to the surface the significant aspects of important current tendencies. All of these facts are illustrated in the program, which brought out most instructive material in regard to outdoor substations, novelties in control apparatus and other topics. The demerits of the committee's plan are conspicuously these: The very attempt to cover a whole field systematically involves the reiteration of many statements of standard practice which are the stock in trade of the well-informed engineer. These statements were put into the papers in an obviously conscientious attempt to execute the commissions assigned. In some parts of the field covered there were really no conspicuous developments to report, and it would really have been better to have left these parts uncovered and to have concentrated for the time being on the more interesting and significant parts. We like the idea of a program systematically planned and realize that the primary purpose of this one was to stimulate discussion. We would urge, however, that discussion will be stimulated more by a few carefully selected, significant statements than by a mass of generalizations from which the important facts must be laboriously sifted. Experience proves that often the best discussion is provoked by seemingly insignificant but really important statements, sometimes not those directly in line with the speaker's main purpose.

REMARKABLE IMPROVEMENT IN CAR PAINTING

From time to time new ideas are advanced and new methods are devised that are radical departures from the beaten path of progress, yet they are so simple and so logical that one cannot but wonder why they were not conceived years before. This thought is especially applicable to the new method of reducing the time required in painting the cars of the Cincinnati Traction Company. By using a portable paint-drying oven, as described on another page in this issue, instead of permitting the paint to dry in the usual way, this company has reduced the time ordinarily required by 80 per cent. The delay in general adoption of this method by other companies cannot be attributed to the prohibitive expense of the plant necessary to accomplish the work, because the baking oven described cost only $300. Moreover, the principle is not new because every painter knows that paint dries more quickly in summer than in winter, and he also knows that many an excellent job of varnishing has been spoiled by insects and dust particles.

The new process not only reduces the time required to paint a car, but at the same time it makes the finished job as nearly perfect as it is practicable to make it. This increased efficiency is remarkable when one considers how few improvements have been introduced in car painting since the old horse car days. Indeed, when the manufacturers introduced the six-day process it represented an epoch, and now to decrease this time more than 80 per cent is certainly a revolutionary act in the history of car painting.

The process used by the Cincinnati Traction Company, it should be said, is by no means the same as that introduced a year ago by the Hudson & Manhattan Railroad because in the former the ordinary air-drying paints and varnishes are used in the customary manner, the portable oven being used merely to accelerate the rate of drying by keeping the car in an atmosphere of hot, dry air.

OUTDOOR SUBSTATIONS

One of the most interesting and timely subjects discussed at the second annual midwinter convention of the American Institute of Electrical Engineers was the outdoor substation. It is true that there is nothing radically new or unique in such substations, because electrical transforming apparatus of the a.c. type, has been placed out of doors for nearly thirty years. In lighting systems, also, the larger part of the customers are served from outdoor transformers, usually installed, with their fuse cut-outs, on poles. But the papers at the A. I. E. E. meeting, which are abstracted in this issue, describe the great improvements made during the past two or three years in placing the larger apparatus out of doors.

Railway substations have usually been of the indoor type because buildings are necessary to protect rotary converters and motor-generator sets, as well as the low-tension switches and the measuring instruments. With so much of the equipment under cover it was quite natural for the railway company to place the transformers and the high-tension switches under the same roof, as they do not increase the size of the building greatly when they are connected to transmission lines of moderate voltage, say up to 33,000. There are advantages, also, in having everything about the plant within easy reach and convenient for inspection.

The change in design of substation which is now taking place and which is sure to extend in railway work is due to the increase in transmission line voltage. One hundred thousand volts for a transmission line emf does not involve any serious difficulties now, and 150,000 volts may soon be in considerable use. Apparatus for use on such voltages is bulky. The conductors must be widely separated, and switches, lightning arresters, choke coils, buses, etc., all take up a great deal of space. While, in moderate-voltage plants, this apparatus can be tucked away in out-of-the-way corners, in high-voltage plants the same equipment may easily require more space than the rotary converters and switchboards. Where land is cheap, therefore, it would seem to be a rational procedure for the constructing engineer to place out of doors every part of the equipment which can be made weatherproof without too great expense.

It is true that the outdoor substation movement is being pushed more at present by the power transmission companies. For their purposes many customers can be supplied with power at reasonable rates through an outdoor substation when an indoor one would be out of the question. With this condition impelling the manufacturing companies to produce satisfactory outdoor transformers, switches, etc., the electric railway companies can continue the work, whereas it is quite unlikely that they alone would have been in a position to start it, not having so much to gain. At present, however, the saving, even for railway plants, is apt to be considerable.

While this development is going on, it must be pushed still farther, namely, to the power plant itself. The machinery section of a modern power house is becoming proportionately smaller year by year as compared with the transformer and switching sections. The cost of power houses is large compared with that of substations, and a proportional saving aggregates a much greater sum of money. If 10 per cent in the cost of a power plant can be saved by placing all possible apparatus outside the building, the economics of the situation dictate that it should be so placed. In all of this we are assuming that the engineering problems of the outdoor substation are solved or sure to be solved in the near future. The opinion of the speakers at the A. I. E. E. meeting indicates that this is the case, and these speakers are well qualified to express such an opinion.

EFFECT OF BIENNIAL BITUMINOUS COAL STRIKE

Biennially the bituminous coal consumers of the Central States district must store a sufficient quantity of coal to tide them over the period when the operators and miners are negotiating a new wage contract. The present contract expires on April 1 of this year, so that those desiring surplus coal for storage purposes must purchase it in advance of that date. In case the miner and the coal consumer are able accurately to anticipate the time required to complete these negotiations, the one does not suffer, because he has worked constantly for the few months prior to April 1 to supply the surplus quantity of fuel, but the latter, unless he is properly prepared to store surplus coal, will suffer a loss due to the slacking. A general survey of the Central States district demonstrates, all too plainly, the unpreparedness of most consumers. Most of them are storing coal in the open on unused property, instead of in subaqueous coal storage pits, which would reduce slacking to a minimum.

Many central station and railway generating station operators have seen the advantage of the submerged coal storage pits, not only to tide them over these strike periods but to make it possible to purchase and store large quantities of fuel when the market is low or the quality of the fuel is better for the price than can be obtained at any other time. On the other hand, many operators have not provided themselves with storage pits, either because they have failed to realize their economic value or because they do not realize the value of a uniform fuel cost regardless of market conditions or these biennial strike periods.

If the negotiations last longer this year than is anticipated, the consumer must purchase higher-priced coal from fields unaffected by the strike, the miner must suffer because he has spent his surplus earnings, and the operator will lose because the fuel he should be furnishing is purchased from his more fortunate competitors. It is unfortunate that those engaged in coal mining, employers and employees, cannot settle their disputes in some other way. But as there appears to be no immediate relief, the bituminous coal consumer should so prepare himself that fuel waste through open storage is reduced to a minimum.

JOINT POLE USE IN PRACTICE

At the meeting of the joint committee on the joint use of poles, held at the midyear conference of the American Electric Railway Association, Chairman Harvie reported that several points had been raised with regard to certain clauses in the proposed specification. Among the matters which were suggested to the committee for consideration was the substitution of a cross-arm rental system for the proposed attachment rental system. This change was suggested by the Virginia Railway & Power Company, and it is based upon the company's experience with both methods. The company believes that the diversity in the size and character of the attachments makes it impossible justly to charge a rental for them on a purely unit basis and that even if some compromise average price were agreed upon the bookkeeping necessarily would be more complicated than if the rentals were figured on a simple cross-arm basis. By virtue of an agreement between the Virginia Railway & Power Company and the city of Richmond to arbitrate the matter of joint use of poles, an award was recently made by the arbitrator selected by both parties, a judge of one of the city courts and formerly chairman of the State Corporation Commission. This award was to the effect that an annual rental of $1 should entitle the licensee to the use of one pole for the space of one standard eight-pin cross-arm not to exceed 10 ft. in length and that the cross-arm and attachment should not occupy more than 26 in. of the pole. The award also states that additional space should be provided for at the rate of 40 cents for each 13 in., and additional cross-arms at the rate of 80 cents a year. This award, which was acquiesced in by the city without objection, is considered by the railway company as important in view of the experience of the arbitrator in such matters.

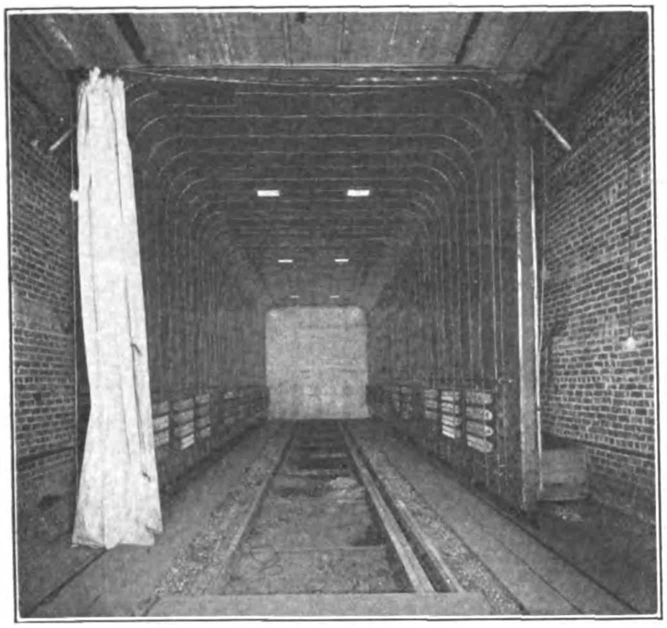
Regardless of the rental rates, which must always be a local matter, it is evident that the bookkeeping of cross-arm charges is simplicity itself. From an engineering standpoint also, it is far better to work with the agreed minimum spacing between cross-arms than to face the risk of crowding on one arm a lot of wires which bear circuits of different characters. Another objection to the attachment basis is the difficulty of checking the installation of thousands of parts. The executives of the companies at interest may make an agreement in perfect good faith, but it does not follow that the linemen will adhere absolutely to the conditions of the agreement. The gang will naturally take the easiest way when putting in connections, provided the variations from the practice prescribed are not too glaring. It is practically impossible for a company to require line inspectors to climb every pole to look for improperly placed and possibly dangerous fixtures. But any disobedience to joint pole agreements would be quickly detected if each user was rigorously limited to certain cross-arms rather than to parts of cross-arms.

Several other points could be urged in favor of the cross-arm basis, but those noted serve to show that the method is simple and practicable.

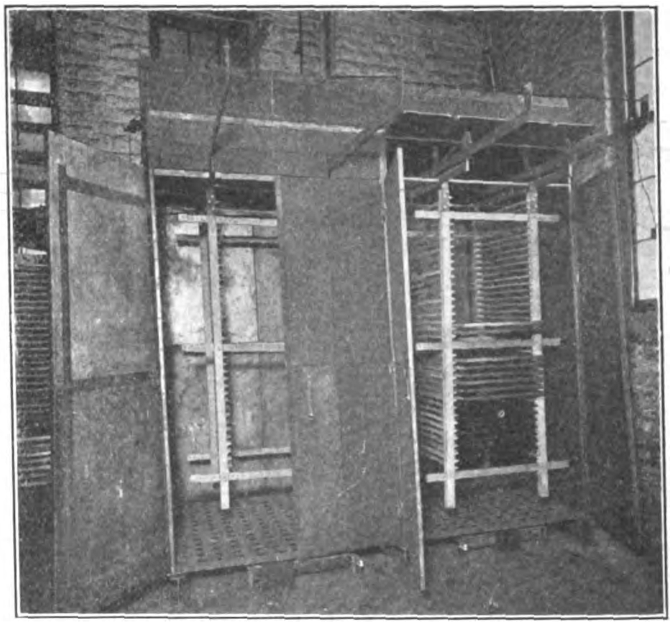
Expediting Car Painting by Use of Portable Drying Oven

Material Economies Have Been Made Possible by the Successful Introduction of This New Method in the Shops of the Cincinnati Traction Company—The Oven Is Used with Ordinary Air-Drying Paints and Varnishes

The mechanical department of the Cincinnati Traction Company, Cincinnati, Ohio, no doubt taking advantage of the suggestion offered by the comparatively recent introduction of baking enamel for painting cars, has now adopted the principle of the drying oven, but is using it in connection with ordinary paint and varnish of the air-drying type. The oven was built at a small first cost, and the painting and drying of a car, which formerly required 186 hours, now requires but thirty-three hours. Moreover, this new method of hastening the drying process has made it possible to complete what is known as a touch-up and varnish job in twenty-four hours. This remarkable saving in time not only reduces the quantity of rolling stock required to operate the system but permits also a reduction in the paint-shop force as well as the shop floor space required to accomplish the work.



Cincinnati Traction Company—Interior of Car Paint-Baking Oven



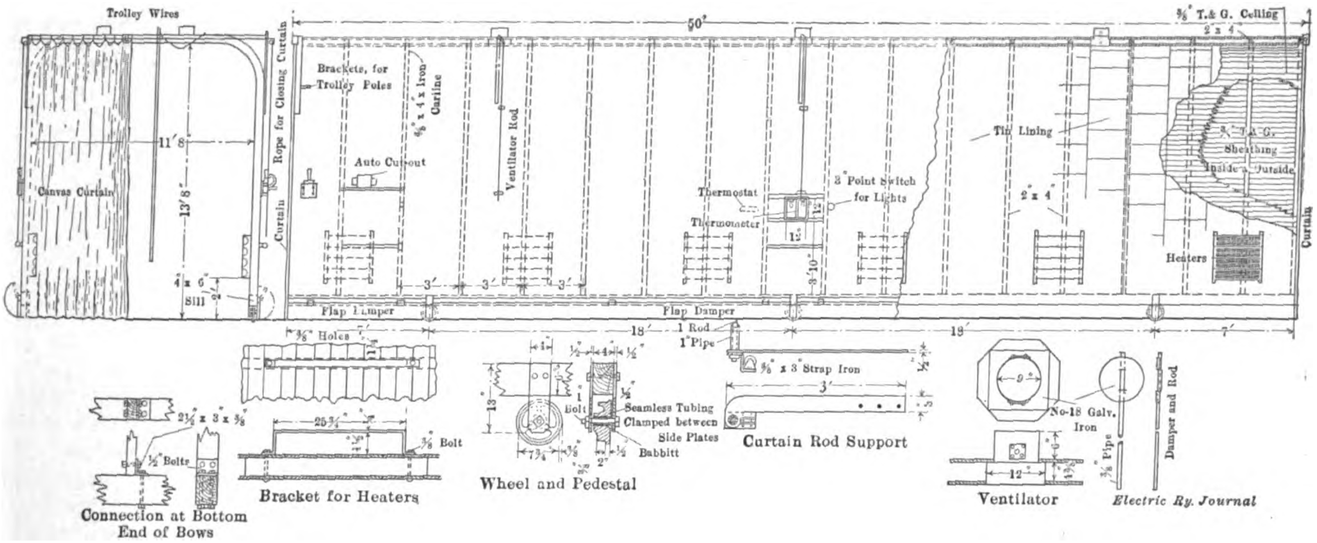
Cincinnati Traction Company—Sash and Door Paint-Baking Oven

An important feature included in this departure from ordinary car painting is the use of a portable instead of a stationary oven. The portable oven was adopted principally because it could be moved about the shop, thus making unnecessary the switching of cars. In fact, a car need not be moved from the time it is set for the cleaning and priming coat until the last coat of varnish has dried and the car is ready to be returned to service. While it might appear impossible to construct an oven light enough to be moved about the shop readily, the mechanical department of the Cincinnati Traction Company has constructed one which is giving satisfactory service and at the same time may be moved by two men. The sashes and doors of the cars, however, are baked in a separate stationary oven.

The oven is a rectangular housing with interior clearances of 13 ft. 8 in. in height, 11 ft. 8 in. in width and 50 ft. in length. It is open at both ends and is lined and covered with wood and tin applied on a wooden frame, the ends being closed by canvas curtains. The oven is made portable by mounting it on six flanged wheels which run on two T-rails laid on a 12-ft. gage and spaced at equal distances outside the track rails in the paint shop. Temperatures up to 135 deg. are maintained by twenty ordinary electric heaters mounted on the walls of the oven and connected in circuits of 5 amp each. All wiring is installed in ½-in. conduit. The circuits are controlled by a thermostat, which may be adjusted for three temperatures: 135 deg., 120 deg. or 115 deg. This instrument is placed in the oven, just inside a small double-glass window, at the center of one side. The snap switches that open and close the heater circuits are mounted on each side of the oven wall beside this window. Energy is supplied to the heaters through a pole and flexible cord connection to the trolley wire, the main circuit passing through a two-pole knife switch before it reaches the controller switch in the thermostat circuit. An auxiliary circuit with individual control permits two heaters to be kept in service during periods of low outside temperature when the oven is not being used to serve in conjunction with the heating system installed in the paint shop.

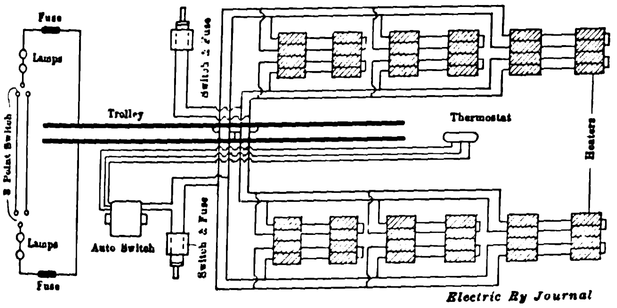
The detailed construction of the oven includes a frame built of 2-in. x 4-in. studding spaced on 3-ft. centers, set on 4-in. x 6-in. sills in the side walls. The studs are bolted to 4-in. x ⅜-in. iron carlines at the wall plate level to form the arched roof. The frame is stiffened lengthwise by two 2-in. x 4-in. diagonals which extend from the lower corner at one end to the center of each wall plate, and it is sheathed and lined with ⅜-in. tongued-and-grooved pine, an ordinary tin covering being applied over this in the same manner as it is on a tin-clad door made in accordance with the underwriters' specification.

Ventilation, which is very essential in hastening the drying process as well as in making the finished job equal to that obtained by the ordinary drying method, is accomplished by installing 9-in. flaps at the base of the oven sides together with six 9-in. openings in the ceiling. The latter are regulated by transom lifts connected to ordinary dampers. The flaps at the base are operated by hand and when in the closed position cover the opening between the base of the oven and the paint shop floor. They are made of 10-in. x 7/8-in. pine boards hinged to the base of the oven sides and arranged in four sections. The curtains which inclose the ends of the oven are heavy duck, arranged on rings to slide on a rod. A rope attached to one of the rings passes over pulleys at each side of the oven and permits the curtain to be pulled across the opening. Three grab handles, mounted on each side of the oven, one at each end and one at the center, are used in moving the oven about the shop. The special car wheels on which the oven is supported are 7¾ in. in diameter with 3/8-in. flanges and 2-in. treads. These are mounted on a 1-in. bolt between two sections of bar iron, 4 in. x 13 in. x ½ in. thick, which are securely bolted to the 4-in. x 6-in. sills which form the base of the oven. To reduce the bearing friction in the wheels to a minimum, the bolts are provided with seamless tubing sleeves and the wheels are babbitt-lined.



Trolley Wires
Canvas Curtain
11'8"
13'8"
4 x 6" Sill
Rope for Closing Curtain
Curtain
Brackets, for Trolley Poles
⅝" x 4 x Iron Carline
Auto Cut-out
Ventilator Rod
3'
3'
3'
Flap Damper
50'
Thermostat
Thermometer
12"
12"
8'10"
3 Point Switch for Lights
Tin Lining
2" x 4"
⅜" T.& G. Ceiling
2 x 4
⅜" T.& G. Sheathing Inside & Outside
Heaters
Curtain
Flap Damper
⅜" Holes
7'
18'
1 Rod
1" Pipe
18'
7'
2½ x 3 x ⅜"
½" Bolts
Connection at Bottom End of Bows
25¾"
⅜ Bolt
Bracket for Heaters
1
½" 4 ½"
13"
Bolt
Seamless Tubing Clamped between Side Plates
Babbitt
7¾
⅜
2"
Wheel and Pedestal
⅜" x 3" Strap Iron
3'
Curtain Rod Support
9"
No-18 Galv. Iron
12"
⅜ Pipe
Damper and Rod
Ventilator
Electric Ry. Journal

Cncinnati Traction Company—Details of Paint-Baking Oven for Cars



Fuse
Lamps
3 Point Switch
Trolley
Switch & Fuse
Thermostat
Heaters
Auto Switch
Switch & Fuse
Lamps
Fuse
Electric Ry Journal

Cincinnati Traction Company—Wiring Diagram of Oven

OPERATING RESULTS

In actual service the baking oven has been found to produce a much better quality of finish than that obtained when the paint is dried in the ordinary manner. Not only is less time required for the work but the finished job is free from hair cracks, and no dust particles or insects have been embedded in the paint or varnish during the drying period. The oven also insures that every coat is thoroughly hardened before the next one is applied, because the time required is uniform regardless of the atmospheric conditions. Moreover, the fact that a car is never moved from the time it is set in the shop for painting until it is finished reduces the lost motion in the paint shop to a minimum. It has been found by an actual check that the current consumption required for drying during the summer months is only 70 amp at 550 volts. At the time that this article was written the company had not had an opportunity to obtain similar data for extremely cold weather, but, inasmuch as the inside temperature variations for the year are slight, the current consumption will not be much more. In either case, however, the cost of current is largely offset by the other advantages gained by the introduction of the new process.

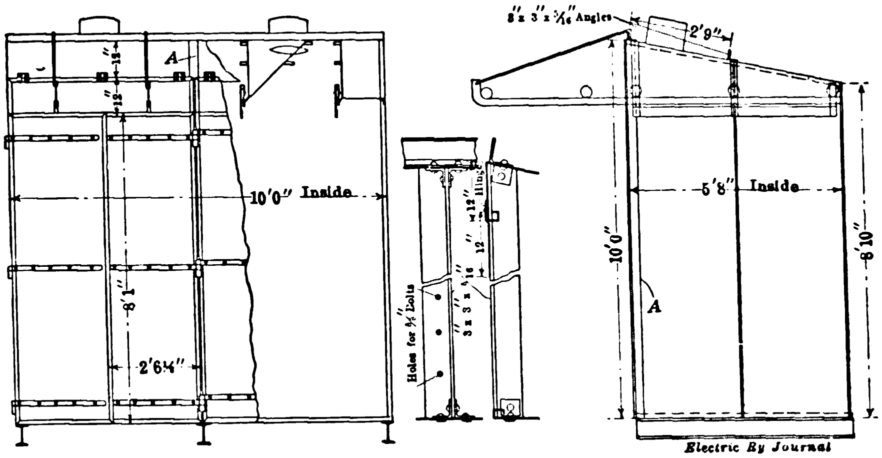
The following is the car paint-baking schedule for a complete job of painting, and from this the time required for a touch-up and re-varnish job may be ascertained:

Paint	Air Drying, Hours	Oven Drying Hours	Degrees of Heat
First coat primer	48	5	135
Second coat primer	12	3	120
Glaze	8	3	115
Rough stuff	12	3	115
Second coat rough stuff	12	3	115
Drying moisture from rough stuff	10	1	115
Stripe:			
First coat yellow	6	1	115
Second coat yellow	6	1	115
Color varnish	24	3	120
First coat varnish	24	5	120
Second coat varnish	24	5	120
Total	186	33	

SASH AND DOOR OVEN

In conjunction with the baking oven for car bodies the Cincinnati Traction Company also has built another for sash and door varnishing. This is installed permanently in the paint shop building. It consists of a sheet-metal housing 10 ft. long by 8 ft. 1 in. high by 5 ft. wide, inside dimensions, and is shown in one of the illustrations. The oven is built with a lean-to roof and a perforated floor supported on 7-in. I-beams. It is inclosed with 1/16-in. sheet iron riveted together and insulated on the outside by ¾-in. pressed cork. The sides are stiffened by turning the laps of the sheet metal in at right angles to the oven walls. The brackets supporting the runways and rack are made of ¼-in. bar iron. Electric heaters are installed under the floor in the space between the beams, and one side of the oven is equipped with four swinging doors. The interior is filled with adjustable wooden racks swung from overhead runways which project 4 ft. beyond the front of the oven. When the four doors are open these racks may be pulled from the interior and the dried sashes removed and replaced with others freshly varnished. These racks are so supported on the oven runways that the vertical members may be adjusted both longitudinally and transversely to accommodate different sizes of sash.

Ventilation is as essential to the proper finishing of sashes and doors as car bodies, and it is provided by two 12-in. ventilators installed in the top and the perforations in the floor. The ventilators are opened and closed by dampers connected to transom lifts. The air enters the oven at the floor level and passes up through the electric heaters and the perforations in the floor. The baking schedule for the sash and door oven is three hours for rubbing varnish and six hours for finishing varnish, making a total of nine hours in all for either metal or wood sashes. The oven temperature for metal sashes is 170 deg. and 130 deg. for wood.



Cincinnati Traction Company—Details of Oven

GLASS FOR SIGNAL LENSES

On Friday, Feb. 20, Dr. William Churchill addressed the New York Railroad Club on the subject of signal glass, or more properly signal lenses. He outlined the optical principles involved in the development of signal lenses from the days of the old "bull's-eye" lantern to the present, when the highly efficient "optical" lens is standard. At present more than a hundred designs of signal lenses are available, differing in focal length, size and type. There are two main classes of lens, the ordinary round form with concentric rings, with corrugations inside or outside, and the "Fresnel," with horizontal corrugation suited more particularly for ship lights. The manufacture of glass for signal lenses requires unusual care, as the color is very sensitive to chemical composition, and the refractive index must be as designed in magnitude and uniformity.

The matter of "spread" of beam is one on which unanimity of opinion is desired, as it is possible to produce high candle power and small spread or the reverse, or any compromise design can be made. Small spread gives great carrying power but small range, and on sharp railroad curves the visible range may not be sufficient to give the desired protection. The latest development consists in the addition of vertical corrugations on the lens face, resulting in a spreading out of the rays in a horizontal plane. The name "Spreadlite" has been given to this type. The lens manufacturers can now provide lenses of practically any characteristics required by the railroads, and it is the province of the latter to determine which are best in any case.

The speaker gave an interesting demonstration of the properties of different lenses by mounting a group of three, representing the most important types, optical, wide-angle and Spreadlite, upon a rotating table with standard "long-time" burners behind them. The same apparatus, with the lenses removed, was used to demonstrate the different standards and possible colors of several tints used for signal lenses.

The discussion following the lecture brought out the situation regarding light signals for daylight use on electrified steam roads. The New Haven road has had difficulty with the semaphore signals in the electrified zone, as the overhead structure interferes with the lines of sight. As a result its signal engineers are studying light signals as a possible means of assistance in eliminating this trouble and further insuring reliability. The Pennsylvania Railroad is also considering the same type of signal for the electric zone. The Brooklyn Rapid Transit Company has adopted these signals for the new construction now under way. In reply to questions as to the details of lenses for light signals for daylight use, Dr. Churchill refused to express any opinion in view of the newness of the development. He stated that lenses of large size, possibly 10-in., will undoubtedly be required, and probably modifications of the present standard colors may be necessary. The problems involved in designing lenses for this purpose are complicated by the variations in sunlight from hour to hour in intensity, quality and direction. In another year the speaker hopes to be able to give the results of a scientific study of the whole matter.

An interesting and natural feature of the discussion was the respect paid by the practical engineers and business men for the contributions made to the art by analytical and experimental study of the subject. As Dr. Churchill pointed out, the lamp and the lens manufacturers, with the aid of the signal association and its members, have co-operated to bring about the present satisfactory status of this branch of railway signal engineering.

ELECTRIFICATION PLANS IN BOMBAY

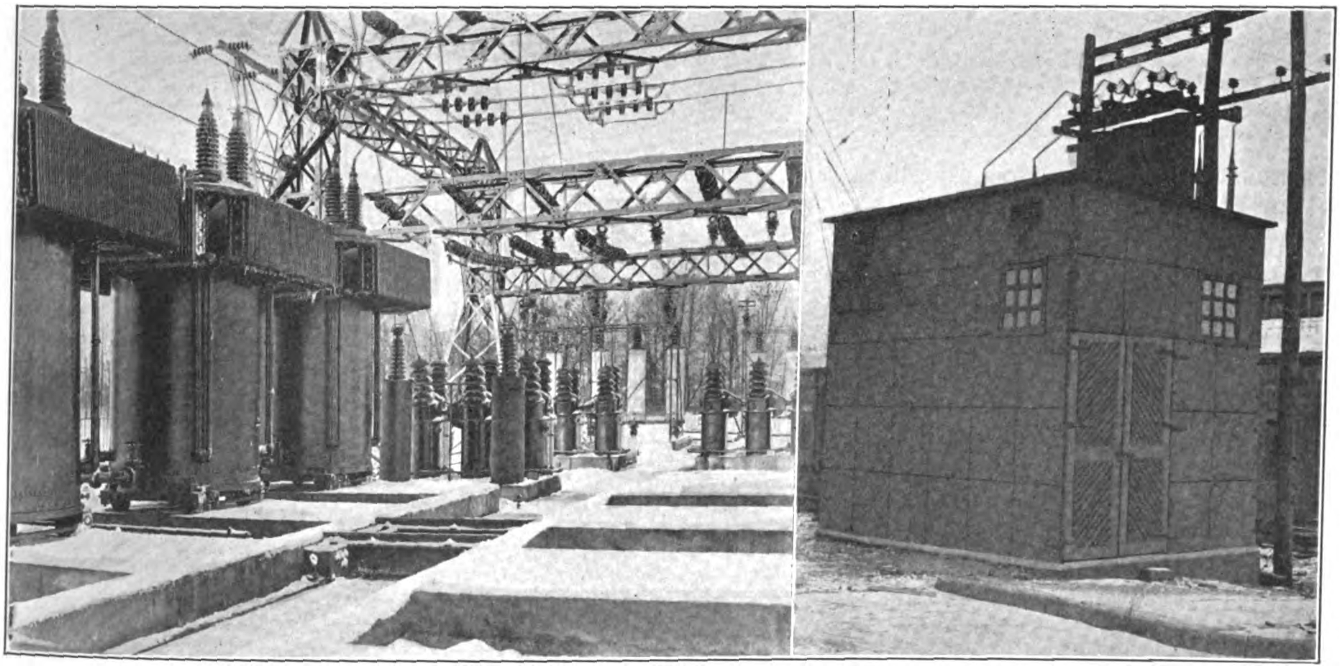
A report on the proposed electrification of the Bombay suburban railways is now under consideration by the boards of the Great Indian Peninsula and the Bombay, Baroda and Central India Railway Companies and the Bombay Port Trust.

The report expresses the opinion that electrification would be remunerative, and advantageous for the public. The suburban traffic must continue to increase, and it is estimated that by the time the work of electrification can be completed the increase over the present figures will be 79 per cent. The speed will be 20 per cent higher than that of steam-driven trains. The cost of equipping all the suburban and Port Trust lines on the overhead d.c. system is estimated at $3,803,333, while the gain by electrification is put at $341,426 per annum, equivalent to 8.98 per cent on the capital expenditure. It is proposed to use trains of three coaches, coupled permanently, and with motor equipment in one coach. It is suggested that a large power station be erected at Thana.

Midwinter Convention of the American Institute of Electrical Engineers

The Three-Day Convention, Held Feb. 25 to 27, Was Under the Auspices of the Electric Power Committee—The Topics Discussed Included Outdoor Substations, Transmission Lines, Reactances in Power Plants, Distribution, Etc.—Abstracts Are Published of the Principal Papers of Railway Interest Presented During the First Two Days

The second annual midwinter meeting of the American Institute of Electrical Engineers was held at the Engineering Societies Building from Feb. 25 to Feb. 27. The convention was under the auspices of the electric power committee, which comprises sub-committees devoted to the following specialties: Power stations, D. C. Jackson, chairman; power generation, H. W. Buck, chairman; protective apparatus, C. P. Steinmetz, chairman; transmission, P. W. Sothman, chairman; distribution, P. Junkersfeld, chairman; economics, William McClellan, chairman, and engineering data, P. H. Thomas, chairman. Each of the six technical sessions was assigned to one or more of the sub-committees and sixteen papers and reports were presented.



Substations—Chicopee Substation After Sleet Storm—Simple Concrete Slab Substation

In opening the convention President C. O. Mailloux referred to the beneficial results of last year's meeting in the rating of electrical machinery. The present administration hopes to secure equally satisfactory results through the new arrangement of committees in operation this year. He then turned the meeting over to D. B. Rushmore, who outlined, with the aid of numerous lantern slides, the recent developments in all important fields of electrical applications.

The rest of the preliminary session was taken up with a discussion of the feasibility of the Institute's publishing reference data, either in loose-leaf form, in bound volumes of papers on special subjects or in compilations of the handbook order. The consensus of opinion seemed to be in favor of some assistance from the Institute in reducing the amount of labor required of the members in looking up data on a given topic. At the same time no feasible scheme for doing this on a large scale presented itself. P. H. Thomas and H. Pender, chairmen respectively of the committees on engineering data and the A. I. E. E. handbook, have this important problem in hand.

POWER STATION SESSION

PROTECTIVE REACTANCES IN LARGER POWER STATIONS

Under this title James Lyman, A. M. Rossman and L. L. Perry give the results of a theoretical analysis of the results of locating reactance coils in generator leads, between busbar sections and in feeders. The concentration of large generating capacity in alternators and power plants may result in very destructive effects from short-circuits. Such accidents as feeder grounds, failure of current transformers, hanging of arcs across fuses and throwing in generators out of phase have resulted in the destruction of generator and transformer windings, oil switches and even masonry. The means for preventing severe disruptive effects is to limit the short-circuit currents by means of reactance (a) in generator leads, (b) in tie lines between power stations, (c) between different sections of station busbars, (d) in station busbars between adjacent generator connections, (e) combinations of any of the above, and (f) in feeder circuits.

Generators having inherent reactance are to some extent automatically protected and this protection can be increased by adding external reactance. There are disadvantages in this, however, in that the coils must be large enough to carry the entire generator output and that a short-circuit on any section of the busbars causes the same drop in voltage at all points in them. The important function of such coils is, therefore, mainly to protect the generator windings.

TABLE SHOWING EFFECTS OF DIFFERENT ARRANGEMENTS OF REACTANCE COILS

System of Arranging Reactances	Maximum Short Circuit Current Possible on Busbars; Based on Normal Rated Current of One Generator Equals 1	Number of Sets of Three-Phase Reactance Units Required	Per Cent Reactance Volts of Each Set of Coils Based on Normal Rated Current of One Generator	Current Carrying Capacity of Each Reactance; Based on Normal Rated Current of One Generator Equals 1	Total per Cent Kva Rating of Reactance Based on Rating of One Generator Equals 100 per Cent	Total Kva Reactance Assuming Nine 25,000 Kva Generators	Maximum Percentage Voltage Difference Along Busbars
Reactances in generator leads	30	9	20	1	180	45,000	0
Reactances in busbars—straight bus							
Between groups of 3 generators per group (single bus)	30	2	∞	2	∞	∞	Not computed
Between groups of 3 generators per group (double bus)	30	4	∞	1	∞	∞	
Between groups of 2 generators per group (single bus) { 10	30	4	16	2.4	368	92,000	
Between groups of 2 generators per group (double bus) generators	30	8	32	1.2	368	92,000	
Between adjacent generators (single bus)	30	8	5	2.22	197	49,250	
Between adjacent generators (double bus)	30	16	10	1.11	197	49,250	
Reactances in busbars, between adjacent generators—ring bus							
Generator connections direct (single bus)	30	9	5	1.11	55.5	13,888	9.9
Generator connections direct (double bus)	30	18	10	.555	55.5	13,888	9.9
Generator connections crossed (single bus)	30	9	5	.666	20	5,000	4.2
Generator connections crossed (double bus)	30	18	10	.333	20	5,000	4.2
Ring and transfer bus, reactances in ring bus only, generator connections direct	30.8	9	12	.555	33.3	8,333	5

Sectionalizing reactances, in tie lines and between large and small busbar sections, are more useful than the above and need not be so large. These, as well as the other reactances, cause voltage drop and their magnitude is a compromise between the conflicting requirements of good voltage regulation, on the one hand, and protection against short-circuit effects, on the other.

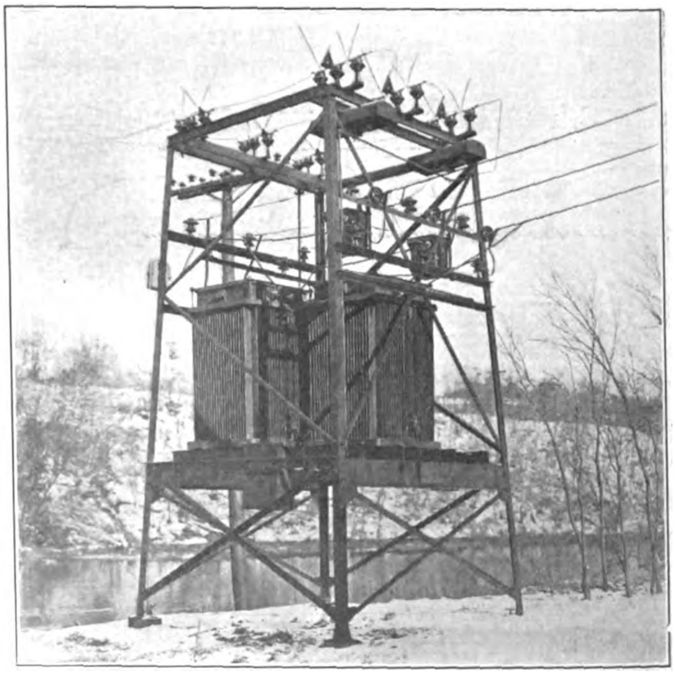
The authors consider six different typical busbar arrangements and analyze the effects of the application of reactance coils in each. The cases are (a) single straight bus, (b) double straight bus, (c) single ring bus, (d) double ring bus, (e) single straight bus and direct feed and (f) single ring and single straight bus. To make their study definite they assume a station containing nine 25,000-kva generators having 10 per cent internal reactance. They then proceed to calculate the short-circuit current, voltage variation and power factor for a number of different arrangements of reactance coils of varying percentages of reactance. The results are presented in the form of curves and the method of calculation is appended. They include in their study the short-circuiting of reactances to eliminate voltage drop when protection is not needed. The accompanying table shows the general results that were arrived at by means of the calculations.

OUTDOOR SUBSTATIONS

The importance of the outdoor substation at the present time is indicated by the fact that four out of the six papers presented in the power station section were devoted to this subject. Alexander Macomber sums up in a brief and practical manner the salient general features of the development of this type of substation which is due to the demand for power in moderately small quantities from high-tension transmission lines. He summarizes the advantages and disadvantages of the outdoor substation in the following manner:

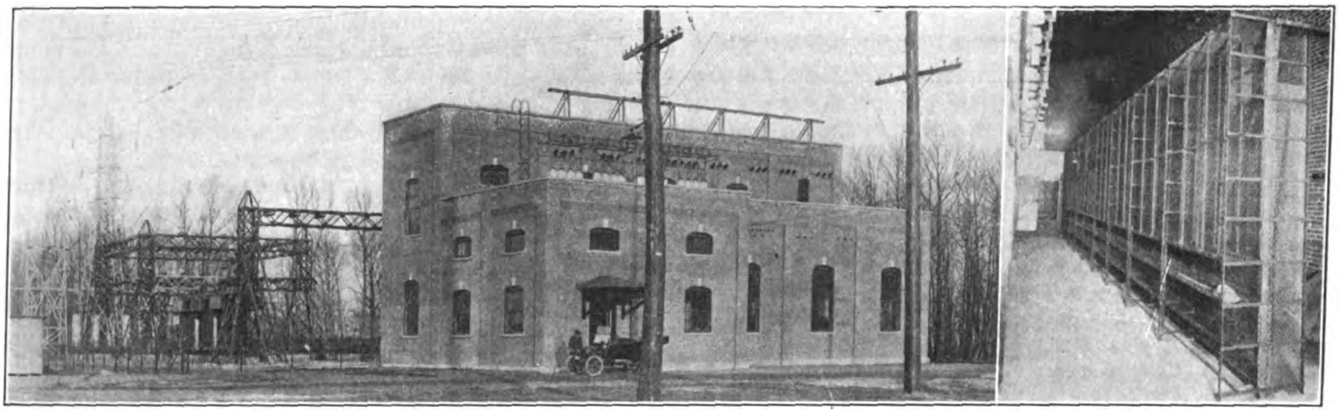
Advantages	Disadvantages
Lower first cost	Repairs
Ease of extensions	Operating risks
Reduction of fire hazard	Danger to public
Simplicity of layout	Appearance

As the table indicates, the primary reason for the use of these substations is low cost. Used necessarily first for the purpose indicated above, their use is extending to other fields. Even where all of the apparatus cannot be placed outdoors, part of it can be so located, and whether it will pay to do so in a given case depends upon the comparative costs of erecting buildings and of constructing transformers, switches and lightning arresters to withstand cold and dampness. Where attendance is required in the substation some building is necessary and in other cases it may pay to put part of the plant indoors.

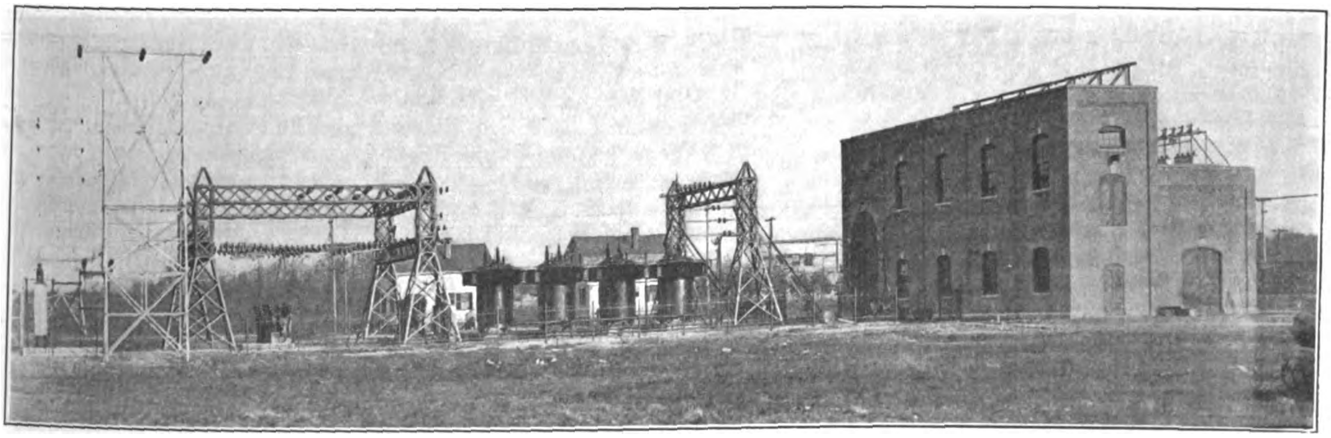


Substations—Typical 750-kva Outdoor Substation

The question which naturally interests the prospective builder of a substation is as to the practicability of operating transformers, and protective and control equipment out of doors. Mr. Macomber claimed that all such apparatus can be constructed so to operate in a satisfactory manner. The electrolytic lightning arrester will function properly in absorbing lightning disturbance and surges at low temperature. Fortunately the most serious disturbances do not occur, as a rule, in winter. Outdoor transformers are beyond the experimental stage, there being approximately 300,000 kva in aggregate capacity either in use now or in process of installation. Both self-cooled and water-cooled types are satisfactory, but certain precautions are required with them to prevent freezing of oil and water. The use of oils having low freezing points is desirable and the natural heat from the windings and cores can be supplemented by that from special coils installed in the tops of the cases. Air-blast transformers have not been used much as yet, but there should be a field for them as the troubles incident to low temperature are absent, but provision must be made to prevent the entrance of moisture. Outdoor switching apparatus is well developed and can be operated even in severe sleet and wind storms. The more delicate parts can be inclosed.



Substations—Indoor-Outdoor Substation at Agawam—Framework for Bus Structure



Substations—Indoor-Outdoor Substation at Chicopee

The author discusses the application of the outdoor substation (a) for small isolated loads, (b) for large capacity loads and, (c) for apparatus auxiliary to large central stations. He concludes that the experience of the few years past shows no serious operating difficulties and that the same ideas may be applied to central stations with good results.

The discussion was continued by L. H. Fullerton, who took up more particularly the design and construction of substations for operation on voltages up to 20,000. A distinction is made between those fed from the regular distribution systems and those fed from transmission systems. He took up various types of substation from the simplest, comprising a small transformer mounted upon a pole, to more elaborate ones in which complicated switching and protective apparatus is employed. In all cases, however, the element of economy in construction is kept clearly in mind and no unnecessary elaboration is recommended.

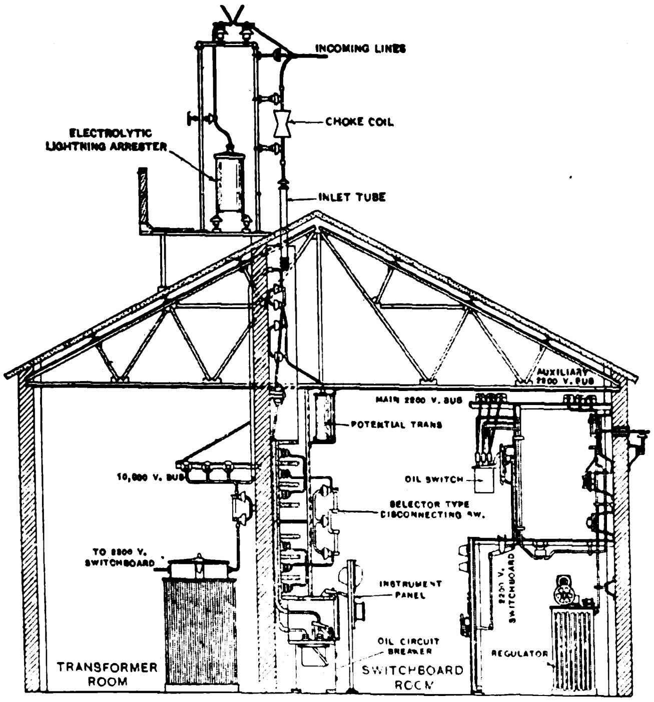
COMPARISON OF OUTDOOR AND INDOOR SUBSTATIONS

In comparing outdoor and indoor substations, the author points out the following advantages of the outdoor type; (1) less cost for making installation, (2) usual greater accessibility for company's employees in case of trouble, (3) less difficulty in connecting to company's lines, (4) absence of requirement of transformer vault and (5) better ventilation. On the other hand, indoor installations are superior in the following particulars: (1) Apparatus is more accessible for inspection or repairs, (2) there is less danger of unauthorized persons interfering with it, (3) customers have control of the installation on the primary side, by means of oil switches, if desired, and (4) apparatus is protected from weather. This comparison is made for small substations in which power is taken from the distribution systems. The same arguments apply still more forcibly in the case of power taken from transmission lines. Mr. Fullerton does not consider high-tension outdoor switching apparatus very satisfactory. He points out that, in company substations, the field for the outdoor installations seems to be with the small town where the load can be picked up along the route of the transmission system without considerable line extension.

Where large municipalities are to be supplied with power, it is usually desirable to install emergency service which requires more or less high-tension switching, and an indoor substation is usually desirable.

USES OF CONCRETE IN SUBSTATION CONSTRUCTION

Mr. Fullerton's paper was well illustrated with photographs of typical substations of various types and with diagrams showing approved layouts of equipment. He recommended the use of concrete slabs for the construction of small and moderate-sized substations, as these slabs can be molded in the shop and erected with great rapidity. He describes a method for constructing concrete cells, busbars and switches. The usual method of building these cell structures is by erecting forms and pouring the concrete, using reinforcing rods where necessary. Mr. Fullerton has found difficulty in securing a uniform and smooth job by this method and has digressed by building expanded-metal framework, plastering the concrete body upon it. The thickest portions are plastered three inches thick. The scratch coat contains a small quantity of hair, the remaining coats being pure cement and sand. The finishing coat is of keen cement, which gives a hard, white, smooth surface. In the finishing coat, a small quantity of lime is used to make the cement work smoother. In the construction of the expanded-metal framework, angles are used in the heavy barriers and small channels are riveted or tied to these, the expanded metal being wired to this skeleton framework.



Substations—Typical Substation Arrangement

TWO RECENT SEMI-OUTDOOR SUBSTATIONS

Under the title "Outdoor Substations in New England," Fred L. Hunt describes two substations which have been built and put into operation by the Amherst Power Company, one at Chicopee and the other at Agawam. These are supplied from the company's double-circuit, sixty-cycle, three-phase, 66,000-volt transmission line extending from Turner's Falls to Springfield. The substations are of a semi-outdoor type, in which all of the 66,000-volt equipment, including the step-down transformers, is placed outdoors, as are also the aluminum lightning arresters on the 13,200-volt outgoing line. The 13,200-volt buses and switch apparatus, the control switchboard, the 2300-volt distributing switchboard and the railway apparatus are placed inside.

In deciding upon which pieces of apparatus should be placed outdoors and which indoors, the matters of practicability and cost were both considered. The 66,000-volt apparatus was the most bulky and the greatest saving in building space could be made by putting it outdoors. On the other hand, the control switchboard, with motors, instruments and storage batteries, and the railway motor-generator sets practically had to be placed indoors. Between these two extremes lay the apparatus designed for moderate voltage, 13,200 and 2300, which could have been placed either indoors or outdoors. This equipment was placed indoors because it would have been more difficult and expensive to handle in an outdoor installation.

In estimating the saving due to placing equipment outdoors the assumption was made that the first cost of the building is in direct proportion to its cubic contents. In the present cases, buildings to house the entire equipment would have cost considerably more than twice as much as did the buildings actually erected. After allowing for the extra cost of outdoor apparatus and of foundations and steel structures for it, the saving was found to amount to 11 per cent of the cost of the complete station and equipment as built.

DETAILS OF THE CHICOPEE SUBSTATION

The general arrangement of the Chicopee substation is as follows: "A tap circuit is brought in from each of the two transmission lines through choke coils, disconnecting switches and solenoid-operated non-automatic oil switches to a transfer bus, from which the transformers are supplied through disconnecting switches and solenoid-operated automatic oil switches, one set for each bank. An aluminum lightning arrester is installed on each incoming line. At present there is one bank of three 1500-kw, oil-cooled transformers of the radiator type in use, with one spare unit, and foundations and conduits are installed for a second bank. This type of transformer construction brings the cost of oil-cooled transformers for outdoor work down to a point where their increased cost over water-cooled transformers is so little that it does not pay to add the complication of water cooling for the small saving in first cost that can be accomplished, especially where the water would have to be pumped, as in this case, and where, as in all outdoor stations in the northern part of this country, special precaution must be taken to prevent the freezing of water pipes. From the transformer bank one circuit is carried underground into the building to the 13,200-volt double bus in a concrete bus structure."

Mr. Hunt calls attention to a number of interesting features in the design and operation of outdoor substations. To prevent the oil in the spare transformer from freezing it is connected to the low-tension bus, while 200-watt heating units located in the covers of all transformers are used to prevent precipitation of moisture. Such precipitation is liable to occur when cold air, taken in from outside, comes in contact with the air above the transformer. The transformer and oil switches are connected by a complete piping system underground to a two-compartment oil tank buried in the ground. Oil can be drained from any transformer or oil switch into its respective compartment of the oil tank and from there can be pumped through a portable oil filter press back into the transformers or switches. To call attention to undue heating in the transformers, alarm thermometers connected to bells in the station indicate excessive temperature. When it becomes necessary to repair a transformer it is rolled onto a transfer truck which is run into a compartment at one end of the station.

Among incidental features may be mentioned the switch hooks used for operating the outdoor disconnecting switches. Each of these is provided with a copper cone at about the middle of the handle, and the cone is grounded when the hook is in use. The outdoor aluminum lightning arrester cans are painted white to prevent the absorption of the sun's rays. Two coats of white paint on the cans have been sufficient to keep the temperature of the arresters below the danger point. The same treatment can be applied to transformers.

The author states that the substations are now under test and that so far the results have been satisfactory. Each outdoor station is surrounded by an iron picket fence and all of the equipment is set on concrete foundations extending below the frost line. Some difficulty was experienced at first in keeping the joints of the cooling radiators on the transformer oil-tight. New radiators have been installed and thus far have stood the test of wide temperature changes without developing leaks. Self-cooling transformers were used in preference to the water-cooled type on account of the greater simplicity. The author believes that practically all substations of the same general arrangement as those described can be built with considerable saving in cost over outdoor substations unless land is very expensive. There is no good reason for using outdoor apparatus except where a saving in first cost can be shown.

OUTDOOR SUBSTATIONS IN MIDDLE WEST

L. H. Perry shows, in his paper, that in the Middle West the outdoor substation is in many cases practically necessary if service is to be supplied at a practicable rate. In many cases of small installations indoor space in existing buildings is not available. It is often cheaper to erect outdoor substations in these cases than to provide additional buildings for them or to enlarge existing buildings.

In the supply of power to the small rural station the chief requisites are: (1) Economy of design, (2) protection to the main line and (3) reliability of service in as far as the elements of the outdoor station itself are concerned. In the class of stations covered by the paper, the absence of better devices of reasonable cost has necessitated the use of the plain wire fuse and horn gap or the liquid high-tension fuse, with or without horn gap, for the purpose of protecting the line. Reliance is placed on the low-tension devices for protection against overload on the substation itself. Choke coils are, in general, used in the transformer leads. In designing these substations it must be remembered that they are often in the hands of inexperienced operators, and the simplest possible arrangement of disconnecting and other switches must, therefore, be employed.

The author states that sufficient success has been attained to demonstrate that by using these small outdoor stations good electric service can be supplied to many rural communities at rates within their reach and a class of customers otherwise inaccessible can be thus secured.

TRANSMISSION SESSION

P. W. Sothman, chairman of the sub-committee on transmission, presented a report outlining the present status of the various divisions of the transmission field. His report was based on data furnished by members of his sub-committee and it contained several appendices which appeared under the names of their respective writers. Under the head of "right-of-way" the most important topic to which attention was called was the protection of lines at crossings. There is need for an intelligent agreement as to rules or specifications upon the subject, preferably bearing the sanction of the Institute. Such specifications should allow a certain latitude in the construction so as not to inflict unnecessary hardships upon small power companies operating at comparatively low voltages, or those located in unsettled districts.

TOWERS

In tower construction it is generally agreed that the square or four-legged tower is more efficient in the use of material than the three-legged type, and the latter is now seldom seen. A flexible tower has been used to some extent with good results, but rigid towers must be placed at frequent intervals along the line. It is too early to say what success will attend the use of the flexible tower in connection with long suspension insulator strings, and until more data are available it is advisable to proceed with caution when considering the adoption of this construction. In lines supported on suspension insulators, two or more conductors are not placed in a vertical plane, especially where snow and ice are liable to collect upon them. If they were so placed there would be danger that when a load of ice and sleet broke away it would not do so uniformly and the cables would be liable to come into contact. In the East the ice seems to collect to a greater extent at the centers of the spans than near the towers, which fact should be taken into consideration. There is a need of standardizing the methods of calculation used in tower design, and the constants for such materials as copper, aluminum and steel used for conductors should be taken at some acceptable figure such as 13,000 lb. per sq. in. for copper and 14,000 lb. for aluminum, as representing the elastic limits. Ordinarily tower dimensions should not be calculated but specifications should call for ability to stand certain loading and towers should be tested for these values.

Foundations for rigid towers should have their tops within one-tenth of an inch of the same height. No material less than 3/16 in. in thickness should be used in tower construction and it is recommended that the minimum number of bolts in any connection be not less than two. Towers should be strong enough to permit men to climb them without danger of bending the angles. Wire spacing should be such as to allow an angle of deflection of 55 or 60 degrees from the vertical under the worst wind conditions, instead of the customary figure of 45 degrees. In designing towers the structure should be arranged to permit the loading of one span with ice and sleet with the two adjacent spans not loaded, and still leave sufficient distance between all wires so that there would be no probable contact due to wind conditions. In the northeastern part of the United States and the eastern part of Canada not less than ¾ in. of sleet or ice should be allowed for. It should be remembered also that the wind load is heaviest at times of sleet. As the section of ice is more or less elliptical, this fact should be considered in estimating the wind pressure.

Fifteen pounds pressure per square foot from wind should be allowed in these parts of the country.

There is danger of injury to towers in erecting them on the ground and tilting them into place. A careful inspection after erection is therefore necessary. Special attention should be given to the support of ground wires, which, as sometimes erected, are liable to come in contact with the power conductors. In general galvanizing seems to be preferred to painting for towers and good galvanizing can be relied upon for twelve or fifteen years. Painting cannot be depended upon for more than two or three years, especially where the atmosphere contains sulphur or other fumes. Footings can be galvanized with good success in most soils, although there are earths where paint coating is more durable. Where extreme acidity or electrolytic action is expected in the soil, it is more economical to provide concrete footings.

CONDUCTORS

The report does not open up the question of the relative advantages of copper and aluminum for power conductors. It states that there are conditions where one or the other can be used to best advantage. Hard-drawn copper cables should not have hemp centers. Steel-core aluminum cables have been made which the makers claim to be as durable as ordinary aluminum cables and free from electrolytic corrosion. Proof upon this point is lacking but it is understood that this type of cable has not been considered satisfactory by English cable manufacturers. Copper-clad steel wire gives good results for long spans where great strength is required, but these wires are still too expensive to be generally used for power conductors. They are coming into use, however, to a certain extent for telephone and telegraph lines. The committee calls attention to the fact that the formulas in existence for the calculation of cable sags are quite complicated, although they give sufficiently accurate results as long as the spans and sags are moderate. A simple method employing the catenary, upon which a set of curves can be based, is recommended. In the matter of ground wires it is generally agreed that such overhead wires are beneficial as a protection against lightning. However, the extent to which such protection is actually afforded is still a matter of some doubt.

INSULATORS

From the committee's report the insulator seems to be the feature of the transmission line with which the greatest difficulty is now being experienced. Suspension insulators are all right when new, but they seem to be subject to an aging process, so that, after a year or two of service, failures begin to develop. To insure steady service the insulators must be inspected at frequent intervals. The trouble is not confined to any make of insulator nor to any section of the country. At voltages of 110,000 and even somewhat higher there seems to be no reason for providing protection for the end units of suspension insulator strings to equalize the voltage gradient over the whole. This may be necessary when voltages go to still higher values. These protecting shields act simply as electrodes for equalizing the electrostatic field in the region occupied by the insulators. Shields should present only rounded surfaces and edges and need be no greater than 12 to 14 in. in diameter to produce good results. With these shields may be mounted arcing rings or tips to keep arcs away from the insulators. The clamps used in securing line conductors to suspension and pin-type insulators are satisfactory as far as the performance of their primary function is concerned. They do not allow the conductors to slip but they sometimes mash the cables and unfit them for taking strain if the sag ever has to be readjusted, which is by no means an uncommon occurrence. Practically none of the clamps are designed with smooth outline or with an idea of avoiding more or less sharp projections which cause static discharges at the higher voltages and which concentrate the electrostatic field in the vicinity.

STATION APPARATUS

The committee's report contained some notes on station apparatus. Particular attention is directed to the necessity for the mechanical bracing of transformer windings as the forces which are developed by short circuits are very great. An important problem of distribution companies serving sparsely settled districts is to secure small, high-voltage transformers which will stand up under the stresses of line switching, surges, etc., which occur in ordinary operation of a large high-tension system. Another vital matter is the status of the lightning arrester. The electrolytic arresters are believed to be the best available at present, but it is still difficult to make any definite quantitative statement as to the protection which they actually afford against lightning or other disturbances. At the same time no one would care to take the responsibility of operating stations without arresters as they are a form of insurance against trouble. Much more information along this line is desirable. Oil circuit-breakers are becoming more reliable for high potentials and heavy service, but it is still unwise to attempt to rupture short circuits close to the generator when their combined normal capacity is much greater than 50,000 kw.

INTERFERENCE WITH TELEPHONE LINES

Interference of high-tension transmission lines with telephone and telegraph circuits is a subject to which but little attention has as yet been given, although the problem is a very important one. Much of the trouble with telephone service is due to poor insulation. With good insulation and with the transmission line well balanced, trouble is not experienced as a rule except at times of disturbance or interruption on the transmission system. In a recent case of protection from interference cited by the committee it was found that there was no protective apparatus on the market capable of handling the large induced currents which were expected. In this case the basic principle worked upon was carefully to insulate and balance the telephone line with respect to the transmission circuit. Transpositions were made at frequent intervals and no twigs or other objects were allowed to come into contact with the wire. Special grounding coils and heavy fuses were used with discharge gaps in vacuum. Condensers and choke coils were provided for absorbing the smaller disturbances. No one remedy is sufficient for all cases and. to insure a quiet working line, each case must be studied by itself and methods adopted to meet the condition.

MORE ABOUT INSULATORS

The report of the transmission sub-committee contained several signed appendices in which some of the following important points are brought out. J. A. Brundige called attention to the deterioration of porcelain insulators in service, of which mention has already been made. A good porcelain for high-voltage insulators must combine high dielectric strength and mechanical toughness. These two qualities are somewhat opposed to each other, for when the former is obtained the porcelain is apt to be brittle like glass. Some of the so-called high-voltage porcelains appear to be lacking in both desirable properties. The porcelain mixtures used by different manufacturers vary greatly in the proportion of ingredients employed. For example, one uses twice as much flint as another. Some standard of proportion seems highly desirable. While the porcelain body is important, the design of the insulator is still more so. An insulator consists of porcelain, cement and iron assembled together, the coefficients of temperature expansion of the three being quite dissimilar. The porcelain is the least able to withstand the forces due to temperature changes and it is, consequently, the part that suffers and cracks, with the attendant electrical punctures ensuing.

Mr. Brundige describes the method of failure of a suspension insulator with metal cap and pin as follows: Cracks develop at some point inside of cap, and when the current leakage through them is sufficient a path is fused through the porcelain by the intense heat generated. If the heating takes place relatively slowly, a hole is apt to be fused through the cap, through which gases and melted porcelain are forcibly expelled, but the insulator usually holds together and continues to support the cable. With a large amount of power back of the break, which may act in the nature of a short circuit inside the insulator, caps have been known actually to explode, in which case the line conductor is allowed to fall. Before the burning of the caps can take place, it is necessary that several of the units of an insulator string be bad, and instances have been observed where all the caps of a ten-unit insulator have been so affected. Modern methods of locating faults, however, are resulting in the reduction of the number of pyrotechnic displays produced by such failures. The megger, an instrument successfully used for measuring high-resistance, is very useful in this kind of work. In a recent experiment, a batch of insulators were immersed in water at ordinary temperature and this was slowly brought up to the boiling point. Many insulators, some two or three years old, were tested in this manner and every one was found to be ruined by the time the boiling point was reached. Similar tests made on new insulators of the same design did not produce failures except in a few units The probable explanation of this is that in the new insulators the cement had not yet obtained its ultimate hardness, and allowed the expansion to take place in the pan without cracking the porcelain.

TROUBLES FROM LIGHTNING

In another appendix L. C. Nicholson discusses briefly the subject of the influence of a direct lightning stroke on a transmission line. While the whole subject is somewhat intangible, observation and inquiry lead to certain general conclusions. It is doubtful if any degree of insulation in use at present, with or without the ordinary protective measures, will withstand the effect of a direct stroke of lightning on the line. The electro-mechanical forces acting on the insulators in such a case are very great, usually causing them to explode. A direct stroke usually envelops all of the conductors of a line and sometimes several lines located relatively close together. This indicates that the area of the stroke is large, or that it has numerous prongs. Burn marks on conductors which were struck when there was no power on the line indicate a diameter of stroke of approximately 20 ft. This has an important bearing on the protection of line by overhead ground wires. Induced effects from strokes at some distance from a line may, on medium voltage lines, be great enough to show flashover or puncture of insulators. Mr. Nicholson's observations on the operation of 60,000-volt lines on pin-type insulators, unprotected by overhead wires, have led him to estimate the radial influence of direct strokes to be limited to 2000 ft. and in some cases to less than 100 ft. The range of the disturbance depends upon the severity of the strokes. In highly insulated lines the danger zone decreases substantially and in the most highly insulated ones at present it is probable that the large majority of induced effects are insulated and protected against, leaving only direct strokes on the line itself. The direct strokes constitute approximately 10 per cent of all lightning disturbances on the 60,000-volt pin-type circuits in New York State.

TRANSMISSION LINES IN THE FAR WEST

In outlining the subject of transmission-line problems in the West, P. N. Downing calls attention to the favorable climatic conditions of the Pacific Coast and particularly of California for high-tension power transmission. Except in the higher mountain districts there is practically no snow to contend with and there are but few places where lightning causes trouble. It is not common practice to install lightning-arrester equipment although some companies have done so. The horn-gap arrester with one side connected directly to the ground without resistance has, in many instances, been used to advantage more as a voltage-limiting device than as a lightning arrester. Ground wires are sometimes used but as there is so little trouble from lightning, engineers have not been able to decide whether or not there is any advantage in using them. Very seldom is an insulator punctured by lightning. This is possibly due to the fact that the high voltage dissipates itself over the surface of the insulators.

The greatest trouble on lines using the ordinary four-part, 14-in. pin-type insulators at voltages around 60,000 is due to leakage over the insulator. During the dry season, which lasts for about six months, dust and salt fogs accumulate on the insulators, particularly near the coast. The resulting leakage may eventually burn off the pole and sometimes the line wire without damaging the insulator. Nothing but cleaning the insulators seems to improve this condition. After the first heavy rain of the early winter the insulators are washed off and little trouble is experienced until they have again become covered with dirt. The best remedy for the trouble seems to be to tie the pins together electrically, but not to ground them. Grounding has produced unsatisfactory results because arcs are established between line wire and ground and these hold until the voltage drops sufficiently for them to be extinguished. In regulating the voltages on high-tension network, synchronous condensers are being used in a number of insulations with entire satisfaction.

The first high-voltage oil switches used on 60,000 volts were put into operation on the transmission lines in California. The same general type with slight modification is now used for 110,000-volt lines. In this switch the circuit is opened at two or four points, depending on the voltage and load carried. The contacts are made by rotating blades moving in horizontal planes. The separate oil containers for each leg of the circuit are insulated from each other and from the ground by means of porcelain bushings. In another successful design of switch a pantograph arrangement of links carrying a contact, and operating by a vertical movement of one corner of the pantograph, is used. This gives a break in a vertical plane. The principal weakness in these switches, which is common to all oil switches, is that under a heavy short circuit they will at times throw oil out of the container. Outdoor oil switches, either automatic or non-automatic, are being used very generally for branch lines, or for sectionalizing trunk lines. These are often operated by means of solenoids placed directly in the main lines. Such an arrangement does away with the use of current transformers, but the connection from movable plunger to relay must stand the entire voltage from line to ground. It is important to keep down the weight of the moving parts so as to insure the desired sensitiveness of the trip. Well-treated wooden rods have been used to make the connection from plunger to trip or relay, but they have caused some trouble from burning.

Mr. Downing confirms the statement made in other parts of the report in regard to the importance of supporting transformer windings so as to prevent injury and distortion from mechanical strain set up when short circuits occur. Some manufacturers have failed to give proper attention to this feature. Transformer designs have, however, more than kept pace with the art of long-distance transmission at high voltages.

OSCILLATIONS IN TRANSMISSION LINES

In another appendix G. Faccioli discusses the oscillations set up in transmission lines by switching. He calls attention to two kinds of oscillation which may occur. In one case inductance may be massed at one point of the circuit and capacity at another, when a dead line which acts practically as a condenser is connected to a generator which acts practically as an inductance, or when a line connected at one end to a step-down transformer is disconnected from the generating system. The other case is that of the distributed induction and capacity of part of a circuit, when a line is disconnected from a generator and the energy stored in it gradually dies out, changing from the electromagnetic form in the distributed inductance of the line to the electrostatic form in the distributed capacity of the line and vice versa. Such oscillations occur when an unloaded step-down transformer is disconnected from the line, its windings acting similarly to a line.

The oscillations described do not, in general, constitute a great danger to the circuit if the contact in the switch is made once, positively, for every switching operation. The case is different, however, if each switching operation is accompanied by an arc, so that the circuit is repeatedly closed and opened. Under this condition the pressure rises may become dangerous, and destructive cumulative oscillations may be set up in the apparatus.

In view of the danger of starting oscillations it is evident that high-tension switching, which has lately gained so much importance in the art, should be done very judiciously and only when necessary, unless special precautions are taken to avoid the disturbances resulting therefrom. As a rule, low-tension switching is preferable, as this avoids high-tension phenomena. In energizing a line, it is preferable to connect the line to the step-up transformer and then to connect, by low-tension switches, the line and transformer to the generator, rather than to connect the transformer to the generator and then to switch the line onto the high-tension winding of the transformer. It would be still better to connect the line and the step-up transformer and the generator together while the whole system is dead and then to bring it up gradually to full potential by the excitation of the generator. In causing disturbances fuses act similarly to switches, except that the former open under load, while switches are, as a rule, operated at approximately no load. The sudden interruption of large currents results in considerable over-tension, and this is the danger that usually accompanies the blowing of fuses.

PUBLIC SERVICE STICKER INVOICE

In his paper on storekeeping methods read before the Public Service section of the American Electric Railway Association, as noted elsewhere in this issue, Robert S. Inglehart made brief reference to the invoice used by the Public Service Railway. As this invoice differs from the "standard billhead" practice of other large companies, some details are given here.

Prior to 1903, the North Jersey Street Railway and the Consolidated Traction Company, now merged with the Public Service Railway, requested that all invoices be made out on their standard billheads. With the consolidation of this and other properties, however, a sticker for attachment to the supply company's invoice was adopted. This sticker contains spaces for the necessary checking notations, distribution of charges, etc., thus securing the uniform location which is one of the chief advantages of the standard billhead form. A short time ago, however, a committee of the Public Service Railway made a general inquiry as to the advisability of adopting a standard billhead form. The analyses of replies received from thirty-one correspondents showed the following arguments for and against the use of such a form:

ARGUMENTS FOR USE OF STANDARD FORM

(1) Permits greater neatness and uniformity in vouchering and filing, and economy of filing space.

(2) Facilitates checking, as the information required is furnished in the same location on every bill. Omissions in checking may thus be readily noted.

(3) Assures the appearance of requisition and order numbers on each invoice.

(4) Secures sufficient copies for all departments interested, thus saving the time and labor otherwise required in making copies.

ARGUMENTS AGAINST USE OF STANDARD FORM

(1) Cost of printing and mailing is prohibitive in large companies.

(2) Blanks are mislaid by shippers, causing delay in rendering bills.

(3) Some shippers refuse to use them on the ground of unsuitability. This refers particularly to dealers in standard commodities such as iron and steel, lumber, sand and gravel, where individual bill forms contain special rulings for use with various billing systems.

(4) Confusion may be caused in vouchering, on account of the similarity of forms. This may lead to the inclusion of bills from different parties in one voucher.

(5) Better notation will be given on individual forms regarding discounts, f.o.b. points, etc., and better-made bills will be received.

(6) Where bills are transferred from individual to standard form in the purchasing department, errors in copying are likely to occur.

(7) The point of origin cannot always be determined, namely, whether the bill has been prepared by the shipper or the purchasing department.

(8) Uniformity in location of notation, checking spaces, etc., may be had by the use of a rubber stamp.

(9) State, county and municipal offices, as well as public utility companies, insist on rendering bills on their own forms.

(10) If shippers give necessary information upon their own forms, no one has a right to ask them to depart from established practice.

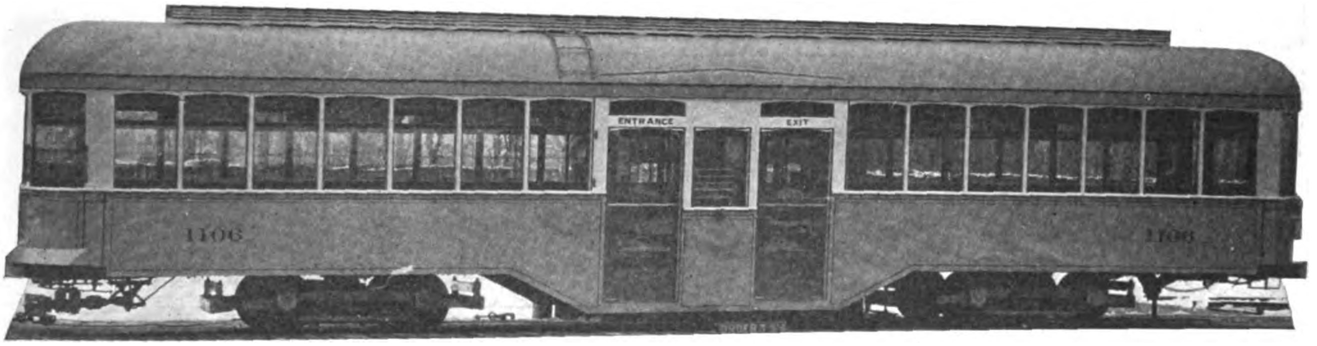
DECISION

Upon a review of all the conditions the committee recommended that the practice of sticker invoices be retained.

Cleveland Center-Entrance Motor Cars

This Article Describes One of the Cleveland Railway's Fifty New Center-Entrance Cars, Which Embody Novel Features in Underframe Design, Door Operation, Seating Arrangement and Lighting

Recently the Cleveland (Ohio) Railway added fifty new center-entrance motor cars to its equipment. Although these are not the first cars of the center-entrance type in Cleveland, they represent a marked departure from the center-entrance trail cars put in operation by this company in the fall of 1912. While the same effort was not made in designing these new cars to obtain a low floor in the seating space, attention was directed to the height of the first step from the pavement, which, as a result, was reduced from 15 in. to 12 11/16 in. The over-all length of these new cars is 2 ft. more than that of the trail cars, which additional length was not enough to provide for the motorman's cab in one end of the body, consequently the seating capacity was reduced from sixty-five passengers in the trail car to fifty-nine in the motor car. This reduction in seating may be accounted for by the additional width required in the entrance well because of the new arrangement of entrance and exit doors. The low step height from the top of the rail to the entrance well also made it necessary to provide two steps from the well to the car-floor level. These motor cars are to be operated either singly or in two-car trains, as they are provided with four motors of sufficient capacity to pull trailers. The principal dimensions of the new cars follow:



Cleveland Center-Entrance Car—Side View

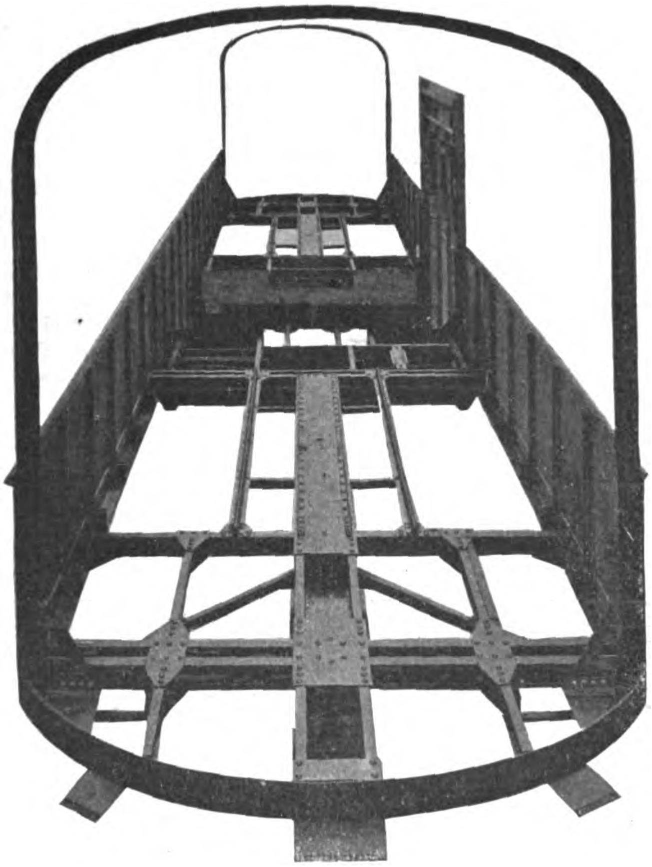
Length over all	51 ft.
Length of body	50 ft.
Truck centers	26 ft.
Wheelbase	5 ft. 6 in.
Step heights	12 1/16 in.; 12 in.; 7 5/16 in.
Floor to top rail	2 ft. 8 in.
Width over side plates	8 ft. 2 in.
Width over sash rail	8 ft. 4¾ in.
Height inside	8 ft.
Height at entrance	9 ft. 7 5/16 in.
Passengers seated, summer	59
Passengers seated, winter	58
Passengers standing	65
Standing room in entrance well	20
Wheel diameter	26 in.
Total weight of complete car	44,280 lb.

SIDE AND UNDERFRAME

The design provides for a single-end, center-entrance, low-step, arched-roof car body, built with an all-steel underframe and side girders, and a composite body and roof framing. The bottom framing is composed of two 5-in. x 3½-in. x 5/16-in. angles extending on both sides from corner post to corner post. The 3½-in. base of this angle supports fourteen transverse floor beams. These floor beams are riveted to the angle which forms the side sill by 3/16-in. gusset plates and to each other by a pair of 4-in., 5¼-lb. channels placed 12 in. out to out of flanges, and extend from the buffer to the point of offsetting the 5-in. x 3½-in. side sill. At this point the box girder center sill is replaced by eight 4-in., 5¼-lb. channels which are riveted to transverse channels. This construction in turn terminates at the edge of the entrance well in a 12-in., 20½-lb. transverse channel. The two 12-in. channels which form the edges of the entrance well are connected under the well floor by four 3-in., 4-lb. channels. Diagonal braces consisting of 2-in. x 2-in. x 3/16-in. angles set flange downward are riveted between the 4-in. transverse I-beams at the corner posts and the center sill at the next transverse floor beam. Four diagonal braces were also included in the two panels each side of the car-body bolster. These are formed of 3/16-in. x 4¾-in. plates fastened at one end to the transom 4-in. I-beams, and at the other to the center sill where it connects to the next transverse floor beam. These diagonals are bored for screws to fasten them securely to the wooden flooring. A valuable maintenance feature is the accessible arrangement of the power conduits.

The side framing up to the sash rail is formed of a plate girder extending around the entire car body from one side of the center-entrance doors to the other. The lower member of this girder is formed of the 5-in. x 3½-in. x 5/16-in. angle side sill, and the upper member is formed by a dropper bar weighing 5.4 lb. per foot, riveted to the outside of the plate girder. The web of this side girder is formed of 34-in. plate, re-rolled, double-pickled ⅛-in. sheet steel between corner posts, and that at the ends is formed of 34-in. No. 14 sheet steel. Forged steel pockets are provided along the base of the side girders as points to secure the body posts, which in turn are bolted to the legs of the stiffener angles.

Two built-up posts at the center-entrance end of the side girders form the framing around the doors. These are connected above the doors by a ⅛-in. plate reinforced by a 3-in., 5½-lb. I-beam, a 2½-in. x 1½-in. x 3/16-in. angle, and a 1¼-in. x 1½-in. x ⅛-in. angle. This plate is punched out over each door opening to form the sign pocket. The two door openings are provided with posts built up of two 3-in. x 2-in. x ¼-in. angles and ⅛-in. x 6¼-in. web plate riveted to the 2-in. legs. This web plate extends from the top of the bottom angle to the lower edge of the ⅛-in. plate over the doors. The post of the door pocket which is formed in the panel between the two door openings is built of two 1¼-in. x 1¼-in. x ⅛-in. angles riveted to a ⅛-in. steel web plate. This web plate extends from the top of the 5-in. leg of the lower angle of the girder to the ⅛-in. plate over the doors.



Cleveland Center-Entrance Car—Steel Under and Side Frame Without Body Bolsters in Place

BOLSTER AND BODY CONSTRUCTION

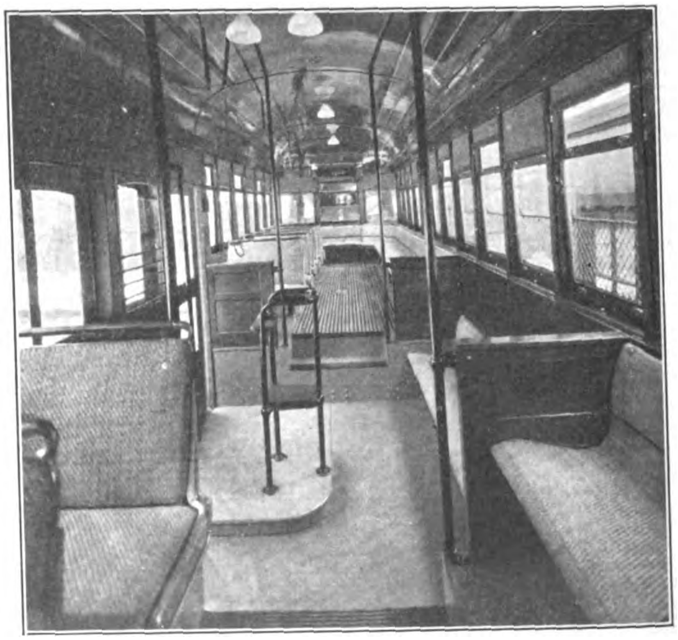
The body bolsters of these new cars are of special design, and are built up of two pressed-steel plate channels to form the web members to which the top and bottom cover plates are securely riveted. The channels are formed of ½-in. steel plates with holes punched from the webs to reduce the weight. The top and bottom plates are ⅜ in. thick and 9 in. wide. To facilitate the removal of the bolster in case repairs are necessary it is attached to the 5-in. x 3½-in. x 5/16-in. angles forming the side sill by means of a bracket forged from a ¾-in. x 9-in. steel plate. This is riveted to the bolster proper and bolted to the side girder angles with two ¾-in. machine bolts. The top plate of the center sill is made continuous over the bolster and bolted to it, and the bottom plate is bent to conform to the forged bracket, and the ¾-in. bolts at the side girder also pass through it. The top member of this bolster is fitted with wide side-bearing segments formed of ½-in. x 4-in. plates bent to an inner edge radius of 25 in. and a chord distance of 23 in. Braces formed of ½-in. x 2-in. steel plates extend from the upper flange of the bolster to points near the end of the side bearing plates, being bolted thereto and riveted to the bolster proper.

At each end of the side girders which terminate at the corner posts the latter are made continuous across the car, forming both corner posts and roof carlines. They are formed of two 2-in. x 2-in. x 3/16-in. angles, finished over with wood so that no metal is exposed to the interior surface of the car. The intermediate posts are of kiln-dried white ash, 1¾ in. x 3¼ in. in section. To the tops of these wooden posts the pressed steel carlines are bolted, and two intermediate elm rafters are placed between each two steel carlines. As shown in the illustrations, the roof is of the plain arch type, extending the full length of the car.

The Scullin method of ventilation, adopted as standard by the Cleveland Railway on all plain arch-roof cars, is also used on the present equipment. A small ventilating louver, running the full length of car body, is supported on aluminum brackets with louvers at the side, allowing air currents to play through the louvers from all directions, creating a vacuum over ducts coming up through roofs under the small ventilating louver deck. The brackets are reinforced at the place where the trolley stand and base are supported. Thirteen ducts leading from the inside of the car to the roof under the ventilating louver are covered on the underside of the headlining by neat polished bronze registers. These roof openings are placed in the center of the ceiling, running longitudinally. With this system it is impossible for snow, sleet or rain to reach the interior of the car.

Eighteen windows are provided on the devil-strip side of the car body and fourteen on the entrance side. These, as well as the three windows in the rear end of the car and the two windows in the motorman's cab, are single sashes arranged to drop into pockets between the window posts. All sashes are made ⅝ in. thick with brass stiles and cherry rails.

The entrance and exit doors at the center of the car are built of 1-in. solid cherry with two glass panels and brass wearing strips. These doors are equipped with ball-bearing door hangers and operated electro-pneumatically by a push button set in the fare box stand convenient to the conductor. As shown in the accompanying illustrations, these doors slide into parallel pockets provided in the panel between them.

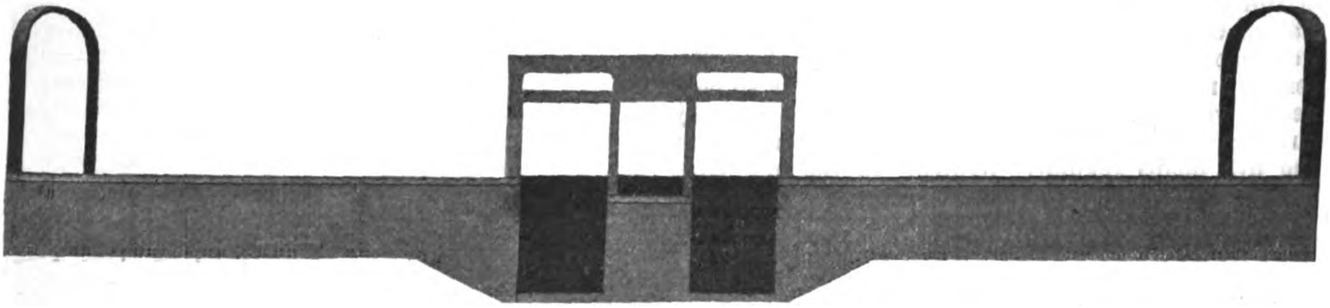


Cleveland Center-Entrance Car—Interior View, Showing Entrance Well

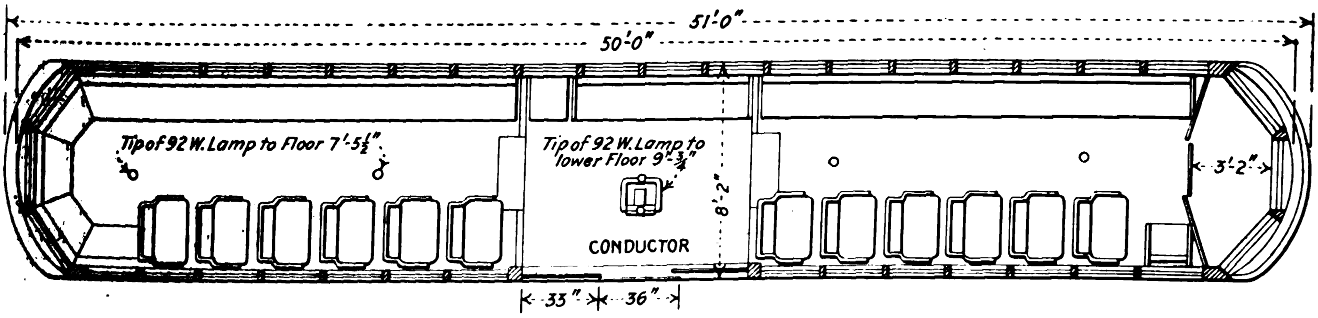
A natural red-cherry wood finish, slightly stained to insure a uniform color, was used in all interior paneling and moldings. The latter are free of all corners liable to collect dust and dirt. The ceiling is formed of 3/16-in. thick agasote in three longitudinal sections and five transverse sections.

INTERIOR ARRANGEMENT AND FITTINGS

As mentioned earlier in the article, this car was designed for single-end operation, consequently the rear vestibule was available for seating space at all times, and the motorman's cab is permanently in the front vestibule. The cab occupies a maximum width of 3 ft. 2 in. The seating arrangement for passengers is somewhat different from that in general use, being a combination of cross and longitudinal seats similar to that used on some other types of cars in Cleveland. The cross seats have pressed-steel pedestals. As shown on the seating plan, six cross seats occupy each end of the car body with longitudinal seats circling the rear vestibule and extending the full length of the devil-strip side of the car. The location of the conductor's stand in the entrance well made it possible to utilize the opposite side of the car at this point for seating space. A longitudinal seat has been installed in the well with a removable panel at one end to provide for the forced hot-air heater during the winter months. By this arrangement a maximum seated load of fifty-nine passengers was obtained with a total standing load of 144 passengers. In order to improve conditions for standing passengers, a continuous hand rail supported in brackets 5 ft. 11 in. above the car floor was provided for the full length of the car on the longitudinal seat side. Pipe stanchions were also provided on each side of the aisle, at the break between the car-body floor level and the entrance well.



Cleveland Center-Entrance Car—Side View of Steel Under and Side Framing for Car with Center-Entrance Openings on One Side Only and Continuous Girder on Devil-Strip Side


51'-0"
50'-0"
Tip of 92 W. Lamp to Floor 7'-5½"
Tip of 92 W. Lamp to lower Floor 9'-¾"
8'-2"
3'-2"
CONDUCTOR
33"
36"
SEATING PLAN

Cleveland Center-Entrance Car—Plan Showing Combination of Longitudinal and Cross Seating, Motorman's Cab at One End Only, Position of Conductor and Location of High-Capacity Tungsten Lamps with Reflectors

FARE COLLECTION

At the time the mechanical department was considering the design of these cars this company had already adopted the method of fare collection in which a combination pay-as-you-enter, pay-as-you-leave principle was used. In the center-entrance trail car, however, the conductor stood opposite the center-entrance doors in the center of the car body; hence he not only blocked the center aisle but it was also necessary that he stand with his back to one end of the car. In these new motor cars the conductor stands with his back to the panel between the center-entrance doors, which not only permits him to clear the entrance aisle but to observe passengers in both ends of the car body. In operating this car with the combination system of fare collection, the conductor collects fares from passengers entering one end of the car pay-as-you-enter, and the pay-as-you-leave principle is applied when passengers leave the opposite end of the car. The conductor's stand is mounted on a slightly elevated platform which not only protects him from the accumulations of snow and moisture in the entrance well during bad weather but also against passengers crowding him away from his station. This method of fare collection was adopted in order to relieve congestion in the downtown district during the evening rush hours, and after more than a year's operation it has been found to work quite satisfactorily.

HEATING

As mentioned earlier in the article, the Peter Smith Heater Company's forced hot-air heater system was used in these new cars. The combination longitudinal and cross-seat seating arrangement was found to be more advantageous for use with this type of heater than with cross seats throughout. The longitudinal seats permitted the heater duct to be supported under them, and the duct is so designed in section that the registers direct the hot-air current at an angle of 45 deg. to the floor level. About the only difficulty experienced in installing the heating system was the difference in the elevation of the two ducts leading from the heater to each end of the car body. Inasmuch as the heater was installed at one side of the entrance well, the hot-air duct leading from one side of the heater was taken off at the correct elevation. The duct on the opposite side of the heater, however, had to be taken off at an elevation which would permit it to be installed under the longitudinal seats in the entrance well and then offset sufficiently to elevate it to a position under the seats in the car body proper.

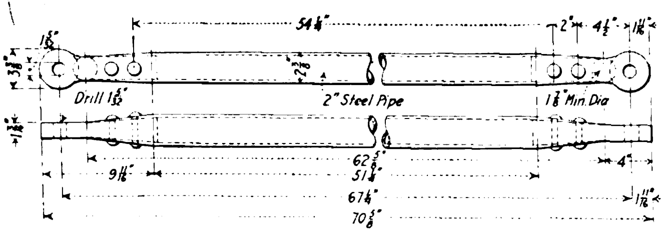
CAR LIGHTING AND SIGNAL SYSTEM

The system of illuminating these new cars was adopted as a result of an exhaustive test in car illumination made by the Cleveland Railway during 1911 and 1912, the results of which were published in the ELECTRIC RAILWAY JOURNAL for Aug. 2, 1913. In this test the illuminating system which gave the highest efficiency was furnished by five 100-watt Mazda lamps in Holophane, satin-finish reflectors mounted in special shade holders. These lamps were in series and were mounted on the upper deck ceiling along the center line of the car, and a spare lamp was so connected with a selector switch that it could be instantly cut into the circuit in case of failure of any one of the five lamps regularly lighted. In the new cars, however, 92-watt lamps securely fastened in electric pendants and provided with deep Alba reflectors were installed. Five of these lamps were spaced uniformly along the center line of the car ceiling with the spare lamp beside the one over the entrance well. The selector switch was placed in the panel just back of the conductor's stand. All light wiring was installed in flexible loom which passes through the steel carlins between the headlining and the roof sheathing.

In addition to the usual buzzer system installed with push buttons at convenient locations on the posts between the windows, a Consolidated Car Heating Company's light signal system was provided. The signal circuits were so arranged that the signal lamps in the motorman's cab will indicate the position of the center-entrance doors as well as show the signals operated by means of the conductor's push button. Both the signal and lighting systems were also arranged for trailer operation, a coupler socket and drum switch being provided just inside the rear buffer.

BRAKE APPARATUS, MOTORS AND TRUCKS

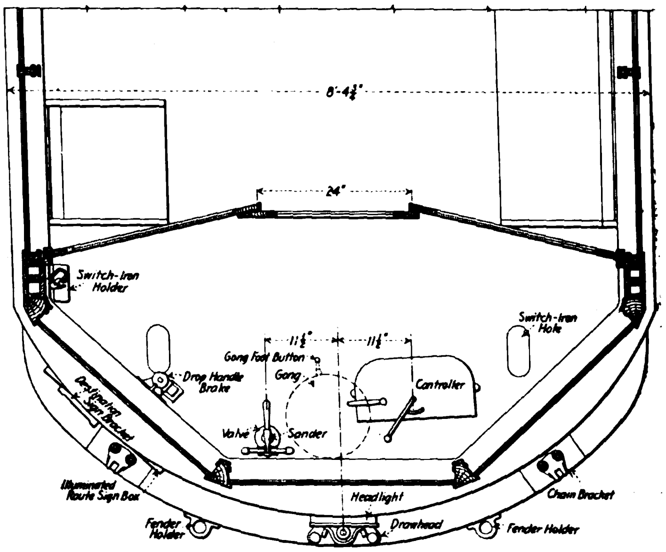
The brake apparatus of these center-entrance motor cars is novel in that two 8-in. x 8-in. air cylinders were employed, one operating the brakes on each truck, although the hand brake operates both trucks. A single lever having equal arms was used with one end connected to the push rod of the cylinder and the other end to the truck brake pull rod. The two cylinders were in turn connected by an air pipe to insure uniform pressure on both pistons and consequently equal brake power on both trucks. The brake cylinders were placed horizontally against the large 12-in. channels each side of the center-entrance well and were hung from the steel underframing in forged-steel stirrups.



Cleveland Center-Entrance Car—Coupler

A hand-brake system including the usual drop-handle brake staff was installed on the step side of the motorman's cab. The hand-brake rod was hung below the step side and side sill and extended to a long lever operating in a horizontal plane and placed just in front of the center-entrance well. The other end of this lever was connected in turn to an extension of the forward lever of the air-brake apparatus by a slotted link. From this connection a cable was carried under the center-entrance well and connected to the pull rod of the rear truck brake.

A commutating-pole type motor designated as No. 340, made according to special designs by the Westinghouse Electric & Manufacturing Company and having the following characteristics, was adopted: 40 hp on one-hour rating; gear ratio, 15/57, and to operate on 26-in. wheels. It was the aim of the railway and the manufacturers to produce a motor having the same operating characteristics as the 101-B but which could be adapted to a 26-in. wheel. This was accomplished in a large measure by the co-operation of the railway company and the Westinghouse engineers, and a very satisfactory type of motor resulted without sacrificing any of the properties of the older type.



Cleveland Center-Entrance Car—Plan of Platform

Trucks of special design, No. 51-E, were furnished by The J. G. Brill Company. They were constructed to be equipped with two motors each and to operate with 26-in. one-wear rolled-steel wheels on axles of 4½ in. diameter at the motor bearings and 5-in. diameter at the gear seat, and with the railway's standard 3¾-in. x 8-in. journals. Roller side bearings and ball center bearings were also included. The wheelbase of the truck is 4 ft. 10 in., and the height from the rail to the top of the complete center plate is 21 in., with the car body in place.

These cars were designed by the mechanical department of the Cleveland Railway, under the supervision of Terrance Scullin, master mechanic, and were built by the Kuhlman Car Company, Cleveland, Ohio.

The fifth annual dinner of the civil, mechanical and electrical engineers at Boston will be held on the evening of March 4 at the City Club, the principal speakers scheduled being as follows: Guy E. Tripp, chairman of the board Westinghouse Electric & Manufacturing Company, on "The National Government and Business"; Dr. A. E. Kennelly, professor of electrical engineering at Harvard University, on "Results for the Electrical Fraternity Accomplished by the International Electrical Congress," and Dr. M. W. Franklin, on "Ozone Applied to Ventilation." N. J. Neall, Boston, is chairman of the committee on arrangements, Harold G. Payne, 12 Pearl Street, Boston, being in charge of tickets.

A. E. R. A. Section Meeting at Newark

At the Public Service Railway's Meeting Held in Newark, N. J., Feb. 19, Robert S. Inglehart Read a Paper on "Keeping the Company Department Store" and James H. McGraw Made an Address on "Organization and Teamwork"

The regular meeting of the Public Service Railway Company's section of the American Electric Railway Association was held at Newark, N. J., Thursday evening, Feb. 19. The business consisted of a paper on "Keeping the Company Department Store," by Robert S. Inglehart, general storekeeper Public Service Railway, and an address on "Organization and Teamwork," by James H. McGraw, president McGraw Publishing Company. In accordance with the practice of this section, written discussion on the technical paper of the evening was presented by two other employees of the company, George J. Newton, assistant purchasing agent, and William J. Hughes, traveling auditor, in addition to the impromptu discussion. About 160 men were in attendance despite the unusually bad weather.

KEEPING THE COMPANY DEPARTMENT STORE

The meeting opened with the paper by Mr. Inglehart, who said that in the early days of electric railways each department had its own store and the supplies were bought in small quantities as required. This method, of course, proved expensive, as it necessitated separate office forces and delivery systems. About four years ago the Public Service Railway centralized its line, mechanical and stationery supplies under one roof and arranged for their distribution by the supply cars.

On the Northern division of the Public Service Railway two points were used for receiving all supplies and materials, namely, the general storeroom at the Plank Road shops, Newark, for all car and line department supplies and for the stationery used by the railway, gas and electric companies of the Public Service Corporation, and the Passaic wharf storeroom, about 1 mile distant from the Plank Road shops, for all maintenance of way and building supplies. On the Southern division all supplies were received at a storeroom in Camden.

ORGANIZATION OF STORES DEPARTMENT—REPLENISHING STOCK

The organization of the stores department comprised twenty-five men in the mechanical, line and stationery store department in addition to five men in the way department storeroom. This included two men for each of the three supply cars. All storehouse bins were arranged in racks, each rack holding a certain class of material. As the stock ledger showed the number of the rack, as well as the number of the lot, even a person unfamiliar with the storeroom could locate any of approximately 12,000 items merely by reference to the stock ledger.

When replenishment was necessary the stock clerks filled out a storeroom stock memorandum form with a description of the article, quantity on hand and lot number. This form was turned over to a ledger clerk, who indicated on it in red ink the quantity on hand as shown by the ledger. If the ledger account did not agree with the stock clerk's record, the material in the bin was counted again and the ledger re-checked to account for the difference. By this method a perpetual inventory was kept of all active materials so that large discrepancies were not found when the annual inventory was taken.

The stock memorandum form was then given to the general storekeeper, who filled in the amount required to be ordered, and requisition on the purchasing agent was issued accordingly. While it was the policy of the company to keep the stock on hand as low as was consistent with efficient operation, this practice was not permitted to interfere with the purchase of supplies from time to time under favorable market conditions. A maximum quantity had been placed on each stock article, and this information as well as the stock on hand and quantity required was shown on all requisitions issued on the purchasing agent. These data enabled the head of the department to keep posted on the condition of the stock for which he was approving an order for additional supplies.

After the requisition had been signed by the storekeeper, he forwarded it to the head of the department for which the material was wanted. The requisition was then sent to the general manager for approval before going to the purchasing agent.

All requisitions issued by the storekeeper at Camden were forwarded to the general storekeeper in order that the small quantities used at Camden might be supplied from the general storeroom if this could be done to advantage. If the general storekeeper could not furnish the materials, he approved the requisition and forwarded it to the general manager.

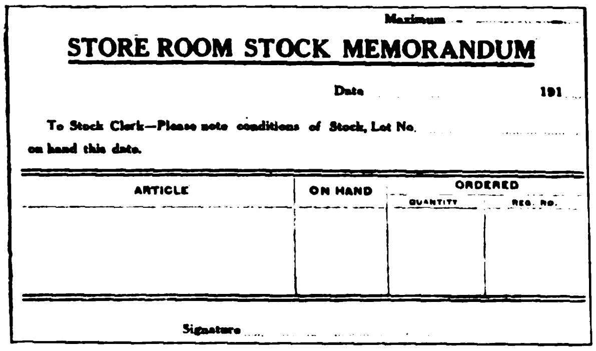
After the original copy of the requisition was approved by the general manager it was sent to the purchasing agent, the duplicate being retained by the general manager and the triplicate and quadruplicate by the storeroom. One of the latter two copies was placed in a numerical file and the other in an alphabetical file according to the class of material ordered. Upon receipt of the original copy, the purchasing agent issued an order for the required material and sent copies of the same to the general manager, the general auditor and the storekeeper. The number of the order was placed on the storeroom copies of the requisition, the alphabetical file copy of the requisition was given to the receiving clerk, and the other copy was kept in the storekeeper's file under the date upon which the material was required. If the material was not received on time, the storekeeper requested the purchasing agent to notify the firm upon which the order was issued to hasten the delivery.

RECEIPT OF MATERIAL, TESTING, ETC.

A large percentage of the supplies received at Passaic wharf arrived in carload lots, while only a comparatively small percentage of supplies arrived at the general storeroom in this manner. Many shipments were received daily at the different freight houses in Newark and were carted to the storerooms.

Certain supplies, such as babbitt metal, composition castings, paints, solder, etc., required analysis before they could be turned into stock. For instance, the babbitt metal specifications called for a composition of 83⅓ per cent tin, 8⅓ per cent copper and 8⅓ per cent antimony. An average sample was taken at random from the delivery received and was sent to the chemist for analysis. If the analysis showed a variation of more than 1 per cent from the proportions specified, it was considered sufficient cause to prompt the cancellation of the order with return of the complete shipment.

When the materials were received at the storerooms the receiving clerks weighed, counted or measured them as the case might be. An entry was then made in the receiving book, which was of loose-leaf form to provide a complete record for future reference. This form showed the shipper of the material, with a complete description of the material, the date of arrival and order number, the quantity or weight and how delivered, whether by freight, express, truck, messenger or parcel post; also if any transportation charges were paid. This form was standard for all storerooms. The receiving clerk after checking and entering the materials turned them over to the stock clerk, who placed them under the proper lot numbers.


Maximum
STORE ROOM STOCK MEMORANDUM
Date 191
To Stock Clerk—Please note conditions of Stock, Lot No.
on hand this date.

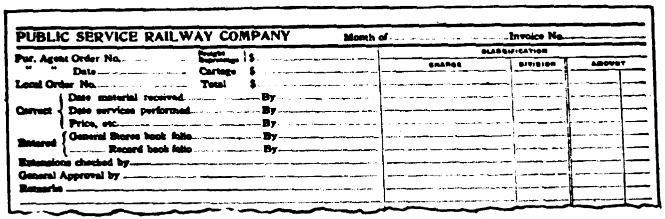
ARTICLE	ON HAND	ORDERED	
		QUANTITY	REQ. NO.

Signature

Public Service Storekeeping—Storeroom Stock Memorandum

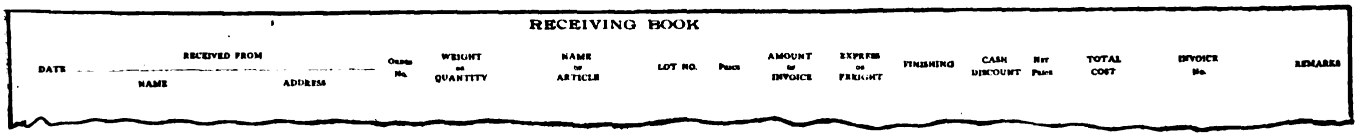
CHECKING THE SHIPPERS' INVOICES

Shippers were required to forward their invoices direct to the purchasing department. All invoices must contain the order number. The invoices were checked with the order by the purchasing agent, who certified to the same as to price, quantity and other particulars. He attached to the invoice one of the company's standard sticker invoice forms,* noting thereon the terms of purchase as well as his approval, and forwarded all invoices to the general auditor to be checked with his records. The invoice passed through the same process in the accounting department and was forwarded to the general storekeeper for his certification. Many of the company's purchases were subject to cash discounts, and invoices for such purchases received preference in all departments over regular invoices. When invoices were received from the accounting department they were checked with the receiving book record, proper entries were made and were noted therein. All invoices were approved by the storekeepers and the head of the department for which the material had been ordered and were then forwarded to the general auditor for payment. The bill clerk before entering the quantity and price on stock ledgers first checked the extensions and discounts. When there was an error on the bill the general auditor was notified by the storekeepers.


PUBLIC SERVICE RAILWAY COMPANY Month of Invoice No.
Pur. Agent Order No. Freight Expressage $
" " Date Cartage $
Local Order No. Total $
Correct { Date material received By
Date services performed By
Price, etc. By
Entered { General Stores book folio By
Record book folio By
Extensions checked by
General Approval by
Remarks

CLASSIFICATION		
CHARGE	DIVISION	AMOUNT

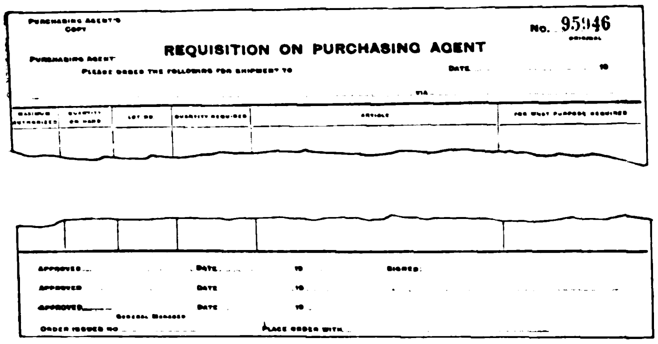
Public Service Storekeeping—Sticker Type Invoice Form


RECEIVING BOOK

DATE	RECEIVED FROM NAME	ADDRESS	ORDER No.	WEIGHT or QUANTITY	NAME of ARTICLE	LOT NO.	PRICE	AMOUNT of INVOICE	EXPRESS or FREIGHT	FINISHING	CASH DISCOUNT	NET PRICE	TOTAL COST	INVOICE No.	REMARKS

Public Service Storekeeping—Headings of Receiving Book

If material received by the stores department was not satisfactory for any reason or was not in accordance with the specifications, the purchasing agent was notified and requested to advise shipping instructions for its return. When material was returned for any reason a return purchase form was made out and sent to the general auditor, charging the firm with the value of the material returned. Frequently firms would ship in excess of the quantity specified on the order. When this occurred the overshipment was returned to the shipper unless it could be used to advantage.

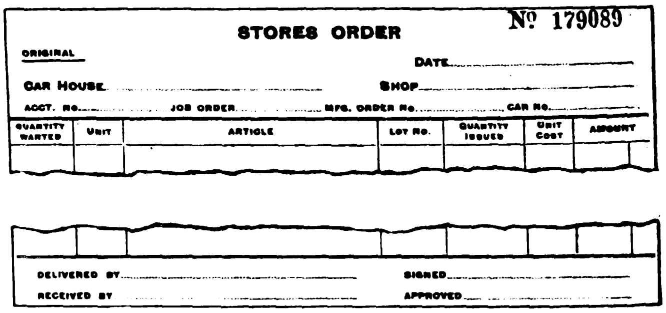

PURCHASING AGENT'S COPY
No. 95946
ORIGINAL
REQUISITION ON PURCHASING AGENT
PURCHASING AGENT
PLEASE ORDER THE FOLLOWING FOR SHIPMENT TO DATE 19
VIA

MAXIMUM AUTHORIZED	QUANTITY ON HAND	LOT NO.	QUANTITY REQUIRED	ARTICLE	FOR WHAT PURPOSE REQUIRED

APPROVED DATE 19 SIGNED:
APPROVED DATE 19
APPROVED DATE 19
GENERAL MANAGER
ORDER ISSUED NO PLACE ORDER WITH

Public Service Storekeeping—Requisition on Purchasing Agent Made by Storekeeper

A loose-leaf stock sheet was used as a stores ledger. This showed the lot number, rack number, description of materials and maximum amount authorized. It provided for the date, statement of quantity on hand on the last day of the preceding month, the amount received on requisition during the month, the total and the amount consumed by day and month for the current year. As both sides of the sheet were used in the same manner, each ledger lasted two years.


STORES ORDER
№ 179089
ORIGINAL
DATE
CAR HOUSE SHOP
ACCT. NO. JOB ORDER MFG. ORDER NO. CAR NO.

QUANTITY WANTED	UNIT	ARTICLE	LOT NO.	QUANTITY ISSUED	UNIT COST	AMOUNT

DELIVERED BY SIGNED
RECEIVED BY APPROVED

Public Service Storekeeping—Stores Order Used by Way Department and Shops

DRAWING MATERIALS FROM STOCK

Three different forms were used by different departments when they desired to draw materials from stock, namely, stores orders, requisition on storekeeper and the material and time report. All of these served the same purpose so far as the stores department was concerned. The maintenance of way department, Plank Road car shops and Camden shops used the stores order. The carhouses of the Northern division used the requisition on the storekeeper, while the line department used the material and time report.

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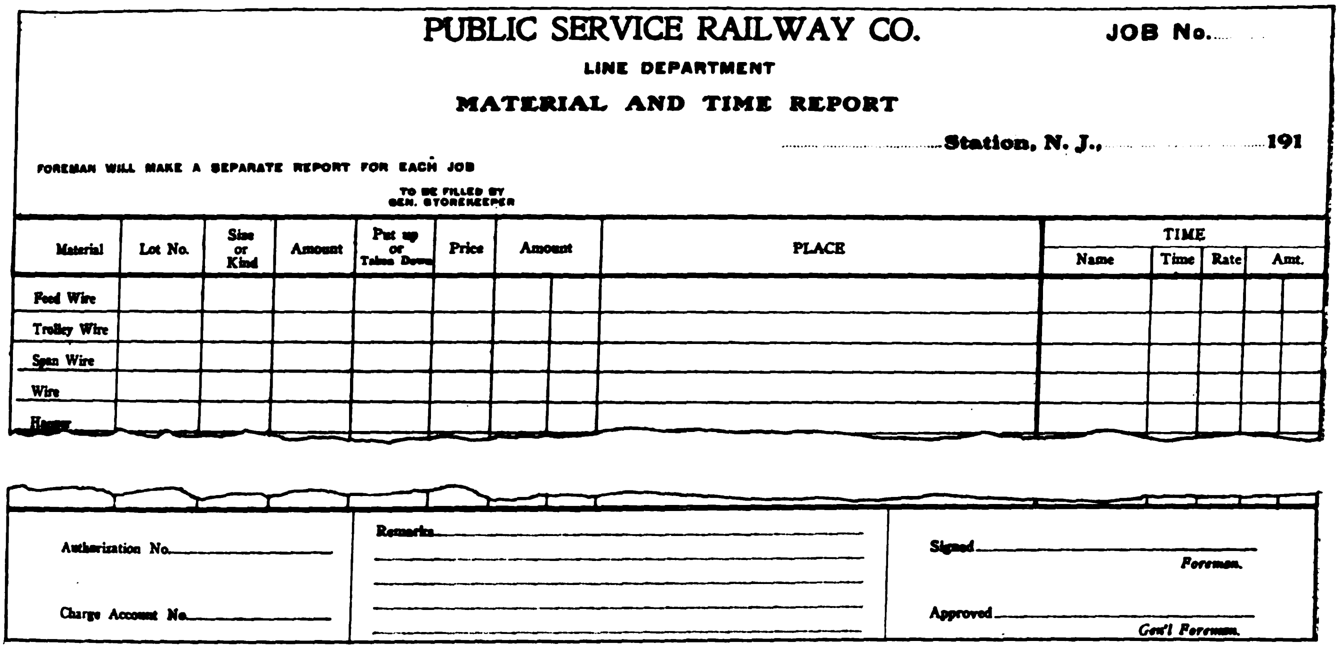
*See article on "Public Service Sticker Invoice," page 454.



PUBLIC SERVICE RAILWAY CO. JOB No.

LINE DEPARTMENT

MATERIAL AND TIME REPORT

Station, N. J., 191

FOREMAN WILL MAKE A SEPARATE REPORT FOR EACH JOB

TO BE FILLED BY GEN. STOREKEEPER

Material	Lot No.	Size or Kind	Amount	Put up or Taken Down	Price	Amount	PLACE	TIME			
								Name	Time	Rate	Amt.
Feed Wire											
Trolley Wire											
Span Wire											
Wire											
Hanger											

Authorization No.

Charge Account No.

Remarks

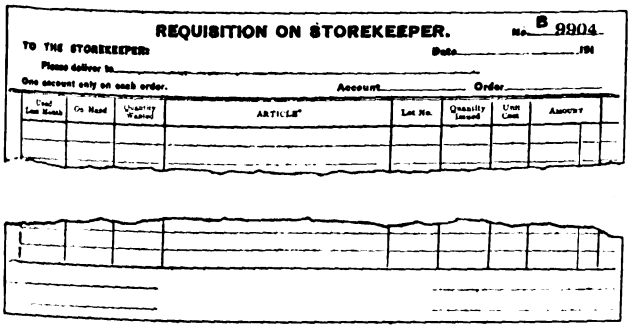
Signed Foreman.

Approved Gen'l Foreman.

Public Service Storekeeping—Form Used by Line Department in Drawing Materials from Stock

Stores orders were signed by the foreman of the department that required the material. These were made out in duplicate, one of which was kept by the storeroom, while the other was sent to the accounting department. These forms showed the number of the car upon which the material was to be used, the job number and the number of the account to which the cost would be charged. They also showed the quantity required, the unit cost, the name of the article, the lot number and the amount. The order was initialed by both the storeroom employee who delivered the material and the employee of the department who received the material.

Requisitions on the storekeeper were signed by the carhouse foreman and had to be approved by the head of the department before they were honored. These were made out in triplicate; the original was kept in the storeroom, the duplicate (manifest) was forwarded to the general auditor, and the triplicate was retained by the division foreman. These forms showed the quantity used during the last month, the quantity on hand, the quantity required, the lot number, the unit cost and the amount. This requisition was initialed by the storeroom employee who made up the order and the motorman of the supply car. The foreman at the carhouse was obliged to receipt in full for the material which he received.



REQUISITION ON STOREKEEPER. No. B 9904

TO THE STOREKEEPER: Date 191

Please deliver to

One account only on each order. Account Order

Used Last Month	On Hand	Quantity Wanted	ARTICLE	Lot No.	Quantity Issued	Unit Cost	Amount

Public Service Storekeeping—Requisition Used by Carhouses of Northern Division

The material and time reports were used only by the line department and they were signed by the division general foreman. These forms showed the kind of material, lot number, quantity used, unit cost, amount and job number. They were required in reporting and charging out of stock the materials used from the various line department sub-storerooms.

SUPPLY CAR SERVICE

The supply cars used for delivering materials were operated on schedule and covered the carhouses of the Northern division each week. The larger carhouses received supplies from the storerooms twice a week, while the smaller ones received one delivery a week. The car arrived at the different carhouses on the same days each week, thus enabling the carhouse foreman and supervisor to arrange to have his requisitions reach the storeroom in ample time to provide for delivery by the next car.

All supplies were checked by the stock clerk before they were loaded on the car each afternoon. When the car was loaded it was locked and left for the motorman and his helper, who took the car out at 7 o'clock on the following morning.

The equipment for handling maintenance of way supplies consisted of thirty cars, including three derrick cars, one engine and one crane car. The supply-car motorman after delivering supplies left the receipts at the storeroom office, after which they were given to the stock ledger clerk, who entered on stock ledgers the quantities delivered. The orders were then priced, extended and rechecked, separated into the different departments, totaled each day and forwarded to the general auditor.

In addition to the regular monthly check of value of materials on hand compared with balances shown on the company's general ledger, the storekeeping department was subject to monthly visits of the traveling auditor, who followed the practice of counting materials in a number of bins, selected at random, and comparing his count with the number on hand as shown by the stock ledger.

DISCUSSION ON STOREKEEPING

Mr. Newton said that the purchasing department applied the system of competitive bidding wherever possible. Estimates were sent in by different manufacturers, these were carefully compared and the order was placed with the lowest bidder. The important element of quality was taken care of in most cases by standardization, or else it was an element which, with prices, was considered in placing the order. Materials like solder, babbitt and composition castings were purchased under the company's own formula, and estimates were submitted with that formula as a criterion. The same plan was followed with printing. The size, weight and quality of the paper had been standardized, after approval by the department heads, so that all printing could now be ordered under specifications. Formerly, much annoying delay was caused by the fact that printers would submit samples of stock with their estimates, and these in turn had to be submitted to the makers of the requisitions. With the standardization of paper stock, however, this source of delay had been eliminated.

A great saving had been effected by advising storekeepers of prospective advances in prices on materials subject to constant market fluctuations, such as turpentine, linseed oil, sponges, nuts, screws, elastic bands, switch rubbers, etc., which were purchased in very large quantities. If an advance in price seemed likely, the storekeepers were advised to requisition, and the orders were placed with the manufacturer who held the material in reserve for the company to draw upon at intervals. By this arrangement the purchasing department was in accord with the company policy of keeping supplies on hand as low as consistent with efficient operation, but at the same time economical purchasing was secured.

In presenting his written discussion Mr. Hughes referred to Mr. Inglehart's description of the course taken by an invoice passing through the storeroom records until it reached the "material and supplies" account. Each month a list of these invoices was prepared and forwarded to the storekeepers for checking in order that no items might be charged on the general books to "material and supplies" account without the knowledge of the storekeepers.

Frequently material was received in advance of the invoice, and if it had to be used at once the charge made was at the last price shown on the stock ledger. If the price on the invoice proved either higher or lower than this charge, an adjustment of prices was made accordingly.

When the storekeeper required for stock materials that could be manufactured more cheaply at the shop than they could be purchased elsewhere, he issued a manufacturing order which showed the order number, quantity on hand, number wanted, lot number, specifications, whether the raw material needed in manufacture was in stock or ordered and any other essential information. All expenditures for labor and material required in manufacture were charged to the order. When the order was finished a complete report in triplicate form was prepared in the shop, one copy for the accounting department, one for the storekeeper and one for the file. This report showed the number of articles manufactured, the cost divided between labor and material and the date of completion. The accounting department's copy of the completed report was sent through the storekeeper, who entered the cost on his records and forwarded them like an invoice. This report also passed through the accounting department just like an invoice, except that instead of an actual cash disbursement the cost of the materials manufactured was transferred from the "goods in process" account to the "materials and supplies" account after the completion of the order.

When the storekeeper sent certain classes of materials to a carhouse he looked for the return of a like amount of old materials. If it was possible to repair the old materials for future use, the storekeeper charged his account with a fixed sum and credited with a like amount the carhouse from which they had been returned. The storekeeper then issued a repair order on the shop which was somewhat similar to the form of manufacturing order. Charge was made against the repair order with the value of material previously charged against the storekeeper's account and credit was given his account for the same amount as in the case of a manufacturing order. All expenses for labor and material for such repairs were charged to the order and credit was given for any salvage recovered.

Another interesting feature of the railway method of stores accounting was in the monthly distribution report. This report was compiled in the accounting department from the stores orders and manifests received by the storekeeper for materials delivered. These were forwarded daily to the accounting department. The individual amounts shown as to the value of materials delivered on stores orders and manifests were tabulated on the adding machine by the storekeeper and the stores orders and manifests were compared with the adding machine list when received in the accounting department. A receipt was signed and returned to the storekeeper for the total amount which the stores orders and manifests represented. The accounting department verified the extension and examined the classifications to see that the proper account had been charged s well as the correct job order number. Distribution of the expenses and analysis of same were then made on a Hollerith machine. On Friday of each week a report was forwarded to the mechanical engineer showing a distribution of his expenses between labor and material for the week ending on the day previous. These reports were used by him as a guide to enable him to determine whether or not economies could be effected.

ORGANIZATION AND TEAMWORK

Mr. McGraw then addressed the meeting on "Organization and Teamwork." He first discussed the importance of the A. E. R. A. section movement and complimented the company on its progressiveness in demonstrating the great possibilities for good that lie in section work. The Public Service Railway was a great organization, one of the best ever developed. It had the confidence of the electric railway industry throughout the country. It was looked to as a leader in the development of the highest ideals in public service work. It stood fully committed to the best possible service to its public with the lowest possible rate of fare, and it had won the good will of its public to an unusual degree even in these times of an extraordinary public criticism throughout the country. Under these circumstances it seemed almost presumptuous to attempt to talk to officers and men of the Public Service Railway on the subject of organization and teamwork. He realized, however, that this was a company section meeting made up of a body of the younger men, the juniors, so to say; that this was the gathering place or forum where young men could come to the front to express themselves in writing and to discuss and debate important questions of their own work for the development of the best that was in them.

One great reason for lack of man development was this: Nineteen out of twenty young men (and even a good proportion of older men) were inherently better than their work would indicate. The trouble was that they were satisfied with less than their best. Their limitations were in the forefront instead of being absorbed by their work. They failed to make the effort to live up to the best that was in them. They shirked responsibility without knowing it. This attitude became a habit of mind which shut them out from assuming their share of the load. The man himself might not be aware of it, but the boss was if he was a student of human nature as most bosses must be. What happened? Jones was passed over in favor of the other fellow, perhaps his junior, while Jones sat and wondered why. He had forgotten the homely little ditty that says:

"So you think there is no place waiting for you;
That the boys are too many and the jobs are too few.
Just a word in your ear: By the time you prepare
To hold down a good job the job will be there!"

Daily incidents like this illustrated the need for just the kind of work that was being done by the company section. It was teaching Jones and all of its other members to do independent thinking and also to do things as well as to think them. It was teaching them how to open their own eyes to their own limitations and possibilities in order that they might be able to carry their full share of responsibilities. In short, it was teaching them how to be motors, not trailers.

THE SHIP THAT FOUND HERSELF

As a happy instance of the meaning of organization Mr. McGraw quoted Kipling's story of the ship that found herself. When the ship started on her maiden voyage the frame, the plate, the engine, the crew and other parts each bragged that it alone was the ship, the burden of their solos being, "I am the ship." But with the first storm each part discovered that it was mutually dependent upon the other; in fact, that each was helpless without the other. When port was reached there was no more individual boasting; the burden was now the chorus, "We are the ship."

"We are the ship" was the motto on which to build the ideal electric railway organization. In other words, *we* are the company; not *your* company or *the* company, but *our* company—*our* ship. We have a slogan; now how shall we live up to it? The kind of president and board of directors was the first thing of importance. His auditors knew that the president and board of directors of the Public Service Corporation were big, broad-gaged men actuated by the right motives both toward the men under them and the public which they serve. They were actuated by the spirit that the entire organization of a public service company from the board of directors to the least important employee is made up of public servants, owing to the public a duty as direct as that which they owe to the owners of the property. The same thought had been condensed to the phrase "Safety first, service second, rates third." This feeling applied with special force to those officers and employees who were constantly in touch with the public. Much was heard about the "men higher up," but in public service companies much of the difficulty was with the "men lower down." The public failed to discriminate between the unwise, unjust and inconsiderate action of an agent or employee and the action of the company itself, but the company was always held responsible.

ELECTRIC RAILWAY ORGANIZATION

In speaking of an electric railway organization, we were sure to think of the usual key diagram which showed a fine big circle for the president and board of directors, a smaller one for the general manager, still smaller ones for the department executives, and so on until, perhaps, only pinheads were left to represent the "subs" and the "sub-subs." Of course, these diagrams were of great value on different properties to show the interdepartmental relations and who's who—if not always why. But the most ingenious diagram could give no hint about the real efficiency of the corporation which is thus pictured. The study of organization must go below such mere mechanical divisions to basic problems like these: How can we best develop the best that is in each individual? How can we foster team work between those individuals? How can we give the organization as a whole so definite a character that its attitude and aims will be justly crystallized in the behavior and expressions of its employees and be understood by the public? And in this study he would include the employees all the way down the line to the platform man.

DEVELOPMENT OF THE INDIVIDUAL

The first task must be the development of the individual, not only the individual at the bottom but also the individual at the top. The success of the electric railway as an organization began with the viewpoint which the president and its board of directors assumed toward their employees. If the company would not condescend to study the individual needs of its men, the men were not very likely to study the needs of the company. Now, studying the needs of the men did not mean necessarily the payment of more and more wages or the granting of shorter and shorter hours, but rather the cultivation of each man's individuality or powers of self-expression to fit him for the next step upward. When a business was so small that one executive could keep in touch with all of his men it was easy to advance each one according to his deserts. In the great corporations of to-day, however, the most capable manager could not develop his men by personal intercourse alone, and in this fact lay the failure of many a large organization to attain the efficiency of its smaller competitor.

How could the democratic spirit which had made this country the greatest in the world be applied usefully to American industrial life? To be sure, technical questions could not be decided by universal suffrage, but we could have an organization which would give each man a chance to express himself about his particular line of work, and which would enable him to advance with no more artificial impediments than he would encounter in political life. The spirit of the Public Service Railway stood for this idea as expressed by the company section. For instance, not only the architect and the master mechanic should design the shop, but the very man who worked under an ice-covered car body should also have a word. How much greater interest every employee would feel in his work if he knew that his experience was also an appreciated factor in the company's decisions!

A great many companies now had meetings of the general manager and department heads at stated intervals. This practice was an excellent one so far as it went; but it could be carried still further and conferences could be instituted between the foremen, the assistant foremen and the understudies of the department heads, so that when the subordinate men advance they, too, would have some acquaintance with the other fellow's problems. But the Public Service Railway had gone still further than this by the organization of a company section which, like the good old New England town meeting, was open to all regardless of position and gave each man the chance for the utmost freedom of expression on the topics that touched his bosom. He did not believe that there could be a better way than this to broaden the education of every man and to bring all classes and ranks of employees together, thus securing that mutual understanding and personal intercourse so difficult in a big corporation. Of course, some men are not so resourceful in speaking as they are in acting. For this reason, written discussions should be encouraged just as much as oral discussions.

Mr. McGraw then described the editorial organization of the periodicals of the McGraw Publishing Company. Each paper was departmentalized so that each editor, whether associate or assistant, had a division for which he was solely responsible except as to general editorial policy. Frequent conferences were also held at which the needs of each department were discussed and at which plans were made to increase or decrease activities in certain lines according to the wants of the industry served. Thus, while each man's individual ability was developed, he also obtained the all-around knowledge necessary to give him the proper sense of perspective.

Mr. McGraw added that the success of any organization in developing and keeping its men must be measured by its degree of self-perpetuation. If it must go far afield every time a big job becomes vacant, its action reflected on the executive far more than on the rank and file. The company section was a great force in developing men for higher positions.

TEAMWORK

If the organization was composed of men who were capable of growing up to larger responsibilities, the next problem was that of directing the energies of these men to a common end. This had its difficulties because ambition and co-operation might be mutually destructive instead of mutually helpful forces. It was necessary to show that in the long run what was best for the organization as a whole was also best for the individuals in that organization. It was not enough to love one's work and to be ambitious to get on in the organization; each man must also love his fellow-worker if ideal service both to his customers and the stockholders was the goal. To love one's fellow-worker meant simply this: that a man should understand the other fellow's problems so well that every move he made would be the move that would be the best for all and not for the individual. Mr. McGraw then emphasized that point by examples from electric railway practice.

For instance, the track engineer when figuring on the comparative costs of rail joints should not try to "put one over" on the power and accounting departments by ignoring the value of the electrical energy that he might have to take from the trolley line for installing those joints. It was true that he wanted to make the best possible showing for his department, but he must not forget that he and the power engineer were going to be bad friends just as soon as the latter discovered the leak. So, again, the carhouse foreman must bear in mind that a car had no business to burn its lamps when once it had entered the carhouse. Teamwork here meant plainly enough: "Keep down the other fellow's expense as willingly as you want to keep down your own."

It was natural that when the annual budgets were prepared, each department should think its own wants the most pressing; but when so many hands were knocking at the gates of the treasury every dollar spent must be granted only where it would go the furthest. But it should not be left entirely to the general manager, the president and the board of directors to decide what department was the most deserving. The budget makers should first try to decide among themselves whether the desired betterment in service could not be obtained by some other division of the appropriation than that worked out independently by each man. Additional feeder capacity, for example, might keep the cars to schedule for much less money than new, higher-powered rolling stock.

In a large organization which numbered hundreds, nay, thousands, of men such effective teamwork as this might seem almost impossible, for even with the monthly section meetings it was still a hard problem to tie together in harmonious understanding all the rank and file scattered on hundreds of miles of track. But a good start had already been made by the baseball leagues and other friendly sporting competitions, and by the trips which the management arranged to show the men from one division over the properties of another—a practice that could only tend to broaden their minds and to give them a greater pride in their organization. Yet, after all, it was not the section meeting, the sporting competition or the excursion trip that was making the Public Service men the greatest group of teamworkers in the world—it was the knowledge that the directors of the company were broad-minded enough to treat them as men who had a real interest in their work and as men who had within them the seeds of ever greater worth.

THE ORGANIZATION AND THE PUBLIC

The last problem in organization was that of public relations. This subject had always been an important one but never had it been of such commanding importance as to-day when so many absurd ideas were extant concerning the fabulous profits and alleged tyrannical attitude of public service corporations. The rank and file who were in direct contact with the realities knew better and could perform truly patriotic service by setting their fellow-citizens right on this vital matter. But it was not so much what the men said as what they did that would win the good will of the public. They were the working force of the greatest public utility organization the world had ever known. Through their connection with that organization they were responsible for the welfare and comfort of millions of people—for their light, their power, their transportation. Was it not a worthy ambition to say to themselves: "We will supply that light, that power and that transportation so well that the people will arise and call us blessed"?

It was true, considered in one sense, that each man was only a very small fraction of a great organization, but in another sense he was really *the* organization, for his every word and action might be interpreted by the public as the spirit animating the Public Service Corporation as a whole. The conductor who aided a crippled passenger to alight, the trackman who did his work with the least disturbance of a citizen's sidewalk, and the transportation superintendent who could sympathetically listen to a fair or unfair complaint were all just as important intermediaries with the public as the biggest stockholder; in fact, they might be more important because the people were affected more directly by the action of an employee. These innumerable points of contact between the corporation's employees and the public created that atmosphere which made or marred the success of a public utility even when no great tangible faults or merits were in question. It was needless to add that the fair policy of the man higher up could have the most beneficial effect on these missionary labors of the rank and file. If the directors were imbued with the ideal that public service was a public trust, they would not only give good service to their patrons but would see to it that their own enlightened sentiments were made to permeate every branch, twig and leaf of the organization. Then and then only would the organization have acquired that definite personality which would make every employee a true and worthy representative and exponent of his company's policies.

CONCLUSION

In concluding, Mr. McGraw said to his auditors that his discussion must have been rather academic to them as employees of the Public Service Corporation of New Jersey, as no other public utility of this country had been so progressive in developing the features of organization that he had discussed. Their management was the first to install cadet engineering and apprenticeship courses which attract to electric railway work the kind of men that can "make good" in jobs where education and executive ability must go hand in hand; it was the first to secure real teamwork through personal contact at monthly section meetings; it was the first to inaugurate a system of welfare work that far exceeded in benefits the model methods of the great government of Germany; yet during this time it had raised its railway, lighting and power service to the highest possible standards. Here were achievements that every Public Service man should be proud to trumpet forth as a fitting reply to the silly denunciations of what that great statesman Bismarck rightly had called the "reptile press."

Upon the conclusion of Mr. McGraw's address a vote of thanks was given to the speakers of the evening. The meeting was then adjourned.

WELFARE DEPARTMENT FOR NEW YORK ELECTRIC RAILWAYS

T. P. Shonts, president of the Interborough Rapid Transit Company and the New York Railways, announced on Feb. 2 that a welfare department had been formed in connection with these companies and placed under the supervision of H. H. Vreeland, vice-president of the Interborough-Metropolitan Company. Welfare work in the organization of these companies has dated from the time twenty years ago when Mr. Vreeland inaugurated in connection with the old Metropolitan Street Railway what is now known as the New York Railways Association. Since that time there have been different movements looking toward the improvement of the social and economic surroundings of the employees, brought about through the voluntary co-operation of the officials of the companies and the directors and evidenced by personal contributions and the extension of the companies' credit in supporting these movements. Now, however, there has been evolved a desire on the part of all more effectively and scientifically to combine the functions of administering and developing the welfare work already being done. Previously this has been handled by the different departments, but the work has become so extensive and the monetary amounts involved have become so large that it has seemed best to the directors of the company to place all the welfare work directly under their supervision. In other words, the work is now to be completely unified under the head of one supervisor instead of being handled in a subdivided form by the various departments.

In order to bring about this unification it has been decided to create a separate and distinct unit of organization to be known as the "welfare department." To co-ordinate the various functions of the work there is to be a general welfare committee, consisting of the department heads of the companies and serving in an advisory capacity in furthering the work of the welfare department. The welfare department is to be in charge of an officer with the title of "director of welfare work," who will also act as chairman of the welfare committee. The director of welfare work as a line officer will work in close harmony with other department heads, and as chairman of the welfare work he will be staff officer reporting directly to the president. The appointment of Mr. Vreeland as the first holder of this new office took effect Feb. 1.

The extent to which the companies concerned have previously engaged in welfare work may be judged from the following list of activities. It should be noticed that some of the lines of welfare work in the list are in connection with the street railways and others are in connection with the subway and elevated lines.

(1) The inauguration of the Voluntary Relief Department and the Relief Association. These organizations comprise at the present time approximately 60 per cent of the employees of the entire system. They pay certain death benefits according to the class membership held by the employees and enable the employees to carry life insurance at a minimum cost. The Interborough Rapid Transit Company pays all the administrative expenses of its association.

(2) In connection with one of these associations a loan fund has been established for the purpose of aiding employees who, by reason of sickness or death in their families, become in need.

(3) In an effort to reduce the high cost of living, the company, with the approval and co-operation of the employees, has established three co-operative stores in New York City upon the company's property. The operation of these stores has previously been described in the Electric Railway Journal.

(4) At practically all terminal points throughout the city the company maintains restaurants open twenty-four hours during the day at which cooked food is served to the employees at cost.

(5) At many of its terminal points the company maintains recreation rooms in which there are libraries, pool tables, baths and other comforts.

(6) The company has devoted some of its real estate holdings to playgrounds for its employees for baseball, football, tennis, etc., with a grand stand for use in bad weather.

(7) The company has organized a baseball league with clubs from the various departments. In this there is the keenest rivalry. The officers of the company, to show their interest, personally contribute each year a pennant and gold medals for members of the successful team.

(8) The Interborough Rapid Transit Company has a band of 100 employees, uniformed and equipped at the expense of the company. This organization plays at various social and other functions of the employees and often participates in patriotic and civic functions.

(9) Employees' picnics, balls, clambakes and other outings are further examples of the things concerning the employees in which the companies co-operate.

(10) The Interborough Rapid Transit Company publishes monthly and circulates among all its employees the *Interborough Bulletin*, containing articles of interest to the employees and a page or two relating to matters of personal interest to them.

(11) The company furnishes free to all transportation employees in the subway white duck uniforms, which are laundered without cost to the employees.

(12) The most recent example of welfare work on the part of the companies was the Thanksgiving gift made Dec. 1 to the wife of every married employee who had been in the service one month or more. This consisted of a pass good for free transportation over the system on which the husband is employed.

Under the new arrangement the work in connection with these welfare activities will be thoroughly organized on a unified basis, and various new movements will be taken up by the welfare committee and welfare department as these are deemed advisable.

Papers at the C. E. R. A. Convention

Abstracts Are Published of the Papers Read at the Cleveland Meeting of the Central Electric Railway Association—A Report Is Also Presented of the Proceedings on Thursday and Fridaay

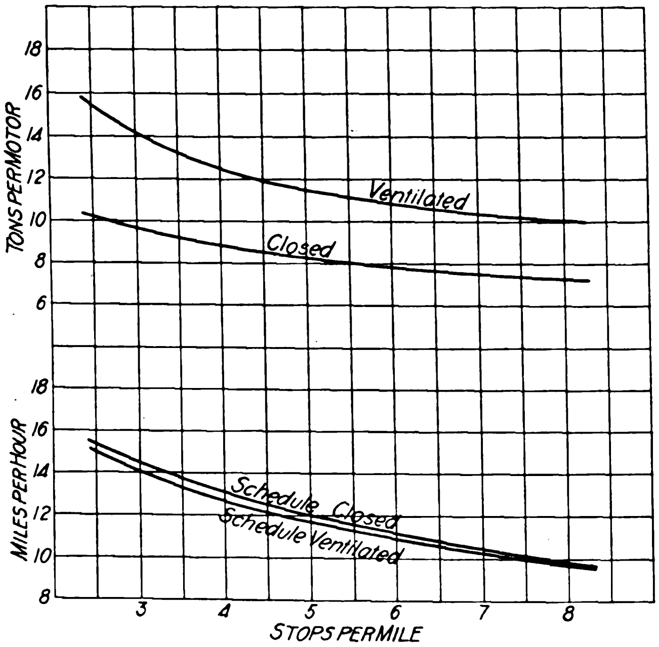
RAILWAY MOTORS

BY J. F. LAYNG, GENERAL ELECTRIC COMPANY

When the purchase of railway motors is made, the first cost is not the only thing that is now considered. The different phases touched upon are generally as follows:

Service capacity, reliability, efficiency or energy consumption, maintenance, first cost and weight.

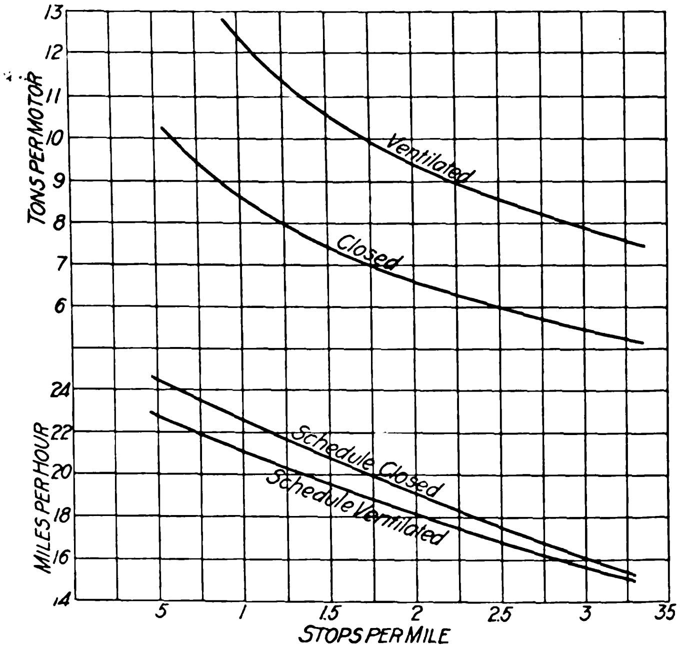
During the past few years many mechanical improvements have been made in lubrication as well as in the application of sheet-steel commutator covers, axle-bearing guards and a number of other small points which, while not revolutionary, will tend to reduce the maintenance and facilitate handling and care of the apparatus. The use of box frame motors is gradually increasing because master mechanics want a motor with the fewest possible parts and one that will be entirely free from oil within the motor shell. Another reason why box frame motors are usually selected is that while it is possible with the split-frame motor to make many minor repairs without removing the motor from underneath the car, bad repair conditions in the pit often make the total detention and maintenance costs greater than if the motor had been taken completely from the truck. With the present mechanical design of the motors and trucks of single-truck cars it is usually considered absolutely essential to have a split-frame motor.



Service Capacity Curves of 50-Hp Railway Motor, Ventilated and Closed; 69:15 Gearing, 35-In. Wheels, 550 Volts

The only radical improvement in the electrical design of railway motors during recent years has been the adoption of commutating poles to meet relatively high voltages which are being used in city and interurban lines.

During the last four years, however, a very decided improvement has been made in ventilation. Many forms of ventilated motors exist, but the one in most general use is that in which the air is taken in at the upper and pinion side of the motor, the air flowing between the field coils, over the surface of the armature, under the commutator and through longitudinal holes in the armature laminations, and forced by a radial fan to atmosphere. With this method the interior of the motor is kept at practically a uniform temperature, and the work capacity is greatly increased. An example of this is shown by a 50-hp motor which, when entirely closed, can propel a car weighing 7.2 tons per motor and making eight stops per mile. The same motor ventilated and making the same stops can haul 10 tons per motor. If this motor is operated in a service with but one stop per mile it could haul a car weighing 8.6 tons per motor, and when this same motor is ventilated it would be possible to increase this weight to 12.2 tons per motor. All of these figures are based upon motors with a temperature rise of 65 deg. C. There is necessarily some slight difference in the schedule speed for the two weights of equipment with the same gearing. This is illustrated by the two accompanying curves.



Service Capacity Curves of 50-Hp Railway Motor, Ventilated and Closed; 65:19 Gearing, 33-In. Wheels, 550 Volts

The continuous rating is another indication of the work capacity of the motor. A certain motor when fully inclosed and operating on 500 volts will have a continuous rating of 29.5 amp. This same motor under the same conditions ventilated will have a continuous capacity of 44 amp. These figures show that the ventilated motor will accomplish a given work at a much lower temperature than the same motor non-ventilated; or, to put it in another way, a much smaller ventilated motor can be used to perform a certain service. An example which illustrates this point is that of a car weighing 45 tons, equipped with four 100-hp motors weighing 4100 lb. each. These motors were removed from the car and four 40-hp ventilated motors with field control were substituted. These same motors are satisfactorily performing the same schedules that had been operated previously by the larger motors. The surprising feature of this test has been that the hottest part of the windings of the smaller ventilated motor which performed this service was 59 deg. C. rise, or approximately the same temperature as that obtained by the 100-hp non-ventilated motor. This point is brought out merely to show what can be accomplished in work capacity by ventilation, and not that the manufacturer would ordinarily be willing to recommend such a small motor for this service. The mechanical construction of the smaller motor does not fit it to perform regularly, in all classes of service, the duties imposed by this heavier car. Thousands of these motors are in daily service on all classes of roadbed, and not a single case of equipment failure has been traced to ventilation.

The usual practice is to place the air intake at right angles to the direction of car motion. With this arrangement wheel wash and heavier dirt pass the intake without entering the motor. A certain amount of dust is drawn through the motor, but in order to be drawn in with the air circulation this dust must necessarily be very fine and of a light character. Practically all of it is suspended in the air circulation of the motor and forced out, and does not lodge within the interior of the motor shell. Inspection of many equipments in service show that the brush holders, brush-holder supports, commutators and commutator V rings are cleaner than, or at least as clean as, other motors which are in the same service.

A number of tests which have recently been made show that in frequent stops (city service) non-ventilated motors with an hourly rating of 25 per cent greater than ventilated motors run at practically the same temperature. This shows that when ventilated and non-ventilated motors are being considered for the same service the ventilated motor will run at much lower temperatures, and therefore it should naturally be a lower maintenance machine than the non-ventilated motor which runs at a higher temperature; and also that in so far as work capacity is concerned, this type of motor gives the greatest value for the investment.

FIELD CONTROL

When selecting equipments, many operating officials frequently ask the question: "What are the advantages of field control?" For frequent-stop city service with field control, there will be a saving from 6 per cent to approximately 10 per cent in energy consumption and for elevated service from 4 per cent to 7 per cent. It is very hard to make a statement for interurban service as there are such wide variations in interurban work. Where the interurban stops are infrequent, the saving is very small and it is not considered advisable to accept the additional complications of equipment for energy saving alone. In general, it may be said that with field control a motor of somewhat lesser hourly rating, and consequently a somewhat lighter motor, can perform any service for which it is selected, but the increased cost of the control equipment, together with the complication of the additional elements required, makes the total cost of equipment approximately the same as if standard equipments were selected.

As regards the future motor, there are so many lines of investigation based on improvements in insulation, ventilation and further investigations of the value of field control that it is extremely difficult to prophesy what improvements the coming year will bring forth.

DISCUSSION ON JOINT WEIGHT AND INSPECTION BUREAU

BY J. H. CRALL, GENERAL FREIGHT AND PASSENGER AGENT TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

The question of the advisability of establishing a joint weight and inspection bureau was first considered in the early part of 1912 at a meeting of the Central Electric Traffic Association, and it was decided to make a test by the employment of one man at an expense of $100 per month at the Indianapolis freight terminals for a period of ninety days. This inspection, which was as thorough as it could be made by the employment of only one man, resulted in a saving, within this period, of $1,186.16, or an average of $16.95 per day, at a total expense of $300. This saving could have been materially increased by the employment of an additional inspector, as the freight handled where this test was made is too heavy to enable one man to give personal attention to all shipments, which pass through four separate freight houses. In the face of this showing there has not as yet been sufficient interest shown by the member lines relative to the establishment of such a bureau to warrant the venture.

The duties of the local agents, especially at the larger terminals where most of these abuses are apparent, are of such a nature that they cannot give this matter the close personal attention which it demands. Corrections by local agents on classification and rates could in most instances be made, but corrections on weights require close, careful inspection. In the test made at the Indianapolis terminal it was shown that most of the corrections were made on weights, and not on rates and classification, as for example:

A shipment of 1000 rolls of roofing paper was billed at 5000 lb.; the actual weight was 6000 lb.

A shipment of pipe and castings was billed at 1700 lb.; the actual weight was 4700 lb.

Fifty-two boxes of oranges were billed at 2000 lb.; the actual weight was 3400 lb.

A shipment of advertising matter billed at 1050 lb. was found to weigh 4250 lb.

A manufacturer having an order for 268 auto tops was billing these at 450 lb., and this was changed to 550 lb. actual weight. On this order alone there was a saving and increase in revenue of $77.72.

These are only a few of the hundreds of corrections made during this three months' trial. It necessarily follows that to remedy these errors in weights personal attention of an inspector is imperative, as the billing clerk almost invariably issues his expense bill from the information given him on the shipping instructions.

Another reason why a joint weight and inspection bureau should be maintained is the effect it would have upon the shipper. It is an undisputed fact that when there are few restrictions and billing is not carefully scrutinized many shippers take advantage of this delinquency by under-billing. But the fact that a bureau of this kind was maintained would undoubtedly have a tendency to eliminate this practice to a great extent. The mere knowledge that shipments were subject to inspection would have this tendency.

Inspection at any particular terminal or station would not only be a local benefit but a benefit to all lines having interline traffic arrangements. This being the fact, it follows that all interested lines should share in the cost of maintenance. I am inclined to believe that if this bureau is established by this association it should be started in a limited way, possibly along the following lines:

A chief inspector—To have charge of all inspections, to make inspection at intermediate points, and to check and compile all reports, at a salary of $125 per month.

At Indianapolis should be two inspectors at $75 per month. In addition to checking at Indianapolis they should inspect Terre Haute, Lafayette, Kokomo, Muncie and intermediate stations.

At Fort Wayne should be one inspector at $75 per month. In addition to inspection at Fort Wayne he should have charge at Kendallville, Waterloo, Bluffton and intermediate stations.

At Lima should be two inspectors at $75 per month, who would, in addition to their work at the two freight houses in Lima, have charge at Toledo, Bluffton, Wapakoneta, Findlay, Sidney and intermediate stations.

At Dayton should be two inspectors at $75 per month, who would, in addition to inspecting the four freight houses at Dayton, have charge at Columbus, Piqua, Hamilton and intermediate stations.

At Cleveland should be one inspector at $75 per month. In addition to inspection at Cleveland he should have charge at Norwalk, Mansfield and intermediate points.

The traveling expenses of the chief inspector would be about $55, the traveling expenses of other inspectors about $80, and stationery and postage would be about $15, making a total cost each month of $875.

The chief inspector would devote most of his time to junction points and other important places not covered by regular inspectors, in addition to which he would compile all reports and have charge of and direct his assistants. The actual mileage of the member lines handling freight is 3051. If they would all join in this expense the cost to such participating lines would be $3.11 per mile per year. If we can keep the cost approximately within these figures, would it not be advisable, as a business proposition, to establish a bureau, as the saving in revenue would be four times the cost of maintenance?

DISCUSSION ON JOINT WEIGHT AND INSPECTION BUREAU

BY C. O. SULLIVAN, TRAFFIC MANAGER WESTERN OHIO RAILWAY

It is a question why such an important matter as the establishment of a joint weight and inspection bureau has been neglected. The interurban lines have been depending upon the shipping public to furnish correct weights and descriptions of articles transported, although it is now known positively that they are losing a great deal of money by doing so. The facts are that the shipping public, being aware that no inspection is made, gives underweight and false descriptions of freight.

There is no way for the accounting department to detect underweights except upon such articles as have estimated weights assigned to them in the official classification. But even in such instances I know of cases where, with the weights given in classification, articles have been accepted and billed at lesser weights. This is due to carelessness on the part of the agents, and it shows that there the interurban lines have more than the shipper to contend with.

An inspector for a joint bureau is wholly independent, and he is not hampered, as an agent is, by the possibility of losing business when he calls attention to classification of weights and descriptions of freight. He can depend upon the fact that the law is just as severe upon the shipper for giving false weights and descriptions as it is upon the railroad for transporting shipments for one consignor at a less charge than for another. In addition, the activity of an inspector puts the agent upon his mettle, for the latter must realize that if he allows underbilling to continue he will eventually be reported.

Too much attention has been given to the cost of a joint inspection bureau and not enough attention has been accorded to the benefits that will be derived from it. If the matter is taken up with the accounting department under the existing loose methods, it will be found that a surprising number of cases of incorrect billing have been caught even in this way. But there is no chance for the accounting department to catch underweights, and this can only be corrected by inspectors.

The committee's report on the Indianapolis inspection test shows that this cost was $287 during the ninety days. On this basis it would cost $1,148 per year for one inspector, or $11,486 for ten inspectors. With the support of at least 2500 lines of membership lines out of the 3900 miles in this association the expense would be about $4 per mile per year. The committee shows the earnings to be $1,250 for ninety days, and on this basis it would amount to $5,000 per year for one inspector, or $50,000 for ten inspectors. However, I believe that this amount will be increased $15,000 during the first year that the bureau is established, making the first year show a gross earning of $65,000. This would leave a net earning of $38,514 on the basis of the Indianapolis test, but on my estimate it would leave a net earning of $50,000, or on the basis of 2500 miles a net earning of $20 per mile.

With regard to the smaller lines, it should be said that these will receive freight from the larger terminals where inspectors are regularly stationed, and they will thus secure a benefit from this source as well as having their stations inspected at regular intervals.

It would be impossible to have inspectors at all stations all the time, but it will be the aim to have every station of any consequence inspected, so that the smaller lines will feel the benefit of the inspection at the larger terminals and will benefit locally as well. The fact that agents will be subject to visits by the inspector will get them into the habit of watching all the shipments, and if an agent is found persistently to neglect watching his billing he can be removed.

The question may arise as to how long it will be necessary to continue such an inspection bureau. It should be permanent. The steam lines have such a bureau that has been operating for twenty-five years or more, yet with the almost perfect system of inspection, together with the laws making falsification punishable by fine and imprisonment, the shipping public still tries to get its freight transported at less than the regular price whenever that is possible.

The joint weight and inspection bureau of the steam lines at Cleveland, Cincinnati, Columbus, Dayton, Akron, Springfield and Toledo for the month of November, 1913, weighed a total number of 3319 cars, of which 948 showed underweights. The gain in weight resulting from the carload weighings amounted to 18,352,000 lb. The total number of less-than-carload shipments which were found to be underweight was 7172, giving a gain in weight of 824,000 lb. Both carload and less-than-carload shipments involved a saving, due to the existence of the bureau, of the charges on more than 19,000,000 lb.

With regard to the inspection of classification, the total gain amounted to more than 2,000,000 lb., most of the changes in classification taking place by raising shipments billed as second-class to first-class, with shipments raised from third-class to second-class next, and then with shipments raised from fourth-class to third-class.

The total saving from both weight inspection and classification inspection amounted to the charges on more than 21,300,000 lb. These figures show the vast amount of tonnage that would be lost by the steam lines each month except for the rigid system of inspection, and if it were not for this inspection they would, no doubt, lose many million pounds more than indicated by the existing figures. It should be remembered that only seven of the larger terminals in the State of Ohio are taken as a basis for this case. All of these terminals are served by the interurban lines.

In closing I must urge upon you to consider this matter very thoroughly, and it is my hope that some action will be taken at this meeting which will permit the establishment of a permanent joint weight and inspection bureau for the interurban lines.

ANNUAL REPORT OF THE SECRETARY-TREASURER

BY A. L. NEEREAMER

The interurban membership of this association on Dec. 31, 1912, consisted of fifty-eight lines, covering 3841 miles and one city line. Since that time the city line and one interurban line, amounting to 60 miles, have withdrawn. During the same period two interurban lines amounting to 45 miles have affiliated with the association. This, together with the merging of some of the member lines and extensions of others, leaves the present membership fifty-eight lines, covering 3859 miles, an increase of 18 miles. During the year 1912 the membership in the supply men's department was 131 and for the year ended Dec. 31, 1913, 121, a decrease of ten. Receipts and disbursements for the year 1913 are as follows:

RECEIPTS

Cash on hand Jan. 1, 1913	$1,641.37
Interurban lines	3,785.65
City lines	9.38
Supply men	968.00
Sale of buttons	18.00
Stationery and printing	1,272.19
Central Electric Railway Accountants' Association	28.50
Miscellaneous	10.57
Interest	51.32
	$7,784.98

DISBURSEMENTS

Payroll	$3,280.00
Traveling expenses	172.37
Stationery and printing	1,437.75
Postage	185.00
Telephone and telegraph	100.65
Office incidentals	14.00
Taxes and insurance	6.69
Freight and express	56.56
Office fixtures	2.00
Rent	504.00
Legal expense	19.85
Central Electric Railway Accountants' Association	134.12
Checking account	87.68
Savings deposit	1,784.31
	$7,784.98

You will note from this report that there is on deposit $1,871.99, of which $1,784.31 is with the Fletcher Savings & Trust Company, drawing 3 per cent interest.

Your attention is also called to the following statement of accounts receivable and payable:

ACCOUNTS RECEIVABLE AND PAYABLE DEC. 31, 1913

Cash on deposit	$1,871.99	Accounts payable	$0,000.00
Receivable from railroads	270.30	Total assets	2,142.29
	$2,142.29		$2,142.29

During 1913 your secretary made a trip through the eastern part of the territory, endeavoring to secure additional railroad members. During that trip, after presenting the proposition to a number of non-member lines, he was able to secure but two members, and since the first of the year another one of the lines has affiliated with the association, this line not being included in the report for the year 1913. There are still quite a number of lines in the eastern and northern part of the territory that are not members of this association. During the year covered by this report your secretary corresponded with those lines, explaining in detail the work which we are doing and the benefits that might be derived by becoming a member, endeavoring by correspondence to persuade these lines to join the association, but did not meet with any success.

For the valuable assistance received from the officers, committees and members during the past year your secretary wishes to extend his thanks and express his hearty appreciation.

ANNUAL REPORT OF THE CHAIRMAN OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

BY A. L. NEEREAMER, CHAIRMAN

Your chairman takes pleasure in submitting herewith his report for the year ended Dec. 31, 1913.

The past year has been one of great activity in this association, and many important points have been discussed and harmoniously settled. No one great proposition stands out as an achievement during the past year, yet in the aggregate the work accomplished has been greater than in any previous period.

Of the membership of the Central Electric Railway Association forty-six lines, representing 3569 miles, participate in the tariffs and other publications of this body. This is an increase of 291 miles over the previous year. The number of interested lines remains the same, but this can be easily accounted for when we consider that a sufficient number of the lines merged during the period mentioned to offset the additional members.

The interchangeable 1000-mile ticket is now participated in by thirty lines, covering 2792 miles, an increase of 246 miles but a decrease of two lines for the reasons given above.

The chairman files the official classification for thirty-eight member lines.

We now have in course of reconstruction the following tariffs which will be printed and filed as soon as possible: the joint and local baggage tariff, the official interurban railway equipment register, joint exceptions to official classification and joint passenger tariff No. 6. This latter tariff will show an almost complete reconstruction. All useless rates and routes are being eliminated, and the territory covered will be very greatly increased, particularly that portion of the territory which has been heretofore confined to intrastate traffic and has now been opened to interstate traffic.

During the year just passed there have been two issues of the official classification, Nos. 40 and 41. Both of these issues have had quite a number of supplements, for some of which it was necessary to secure special permission from the various railroad commissions. The fact that the filing of these was handled through the chairman's office has saved considerable labor and expense to the member lines, particularly in securing the "special permission."

The interchangeable 1000-mile ticket is proving more popular each year. During the year just passed approximately 5000 of these tickets have been ordered by the member lines and placed in the hands of their agents. This makes an average of about 4000 per year since its inception.

As a means of stimulating through traffic the chairman submits for consideration the following suggestion: That a card about 18 in. x 20 in. be printed advertising the sale of through interline tickets, checking of baggage and sale of the interchangeable mileage ticket by member lines, this card to be posted by all companies at their stations and distributed about the various cities. This suggestion is offered for the reason that a number of cases have been brought to the attention of the chairman where the traveling public did not know it was possible to purchase through tickets and check baggage to destination.

For the successful results that have been accomplished by this association the chairman desires to thank the various committees and members, not only of this body but of the parent body, for the conscientious co-operation and support given him. At this time he also desires to extend special commendation to the members of the Traffic Association who attended the last two meetings, during which all of the rates and divisions between headline points were checked. As a record of the hard work of the members present this task was accomplished in two meetings, the best record heretofore having been four meetings.

With loyal co-operation and the display of the same spirit during the coming year, greater and more valuable work can be accomplished as well as the scope of the association extended.

DISCUSSION ON JOINT WEIGHT AND INSPECTION BUREAU

BY F. D. NORVEIL, GENERAL FREIGHT AND PASSENGER AGENT UNION TRACTION COMPANY OF INDIANA

"Weight and Inspection" very early received attention from the steam railroads. Their organization, known as the joint weight and inspection bureau, has ramifications in every important city in the United States, its control being absolutely independent of any one or any combination of railroads. These companies decided after years of trial of different plans that the only sure way was inspection by inspectors who were responsible only to the head of the organization.

While it is not my intention to charge direct dishonesty against any shipping interests, we know from our experiences that we cannot depend upon the shippers to give correct weights or correct classifications in all cases. Hence the necessity of some supervision.

THE TRIAL IN 1912

The Central Electric Traffic Association early in 1912 decided to make a test case at some industrial center, placing one man in charge as an inspector with absolute authority to correct billings of all kinds—both inbound and outbound. A few electric lines joined in the expense necessary for the experiment, and it was begun on May 25, 1912, and terminated on Aug. 31, 1912. Shipments aggregating 789,691 lb. which were inspected showed a total saving to the lines interested of $1,250.40. This period covered sixty-two working days, with an average of 11,362 lb. and a saving of $17.99 for each day the inspector was employed. Indianapolis was selected by the Traffic Association as being geographically well situated and under shipping conditions the best for trying out an experiment of this character. The lines interested were the Indianapolis, Columbus & Southern, the Indianapolis & Cincinnati Traction, the Terre Haute, Indianapolis & Eastern, and the Union Traction Company of Indiana. The saving for each line named in the order named was: $93.08, $126.79, $373.04 and $657.49, or a total of $1,250.40. The expense incident to this experiment aggregated about $300.

It was first thought that we might extend the operation of this proposition to many of the towns in the Central Electric Traffic Association's territory, but the expense looked appalling, and it was suggested that an effort be made to join the steam road weight and inspection bureau and let their inspectors and their rules cover the traction lines. This matter was referred to a special committee appointed at South Bend, Ind., at the fall meeting in 1912. After various efforts on the part of the committee to get some expression from the steam roads' weight and inspection bureau, it was found that the proposition could not be considered, and it was therefore dropped. However, the matter has again been brought up in order to effect some line of action which will accomplish the most good at the least expense.

There are three freight houses at the Indianapolis Terminal, and to divide his time equally among these freight houses the inspector worked two days out of each week in rotation. In other words, one freight house would receive inspection on Monday and not again until Thursday, except in a case where the inspector might be called in on some special occasion to settle a question of importance between parties offering deliveries and the warehouse men.

It seemed as though the work of the inspector even put "ginger" into other employees and caused them to pay greater attention to classifications, weights and other particulars than they would do were there no inspector on duty.

Do not mistake the importance of this work or imagine that all the good that was done was confined wholly to the city of Indianapolis, because shipments originating at points outside of that city received the same inspection and correction as consignments which were forwarded from Indianapolis. This was equally true as regards shipments coming from foreign lines for an Indianapolis delivery, so that the good done at any inspection point is not confined wholly to that point.

POSSIBILITIES OF THE NEW BUREAU

Taking this trial as a basis, we argue that inspection at the very large industrial centers and points where large shipments originate would practically cover the State of Indiana. In other words, an inspector at Indianapolis, Fort Wayne, Terre Haute and South Bend, with one or two traveling inspectors, say for such junction points as Lafayette, Kokomo, Richmond, etc., would practically cover the entire transportation business of the State, and the same plan would apply in Ohio as well. I question whether at the beginning it would be necessary to make this a distinct organization but believe that the duties incident to its supervision should be cared for by the chairman of the Central Electric Traffic Association, as was done at the time of the Indianapolis experiment. He might receive the help of an advisory committee, composed of, say, three members of the Traffic Association, so that they might decide important questions which could not await the regular meetings of the association.

The expense as outlined for the State of Indiana could probably be covered for $500 per month, and by confining regular inspectors to fewer points this expense could in like manner be decreased. From the fact that nearly every business is now employing a traffic man, who closely scrutinizes every waybill coming to his house in his effort to earn his salary, it appears that business men are taking advantage of every technicality to get some return on freight paid.

There is no question that the items covered by the official classification will be more closely drawn from time to time, and, on account of the stringent rules forced on the railroads, whether they desire it or not, they must use every means in their power to get all the revenue that is due them, and we all know that this is little enough.

When the business done by electric railways was confined wholly to their own line, they might have taken the liberty to say it was nobody's business how they did their work, but the great increase in the interchange of traffic made by electric railways as between themselves makes such a stand untenable. No one railway has the right, through the carelessness of its employees, to burden a connecting line with errors in billing or from any other cause.

This reason alone should make for closer scrutiny of checking bills against the freight at all passing points, as all errors in billing and wrong classification are in a manner preventable. An instance recently came to our notice of bad inspection which occurred in this manner: A consignment of shoes forwarded from a factory in Ohio to various agencies in Indiana was originally sent in fiber packing cases, meeting the specifications of the official classification, being properly sealed, etc. After a time the remainder of this same consignment was returned in the original packing cases. However, in the later case the shipment was accepted by the forwarding agent without his compelling the shipper to comply with the regulations governing the handling of package freight in fiber cases. In many instances these kinds of shipments are accepted without the corners being sealed or otherwise strengthened, simply being closed by a cord tied around them. As the strength of a fiber case is absolutely dependent upon the proper sealing, the consignment referred to had no protection whatever and might just as well have been done up in ordinary wrapping paper. Such carelessness as this would be detected by an inspector, and many a dollar would be saved in loss and damage to the carrier.

Before closing this paper I would like to call your attention to Interstate Commerce Commission's decision, No. 4631, of June 18, 1913, on the matter of alleged irregularities and discrepancies in the weighing of freight by carriers. Evidence of the importance of this subject, from the viewpoint of the commission, is borne out as follows, quoting from this report: "While it is true much of this investigation has been along the lines of car load weights," it further states "that some attention incidently has been given to platform scales."

This investigation took on a wide range. Hearings were held in all parts of the country and occupied forty-six days, with over 7000 pages of testimony. Surely a subject of this importance to the steam lines and the Interstate Commerce Commission should receive some attention from the electric railways.

REPAIRS AND WELDS OF TRACK AND ROLLING STOCK BY ELECTRICITY

BY E. C. PRICE, VICE-PRESIDENT THE INDIANAPOLIS SWITCH & FROG COMPANY

The term electric welding without classification or definition is vague and covers a variety of methods, such as the "spot," or "soak," welding in which the parts to be welded or united are interposed between electrical poles carrying an alternating current of high amperage and low voltage. The interposed members, acting as resistance, are thus brought to a welding heat, and during this time mechanical pressure is applied, making a perfect butt weld. However, with large areas, or in case of excessive impurities in the metal, the slag retained within the weld renders it more or less imperfect. This method is rapid but limited in its use.

In another method of electric welding a carbon-arc flame from a low and varying voltage and heavy current is directed against the parts to be welded until the surfaces are brought to a welding heat. If the metal is to be added, it is placed in small sections within the heated area or on the surface against which the flame is directed. This process admits of hammering or forging the metals while at a welding heat, effecting a substantial weld for a wide range of work, particularly where the heating of the whole member is not detrimental.

The latest method of electric welding is the outgrowth of the carbon-arc welding, but it differs in process, application and results, having proved particularly adaptable to certain classes of work for the following reasons: First, a metal electrode is employed and constitutes the material to be added to or welded on a worn or broken part; second, the welding heat is confined to an area equivalent to the area of the end or point of the metal electrode and the welding action is instantaneous, beginning when the arc is drawn and terminating with the withdrawal of the electrode; third, the metal is not simply melted or laid on as in welding by flame, but makes a thorough amalgam.

The electrode is fluxated steel, iron or other metal of proper and varying constituency and size, averaging 3/16 in. or ¼ in. in diameter. Suitable electrical current is passed through the welding machine, adapted and regulated according to the nature of the work, and then through a flexible cable to which is attached an insulated handle or head holding the metal electrode. This forms the positive electrode, and the part to be welded or added to forms the negative electrode.

To start the welding, the electrode is placed in contact and withdrawn just a sufficient distance to form a short arc. This arc makes a pocket or cavity in the negative member and at the same time deposits therein a molten globule of metal from the positive electrode. The action is continuous until the positive electrode is melted down. The molten metal follows the direction of the current and unites by "first intention," making a perfect joining of the metals. It does this without disseminating undue heat.

Thus the method is particularly applicable in the filling in of key seats and the building up of worn bearings and tapers of armature or commutator shafts, without removing the shaft or injuring the winding. The electrode used for this class of work is a steel that is easily machined and the process has a wide range of use in and around carhouses. Where broken wrought-iron, cast-steel, malleable-iron or gray-iron parts were formerly discarded, they can now be reclaimed at a very little outlay and frequently in less time than is required to procure or apply new parts, it being possible in many instances to repair breakages without removing the parts from the cars.

Special track work, such as frogs, switches, mates and crossings, particularly of the later type of construction, including hard-center or solid manganese work, always become worn or broken down at the intersections, although the main portion may be still practically as good as new. The worn-down intersections are built up by depositing new metal, using an electrode of special hard steel. This is then ground down to the original surface at a cost for material and labor varying from 1 per cent to 9 per cent of the value of the layout without disturbing the paving or interfering with traffic to any extent.

The durability or permanency of repairs has not been fully determined because the proper steel properly applied has shown wearing qualities equal to, if not greater than, the original metal. Work done at the time the process and materials were first perfected, which was about two years ago, is still holding up and giving good service. The metal unites with and adheres to any normal manganese steel and, while the application of heat to manganese has a tendency to soften it, the metal is toughened and the added hard steel becomes the new wearing surface. Since the heat is applied only at the points of and under the deposit, the adjacent surface is not affected or impaired.

An analysis of the failures recorded in the welding of manganese steel would indicate contributing causes that, with ordinary care, could be eliminated. But in connection with the welding of manganese or other hard wearing steels an occasional instance has been discovered which is not thoroughly understood or explained, namely, the presence of a peculiar content or ingredient that causes vehement boiling or combustion, practically consuming the electrode metal without a residue of deposit. This, however, is a rare occurrence and is simply mentioned as an interesting fact.

The building up of Bessemer or open-hearth rail is attended with practically no contingencies, and a veneer of hard-welding steel either on special work or for the filling in of low or battered joints practically converts the ordinary construction into hard-service or armor-plated work. Cupped joints, deep corrugations or depressions are filled in, then ground to the original surface with a track grinder.

The cost of the latter class of work varies somewhat with the condition of the track, traffic and grinding facilities, but an average cost for filling in cups from 8 in. to 14 in. in length and from ¼ in. to ⅜ in. in thickness and re-grinding is about 75 cents per joint. Roads equipped for doing this kind of work can build up depressions as soon as any appreciable wear is in evidence, as steel can be applied as lightly as 1/16 in. in thickness. This requires less grinding and keeps the track normal in surface and the special work built up to the benefit of the rolling stock as well as the patrons of the road.

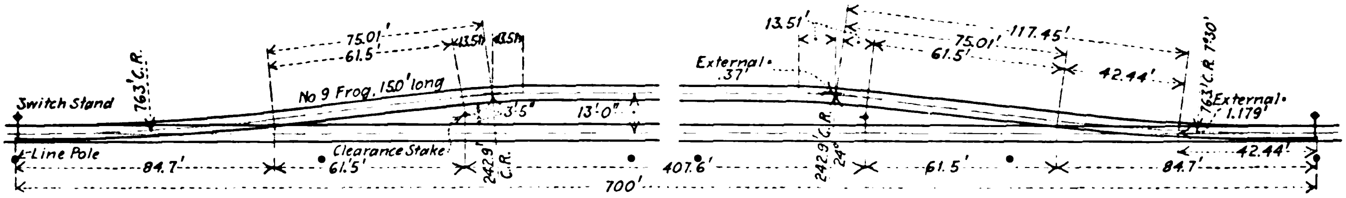


Fig. 1—Track Construction and Maintenance—Through Type Electric Siding

In the maintenance of roadway, one of the gravest problems is that of joint plates and bonds. A joint that will eliminate pounding and subsequent cupping of rails, that will not require re-bolting or the taking up of pavement, and that will have perfect conductivity, is a profitable investment, even though it is installed at a cost several times that of the ordinary bolted and bonded joints.

A description of one form of welded joint is as follows: A pair of plates fitted to a bearing on the base or flange of the rail are clamped or temporarily bolted in place and welded around the edges. In the case of side bearing rails, head supports are also welded in place and in some instances the base of the rails is welded to a plate placed lengthwise beneath the joints. One man and a helper will apply from seven joints to twelve joints per day, the cost for the ordinary girder rail being from $3 to $5 per joint for straight splices and from $4 to $6 per joint for compromises. This cost is based on welding under traffic. The strength of the joint is demonstrated by the fact that where a rail has broken owing to spiking down too near the joints during the welding process the joint has held intact and the rail broken from 4 ft. to 6 ft. from the joint. Meter readings have shown the conductivity to be practically double that of the rail sections and the joints installed during the last two years have withstood temperature ranges of more than 100 deg.

TRACK CONSTRUCTION AND MAINTENANCE

BY L. A. MITCHELL, SUPERINTENDENT TRACK AND ROADWAY UNION TRACTION COMPANY OF INDIANA

The location of a line of railroad is generally governed by the topography of the country between the points it is intended to connect, but the topography too often receives too much consideration, or, rather, an alignment is established with the idea of evading heavy grading work and with too little consideration of the grades and curves that will exist and will have to be operated over after the line is completed. After the preliminary survey has been made and the topography of the country is thoroughly known to the engineer, he instructs his locating party to locate a line with a certain limiting degree of curvature and limiting gradient. These two are inseparable, as a curve of any given degree will offer to the operation of a train a resistance which is equivalent to a certain grade.

TRAIN RESISTANCE DUE TO CURVES, GRADES AND SLIDING WHEELS

It is unfortunate that the experiments for determining the amount of curve resistance to the operation of a train have not been more numerous or more satisfactory. The results which have been obtained, however, show that in all probability the resistance of a curve is about ½ lb. per ton per degree of curvature. The resistance offered to train operation due to grade is 22.4 times the rate of grade per 100 ft. per ton or 14/33 times the rate of grade per mile. This equation and the first on curve resistance may be combined, and it will be found that a 1-deg. curve will offer resistance equal to a grade of 0.025 ft. per 100 ft.

It can readily be seen that for flatter curves the resistance to train operation due to curvature for single-car trains will not be great, but in the operation of 100,000 car miles this resistance will be considerable. Nearly all electric railways are compelled to have curves of 100 deg. or greater, on account of passing through towns and cities, and, according to the preceding assumption, a 100-deg. curve would be equivalent to a 2½ per cent grade on tangent track. However, I do not believe any of the experiments noted were made on curves of such high degree, and no doubt other forces enter into the operation of the car around a curve of such high degree. On these sharp curves it is necessary to have guard rails, at least a single guard rail, and many engineers think a double guard rail is necessary. The wheels which come in contact with these guard rails necessarily offer greater resistance to the movement of the car than if no guard rails were present.

Another resistance is the sliding of wheels, both lateral and longitudinal. This resistance enters into train operation no matter what the curvature, but it is much greater on sharp curves. From the standpoint of maintenance, curves increase the cost of wheel maintenance as well as the cost of renewing rails. In addition, we have the increased amount of power necessary to carry a train over a given piece of track. Probably the most noticeable example of the resistance of curves is when we stop one of our heavy interurban cars with one or both trucks in a sharp curve, particularly when the line voltage is weak. With practically all wheels in contact with guard rails—and with the trucks at an angle, the resistance is maximum just before the car commences to move.

DRAINAGE

Drainage conditions can very often be materially improved from a maintenance standpoint if proper consideration is given to this matter at the time the road is located and constructed. This has been especially neglected in the construction of city tracks. We can find many examples where it is almost impossible to keep the track in any kind of surface, owing to the fact that the water which has followed down along the rail or seeped through the street covering has found its way to the foundation of the track, where no way has been provided for it to get away. Such track will have to be rebuilt very much sooner than if a tile drain had been placed under the foundation and connected with sewer inlets at street intersections. If the track foundation is concrete, the tile drain should be laid under the concrete and surrounded by cinders, crushed stone or some other loose material so as to afford opportunity for any water that might get under this foundation to drain into the sewers. It is also advisable to place surface drains to take off any water that may run along the flangeways, at least at street intersections, and connect these to sewer inlets.

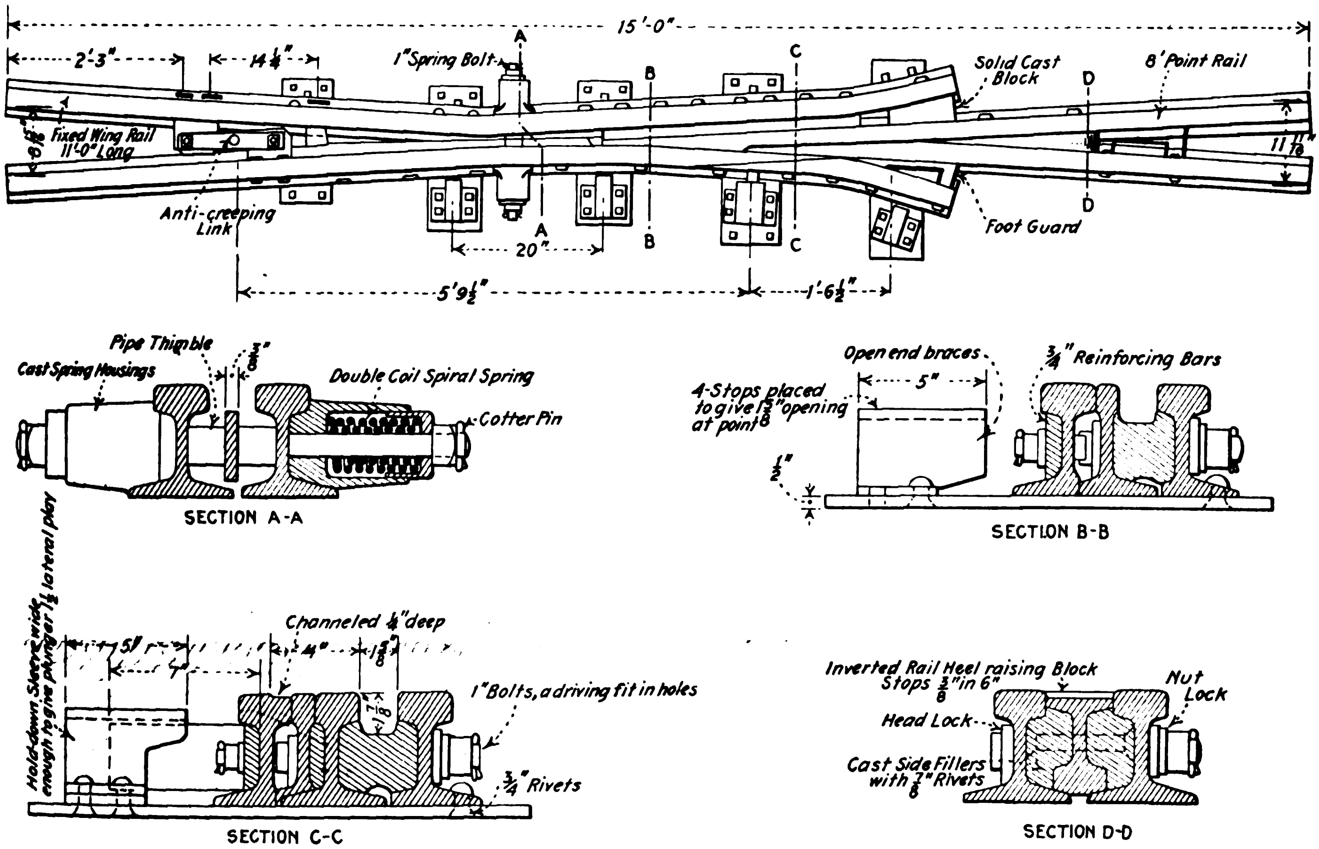

15'-0"
2'-3"
14¼"
1" Spring Bolt
A
B
C
D
Solid Cast Block
8' Point Rail
Fixed Wing Rail 11'-0" Long
11 1/16"
Anti-creeping Link
20"
Foot Guard
5'9½"
1'-6½"
Pipe Thimble
Cast Spring Housings
3/8"
Double Coil Spiral Spring
Cotter Pin
SECTION A-A
Open end braces
¾" Reinforcing Bars
4-Stops placed to give 1⅜" opening at point
5"
½"
SECTION B-B
Hold-down Sleeve wide enough to give plunger 1⅛ lateral play
Channeled ¼" deep
5"
7"
4"
1⅝"
1 7/8
1" Bolts, a driving fit in holes
¾" Rivets
SECTION C-C
Inverted Rail Heel raising Block
Stops ⅜" in 6"
Nut Lock
Head Lock
Cast Side Fillers with ⅞" Rivets
SECTION D-D

Fig. 2—Track Construction and Maintenance—Construction of No. 9 Frog for Through Type Electric Siding

FOUNDATIONS

Many of us in Ohio and Indiana found out several things about the foundations of our bridges after the flood of 1913. From what information I can obtain, I believe that not less than 95 per cent of the bridge failures on both steam and electric lines were due to poor foundations. Almost invariably these foundations had not been carried deep enough or they had been placed on a material which is not considered reliable when subjected to excessive erosion.

Many foundations were found to have been placed on gravel varying from 1 ft. to 4 ft. or 5 ft. below the stream bed, and during the excessive high velocity of the water in the streams they were undermined and the superstructure damaged. It was found that other foundations were placed on a thin layer of hard pan which varied from 1 ft. to 3 ft. in thickness and was partly soluble in water. As this material was washed out the foundation failed. In one case the bridge abutment was placed on gravel, although solid rock existed about 4 ft. below the base of the foundation.

If it was not known before, it was certainly proved during last year's flood that a gravel foundation for piers or abutments carried to any reasonable depth is not safe without driving piles. It has also been clearly determined that a stratum of hard pan should be of greater thickness than 1 ft. or 2 ft. before it is used as a foundation. In all probability, a stratum of hard pan should have a thickness of not less than 8 ft., and the foundation should be carried at least one-half of this distance into the foundation material. Further, this hard pan should not disintegrate when allowed to stand in water.

Investigation as to the quality of material can easily be made by using a 2-in. or 2½-in. auger inside of a 3½-in. pipe. A sample of the material can be obtained as frequently as desired and to a considerable depth. This method, of course, will not be very satisfactory in a gravel-like material when any boulders are present.

BALLAST

Ballast is a material that is just as essential to the riding qualities of good track as good rails and ties. Poor riding track which is so on account of poor ballast conditions introduces stresses into a car body which will eventually loosen nearly every joint of the whole structure. If the car is allowed to run until this condition is pronounced, it means ultimately that the extra car shop labor and material will cost more than proper track ballasting and surfacing.

The Pennsylvania Railroad, in 1911, made some rather extensive tests to determine the best kind of a cushion for broken stone ballast to be placed between the sub-grade and the ballast proper. Its experiments were made with the idea of using broken stone ballast entirely, but the object was to find out how much and what kind of material was the best to take care of the drainage of the ballast proper and also to distribute the load transmitted through the ballast over the sub-grade. These experiments showed that cinders and good clean gravel were probably the two best materials that could be used as a ballast cushion; also that about 2 ft. of either of these materials under the ballast proper gave the most uniform distribution of load over the sub-grade. For the loads electric railways ordinarily carry 1 ft. of this material would be ample thoroughly to distribute the load over the sub-grade, and this with an additional 1 ft. of regular ballast, either stone or gravel, would give very excellent track. Inasmuch as cinders are a continuous by-product of most electric railways, it would seem that very excellent track could ultimately be obtained by using this material as ballast and then putting in gravel or broken stone on top of the cinders for the regular ballast course.

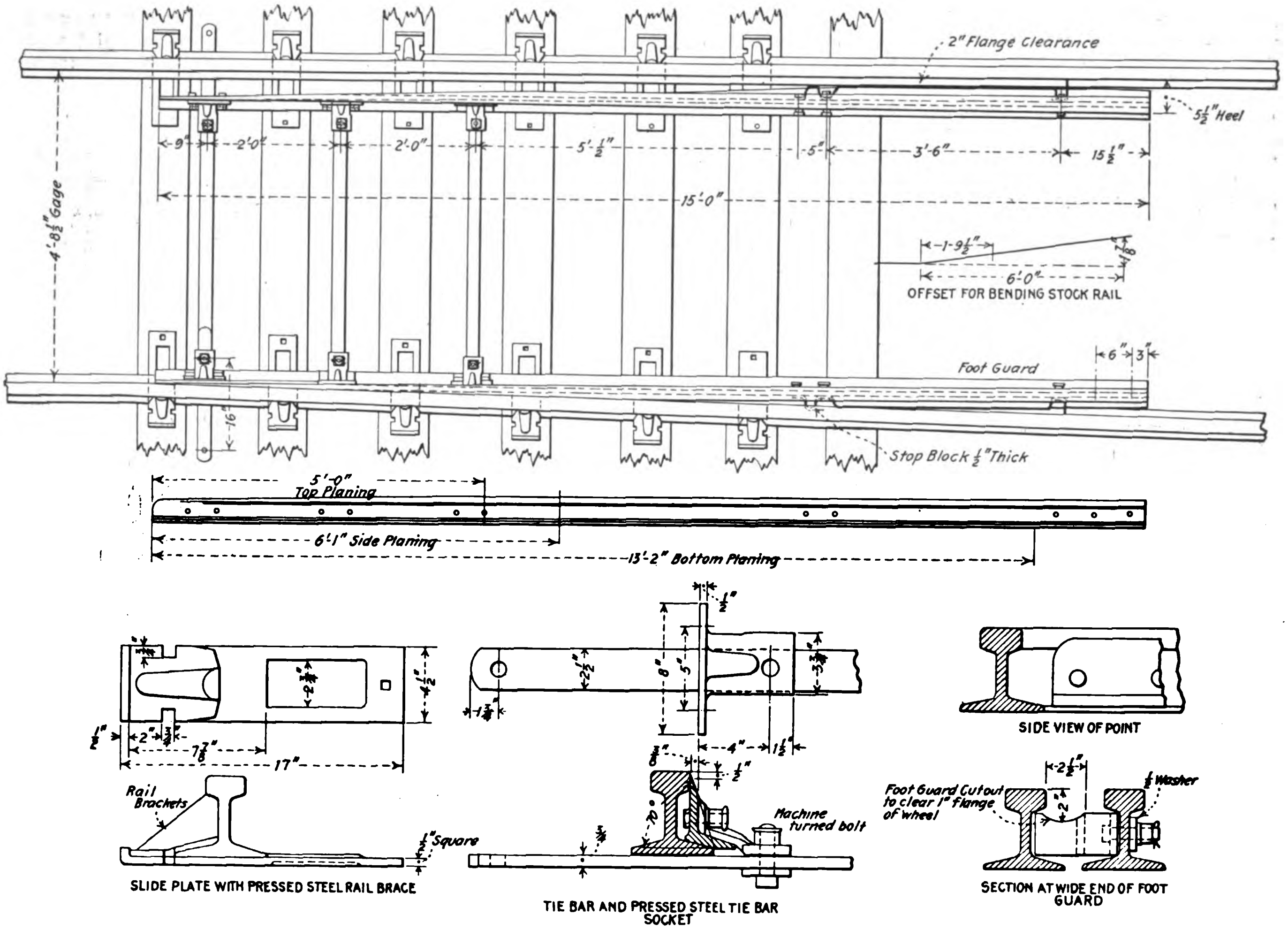

2" Flange Clearance
5½" Heel
9"
2'0"
2'0"
5'½"
5"
3'6"
15½"
15'0"
4'-8½" Gage
1-9½"
6'0"
OFFSET FOR BENDING STOCK RAIL
Foot Guard
6"
3"
16"
Stop Block ½" Thick
5'-0" Top Planing
6'-1" Side Planing
13'-2" Bottom Planing
Rail Brackets
½" Square
2"
7⅞"
17"
SLIDE PLATE WITH PRESSED STEEL RAIL BRACE
Machine turned bolt
TIE BAR AND PRESSED STEEL TIE BAR SOCKET
SIDE VIEW OF POINT
Foot Guard Cutout to clear 1" flange of wheel
¼ Washer
2¼"
SECTION AT WIDE END OF FOOT GUARD

Fig. 3—Track Construction and Maintenance—Detail of Switch Points for Standard Siding

Cinders have a peculiar quality of absorbing water, nor do they wash away so fast as gravel when water flows over the track. On the other hand, cinders will compress and after use for a considerable time will have a more uneven surface than gravel.

STANDARD CONSTRUCTION PROPOSED FOR SIDINGS

For many years it was impossible for electric roads to adopt standards for construction because their method of transportation was new and subject to rapid developments. I am submitting four drawings as possible standards for side-track construction.

Fig. 1 shows the general layout for a through type electric railway siding, using a No. 9 frog which has a lead of about 85 ft., with a frog angle of 6 deg. 21 min. and a 7 deg. 30 min. curvature from the switch points to the frog. Electric railways have generally constructed sidings with too large a frog angle, which necessitates a sharp degree of curvature leading to the siding. This excessive frog angle has been the cause of many accidents and has also increased the maintenance cost on the siding entrance. The siding shown here has a clear distance between clearance stakes of a fraction more than 407 ft., and the total length of the siding between switch stands is 700 ft. The clear distance of this siding will allow the storage of six of the largest interurban electric cars. The reason for making this siding a certain number of pole lengths long is that this allows each switch stand to be placed opposite a pole, thus facilitating the wiring of the electric switch lamp direct from a pole already in place; also, should an overhead trolley switch be used, it would be operated by the switch stand and so could be installed without the necessity of an additional pole.

Fig. 2 shows the construction of the No. 9 frog used in the foregoing siding, with 70 lb. A. S. C. E. rail. This frog has been found to be very satisfactory. All of the plates under this frog are ½-in. thick, and all fillers are rolled steel. This frog has but one spring and one holding-down bar. It is fully equipped with foot guards and an anti-creeper. All bolts in this frog are of special heat-treated steel, whose elastic limit is not less than 75,000 lb. per sq. in. and whose ultimate strength is 100,000 lb.

Fig. 3 is a detail of the switch points for this standard siding, showing dimensions of plates and rail braces; also the extent of the side and base planing. These points are 15 ft. long and are equipped with foot guards. One head rod is adjustable and the other two rods are rigid.

Fig. 4 shows a switch stand which is very desirable on account of its few movable parts and also because every part of this stand is open and can be seen easily, thus enabling a section man to inspect this stand without disturbing any part of it. Another feature is that when the switch is thrown properly the handle will drop into the notch in the top plate. This is evidence to the trainmen that the switch points are in their proper position. Still another good feature is that it is impossible to twist the stem of this stand, because the connecting rod and the crank on the lower part of the stand are always in a straight line, so that should a train run through a switch there will be a direct tension or compression on the crank and the connecting rod. This condition is obtained because the lever handle, in throwing this switch, swings through 180 deg. and leaves the crank for either position of the switch points in a plane at right angles to the plane of the switch handle.

STREET CONSTRUCTION, INCLUDING JOINTS

The foundation material, weight and section of rail and the design of switches and frogs are features of street construction which are very important, but I do not believe that there is any one thing that is of as much importance as the construction of the joint. It has been the experience of practically every electric railway that the joint has failed first and that reconstruction was made necessary on account of the failure of the joints, whereas the rail in between the joints had many years of life.

In modern street construction four types of joints are used. All of these are tight, with the ends of the rails milled so that they will fit tight together with no allowance for expansion and contraction. These types are the driven-bolt joint, riveted joint, welded joint and the combination of bolted and welded or riveted and welded. As far as I can ascertain, the purely welded joint has given trouble. The only explanation I can see for this is that in applying the weld the ends of the rail are heated to a temperature high enough to change the molecular construction of the steel in such a way as to cause fractures of the rail just back of the weld. I have not heard of any failures of the combination joint where bolts or rivets and a small weld were used. I believe that practically as satisfactory a joint can be obtained as any now in use by using driving fit bolts or rivets and supporting the whole joint by means of a broad steel tie. This gives a supported joint, and if the rails are properly ground at the joint so that no hammer is allowed to start, this type promises as long a life as any now in use.

Some companies are buying their rails with the holes drilled or punched a fraction of an inch smaller than the size of the bolt that they intend to use. Then, by means of reaming machines, they ream these apertures out to a true round hole of the exact size that they wish to obtain. Very satisfactory results have been obtained, however, by having these holes drilled to the proper size at the rail mill and then using machine bolts of the same size as the hole. I do not believe that a joint bolt for street track of the heavier type of construction should be less than 1⅛ in. in diameter. Fig. 5 shows the supported bolted joint described.

Where street track is constructed with tight joints and steel ties are used at the joints or throughout the total length of the track, joint bonds and cross bonds can be eliminated by welding the joint bars to the rail and the rail to the steel tie. All rail joints in street track should be ground to an even surface, as the specifications under which we buy rail allow for a possible maximum difference in height of the rails of 3/64-in., and this is sufficient to start a hammer which will very quickly cup the rails.

The foundation of street track is a question upon which engineers differ very widely. Some say that street track foundation should be absolutely rigid, others say that it should be elastic like open track construction, and still others say that it should be a combination of the two. Some engineers assert that they have obtained good results by placing track on ordinary stone or gravel ballast, tamping it well and then concreting on top of the ballast as a foundation for the pavement only. Another type of foundation is to lay from 6 in. to 12 in. of concrete in the bottom of the trench, place in about 1 in. of sand, surface the track on this sand and then fill in to the proper elevation with concrete. The remaining method is to have concrete from the bottom of the trench up to the cushion for the pavement. It is impossible with any kind of ballast to tamp up track so that there will be no settlement, and consequently the pavement will finally work loose about the rails. It would seem, therefore, that a rigid foundation will give a construction which will require the least maintenance of track and pavement.

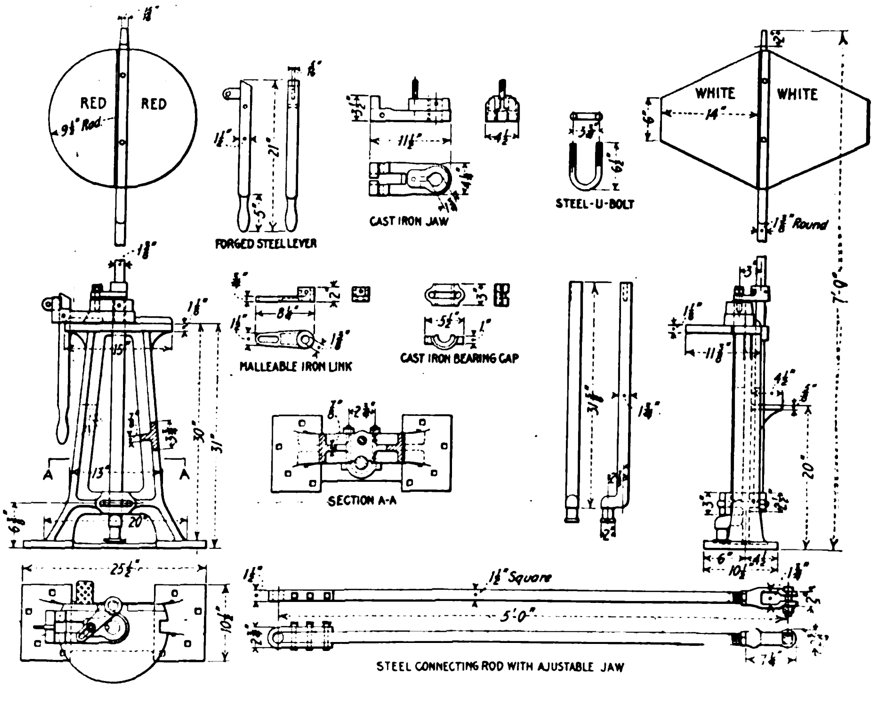


Fig. 4—Track Construction and Maintenance—Details and Assembly of Switch Stands

The proper type of rail for street construction has also been the subject of a great deal of thought. I believe that we will eventually come to the use of T-rails entirely, with a section of sufficient height to allow for paving. This height should not be less than 7 in. A chamfered granite block has been found to give excellent service as a flangeway. Higher carbon steel rails have probably not been used sufficiently to determine the extent of their advantages and whether or not they are worth the increased expense. It is undoubtedly true, however, that for bolts a special steel is advisable. Special steel bolts with an elastic limit of not less than 75,000 lb. per square inch and an ultimate strength of 100,000 lb. are giving a very much stronger joint construction and are also rendering excellent service in built-up railroad crossings.

GUARD RAILS, SPECIAL WORK AND CROSSINGS

In constructing short radius curves at street intersections it is a general practice to have the guard rail higher than the running rail. This is so whether the guard is rolled as part of the running rail or a rail is used as a guard. I have found it very satisfactory, however, to use a guard rail of the same height as the running rail, and to bolt this to the running rail every 2 ft. by 1-in. machine bolts with steel lugs holding the guard rail at the proper distance from the running rail to secure the proper flangeway. In case a rail is used as a guard rail, the method described gives a much more substantial form of construction than using a rail of less height than the running rail and supporting it on steel plates to give it the proper elevation because the equal height guard rail has as a firmer foundation the same ties that support the running rail. This equal-height construction also makes an easier riding street intersection for vehicles.

The raising of flangeways in frogs and mates so that the flange of the car wheels will ride while the tread of the wheel is passing over the opening in the ball of the rail has been widely discussed, and it has been stated that chipped flanges will occur where this type of special work is used. But if a car is operated at the proper speed over a piece of special work with raised flangeways, chipped flange trouble is not probable. A common mistake in the raising of flangeways is that the approach is made too steep so that the flange of a wheel will receive a strong blow when it comes in contact with the raised portion of the flangeway. We want to avoid pounding in the special work as well as at joints, and the raised flangeway with a long flat approach is the way to eliminate this hammer.

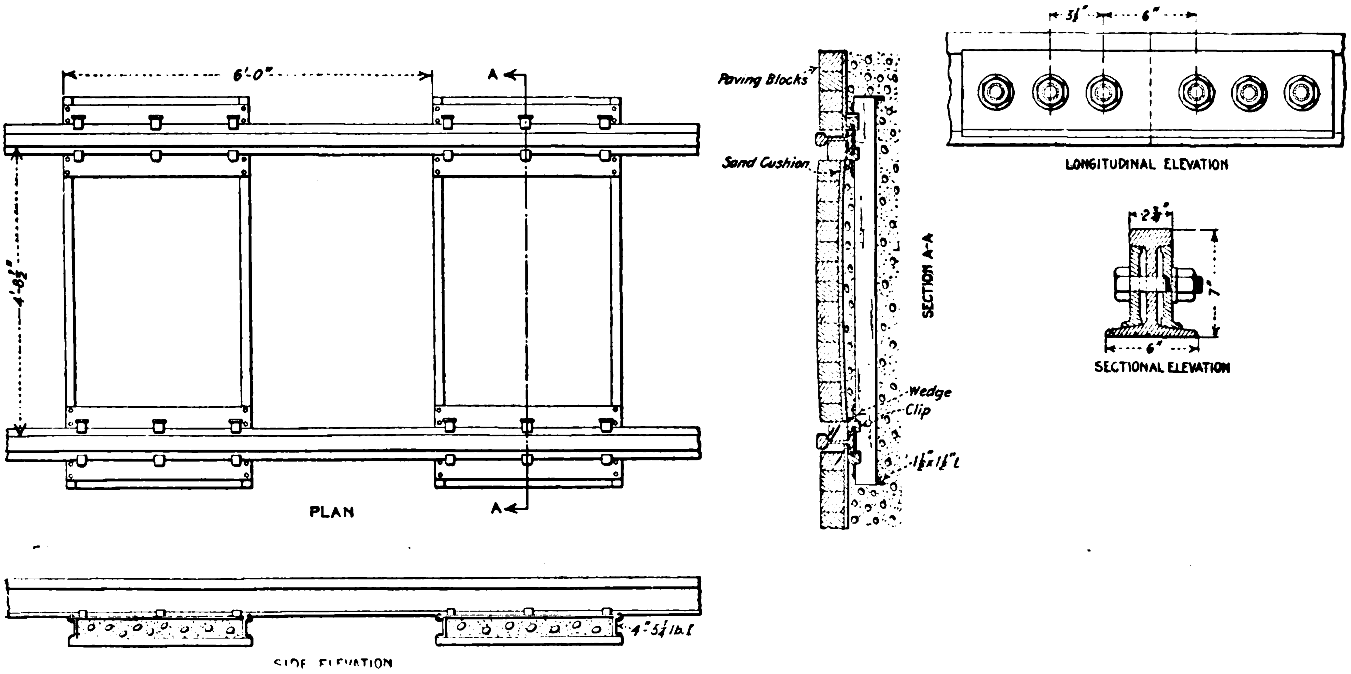


Fig. 5—Track Construction and Maintenance—Sections and Plan of City T-Rail Construction; Also Details of Joint

Railroad crossings and the expense of maintaining them have always been a source of much concern to both steam and electric engineers. Out of 152 railroad crossings during the year 1913, I had eighteen new installations, at an average cost of $260 per crossing. If I include these new crossings, my average maintenance cost per crossing was $68 for the year. An average maintenance cost excluding the cost of the new work but including the cost of installing it was $37.50. It is impossible to arrive at any average cost of maintenance for a railroad crossing, because it depends entirely upon the amount of traffic, but this cost can be decreased and the life of the crossing increased by having a construction which allows as little movement as possible between the various pieces. All of the frog bolts should be driving fit and of special steel, the filler should fit the rail sections under the ball and at the base, and machine knee braces should be used. A rigid inspection of crossings by taking them apart will often reveal a very poor fit between the fillers and the rails and also between the knee braces and the rails. To obtain rigidity in a crossing and reduce the possibility of movement between various parts, solid cast manganese crossings are used to a large extent. Manganese steel, however, will break easily, and I am inclined to believe that the better type of crossing is the built-up type with manganese steel running and easer rails.

The foundation of a crossing should be continuous throughout its whole length of the crossing and should extend beyond the joints of the wing rails. In many cases timbers are used and placed under the steam railroad rails throughout the entire length of the crossing to give them a continuous support. I have found, however, that a steel structure consisting of channels and plates riveted together, filled with concrete and placed in its entirety on broken stone ballast gives very satisfactory results. A crossing with this type of foundation as installed under two main line tracks of the Big Four Railroad did not require any attention for a whole year, whereas in the same length of time an ordinary built-up crossing installed at practically the same time, but without this type of foundation, showed considerable wear and was working to quite an extent, even though the traffic over it was probably less than one-half that of the crossings with the steel foundation. The latter showed very slight wear for the period mentioned. From my experience it looks as though this type of crossing foundation is a decided improvement over other methods, but it may be that longer experience will show that even this foundation can be improved.

RECORDS

The cost of construction and maintenance work must be known to the engineer in order that he may determine, while the work is going on, that it is not more expensive than it should be. Materials purchased for renewals must be kept track of to ascertain if they are rendering proper and efficient service. To obtain this information the records must be such that the desired information will be at hand at the proper time and in the proper form.

ACCOUNT OF THE C. E. R. A. PROCEEDINGS

The annual meeting of the Central Electric Railway Association was held in Assembly Hall, the Hollenden Hotel, Cleveland, this week on Thursday and Friday. The sessions began Thursday morning with 137 delegates in attendance. President Brady called the meeting to order and introduced Hon. Newton D. Baker, Mayor of Cleveland, who made an address of welcome.

Mayor Baker said that he was very glad that the Central association had selected Cleveland as its meeting place this year. Street railways throughout the country were in a period of transition. Over-extension of them had occurred, and the results were still in evidence, although much of this over-construction of railways was justified from the standpoint of city and rural development. Regulation of public utilities in some form was now generally regarded as inevitable. In Europe, where regulation of this kind had preceded that in this country, it had forced private owners of city railways to a large extent out of transportation enterprises. Here regulation is complicated because of outlying and unprofitable lines which had been built for the future. But even where regulation was not active the primary purpose of railway men should be to act as public servants. So far as the future was concerned, the effect of regulation of public utilities would be to improve the mutual understanding and sympathy between the railway company and the public, and the value of pioneering would be recognized. In other words, a calmer attitude on both sides was certain. The Mayor continued that in Cleveland the railway company was a partner of the city. In this case regulation had been very successful, and the relations between the public utility and the city were now on a thoroughly satisfactory basis.

JOINT WEIGHT AND INSPECTION BUREAU

Following the address by Mayor Newton, the president announced that the first business on the program was a discussion of the proposed joint weight and inspection bureau. The papers on this subject by J. H. Crall, C. O. Sullivan and F. D. Norviel were then read. They appear elsewhere in this issue.

Summing up the papers, Mr. Norviel said that he had interviewed several business houses on the subject and that he had been met with ridicule when he called attention to inaccuracies in billing, weights and classification. Mr. Sullivan said that the expense of maintaining the existing bureau of weight and inspection on the steam railroads was divided on a mileage basis, and he did not believe that in the case of the proposed electric railway bureau it should be done on a basis of business handling. Mr. Crall said that so far as his own line was concerned it could have its inspection done more cheaply by hiring a special inspector than by co-operating in any joint bureau on a mileage basis. Nevertheless, he believed in the co-operative plan.

In continuation of the discussion several delegates expressed the belief that the benefit to be derived from such a bureau by the different companies was in direct proportion to the business done and not according to mileage. G. W. Parker, Detroit United Railway, said that a great deal of good on his road had followed a campaign to raise the efficiency of the station agents. He did not believe that the shippers were to blame for inaccuracies in all cases. Overworked shipping clerks often guess at weights. However, he hoped that the work of the committee would be continued as it would be of great value. S. W. Greenland, Fort Wayne & Northern Indiana Traction Company, said that his company expected to install an inspection bureau for itself if the co-operative plan was not adopted.

President Brady said that inspectors should be employed in any case, and that it was a question simply whether they should be employed by the individual road or on the co-operative plan. F. D. Carpenter, Western Ohio Railway, said that if the mileage basis would not do some other should be adopted. He expressed himself as strongly in favor of establishing a bureau of some kind promptly. Then if the details of operation were not satisfactory they could be changed later if necessary. H. A. Nicholl, Union Traction Company, of Indiana, moved that the association should go on record in favor of the bureau and that it should refer the matter to the Central Electric Railway Traffic Association with instructions to work out the details of operation, provided enough roads would join in the plan. The motion was carried unanimously.

CLAIM INDEX BUREAU

William Tichenor, Terre Haute, Indianapolis & Eastern Traction Company, who was to have delivered an address on the subject of the claim index bureau of the association, was unavoidably prevented from attending the meeting. Instead, the discussion was opened by Elmer E. Slick, claim agent Union Traction Company of Indiana. He said that his company had received practically no benefit from the local bureau and practically none from private bureaus. In fact, he believed that few claim fakers really existed and those which were engaged in this business could be discovered without outside agencies.

President Brady said that if the existing local bureau of the association was not serving any useful purpose it should be dropped. After further discussion in regard to the value of the local bureau, the matter of its continuance was referred to the executive committee for consideration and action.

ELECTRIC WELDING FOR TRACK AND ROLLING STOCK

The next subject on the program was "Repairs and Welds of Tracks and Rolling Stock by Electricity," by E. G. Price, Indianapolis Switch & Frog Company. This paper is published in abstract elsewhere.

After reading his paper, Mr. Price exhibited several interesting samples of steel to which additional pieces of both hard and soft metal had been welded.

In further discussion of the paper it developed that the necessity of screens around operators when working in public streets had been shown. These screens prevented onlookers from inconvenience from the bright light produced during the welding. The fact was also brought out that the direct current carried metal with it so that welding could be done with an inverted arc, provided that a small electrode was used. Any tendency of the metal to become overheated and consequently cracked was overcome by the use of thin films of welded material. Power for welding cost from ½ cent to 1¼ cents per minute, but it should be borne in mind that the power so taken from the trolley wire stops instantly when the arc is broken. The sought-for pocketing of metal on the welded part took place with voltages as low as 125, but better results were secured with 200 volts, and 500 volts was necessary for best operation. Grinding of welds after they had been made was necessary because if an attempt was made to smooth off the surface by the carbon flame it injured the surface of the metal.

TRACK CONSTRUCTION AND MAINTENANCE

The paper on track construction and maintenance by L. A. Mitchell, Union Traction Company of Indiana, was then presented by Mr. Mitchell. It is presented in abstract elsewhere in this issue.

During the discussion C. H. Clark, Cleveland, said that if sulphur was present in track ballast through the use of slag or cinders, it was apt to corrode the rails. Mr. Mitchell said that International steel ties had been in use on the lines of the Union Traction Company of Indiana for some fifteen months and had given very satisfactory service. S. W. Greenland, Fort Wayne, said that he had been using cast welded joints for three years without a single failure.

Mr. Clark said that the Cleveland Railway had been employing for some time high-carbon rail with titanium to prevent brittleness. The Clark joints used by the company had high-carbon plates and high-grade rivets. There had never been a failure of this kind of joint. The cost per joint was about $5. G. J. A. Paul, Youngstown, said that the experience on the Mahoning & Shenango Valley Railway with cinders used as a sub-ballast had been satisfactory, but that it had not been used directly as ballast because of its tendency to deteriorate the rails.

The association then adjourned to acept the invitation of the Cleveland Railway to take a trolley trip around the city and visit various factories, particularly those engaged in manufacture of electrical and electric railway apparatus. This trip was very enjoyable.

FRIDAY'S SESSION

The session on Friday was opened with an address on "Taxation," by Peter Witt, City Street Railway Commissioner of Cleveland. Mr. Witt made a vigorous speech advocating the exemption of taxation on improvements. Such a plan, he said, would relieve the increasing burden of taxation which is being carried by corporations. As an example, he cited the unprofitable extensions of the Cleveland Railway, which, he said, were taxed heavily, although the lines increased land values enormously. According to Mr. Witt, a single-tav campaign will be inaugurated next year in Ohio.

The address made by Mr. Witt was followed by a paper on "Railway Motors," by J. F. Layng, railway engineer General Electric Company. This paper is published in abstract elsewhere in this issue.

The annual report of A. L. Neereamer as secretary and treasurer of the association was then read by Mr. Neereamer.

President Brady then delivered his annual address as retiring president. He referred to various local problems before the association and also to national problems in which all of the members were interested. Mr. Brady cited especially the dangers to the community in general and to the taxpayer in particular of municipal ownership of electric railway companies. Regulation of public utility companies, he said, to be successful must be reasonable. Examples of regulation and of ownership of public utilities, such as are often quoted from European practice, are not comparable with situations in this country because of the great difference in conditions. Mr. Brady believed that a campaign for government ownership of railroads here was inevitable and that such a campaign would have an important though indirect influence on the favor with which municipal operation of public utilities would be considered. He believed that the best course to pursue was one of publicity upon the whole question.

The president then called for the report of the nominating committee. This recommended the following:

For president: E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway.

For first vice-president: Charles L. Henry, president and general manager Cincinnati & Indianapolis Traction Company, Indianapolis.

For second vice-president: A. Benham, general manager Ohio Electric Railway, Springfield, Ohio.

For treasurer: A. L. Neereamer, Indianapolis.

These officers were unanimously elected. After President Brady had officially announced the result of the election, Mr. Schneider, the new president, was invited to take the chair. He did so and made a short address in which he expressed his appreciation of the honor conferred upon him. The meeting was then adjourned.

OTHER BUSINESS AND ENTERTAINMENT

The Central Electric Traffic Association held its meeting on the evening of Wednesday, Feb. 25. The report of the chairman was read and discussed. It appears elsewhere in this issue. At the close of the meeting Mr. Neereamer was re-elected chairman.

A smoker for the entertainment of those delegates who arrived in Cleveland early was also held Wednesday evening. The entertainment was provided by professional talent with volunteer assistance. Among those who gave their services were Messrs. Crume, Kennedy, Scullin, Witt and Starkey.

The thanks of the association for this entertainment, which was arranged by the supplymen, were officially extended to them by the association in a vote taken the following day.

MEETING OF 1914 CONVENTION LOCATION COMMITTEE

A meeting of the committee on the location of the 1914 convention of the American Electric Railway Association was held last week. Those in attendance were C. Loomis Allen, chairman; H. C. Donecker and L. S. Storrs, representing the Railway Association, and C. R. Ellicott, H. C. McConnaughy and S. K. Colby, representing the Manufacturers' Association. Secretary Burritt was also in attendance.

It was decided to appoint a committee consisting of Messrs. Storrs, Colby and McConnaughy to visit Boston and consult with the representatives there of the Chamber of Commerce and the Mayor of the city to see what arrangements could be made for holding the 1914 convention in Boston. Secretary Burritt was requested to visit Washington and consult the Chamber of Commerce in Washington to see what arrangements could be made for holding the 1914 convention in Washington.

Another meeting of the committee was scheduled for the afternoon of Feb. 27, when the report of these two committees will be considered.

COMMUNICATIONS

ROLLER BEARINGS IN PLACE OF JOURNAL BRASSES

MICHIGAN UNITED TRACTION COMPANY
ALBION, MICH., Feb. 18, 1914.

To the Editors:

Referring to your editorial of Jan. 31 entitled "The M.C.B. Brass Should Be Discarded," I am not certain that the M.C.B. brass should be discarded simply because some roads using high brakeshoe pressures have had some trouble with displacement of journal brasses. Of course, some roads have for several years been using a design of journal brass which has reduced their hot boxes and have overcome the displacement difficulty by redesigning the brass to give a larger arc of contact on the journal. But this is not necessarily the proper remedy. If the brakeshoe pressure is applied on both sides of the wheel, the tendency to displace the brass and to set up other strains on the truck will be greatly reduced.

However, braking on both sides of the wheel, although undoubtedly a correct method, has not been adopted simply because it adds somewhat to the details on the truck and because it increases the first cost. Yet some of the larger interurban lines are putting on heavier steel coaches and heavier equipment, and, when a pressure of 100 per cent of the light weight of the equipment is applied on one side of the wheel, the M.C.B. limit per brakeshoe has already been reached and exceeded.

I believe that the whole subject of journal brasses, brakeshoes, brake pressures and the redesigning of the journal bearings should be submitted to a committee of the A. E. R. A. with the idea of obtaining recommendations as to the best solution of the whole problem. In this connection it may be appropriate to suggest that the committee investigate most thoroughly the question of whether a new brass should be recommended, or some other form of ball or roller bearing, to take the place of the time-worn and much-abused M.C.B. brass.

There are quite a number of cars now running with this type of bearing and it is quite conceivable that, with the high-grade materials available and the improved methods of manufacture at this time, there may be a solution of the bearing question entirely different from a redesigning of the M.C.B. brass. Cost of power is continually climbing, and if there are any advantages in power consumption, in oil consumption, in cost of maintenance, or in reliability of service, due to another type of bearing, these and other points will be brought out in the investigations of the committee and the whole industry will benefit by its work.

R. C. TAYLOR, Superintendent of Equipment.

END THRUST ON JOURNAL BRASSES

BAY STATE STREET RAILWAY
BOSTON, MASS., Feb. 24, 1914.

To the Editors:

The editorial in your issue of Jan. 31 and the article upon the use of an extended brass on the New York, Westchester & Boston Railway were very much to the point, but it is possible to go somewhat farther in the matter of journal box design, with particular reference to the damaging effects resulting from excessive end play, especially on lighter equipment. In fast interurban service very heavy equipments are generally used, but the long-radius curves ordinarily found on the line enable the car to escape the side lash or pounding back and forth of journals so often encountered with local city or suburban rolling stock on sharp curves. Our troubles with the so-called "M. C. B. standard design" of box have arisen from the limited bearing surface on the top of the journal, with a resulting tendency on its part to draw to one side under a heavy application of the brakes, mainly in interurban service; and in addition, on city cars, the end thrust has required special treatment.

In the M. C. B. standard 3¾-in. x 7-in. box the standard shoulders at each end of the journal are too small to take care of the end thrust for any length of time, and the shoulders soon wear into the brass. Then, as the play increases, the axle bearings, gears and gear cases become damaged. About two years ago this was overcome by placing an end-thrust bar at the end of the journal. The dimensions of the end-thrust bar are about 5¾ in. x ⅞ in. x 1⅞ in., the bar being of malleable iron and lined with babbitt on the inside face, the metal being held in place by pouring it through the tapered holes. A photograph of the open journal box with the thrust bar in place was shown in the Oct. 5, 1912, issue of the ELECTRIC RAILWAY JOURNAL on page 617. A similar illustration was also shown in the 1912 report of the equipment committee of the American Electric Railway Engineering Association. In extending the brass down the side to about half the diameter of the axle it was found necessary to use only about 30 per cent of its bearing area to take care of the side play.

To introduce this improvement it was necessary only to extend the boss on the side of the journal box 1 in. and place ribs or lugs at the sides so that the end-thrust bar could be properly carried. This additional work on the standard box did not change its actual features or prevent its use in connection with the old standards. This small alteration of the box has covered the ground fairly satisfactorily and has required no change in the standard journals.

In making use of the extended brass the box has to be lifted a little higher than is usually necessary, and to accomplish this, together with the use of the end-thrust bar, the lugs supporting the latter must not project out far enough to interfere with the lifting of the box sufficiently so that the extended brass can be slipped into place. I feel that the subject should have the further attention of the Engineering Association, and it, no doubt, will be taken up as soon as the opportunity permits.

E. W. HOLST, Superintendent of Equipment.

WELL-BUILT TRUCKS A HELP FOR JOURNAL-BRASS TROUBLES

NEW YORK, Feb. 24, 1914.

To the Editors:

Experience with journal brasses on motor trucks seems to indicate that most of the troubles (principally consisting in the brass being worn out of shape) seem to be due to the pull of the motors on the axle, as well as to the action of the brake. In all cases these are aggravated by the loose fit of the journal boxes in the pedestal guides. If proper attention is given to this point, most troubles with journal brasses will vanish. There have been trucks turned out by prominent manufacturers which were literally thrown together and in which scarcely anything fitted; even truck bolts were a loose fit before the pressure of the nut was applied. On the other hand, some trucks are built with care, journal boxes are fitted to pedestal guides, bolt holes are reamed with a taper reamer and bolts are a driving fit.

In using outside brakeshoes on well-built steel motor trucks the action of the air brake has never caused any trouble with journal brasses.

Over twenty-five years ago the old Eames Vacuum

Brake Company, now the New York Air Brake Company, used fifteen or twenty different styles of locomotive brake rigging, and among these was one with a brakeshoe on each side of the driving wheel. This type was applied principally to eight-wheeled engines, usually at the request of the railroad company, which wished to avoid the pressure on one side of the driving boxes. However, most roads did not consider the point a serious one and do not do so at this time. We did not call that type of brake a "clasp brake" then—some one has invented the name since. E. C. BOYNTON.

PACIFIC CLAIM AGENTS' EXECUTIVE COMMITTEE MEETING

The executive committee of the Pacific Claim Agents' Association met at 11 a. m., Feb. 6, 1914, at Seattle, Wash., in the office building of the Puget Sound Traction, Light & Power Company, where the secretary-treasurer of the association maintains offices.

Pacific Claim Agents' Executive Committee Meeting at Seattle

Those present were: President J. H. Handlon, claim agent United Railroads of San Francisco; First Vice-president Thomas G. Aston, claim agent Washington Water Power Company, Spokane, Wash.; Second Vice-president A. M. Lee, assistant general claim agent Northern Pacific Railway Company, Seattle, Wash.; A. E. Beck, claim solicitor British Columbia Electric Railway, Vancouver, B. C.; H. G. Winsor, claim agent Tacoma Railway & Power Company, Tacoma, Wash.; H. K. Relf, claim agent Spokane, Portland & Seattle Railroad, Portland, Ore.; B. F. Boynton, claim agent Portland Railway, Light & Power Company; George Carson, general claim agent Puget Sound Traction, Light & Power Company, Seattle, Wash., and T. N. Henry, temporary secretary-treasurer.

After the subject committee for the 1914 convention had made its report and President Handlon had read a list of a large number of suggested topics, it was finally decided to have written discussions on the following subjects prepared for the annual convention to be held at Spokane on July 9, 10 and 11, 1914:

What methods should be pursued to keep informed of the movements of witnesses in cases where litigation is likely to arise?

What are the most effective methods that can be adopted by public service corporations in prosecuting fraudulent claimants and professional witnesses?

The prevention of automobile accidents. Statistical information showing the accident cost of trainmen with respect to length of service.

To what extent can the claim department co-operate with the operating department in the matter of selecting trainmen as to their moral, mental and physical fitness?

What can be done toward remedying the trespassing evil?

The following questions were also selected for oral discussion: "Is it advisable for a statement to be secured from an injured person immediately after an accident occurs without regard to liability or the intention of the injured person to file claim?" and "What policy should be adopted in the disposition of claims of doubtful liability?"

It was decided to establish a library of safety literature at the office of the secretary-treasurer of the association and to make an exhibition of this safety literature at the Spokane annual meeting for the benefit of the public.

The following committee was appointed by the president to make a report on the safety movement from the standpoint of the public and from the standpoint of transportation companies: Messrs. Carson, Aston, Lee, Boynton, Beck and Winsor. The following committee was selected to have charge of the entertainment to be afforded the members of the association at Spokane: Messrs. Aston, Relf, McDonald, Crowther, Ryan and Kone. T. N. Henry was elected secretary-treasurer of the association.

MEETING OF 1915 CONVENTION COMMITTEE

A meeting of the committee of the American Electric Railway Association on the location of the 1915 convention was held in New York Feb. 25. Those in attendance were J. D. Mortimer, chairman, C. L. Henry and H. C. Donecker, for the Railway Association, and E. H. Baker and H. G. McConnaughy, for the Manufacturers' Association. Secretary Burritt was also in attendance.

The committee first attempted to estimate the number which will attend the San Francisco convention because a guarantee must be given to the hotels so that rooms will be reserved. It was decided, however, that in view of the unusual circumstances of distance, etc., connected with this meeting it was practically impossible for the committee to estimate the attendance without further information. Consequently it asked Secretary Burritt to mail to each member company a circular letter asking each company to advise the association of the number of men each will send to the convention and for which the company will guarantee the hotel charges, also the number of additional representatives who will probably attend the meeting. The letter will be accompanied by a blank on which this information may be entered.

The companies will also be asked to state as closely as possible the period of time for which the rooms will probably be required, the kind of room wanted, etc. This letter will be accompanied by a statement of the rates to be charged during the convention period by the different hotels, if this information is available at this time. The committee sent a telegram to Messrs. Gregory and Hanlon, the Pacific Coast members of the committee, for this information. The hotels in San Francisco request this information from the association by July 1 of this year so that they may make the desired reservations.

ANGLO-AMERICAN EXPOSITION

The exposition which is being arranged to celebrate the 100th anniversary of the treaty of Ghent is expected to promote a friendly feeling between the two countries. To this end the management urges that the representatives of American firms should be men capable of making the most of the opportunity. Each exhibition space should be regarded as an actual branch of the house represented.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

STATUARY BRONZE FINISH OF CAR HARDWARE

BY O. T. KREUSSER

The repolishing of the bright brass work on cars every few years, or at more frequent intervals, to keep it presentable, has undoubtedly exasperated more than one individual who is interested in car maintenance. In order to refinish the hardware properly, it is necessary to remove and repolish it. This means the labor of removal and replacement with its accompanying loss of parts; furthermore, the permanency of finish depends entirely upon the life of the lacquer which is used to prevent the tarnishing.

To obviate this trouble and at the same time enhance the finished appearance that bronze trimmings give to a car the statuary bronze or oxidized surface finish was introduced. The theory of this treatment is to tarnish the brass work with chemicals to a suitable and attractive shade before installation, and then when it is worn or chafed the tarnish due to natural oxidization will readily blend with the tarnish which was first applied artificially. In this way good appearance is maintained permanently, as the trimmings can be readily cleaned and freshened simply by rubbing them off with a rag and oil when necessary. Many roads have obtained these statuary finishes (of which there are endless shades of color) on new equipment as applied by the hardware manufacturers, but they do not know how to duplicate the finish when replacements or repairs become necessary.

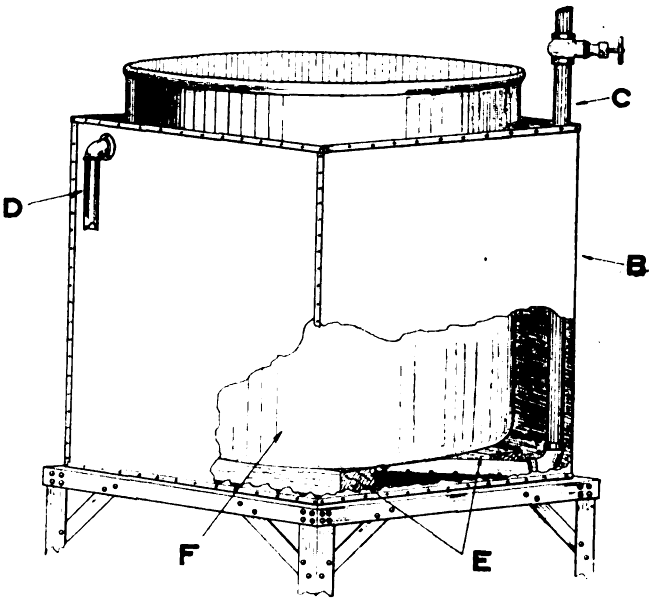
The following process can be readily adopted at any shop that has access to a sand blast. It will give uniform results without the necessity of scratch brushing at a cost of labor and material no greater than that of polishing.

Before coloring it is necessary to obtain a clean matte surface on the brass work to permit the coloring chemicals to act evenly and without spotting and also to attain some depth in the surface of the metal. The sand blast readily accomplishes this and at the same time removes all old lacquer, dirt, grease, etc. The coarseness of the sand and the air pressure used determine the roughness of the matte finish. The operator should handle everything during and after sand-blasting with cloth gloves in order to eliminate finger marks on the finished work.

After sand-blasting, the work is hung on copper wire hooks, suitably arranged on sticks (in order to handle as many pieces as possible in one operation), and then thoroughly rinsed in clear water. A bristle brush is used, if necessary, to remove dust and sand, and then the pieces are dipped into solution No. 1, which is made up in approximately the following proportions: hot water, 10 gal.; copper sulphate (bluestone), 20 lb., and potassium chlorate, 20 lb. This solution is heated to about 200 deg. Fahr. or above, either by a steam coil in a water bath which surrounds an earthen crock containing the solution or by direct flame under the water bath. Metal should not be allowed to come permanently in contact with the solution on account of the latter's rapid corrosive properties.

After the pieces have been permitted to hang in solution No. 1 for several minutes, they will assume a light brown color. They are then rinsed in clear water and dipped momentarily but repeatedly in a wooden tub containing No. 2, a very dilute cold solution of about 2 oz. of sodium sulphide (liver of sulphur) and 10 gal. of water, until the proper deep brown shade is obtained.

Following this process, the pieces are rinsed thoroughly in clear water, dried in sawdust and lacquered. The lacquering is not absolutely necessary but eliminates any undesirable appearance which may be caused by chemicals not thoroughly washed or by dust getting into the matte surface.



B—⅛-in. sheet-iron tank. C—Steam pipe with perforations at bottom of tank. D—Water overflow to sewer connection. E—Hard maple blocks supporting crock above steam pipe. F—Earthenware crock, 24-in. or larger in diameter.

Statuary Bronze Hardware—Method of Heating Solution with Water Bath

Solution No. 1 can be used indefinitely by adding additional chemicals, a few pounds at a time, and stirring as required. It is advisable always to work the solution at about the same temperature in order to get uniform results. Solution No. 2 will be more active if made upon the day of use.

The process is accomplished very rapidly, and with a little system the man engaged can keep the several operations running simultaneously. Long pieces, such as brass hand-strap rails or other parts that are too long to be placed endwise in the crock may be readily treated by slowly moving them across the top of the crock and by ladling the hot solution over them with an earthenware dipper. Screws, etc., after sand-blasting, should be handled throughout the process in an earthenware basket.

NEW USES FOR ELECTRIC ARC WELDING

BY R. H. PARSONS, ELECTRICAL FOREMAN THIRD AVENUE RAILWAY, NEW YORK

It is no longer necessary to defend the practicability of electric arc welding, as that fact is proved by its continued successful use in many large shops. For example, the Third Avenue Railway has been using a home-made welding outfit at its Sixty-fifth Street shops for more than two years. The variety of work to which this outfit is adapted is surprising. The accompanying halftones illustrate a few of the jobs that have been carried out with this equipment since it was described in the Electric Railway Journal for June 21, 1913.

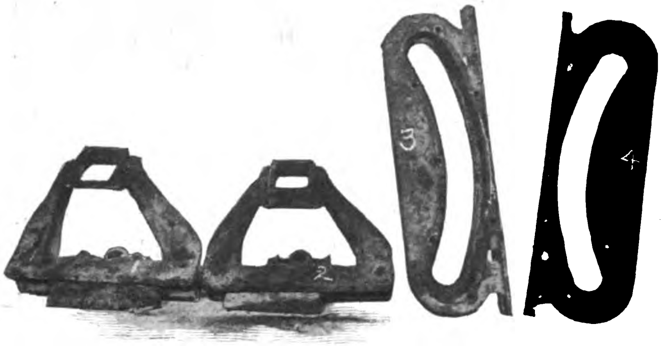


Fig. 1—Worn and Repaired Compression Spring Bracket and Radial Casting

Fig. 1 shows some easily recognized truck parts. No. 1 is a compression spring bracket of a Brill 22-E truck of which the part holding the compression block is nearly worn through. No. 2 is a similar bracket which was worn to the same extent but which was repaired by filling it in with the electric welding process. No. 3 is a radial casting of a Brill 22-E truck worn badly in the slide, as illustrated by the chalk mark on the casting. No. 4 is a similar part, which was worn as badly as No. 3 but which was repaired.

Fig. 2 presents a number of small parts which will be explained in detail, using the chalk-marked numbers as guides. The parts in the center on which the numbers cannot be seen are a good sample of "before and after." They show a compression block of a 22-E truck. After the repair noted in this picture, the block was ground to a smooth finish and is now as good as new. Nos. 12 and 13 show one of a large number of reclaimed body spring posts, also of Brill 22-E trucks. As they are built up by the electric welder they are hammered continuously on an anvil. When built up to a size a trifle larger than needed, and while still quite hot, the post is dipped two or three times in cold water, thus chilling and hardening the surface extremely. The post is then ground to a smooth finish, and is then actually better than a new steel one.

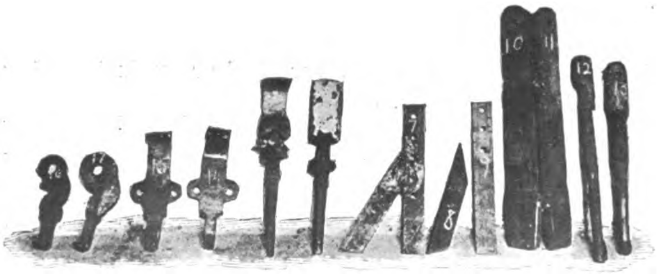


Fig. 2—Miscellaneous Parts, Before and After Welding

Nos. 7, 8 and 9 are life-guard brackets which formerly were welded by a blacksmith. The present method, however, is to cut and drill the pieces of straight flat iron by the use of jigs and then to place them in a form which holds them in the shape to which they should conform when finished. While in the form the holes in the brackets are placed over pins to keep the pieces in their proper position, nor are the pieces allowed to touch each other. The pieces are then welded, and upon cooling they are removed from the form finished. The job is completed in about one-half the time taken by the old method of welding the pieces with the blacksmith fire, cutting off the ends and drilling.

Nos. 10 and 11 are brake levers. No. 10 is worn quite badly at the place where it rests on the support. No. 11 is a similar lever which was worn but which has been built up by the electric welding process. The lever is ground smooth before re-use.

Nos. 14 and 15 present a brake lever fulcrum which was originally made for a narrow beam but which later was changed for use on a wider beam. The end of the old fulcrum was cut off, a new piece was made by the blacksmith, as shown by No. 14, and then this piece was welded on with the result shown in No. 15. Fulcrums for 200 trucks have been so remodeled.

No. 16 shows the fulcrum as it was before cutting it for No. 15. Some of these fulcrums were found to give way at the place shown by the pencil mark. To overcome this a ¾-in. x 1-in. iron was bent to fit over the part where the eyelet is, extending to about the center of the back of the fulcrum. Then the iron was secured to the fulcrum by means of electric welding.

Fig. 3 is a pedestal for a storage-battery sweeper. This piece was broken at the points shown by the chalk marks, the jaws having been broken off entirely when the sweeper left the track during the snowstorm of Feb. 13. The pedestal was removed from the sweeper, sent to the shop, repaired and returned to the sweeper within twelve hours. This job was accomplished by bolting the jaws in place with two strips of iron and by welding. The metal was preheated in a blacksmith forge, welded while hot and when finished it was left to cool in the dying forge fire. This precaution was taken to prevent cracking from unequal contraction, as the material was cast iron.

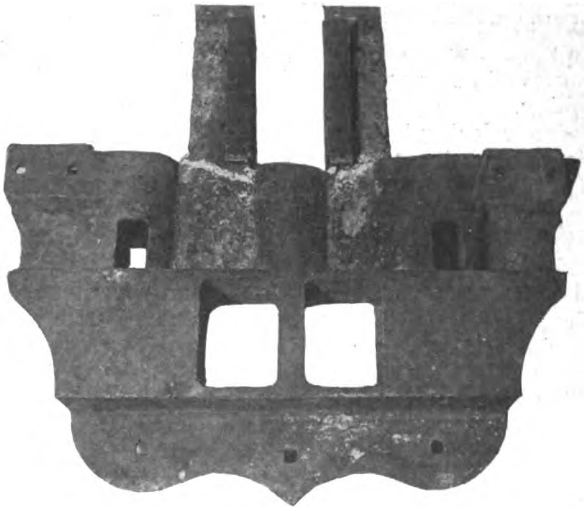
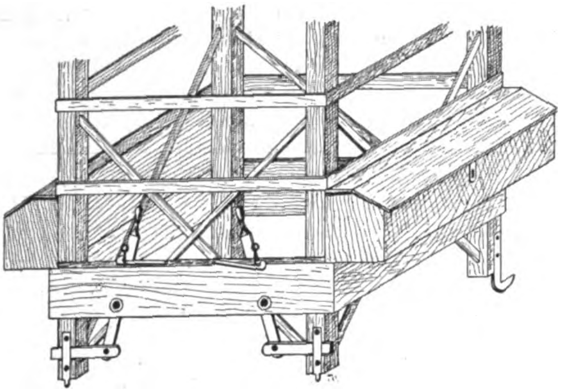


Fig. 3—Repaired Pedestal of a Storage Battery Sweeper

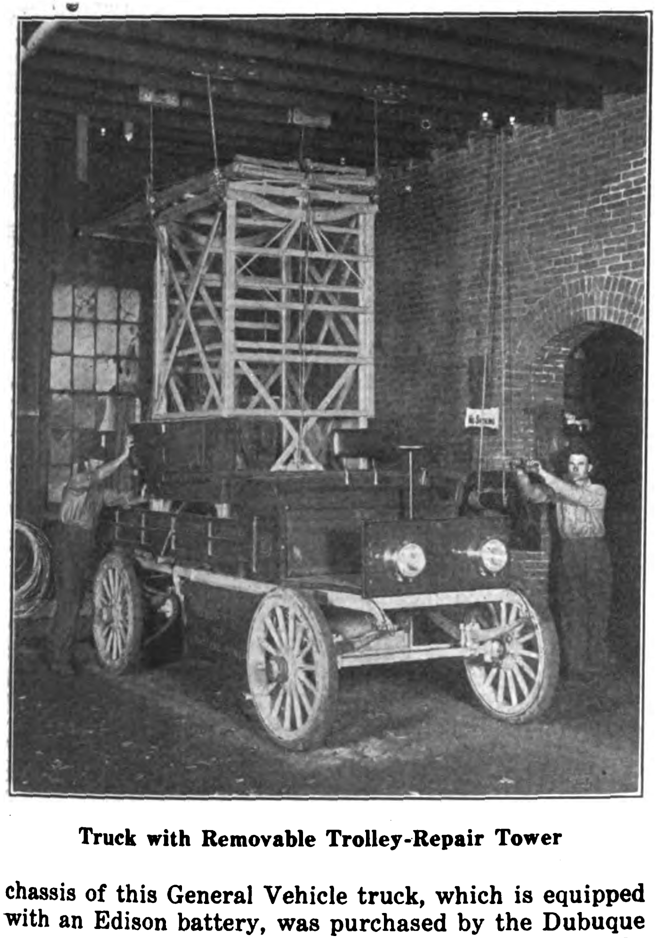
It is unnecessary to give the costs and other particulars of these jobs, since it is apparent to all how great the saving must be, particularly in the case of castings Nos. 1 and 3 and the sweeper pedestal. The main point is to be able to keep the cars moving by having available a convenient means of repairing important parts.

ELECTRIC TRUCK WITH REMOVABLE TOWER

The Union Electric Company, Dubuque, Ia., has in use an electric 1-ton truck which is equipped with a removable trolley-repair tower so that the vehicle may be employed either as a regular delivery truck or as a tower wagon. When not in use the extensible tower is hung on ropes and pulleys in one corner of the garage. To convert the truck into a trolley-repair wagon, it is backed under the suspended tower and the framework is lowered by means of the double windlass at the right. Bolts hold the tower in place on the body of the wagon. The chassis of this General Vehicle truck, which is equipped with an Edison battery, was purchased by the Dubuque company about twelve months ago, tower and body having since been built in the company's own repair shops. H. G. Gorr, superintendent of light and power, designed this form of removable tower.



Method of Attaching Tower of Truck Body

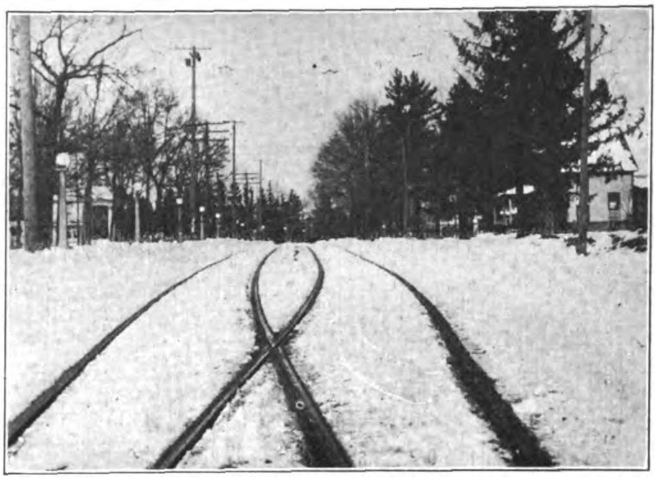


Truck with Removable Trolley-Repair Tower

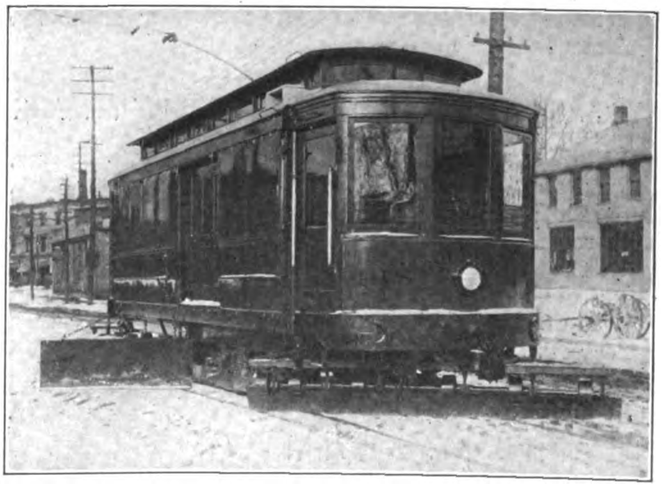
The Victorian Parliament has passed four bills for the construction of electric railways around Melbourne, Australia. The total cost of the railways will be about $1,140,000.

MICHIGAN UTILITY CARS WITH SNOW-REMOVAL EQUIPMENT

The Michigan United Traction Company, which operates the interurban lines radiating from Jackson to Kalamazoo, Lansing, St. Johns and Owosso, and also the city lines in these places, has just placed in service in each city general utility cars of the type shown in the accompanying halftones. The car bodies are 35 ft. long and are supplied with single Dupont trucks, two GE-57 motors and double-end K-34 controllers. The bodies have steel underframes and are fitted with forged drawbars designed for heavy hauling and wrecking purposes. They are fitted with center side doors and are supplied with jacks, blocks, rerailers, hose bridges, ropes, chains and, in fact, everything necessary to handle derailed or disabled city cars. They are also equipped with large sand boxes for carrying 60 cu. ft. of sand, so that they may be used for sanding the tracks when necessary. During the winter months these utility cars are equipped with diagonal snow scrapers and with side wings on both sides and ends. These devices are all operated by hand wheels from the interior of the car.

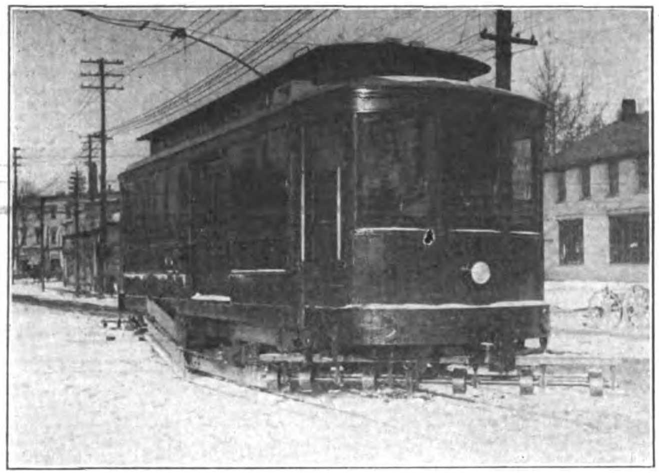


Michigan United Utility Car—Section of Double Track Cleared by Snow Scraper



Michigan United Utility Car—Wings and Scraper in Operating Position

The diagonal scrapers, it is believed, are unique. They are mounted on the cars normally at an angle of 45 deg. to the track and project beyond the rail 3 ft. on each side. These scrapers are pivoted on the right-hand end and may be set to take any width of devilstrip from 4 ft. to 6 ft., or they will swing to the inside limits of the car body for clearance at the carhouses. The scraper blades are 3/16-in. steel, 12 ft. long, with curved top. They are cut and lapped at the center to conform to the contour of city pavement. The blades are hung on six-scroll springs mounted on a solid shaft resting in compensating bearings. These diagonal scrapers clean the snow from the center of the devilstrip to the right-hand side, and then the snow may be winged up to 8 ft. outside the rail. During a recent storm these cars were operated at full speed, and after passing up one track and down the other, left the street clean to the rails for a total width of 31 ft. 4 in. Their operation during the winter has been very satisfactory. The diagonal scrapers were designed by the engineers of the Michigan United Traction Company, in consultation with F. N. Root, and are being manufactured for general sale by the Root Spring Scraper Company, Kalamazoo, Mich.



Michigan United Utility Car—Wings and Scraper in Carrying Position

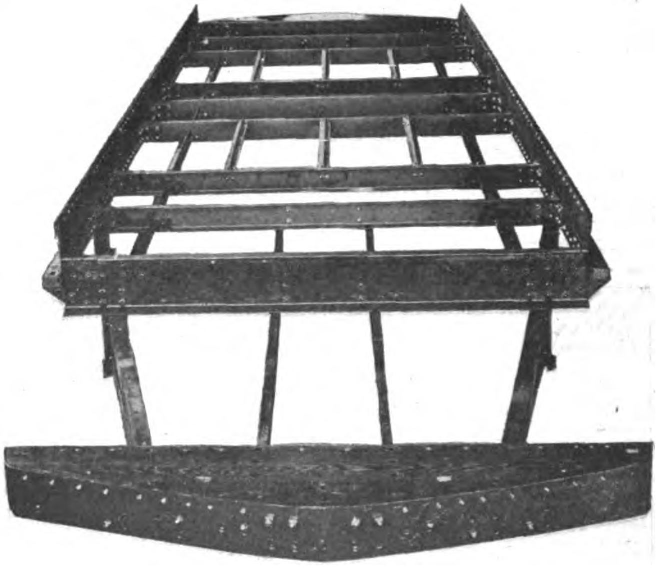
STEEL UNDERFRAME CARS FOR PINE BLUFF, ARK

Within the past year the Southern Car Company, High Point, N. C., built for the Pine Bluff Company, Pine Bluff, Ark., twelve steel underframe single-truck, arch-roof cars of the type illustrated, in accordance with the designs of Ford, Bacon & Davis, consulting engineers. These cars are completely vestibuled with hinged doors so that no bulkhead doors were considered necessary. The platform steps are fixed. The principal dimensions of these cars are as follows: Length of the car body over the bumpers, 33 ft. 10 in.; over the dashers, 32 ft. 4 in.; over the corner posts, 21 ft. 4 in.; over the platform steps over all, 4 ft. 6 in.; over the side posts, 8 ft. 3 in.; over the letterboards, 8 ft. 3½ in.; over the upper drip rails, 8 ft. 6 in.; over the sidesill angles, 8 ft. 2½ in.; distance from the top of the rail to the top of the roof at the center, 10 ft. 8 11/16 in.; distance from the top of the rail to the floor level, 2 ft. 9 11/16 in. The step heights are 12 13/16 in. from the top of the rails to the first step and 12 in. from the first to the second step. The truck has a wheelbase of 9 ft. and is fitted with 33-in. wheels.

THE PINE BLUFF COMPANY

Arch-Roof Single-Truck Car Without Bulkhead Doors

The side sills comprise 1¼-in. x 12-in. steel plate with an angle at the bottom and a steel bar riveted to the plate on the same side as the angle; the end sills are 10-in., 15-lb. channels which are riveted to the side sills and reinforced at the corners with angles; the cross sills, which are riveted to the side sills through intermediate angles, are 6-in., 8-lb. channels. As to the body framing, the corner posts are of yellow pine 3½ in. x 3¾ in., made in two pieces; the side posts are 1 in. thick by 1¾ in. maximum width and the continuous-type carlines are formed of steel 1¾ in. deep and 3 in. wide bolted to side pieces and wooden carlines. Poplar is used for the roof and agasote for the ceilings.



Underframe of Pine Bluff Single-Truck Car

The interior finish is in dull mahogany. Ventilation is obtained by means of Garland ventilators, two per car. The operating equipment of each car includes two GE-219 motors rated at 40 hp each, K-36 control and St. Louis vertical wheel brakes.

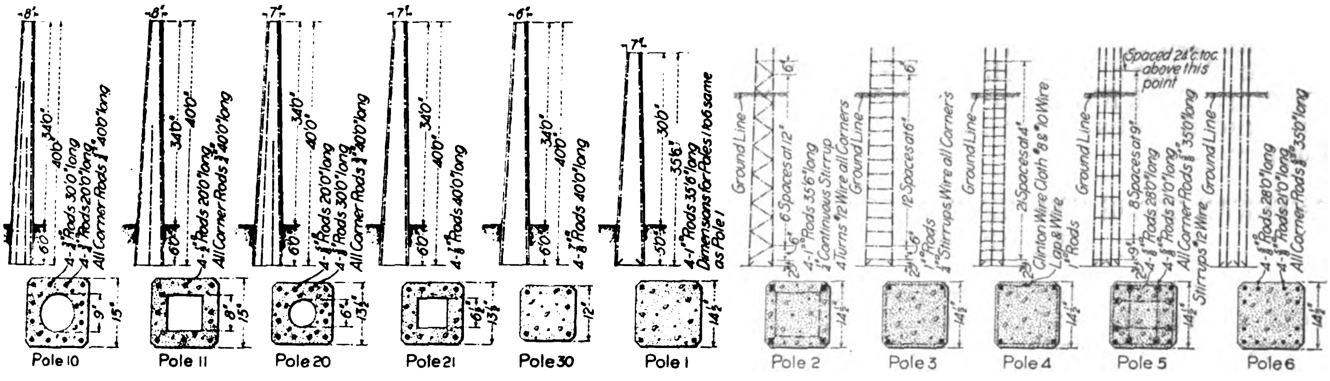
PROPOSED SELKIRK TUNNEL AND ELECTRIFICATION

Plans for the boring and ultimate electrification of a five-mile, double-track cut-off tunnel through the Selkirk Mountains in British Columbia are being considered by the Canadian Pacific Railroad. The bore of the tunnel will be 17 ft., and the grades encountered will reach about 2 per cent. It is expected that the tunnel will be approached by an electrified section of 7 miles of double track and that the third-rail 2400-volt d.c. system will be employed. Power will probably be supplied from a future power station to be installed near the electrification, rather than by undergoing the great expense of erecting a long transmission line over this mountainous section, in order to purchase energy from any already existing station.

When the question, Shall smoking be abolished on street cars? comes up for settlement with any city, there can be only one answer in the opinion of *The Journal of the American Medical Association.* From the point of view of hygiene and common cleanliness, to say nothing of the comfort of the majority, smoking on street cars is an indefensible nuisance.

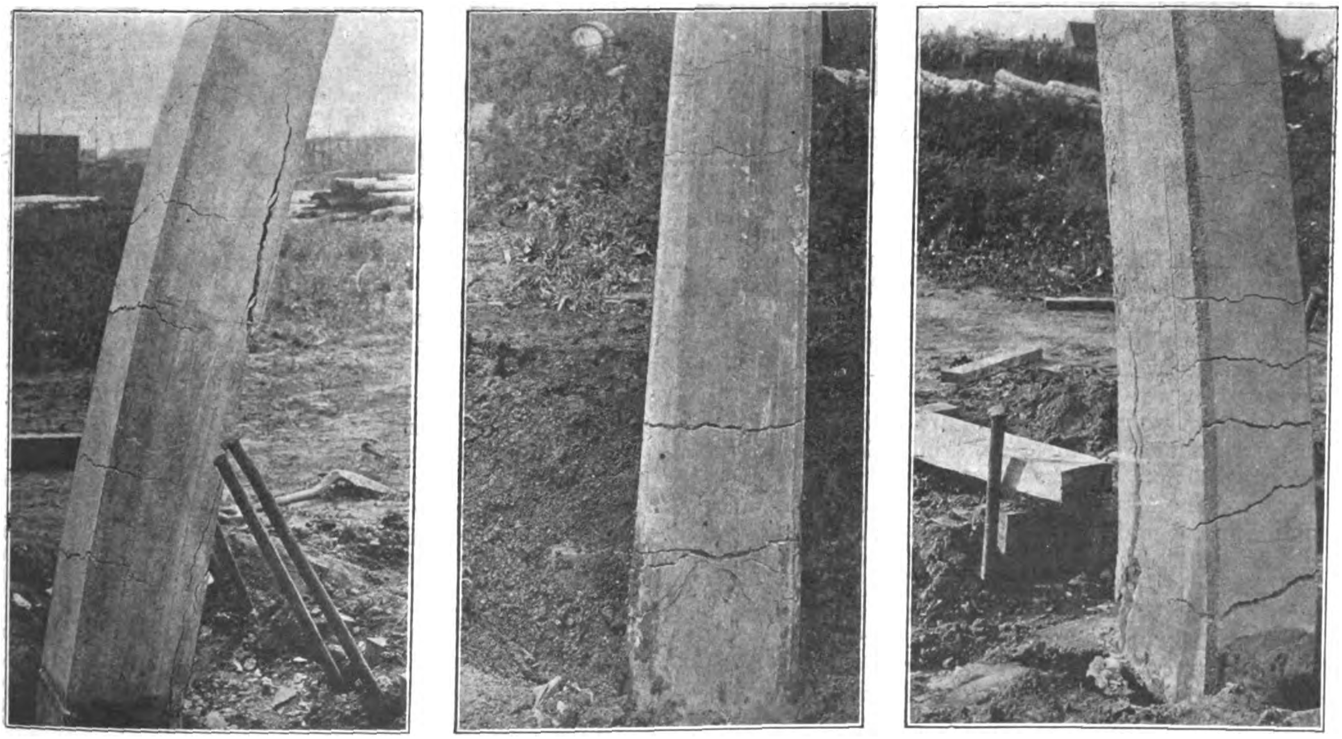
RECENT CONCRETE-POLE TESTS

Two subsidiary companies of H. M. Byllesby & Company, of Chicago, have made systematic tests of solid and hollow reinforced poles, with the object of determining the best form of pole and placing of reinforcement. Six poles each were tested by the Oklahoma Gas & Electric Company at Oklahoma City, Okla., and the Nashville Railway & Light Company at Nashville, Tenn. The cross-section of the poles and the schemes used in reinforcing are shown in the accompanying diagram.


Pole 10
Pole 11
Pole 20
Pole 21
Pole 30
Pole 1
Pole 2
Pole 3
Pole 4
Pole 5
Pole 6
All Corner Rods
Dimensions for Poles 1 to 6 same as Pole 1
Ground Line
6 Spaces at 12"
Continuous Stirrup
4 Turns #12 Wire all Corners
12 Spaces at 6"
Stirrups Wire all Corners
21 Spaces at 4"
Clinton Wire Cloth #8 8"#10 Wire
Lap 8 Wire
8 Spaces at 9"
Stirrups #12 Wire
Spaced 24" c. to c. above this point

Designs of Test Poles—Poles 10 to 30 Were Tested at Oklahoma, 1 to 6 at Nashville

The concrete for all poles was in the proportions 1:2:3½, and high-carbon square, cold-twisted steel bars of 50,000 lb. per square inch elastic limit were used for reinforcing. The rods were bent to insure good bonding. The poles were molded in wooden forms by men experienced in concrete work but not especially trained for pole making so as to duplicate field conditions. The hollow poles were made with sectional tapered sheet-iron cones.



Concrete Pole Tests—Cracks from Stresses in Poles 3, 4 and 5

At Oklahoma City the pull was applied by means of a cable attached 6 in. below the top of the pole and passing over a block attached to a neighboring gas tank frame. A coal car was attached to the free end of the cable and loaded with sacks of sand. At the ground line the poles butted against a heavy, rounded-end timber braced against the bank, with another timber renewed for each test braced against the butt.

At Nashville the pull was applied by a cable attached 1 ft. from the top of the pole and passing through a block at the top of a guyed mast. The pull was applied by a hoisting crab and measured by means of a pair of dynamometers. Here the poles were braced at the ground line and concrete footings were placed around the butts. Deflections were measured by means of a rule at Oklahoma and by rule and plumb bob at Nashville. Poles were tested to destruction in all cases.

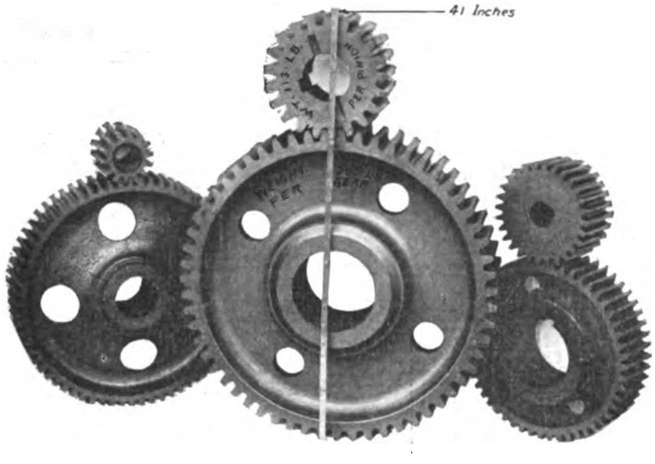
The general conclusion was that hollow poles are not successful in resisting shearing forces from the ground line down, as all showed shearing failure in this region. After failure the tendency of the concrete on the compression side was to slide by that on the tension side, causing a shearing action in the side walls. Inasmuch as hollow poles are more expensive than solid ones and are more difficult to make and as they are not much lighter for equal strength, their use is not advised. Poles having few bars with some butt reinforcement were shown to be preferable.

At Nashville the tests showed that a safety factor of two is obtained when 1200 lb. per square inch unit stress is allowed for 1:2:3½ concrete and 30,000 lb. per square inch for high-carbon steel. The average calculated breaking load (straight-line formula used) for four hollow poles was 2375 lb., and the actual breaking load was 1557 lb. applied 6 in. from the top. Five of the solid poles had calculated average breaking loads of 3500 lb., while the actual breaking load was 3610 lb.

The tests at Oklahoma City were under the direction of J. M. Brown, superintendent of the electrical department, under the supervision of W. R. Molinard, secretary and general manager of the Oklahoma Gas & Electric Company, a subsidiary of H. M. Byllesby & Company. H. M. Fisher superintended the building and testing of the poles for the Nashville Railway & Light Company.

AMERICAN GEARS FOR HEAVY ELECTRIC TRACTION IN ENGLAND

The Tool Steel Gear & Pinion Company, Cincinnati, Ohio, through its London representatives, Scholey & Company, Ltd., recently received the contract for a total of 344 gears and 344 pinions to be used in electrification work on the London & South Western Railway, London, England, one of the large steam railroads. Not only is this the largest single order that has been placed in England but the gears are believed to be the largest known in electric railway service. They have sixty teeth, two diametral pitch, with 6-in. face, 8-in. bore and an outside diameter of 30½ in. The forged blanks from which these gears are made weighed a little more than 700 lb. each, while the finished gear weighs 565 lb. The gears are to be used on 200-hp motors. The accompanying halftone shows the size of the gear and pinion as compared with an ordinary city service gear and pinion and with an interurban gear and pinion. The diameter of the city service gear is usually about 23 in. to 24 in., while the diameter of the ordinary interurban gear will run from 17 in. to 20 in. The gears for the London & South Western Railway will weigh about three times as much as a gear for city service and two or three times as much as a gear for interurban service. The order for this equipment was placed after an English engineer had visited the United States to investigate thoroughly the record of this maker's tool-steel gears and pinions in heavy-duty service. The first shipment has already gone forward to London.



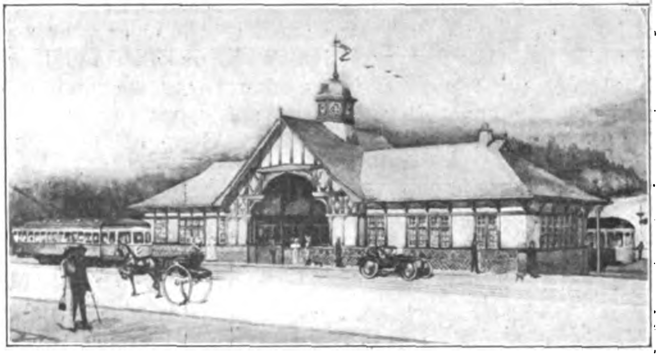
Comparison of Gears and Pinions for City, Heavy and Interurban Traction

Another large contract has just been placed with the same company by the London & North Western Railway, another of the large British lines which are being electrified in London and vicinity. The first order from this company called for 178 gears and pinions, the gears being a trifle larger than those for the London & South Western line. These gears are to have sixty teeth, thirteen module (the metric pitch designation), with 6-in. face and 8 1/16-in. bore. The outside diameter of these gears will be 31¾ in. and the estimated weight will be about 600 lb.

EBURNE INTERURBAN STATION AT VANCOUVER, B.C.

The terminal of the Eburne and Lulu Island interurban line at Vancouver, B. C., has become inadequate on account of traffic increases in recent years, and last year it was decided that an entirely new station was needed. The company improved the opportunity to move the site about two blocks, and the new station is now nearing completion. A view from the architect's drawing accompanies this article.

The city cars pass on one side of the station and the interurban cars on the other. A passageway to connect the two lines extends through the building and is flanked on one side by ticket offices to handle crowds during the season when the Lulu Island race tracks are open. On one side of the passage is the general waiting room, separated from the passage by plate-glass windows, thus allowing a range of vision from the ticket offices which gives the agents supervision over the waiting room at rush-hour periods. At other times a small ticket office in one corner of the waiting room is used. On the other side of the passage are the ticket and staff offices and a public lavatory, which is entered from the rear platform. On the side of the building adjoining the interurban tracks an overhanging roof projects 10 ft. and is supported on posts.



Eburne Station at Vancouver, B. C.

The station building is of wooden frame construction, finished on the exterior in half timber with cement and granite stucco panels. The station was designed by R. Lyon, architectural engineer for the British Columbia Electric Railway Company.

AMBULANCE CHASING DENOUNCED

In a recent lecture before the Boston University Law School, former President William Howard Taft declared that the fraud and chicanery of the ambulance-chasing lawyer are enough to cause statutory prohibition against this evil. "The ambulance chaser," said the former chief executive, "is a term that has come to be accepted in the profession, and these, together with scheming lawyers who seek business through their agents, do not make for a better tone in our profession. One of the great benefits of the workmen's compensation act will be the elimination of this class."

News of Electric Railways

Committee on Federal Relations of the A. E. R. A. on Pending Bills

Arthur W. Brady, chairman of the committee on public relations of the American Electric Railway Association, has addressed a letter to the members of the association calling attention to the steel-car bills, the Stevens bill and the proposed bill for the regulation of securities now pending in Congress. Of the five steel-car bills introduced in the House and the one bill introduced in the Senate, only one now excludes electric railways from its provisions. These bills provide generally that no carrier engaged in interstate commerce by railroad shall after a certain date put into use any new passenger, express or baggage cars not of steel, or within a certain further period have in use any such cars not of steel. The Stevens bill vests the Interstate Commerce Commission with full power "to investigate the roadbed, track, structures, equipment and facilities used by common carriers in interstate or foreign commerce, the operating rules, regulations, methods, train schedules, size of train crews, hours of labor of railroad employees, or any other matter affecting the safe operation of trains engaged in interstate or foreign commerce." The commission is to have power, after notice and hearing, "to issue an order or orders fixing, determining and designating the changes, improvements and repairs to be made in the way and structures, the kind of equipment, the standard of equipment and supplies, the installation of signal systems, train control devices, automatic train stops, and other safety appliances, the operating rules, regulations and methods, train schedules, running time of trains, size of train crews and hours of labor of railroad employees to be adopted, used and maintained in the operation of trains in interstate or foreign commerce."

Heavy penalties are imposed for failure to obey such orders. Attention is also called by Mr. Brady to the bills to require the use of block signals on the lines of all common carriers "engaged in interstate commerce by railroad."

Mr. Brady says that a widespread misunderstanding exists as to what carriers are engaged in interstate commerce. The belief that a carrier is engaged in such commerce only if its road extends into more than one State, or if through cars are operated over a route extending into more than one State, is erroneous. The courts appear inclined to hold that the slightest tincture of an interstate transaction renders a carrier an interstate carrier. Thus the mere carrying of interstate express matter for an express company by a railroad lying wholly within one State has been held to make that railroad an interstate carrier. Under the decision of the Supreme Court of the United States last year in the Omaha & Council Bluffs case, however, purely urban electric railways do not fall within the jurisdiction of the Interstate Commerce Commission under existing laws, even though engaged in interstate commerce. A bill is pending, however, introduced by Congressman Green of Iowa, to amend the existing acts so as to make them applicable to such companies. This bill is approved by the commission.

The committee of the association has labored under considerable disadvantage from its inability to ascertain accurately what electric railways are engaged in interstate commerce, particularly as no list of such companies is published by the Interstate Commerce Commission, and the association has requested that a blank which it inclosed with Mr. Brady's communication be filled out and mailed promptly.

A hearing upon the bills mentioned was held on behalf of the electric railways before a subcommittee of the House committee on interstate and foreign commerce on Jan. 23, 1914. Members of the committee on federal relations of the American Electric Railway Association and other representatives of electric railways were present and asked for the exclusion of electric railways from the operation of any of these bills on the grounds that few of the electric carriers are interstate carriers, except in a technical sense; that in practically every state there is now a commission having substantially all the powers over electric railways proposed to be vested in the Interstate Commerce Commission by the bills in question; that the interurban electric railways engaged in interstate commerce are now subject to the operation of the original interstate commerce act; that the rolling stock of the electric interstate carriers is comparatively new, and that to require radical changes in their rolling stock equipment as proposed by the steel-car bills would impose a burden upon them both unnecessary and beyond the financial ability of these companies to assume.

Members of the Interstate Commerce Commission appeared before the House interstate and foreign commerce committee on Feb. 19, 1914, as expert advisers on the proposed bill to authorize federal regulation of railroad securities. Commissioner Clements said:

"Personal guilt should be provided for in legislation to empower the Interstate Commerce Commission to regulate issues of railroad securities. Put the responsibility on the directors to see that they neither misapply nor permit the misapplication of moneys."

Chairman Clark told the committee that no common carrier could have good reason to object to government supervision when securities were to be issued for proper purposes. He condemned "pyramiding" of stocks and bonds and permitting railroads to bond themselves to buy stocks of other roads for speculative purposes. He thought the proposed exemption of short-term notes should be carefully considered because of probable refunding requirements, and that it might interfere with effectual regulation.

On Feb. 25 the holding companies bill had not yet been Commission, appearing before the House committee on interstate and foreign commerce, disapproved of the Clayton bill, giving the commission power to supervise the future issue of railroad securities, on the ground that it would practically compel the commission to give a clean bill of health to prior issues and otherwise place that body in an embarrassing position. As a substitute Mr. Meyer advocated an amendment to Section 20 of the Interstate Commerce act, extending the powers of the commission to secure information of the relations between railroads and holding companies and contractors.

Up to Feb. 25 the holding companies bill had not yet been introduced in either House.

The conferences which have been held between Chairman Sims and other members of the railway capitalization subcommittee with the Interstate Commerce Commission indicate, according to one source of information, that the following propositions in all probability will be embodied in the first draft of the proposed railway capitalization law:

Prohibition against any railroad corporation issuing stock, bonds, or other indebtedness, except for actual necessary railroad property purposes, so as to add to the railroad's value, and the issue then only to be upon approval of the Interstate Commerce Commission.

Personal guilt and responsibility of directors and other officers, including imprisonment penalties for violation of the proposed law.

Reasonable restrictions on the amounts of stock and bond issues.

Guarantee by applying railroad, as a condition precedent to approval of stock or bond issues, that the proceeds will apply to the railroad's upkeep, extension or other legitimate ascertained use.

Restrictions to make impossible the disposition of stock or bond issues except for bona fide value in open market.

Public hearings upon applications of railroads and other common carriers to issue stock and bonds, upon notice to the particular railroad and to the Department of Justice, and possibly to the railroad commission of the state or states affected.

Regulation of purchases of railroad supplies to prevent officers selling to themselves through double corporation connections.

Avoidance of finality or guarantee effect of the Interstate Commerce Commission's "O K" on stock and bond issues in case of subsequent court or other proceedings.

Authority to competent courts to enjoin all issues contrary to this proposed law upon suit of the United States or any officer or stockholder of the offending railroad.

Decision in Indianapolis & Cincinnati Traction Company Arbitration Case

The Public Service Commission of Indiana on Feb. 21 handed down its decision in regard to the rate of wages of trainmen of the Indianapolis & Cincinnati Traction Company. Following the agreement of Nov. 7, 1913, between the Indianapolis Traction & Terminal Company and its employees, which ended the strike of Nov. 1-7, 1913, the Indianapolis & Cincinnati Traction Company entered into an agreement with its trainmen providing that the Public Service Commission should sit as a board of arbitration and decide for three years any grievances which might be presented to the company and not satisfactorily adjusted between the company and the employees. On Nov. 25, 1913, Charles L. Henry, president of the company, and a committee of employees presented to the commission twenty-one grievances regarding wages, working conditions, etc. These were subsequently withdrawn, and the company and its employees satisfactorily adjusted nineteen of the grievances, submitting to the commission only the demand for a flat wage scale of 35 cents an hour instead of the present sliding scale of 21 cents to 30 cents an hour, and the demand that the two divisions of the company be operated separately, which necessitated the addition of one car. The hearings before the commission were brief. Mr. Henry represented the company in presenting evidence to show why the financial condition of the road did not permit any increase in wages. The men were represented by a committee of employees. The ruling of the commission reviews the evidence presented, and reads in part as follows:

"The trainmen asked that each division be operated separately; that is, that the cars running between Greensburg and Indianapolis over that division be not transferred at Indianapolis and run between Indianapolis and Connersville over that division, and that a separate set of cars be set apart for each division. This would require ten cars instead of nine, make one extra train crew necessary and increase the pay roll of the trainmen more than 10 per cent. The advantage that would accrue to the trainmen would be a greater layover at the end of each run. The layover time on the present schedule is from ten minutes to an hour and twenty minutes, but in most cases from about twenty to thirty minutes, and the running time over each division from about one hour and thirty or forty minutes to two hours and ten minutes. The trainmen contended that these layover periods are quite frequently lost to them by reason of delays on the road between terminals, and that they should have more layover time in which to rest preparatory to the next run. The desirability of such a change in the working hours of the trainmen will, no doubt, be conceded by everyone, but in this case the award on that point, as well as on the matter of the increase in wages, must be determined largely, if not wholly, by the state of the financial budget of the company.

"The scale of wages paid to the trainmen in the employ of the respondent begins with a wage of 21 cents an hour and increases 1 cent an hour each year until a maximum of 30 cents an hour is reached. This is substantially the scale now paid by all interurban roads in this part of the country, and the maximum is 3 cents an hour more than the maximum in the award recently made in the arbitration between the employees and the Indianapolis Traction & Terminal Company.

"The average of earnings of trainmen on respondent's road is considerably more than that of other employees of the company in other departments of service. This may be accounted for in part by the fact that trainmen are on duty more hours per month than are other employees. The working hours of trainmen, however, are as good as will be found on any other interurban road. On the present time cards all runs but two are straight runs. Very few are less than ten hours and only a few are more than eleven hours. Two swing runs are completed in substantially thirteen hours, with ten hours and thirty minutes of platform time, and they are daylight runs, or practically so. The runs are so arranged that the men may reside in the cities on the line of respondent's road other than Indianapolis, and have thereby some valuable advantages in the matter of living expenses.

"Wages of trainmen have been increased 24.99 per cent in seven years, which is more than the increase in the cost of living during that time.

"The properties now owned by the Indianapolis & Cincinnati Traction Company passed through a receivership from 1906 to November, 1910, at which time they were sold at a receiver's sale to the respondent. No dividend on stock or interest on bonds was paid during the period of the receivership, and since the reorganization dividends amounting to $27,500 have been paid on the preferred stock, the only return the investors have received in eight years on an investment of $1,800,000.

"The gross operating revenues last year were barely sufficient to pay the operating expenses and interest on bonds, and there is no indication of an increase in revenues in the near future. It will be necessary for the company to borrow money to make repairs due to the flood damages of last year and to install such block signal equipment as may be required. The operating revenues of this company are 29 per cent less per mile than those of any other interurban railway running into Indianapolis, and 49 per cent less than those of the road having the highest rate of income per mile.

"In the settlement of the nineteen grievances which were adjusted between the company and the employees the company conceded practically all the demands of the employees, and these concessions entail an additional and substantial burden on the company. From the uncontroverted evidence the employees receive all of the operating revenue not expended for repairs or in the payment of interest charges. The stockholders are receiving no dividends on their stock, and until recently no interest was paid on bonded indebtedness. Certainly when labor receives all the income, as it is and has been doing in this case, there can be no just claim that any part of the invested capital should be applied on or added to a wage which is as liberal as the wage scale of the trainmen employed by the respondent company.

"We have absolute confidence that the employees will concede the justness of this conclusion when they understand all the facts about the inability of the company to pay a higher wage. The personnel of the committee of employees which appeared before us would seem to justify this confidence. We therefore find in favor of the Indianapolis & Cincinnati Traction Company on grievances one and two."

Application Made by Cleveland Railway for Approval of Stock Increase

The Cleveland Railway applied to the Ohio Public Utilities Commission on Feb. 21 for authority to issue $2,141,100 of common stock, the proceeds to be used to purchase new cars and make other improvements, all at an estimated cost of $3,477,631. To meet the entire amount of the proposed expenditures the company will later apply for authority to issue $2,000,000 of additional stock. The money derived from the sale of the stock to be issued at present will be expended as follows: new motor cars, trail cars and equipment, $950,000; right-of-way for the East Seventieth Street extension, $160,000; tracks on East Seventy-ninth Street and East Eighty-second Street, $275,000; tracks for the East Thirtieth Street cross-town line, $150,000; land for the Harvard Avenue shops, $100,000; garage at Scovil Avenue and East Fourteenth Street, $4,000; equipment of office with dictagraph system, $1,600.

The members of the street railway committee of the City Council inspected the new carhouse and yards of the Cleveland Railway at St. Clair Avenue and East 129th Street, Cleveland, recently and voted to approve the expenditure of the money required for the improvement. Councilman William Stolte, who introduced the resolution in Council providing for an inspection of the property, announced that he merely wanted to learn whether the expenditure was justified and whether the company and the city could afford it. J. J. Stanley, president of the company; George L. Radcliffe, general manager, and C. H. Clark, engineer of maintenance of way, accompanied the committee, as did Terrence Scullin, master mechanic, who designed the carhouse and yards. Peter Witt, street railway commissioner, and J. H. Alexander, engineer in his office, also were members of the party, although Mr. Witt had previously informed the committee that he would not accompany the members in an official capacity.

Mr. Stanley stated that the company had endeavored to construct a building that would afford comfort and convenience to the employees and not be a detriment to the adjoining property. The yards and building had been made sufficiently large to accommodate the growth of traffic for some years to come. The items of cost for the plant follow: land, $34,213; buildings, $86,950; fencing, $2,812; fire protection, $23,635; track and overhead work, $62,152. The cost of the office building alone was $47,775. It is said that the company will spend about $5,000,000 within the next five years in erecting improved houses and building car yards. The next one will probably be built at the terminus of the Superior Avenue line to replace the carhouse and yards at East 105th Street, which is some distance from the end of the line.

In an interview at Columbus F. E. Munn, a member of the state tax commission, declared that the valuation of $22,124,180 placed on the property of the Cleveland Railway must stand unless the courts order a reduction. He said that the advice of the Cleveland City Council to the company to pay on only $19,000,000 will not affect the action taken by the commission.

The City Council on Feb. 24 approved the request of the Cleveland Railway for authority to spend $573,312 for the renewal of about 6 miles of track and the resurfacing of 8,555 ft. of track in another location. The Council also approved the agreement made between the city officials and the company by which $18,000 a month will be deducted from the gross receipts and credited to the maintenance, depreciation and renewal reserve to make up the deficit existing from charging off the value of old power houses and equipment and that which was caused by exceeding the allowance for the past two or three years.

Rental Basis for Chicago's Proposed Subways Recommended by Bion J. Arnold and George Weston

In connection with the proposed Chicago passenger subways, one of the most important subjects under discussion is their rental value to the surface railways of Chicago, now combined under the name of the Chicago Surface Lines. On Feb. 20 Bion J. Arnold, chairman of the Board of Supervising Engineers, Chicago Traction, and George Weston, a member of the board as a representative of the city, presented a letter on the subject to the subway subcommittee of the committee on local transportation of the Chicago City Council. This report was in response to a request for a recommended basis for determining the annual rental, if any, which should be paid by the Chicago Surface Lines to the city of Chicago for the use of the subways.

Under the street railway settlement ordinances of 1907 there has been accumulated in the city treasury a traction fund which, on Feb. 1, 1914, amounted to about $13,000,000. Messrs. Arnold and Weston say that the best plan under the copartnership arrangement with the companies would be for the city to invest its traction fund in subways or other extensions to the surface line properties in such a manner as to increase the service return for the people and charge no rental at all for such money as the city invests in subways or extensions. By this method the traction fund would be utilized in effect as an amortization fund, and the purchase price, or agreed capital value of the company, kept down accordingly. They also contended that the maximum service to the public and a fair return to the companies on the agreed capital value should be the two fundamentals upon which the operation of any traction system should be based. After stating this fact the letter continues:

"However, inasmuch as the companies are interested in the divisible net profits over and above their 5 per cent return upon their investment, we believe that the citizens and the city of Chicago would best be served by limiting the return of the companies upon their agreed capital value, including the 5 per cent interest allowance, to some fixed maximum amount, and that all earnings over this fixed percentage should be placed in what might be called a 'surplus earnings fund' to be applied to subway rental or an amortization fund."

In addition to the excess net profits over the fixed maximum rate of return to the companies upon their agreed capital value it was recommended that the saving realized by the operation of cars in the subways also be set aside for subway rental to be paid to the city. This saving and the excess net profits shall be paid to the city, it is proposed, until the subway rental shall equal 5 per cent upon the investment. The remainder of this fund, if any, is to be utilized as an amortization fund. In making their calculations Messrs. Arnold and Weston recommended 7 per cent to be the maximum allowable return to the companies upon the agreed capital value. It is proposed that this 7 per cent be a maximum but not a guaranteed percentage, it being understood that the return to the company shall be limited to its proportion of the divisible net profits, as provided in the ordinances of Feb. 11, 1907.

Referring to the proposed Clark Street subway, from Eighteenth Street to Elm Street, and the proposed West Side "U" loop subway, as well as the proposed short subways under railroad tracks on the West Side, a table was presented showing the financial results of subway operation using two-car trains, assuming that the maximum return to the companies shall be 7 per cent and that the ratio of operating expenses to gross earnings is 65 per cent. This table goes back to 1912 in relation to the city's 55 per cent of the net receipts and to the companies' total return upon purchase price. It assumes parts of the subway in operation in 1917, and gives figures year by year until 1926 inclusive. At the end of 1926 it is figured that the saving from subway operation will amount to $8,375,000. The city's 55 per cent of the net receipts from 1912 to 1926 inclusive is estimated as $54,552,600. The average of the companies' total return upon purchase price from 1912 to 1926 inclusive is 6.96 per cent. From 1923 to 1926 inclusive the companies' return will be 7 per cent or over, the rate in 1926 being 7.303 per cent. The total rental to the city is given as $9,840,000 in the period from 1917 to 1926 inclusive. The city's investment in subways will range from $18,000,000 in 1917 to $48,000,000 in 1926, but in the year last mentioned there would be in addition subways in course of construction to be ready for operation in the year 1927 to the amount of $17,000,000. The rental return to the city in percentage of its subway investment is given as ranging from 1.93 per cent in 1917 to 3.92 per cent in 1926.

In explaining the report to the subcommittee Mr. Arnold said that the city cannot have high-class subway service and large profits. On motion of Alderman Captain, a member of the subcommittee, the engineers were asked to submit additional figures showing the rental values on subways worth $26,000,000 at a 5 per cent rate of return.

At a meeting of the subcommittee of the local transportation committee of the Chicago City Council on Feb. 23, Leonard A. Busby, president of the Chicago Surface Lines, stated that his company would not put $5,000,000 into the subway construction except in accordance with the fixed letter of the 1907 traction ordinance. This provides that if the railway companies invest in the subway construction the city would not be able to recapture the subway until it purchased the entire traction property. Prior to this announcement the subcommittee worked with the idea in mind that the companies would assist in financing the initial subway and drafted an ordinance along that line. In addition to this object W. W. Gurley, attorney for the surface lines, added further confusion to the tentative plans by advising the subcommittee that the city could not legally use the West Van Buren and Washington Street tunnels as a part of the subway scheme. This opinion was sustained by assistant corporation counsel assigned to subway work. Both of these objections were of vital importance to the success of the initial subway scheme, and to meet them the subcommittee decided that the city should finance the initial subway and the corporation counsel was instructed to redraft the ordinance along that line.

At the suggestion of Bion J. Arnold the subcommittee considered the following change in the initial subway route to eliminate the second objection: The original scheme provided for a U-shaped tunnel beginning at Clinton Street west of the Chicago River, proceeding east on Washington Street to Michigan Avenue, thence south on Michigan Avenue to Jackson Boulevard, thence west on Jackson Boulevard to a point near the Chicago River where it diverges to the south, using the Van Buren Street tunnel under the river. It is now proposed that the subway shall use Randolph Street on the north, proceeding south on Michigan Avenue to Harrison Street, thence west on Harrison to some point in West Chicago. This will require two new subways under the Chicago River and will increase the cost of this initial line. It is planned, however, to extend the time of completion from 1917, as originally proposed, to 1919, so that the subways can be built and equipped entirely out of the city's traction fund.

Mr. Dalrymple on His Visit to America

James Dalrymple, general manager of the Glasgow (Scotland) Corporation Tramways, has submitted to the members of the Glasgow Corporation a preliminary report containing about 6000 words on the recent visit of himself and the master of works of Glasgow to the United States and Canada. Mr. Dalrymple was very much grieved with the uncomplimentary way in which Americans spoke of their municipal representatives. He scarcely ever heard a good word in regard to a city council. Some of the best and most capable Americans he met, however, were members of the city councils and civic officials. He doubts very much whether the commission form is the last word in city government. He takes up in turn each of the cities which were visited. An abstract of his most significant remarks about his street railway investigations follows:

"No city in the world has the same traffic problems to solve as New York. On Manhattan Island alone there are 457 miles of surface lines, 120 miles of elevated lines, and 71 miles of subway lines. All these together carry annually about 1,100,000,000 passengers. There is a universal 5-cent fare. The company has for some time been experimenting with various types of cars, and among these is the double-deck car. We found it different in many respects from our double-deck car. It seemed, however, to suit the conditions quite well, and was highly spoken of by the general manager. The only other double-deck car which we saw in service was at Pittsburgh. We did not care to sit in the lower portion of the car, as it gave one the feeling of being too near the street. There are also in service a number of single-deck cars with this low floor, which we inspected very carefully. We were much interested in the storage-battery cars on the crosstown lines. They appear to answer the purpose all right. Every year, as another forty or fifty story office building is erected, the problem of meeting the congestion of traffic is becoming more difficult.

"One of the great drawbacks to the successful operation of tramways, more especially in some of the Eastern cities, is the change which is continually going on in the personnel of the staff. We were informed that in some systems almost the entire staff changes every year. This, of course, is very different from the conditions on this side. Americans never seem to join the street railway service with the intention of remaining at the work. They can very often do better, whereas with us no better employment can be found.

"There has been for the past few years a considerable outcry on the part of tramway authorities in regard to fares. The cash fare all over the United States is 5 cents. In many places tickets are sold at a discount, which brings down the average income per passenger to about 4 cents or even less. In some places these tickets are used to such an extent that very little actual cash is handed to the conductor. These reductions in fares are being pressed on the companies, and, at the same time, the city boundaries are being extended, and passengers must be carried to the new boundary line without any additional fare. Of course, the system of transfers is universally adopted. All these arrangements must lead to a great deal of abuse. In the case of discount tickets the officials admit that they are defrauded by the conductors. The transfer system also is very much abused, and this abuse is very difficult to check.

"The only municipal tramway lines that we saw were those in Toronto and San Francisco, and, of course, in both of these cities 90 per cent of the lines are still in the hands of private companies. The idea of municipalization of street railways is, no doubt, gaining ground in the United States, and if one of the larger cities were to take a step forward and make a success of a municipally owned and operated street railway a great change might very soon take place in the street railway business throughout the whole country.

"The relationship between the municipality of Cleveland and the street railway has for many years been very peculiar. In Cleveland the fare is 3 cents instead of 5, and quite recently there was an arbitration between the city and the company in regard to the terms of the agreement. It did not seem to us that the company was spending a sufficient amount on its track, and the arrangements under which the company is carrying on business did not seem at all satisfactory.

"While being shown over the street railway system in Milwaukee we were particularly struck with the magnificent head office accommodation. We have seen most of the tramway offices in this country and also on the Continent, but we have never seen any arrangement so complete as we saw at Milwaukee.

"As a general rule the street railway companies of the United States have not spent much on their workshops and car sheds. Things are, however, now improving very much. We were much interested in the newer style of carhouse. This is of a simple description; indeed, it seemed only to be used when the cars were being cleaned or inspected. At other times the cars were allowed to lie out in the open. It was really not a carhouse, but a car yard. This free and easy way of storing tramcars is becoming fairly general. The companies are saved the expense of erecting elaborate carhouses such as we have here, and, as their experience of the fire risk has not been very good, that danger is practically eliminated. Ample provision, however, is made in the open yards for dealing with fire by the erection of platforms 20 ft. high, on each of which is placed a standpipe.

"Everybody we met seemed anxious to learn how Glasgow operates its municipal tramways. All kinds of tales have been circulated through the press as to the results of municipal operations in Glasgow and in this country generally, but the citizens of the American cities have apparently come to the conclusion that these are, for the most part, fairy tales, and are anxious now to get the actual facts.

"We knew Los Angeles best because of its remarkable tramway system. It is generally admitted among tramwaymen that the Los Angeles city and suburban street railway systems are, in many ways, the finest in the States. We know of no other city of the size with such an extensive and complete system.

"We were anxious to see the street railway system of Pittsburgh, as the company is experimenting with the double-deck car. The Pittsburgh people have carried out a great improvement in the heart of the city by cutting away a hump. We examined this piece of work with much interest.

"After leaving Washington we spent a couple of very busy days in Philadelphia. The street railway system of Philadelphia is very extensive, and proposals are being made for further extensions, both underground and elevated, which are to cost many millions of pounds sterling. The street railways are all owned and operated by one company, but the city has organized a special department to deal with the whole question of city transit. This department is under the charge of an experienced street railway man, A. Merritt Taylor, who has prepared a very complete and interesting report on the proposed extensions. The cars in Philadelphia have the entrance and exit at the motorman's end. It is thought that there is less liability to accident when the passengers both board and leave the car under the eye of the motorman, and, of course, passengers are not so apt to pass behind the car in front of a car coming in the opposite direction as when they alight at the rear end. The education of those in charge of vehicles on the streets of Glasgow is very deficient when we consider what has been done in this connection in many American cities.

"The last few days of our tour were spent at Atlantic City on the Atlantic seaboard. During the week ended Oct. 18 the annual convention of the American Electric Railway Association was held at Atlantic City, and hundreds of tramwaymen had traveled thousands of miles to attend this convention. We had the feeling, in attending these meetings, that rather too many subjects were dealt with, and that sufficient time could not be given to general discussion. One important feature of this convention is the exhibition of tramway appliances. We were very much surprised to see such a large exhibition, and, although it was entirely confined to tramway plant, the floorage occupied might be as large as the machinery hall of one of our international exhibitions. The exhibits also were most tastefully arranged, and there was ample opportunity for a thorough inspection.

"One very striking difference between New York and the other American cities and Glasgow is the number of passengers carried per car mile. In America the cars carry from five to six passengers per car mile. This figure represents what are called 'revenue passengers.' If transfers were included, the average would be somewhat higher. In Glasgow we are now carrying over fourteen passengers per car mile. We were amazed at the vast sums which have been expended on the transit systems of New York; but when we were informed that in the four chief cities, viz., New York, Chicago, Philadelphia and Boston, the capital expended for this purpose amounted to about £100,000,000, and that arrangements have been made for the expenditure of another £100,000,000, making £200,000,000, we thought it was time to say 'Good-by!'

"The above notes do not deal in any way with the main object of our visit to America. In no city did we see congestion of car traffic such as can be seen in Glasgow any day at the corner of Argyle Street and Jamaica Street. The city authorities of the United States would not submit to this state of affairs for a week without setting about to find a remedy. The citizens of the United States seem to have a better appreciation of the value of time than we have. In many cities it seemed to us as if there was a bridge opposite every street. In Chicago, for instance, there are surface lines crossing the Chicago River, also elevated lines and underground lines, and Chicago is a very busy port. The tramway traffic, like that of Glasgow, converges on the center of the city, and ample provision is made for getting across the river, and although there are twice as many cars as we have in Glasgow, there is no such congestion and loss of time as we have here.

"Many of the cities of the United States are groping for the best type of car for dense city traffic, and many changes have been made within recent years. We think, however, that the consensus of opinion now is that our light single-truck car, carrying about sixty passengers, answers the purpose best of all. Of course our type of car with the top deck has its drawbacks. It cannot be turned about and altered like a long single-deck bogie car such as is in general use in America. We cannot, for instance, make it adaptable so readily for the 'pay-as-you-enter' system. We went very fully into the question of fares, and we are satisfied that we are on the right lines, and every tramwayman in the States is now also satisfied that the graded or zone system of fares is the correct system."

Additional Rapid Transit Construction Contract in New York

The Public Service Commission for the First District of New York has awarded the contract for the reconstruction of the Steinway tunnel to the Rapid Transit Subway Construction Company, the lowest bidder, for $383,910. This tunnel connects the boroughs of Manhattan and Queens, and is already completed as a two-track line from a point between Lexington and Third Avenues, Manhattan, under Forty-second Street and the East River to Jackson and Van Alst Avenues, Long Island City. It was built, however, for trolley car operation, and as it is to be made a part of the dual system of rapid transit and operated in connection with the existing subway, certain reconstruction is necessary. The station in Manhattan will be on the south side of Forty-second Street between Lexington and Third Avenues, and access to the tunnel will be by an escalator. The contractor will have nine months in which to complete the work. Eventually this tunnel will be connected with the existing subway by an extension westward to Times Square, and with the new rapid transit lines in Queens by an extension from its present terminus to the Queensboro Bridge Plaza. Work on the Queens extension is already under contract.

Bids for construction of Section No. 6-A of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan, will be opened by the Public Service Commission on March 12. This section is the junction of the new Seventh Avenue subway with the existing subway near Times Square, and covers that portion of the new line from a point 100 ft. south of Forty-third Street to a connection with the existing line north of Times Square.

The New York Municipal Railway Corporation has been authorized by the Public Service Commission for the First District to award the contract for the construction of Section No. 2 of the Lutheran Cemetery line, in Brooklyn, to F. W. Burnham, the lowest bidder, for $143,225. The Lutheran Cemetery extension will be an elevated railroad between Wyckoff Avenue, Ridgewood, and Lutheran Cemetery.

Philadelphia's Borrowing Capacity.—The annual report of the City Comptroller of Philadelphia, Pa., submitted to City Councils on Feb. 19, 1914, shows that based on the assessed value of personal property the borrowing capacity of the city for transit facilities and other permanent improvements for this year is $40,007,767. This is in addition to a total borrowing capacity of $13,112,151 on assessed realty values which is available for general purposes. Loans authorized and unissued total $13,150,000. The net funded debt is $92,336,707.

Chamber of Commerce Committee to Consider Proposed Legislation.—An immediate result of the second annual meeting of the Chamber of Commerce of the United States was a resolution instructing the president of the chamber to appoint a special committee of not less than seven members to consider all proposed anti-trust legislation, and to make preparations for taking immediately a nation-wide referendum through the commercial organizations of the United States. The chairman of this committee is R. G. Rhett, Charleston, S. C.

Change in Motive Power in New York City.—Permission to change the motive power from horses to the underground conduit system has been granted by the Public Service Commission for the First District of New York to the Dry Dock, East Broadway & Battery Railroad for that part of its road lying in Canal Street east of the Bowery. Permission to make such change was granted by the former Board of Railroad Commissioners, and in December, 1913, the company, through Frederick W. Whitridge, its receiver, petitioned the Public Service Commission for consent to make the change. Property owners representing more than half the value of the property along the road have consented to the change.

New York Subway Equipment Contract Approved.—The Public Service Commission of the First District of New York has approved the contracts entered into by the Brooklyn Rapid Transit Company with the American Car & Foundry Company, the General Electric Company, the Westinghouse Electric & Manufacturing Company and the Westinghouse Traction Brake Company to construct 100 new subway cars, each concern providing a certain part of the equipment. Each car body will cost $6,119, each motor equipment $1,100, each control apparatus $975, each set of brakes $911, and each truck $450, making a total for each car of $9,555. The cars will be 67 ft. long and 10 ft. wide. The cars in the present subway are 51 ft. 5 in. long and 8 ft. 8¾ in. wide. The American Car & Foundry Company will make the car bodies and trucks; the General Electric Company will supply the motors, and the Westinghouse companies the control apparatus and air-brake equipment. Deliveries of the different parts are to begin in August, 1914, and to be completed by Dec. 1, 1914.

Westinghouse Electric Veterans Organize.—On the evening of Feb. 21 the employees of the Westinghouse Electric & Manufacturing Company who have been in its employ for a period of twenty years or more organized the Veteran Employees' Association of the Westinghouse Electric & Manufacturing Company. About 325 employees of the company are eligible to membership, and approximately 315 were present at the first meeting. The speakers were E. M. Herr, president; Charles A. Terry, vice-president, and James J. Barrett, representing the shop. Mr. Herr promised the support of the company to the organization and stated that the officials of the company were working on a pension plan for the employees, details of which will be announced later. Guy E. Tripp, chairman of the board of directors, was present and was elected an honorary member of the association, as was also Mr. Herr. Neither of these gentlemen has been connected with the company the required number of twenty years. A standing toast was drunk to George Westinghouse, who was unable to be present on account of illness.

Montpelier Strike to Be Arbitrated.—An agreement to arbitrate the question in dispute has been reached between the officers of the Barre & Montpelier Traction & Power Company, Montpelier, Vt., and its motormen and conductors, and the men returned to work on Feb. 18. The total membership of the local division at Montpelier is reported to be twenty-seven. Only eighteen of this number are actually in the employ of the company, but all of the union men connected with the company went out when the strike was voted. The strike lasted about two weeks. During that time there was no serious trouble of any sort and no particular difficulty was experienced in maintaining the service, although traffic was light. The company offered to advance wages about 1 cent an hour and grant the men's request for a reduction in working time. The men asked for $2 a day for the first year, $2.25 for the second year and $2.50 a day thereafter. The old rate was 16½ cents to 22 cents an hour, and the rate offered the men was 18 cents an hour for men employed six months, 20 cents an hour the second six months, 21 cents an hour the third six months, 21½ cents an hour the fourth six months, 22 cents an hour the fifth six months, 22½ cents the sixth six months and 23 cents an hour thereafter.

Lectures on Public Utilities.—The West Side Young Men's Christian Association of New York has announced a series of lectures on public utilities beginning on March 2 and ending on May 4. Among the speakers already announced are Frank A. Vanderlip, Governor Cox of Ohio, Arthur Williams, Harry Butler, Francis T. Homer, Howard Elliott and Samuel Insull. Among the representative bankers, engineers, manufacturers, etc., who have consented to act as a committee to co-operate with the finance forum of the association in outlining the subjects and selecting the speakers are A. H. Bickmore, of A. H. Bickmore & Company; A. W. Burchard, of the General Electric Company; Henry P. Davidson, of J. P. Morgan & Company; William B. Dinsmore, of Eikleham & Dinsmore; H. L. Doherty, of H. L. Doherty & Company; Rodman E. Griscom, of Bertron, Griscom & Company; H. R. Hayes, of Stone & Webster; Allen G. Hoyt, of N. W. Halsey & Company; A. B. Leach, of A. B. Leach & Company; S. Z. Mitchell, of the Electric Bond & Share Company; Ray Morris, of White, Weld & Company; J. H. Pardee, of The J. G. White & Company Management Corporation; Seton Porter, of Sanderson & Porter; Calvert Townley, of the Westinghouse Electric & Manufacturing Company; M. A. Viele, of Viele, Blackwell & Buck; F. C. Walcott, of William P. Bonbright & Company, Inc.; John C. Weadock, of Hodenpyl, Hardy & Company; George C. White, of W. S. Barstow & Company, and R. E. Wilsey, of H. M. Byllesby & Company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The committee on street railways will hold hearings in western Massachusetts in the near future upon seven bills drafted to increase the electric railway facilities of the Berkshire district. At a hearing in Boston on Feb. 26 City Solicitor Anderson of Worcester favored a bill requiring street railways to lay granite or wooden block paving between their tracks in the highways, the enforcement of the proposed act to be in the hands of the street commissioner. Francis H. Dewey, president of the Worcester Consolidated Street Railway, opposed the measure.

NEW YORK

A bill has been introduced in the Assembly amending the Public Service Commissions law by providing that in first-class cities the Public Service Commission may compel the interchange of transfers between surface, elevated and subway lines at intersecting points, in cases where arrangements exist for the interchange of transfers at other intersecting points between such lines and systems.

The following bills have been introduced in the Senate: An act providing for the appropriation of $600,000 toward the elimination of grade crossings within the jurisdictions of the Public Service Commissions for the First and Second Districts: an act to amend the highway law in relation to public street surface railroads in towns; an act to amend the Public Service Commission law in relation to the issue of stock by railways.

The following bills have been introduced in the Assembly recently: an act to amend the Public Service Commission law in relation to free transportation or reduced rates; an act to amend the Public Service Commission law in relation to the interchange of transfers between certain railroads in cities of the first class; an act to amend the railroad law in relation to the operation of trains or cars in cities of the first class; an act to amend the railroad law in relation to the protection of grade crossings; an act to amend the railroad law in relation to the protection of passengers in New York City. The two new sections of the last act follow:

"Section 197-a. Protection of passengers in New York city. Every corporation owning or operating a street surface railroad in the city of New York which shall permit more than ten passengers to stand within any car and three passengers to stand on the rear platform of any car operated by such corporation after the seats provided for passengers in such car are filled shall place a conductor on the rear platform of such car and a collector of fares on the inside thereof and prominently display on the front end of such car, at all times when more than ten persons are standing in such car and more than three are standing on the platform, a sign bearing the words 'Standing Room Only' in black letters on a red background, which letters shall be large enough to be easily read at a distance of 100 ft. and which shall be so illuminated at night that it may be plainly read.

"It shall be the duty of such conductor and collector to call out the names of all streets and transfer points in time to allow passengers to signal such car to stop at the desired destination.

"Every such corporation violating any of the provisions of this section shall suffer a penalty of $50 for each offense, to be sued for and recovered by the city of New York, in any court of competent jurisdiction, upon the complaint of any citizen of or resident in such city.

"Sec. 197-b. Idem. No corporation owning or operating any elevated or sub-surface railroad in the city of New York shall suffer or permit more than fifteen persons to enter, or stand in, any car of any train operated by it after the seats provided for passengers in such car are filled with passengers. Every corporation violating the provisions of this section shall suffer a penalty of $50 for each offense, to be sued for and recovered as provided in Section 197-a of this chapter."

PROGRAM OF ASSOCIATION MEETING

American Railway Engineering Association

The fifteenth annual convention of the American Railway Engineering Association will be held at the Congress Hotel, Chicago, March 17 to 20, 1914. The meetings will be held in the Florentine room of the Congress Hotel, beginning at 9.30 a. m. and 2 p. m. each day.

On March 17 the address of the president will be delivered and the report of the secretary, report of the treasurer and the reports of standing and special committees will be presented.

On March 18 the reports of standing and special committees will be presented and the announcement made of the result of the ballot for officers for 1914. The annual dinner will be held in the gold room of the Congress Hotel at 7 p. m.

On March 19 the reports of standing and special committees will be presented and officers will be installed.

On March 20 delegates will be free to visit the exhibit of the National Railway Appliance Association in the Coliseum and the armory.

Members are privileged to invite friends to the meetings of the association, and it is suggested that these invitations be extended by members direct, either verbally or by letter. Members are requested to register on arrival in Room 1166 of the Congress Hotel and receive a badge, program and other convention literature.

Financial and Corporate

Stock and Money Markets

Feb. 25, 1914.

A selling movement on the New York Stock Exchange to-day brought sharp declines in a large number of issues. Selling from abroad contributed to this, but the decline was aided by local trading pressure due to the Mexican situation. Non-dividend issues, including the Interborough-Metropolitan preferred, were the weakest features. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 3 per cent; four months, 3 @ 3¼ per cent; six months, 3¼ @ 3½ per cent.

The Philadelphia market showed weakness to-day. Local traction sales were limited, Philadelphia Rapid Transit certificates figuring in small amounts in the trading.

On the Chicago Exchange an easier tendency prevailed. Bonds were steady.

Pressure was exerted on the Boston market to-day and sharp declines resulted, these being particularly noticeable in the mining issues.

Dealings in Baltimore were on a larger scale to-day, sales totaling 2142 shares of stock and $52,500 of bonds, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 18	Feb. 25
American Brake Shoe & Foundry (com.)	96¼	97
American Brake Shoe & Foundry (pref.)	144	144
American Cities Company (com.)	36	36
American Cities Company (pref.)	61¾	61¾
American Light & Traction Company (com.)	353	352
American Light & Traction Company (pref.)	106	106
American Railways Company	39¼	39
Aurora, Elgin & Chicago Railroad (com.)	39	*39¼
Aurora, Elgin & Chicago Railroad (pref.)	79	80¾
Boston Elevated Railway	82½	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com).	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	40	39
Brooklyn Rapid Transit Company	92⅜	92
Capital Traction Company, Washington	109	109
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	92	93
Chicago Railways, ptcptg., ctf. 2	33⅛	32¾
Chicago Railways, ptcptg., ctf. 3	7½	7
Chicago Railways, ptcptg., ctf. 4	2⅞	3
Cincinnati Street Railway	107	110
Cleveland Railway	105	105
Cleveland, Southwestern & Columbus Ry. (com.)	*5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	*26
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	a75	53
Columbus Railway (pref.)	a90	80¼
Denver & Northwestern Railway	71	71
Detroit United Railway	71	a85
General Electric Company	148¾	148
Georgia Railway & Electric Company (com.)	118½	120
Georgia Railway & Electric Company (pref.).	85¾	85½
Interborough-Metropolitan Company (com.)	15¼	14½
Interborough-Metropolitan Company (pref.)	61	59¼
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	19½	*19½
Kansas City Railway & Light Company (pref.)	35	*35
Lake Shore Electric Railway (com.)	5	*5
Lake Shore Electric Railway (1st pref.)	82	*82
Lake Shore Electric Railway (2d pref.)	20	*20
Manhattan Railway	130	131⅛
Massachusetts Electric Companies (com.)	11¼	11
Massachusetts Electric Companies (pref.)	62	*61½
Milwaukee Electric Ry. & Light Co. (pref.)	95	*95
Norfolk Railway & Light Company	24½	*24½
North American Company	71¼	70
Northern Ohio Traction & Light Co. (com.)	70	60
Northern Ohio Traction & Light Co. (pref.)	101	98¼
Philadelphia Company, Pittsburgh (com.)	44¾	43
Philadelphia Company, Pittsburgh (pref.)	43	43
Philadelphia Rapid Transit Company	18⅜	18⅜
Portland Railway, Light & Power Company	53	*53
Public Service Corporation	112	112
Third Avenue Railway, New York	43¾	42¼
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	105½	106
Union Traction Company of Indiana (com.)	11½	*11½
Union Traction Company of Indiana (1st pref.)	80	*80
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore).	25¼	25¾
United Rys. Inv. Company (com.)	22¼	21½
United Rys. Inv. Company (pref.)	46	45
Virginia Railway & Power Company (com.)	53	53
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	87½	87
Washington Ry. & Electric Company (pref.)	87½	87
West End Street Railway, Boston (com.)	72	71
West End Street Railway, Boston (pref.)	92	92
Westinghouse Elec. & Mfg. Company	70½	70
Westinghouse Elec. & Mfg. Co. (1st pref.)	116	116

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* Last sale. a Asked.

ANNUAL REPORT

Cleveland Railway

The statement of income, profit and loss of the Cleveland (Ohio) Railway for the fiscal year ended Dec. 31, 1913, as based on the actual disbursements, and on ordinance allowances, follows:

		Actual	Ordinance Allowances
Operating revenue:			
Revenue from transportation	$7,093,836		
Revenue from operation other than transportation	55,953		
Total operating revenue		$7,149,789	$7,149,789
Operating expenses:			
Maintenance of way and structures	$983,991		
Maintenance of equipment	791,381		
Traffic	739		
Conducting transportation	3,024,148		
General and miscellaneous	679,398		
Total operating expenses		$5,479,657	$5,187,699
Net earnings from operation		$1,670,132	$1,962,090
Miscellaneous income		40,977	40,977
Gross less disbursements		$1,711,109	$2,003,067
Taxes		435,520	435,520
Net income		$1,275,589	$1,567,447
Interest		1,574,008	1,574,008
Deficit		$298,419	$6,461
Plus reduction value of obsolete equipment		788,667	
Total deficit		$1,087,086	

The report shows that the maintenance expenses for the year were $1,775,373, to which was added $68,425 for the value of discarded cars and $720,241 for the value of discarded power equipment, giving maintenance, renewal and depreciation charges for the year of $2,564,039. The allowances in the maintenance and operating reserves was $5,187,699, the expense $5,479,657, giving a deficit of $291,958. When to this figure was added the above value for obsolete cars and power equipment, the net deficit in the reserves for the year was found to be $1,080,624.

The total passenger car miles run in 1913 were 30,057,105; the revenue mileage was 30,295,735. Register fares were 220,511,190 in 1913 as compared to 203,349,655 in 1912; transfers, 87,596,428 in 1913 and 80,169,027 in 1912, and employees' transportation, 888,297 in 1913 and 777,137 in 1912. The ratio of transfers to register fares and employees' passes increased from 39.27 per cent in 1912 to 39.56 per cent in 1913.

The following increases took place during 1913 as compared with 1912: Passenger revenue, 7.97 per cent; gross income, 7.65 per cent; maintenance allowance, 4.22 per cent; maintenance expenses, 27.96 per cent; operating allowance, 10.18 per cent; operating expenses, 4.40 per cent; taxes, 18.80 per cent; interest, 11.12 per cent, and passenger car miles, 4.13 per cent.

The following comparative table shows the cost and income of the company per car mile in cents for the past three years:

	1911	1912	1913
Maintenance expenses	5.36	4.77	5.86
Operating expenses	12.07	12.19	12.23
Taxes	1.32	1.26	1.44
Interest on funded and floating debt	1,91	1.76	1.07
Interest on capital stock	3.22	3.11	4.12
Total cost of operation	23.88	23.09	24.72
Gross income	22.87	22.95	23.73
Deficit	1.01	.14	.99
Obsolete cars and equipment	.....	.....	2.61
Total deficit			3.60

The condition of the interest fund of the company is shown by the following report:

Original deposit		$500,000
Gross income March 1, 1910, to Dec. 31, 1913		25,512,902
Total		$26,012,902
Deductions:		
Allowances		$18,605,919
Taxes		1,483,577
Interest		5,559,743
		$25,649,239
Balance		$363,663

This balance is $136,337 less than the amount placed in the fund originally under the provisions of the Tayler ordinance, and is accounted for as follows:

1910,	Profit (earnings in excess of allowances, taxes and interest)	$75,994
1912,	Profit (earnings in excess of allowances, taxes and interest)	110,418
	Total	$186,412
1911,	Loss (allowances, taxes and interest in excess of earnings)	$202,129
1913,	Loss (allowances, taxes and interest in excess of earnings)	6,462
	Arbitration expenses in excess of $5,000	14,562
	Payments on account of award of abritrators to apply on 1910, 1911 and 1912 deficits	99,596
	Total	$322,749
	Net loss	$136,337

John J. Stanley, president of the company, says in part:

"During 1913 three arbitrators—C. N. Duffy, vice-president of The Milwaukee Electric Railway & Light Company; A. B. du Pont, of Cleveland, and United States District Judge John M. Killits, of Toledo—made an award increasing the operating-expense allowance from 11½ cents, the rate in 1912, to 12.1 cents, effective from March 1, 1913, and directed that the overdrafts of the operating and maintenance reserves at March 1, 1913, be made good from the company's interest fund by March 1, 1914. The overdraft in the operating reserve, which amounted to $259,592 March 1, 1913, has been made good from the interest fund, and the city street railroad commissioner, acting under authority given by the City Council, has permitted the company to reduce the maintenance overdraft by $106,152. The remainder, which is to be made good from the interest fund by March 1, 1914, amounts to $217,444. By order of the board of arbitrators, the interest fund was increased in the year by $216,003, which had been set up as accident and insurance reserves.

"The operating-expense allowance, therefore, for the year was 11.5 cents per car-mile in January and February, plus the deficits of those months, allowed by the arbitrators, and 12.1 cents during the other ten months, an average of 12.17 cents. Per car-mile the expenses were 12.23 cents, giving a deficit of 0.06 cent.

"The maintenance, renewal and depreciation reserve, in which there was a deficit of over-expenditure on Jan. 1, 1913, of $292,315, and on March 1 of $323,597, was overdrawn at the end of the year to the amount of $1,080,624. Of this $1,080,624, $788,666 is the reproduction value of worn-out or obsolete cars and power-plant machinery. There has been considerable discussion in the newspapers and elsewhere as to this obsolete property, but there can be no question as to the right and duty of the company, the property having become useless and having lost its value, to take it off the books. The reproduction value of the abandoned property, disregarding its probable value as scrap, is equal to 2.61 cents per car-mile on the car-miles of 1913. Assuming that the present allowance of substantially 5 cents per car-mile will be sufficient to take care of ordinary repairs, renewals and depreciation, an increase of the allowance to 7 cents per car-mile would provide for the overdraft due to the discarding of this property in about fifteen months. The present allowance has never been large enough to provide for ordinary maintenance expenses, the cost of necessary renewals, and depreciation. While millions of dollars have been spent in the last four years for repairs and replacements the value added by the betterments has not been sufficient to offset the depreciation.

"The expense on account of accidents amounted to $308,635, an increase over the amount charged to expense and set aside for an accident reserve in 1912 of $75,761, and over the actual expenditures of 1912 of $114,174. The increase is attributed to changes in state laws and to several other causes.

"After a careful study of the workmen's compensation law of Ohio, the officers elected to pay the State 5 per cent of the amount of the premium fixed by the Industrial Commission and let the claim department of the company make all adjustments with employees in accordance with the provisions of the law.

"Numerous franchises were granted in the year by the Cleveland Council for the construction of extensions and the Council also passed an ordinance granting to the company the right to haul freight in interurban cars at night. This was approved at the referendum election.

"The cross-town line in Harvard and Denison Avenues has been completed, and is in operation, and the tracks on West Sixty-fifth Street from Clark Avenue to Detroit Avenue are operated as a cross-town line. Both lines are unprofitable.

"There were 15.4658 miles of additional track laid in the year, and 1.366 miles of old track were abandoned. About 14 miles of track were renewed in the year.

"The company within the year purchased a large tract of land in Harvard Avenue, for a terminal for its new cross-town line in Denison and Harvard Avenues and its East Fifty-fifth Street line. The company's general shops will also be located here. The tract contains 62½ acres, about 25 of which will probably be sold. The company also purchased a strip of land about 2400 ft. in length, extending from Linwood Avenue near Addison Road northerly to Superior Avenue, at a cost of about $140,000, to be used as a right-of-way for a new cross-town line in that part of the city. Additional land on West Sixty-fifth Street, near the L. S. & M. S. R. R., was also purchased.

"It is estimated that improvements will be made in 1914 costing $1,837,500. The Lake View shops and the Superior-Avenue, East Fifty-fifth Street and St. Clair Avenue carhouses will be abandoned within the coming year, and will probably be offered for sale or lease."

Third Avenue Bonds Offered Directly to Public

F. W. Whitridge, president Third Avenue Railway, New York, announced on Feb. 24 a plan of financing which is a radical departure from old methods of corporation financing. Instead of dealing with a fiscal agent who in turn would dispose of the securities to the public at a commission, Mr. Whitridge proposes to sell $4,000,000 of first refunding mortgage 4 per cent bonds of the company direct to the public.

Sealed bids will be received for any or all of the issue at the office of the company at 130th Street and Third Avenue on March 10. Accrued interest will be added and the company will reserve the right to reject any or all proposals. Stockholders of record of March 6 are to have preference.

Concerning the plan Mr. Whitridge says:

"There has lately been a great deal of criticism of bankers' commissions in the matter of corporate financing, and especially of financing by bankers who have any interest in the corporation seeking funds. The credit of the Third Avenue Railway is good, and I am sure that this plan will be sucessful. Of late the country has gone crazy over the matter of corporate financing, and I believe that the selling of securities direct to investors without letting them first pass through the hands of the company's fiscal agent was one of the reforms advocated."

The proceeds of the sale will be used to pay two notes amounting to $2,939,787, representing the remainder of the purchase price of the securities of the New York City Interborough Railway and the Belt Line Railway Corporation, and for other corporate purposes. On the payment of these notes $1,750,000 of first mortgage 5 per cent gold bonds and $734,000 of stock of the Belt Line Railway Corporation and $1,702,000 of bonds and $4,221,000 of stock of the New York City Interborough Railway will pass under the lien of the first refunding mortgage of the Third Avenue Railway.

The bonds offered are part of an authorized issue of $40,000,000, of which $15,790,000 are outstanding. Of the purchase price 25 per cent will be payable at the Central Trust Company on acceptance of any proposal, and the remainder on call at five days' notice when the bonds are ready for delivery. Payment may be made in full when the allotment is made.

American Railways, Philadelphia, Pa.—It is stated that the directors of the American Railways are considering an offer for the company's holdings of $1.244,000 of the 5 per cent bonds of the Springfield (Ohio) Railway due in 1935, representing the advances made by the American Railways for the betterment of the property at Springfield.

Ashtabula (Ohio) Rapid Transit Company.—The Ashtabula Rapid Transit Company has been authorized by the Public Utilities Commission of Ohio to issue $40,000 of bonds, from the proceeds of which it will relay 2 miles of track in the village and replace the pavement torn up in carrying out the work. Commissioner E. W. Doty dissented from the conclusion reached by the other members of the commission in the case. He contended that the company was piling up capital stock beyond the proportions necessary for a property of the kind. The Village Council had by ordinance ordered the company to make the improvements, and the other members held that the commission could not avoid allowing the company to secure sufficient capital for the work. They ruled that the company could not be penalized for possible mistakes of the past.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—J. S. Pevear, William von Phul, H. W. Coffin, J. P. Ross and Hugh McCloskey have been elected directors of the Birmingham Railway, Light & Power Company to succeed M. S. Sloan, W. H. Kettig, William Mason Smith, George H. Davis and S. H. Marsh.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has sold $2,000,000 of 5 per cent thirty-year refunding bonds to Estabrook & Company, R. L. Day & Company, Blodget & Company, N. W. Harris & Company and Merrill Oldham & Company.

Bristol & Plainville Tramway, Bristol, Conn.—The special committee of the City Council of Bristol appointed some time ago to inquire into the purchase of a controlling interest in the Bristol & Plainville Tramway by Richter & Company, Hartford, Conn., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, has reported to the Council. The committee was refused access to the corporate books of the company, and a member of the committee in the capacity of stockholder examined the list of stockholders as of Jan. 25. At the time of the transfer of the controlling interest to Richter & Company there were about fifty stockholders. When the books were examined on Jan. 25 it appeared that the number was being constantly increased through sales of shares in small lots. The committee says that "Bristol at the present time has nothing like a fair share of the membership of the board of directors." In its conclusion the committee suggests that "the charter of the company be so amended by the next Legislature as to provide that the Mayor of Bristol shall be ex officio a director of the Bristol & Plainville Tramway."

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—The stockholders of the Charleston Consolidated Railway, Gas & Electric Company will vote on March 18, 1914, on the question of increasing the common stock of the company from $2,500,000 to $3,000,000, the proceeds to be used to pay for additions and betterments as made from year to year. The company now has outstanding $500,000 of preferred stock.

Chicago (Ill.) Elevated Railways.—At the annual meetings of the stockholders of the Northwestern, the Metropolitan and the South Side Elevated lines, Feb. 24, 1914, the retiring directors were re-elected with the exception of Mason B. Starring, of the Northwestern Elevated Railroad, who is succeeded by W. A. Fox.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—The American Public Utilities Company, Grand Rapids, Mich., has arranged to take over all the electric railway properties of the Chippewa Valley Railway, Light & Power Company, which operates the street railway in Eau Claire and Chippewa Falls, together with the interurban line between these two cities, a distance of 22½ miles; the Chippewa Falls Water Works & Light Company; the Menominee Electric Light & Power Company; the water power plant at Menominee, and rights along the Red Cedar and Chippewa Rivers, with a capacity developing approximately 100,000 hp, together with other public utilities in Menominee, Elmwood, Spring Valley and other small towns.

El Paso (Tex.) Electric Company.—A special meeting of shareholders of the El Paso Electric Company has been called for March 9, for the purpose of voting upon a proposal to increase the common stock by $1,000,000, so that authorized capital shall be $1,000.000 of preferred stock and $3,000,000 of common stock. If this stock increase is authorized, $375,000 will be offered pro rata to the preferred and common stockholders of record March 16 at par. Every eight existing shares will be entitled to subscribe to one share of new common stock. The directors state that in order to meet the demands of a constantly increasing business it will be necessary to make various extensions and improvements to plant, including an extension to the power station, the installation of additional generating equipment and the purchase of more rolling stock.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—The Fort Wayne & Northern Indiana Traction Company has been authorized by the Public Service Commission of Indiana to issue $600,000 of 6 per cent collateral gold notes and $320,000 of general lien bonds. The notes are to be sold at not less than 90 per cent of their face value, and the bonds are to be disposed of at not less than 85 per cent of their face value.

Goshen, South Bend & Chicago Railroad, South Bend, Ind.—Poe & Davies, Baltimore, Md., are offering for subscription at 99½ and interest $100,000 of 6 per cent two-year first mortgage secured coupon notes of the Goshen, South Bend & Chicago Railroad, dated Nov. 1, 1913, and due Nov. 1, 1915, but redeemable at 102 and interest on sixty days' notice. These notes are guaranteed as to both principal and interest by the Gary & Interurban Railroad, the Valparaiso & Northern Railway and the Gary & Interurban Railway. As noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, page 431, Edwin W. Poe, vice-president of the Baltimore Trust Company, and Philip L. Poe, of Poe & Davies, have been elected directors of the Gary & Interurban Railway.

Grand Valley Railway, Brantford, Ont.—The prospects would seem to be improved for an amicable settlement of the differences between the city of Brantford and the Grand Valley Railway, which recently asked for an extension of time in which to meet its obligations to the city. It has been proposed now that the city of Brantford should purchase the railway. G. Watson intimated to the Second Appellate Division at Osgoode Hall, Toronto, on Feb. 16 that the city's offer was the best that had been received, and that he would apply to Justice Middleton later for confirmation by the court of its acceptance. As the purchase proposal will have to be submitted to the ratepayers the court let the matter stand over for six weeks.

Harper's Ferry Electric Light & Power Company, Harper's Ferry, W. Va.—A representative of the Harper's Ferry Electric Light & Power Company is said to have offered $75 a share for the outstanding stock of the company, which is authorized to construct an electric railway in Brunswick. The par value of the stock is $50 a share. The franchise has two years to run in Brunswick. About six months ago the Town Council granted the company a new franchise for twenty years. The plan is to build an electric railway from Winchester, Va., to Washington, D. C.

Hudson & Manhattan Railroad, New York, N. Y.—The directors of the Hudson & Manhattan Railroad have declared an interest payment of $10 on each adjustment income bond of the company for the six months ended Dec. 31, 1913, payable on April 1, 1914. The first payment of $8.34 for the five months ended June 30, 1913, was made on Oct. 1, 1913, being also at the rate of 2 per cent per annum.

Interborough Rapid Transit Company, New York, N. Y.—Lee, Higginson & Company, Harris, Forbes & Company, Kissel, Kinnicutt & Company, William A. Read & Company and White, Weld & Company have underwritten $10,000,000 of first and refunding mortgage 5 per cent gold bonds of the Interborough Rapid Transit Company. This is the same syndicate which purchased the $30,000,000 bonds of the company and offered them at 98½ on Oct. 10. This brings the total amount of bonds sold to the public up to $40,000,000, although a considerable amount have been exchanged for old bonds of the company, so that the total now outstanding in the hands of the public is much larger than the figure mentioned. The bonds are dated Jan. 1, 1913, and are due Jan. 1, 1966. Several firms of brokers are offering a block of these bonds at 99 and accrued interest.

Jacksonville (Fla.) Traction Company.—A special meeting of the stockholders of the Jacksonvile Traction Company has been called for Feb. 26, 1914, to act on the proposal to increase the capital stock of the company $1,000,000, of which increase $500,000 will be preferred and $500,000 common. The enlarged capitalization will be $2,500,000, consisting of $1,000,000 of preferred stock and $1,500,000 of common stock. If the stockholders authorize the proposed increase, $200,000 of the common stock will be offered pro rata to common stock holders of record Feb. 28 at $100 per share, in the ratio of one new share for every four old shares.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee representing the holders of the 6 per cent collateral gold notes of the Kansas City Railway & Light Company announces that it has arranged for the payment on March 2, 1914, at the office of the New York Trust Company interest on the notes from Sept. 1, 1913, to March 1, 1914, at the rate of 7 per cent per annum to holders of certificates of deposit representing the notes.

Manhattan Bridge Three-Cent Line, New York, N. Y.—The Manhattan Bridge Three-Cent Line wishes to issue $260,000 capital stock to acquire property, to improve its facilities and to discharge lawful obligations. It has already issued $190,000, and the application for permission to add to this will be heard by Milo Roy Maltbie, of the Public Service Commission for the First District of New York, on Feb. 27.

New York (N. Y.) Railways.—The directors of the New York Railways have not taken any action on the declaration of interest on the adjustment income bonds for the second six months of 1913 because of a difference of opinion in the board as to the interpretation of the language of indenture covering the mortgage. It is stated that one member of the board, representing the bondholders, takes the position that the directors have no discretion in the amount that shall be paid on the income bonds, but that all unexpended reserves in addition to surplus earnings are applicable to interest payments up to 5 per cent for a given year. In other words, it is contended that the wording of the indenture is mandatory upon this point.

Portland Railway, Light & Power Company, Portland, Ore.—At the annual meeting of the Portland Railway, Light & Power Company at Portland, Ore., on March 18, stockholders will be asked to decide whether the bonds which are reserved to be issued from time to time under the first and refunding mortgage shall be convertible into capital stock, and if so, upon what terms.

Quebec Railway, Light, Heat & Power Company, Ltd., Quebec. Que.—The Quebec Railway, Light, Heat & Power Company, Ltd., announce that interest on the $6,120,400 of consolidated mortgage 5 per cent bonds of the company which was due on Dec. 1, 1913, would be paid on Feb. 23.

Rockford & Interurban Railway, Rockford, Ill.—E. W. Clark & Company, Philadelphia, Pa.; Babcock, Rushton & Company, Chicago, Ill., and Curtis & Sanger, New York, N. Y., are offering the 6 per cent cumulative preferred stock of the Rockford & Interurban Railway at 95 and accrued dividends, netting the purchaser about 6.30 per cent on the investment.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has applied to the Railroad Commission of California for authority to issue $1,000,000 of bonds as additional security for the $2,500,000 of notes which have been extended by the holders. Permission is also asked to issue $500,000 of collateral trust 7 per cent notes. The proceeds will be applied to the East Bay System. A special meeting of the stockholders of the company has been called for April 7 to vote on creating an issue of $35,000,000 bonds. A new series is planned, to be known as the "first and refunding thirty-five-year 5 per cent gold bonds."

Scranton & Binghamton Railroad, Scranton, Pa.—The Public Service Commission of the Second District of New York has entered an order authorizing the Scranton & Binghamton Railroad, a Pennsylvania corporation, to purchase, take and hold the outstanding capital stock of the Binghamton (N. Y.) Railway amounting at par to $978,995, and approving the terms of sale of 90 per cent or more of said stock embraced in an agreement between the Scranton & Binghamton Railroad, G. Tracy Rogers and the First National Bank of Binghamton dated Jan. 8, 1914. It is the intention of the Scranton & Binghamton Railroad to extend its line to the New York State line and to effect a connection with the Binghamton Railway by a short extension of that railway to be hereafter constructed.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway, which applied to the Public Service Commission for the First District of New York for permission to issue $6,650,000 of bonds, has been authorized by the commission to issue $4,000,000 of 4 per cent first refunding mortgage bonds, to run fifty years from Jan. 1, 1910, and to be redeemable after Jan. 1, 1915, at 105 per cent. The bonds must be sold to net the company not less than 82 per cent of their par value, and the proceeds are to be used to pay off notes issued mainly for the acquisition of the securities of the Belt Line Railway Corporation and the New York City Interborough Railway. Of the total amount the commission allows $720,000 for expenses of sale of bonds and for discount, but requires that this amount shall be amortized by the payment each year into a separate fund of sufficient cash to accumulate the amount of $720,000 by Jan. 1, 1959. Action was deferred on the remainder of the bonds applied for.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

El Paso (Tex.) Electric Company, quarterly, 2¼ per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$63,687	*$31,333	$32,354	$17,358	$14,996
1 " " '13	58,793	*28,933	29,860	17,340	12,520
12 " " '14	768,979	*348,911	420,068	207,603	212,465
12 " " '13	715,373	*323,783	391,590	201,236	190,354

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$99,233	*$58,352	$40,881	$27,653	$13,228
1 " " '13	95,633	*59,241	36,392	24,399	11,993
12 " " '14	1,208,529	*716,738	491,791	301,335	190,456
12 " " '13	1,079,302	*645,765	433,537	269,159	164,378

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$33,526	*$22,416	$11,109	$12,632	$1,523
1 " " '12	31,663	*17,086	14,577	9,999	4,578
12 " " '13	425,924	*234,666	191,257	127,316	68,941
12 " " '12	402,188	*224,793	177,395	119,219	58,175

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$117,449	*$67,175	$50,275	$35,035	$15,240
1 " " '12	113,069	*63,585	49,485	34,867	14,618
12 " " '13	1,416,983	*837,497	579,486	421,447	158,039
12 " " '12	1,326,884	*754,821	572,063	419,451	152,612

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$295,377	*$190,295	$105,082	$50,283	$54,799
1 " " '12	259,881	*$150,778	109,103	41,506	67,597
12 " " '13	3,284,532	*2,019,654	1,264,879	561,815	703,064
12 " " '12	2,996,037	*1,702,766	1,293,271	523,068	770,203

NORTHERN TEXAS TRACTION COMPANY, FORT WORTH, TEXAS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$184,876	*$102,571	$82,304	$24,052	$58,252
1 " " '12	170,933	*89,758	81,175	24,662	56,513
12 " " '13	2,132,200	*1,179,941	952,259	286,918	665,341
12 " " '12	1,790,763	*941,690	849,073	266,076	582,997

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$29,523	*$16,630	$12,893	$7,707	$5,186
1 " " '12	27,878	*16,632	11,246	7,334	3,912
12 " " '13	296,595	*194,093	102,472	89,962	12,510
12 " " '12	286,537	*192,674	93,863	86,353	7,510

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$790,307	*$435,126	$355,181	$174,407	$180,774
1 " " '12	725,642	*416,705	308,937	172,977	135,960
12 " " '13	8,613,599	*5,008,375	3,605,224	2,063,019	1,542,205
12 " " '12	8,313,848	*4,772,299	3,541,549	1,976,250	1,565,299

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$74,505	*$49,864	$24,642	$22,968	$1,674
1 " " '12	68,447	*49,447	19,001	17,348	1,652
12 " " '13	827,780	*557,921	269,859	262,264	7,595
12 " " '12	747,058	*551,052	196,007	194,795	1,212

TAMPA (FLA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$83,107	*$49,386	$33,722	$5,059	$28,663
1 " " '12	66,797	*34,361	32,436	4,791	27,644
12 " " '13	844,941	*466,499	378,442	55,749	322,693
12 " " '12	753,835	*394,629	359,205	53,756	305,449

Traffic and Transportation

Traffic Accidents in New York and New Jersey in 1913

The National Highways Protective Society has for several years kept a record of traffic accidents of all sorts in the States of New York and New Jersey. These are classified as automobile, electric railway and wagon, and include only pedestrians knocked down or run over, and occupants of vehicles who received their injury through the fault of some other person. Accidents due to failure of equipment of the vehicle, or to faulty condition of the highway, have not been included, the intention being to note only those accidents for which the driver of some vehicle can reasonably be held to blame. The only electric railway accidents counted are those to pedestrians, or as the result of collisions. Other injuries to passengers or to employees are omitted. Children include all persons under seventeen years of age. Except when otherwise noted, New York State means the State excluding Greater New York.

The total number of persons killed in New York City during 1913 by automobiles was 302, by electric railways 108 and by wagons 132. These figures are derived from the coroners' reports every month, and the totals are all somewhat below the coroners' totals for the year. This is due to the difference in classification, and to the fact that the definite report of the cause of an injury often does not come to the coroners' office until after the end of the month. The only significant discrepancy is in the figures for wagon fatalities, where it is probable that the correct figures would be about 170 instead of 132.

Outside of New York City the reports received by the society and the coroners' figures agree closely. In New York City automobile, electric railway and wagon fatalities for the past four years have been as follows:

	1910	1911	1912	1913
Automobile	112	142	221	302
Electric railway	148	109	134	108
Wagon	211	172	177	170

The percentages of children killed during those four years by automobile, electric railway and wagon, respectively, out of the total number of persons killed by each of these three classes of vehicles, were as follows: automobiles, 45 per cent; electric railways, 31 per cent; wagons, 52 per cent.

Another feature worthy of note is that while in 1910 wagon killings outnumbered those due to automobiles, in 1913 automobile fatalities were more than those due to electric railways and wagons combined.

The total number of persons in New York City who were injured sufficiently to require medical attention or were killed for the year 1913 was 1485. The number of arrests following such accidents was sixty-two, or about one in every twenty-five accidents. In one accident in about fifteen the driver of the automobile ran away without giving any aid to the victim or making his identity known. There were 102 such cases in the city of New York during the past year, or about two every week. This is a felony under the State law, yet in the few cases where the driver was subsequently caught there is no record of any subsequent conviction. In about 15 per cent of the accidents the owner himself was driving. Motorcycles figured in about 5 per cent of the accidents.

In New York State outside of New York City for the past three years the accident record is as follows:

	1911	1912	1913
Automobile	132	127	149
Electric railway	67	79	79
Wagons	31	28	32

For 1912 and 1913 the percentage of children killed has been for automobiles, 26 per cent; electric railways, 25 per cent; wagons, 42 per cent.

The total number killed or injured by automobiles in the State of New York of which the society has record during the year 1913 was 1371.

The percentage of runaways after an accident was about the same as in New York City, as was the percentage of arrests following an accident. There were a very few convictions following these arrests that carried a jail sentence. The percentage of accidents in which the owner was driving was about 20 per cent.

In the State of New Jersey for the years 1912 and 1913 the record of fatalities was as follows:

	1912	1913
Automobiles	91	124
Electric railways	41	28
Wagons	16	26

The percentages of children killed by automobile, electric railway and wagon, respectively, out of the total number of persons killed by each of these three classes of vehicles, were as follows: automobiles, 36 per cent; electric railways, 36 per cent; wagons, 50 per cent.

The total number of persons killed and injured by automobiles for the year 1913 was 992.

The percentage of cases in which the driver ran away after the accident was rather higher than in New York State, being 9 per cent against 7 per cent. There were, however, more arrests in New Jersey following accidents than in the entire State of New York inclusive of New York City, the percentage being about 14 per cent. The proportion of accidents in which the owner was driving was about one in five or about the same as for New York State.

The following table gives the number of accidents in New York City, New York State and New Jersey due to specific classes of vehicles, or to particular circumstances of interest:

	New York City	New York State	New Jersey
Motorcycles	67	190	96
No light on wagon	..	10	3
No light on automobile	..	18	..
U. S. mail	23	3	1
Taxicab	49	14	Few but not counted
Fire Department vehicles	26	5	4
Ambulances	24	2	2
Police and other official	5	2	2
Children, coasting, playing games in street, "hitching," etc	46	12	18
Woman driving automobile	10	14	13

While there was not a single occupant of an electric railway car killed at a railroad grade crossing in New York and New Jersey, during the past year, the occupants of other vehicles contributed ninety-four victims. There is in both States a law compelling electric railway cars to stop at each crossing and the motorman to be assured that the way is clear before proceeding. The society says that could a similar law be enforced against wagons and automobiles, it would save more than fifty lives a year in the two States.

According to the society Los Angeles, with an automobile fatality rate of 153 per 1,000,000 in 1913, has the maximum rate of all the large cities of the world. Baltimore, with a rate of fourteen per 1,000,000, compares favorably with the cities of Europe. In Washington, which has one of the highest rates in the world, there has been for some time an ordinance limiting pedestrians to crossing the streets at the cross-walks only.

The rates for the foreign cities, and for American cities outside of the States of New York and New Jersey, are for the calendar year 1912, except for Los Angeles, where the figures are for 1913. The populations on which rates are based are from the United States Census of 1910 and from the report of the select committee of the House of Commons. The fatality rates per 1,000,000 of population for leading American and foreign cities in the year 1912 follow:

American Cities

City	Automobiles	Street Cars	Wagons
New York	47	28	38
Buffalo	49	51	10
Chicago	48	89	52
Pittsburgh	52	48	43
Providence	48	35	12
St. Louis	30	64	45
San Francisco	52	61	20
Baltimore	14	25	13
Los Angeles (1913)	153	Not given	
Washington	71	56	20

Foreign Cities

City	Automobiles	Street Cars	Wagons
London	46	5	24
Berlin	23	11	31
Paris	47	25	16
Vienna	13	2	15
Glasgow	12	15	19
Liverpool	17	4	16
Edinburgh	15	5	16
Dublin	10	10	22
Belfast	17	4	12
Leeds	19	3	11

Competition Between Teams of Car Crews to Reduce Accidents

The El Paso (Tex.) Electric Railway has adopted a plan which has created a spirit of friendly rivalry among the trainmen and proved an incentive toward reducing accidents. The trainmen, or car crews, have been divided into two teams designated as the "Red" and the "Blue," respectively. Since the teams are competing with each other for the best accident record the division was made by lot, and in order that the more experienced men might not predominate on one side the numbers of the men who had worked less than two months were placed in a hat, and as they were drawn out blindly the first man was assigned to the "Red" team, the second to the "Blue," the third to the "Red," and so on with each succeeding number. Then came the drawing of the numbers of the four-month men followed by the six-month men, the eight-month men and so on accordingly until the list had been completed. This resulted in two teams balanced as to experience.

Since Jan. 1, when the contest was inaugurated, an accurate daily account has been kept of the accident record of the members of the two teams, and at the end of February the members of the team which has made the better score will be the guests at a banquet attended by the officers of the company. The plan is to banquet the winning team at the expiration of sixty-day periods throughout the year.

The accidents have been classified and are charged up against the deserving trainmen in points, a schedule of which has been prepared by the committee on "safety first." It was anticipated that occasionally an accident would occur involving a trainman of the "Red" team and one of the "Blue" as members of the same car crew. It was therefore decided that the responsibility for the accident should be fixed upon either the motorman or the conductor. The plan has already placed the operation of the system upon a plane of higher efficiency. Since the contest was begun the two teams have been on practically even terms and there was no telling on Feb. 18 which one would be returned victorious on Feb. 28. The schedule of points charged up against the trainmen, and through them the teams, follows:

CLASSIFICATION OF ACCIDENTS AND THEIR RATING

1.	Collision, head on	100
2.	Collision, rear end	100
3.	Collision, side	50
4.	Collision, street railway crossing	50
5.	Collision, steam railway crossing	100
6.	Collision, with vehicles, except autos	50
7.	Collision, with autos and motorcycles	40
8.	Collision, with pedestrians	50
9.	Collision, with animals	25
10.	Derailments	15
11.	Motorman lost control of car	75
12.	Defective tracks	0
13.	Defective car or apparatus	0
14.	Boarding moving car	10
15.	Leaving moving car	75
16.	Fell in or thrown off moving car	35
17.	Fell or tripped on stationary car	5
18.	Fell or tripped near car	0
19.	Disturbance on car between passengers	0
20.	Disturbance on car between passengers and crew	15
21.	Horse frightened at car	0
22.	Damage to passengers' clothes	5
23.	Employees injured	0
24.	Not otherwise classified	0
25.	Failure to report an accident	*200

*This is in addition to the points which would naturally accrue on account of the accident.

Freight on a Wisconsin Road

The Common Council of Waupaca, Wis., granted a franchise recently to the Waupaca Electric Light & Railway Company, an electric railway running from Waupaca 5 miles into the country to the Wisconsin Veterans' Home, authorizing the company to carry freight, mail and express in addition to passengers. Among the conditions prescribed are that not more than two freight cars shall be hauled in one train; that no car shall be loaded to exceed 10 tons; that the speed of such cars in the city limits shall not exceed 10 m.p.h. and that no car shall be stopped on certain business streets for the purpose of loading or unloading freight. The passage of the franchise created considerable feeling among some of the people in Waupaca, and a petition was filed with the city clerk by the requisite number of voters to insure a vote on the adoption or rejection of the franchise at the regular spring election in April. The town board of the town of Farmington, which adjoins Waupaca, and wherein the Wisconsin Veterans' Home is located, has already granted the necessary franchise. The idea of an electric railway combining city and interurban features as does this line, and operating almost entirely over the public streets and highways, transporting freight, is something new in Wisconsin. The franchise asked for by the company and granted by the City Council provided that the privilege of receiving freight should accrue only to the Wisconsin Veterans' Home, which is a state institution. The trustees of the home were largely instrumental in inducing the electric line to apply for the franchise, as the only means for conveying the necessary freight and supplies from the steam roads at Waupaca, a distance of 5 miles, to the home has been by teams. The outcome of this innovation in electric railroading in Wisconsin has awakened the interest of many people who are financially interested in similar properties. Irving P. Lord, Waupaca, Wis., is the president and general manager of the Waupaca Electric Light & Railway Company.

Dont's in New Albany

The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Light Company, New Albany, Ind., have combined recently in the distribution of blotters to 7000 school children in New Albany and Jeffersonville, Ind. The blotters are part of the "safety first" campaign being conducted by James Harmon, safety agent. The following matter appeared on the blotters:

"DONT'S THAT AVERT DANGER

"Don't play in the streets where there are tracks.
"Don't cross tracks without looking both ways.
"Don't cross street if you see a car near.
"Don't get on or off a car while it is moving.
"Don't lean out of car window.
"Don't face the rear in stepping off the car.
"Don't touch or allow anyone to touch any wire.
"Don't steal rides on any cars or wagons.
"Don't fail when leaving car to look both ways for any vehicle.
"Don't cross street except at cross-walk.
"Don't stand on car-steps.
"Don't be negligent or careless.
"Do your part to make street car travel safe."

Order on Boston Transfers.—The Massachusetts Public Service Commission has issued an order requiring the Boston Elevated Railway to establish free transfer privileges at Dewey Square between inbound surface cars from South Boston and Dorchester via Dorchester Avenue or Summer Street extension and Atlantic Avenue surface cars running north of Dewey Square.

Ohmer Register Offer Renewed.—The Ohmer Fare Register Company, Dayton, Ohio, through John F. Ohmer, president, has renewed its prize offer for 1914 to the employees of the Denver (Col.) City Tramway. The review of the Ohmer register contest for 1913 was published in the January, 1914, issue of the *Tramway Bulletin*, which is issued in the interest of the employees of the company.

Waiting for Passengers at Transfer Points.—The Denver (Col.) City Tramway has issued a warning to car crews in regard to the necessity for observing closely the provisions of rule No. 132 in regard to meeting cars at transfer points. The company, through the superintendent of transportation, says: "Nothing angers the company's transferring patrons more than to have a connecting car run away from them at a transfer point. Those who are indulging in this practice may expect to be severely dealt with unless it is stopped."

Serious Accident in Indianapolis—Four persons were killed, five probably fatally injured and twenty-five others hurt on the night of Feb. 18, 1914, when an outbound English Avenue car of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., was crushed between two interurban cars. The English Avenue car stopped at the foot of a steep grade, just behind a Columbus & Southern

Traction Company car, and a large Indianapolis & Cincinnati Traction freight car, on the grade behind the city car, crashed into the smaller car.

Hearing on Revision of Brooklyn Transfer System.—A hearing on the plan for the proposed revision of the transfer system of the Brooklyn Rapid Transit Company was held before members of the Public Service Commission of the First District of New York on Feb. 20, 1914. The company was represented by Slaughter W. Huff, vice-president, and George S. Yeomans of counsel for the company. The representatives of the commission and the officers of the company will confer further in regard to the changes and the hearing will be resumed before the commission on March 5.

Terminal Improvements Proposed at San Francisco Ferry.—Plans have been completed by City Engineer M. M. O'Shaughnessy for an elevated loop at the ferry in San Francisco, Cal., to accommodate all Market Street cars of the Geary Street Municipal Railway and the United Railroads. These will be the basis for work at a conference on the loop to be held by the Mayor and the members of the harbor commission shortly. Mr. O'Shaughnessy's plan calls for the expenditure of $250,000 and provides for concrete causeways harmonizing with the ferry building and for ornamental arches extending over the sidewalk lines instead of in the middle of the street.

Decision in Ohio Fare Case.—The Supreme Court of Ohio has sustained the right of the Cincinnati, Georgetown & Portsmouth Railroad and the Interurban Railway & Terminal Company, Cincinnati, Ohio, to charge a 10-cent fare from Cincinnati to California and Coney Island. The terms of the franchise of the Interurban Railway & Terminal Company, secured in 1901, provided for a 5-cent fare between California and the eastern boundary of Cincinnati and from the center of the city to the eastern boundary. California and Coney Island were annexed to the city in 1909 and the city claimed that the company was obligated by statutes under which it made an operating agreement with the Cincinnati Traction Company to carry passengers within the city limits for 5 cents.

Motor Bus Suggested for Toronto.—Oliver Hezzelwood, president of the Dominion Automobile Federation, read a paper before the Ontario Motor League recently in favor of municipally owned motor buses as a solution of Toronto's transportation problem. The speaker submitted the following estimate of the cost of installing an experimental system in Toronto: Twenty buses, London B type, garage, etc., approximately $150,000; annual charges for operation, management, insurance, depreciation and interest on outlay at 6 per cent, $166,000; revenue from operation of twenty buses, based on 300 days each per year at a 3½-cent fare, $195,500; profit, $29,500. After the meeting the officers of the league decided to forward a copy of the address to Mayor Hocken and Controllers McCarthy and Simpson gave their assurance that they would move and second a resolution to have the suggestion placed before the transportation commission for consideration with the other plans that have been advanced.

Ticket Choppers in New Subways in New York.—The Brooklyn (N. Y.) Rapid Transit Company will accept as final the decision of the Public Service Commission of the First District of New York that ticket choppers shall be installed in all its new subway lines now under construction or about to be built. By this order all the stations on the Montague Street-Flatbush Avenue, Fourth Avenue and the Queens elevated roads, which are to be operated jointly by the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company must be equipped with ticket choppers. The turnstiles will be allowed to remain in the stations on the Center Street loop as an experiment. On the New Utrecht Avenue and Culver lines turnstiles will be allowed at the stations, except at Eighteenth Avenue and Coney Island on the former and Coney Island on the latter, until the traffic at the other stations becomes sufficient to warrant the commission ordering the choppers installed. Stations on lines built and owned by the company, such as the Sea Beach line, may be fitted with turnstiles if the company desires, but the commission reserves the right to order a change when it deems it necessary.

Personal Mention

Mr. J. S. Pevear has been elected a vice-president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Mr. George Bullock.

Mr. F. W. Brown has been appointed traffic manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., a newly created position with the company.

Mr. Henry W. Rowley has resigned as president and as a director of the Billings (Mont.) Traction Company, to take effect as soon as his successor has been elected. Mr. Rowley is retiring for the reason that his other lines of business require all his time and attention. He will retain his interest in the company.

Mr. W. E. Hendley has been appointed to take charge of a new department with the San Francisco-Oakland Terminal Railways known as the coasting recording department. He will have charge of the records of motormen's performances as shown by the coasting recording devices which are being installed on all of the company's cars.

Mr. Charles R. Barnes, chief railroad inspector to the Public Service Commission of the Second District of New York, has been retained by the Ontario Railway Board in accordance with the promise of the members of that body to the officials of the city of Toronto to retain the services of an independent traffic expert to report upon the street railway system with a view to suggesting new routes and re-routing.

Mr. Lewis E. Palmer has been appointed advertising manager of the Stone & Webster Engineering Corporation, with headquarters at Boston, Mass. He succeeds Mr. Barrett Smith, whose assistant he has been for the past two years. Mr. Palmer was graduated from Cornell University with the degree of A.B. in 1905, and prior to his connection with the Stone & Webster organization was a member of the editorial staff of the *Survey*, New York.

Mr. E. W. Reed, who has been general superintendent of the Chattanooga Railway & Light Company, Chattanooga, Tenn., will continue in that capacity, but with considerably widened powers. He will have complete authority in the operation of both the street railway and the light departments of the corporation. Mr. Reed has practically all the powers which were exercised by Mr. W. E. Boileau, formerly general manager, which position has been abolished.

Mr. F. W. Hoover, general manager of the Tennessee Power Company, one of the two companies which have developed 150,000 hp in the Chattanooga district, has been designated executive officer of the Chattanooga Railway & Light Company, Chattanooga, Tenn., with instructions to report to Mr. M. H. Hopkins, first vice-president of that company. Mr. Hoover is second vice-president of the Chattanooga Railway & Light Company, having been elected to that office some time prior to the resignation of Mr. W. E. Boileau as general manager. Mr. Hoover continues as general manager of the Tennessee Power Company.

Mr. Theodore Beran, New York district manager for the General Electric Company, was the guest of a number of his friends and business associates at a dinner given at the Machinery Club, New York, on Feb. 20, to mark the twenty-fifth anniversary of his advent into the electrical field. It was in 1889 that Mr. Beran became cashier for the old Sprague Electric Company, which afterward, merging with the Edison General Electric Company and the Thomson-Houston Company, became the General Electric Company. In 1893 Mr. Beran was appointed manager of its supply department and continued in that position until 1902, when he went to Rugby, England, where he organized the supply department of the British Thomson-Houston Company. After two years abroad he returned to New York and succeeded Mr. Charles T. Hughes as acting manager of the New York district office of the General Electric Company. Since 1905 Mr. Beran has served as district manager..

Prof. Lewis E. Moore, of the Massachusetts Institute of Technology, has resigned to become consulting engineer of the Massachusetts Public Service Commission. Professor Moore was educated in Chicago public and manual training schools and received the degree of B.S. in mechanical engineering from the University of Wisconsin. In 1901 he took a course in structural engineering at the Massachusetts Institute of Technology, and after teaching in the universities of Illinois and Wisconsin he became in 1907 assistant professor of civil engineering at the first-named institution, specializing in bridge design and foundations. Since he took up his residence in Boston Professor Moore has been employed in expert work by the Massachusetts Railroad Commission, the predecessor of the Public Service Commission, and has engaged in consulting work. In his new position he will take up the consulting work formerly handled by Prof. George F. Swain for the Railroad Commission and will have supervision of some 3000 bridges in the State, together with an oversight of railroad signal installations.

Mr. Seymour Van Santvoord has been nominated by Governor Glynn of New York as a member of the Public Service Commission of the Second District to succeed Mr. Frank W. Stevens, Jamestown, whose term expired a year ago. Mr. Van Santvoord was born in Troy in 1859. At the age of fourteen he became connected with *Rough Notes*, published at Kinderhook, N. Y., and learned the printing trade. He entered the sophomore class of Union College and was graduated with honors at the age of nineteen. He then studied law at the Albany Law School and was admitted to the bar in 1881. He opened an office in Troy, where he has practised ever since. He was counsel to the Walter A. Wood Company, Hoosick Falls, N. Y., in 1893, and was made one of the receivers of the company in 1895. Upon the reorganization of the company he was elected president and held the office for nine years, when he resigned to devote himself largely to the Security Trust Company, which he helped to organize in 1901 and of which he was president until 1912. In that year he resigned to become counsel to Governor Dix. The Senate has confirmed the nomination.

Mr. E. F. Schneider, who was elected president of the Central Electric Railway Association at the meeting held in Cleveland, Ohio, this week, is secretary, general manager and purchasing agent of the Cleveland Southwestern & Columbus Railway, which operates 225 miles of interurban electric railway in Cleveland and vicinity. Mr. Schneider has been connected with the Cleveland Southwestern & Columbus Railway for fifteen years, for ten years of which he acted as secretary of the company and in various other capacities. In January, 1910, he was in addition appointed general manager to succeed Mr. C. N. Wilcoxon. In all Mr. Schneider has been connected with electric railway work for about twenty years. His business experience also extends to commercial fields. Mr. Schneider has made a special study of accident prevention, in which field he was one of the pioneers, and has contributed the results of his experience along these lines in articles which have appeared at various times in the ELECTRIC RAILWAY JOURNAL.

E. F. Schneider

Mr. E. C. Deal has resigned as vice-president and general manager of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., to become connected with W. N. Coler & Company, New York, N. Y., who control and operate a number of electric railways, electric light plants and gas and water companies. Mr. Deal gained his early experience with the Georgia Electric Light Company, which he served in various capacities from 1894 to 1898. He then entered the employ of Stone & Webster, Boston, Mass., but left them in 1904 to enter the employ of the Gas & Electric Company of Bergen County in New Jersey as chief engineer in charge of the company's properties in more than forty municipalities in northern New Jersey. After this company was absorbed by the Public Service Corporation of New Jersey Mr. Deal was made superintendent of the electric properties of the Public Service Corporation in central New Jersey. He resigned from this company in 1908 to become connected with W. N. Coler & Company as manager and engineer of public service properties owned by them. Following the acquisition of the property of the Augusta Railway & Electric Company and the Augusta-Aiken Railway & Electric Company by a syndicate in which J. G. White & Company, Inc., New York, N. Y., were interested, Mr. Deal resigned from Coler & Company to become manager of the Augusta-Aiken Railway & Electric Corporation, the successor company at Augusta. This was in April, 1911. In April, 1913, he was elected vice-president of the company in addition to general manager.

Mr. Thomas R. H. Daniels, who resigned on Feb. 15, 1914, as chief engineer of the Birmingham Railway, Light, Heat & Power Company, Birmingham, Ala., has been appointed engineer of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., and will assume his new duties on March 1. Mr. Daniels entered the electric railway field in 1898 as assistant engineer in charge of track and roadway of the Rhode Island Company, Providence, R. I. He left that position in 1904 to become assistant engineer for Westinghouse, Church, Kerr & Company, New York, N. Y., in the construction of the new terminal station for the Pennsylvania Railroad in New York City. He resigned from Westinghouse, Church, Kerr & Company in 1906 and took charge of the rebuilding of tracks, etc., of the United Railroads, San Francisco, as assistant engineer, after the earthquake. In 1908 he severed his connection with that company and became assistant engineer of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., and was the construction engineer in charge of the erection of the new West Tenth Street power station of that company. Mr. Daniels held that position until May 1, 1911, when he became chief engineer for the Birmingham Railway, Light, Heat & Power Company.

T. R. H. Daniels

OBITUARY

Henry Morrison, superintendent of the Sioux City (Iowa) Service Company, is dead. Mr. Morrison was born in Galena, Ill., in November, 1860, and began active street railway service in 1902 with the Sioux City Service Company. He was gradually advanced to the position of superintendent of that company. Mr. Morrison is survived by two children.

Samuel W. Allerton, for many years prominent as a capitalist in Chicago, died at his winter residence in Pasadena, Cal., recently. Mr. Allerton was at one time a large stockholder in the Chicago City Railway and also served as a director of the company. He took a large part in establishing the cable railway systems in Chicago. Mr. Allerton was born in New York State in 1828.

Charles W. Roe, assistant superintendent in charge of the Crosstown and Maspeth depots of the Brooklyn (N. Y.) Rapid Transit Company, is dead. Mr. Roe was born in Detroit, Mich., where he obtained his first railroad experience. Going East, he entered the service of the Public Service Railway of New Jersey, and in 1906 entered the service of the Brooklyn Rapid Transit Company. He is survived by a widow.

Franklin Phillips, head of the foundry and machinery firm of Hewes & Phillips, Newark, N. J., is dead. Mr. Phillips was born in Newark fifty-seven years ago and was graduated from Cornell in 1878. He immediately became connected with the firm of Hewes & Phillips, founded by his father, and soon established a reputation as a mechanical, steam and hydraulic engineer. He was a trustee of the Newark Technical School, president of the Foundrymen's Association of New Jersey and a member of the Newark Board of Trade, the Essex Club and the American Society of Mechanical Engineers. He is survived by his widow, one son and a daughter.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Fresno, Clovis & Academy Interurban Railway, Fresno, Cal.—Application for a charter has been made by this company to build a 24-mile electric railway between Fresno, Clovis and Academy. Capital stock, $500,000. Incorporators: F. S. Granger, Fresno; F. M. Blanchard, Fresno; F. E. Buckman, Clovis; T. E. Allen, Clovis, and M. A. Zuccardi, New York. [E. R. J., Feb. 21, '14.]

***Windfall & Central Indiana Traction Company, Windfall, Ind.**—Incorporated in Indiana to build an electric railway from Tipton to Marion via Windfall. Capital stock, $10,000. Directors: Ezra N. Todd, Thomas E. Dean and Guy Dean.

Hiawassee Railway, Andrews, N. C.—Chartered in North Carolina to build a 35-mile electric interurban railway from Andrews to Hayesville, N. C., and Hiawassee, Ga. One hundred and fifty thousand dollars in bonds has been voted in Cherokee County and Clay County. Incorporators: J. W. Walker, Andrews, N. C., and G. H. Haigler, Hayesville, N. C. [E. R. J., June 7, '13.]

***Seabeach Railroad, Beaufort, N. C.**—Chartered in North Carolina to build a 14-mile electric railway from Beaufort to Cape Lookout, N. C. Capital stock, $275,000. Incorporators: C. J. Becker, Wilmington, N. C.; George P. Westervelt, James Hodges and Herbert G. Lord, Jr., all of New Jersey. Winston & Biggs, Citizens' Bank Building, Raleigh, N. C., may give information.

***Cleveland-Pennsylvania Interurban Railway, Cleveland, Ohio.**—Incorporated in Ohio to build an electric railway between Cleveland and Sharon, and eventually to extend the line to Pittsburgh, via New Castle, Pa. Right-of-way over the present Sharon-New Castle line will probably be secured instead of building a new line. The company is to use the lines of the Eastern Ohio Traction Company from Cleveland to Middlefield and will build from Middlefield to Sharon. Capital stock, $50,000. Incorporators: Henry P. Smith, Elijah Ashley, G. A. Mowers, Robert P. Thomas and Herbert A. Wadsworth, all of Pittsburgh.

***Madison & Janesville Traction Company, Beloit, Wis.**—Incorporated in Wisconsin to build an electric railway from Beloit to Whitewater and Elkhorn and from Janesville to Madison. Capital stock, $25,000. Frank H. Weston, Madison, incorporator.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to proceed with the work on the proposed elevated railway in the rear of the station at Sixth Street and Los Angeles Street in Los Angeles.

Los Angeles, Cal.—The Lone Pine Utilities Company has asked the Council for a franchise to operate a trackless trolley line from Grava station in the Cajon Pass on the Santa Fé Railway to what is known as the Upper Swartout Valley, a distance of 18 miles. [E. R. J., Aug. 31, '13.]

San Diego, Cal.—The Los Angeles & San Diego Beach Railway has asked the Council for a thirty-eight-year extension of time of its franchise on the La Jolla line in San Diego.

San Luis Obispo, Cal.—The Pacific Coast Railway has been granted authority from the commission to exercise its franchise rights granted by the Board of Supervisors of San Luis Obispo County.

Stockton, Cal.—The Stockton Electric Railway has received a franchise from the Council to double-track some of its lines in Stockton.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has received a twenty-year franchise from the Council on Main Street between Broadway and Missouri Avenue in East St. Louis.

Pekin, Ill.—The Pekin City Railway will ask the Council for a franchise in Pekin.

Peoria, Ill.—The Peoria Railway has asked the Council for a franchise for an extension of its tracks in Peoria to enter a new terminal station at Hamilton Street and Jefferson Street.

Louisville, Ky.—The Louisville Railway has asked the Council for a franchise to extend its line on Chestnut Street from its present terminal to Shawnee Terrace, near Shawnee ark, in Louisville.

Middlesboro, Ky.—The Council in Middlesboro has announced that a franchise for an electric railway will be sold at public auction April 30 to the highest bidder. Address Mayor Manring.

Kansas City, Mo.—The Metropolitan Street Railway has asked the Council for a franchise on Twenty-fourth Street from Main Street to Grand Avenue to reach the new Union Station in Kansas City. Other extensions are being planned by the company.

Butte, Mont.—The Butte Electric Railway has asked the Council for a franchise to extend its Oregon Avenue line in Butte from the intersection of Dewey Street and Hill Street across the flat toward Three Mile and into the Gilman addition.

Portland, Ore.—The Portland & Oregon City Railway has received a franchise from the City Council for the construction of its lines in Portland.

Chesterfield, Va.—The South Richmond & Chesterfield Railway has asked the Council for a franchise in Chesterfield. This is part of a plan to build an electric railway from the intersection of Broad Rock Road and Hull Street, Richmond, to Falling Creek. John C. Robertson, Richmond, is interested. [E. R. J., Oct. 11, '13.]

Richmond, Va.—The Virginia Railway & Power Company has received permission from the Council to reconstruct its tracks in West Broad Street from Foushee Street to Harrison Street in Richmond.

Seattle, Wash.—The reconstruction of the Fauntleroy Park Street line and the shortening of the distance by 1 mile or more is proposed in a bill introduced into the Council recently to grant a franchise on Avalon Way and other streets to the Puget Sound Traction, Light & Power Company. It is understood this franchise will be accepted by the company and that construction work will begin immediately.

Tacoma, Wash.—The City Council has made an agreement with the Puget Sound Traction, Light & Power Company whereby the former will construct a 1-mile electric line across the tideflats at a cost of $85,000, and the latter will operate same for the city.

TRACK AND ROADWAY

Birmingham, Ensley & Bessemer Electric Railway, Birmingham, Ala.—Work has been begun by this company on the Tidewater line from Fairfield to Bessemer. Later the line will be extended to Tuscaloosa.

Fresno, Clovis & Academy Interurban Railway, Fresno, Cal.—This company, the incorporation of which is noted elsewhere in this issue, has secured all the right-of-way on the line between Fresno and Academy and will soon begin work on the construction of several bridges. Financial arrangements have been made and plans are being considered to build an 8-mile extension to Centerville. F. S. Granger, Clovis, president. [E. R. J., Feb. 21, '14.]

San Francisco-Oakland Terminal Railway, Oakland, Cal.—This company plans to spend $35,000,000 for the refinancing and improving of the Key Route and Oakland Traction properties and their future development. This sum does not include the proposed extension to San José or Sacramento, but it is to be used to refund outstanding bonds and to the extension and improvement of the lines within the immediate vicinity of Oakland.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—A 7-mile branch will be built by this company from Graton to Camp Meeker.

San Diego (Cal.) Electric Railway.—Preparations are being made by this company to expend $250,000 in improvements of its tracks on Fifth Street in San Diego and to replace the rails on Fifth Street from Ash Street to University Street with "Trilby" 114-lb. rails. It is planned to repair Fifth Street with concrete base and asphalt surface. The rails on Fourth Street from Broadway to Sixteenth Street will also be replaced with 114-lb. rails.

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has given notice of a call for bids to be opened on May 4 to build the Chestnut Street branch of this railway from Van Ness Avenue along the exposition grounds. This will be the first portion of the extension to be built under the recent bond issue.

Pacific Gas & Electric Company, San Francisco, Cal.—Plans are being formulated by this company which will necessitate the complete remodeling of the downtown system, establishing belt lines in the business district and constructing new lines on I Street and L Street in Sacramento.

San Ramon Valley Railway, San Francisco, Cal.—This company, a subsidiary of the Oakland, Antioch & Eastern Railway, plans to place its line in operation on March 1. This line will join the main line of the Oakland, Antioch & Eastern Railway 1 mile west of Walnut Creek and extend 11 miles southward through Danville and Alamo to the foot of Mount Diable.

United Railroads, San Francisco, Cal.—Grading will be begun at once by this company on the extension of the Polk Street line from Lombard to the bay and the transport docks in San Francisco.

***Colorado Springs, Col.**—The Chamber of Commerce and other civic bodies in Colorado Springs, Pueblo and Denver have been asked to co-operate in the construction of an electric line to connect Colorado Springs, Pueblo and Denver, a total length of 115 miles. Frank R. Dusen, Denver, represents the promoters.

Washington Railway & Electric Company, Washington, D. C.—Surveys have been completed and grading has been begun by this company for its 2.94-mile extension from Wisconsin Avenue via Macomb Street and Massachusetts Avenue to the District of Columbia line.

Jacksonville (Fla.) Traction Company.—Work has been begun double-tracking this company's line to the baseball park in Jacksonville.

***Griffin, Ga.**—Surveys are being made to build an electric railway in Griffin. No names are yet given of those interested in the project.

Galesburg Railway & Light Company, Galesburg, Ill.—This company is asked to consider plans for extension of its lines in Galesburg in three directions.

Evansville (Ind.) Railways.—Surveys are being made for a line from the Rockport traction line at Kincaid station and extending to a point opposite Owensboro.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being considered to extend the South Eighth Street line in Richmond into Beallview.

Southern Iowa Traction Company, Centerville, Ia.—This company, whose entire stock was recently purchased by the Centerville Light & Traction Company, will be made into an electric line as soon as material can be obtained. Contracts have been let for all equipment as announced previously in the ELECTRIC RAILWAY JOURNAL.

Union Traction Company, Independence, Kan.—Right-of-way has been secured by this company for the proposed extension from Coffeyville to Nowata.

Central City, Greenville & Drakesboro Railway, Central City, Ky.—J. A. Steiner, Central City, has been appointed engineer in charge of preliminary plans for the construction of the proposed interurban line between Central City and Greenville, Ky. [E. R. J., Feb. 14, '14.]

Alexandria (La.) Electric Railway.—Work has been begun by this company on the reconstruction of its tracks in Alexandria.

Cumberland County Power & Light Company, Portland, Maine.—Right-of-way has been secured by this company for a 7-mile line to extend from its present line at Dunstan, Maine, to the steam power station of the York Light & Heat Company in Biddeford.

Cumberland (Md.) Electric Railway.—Plans are being made by this company for an extension to Mapleside.

Bay State Street Railway, Boston, Mass.—Work will be begun at once by this company double-tracking its Chatham Street and Chestnut Street line in Lynn.

Muskegon-Casnovia Land & Development Company, Muskegon, Mich.—Right-of-way has been secured by this company for its line to connect Muskegon, Saginaw, Egelston, Moorland and Casnovia. Norman B. Lawson, Muskegon, is interested. [E. R. J., Jan. 31, '14.]

St. Paul Southern Electric Railway, St. Paul, Minn.—This company is asked to consider plans to extend its line from Hastings to Red Wing in the near future.

Meridian Light & Railway, Meridian, Miss.—The Asylum and College line is to be double-tracked from Eighteenth Street and Thirty-fourth Avenue to the end of the line. Work will begin within a few weeks. Work has already begun on a concrete bridge spanning the brook which extends through the park over which the car lines will pass. A part of the line from Eighteenth Street on Thirty-fourth Avenue is already double-tracked, but this will be reworked and the rest of the track, to the end of the line, a distance of about ½ mile, will be double-tracked.

Caldwell County & Southern Railway, Kingston, Mo.—This company has been organized to build a 9-mile electric railway from Hamilton to Kingston. Capital stock, $100,000. F. L. Bowman, Kingston, and D. Miller, Kansas City, are interested. [E. R. J., Dec. 27, '13.]

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has been asked to consider plans to extend its lines from Forty-sixth Street and Cuming Street in Omaha to Benson.

Brooklyn, N. Y.—The New York Municipal Railway has been authorized by the Public Service Commission, First District, to award contract for construction of Section 2 of the Lutheran Cemetery line, Brooklyn, to F. W. Burnham, 30 East Forty-second Street, New York. The Lutheran Cemetery extension will be an elevated railroad, to connect the Myrtle Avenue line at Wyckoff Avenue, Ridgewood, with Lutheran Cemetery. The contract calls for the construction of an elevated railroad structure about 1050 ft. in length and an approach about 315 ft. long, together with concrete retaining walls, earthfill, removal of a boiler house, switch plant, signal tower, etc.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—This company has received permission from the Public Service Commission to electrify that part of its line which lies along Canal Street east of the Bowery. At present it is operated by horse-power.

Frontier Electric Railway, Niagara Falls, N. Y.—This company, which is surveying for an electric railway line between Buffalo and Niagara Falls and has completed part of the work of laying the track, will start construction in the vicinity of the Buffalo city line and North Tonawanda early in the spring. Almost all of the right-of-way has been secured. It will be a three-track line, two for passenger traffic and one for freight trains. James S. Simmons, vice-president. [E. R. J., Nov. 1, '13.]

Suffolk Traction Company, Patchogue, N. Y.—During the next eight weeks this company will award contracts to build 11 miles of new track.

Charlotte (N. C.) Electric Railway.—Work has been begun by this company on the extension of its line in Myers Park from the present terminus at Providence Road to the site of Queens College.

Canadian Pacific Railway, Montreal, Que.—Plans are being considered by this company for the ultimate electrification of a 5-mile, double-track cut-off tunnel through the Selkirk Mountains in British Columbia. The bore of the tunnel will be 17 ft. and the grades encountered will reach about 2 per cent. It is planned to have the tunnel approached by an electrified section of 7 miles of double track and that the third-rail 2400-volt d.-c. system will be employed. Power will probably be supplied from a future power station to be installed near the electrification.

Saskatoon (Sask.) Electric Railway.—The Municipal Council plans to spend $100,000 on extensions of this company's lines during 1914.

Hull (Que.) Electric Company.—The extension of this railway to Gatineau Point is being considered.

Shelbyville, Petersburg & Decatur Railroad, Shelbyville, Tenn.—It is reported that this company will award contracts in March to build its line between Shelbyville, Tenn., and Decatur and Athens, Ala. The work will include 250,000 cu. yd. earth excavation, 75,000 cu. yd. rock excavation, three 60-ft. and three 40-ft. steel bridges, 1,000 lin. ft. trestles and 2500 cu. yd. masonry. G. B. Howard & Company, Franklin, Tenn., engineers. [E. R. J., Jan. 31, '14.]

El Paso (Tex.) Electric Railway.—Since the first of the year this company has completed two additional lines of new track and it is now building a third. With the completion of the new line now under construction the company will have added to its trackage approximately 5 miles.

San Antonio (Tex.) Traction Company.—Work has been begun by this company relaying track and double-tracking some of the lines in San Antonio.

Ogden (Utah) Rapid Transit Company.—Plans are being made to extend the Wall Avenue and Twenty-fifth Street lines in Ogden.

Seattle, Wash.—The City Council has appropriated the sum of $25,000 and directed the Board of Public Works to proceed at once with the repairing and construction work as may be necessary to place the roadbed, tracks, etc., of the Lake Burien & Highland Park Electric Railway line in condition for efficient operation. This railway was recently deeded free to the city of Seattle.

Wenatchee, Wash.—Estimates are being made and a company will be incorporated shortly to build an electric railway from Wenatchee to Leavenworth and from Wenatchee to Clockhum, 40 miles. Hyman Harris, Wenatchee, is interested. [E. R. J., Jan. 24, '14.]

***Baraboo, Wis.**—A corporation has been formed with a capital stock of $1,000,000 to build two electric railway lines through Baraboo. One will extend from Cashton to Baraboo and Portage and the other line from Plain to Devils Lake, Baraboo and Kilbourn, making more than 100 miles of electric railway with Baraboo as the central quarters. Among those interested are T. Edward Mead, T. F. Risley and W. H. Marriott, all of Baraboo.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—Plans have been completed by this company to build a new freight car repair shop in the new Sixteenth Street freight yards at New Westminster, B. C. The structure and plant is to cost about $25,000 and will include a blacksmith shop equipped with an electrically driven drill press and other machines.

Geary Street Municipal Railway, San Francisco, Cal.—Bids are being received by this company to build an addition to its carhouse in San Francisco.

Illinois Traction System, Peoria, Ill.—Plans are being made to begin work soon on the construction of a new passenger station at the corner of Hamilton Boulevard and Jefferson Avenue in Peoria.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Plans are being made by this company to build three new four-story brick warehouses in Spartanburg at an aggregate cost of $25,000. The structure to be located on Spring Street will be 30 ft. x 60 ft., and the two buildings to be constructed on Wofford Street will be 48 ft. x 83 ft. Bids have been submitted for the work, but no contract has been let yet.

Southern Traction Company, Dallas, Tex.—This company plans to build a new passenger station at Reagan Street and Oak Street in West.

POWER HOUSES AND SUBSTATIONS

Cumberland County Power & Light Company, Portland, Maine.—This company has acquired right-of-way for a pole and tower transmission line to extend from its present line at Dunstan, Maine, 7 miles to the steam power station of the York Light & Heat Company in Biddeford. The line will be single-circuit, three-phase, and the current transmitted will be of a frequency of 60 cycles at a pressure of 38,000 volts. Contracts have already been let for the pole fixtures, electrical apparatus, etc. It is planned to have it completed during the spring.

Manufactures and Supplies

ROLLING STOCK

Youngstown & Southern Railroad, Youngstown, Ohio, expects to purchase one combination baggage and passenger car during 1914.

Toledo & Western Railroad, Toledo, Ohio, expects to purchase one electric locomotive and electrical equipment for two package freight cars and two passenger cars.

Badger Railway & Light Company, Milwaukee, Wis., will order ten or twelve gasoline cars for its new 22-mile road. Specifications will be let in about six weeks.

Trenton & Mercer County Traction Corporation, Trenton, N. J., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as being in the market for ten passenger cars, has ordered these cars from The J. G. Brill Company.

Wisconsin Public Service Company, Green Bay, Wis., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21 1914, as being in the market for four cars, has ordered four 28-ft. double-truck semi-steel city cars from the St. Louis Car Company.

Chicago (Ill.) Elevated Railways, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, as having ordered 128 center-door cars from the Cincinnati Car Company, has specified the following equipment for these cars:

Seating capacity.........44
Weight of car body, 28,200 lb.
Bolster centers, length, 38 ft. 8 in.
Length of body..37 ft. 10 in.
Length over vestibule.48 ft.
Width over sills, 8 ft. 8 3/16 in.
Width over posts at belt, 8 ft. 6¾ in.
Height from top of rail to sills........ 3 ft. 2 in.
Body ....steel
Interior trim........Agasote
Underframe ....steel
Air brakes ....West.
Axles. Standard Steel Works
Bolsters, body..Cin. Car Co.
Brakeshoes, Am. Brake Shoe & Fdy.
Bumpers, Ry. Improvement Co.
Center bearings....Baldwin
Control system ......West.
Couplers...Stearns & Ward
Curtain fixtures, Cur. Sup. Co. and Ry. Supply & Curtain Co.
Curtain material..Pantasote
Destination signs, Elec. Serv. Sup. Co.
Gears and pinions, Gen. Elec. Co.
Hand brakes, Blackall brake ratchet
Heating system.....Consol.
Journal boxes, T. H. Symington Co.
Motors. .....two G. E.-243
Paint..Chicago Varnish Co.
Sash fixtures.......Edwards
Seats...........Hale & Kil. and J. G. Brill Co.
Seating material.....rattan
Side bearings, Joliet Ry. Supply Co.
Springs, Standard Steel Works
Trucks, M. C. B. equalizing bar
Varnish, Chicago Varnish Co.
Ventilators.....Vacuum Car Vtlg. Co.; Ry. Utility Co. and Auto Utilities Co.
Wheels, Standard Steel Works

TRADE NOTES

Hall Switch & Signal Company has taken a contract for the installation of an electric interlocking plant for the New York Municipal Railways Company at Myrtle Avenue and Broadway Junction, Brooklyn, N. Y.

Edward H. Chapin, of the National Car Wheel Company, at Rochester, N. Y., has also been appointed special representative of the Ohmer Fare Register Company to look after the welfare of this company in the territory east of Buffalo, including the New England States. This arrangement is being made with the consent of the car-wheel company so that it will not interfere with his interests in that corporation.

Esterline Company, Indianapolis, Ind., reports that the San Antonio Traction Company has placed an order for 240 "Golden Glow" headlights to completely equip its cars. This order was placed through the Grayson Railway Supply Company, St. Louis, Mo., after some exhaustive tests had been made in San Antonio. This headlight has a 23-watt bulb. In tests an object could be seen on the track a block and a half away. In one case with a 36-watt bulb, the "Golden Glow" headlight gave a beam illumination for between seven and eight poles on a suburban line.

Bertram Smith, Chicago, Ill., has been appointed assistant manager of the Edison Storage Battery Supply Company, San Francisco. Mr. Smith started in the storage battery business in 1899 with the National Battery Company, Buffalo, N. Y. He was secretary and treasurer of that company for three years, but since its absorption by the United States Light & Heating Company, Chicago, he has been manager of the latter company's battery department.

Barrett Smith, Boston, Mass., for five and one-half years in charge of advertising for the Stone & Webster Engineering Corporation, Boston, Mass., has opened an office at 20 Central Street for the practice of advertising and advertising management. Mr. Smith was graduated in 1904 from the College of Mechanical Engineering, Cornell University, having had experience in various manufacturing plants and shops before taking his degree. Soon after graduation he went to China, joining the staff of Mackenzie & Company, Ltd., of Shanghai, as mechanical and constructing engineer, with headquarters at Tientsin, Province of Chili. Upon his return from the Orient he entered the new-business department of J. G. White & Company, Inc., taking charge of the firm's advertising in 1907-8, following which connection he joined the Stone & Webster organization as head of the publicity department of the Engineering Corporation. Mr. Smith is advertising consultant to the Stone & Webster Engineering Corporation and others.

ADVERTISING LITERATURE

Railway Track Work Company, Philadelphia, Pa., has issued a catalog describing the operation of its reciprocating track grinder.

Mesta Machine Company, Pittsburgh, Pa., has issued a catalog describing and illustrating its pickling machines for pickling metals of any shape.

Pawling & Harnischfeger Company, Milwaukee, Wis., has issued a catalog illustrating the words of its title, "Difficult Drilling and Boring Made Easy."

Northern Engineering Works, Detroit, Mich., have issued Catalog No. 26, illustrating its electric traveling cranes, hand power traveling cranes, electric and pneumatic hoists, overhead track systems, bucket handling cranes and railway cranes.

Okonite Company, New York, N. Y., is circulating a testimonial letter from the Commercial Cable Company containing a sample portion of a submarine cable which was installed in 1900 and 1904 between New York City and Coney Island, and which when recently withdrawn was found to be in perfect electrical and physical condition.

T. L. Smith Company, Milwaukee, Wis., has issued Catalog No. 300, describing and illustrating its concrete mixers. An improvement over last year's machine has been made in the design of water tank, which is inclosed and equipped with air valve and three-way inlet and outlet valve. The catalog also describes side-loaders and side-gate cars.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued a folder showing comparative sulphur prints of the cross-section of twelve untreated rails and twelve titanium-treated rails. These prints constitute a summary of prints shown in Bulletins Nos. 1 to 5 inclusive of this company, and show excessive segregation in the cross-sections of the untreated rails.

Chicago Pneumatic Tool Company, Chicago, Ill., prints in the February, 1914, issue of *Ideal Power* an illustrated description of the sinking into position of the Harlem River tunnel subway tubes. One compressor, manufactured by this company, with a listed capacity of 450 cu. ft. of free air per minute, furnished air at 100 lb. pressure for a maximum of eleven No. 80 Boyer riveting hammers, eight Boyer calking hammers and two No. 2 Little Giant reamers.

Thew Automatic Shovel Company, Lorain, Ohio, has issued Catalog No. 9 describing and illustrating its full circle swing steam shovels with horizontal dipper crowding motion. A special design is made to meet the requirements of electric railway service. This design is particularly suited for the shallow trench work in track construction and reconstruction of city and interurban electric lines. Circular No. 15 describes the successful use of this shovel on the Brantford & Hamilton Electric Railway.

NEW PUBLICATIONS

Economics of Interurban Railways. By Louis E. Fischer. 116 pages. McGraw-Hill Book Company, New York. Cloth, $1.50 net.

This book is devoted to a study of the proper elements to be considered in establishing an electric interurban railway. The first two chapters deal with the inception and development of electric traction and with classifications and definitions. Chapter III, based on typical existing lines, shows how revenue is related to the number and class of population served. Chapters IV and V give the minimum and average operating expenses and construction costs for typical selected lines, and Chapter VI is devoted to special hypothethical cases and their profitableness as judged by the foregoing conclusions. Mr. Fischer clearly shows that most electric interurban railways fall within fairly definite limits and that in the case of a normal road the results of its operation can be predicted with a reasonable degree of accuracy. The abnormal roads, of course, present problems that only the expert can solve, but the general principles of electric interurban railway construction and operation are opened up for the layman and investor. Mr. Fischer's book is intensely practical and his conclusions are well fortified with illuminating statistics and curves.

Bases for Freight Charges. By C. L. Lingo. 62 pages. La Salle Extension University, Chicago.

The value of a traffic man's service is measured not only by his technical knowledge and understanding of railway tariffs, but also by his comprehensive application of such rules and practice to the business in which he is engaged. He must know how to put these rules into effect legally, and how to make use of all the means that are available or can be devised for the betterment and development of traffic. Information regarding such things is contained in Mr. Lingo's book. While it deals more specifically with steam railroads it serves as a good basis of study for electric railway officials of lines doing a freight business. Among the topics discussed are freight tariffs, rates, weights and special charges. This treatise is one of a series of transportation publications which will form the basis of the LaSalle Extension University course in interstate commerce and railway traffic. Another book of the series which may well be read together with Mr. Lingo's is "Freight Rates: Official Classification Territory and Eastern Canada," by C. C. McCann and W. A. Shelton. This treatise endeavors to show that not only is the rate structure in the eastern part of the United States definite, but also that it approaches very closely a scientific basis that is capable of analysis and explanation.

American Red Cross Text Book on First Aid. By Major Charles Lynch. 146 pages. P. Blackiston's Son & Company, Philadelphia. Paper, 30 cents net.

This is a very complete, well-organized and sensible book, similar to other small books on the subject of "first aid" that have been put out under the auspices of the American Red Cross, but intended to contain material more specifically applicable to railroad men. General information concerning first aid, bandages, sprains, fractures, wounds, bleeding, burns, electric shock, poisoning, transportation of the injured, etc., is given, as well as a special chapter on railroad and shop first aid. The book is intended to supplement the visit of American Red Cross cars to the different railroads and to furnish material for practical and useful courses for the employees under the charge of a competent instructor. Every chapter in so far as possible is made complete in itself so that employees can with benefit attend first aid meetings held anywhere on the line. The book is well summed up by questions and practical exercises at the end of each chapter and is also well supplied with illustrations that are a clear and forceful augmentation of the text. The book for obvious reasons is non-technical and does not take one far into the realm of medicine and surgery, which is commendable. It would perhaps have been well where statements such as "No germs float in the air and there is no danger in exposing wounds to the air" appear, to present definite explanatory information. The book as a whole, however, is an excellent text-book for the employee, and it should be a valuable aid in furnishing the necessary curative element in work along safety-first lines.

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CONSOLIDATION IN CHICAGO

The operating consolidation of the surface lines in Chicago which has just been accomplished has resulted in the largest surface electric railway system in gross earnings in the world. The Chicago Railways Company was the largest earner in the combine, having gross receipts during the year ended Jan. 31, 1913, of slightly more than $18,000,000. The lines concerned in the consolidation controlled by the Chicago City & Connecting Railways earned during the same period about $12,000,000, making a total of about $30,000,000. The only city railway by which this total is exceeded is the Interborough Rapid Transit Company of New York, whose subway and elevated lines earned during the year ended June 30, 1913, $32,497,870. Consequently the Chicago system is the second largest in gross receipts among the city railways and the largest among the surface railways. It may be interesting in this connection to mention the receipts for the last year reported of the five other largest electric railway companies in the order of their gross receipts: Brooklyn Rapid Transit Company, $24,152,288; Philadelphia Rapid Transit Company, $23,927,179; Boston Elevated Railway, $16,808,909; Public Service Railway, $15,259,-794, and New York Railways, $14,065,158. The first three roads in the list have elevated and subway lines. The Brooklyn Rapid Transit Company is represented in the subway group through its use now of a part of the new loop connecting the Williamsburg Bridge and the original Brooklyn Bridge—a line which will be completed shortly.

THE FASCINATION OF RAILROADING

One cannot be long in touch with the transportation industry without realizing that, despite the increasing burdens and complex problems constantly demanding attention, railroading has a fascination for those engaged in it which never seems to diminish. This is peculiarly true in the electric railway field, where problems are ever-changing in character and where the progress of electrical engineering and of operation, the broad yet close relations with the great public and the mechanical aspects of the industry demand the most careful analytical study. At the same time they yield full opportunity for co-operative endeavor. The "call of the rail" is as real a challenge to men of red blood and keen minds as the sustained impulse to employ one's talents in pioneer work on the fast-disappearing frontier of civilization. Once it is heard, it stays with one for a lifetime, and a sympathetic interest in railroad problems is never lost, no matter how far afield one's personal fortunes may carry him. The recent dinner of the New England Street Railway Club furnishes an instance of this. All but one of the nine past-presidents in attendance are still actively engaged in electric railway work, and every one discussed either entirely new problems or new aspects of old issues of large interest. The rewards of ability and loyalty are still sufficient to hold the devotion and interest of the leaders of the profession—the men who recognize new problems as they arise and who advance by their attempts to solve them in the interests of the industry as a whole.

THE RIGHT JOB FOR THE MAN

To find the right man for the job is an old and ever-pressing problem in spite of parades and mass meetings of the unemployed. It now appears, however, from the results of investigation and observation that the search should be directed toward finding the right job for the man. In other words, employers have found that, instead of the old policy of "hiring and firing" until the right man is discovered, it is worth while to give some study to individual adaptability with a view to discovering what work a given man can do best. Excluding drones who are beyond redemption, it has been found that men who were a failure and who would not, even if allowed to do so, stay in one line of work have made valuable employees in some other line. Individual peculiarities, likes and dislikes are worth considering in this connection, and with employments so varied as those found in electric railroading it should be possible to avoid the loss of useful workers by putting them where they can do their best work. One industrial concern believed it worth while to investigate this theory and asked every man who left its shops or who was recommended for dismissal to say why he was resigning or why he was not doing better work and whether there was work that he would like to do and felt that he could do well. A majority of the replies indicated that dissatisfaction or unsatisfactory service was due to a misplacement of men rather than to shiftlessness or actual inefficiency. No doubt, these matters were easily adjusted among the small bodies of employees that were the rule in former days, but there is something in the idea outlined above that applies to the building of a permanent, contented and efficient railway organization on the large scale that is required to do to-day's work. In perhaps no other industry does teamwork mean more than it does with the electric railways or do the departments have to rely upon each other for efficient co-operation to as great a degree.

RESULTS OF THE A. I. E. E. MIDWINTER CONVENTION

In this and the preceding issues of the ELECTRIC RAILWAY JOURNAL considerable space has been devoted to a report of the meetings held recently in New York by the American Institute of Electrical Engineers. The field of this organization differs from that of the American Electric Railway Engineering Association, which cannot, in the limited time at the disposal of its members in conventions, devote much attention to subjects like those taken up at the Institute meetings. The railway association must concern itself primarily with problems immediately affecting electric railway operation. These cover a very wide field of civil, electrical, mechanical, highway and other branches of engineering. The function of the Institute meetings is to permit the discussion of those more technical electrical subjects upon the proper understanding of which success in solving engineering problems depends.

The winter meeting of the Institute differs from the summer meeting in that fewer subjects are discussed and a determined effort is made to exhibit the present state of the art and science of one particular branch of the industry. The 1913 meeting, which was the first of these midyear meetings, was taken up with the problems of electrical machinery design. This year the most timely topics were considered to be those connected with power generation and transmission. Two important recent developments have imposed new problems along this line upon the electrical engineer. These are the aggregation of great numbers of large generating units in single power stations and the tendency to use very high voltages in power transmission lines.

The problem incident to the concentration of power generating capacity is the safeguarding of the service from the effects of short-circuits. The solution lies in the correct application of reactance coils in addition to the circuit-breaking devices already standard. While this development is comparatively new, there appear to be no serious obstacles at present in sight. The case is different with the transmission line. Here large power capacity and high voltage have produced difficulties which tax the ability of engineers and manufacturers to the limit. The manufacture of porcelain which will permanently resist electric stresses appears to be difficult. The production of apparatus to protect equipment from the effects of line surges resulting from switching and atmospheric lighting is also by no means standardized. In fact, as was emphasized by Dr. C. P. Steinmetz, it is very difficult to secure data on the subject. The mobility of the theory as well as the practice is evident from Dr. E. E. F. Creighton's statement that lightning appears now not to be an oscillating discharge but a unidirectional one.

The New York discussion was of a practical rather than a theoretical nature in spite of the highly technical topics above suggested. The operating engineers insisted that the way to solve the problems is not to restrict the operators in the legitimate use of apparatus but for operators and manufacturers to get together in the effort to make it better. For example, Mr. Osgood stated that there is no use in recommending a limitation of switching operation to prevent surges. Switching is an every-day necessity. It is better rather to construct the lines so that they will stand switching surges.

GETTING THE TECHNICAL SCHOOL AND THE ELECTRIC RAILWAY BUSINESS CLOSER TOGETHER

Twenty years ago the graduate of a technical school was taken as a joke when he entered a shop to show what he could do. He was made the butt of certain standard jests, which, in general, he took in good part. There was some reason for this attitude on the part of the shopmen who had earned their places through hard, dirty work and who naturally resented the "highbrow" element which had been having a good time in school while they toiled. The much-schooled lad, also, was apt to assume an air of superiority which did not improve his standing as a "mixer."

The hard knocks of the old days were not without their compensations, for they served to bring out the staying and fighting qualities of some of the recipients and to discourage others who were not fitted by temperament and training for railway work. As a consequence, the condition of twenty years ago does not exist to-day, and the youngsters who stuck are now, in many cases, master mechanics, superintendents, general managers and presidents. They have, by ability and tact, created an atmosphere in the business which is more congenial to the beginner.

In spite of the fact that they are more welcome than formerly, there is a strong tendency on the part of technical graduates to keep away from electric railway work, and this condition is unfortunate. The reason for this seems to be a lack of opportunity to secure a reasonable salary after a fair probationary period as compared with the possibilities in commercial lines. As we have remarked before, it is the future in a job rather than the immediate recompense that makes it attractive. There is a great lack of this future in the engineering and mechanical departments of electric railways. The salaries of most master mechanics and superintendents are so low compared with what the incumbents of the positions would earn in business that it is going to be increasingly difficult to get and to hold good men in them unless the men are paid more and understand that if they more than "make good" there is sure promotion ahead. If the electric railways want technically trained men, they can get them, and to insure continued progress such men must be had. Sales work needs them, too, and at present is making the higher bid. If the attractions of the railway business are really greater than they seem, it is up to the railway companies to make this fact more generally known and to get a little closer to the technical schools. The manufacturing, telephone, telegraph, lighting and other companies are, at this season, sending responsible representatives to the leading schools of this kind to study the student body. If electric railway organizations are doing this, the fact has not yet come to our notice.

ACCOUNTING FOR DEPRECIATION

An inspection of a number of recent electric railway reports does not show any provision for accounting for depreciation, although depreciation is just as positive a charge against the property as any other. In fact, it is one of the few items of expense which cannot be escaped, and any attempt to ignore its existence is illusory. Even those roads which are striving in every direction for "economy" cannot afford to neglect this item. Thus, on the New York, New Haven & Hartford Railroad, the establishment of a recent arbitrary depreciation charge for equipment increased the December equipment expenses of that company 15.73 per cent. Yet this expense, far from being unjustifiable, is absolutely necessary if the accounts are to show the real condition of the property.

It is true that until a comparatively short time ago accounting practice paid little attention to the element of depreciation. But, thanks to considerable litigation and the efforts of regulatory bodies, the recognition of its existence has become more general. The average electric railway official should now know that depreciation in theory means the decrease in value of an asset due to deterioration through the lapse of time, wear and tear, inadequacy or obsolescence. He should also know that depreciation, having theoretically to do with the ultimate deterioration of the whole property, is something more than the ordinary maintenance expenses needed to keep the property in good current operating condition. He should then appreciate the fact that depreciation reserves should be set up for the purpose of spreading the cost of final renewals of the deteriorated property as equitably as possible over the period during which the property is expected to render efficient service. Finally, he should realize that the income from operation during a period should pay all items of operating cost, including administrative expenses, taxes, repairs and renewals of original and supplementary investment currently made, and also a proportionate cost of final renewals and replacements. This estimated cost of future or final renewals—depreciation, in other words—is clearly as much a part of the cost of operation as the expense for power or the wages of the train crews, and if it is not included in any electric railway report the net profits are incorrectly stated.

Boards of directors seem sometimes to forget that they are acting in a dual capacity for the stockholders. They are not only in charge of the operation of the road and thus must develop its net earning capacity to the fullest extent but they are also guardians of the investment and should not allow any shrinkage of the assets. The duty to renew and replace the plant rests upon them, and the establishment of depreciation reserves is evidence that this duty is being recognized and that everything possible is being done to provide against any impairment of the investment and a lessening of service efficiency. The depreciation charge should be sufficient to maintain the property in such condition as will enable it to render the most efficient service to the public at all times. No property, of course, can be kept at 100 per cent of its value. To attempt so to maintain it would mean a deliberate waste of materials and equipment.

The plea is often made that stockholders suffer through decreased dividends when depreciation reserves are set up, because the apparent net profits applicable to dividends are less. But if the same stockholders see from the report that their capital is being dissipated to pay unearned dividends the credit of the company will suffer much more than if the report showed the company's true net profits. Moreover, the public will also then understand the real condition of the property, and if a reasonable return is not being earned, the company can fairly ask for increased rates.

SELLING SECURITIES DIRECT TO THE PUBLIC

The plan of the Third Avenue Railway of New York to offer $4,000,000 of bonds directly to private investors is a development of considerable interest. This is not an unheard-of proceeding, but it is sufficiently uncommon and yet contains sufficient promise to make it worth watching. Its outcome, whether favorable or otherwise in this particular case, will not, of course, prove its adaptability or non-adaptability to all cases, for much depends upon the credit of the individual company, the absorbing power of the local market and other factors.

The popular objection to bankers' commissions is not always, or even often, justifiable. If an issue is sound, the bankers who take it over in bulk for distribution to individual investors make no exorbitant profit, except in the rare cases of collusion to mulct a company for the enrichment of a favored banking house. The banker is worthy of his hire, just as is the broker who has facilities for distribution and receives a generous commission for marketing the entire output of a mill. When an issue is not a good investment the banker may get a larger commission, but he usually earns it by his assistance in marketing securities that from one point of view should not be marketed at all. Even with bankers' commissions eliminated, no company can sell its securities without expense, and, when due allowance is made for this, possibly no better return can be obtained by direct sale than from the bankers.

In the case of the Third Avenue issue it is required by the Public Service Commission only that the bonds shall net the company 82. This raises the question of what the company would get from the bankers for this issue. A price of 82 is not particularly low for a 4 per cent first mortgage bond. The present bonds of this issue now outstanding are selling in the market for about 83. On the other hand, the first real estate and refunding fours of the New York Railways since Jan. 1, 1914, have ranged from 75 to 79⅛.

There is another phase of the matter, however, besides that of dollars and cents. The most logical and useful investors in public utilities in small communities are the local inhabitants—in other words, the customers. If a public utility is marketing an amount of stocks or bonds not in excess of the investing power of its locality, why should not the people of the neighborhood where it operates have a chance to buy these securities directly and possibly to get the advantage of at least a part of the commissions and discounts that usually go to bankers? From the point of view of a favorable answer to this question, it is to be hoped that the Third Avenue experiment will be tried out under circumstances that approximate average conditions more nearly than does the New York attempt to eliminate the financial middleman. If investors in sufficient numbers would buy public utility securities over the local company's counter, it would be better for all concerned—except the bankers. General but localized distribution of utility securities would mean a degree of desirable public ownership that should both directly and indirectly bring good results. It might in some cases change local opinion as to the profits of public utility operation, but that, too, would be in the line of sound public education. No company, however, would be justified in trying the experiment of a direct sale of securities to the public unless it was reasonably certain of a successful outcome of the attempt, for in the case of failure it would have only a discredited issue with which to go to the despised but very useful banker.

THE SWISS REPORT ON ELECTRIFICATION

Few documents on the subject of railway electrification will be found of greater interest than the report of the Swiss Electrification Commission which is published elsewhere in this issue. It is true that Switzerland is a small country, but a decision which relates to the possible electrification of 1875 miles of track is worth the attention even of our own great railroad systems. The Swiss federal government has already voted a preliminary credit of $8,000,000 for the electrification of the Gothard line, detailed studies of which form a part of the commission's report. This first work is to cover 67¾ miles of track between Erstfeld and Bellinzona, and it is to be completed in the year 1918. Thus the recommendations of the commission, at least as to the order of electrification, are being followed. However, the system of contact wire transmission and of motor propulsion for the Gothard line has not yet been fixed absolutely in favor of single-phase despite previously published statements to that effect which were based upon the commission's strong advocacy of that system for general electrification.

Referring now to the report itself, it is of interest to note that, although the studies of the commission were begun before the present high-tension d. c. developments, it did take into consideration the use of direct current at 3000 volts, and even the ultimate use of a 6000-volt, three-wire system. It was equally progressive in assuming the possibility of an 8000-volt, three-phase contact line, although the neighboring Italian State Railways use but 3300 volts. The same liberal point of view is indicated in the permissible motor voltages, which were assumed at 1500 volts per commutator for direct current and 6000 volts for three-phase induction motors. Furthermore, the commission had no doubt of the practicable operating qualities of any of the three systems. The question, in short, was not what system would do the work, but what system would do the work required for the least ultimate cost.

The commission compares the efficiency of each system from the point of energy use and finds that while each system is better than the others in individual parts, the total efficiencies do not differ enough to manifest marked superiority of any one so far as this feature is concerned. A much more important problem was the equalization of energy requirements, and here it was found that the cost of accumulators as equalizers was prohibitive even with d. c. operation throughout. Another factor which adversely affected the choice of direct current was that, in the opinion of the commission, regenerating equipment was not justified on d. c. cars, although it might be considered for a. c. equipment. Curiously enough, the commission finds that regeneration in mountainous Switzerland would save only 4 per cent in energy because of the moderate grades and broken profile of the main railway lines.

Perhaps the most astonishing feature of the report is the complacent attitude taken with regard to the much-mooted effect of single-phase traction current on telephone, telegraph and signal circuits. The commission, from tests made on an experimental line in conjunction with the Federal Telegraphs and a manufacturing company, concludes, first, that ground return for weak-current circuits must be abolished, no matter what system of electric traction is used, and, second, that while single-phase current does cause somewhat more trouble than high-tension direct current, remedies are available in either case. Another factor in favor of 15,000-volt, single-phase trolley operation was that the railways could either generate their own power from new single-phase plants or purchase it from existing plants under favorable conditions of transformation. Still another factor which led to the recommendation of single-phase was that this system was the only one that permitted unlimited speed regulation without rheostatic losses.

The decision of the Swiss Electrification Commission is not binding, of course, on the federal government. But as the Lötschberg railway seems to be operating very successfully, as shown by another article in this issue, the chances seem to be in favor of the adoption by Switzerland of the report of its commission.

COMPANY SECTIONS IN A. E. R. A.

The article by T. C. Martin, secretary of the National Electric Light Association, in this issue, describing the educational value of the company sections in that organization, should be helpful to those railways which are considering the establishment of company sections in the American Electric Railway Association. There is no doubt, as Mr. Martin says, that the meetings of these sections form a rallying place for social forces and that the acquaintanceship thus obtained creates a sentiment of comradeship, a closer touch between officer and employees and a higher degree of loyalty. This is entirely apart from the undeniably great advantages from a technical standpoint which the meetings provide. We referred recently to the lack of any system of training and systematic promotion for men on most of our electric railway systems and to the dangers which follow ignorance on the part of the company's higher officials as to the character of the work of the men who are being trained to take positions of responsibility. This apathy on the part of the higher officials is nearly always followed by apathy in regard to their duties on the part of the men who report to them in the organization.

We contend that electric railways have failed to take advantage of the splendid tool which the company section places at their disposal. That there is no reason why they cannot equal or even surpass the educational work of their electric lighting brethren is proved abundantly by the "logs" of the Newark and Milwaukee A. E. R. A. sections which are published elsewhere in this issue. Since its organization the members of the Public Service Railway section have listened to papers and participated in discussions on ten distinct features of the railway business, from car derailment and prevention to the excellent paper on storekeeping which was published in our last issue. In addition to the strictly business part of each monthly meeting, some company executive or outside speaker is usually invited to deliver an inspirational address on a topic broad enough to interest all attendants. The Milwaukee section also has monthly meetings at which more than twenty topics have been considered since the section was organized in March, 1912. The features of the November and December meetings at Milwaukee were talks by employees on what they had seen and heard at the annual convention of the American Electric Railway Association. At the February, 1913, meeting the members enjoyed a talk on electric railway practices in other lands, and at the May, 1913, meeting, they were addressed by a member of the Wisconsin Railroad Commission. It is interesting to note that of the 342 members of the Public Service section the attendance at the meetings averages from 150 to 200, despite the great extent of the Public Service Railway's territory, and that in Milwaukee the attendance averages as high as ninety to 110 out of a total of 120 members. The present Milwaukee membership is 120, compared with forty-five only one year ago, and the present membership comprises 75 per cent of the class of men who might be expected to take an interest in company section work. The Denver section has the broadest scope of all, as indicated by the fact that at its last monthly meeting even motormen and conductors were present in good force to discuss the problems of their work.

Surely the foregoing citations are enough to show that company section work has great possibilities for developing that get-together spirit called teamwork which brings each man so close to his fellow-workers that he feels himself bone, blood and flesh of a living organism, rather than an automatic cog or wheel in some relentless mechanism. Up to last week the members of the American Electric Railway Association had organized only three company sections compared with about fifty in the National Electric Light Association, but the news that the Capital Traction Company of Washington has become the fourth in the band of pioneers is a happy omen that the increase in A.E.R.A. company sections will show more encouraging progress in the future.

THE PLACE OF THE TECHNICAL JOURNAL IN PROMOTING EFFICIENCY

The time has passed when any electric railway employee, or any one else for that matter, expects to make progress and secure financial and other recognition without "being on the jump." When promotions are to be made the query is as to what the younger men are doing to keep up with the times.

There are some so-called geniuses whose minds produce results without external stimulation, but they are few. The average man needs all the help he can get to keep him from running in a rut. The technical journal can help him most effectively here. The editorial staff of this paper like to think of it as analogous to a convention of the American Electric Railway Association. Each of the company members of this association selects one or more of its responsible officials and sends them at considerable expense to the meeting. The expense is justified by the attention given to the papers which are presented, and particularly to the discussion. Exhibits of manufactures are examined, old friends are met and new acquaintances are made, sundry items of information are picked up, and in many ways every one feels that "it was good to be there." We believe that no better expenditure of money can be made than by sending all the men to the conventions that the company can afford. There is general unanimity of opinion on this point.

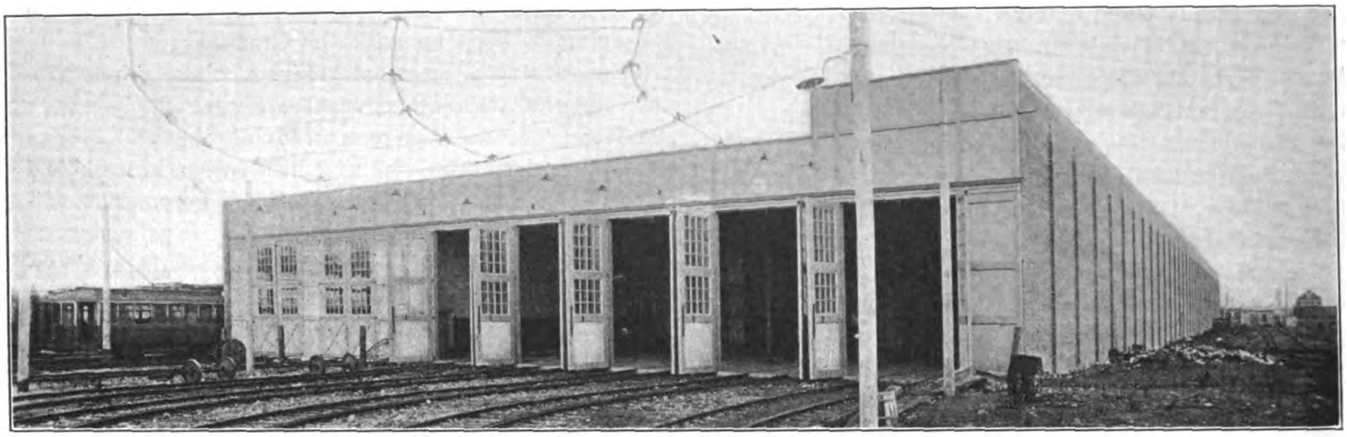
To return, however, to the analogy. The ELECTRIC RAILWAY JOURNAL has its editorial and contribution columns, which contain papers on timely subjects, analogous to the convention papers. In the communications department discussion is carried on. The personal items take the place of the greeting of old friends and introductions to new railway men. The news items are of the same variety as those picked up in and about the convention hall. The trade notes and advertisements play the same parts as do the exhibits at the meetings.

It is a great thing to be sent to a convention, and each attendant incurs a responsibility at least commensurate with the value of the time lost from work and the size of his expense account. And yet comparatively few can attend these meetings, and they can do so but once a year. The technical paper reaches or can reach each week every man in an organization who has a brain worth stimulating. As it discusses all branches of the industry, it is a combination in a sense of the conventions of all of the different electric railway associations. Each reader can select such parts for perusal as concern only his own work in the organization, or he can follow the development in all of its branches. Possibly the above analogy may not have occurred to the reader and may prove suggestive to him.

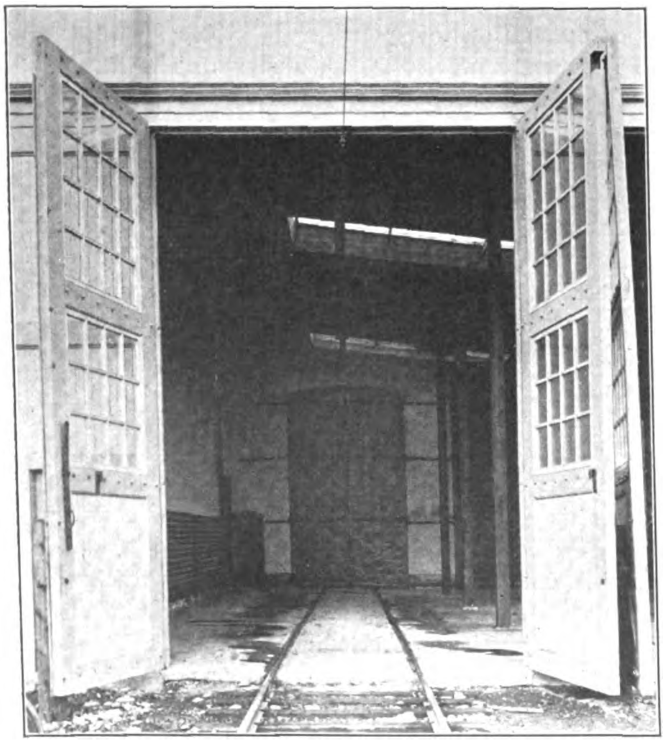
New Carhouse and Shops at Edmonton, Alberta

An Unusual Feature of the Carhouse Is the Use of a Car Anteroom or Vestibule to Avoid the Chilling of the Main Section of the Carhouse by the Opening of Doors During the Winter

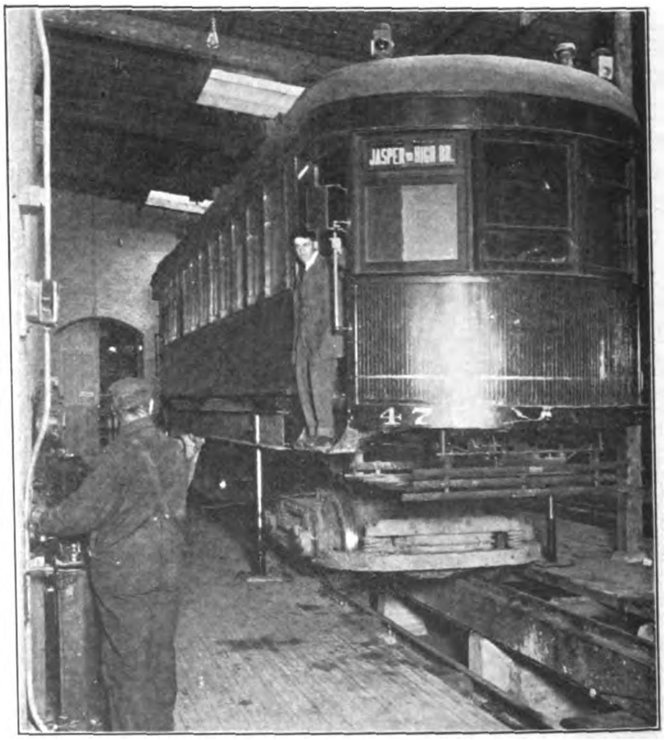
BY W. T. WOODROOFE, SUPERINTENDENT EDMONTON RADIAL RAILWAY



Edmonton City Maintenance—View of Carhouse (North End), Showing Fire Wall on the West



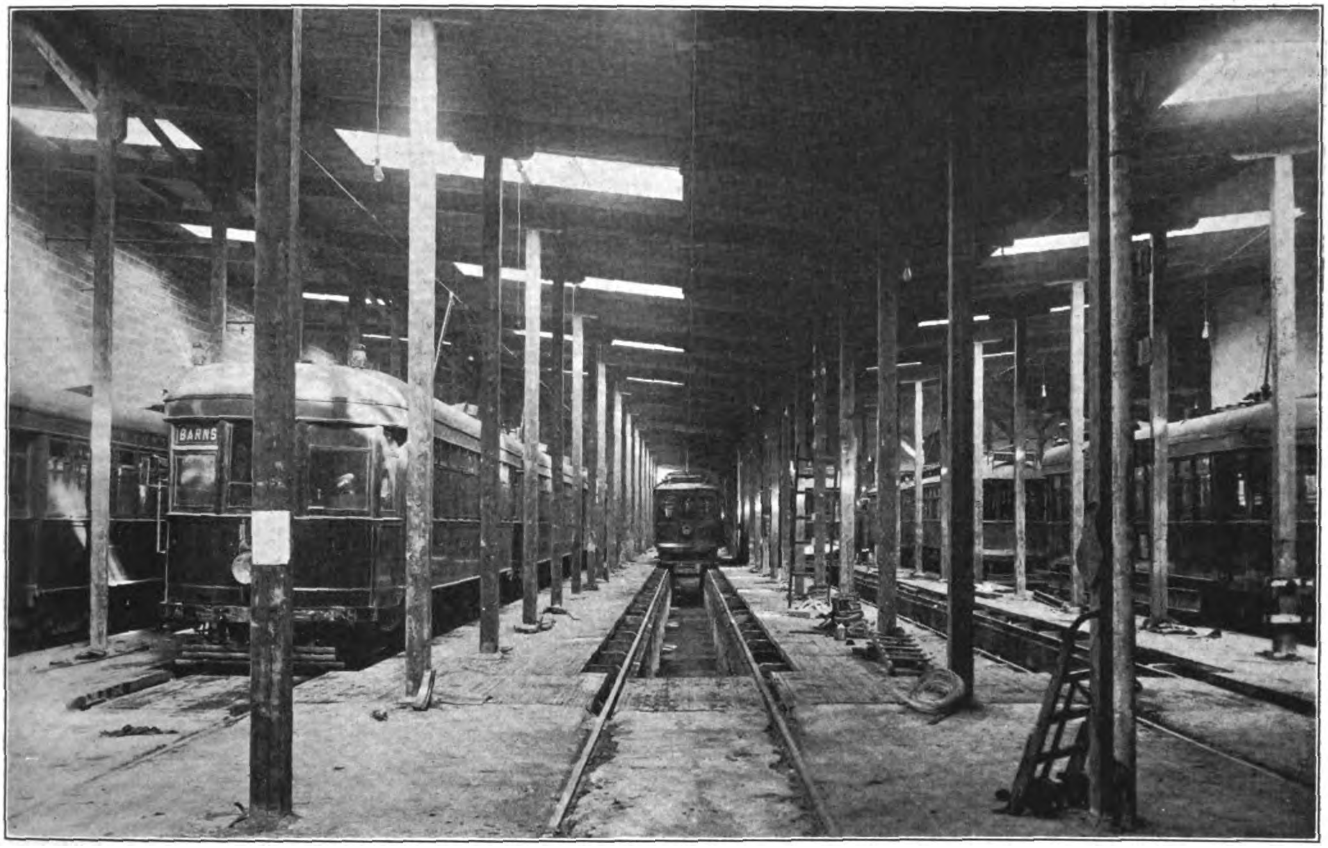
Edmonton City Maintenance—View of Carhouse, Showing Vestibule



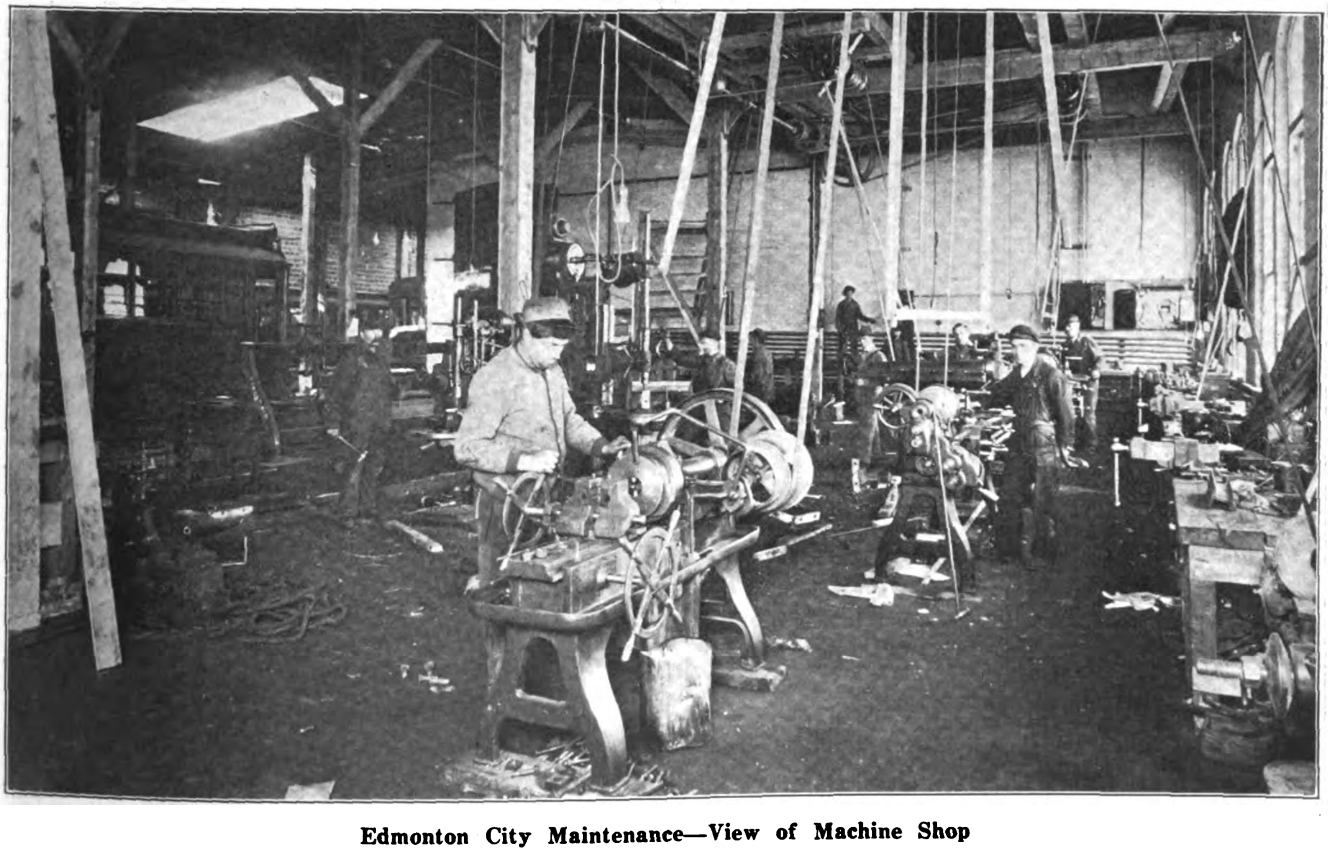
Edmonton City Maintenance—Part of Repair Track, Showing Car-Body Hoist

Edmonton, the capital of the Province of Alberta, Canada, is one of the newest cities in the Northwest. Its rapidly growing population, at the time of the census of May, 1913, was 63,500. The city occupies a fairly central position in the Province. Streets and avenues are laid out at right angles with each other, running north and south and east and west respectively. All public utilities are owned and operated by the municipality.

The street railway commenced operation in November, 1909, with five cars; at the present time it has seventy-two passenger cars and eight service cars. When the system was started a temporary carhouse was built on Syndicate Avenue, with a capacity of six cars, but the development and growth of Edmonton very quickly rendered it necessary to provide for a new carhouse and shops. A site was purchased in the northwest portion of the city, adjacent to the Canadian Northern Railway's main line and conveniently situated with regard to the Exhibition Grounds and the industrial portion of the city. The property provides plenty of ground for a material yard, and provision is made for two more sections of the same size as the existing structures. A temporary storage and operating carhouse was also erected on the south side of the city to reduce dead mileage.



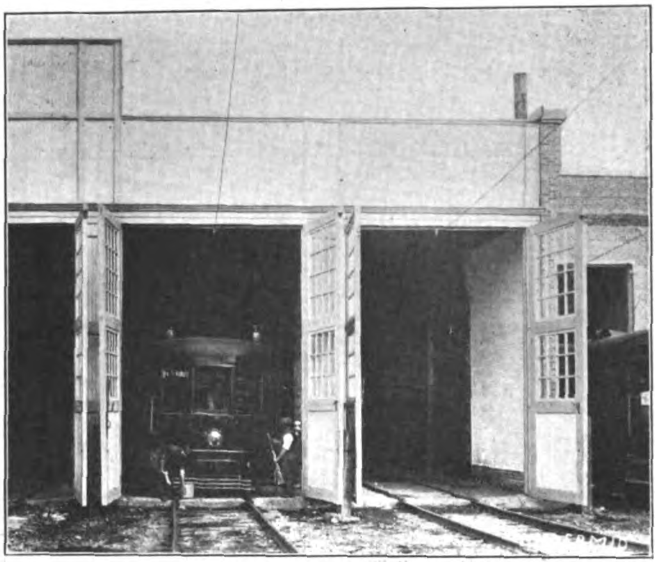
Edmonton City Maintenance—View of Storage Section



Edmonton City Maintenance—View of Machine Shop

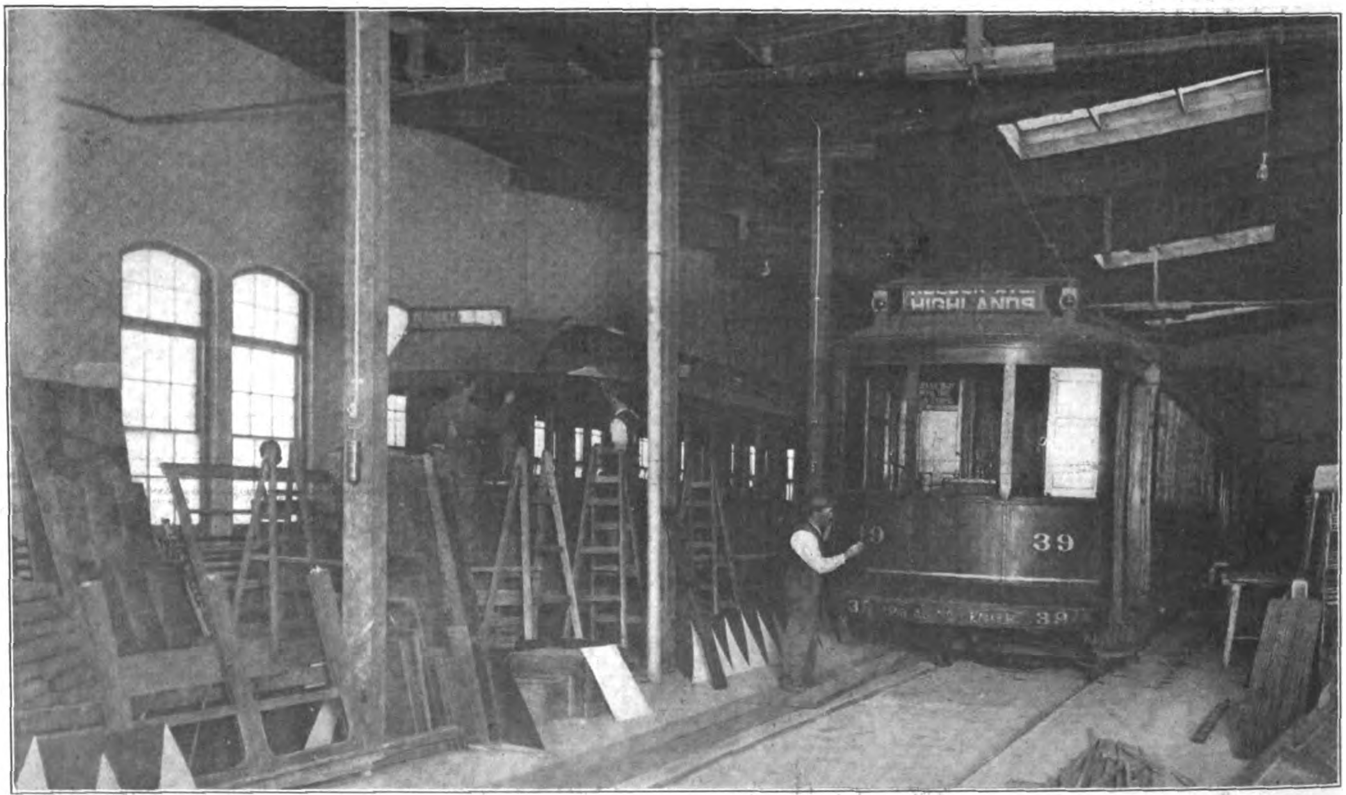
CONSTRUCTION, LIGHTING AND HEATING

The new carhouse and shops are combined in one building which runs north and south. The carhouse is one story high and double-ended with special work at each end to enable cars to make any desired movement. The building has substantial concrete foundations with the main walls of brick extending above the roof to minimize risk from external fires. It should also be noted that windows are provided only in the main walls where necessary for the lighting of the shops. The main wall adjacent to the track provided for external storage is devoid of windows and rendered non-inflammable, while the carhouse proper receives its light from double window skylights. Artificial illumination is carried out with 110-volt tungsten lamps which receive their supply from the municipal power station. All wiring is carried in conduit.



Edmonton City Maintenance—South Entrance to Carhouse, Showing Washing Tracks

On account of the low winter temperature special care has to be exercised to keep the building warm. Cars when entering at either end pass through a vestibule so that cold air is not carried into the main body of the building. The outer doors of the vestibule are of wood, but the inner doors are fireproof. These vestibules serve other purposes as they are heated by steam pipes and provide accommodation for the washing of the cars. The floors are of concrete and are well drained. With regard to the main body of the carhouse the heating is carried out by hot-air pipes which receive their supply from a central heating plant.



Edmonton City Maintenance—View of Paint Shop

There are five pits in the carhouse, and the total inside storage is for fifty-one cars, while the provision for outside storage is approximately eighty cars. The pit foundations are of well-drained concrete. The track is laid on heavy timber supported on concrete blocks or pillars. Ample space is allowed between the rails and the sidewalks or devil-strips to enable a man to sit down alongside a car to inspect the equipment in the most accessible way, thus promoting thorough overhauling and inspection. The repair track lies along the machine shops and is provided with one Columbia car-body hoist which enables a car body to be lifted from the tracks in about ten minutes. This hoist is driven by an electric motor operated by a controller located alongside the track.

A yard for the storage of track material is provided on the east side of the carhouse. Special sheds are also installed alongside the carpenter shop and blacksmith shop for lumber and iron. On the west side the provision for external storage will be utilized with the minimum of change when the carhouse is extended. The offices and carmen's rooms are also on the west side. The shops, which are on the east side of the building, are referred to briefly in the following headings.

PAINT AND CARPENTER SHOPS

The paint shop has a capacity of six cars, is well supplied with windows on the east wall and has extra heating apparatus. It includes a separate and specially constructed fireproof room for storing and mixing paints. The floor is finished with concrete, and all arrangements are provided for washing and thoroughly cleaning the cars before painting.

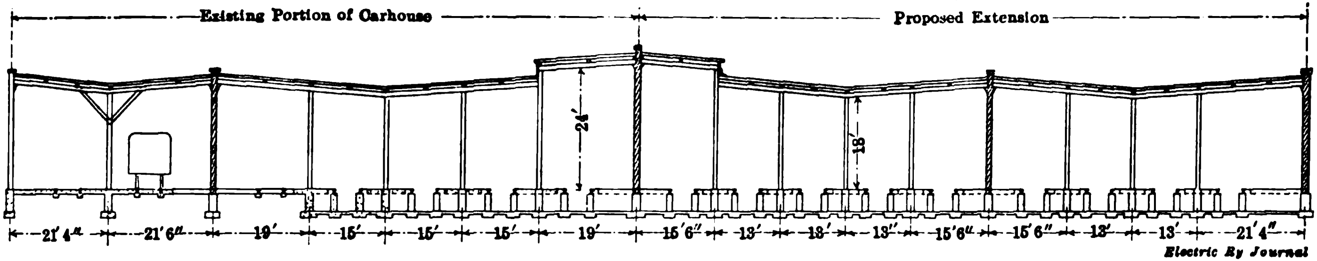
The carpenter's shop, which is south of the paint shop, holds two cars. Provision is made for five carpenters' benches, and sufficient room has been allowed for installing woodworking machinery when required. This shop carries out repair work and has built one complete line car.

MACHINE AND BLACKSMITH SHOP

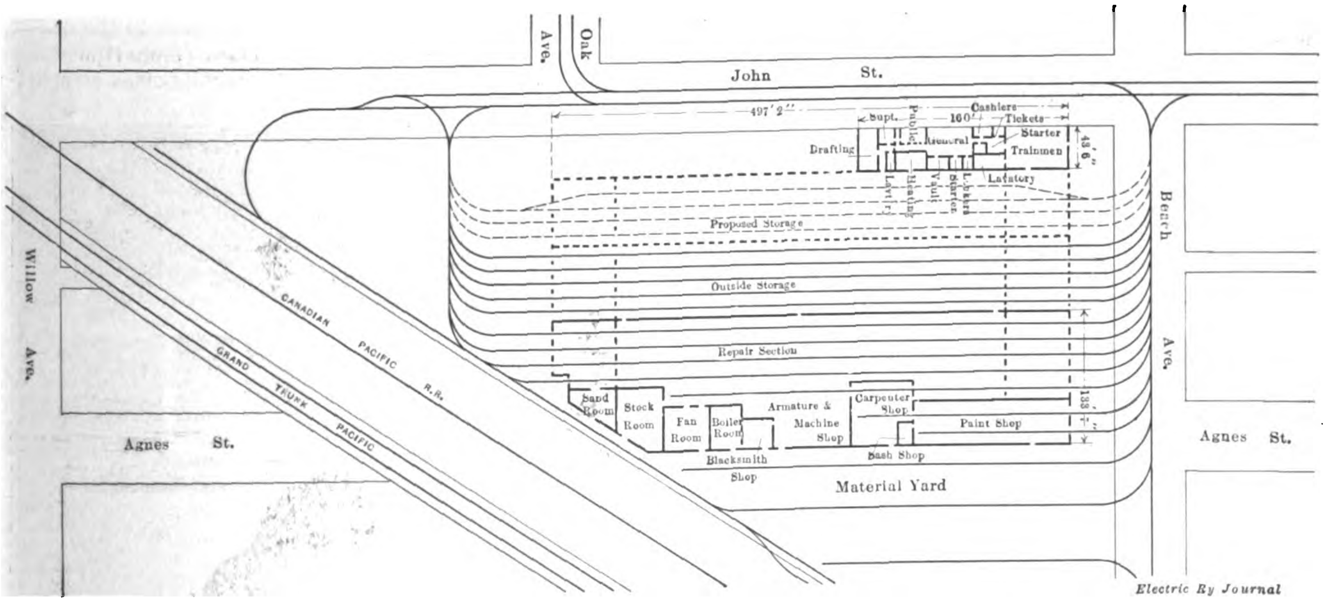
The machine shop is situated in the center along the east wall and adjoining the main carhouse without any dividing wall. The shop is provided with a wood-block floor and is equipped with the following tools:

One 42-in. wheel-truing lathe.
One 24-in. engine lathe.
One 14-in. automatic lathe.
One 24-in. shaper.
One emery wheel.
One bolt-threading machine.
One 34-in. vertical drill press.
One 250-ton wheel press.
One forge for babbitt work.

Most of the machines are driven with individual motors. Two 3-ton jib cranes are provided so that wheels, axles, etc., may be lifted directly from the repair track alongside the machine shops and put into the various machines.


Existing Portion of Carhouse
Proposed Extension
24'
18'
21' 4"
21' 6"
19'
15'
15'
15'
19'
15' 6"
13'
13'
13'
15' 6"
15' 6"
13'
13'
21' 4"
Electric Ry Journal

Edmonton City Maintenance—Cross-Section of Present and Future Carhouse


Ave.
Oak
John St.
497' 2"
Supt.
Public
160'
Cashiers
Tickets
General
Starter
Trainmen
Drafting
43' 6"
Lavtry
Heating
Vault
Starter
Lockers
Lavatory
Proposed Storage
Outside Storage
Repair Section
Sand Room
Stock Room
Fan Room
Boiler Room
Armature & Machine Shop
Carpenter Shop
Paint Shop
133'
Blacksmith Shop
Sash Shop
Material Yard
Willow Ave.
Canadian Pacific R.R.
Grand Trunk Pacific
Agnes St.
Beech Ave.
Agnes St.
Electric Ry Journal

Edmonton City Maintenance—General Plan of Carhouse and Shop Layout, Showing Also the Location of the Material Yard and Steam Railroad Connections

The blacksmith shop is entirely separate from the rest of the carhouse and contains the following tools:

Two forges.
One 200-lb. motor-driven hammer.
One drill press.
One bolt-cutting machine.
One emery wheel.

HEATING PLANT

On account of the low temperature which sometimes prevails in Edmonton, special provision has had to be made for heating. Two systems are in operation: first, low-pressure steam to radiators for the shops and carhouse vestibules; second, hot-air forced-draft system for the main carhouse. The blower of the latter system is driven by a low-pressure single-acting steam engine which is supplied with steam from the same boiler which feeds the radiators.

For heating the shops during the daytime only low-pressure steam is used, but at night, when the cars go in, the blower is started and hot air is blown under each of the cars through the system of galvanized-iron pipes.

ELECTRICAL SHOPS

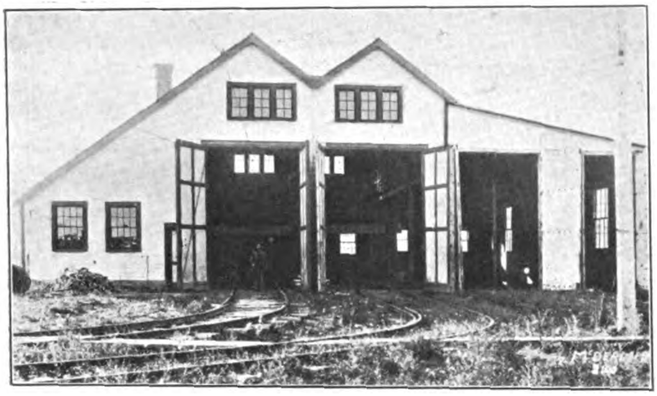
The electrical shops are situated in the same room as the blower and contain a drying oven for coils, three large armature stands, three small armature stands, one controller repair outfit and the necessary equipment for rewinding armatures and rebuilding commutators. All armatures after being repaired are tested for short-circuits, grounds and insulation resistance.

STORES, SAND DRYING, FIRE PROTECTION, ETC.

The shops have a large, well-laid-out storeroom in which all department supplies are kept. Sand drying is carried out in a separate outbuilding, the damp sand being loaded up around the center heater until thoroughly dry, when it is transferred to bags ready for the cars. In connection with the prevention of fire in the carhouse, mention may be made of the institution of a special fire squad, which is exercised weekly. Each member is appointed to a special duty so that the cars can be taken out of the building with a minimum delay and the hydrants brought into operation at a given signal. The shops and carhouse are also fully provided with Pyrene and chemical extinguishers. Seven hydrants, each with 100 ft. of hose, are installed inside the carhouse and five hydrants outside in suitable locations.

OFFICE BUILDINGS AND ENGINEERING

The office building is a one-story brick structure. As the accompanying plan shows, the engineering department and superintendent's office are at one end, the public and general offices are in the center, and the traffic department and motormen's and conductors' assembly rooms are at the left.



Edmonton City Maintenance—Temporary Car Sheds, South Side, Edmonton

The buildings were designed by the city's architect under instructions from the street railway department. The track layout was designed and carried out by the department. Work was commenced in September, 1912, and the carhouse was occupied in July, 1913. All the work in connection with the carhouse was done by day labor and was continued without interruption during the whole of the winter.

IMPROVEMENTS IN ROTON PARK PROPERTY AT NORWALK, CONN.

The Roton Point property at Norwalk, Conn., has been leased by Neville Bayley, of New York City. The lease was formerly held by Capt. A. J. Smith, owner of the local steamboat line. The new lessee is under contract to spend $75,000 in improvements, and he has already had his engineer on the ground making definite plans for the work to be begun as soon as the weather permits. Roton Point is patronized by the population within a radius of 50 miles. A large number of towns from New Rochelle east are within convenient reach of the property. The plan of the new management is to make the resort attractive for high-class patronage, and no liquor will be sold on the grounds. Already more than fifteen church excursions have selected the Point for this year's picnics, and there is every evidence that the public will show appreciation of the efforts to be made in its behalf. Among the improvements will be the remodeling of the old hotel into a large casino, the construction of 1000 new bath houses and the installation of 5000 incandescent lamps about the park. A large roller coaster also will be built and installed by the Ingersoll Engineering & Construction Company of Pittsburgh. Various other amusements will be provided.

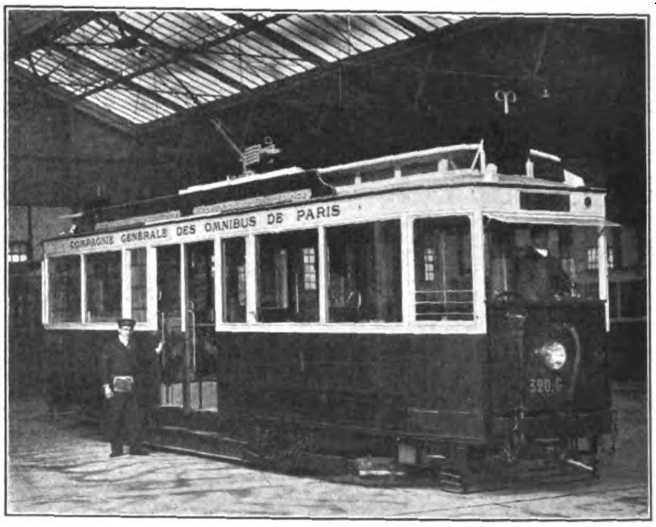
The Roton Point location is ideal for a place such as is proposed. The grounds are ample and the location on Long Island Sound makes bathing and boating on a large scale possible. Brant O'Brien will act as publicity manager for the Roton Point Company, which will operate the property.

CAR DESIGN IN FRANCE

The progress in car design which has characterized the electric railway industry in this country within the past few years has had a parallel abroad, where the same interest is being expressed not only in center-entrance cars but also in light-weight cars.

A short account was published in the issue of Oct. 4 of some new cars built by the General Omnibus Company of Paris, the principal tramway company in that city. Most of the tramway companies in Paris work under two serious handicaps in securing the best results in car design. In the first place they are limited to very narrow over-all widths, usually 6 ft. or less. This permits, with cross seats, only three transverse seats. These are usually arranged by placing a row of single seats on one side of the aisle and a row of double seats on the other. Again, as the law usually provides that no passengers shall stand in the aisle, it is the practice to arrange for other space for them up to the limit of the number of standing passengers permitted under the law. Hence some of the space which in America would be allowed for seats is left open for standing passengers, and this increases the weight of the car per seat. However, the weights per seat of a number of the recent motor cars have been brought down to 900 or 1000 lb. by the use of light frame construction and, in some cases, by the employment of sheet aluminum for side panels.

The General Omnibus Company of Paris, as stated in the issue of Oct. 4, has two new standard types of cars. One is mounted on a single truck with a wheelbase 11 ft. 10 in. in length. The other is a double-truck car, but both have center entrances. Both also are divided into first-class and second-class compartments, one being on one side and the other on the other side of the center entrance. Both also have two smoking compartments, one for each class. They are next to the center entrance with seats in the first-class compartment for two passengers and seats in the second-class compartment for three passengers. The main dimensions and data of these cars are shown in the table on page 515.

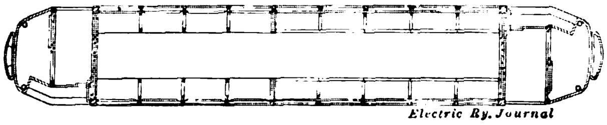


Standard Single-Truck Motor Car—General Omnibus Company, Paris

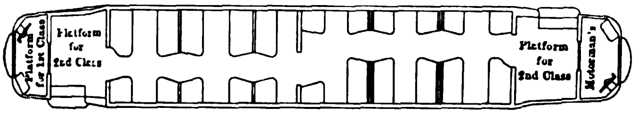
The standard trail car of the company is 38 ft. 1 in. over all, weighs 17,380 lb. and carries thirty-eight seated and nineteen standing passengers. This is a weight of about 460 lb. per seat.

The Paris & Department of the Seine Tramway Company has also adopted the long wheelbase truck. Two wheelbases were used, 11 ft. 2 in. and 11 ft. 6 in.

There is no radial action in these trucks, yet they pass around 60-ft. curves without difficulty. The wheel has a flange 9/16 in. deep and 11/16 in. wide, and the groove in the rail on curves is 1¼ in. wide. Steel-tired wheels, 31½ in. in diameter, are used, and the tires have a life of 50,000 to 60,000 miles. There are two steps, one 11.8 in. and the other 11.5 in. to the center entrance.


Electric Ry. Journal

Standard Double-Truck Car—Nogentais Tramways

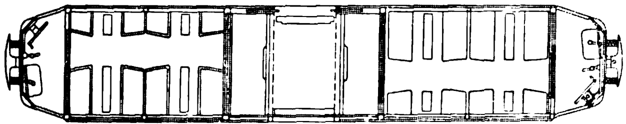


Electric Ry. Journal

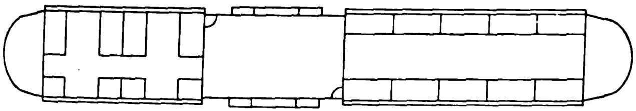
Standard Double-Truck Car—General Paris Tramway Company

The Nogentais Tramway has two standard cars, a single-truck and a double-truck. The latter is 40 ft. over all and seats sixteen first-class and twenty second-class passengers and has standing room for fifteen second-class passengers.

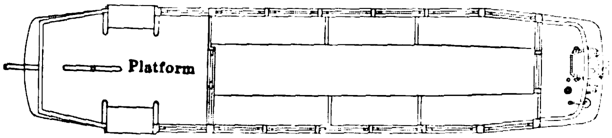
The General Paris Tramway Company, still another company, is using an end-entrance car of which a plan is shown. This car weighs 32,560 lb., or 1015 lb. per seat. It seats fifteen first-class passengers and seventeen second-class passengers and has standing room for two first-class passengers and seventeen second-class passengers.


Electric Ry. Journal

Standard Single-Truck Car—General Omnibus Company, Paris


Electric Ry. Journal

Standard Maximum Traction Truck Car—East Parisian Tramways Company



Electric Ry. Journal

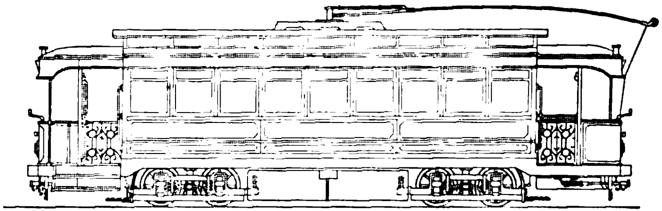
Car for Two-Car Train Operation—Bordeaux

TABLE SHOWING DIMENSIONS OF STANDARD CARS—GENERAL OMNIBUS COMPANY, PARIS

	Single-Truck Car	Double-Truck Car
Length over all	34 ft. 5 in.	36 ft. 4½ in.
Width over all	6 ft. 6½ in.	6 ft. 6½ in.
Height of floor of car above top of rail	21½ in. to 23½ in.	21½ in. to 23½ in.
Weight with truck and electrical equipment	29,700 lb.	33,000 lb.
Weight per linear foot.....	863 lb.	837 lb.
Weight per seat	990 lb.	917 lb.
Number of seated passengers	30	36
Number of standing passengers	19	18

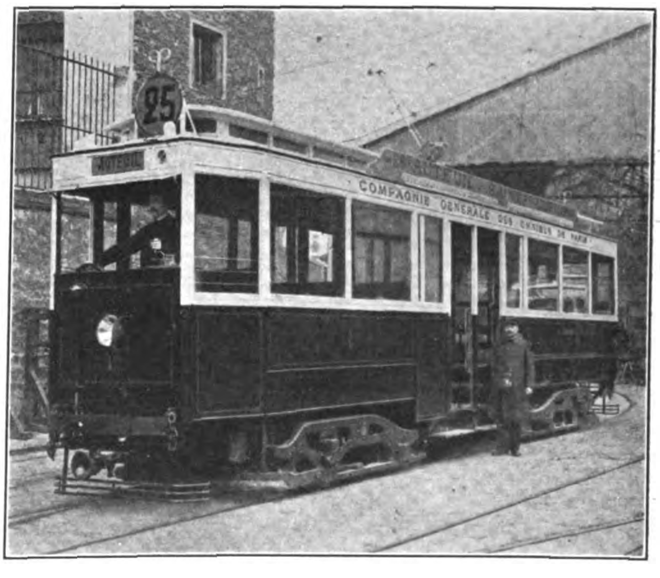
The present standard of the East Parisian Tramways Company is a car with maximum traction trucks carrying sixty-one passengers in all, of whom thirty-two are seated.

Another Paris company which has developed a center-entrance car is the Arpajon line. This car weighs 37,400 lb. and has thirty-two seats and room for twenty standing passengers. It is designed for use with a trail car having thirty seats and standing room on the platform for thirty-two additional passengers.


Electric Ry. Journal

Standard Double-Truck Car—Nogentais Tramways

The Bordeaux Tramways Company has developed a single-ended car of novel type shown in one of the plans. This car is mounted on a truck with a 7-ft. wheelbase and has a 17-ft. body with 9-ft. 6-in. platform. These cars are intended usually to be run in trains of two cars each with the long platforms coupled together, although they can be operated separately. Each car is equipped with one motor, which when the cars are run independently is used with a resistance, but when run in trains of two cars each two motors are provided for the train. They are mounted on Brill 21-E trucks. Each car has accommodations for twenty-two seated passengers and twenty-one standing passengers.



Standard Maximum Traction Truck Motor Car—General Omnibus Company, Paris

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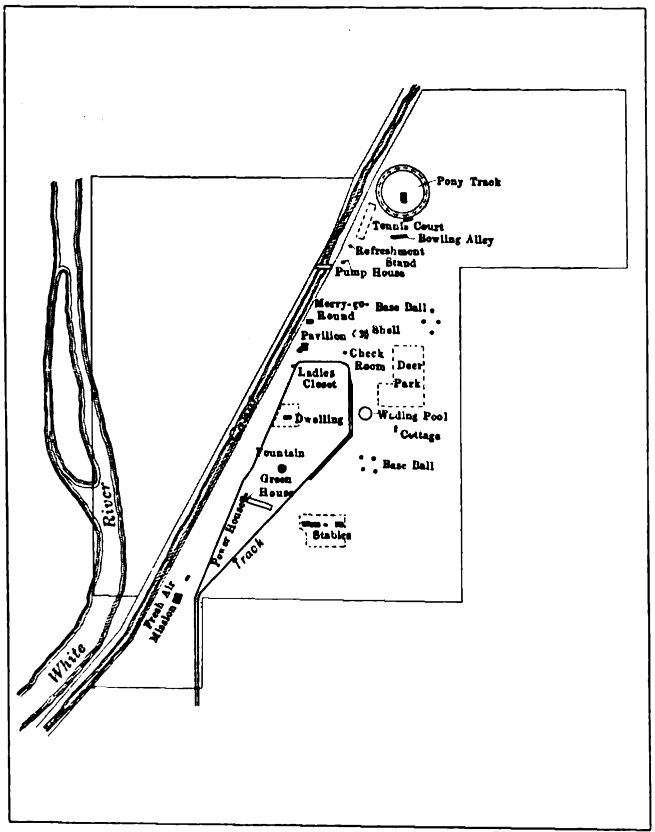
The British Columbia Electric Railway has just completed its first interurban car of arch-roof type at the company's shops in New Westminster, B. C. The new car is for the Fraser River Valley line. It is 55 ft. over all, has the usual steel and timber frame construction, M. C. B. trucks and a 460-hp motor equipment. The interior finish is quartered oak. It is expected that more cars of the same type will be turned out in the near future.

Fairview Park at Indianapolis

Since the Plan Was Adopted of Developing This Park as a Distinctively Family Resort It Has Proved Very Successful—It Is About 7 Miles from the Center of the City

For several years past Fairview Park, owned by the Indianapolis Traction & Terminal Company, has been passing through various stages of evolution from an amusement park to a family recreation ground. This park, situated about 7 miles northwest of the center of Indianapolis and comprising some 253 acres of ground, was purchased by the company in 1899. Attractions of the kind usually found in amusement parks, such as a dance hall, roller coaster, toboggan, etc., were installed at first, but as these amusements drew a certain boisterous and objectionable element it was found to be impossible under such conditions to develop the picnic ground along the original plans. These attractions were therefore gradually eliminated and the company began the development of the present policy of creating a distinctively family park which would be an especially desirable place for women and children and picnic parties at all times. The plan has proved very successful from the viewpoints of both the public and the company.



Electric Ry Journal

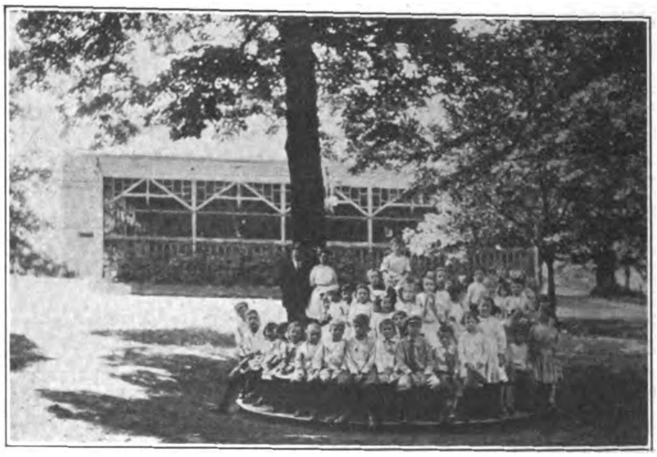
Fairview Park—Layout of the Grounds

The park is open to the public the entire year, but the regular season covers a period of about sixteen weeks from the middle of May to the middle of September. If the weather continues pleasant during the late fall, or if there is an early spring, a great many people visit the park to enjoy the beauties of the spring and autumn foliage. On some Sundays in the late fall the attendance has been as large as during the summer season when the attractions are in full swing.

It has been the experience of the Indianapolis Traction & Terminal Company that the operation of this park has been more profitable to the company since the general forms of amusement park attractions were abandoned. The change also made a great difference in the reputation of the park, which is now known as one of the most desirable places in the city as a recreation ground for children and a family picnic park. The elimination of all objectionable elements has proved to be good business policy. No automobiles or horse-driven vehicles are allowed in the park, provision being made for checking them at the entrance. This insures the safety of children in the park, as it gives them the entire freedom of the place and eliminates the danger of their being hurt when running across the paths or driveways.

Fairview Park is particularly favored with natural scenic effects, and these have been enhanced by careful landscape gardening, so that the park has become noted as one of the beauty spots of the city. A large greenhouse furnishes all the plants and flowers needed for the many flower beds during the season. An old canal with its picturesque towpaths runs through the park and forms one of the natural attractions. Especial attention has been given to furnishing amusement for children. A wading pool has been constructed with a long sloping cement floor, graduated from a depth of 1 in. at one end to nearly 2 ft. at the other end. Lake sand is spread on the floor of this pool, and a "beach" is made at the shallow end. Swings, gymnasium apparatus and a miniature merry-go-round are also furnished, with attendants in charge.

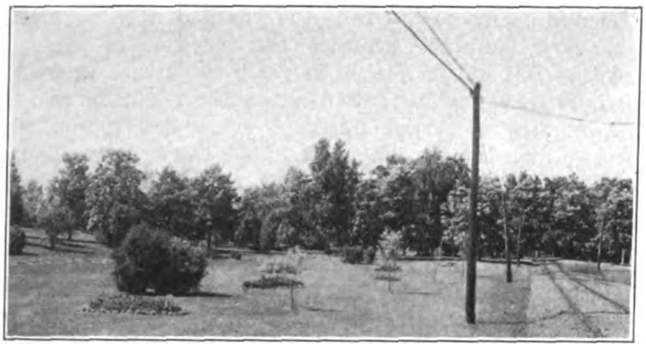
Among the other amusements which are favorites at the park are the tennis courts, pony track and three baseball diamonds which are maintained in the park and may be reserved for amateur games, without charge, by application to the park superintendent. The diamonds are not inclosed or fenced and are provided for the use of young amateurs or the amusement of organizations that may be picnicking in the grounds.



Fairview Park—Dining Hall and Miniature Merry-Go-Round

An excellent dining hall forms one of the concessions and is very popular for chicken suppers during the summer and fall. A deer park is maintained by the company, containing the finest collection of deer in the

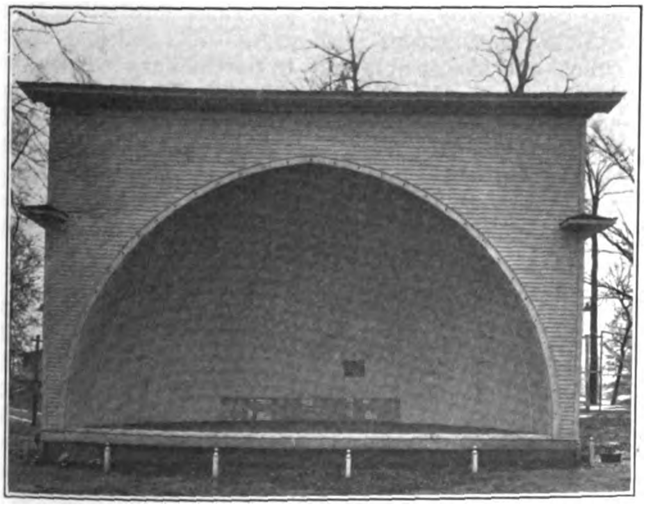
State. The well-known high-diving horses "King" and "Queen," which were owned by the late Hugh J. McGowan, are kept at this park, and a diving pool is maintained. Large crowds are drawn to the park on the days when these horses make their remarkable dive from a 40-ft. chute. A large band shell, noted for its splendid acoustic properties, faces a grove where seats are placed for the accommodation of about 3000 people. Band concerts are given in the park on Thursday and Sunday evenings. During the latter part of last year the company installed a moving-picture machine as an added inducement for evening travel. A screen is erected across the front of the band shell, and free moving-picture shows are given on the evenings when there is no band concert, a change of films being made each night. The cost of operation has proved very small, and, without any advertising, the average attendance last year at these shows was 2000. It is expected this feature will draw larger crowds during the coming season.



Fairview Park—Entrance to the Grounds

Fairview Park—Scene on the Canal

Each year there is usually some special attraction at the park, such as the "Hiawatha" Indian players, which is staged on one bank of the canal against a natural wooded background, the high sloping hillside of the other bank forming a natural amphitheater. A charge of 25 cents admission is usually made for these special attractions, and the attendance averages 2000 each night.



Fairview Park—Music Shell for Open-Air Concerts

The railway company receives 15 per cent of the receipts from the pony track, merry-go-round and shooting gallery concessions and 10 per cent from the restaurant. All other attractions in the park are installed and maintained by the company. It has been found that for the heaviest four months of the season the revenue from these concessions pays the entire operating cost of the park, leaving as a profit the net revenue derived from transporting passengers. Approximately 15,000 people visit the park on pleasant Sundays, about 5000 on Thursdays when there is a band concert, and from 2000 to 3000 on other pleasant days. There is a large loop with unloading and loading stations in the center of the park, and storage tracks are provided for the extra cars required to handle the crowds when the concerts are over.

A small power plant furnishes current for lighting the park throughout with arc and incandescent lamps, as well as the current required for power purposes in buildings on the grounds. A large number of arc lamps are used in that portion of the park where the principal attractions are located. Several hundred incandescent lamps are used to illuminate the various walks, besides those required for the band shell and buildings. In the woods and outskirts of the park about ninety gasoline lamps with incandescent mantels are used. These gasoline lamps are mounted on the standard form of iron gas lamp post.

The line to the park is double-tracked for the entire distance. A spur track in the park approximately 800 ft. long provides storage for fifteen or twenty cars to take care of the first rush after band concerts or other attractions. The regular city fare is charged for the 7 mile ride to the park, namely, twenty-five tickets for one dollar, six for 25 cents, or a 5-cent cash fare, with the usual transfer privileges. All fare collections are made on the cars.

No special days are set aside for special assemblages at the park, but during the season if the weather permits there are Sunday school picnics and gatherings of various clubs and associations almost every day. The State organization of the Modern Woodmen of America holds its annual picnic at Fairview Park every year, and many other organizations of this character have selected the park for their annual gatherings. The only special arrangements required are for special cars and whatever reservations may be needed at the restaurant or dining hall. The company does not make any attempt to solicit this business, as it is generally known that the park is free and open at all times and that it is particularly intended for such gatherings.

The park is under the management of W. F. Milholland, secretary and treasurer of the Indianapolis Traction & Terminal Company. A park superintendent, who resides on the grounds, has direct charge of the park employees and attendants. Since the park has been operated under the present plan it has been considered a very good investment by the company. It was found when first operated with the usual "White City" form of attractions that the return on the investment was too low to warrant the company in continuing to operate it under that plan.

Company Sections in the N. E. L. A.

The National Electric Light Association Now Has Nearly Fifty Company Sections, Whose Splendid Educational Work Is Described in Detail by the National Secretary

BY T. C. MARTIN, SECRETARY NATIONAL ELECTRIC LIGHT ASSOCIATION

In the course of his duties the writer has had occasion recently to visit a number of cities where the electric lighting and electric railway services are supplied by the same company and to discuss with the officers of these companies the question of the establishment of company sections, both lighting and railway, in those properties. The development of company sections among the members of the National Electric Light Association has been an important feature of its growth and of its ability to serve the industry which it represents. For this reason the writer believes that some information in regard to its company sections may be of benefit to the members of the American Electric Railway Association, among whom the company section idea has not been so widely adopted.

PROBLEMS CAUSED BY RAPID GROWTH

An industry or public utility system growing at the rate of 20 per cent per annum and maintaining that rate, with acceleration, if anything, over at least two decades has a good many problems on its hands incident and attributable wholly to rapid expansion. The central station business has been under just this strain, and no other development in the electrical field has been so fast or so sustained. It has had to work out its own salvation from within, excepting such aid as might come from bodies of regulation, and these seldom or never have done anything other than restrict. There have been the requirements of new capital to be raised and only to be secured when managers could show a good return on that already intrusted to them and turned over at an ever-falling price per kilowatt-hour. There is the incessant assimilation of new inventions and methods on a vast scale, with a consequent and corresponding scrap heap. There is, over and above all, perhaps, the stern necessity of recruiting and retaining a great army of employees, whose skill, loyalty and efficiency must be directed toward achieving the ideal of the best service at the lowest rate to the largest possible public.

It is not generally recognized how serious has become this question of personnel in the central station industry, but among those responsible for the successful operation of its large systems of public utility supply a keen realization has long existed of the condition to be met. If it had not existed, we should probably have seen something like the recent occurrence in England, when one of the large steam railroads took a manager from this country because such men were not being trained there within the industry, which has thus apparently been neglecting the educational work so necessary for self-preservation and efficiency. With its rapid expansion, the central station field has made an enormous demand on colleges and schools of every kind and degree for youthful graduates to fill not only new places but the vacancies in the old ones. The subject has many interesting and suggestive points of view as well as many hard, matter-of-fact difficulties to be dealt with wisely. Given an industry growing 20 per cent annually and a staff all told of not less than 100,000—probably much greater if all incidental construction work were taken into account—it would appear that recruits to the number of at least 20,000 were needed each year to take the "oath of allegiance." It is very doubtful whether the increase in personnel works out at such a high ratio in an art where the whole tendency is toward automatic operation and the economies of larger units of every description. But if we took the enrolment at 10,000 the figure would certainly be conservative. That is not all. This is a restless age of much groping, and far too many young fellows with a brand new diploma take up electricity because it "sounds good" and without any peculiar or special bent for an electrical career. They can't be blamed for the airy and easy way they tackle the job offered them in the public utility, and it is partly the fault of our educational system that they have not been earlier tried out and sifted as to the work they can do best and with most zest. After all, few of us have a real mission in life. We just tail on behind the leaders, or vote against them, lest one good doctrine of progress should corrupt the world.

Hence it comes about that gathering up in its seine some thousands of new men every commencement term, and other thousands all around the calendar, the central station industry finds a large percentage escaping through the meshes or being thrown overboard. This process of elimination is staggering in its analysis of fit and unfit, and happily a large number of estimable people escape to other spheres of occupation, to be tried again for a time at least, although it may be doubted whether the average American in this respect is as fickle and variable as he was when the dynamo, motor and incandescent lamp were invented. Anyhow, the fact remains that in many of our large central station companies the personnel *en bloc* will change every three years, and seldom at a lower rate than 20 or 25 per cent yearly. Here is a serious fluctuation to be dealt with, inherent perhaps in the conditions of the times, and susceptible only to partial cure by such welfare work as the National Electric Light Association has outlined and attempted at one point or another in sick and accident relief, savings funds, profit sharing, stock ownership, long-service annuities or "pensions," and last but not least in its educational work as typified in the creation and cultivation of the company section.

EDUCATIONAL WORK OF COMPANY SECTIONS

Like the statistical work of public utility associations and companies, their educational work, while of equally extraordinary extent is little appreciated, and they still get very little credit for it. The corporation schools of this country are a most significant supplement to the institutions officially recognized as endued or endowed with the ability to teach but which leave their "finished" product in a relatively raw state. The company sections of the National Electric Light Association now numbering nearly fifty, with a membership of 10,000 officers and employees, are on such a democratic and inclusive basis that they reach from systematic education at one end of the scale for large groups of men down to small bunches of a score or two—or even much less—gathered together in the name of the National Electric Light Association to discuss some paper or topic of the hour bearing upon the art in its different aspects. Within a period of only five or six years, the company section work of the association has opened up so many fertile possibilities that it is hardly within the ability of anyone to say what the limits of its evolution will be. Reference can be made here to only the more prominent lines of work followed up. It may be stated at the outset that about much of the section work there is no novelty. Public utility companies have had their clubs and social or educational organizations for many years past, and even in the National Electric Light Association these are still maintained without any attempt to bring them inside the sphere of National Electric Light Association direct influence. So long as the good work is done with an eye single to the common purpose, the agency really matters little. In some instances company organizations of one kind or another that were pre-existent have been "tied in" with the section, and the result is good. This would seem to be a preferable plan, as it makes everyone with ambition and outlook a member of the body that represents the industry as a whole and which serves as a great clearing house for information.

FUNDAMENTAL PLAN OF COMPANY SECTIONS

A fundamental plan in all the company sections of the National Electric Light Association is the holding of regular meetings for the presentation of papers, for discussion and for social fellowship. This has proved to be a very good thing and has brought with it one or two developments of its own. In some of the larger sections, with 1000 or more members, it was found that men were not greatly or at all interested in topics outside their own sphere—technical, commercial, accounting, etc. This has led to the creation of branches or departments within the section, so that those in a given group can get together and study their own specific problems, all groups meeting together once in awhile on some special occasion. At the other extreme are smaller sections that necessarily soon use up their available local talent and run short of authors and topics.

To meet this condition the National Electric Light Association Lecture Bureau was organized two years ago on the theatrical agency plan. It has a list of some two score lectures constantly renewed, nearly all illustrated, on electrical topics of the day, which are available free of cost to any company section on request. Each section secretary has sent to him the list of lectures, or additions to it, and makes his selection. Then the manager of the bureau fixes dates. It is not often that the author of the lecture can be present at the scheduled meeting, but some local member or officer can present the lecture and often supplement it. Text and lantern slides are thus in constant circulation all over the country disseminating information. The range of subjects is wide, from Mazda lamps to refrigeration, from the colossal Keokuk plant on the Mississippi to the operation of the Panama Canal, from sign lighting to the principles of economics and public utility finance. The authors are all well known; some of them are the great leaders of the industry. The value of the material may be inferred from the fact that universities and government institutions have applied for it. Obviously such useful work tends to foster existing sections and create new ones. It all helps the cause.

ADVANTAGES TO COMPANIES AND TO MEMBERS

As rallying centers for social forces and influences in a company, the section seems to have no superior, begetting in every organization, small or large, an *esprit de corps*, a sentiment of comradeship, a closer touch between officer and employee, a higher degree of loyalty. Unsuspected talent of many sorts is brought to notice, and so far as known the result is always good alike to the company and the individual. One instance may be taken as typical. A young man in a not particularly large or conspicuous city managed by dint of effort to get a small company section going. It was all public-spirited work. Then he thought that the president of the National Electric Light Association could give them a boost by "stopping off" for an address between visits to much more important places. This was accomplished. The moment soon came when the two presidents whose acquaintance was thus made felt that the energetic young hustler needed a larger sphere, and now at a greatly advanced salary he is with one of them making good. There are in reality a good many such men for whom the company section has been the first chance they had to get out into the open and become known. The inference need not be pointed out.

OTHER ACTIVITIES OF COMPANY SECTIONS

National Electric Light Association company sections are versatile. One of them has a brilliant circus troupe of 400 members. Some of them have excellent bands and orchestras, or soloists of striking ability. Baseball teams are numerous, with a national cup trophy to be played for each year at the annual convention. Balls, picnics and entertainments of a diversified character, as well as annual dinners, are usual events. These are all under the management of the sections, free of any interference or dictation, and the annual elections are often most exciting affairs with brisk campaigning for two or three rival tickets. Several of the sections issue monthly bulletins devoted to section work, gossip and company news, the pages light and pleasant but with a serious purpose underlying it all, and usually with a "Question Box" department where any member may propound anonymously his difficulties and get them settled. There are Question Box prizes and other awards, such as those for the best suggestions as to improving company practice or methods of doing business. The association has a gold medal for the best paper presented each year before any company section, and this has of late been supplemented by cash or book prizes for the second and third competitors. Recently three cash prizes of $25, $15 and $10 were offered for the three best sets of ten reasons for company section membership. There were no fewer than fifty-one excellent entries from eleven company sections.

HOW THE COMPANY HELPS

Frankly recognizing the good effects of the sections, the companies are universally desirous of promoting their strength and prosperity, although the methods vary. In some instances half the dues of $5 are paid by the company to the association.

Usually provision is made for meeting rooms and sometimes for refreshments. Now and then an outside entertainer is brought in to liven up a program. Sometimes a definite annual contribution is furnished toward section expenses. In all of these matters the parent body does not make the slightest effort to dictate the policy. Its only step in that direction is to require that it shall authorize the company section to be formed and to suggest a standard but optional form of organization. In this way it has a number of experiment stations at work all aiming to help solve for it and the world at large some of the greatest social and industrial problems of the day, and all of them making a definite mark in opening a career to talent, educating the staff almost unconsciously to higher standards and assuring better return to capital while insuring better service to the public. The company section is a great institution. With all its drawbacks and shortcomings it is an admirable extension of the little red schoolhouse.

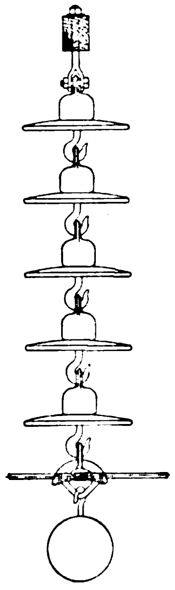
Midwinter Convention of the A. I. E. E.

A Conclusion of the Report of the Proceedings Begun Last Week and a Digest of the Discussion on the Earlier Papers—The Important Topics Related to Power Generation and Distribution

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 28 the larger part of the papers delivered before the midwinter convention of the American Institute of Electrical Engineers on Feb. 25 and 26 were abstracted. In addition to those mentioned there remain the papers by Messrs. Kruesi, Buck and Hutchinson and all of those delivered on Friday.

At the end of the power station session program a paper of rather unusual type was furnished by A. H. Kruesi, who gave in outline a number of suggestions upon which discussion can be based. The topic of the outline was "Steam Versus Motor-Driven Power House Auxiliaries, from the Electrical Engineer's Point of View." He took up the subject from the standpoint of reliability of service and source of energy. The topics suggested were these: (1) excitation of generators, (2) ventilation and air cleaning, (3) choice of transformers as to type, (4) arrangement of large transformers, (5) switching systems for high-tension generating stations, (6) protective reactance coils, (7) wiring for power stations, (8) present status of outdoor substations.

At the transmission session H. W. Buck gave the results of experience with suspension insulators and demonstrated that it is possible to have excessive angular deflections with wind pressures of 15 lb. per square inch and the sleet loads ordinarily assumed. Copper conductors smaller than No. 1 and stranded aluminum cables of any size used in commercial practice are deflected more than 60 deg. at the insulators, this being the limit recommended by Mr. Buck. He gives a table showing the deflections produced in conductors of standard sizes and also the amount of "ballast" needed to reduce the deflection within safe limits. The maximum weight of ballast required is for No. 0000 aluminum cable, nearly 0.2 lb. per foot of cable. One mode of attaching ballast is shown in the accompanying illustration.


A. I. E. E.—**Ballasting Suspension Insulators**

POWER GENERATION SESSION

Dr. Cary P. Hutchinson presented the most elaborate paper of the convention, in which he outlined and illustrated an original method of applying hydrographic data in designing hydroelectric power plants. The method was made definite by application at McCall's Ferry on the Susquehanna River. The method is a graphical one and is designed to bring together the data relating to the available water supply, the necessary auxiliary power supply and the characteristics of the load. The author called attention to the lack of systematic methods in handling problems of this kind, stating that the question presents itself in two forms: First, in the case of a proposed new development on a variable stream, for what stream flow shall the development be made? Second, assuming a plant already in operation, to what extent shall an auxiliary supply be provided in order to convert the variable supply into a continuous supply? Both cases involve a determination of the total annual cost of an auxiliary supply adequate to supplement the deficiency in stream flow. In one case the selling price of the combined hydraulic and auxiliary supply is to be determined and the development fixed for such a stream flow that, at this price, the supply can be sold in the given market.

Under the title "The Cost of Electricity at the Source" H. M. Hobart gave the results of a study of the cost of generating electrical energy on a large scale. He stated that, under favorable conditions, electrical energy can be manufactured in bulk at a cost in the neighborhood of 0.25 to 0.40 cent per kw-hr. He called attention to the statement made by Ferranti in 1910, to the effect that on certain assumptions a station equipped with ten 25,000-kw generating sets could be built at a total cost of $35 per kw. Mr. Hobart has made estimates which indicate that this rate is sufficient for a 100,000-kw station equipped with five 20,000-kw, 1800-r.p.m. steam-turbine-driven, three-phase generators and all the machinery required in such a plant. Of the amount stated the outlay for the turbo-generators, cables, exciters and switchgears is covered by 30 per cent.

The total cost of generating energy in a steam-driven plant is estimated to be from 0.225 cent per kw-hr. at 100 per cent load factor with coal at 50 cents per ton to 0.905 cent with 50 per cent load factor and coal at $5 per ton. The cost must be increased slightly when the output is produced at less than 100 per cent power factor and about 5½ per cent when the pressure has to be stepped up in transformers.

Mr. Hobart recorded the results of his calculations in graphical form and the curves were published in connection with his paper. His purpose in presenting the results of the calculations is to call attention to the low price at which energy can be produced in bulk. The retail price of energy to small customers is so much greater than the figures given that there is apt to be a wrong impression as to the cost of generating it. Mr. Hobart believes that if the promoters of large manufacturing enterprises realized the actual facts there would be an increased incentive for them to locate their establishments near sources of electricity supply.

DISTRIBUTION SESSION

The report of the sub-committee on distribution was presented by the chairman, P. Junkersfeld. The report is of particular interest to electric railway men as it deals to a considerable extent with distribution for electric railway systems. After a brief introduction by the chairman, a number of appendixes were given, each containing a special article by a well-known authority.

GENERAL DISTRIBUTION PROBLEMS

Mr. Junkersfeld called attention to the advantages of the centralized generation of electrical energy and to the extension of the same principles to include transmission to substations and in some cases to the substations themselves. He concluded his section of the report with a bibliography on distribution for light and power, distribution for electric railways, cables and underground construction, and substations and storage batteries.

The first appendix to the report contained a review of the situation in three-wire direct-current distribution, by Philip Torchio. Among the conspicuous improvements relating to distribution Mr. Torchio mentions first the development of the commutating-pole synchronous converter. This, in conjunction with graphite brushes with slotted commutators and self-lubricating copper graphite brushes for the collector rings, has made the operation of synchronous converters practically independent of attendance, except for starting up and shutting down and the periodic cleaning and setting after the machines are shut down. Other important innovations have been the split-pole synchronous converter and the synchronous booster-converter for obtaining regulation. He also called attention to the development in the storage battery situation, standby batteries consisting now of very thin plates similar to those used for electric vehicles.

The second appendix contained a discussion of alternating-current distribution by H. B. Gear. He took this up under two headings, bulk supply and general distribution. The former has largely been developed in America on the principle of radial lines. The author showed, by means of diagrams, the prevalent arrangement of direct lines and tie-lines. He stated also that the maximum-sized three-core cable for 6600 volts has a capacity of 3200 kva and for 20,000 volts one of 5000 kva. Previous to the last two or three years it was not satisfactory to operate high-tension lines in parallel at the substation end owing to the absence of reliable reverse-power relays which would permit satisfactory parallel operation.

The use of separate cables for different converters has resulted in an accumulation of surplus cable capacity amounting to from 50 to 80 per cent of the maximum substation load. At the present time, in Greater New York and Chicago, there is not far from $1,000,000 of surplus cable investment. This condition has been recently much improved by the use of considerably larger converting units, which make possible large saving in future cable investment by permitting larger loads on the cables. Another source of relief has appeared in the development of protective relays designed to permit lines to be operated in parallel. Reverse-power relays have also been developed and are under trial at the present time. The performance of these will be watched with the most sympathetic interest by all who are interested in getting high-tension cable investment down to an economical basis.

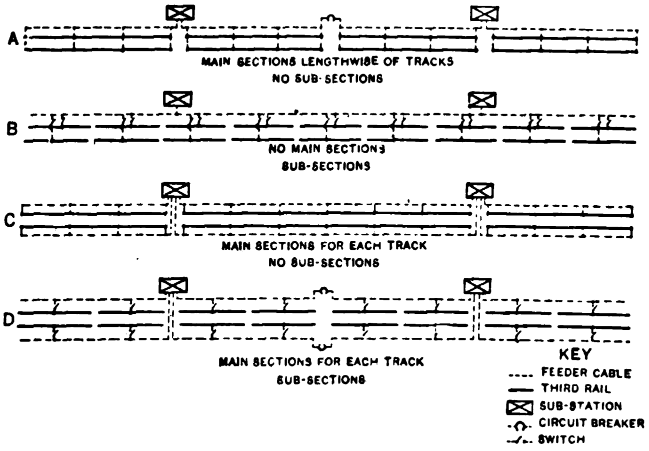
In a third appendix, H. Goodwin took up the effect of consumer's apparatus and wiring on distribution. He called attention to the necessity for keeping up the quality of motors connected to supply systems. While it might at first appear that the manufacturer's point of view is opposed to that of the central station, a broad view will indicate that the electric art and industry will develop most rapidly and permanently if all join to keep as low as is reasonably possible the rates for electrical energy, which cannot be done if central stations are put to excessive expense on account of the poor characteristics of the apparatus used by consumers. The author called attention to the improvements which have been made in motors, particularly in the development of a type of a.c. motor which draws power of unity power factor and thereby improves the general power factor of the system.

POWER DISTRIBUTION FOR RAILWAYS

Under the title "D.C. Distribution for Surface Railways' Interurban Service," R. H. Rice outlined the situation in this field, dividing it into three component parts: (1) the converting equipment in the substation; (2) the positive system from the substation switchboard to the car, including feeders and trolley wires, and (3) the negative system, or return, which completes the electric circuit from the car to the substation negative busbar and includes the electrical features of the track. Substation equipment has become quite well standardized. The supply is practically always from three-phase high-tension lines and for railways is of twenty-five cycles. Each converter in service should preferably be served from a separate high-tension line when the machines are of large capacity and used in important city service. A few years ago 2000 kw was the limit in size, but 4000-kw machines are now in service. The cost of these large machines is less per kilowatt, and they occupy but little more space in the substation.

Mr. Rice gave in considerable detail the modern practice in distribution for electric railways, both overhead and underground. He called attention to the fact that in many cases the return circuits, except possibly the rail bonding, are almost wholly neglected, while the positive system is carefully planned and constructed. A poorly built negative system does not jeopardize life or cause delay to the same extent that similar neglect in a positive system would do, but elements of danger and loss are present which should under no circumstances be neglected.

In beginning the appendix on the subject "Direct-Current Distribution for Underground and Elevated Railways," E. J. Blair called attention to modifications of the third-rail system which are used in different parts of Europe. In this country the third-rail construction is standard and seems to meet nearly all conditions. With the great density of traffic common in this country the distribution must be made out in such a way as to fulfil the following conditions: Action with maximum of reliability must be provided; the system must be able to care for big loads out of all proportion to the mean requirements; provision must be made for very heavy currents for train units and such close headway that extreme current energy per mile of track will obtain.



A. I. E. E.—Sectionalizing Railway Feeders

In laying out a distribution system under such conditions the problems of size and quantity of conductors are the least difficult for the engineer to solve, and the most important feature to be considered is simplicity and perfection of operation. Too little attention has been given to this feature. The arrangements and division of electrical distribution with respect to the track—that is, sectionalizing—demand attention. Several methods of sectionalizing are shown in the accompanying figures, which Mr. Blair discussed in detail.

He assumed that the last arrangement is the ideal one and raised the question as to how large the sections should be. In reply he stated that extremely large substations for elevated and subway work should be avoided. For a substation feeding two tracks and in two directions only it would seem undesirable to go much higher than 5000 kw in capacity. Where the feed is in four or six directions the capacity should not exceed 10,000 kw. The single section should be restricted in size to a mean load during heavy periods of 4000 amp and to a maximum length of 2 miles.

W. G. Carlton discussed the subject of d.c. distribution for interurban and steam railroads. He called attention to a few important historical facts in the application of electricity to heavy electric railroading. The earliest large d.c. roads used low-voltage and third-rail distribution. The majority of those now operating or preparing to operate at 1200 volts or higher use overhead trolley. In general the catenary type of construction is preferred. There are twenty-eight railroads operating or preparing to operate at 1200 volts or higher, the maximum voltage being 2400. Power for operation at 1200 volts is furnished direct from steam-driven generators in a few cases, but as a rule is supplied by synchronous converters or motor-generators. The only direct-current, 2400-volt road in operation at the present time uses motor-generators with two 1200-volt machines in series. The Butte, Anaconda & Pacific Railroad installation is an example of what can be done in handling steam railroad service.

Alternating-current distribution for interurban and steam railroads was discussed by W. S. Murray, who stated that the a.c. contact wire in general has no application in the interurban field, where equipment must be common to city and interurban operation. He offers as recommended practice the use of a single overhead wire furnishing high-voltage alternating current of twenty-five cycles as the contact system for the motive power apparatus operated thereunder. This apparatus may be single-phase, split-phase and, through the medium of a rectifier, direct-current.

DISTRIBUTION FOR LIGHTING AND INDUSTRIAL POWER

The principal problems in the relation of distribution and switching apparatus outlined by E. D. Merriam were classified by him as follows: (1) maintenance of continuous power supply; (2) protection against service interruption due to faults in the distribution system and receiving apparatus; (3) safe interruption of circuits as normally loaded; (4) "safety first" protection for all who come near the distribution system, and (5) operation of the distribution system at maximum efficiency. He gave illustrations to show that a considerable number of important distribution problems depend for their solution on the characteristics and performance of switching and auxiliary apparatus and said that strenuous efforts are being made to improve the various devices.

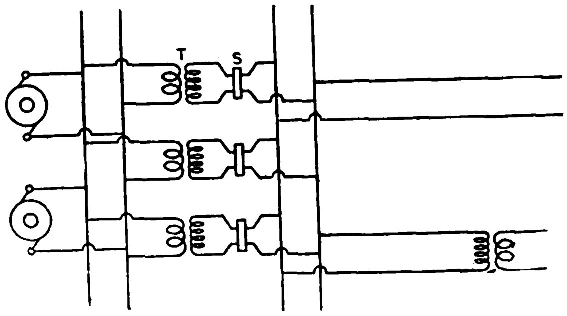
In discussing the subject of distribution for street-lighting service, Paul M. Lincoln called attention to the advantages of constant-current operation for street lighting as compared with constant-potential operation. He enumerated several advantages of this system and commended the series-parallel arrangement.

RECORDING DEVICES

Dr. C. P. Steinmetz directed attention to the importance of having automatic records of occurrences in electric circuits for the reason that circumstantial evidence regarding unusual conditions is practically worthless. He reviewed the different kinds of recording apparatus available and pointed out the field of application of each. For purposes of diagnosis of causes of trouble he recommended the instrument known as the multi-recorder, devised by E. E. F. Creighton, and described in the A. I. E. E. *Transactions*, Vol. 31, 1912, page 825.

Dr. Steinmetz illustrated his argument by means of an actual incident. In the diagram, shown herewith, a large transformer, *T*, installed in a generating station, a high-tension switch, *S*, in the same station and a transformer at the end of a branch line were destroyed. At the same time a flash-over occurred on a transmission line. Post-mortem examination of the transformer showed numerous arc burns on coils and tank and the coils badly deformed and bent out of shape. Circumstantial evidence elicited from attendants showed "static" in the station for some time before the accident, and it was suspected that numerous short-circuits had occurred in the lines during the weeks preceding the accident. This was all the evidence that could be secured, and it was too meager to determine what actually happened.

Dr. Steinmetz then proceeded to analyze the situation from the theoretical standpoint as follows: An arcing ground occurred on the line, producing moderately high-frequency oscillations, a few thousand per second. This lasted possibly for a few hours until the breakdown occurred, either by electrostatic heating or by impact of the oscillations. The insulation in the transformer then broke down, causing a short-circuit through transformer and line. The high-tension switch, in attempting to open, failed on account of the excessive current, and the superposed high-frequency oscillation destroyed it and caused a short-circuit at the transformer terminals. The magnetic forces in the transformer moved the coils, and the shock of the short-circuit broke down the transformer at the end of the branch line.



A. I. E. E.—Diagram Used by Dr. Steinmetz in Discussing Transformer Failure

Another explanation of the accident might be this: Numerous flash-overs had occurred during the preceding weeks in the transmission lines, resulting in heavy short-circuits. While the transformers were strong enough to stand occasional short-circuits, the stresses involved were so numerous that they gradually impaired and finally broke down the transformer, *T*. This resulted in the destruction of the circuit-breaker, the failure of the second transformer, etc.

Other explanations might be made on the basis of lightning entering the line and starting a high-frequency, cumulative surge in the transformers, producing spark discharges, finally ruining the coils. Still again the internal oscillations in the transformer might have occurred owing to the entrance of high-frequency lightning or because of an arcing ground on the line, with consequent spark discharges leading to the destruction of the transformer. These illustrations show how many causes might have contributed to the result and yet how inconclusive is any solution without autographic records of the electrical phenomena.

ALUMINUM-CELL LIGHTNING ARRESTER

Dr. E. E. F. Creighton stated that recent investigations have shown that lightning discharges from the clouds have wave fronts of various degrees of steepness and are impulses rather than high-frequency discharges. This has an important bearing on the development of the lightning arrester. If the above conclusion is true, then the present type of arrester is correct in principle at least. Two of the main protective features of the aluminum-cell arrester are its small dielectric-spark lag and its ability to absorb high-frequency potential of less value than normal line voltage. Dr. Creighton considered that the aluminum-cell arrester is correct in principle and that its cost is justified by its performance.

DIGEST OF THE CONVENTION DISCUSSION

The discussion of the papers was most instructive and interesting. A few salient features only will be mentioned here.

POWER STATION SESSION

P. Torchio, W. S. Moody, H. G. Stott, P. M. Lincoln, V. Karapetoff, H. R. Woodrow and W. M. Davis discussed the subject of power station reactances. The work of the authors of the paper on this subject was appreciated and regret was expressed that it had not included feeder reactances more fully. The importance of including transient effects was pointed out. The plan to be used in the enlarged Interborough plant in New York was explained and shown to be different from any of those described. It is a compromise between the ideal condition and prohibitive cost.

The outdoor substation was discussed by D. C. Jackson, A. H. Kruesi, H. B. Gear, W. S. Moody, A. M. Rossman, J. C. Smith, P. W. Sothman, J. E. Kearns, H. E. Bussey, F. Osgood, K. C. Randall, D. B. Rushmore and R. E. Argersinger. The sentiment was in favor of caution in connection with this type of station. Outdoor substations are already in use to a considerable extent, but some doubt as to their real economy was raised. Indoor substations were favored by some speakers when the necessity for extreme reliability justifies the cost.

TRANSMISSION DISCUSSION

The transmission papers were discussed by D. B. Rushmore, H. W. Buck, F. W. Peek, Jr., C. E. Waddell, P. H. Thomas, William McClellan, V. Karapetoff, P. M. Lincoln, A. O. Austin, F. Osgood, J. A. Sandford, Jr., J. C. Smith, E. A. Lof, E. M. Hewlett and S. Haar. The remarks centered naturally in the faults of insulators and in the electrical and mechanical stresses sustained by insulators. An important feature upon which there was some unanimity was the belief that porcelain does not "age" but that the cause of rupture after a lapse of time was the presence of manufacturing defects temporarily masked. The relation of switching to insulator failures was taken up, and the conclusion seemed to be that switching surges are inevitable and must be provided for. According to Mr. Austin, the testing of insulators with high-frequency power is very satisfactory.

POWER GENERATION SESSION

The discussion of the subject of power generation was focused on the estimates made by Mr. Hobart of the cost of generating electrical energy. It was participated in by H. W. Buck, J. W. Lieb. Jr., H. R. Summerhayes, C. T. Hutchinson, F. A. Scheffler, H. L. Wallau, H. B. Alverson, O. K. Harlan, C. F. Scott, H. C. Abell, A. H. Kruesi and V. Karapetoff. Mr. Hobart's estimates were severely criticised as tending to give a wrong impression of the real cost of generating energy under actual conditions. The wisdom of circulating estimates of this sort was questioned, and the possibility of misuse of the estimates was pointel out. The short life of a modern plant in view of rapid obsolescence was emphasized, amounting on the average to but six years in a prominent case cited by one of the speakers.

DISTRIBUTION AND PROTECTIVE APPARATUS SESSIONS

The discussion on distribution was participated in by H. L. Wallau, D. W. Roper, E. M. Hewlett, P. Torchio, P. S. Taylor, E. W. Trafford, A. P. Kelly, C. Schwartz and W. A. Del Mar. The field was so large that the discussion was necessarily scattered. A number of useful and practical points were brought out by the various speakers.

Dr. Steinmetz's paper brought out statements as to the operation and utility of the multi-recorder of Dr. E. E. F. Creighton. Dr. Creighton's paper was discussed by Messrs. F. W. Peek, Jr., L. C. Nicholson, C. O. Mailloux and C. P. Steinmetz. They all agreed that the aluminum-cell lightning arrester is effective and that further data in regard to its operation are desirable.

INTERNATIONAL ELECTRICAL CONGRESS PUBLICITY MEETING

On Wednesday evening, Feb. 25, a mass meeting was held in the auditorium of the Engineering Societies Building to arouse interest in the congress which will be held in September, 1915, at San Francisco. H. G. Stott, chairman of the organization committee, presided, and addresses were given by Dr. C. P. Steinmetz, honorary chairman of the congress; Dr. William Rader, of Pottstown, Pa.; W. D'A. Ryan, illuminating engineer of the Panama-Pacific Exposition; J. A. Cruikshank, of Philadelphia, Pa., and P. M. Lincoln, of Pittsburgh, Pa. Several of the addresses were illustrated with lantern slides, one with moving pictures. A successful effort was made to acquaint those present with the beauties of a transcontinental trip and the benefits to be derived from a visit to the exposition and the congress.

NORWEGIAN REPORT ON ELECTRIFICATION

The royal Norwegian commission on hydroelectric development has made a report to the Minister of Public Works favoring the electrification of the State railways. It estimates that the cost of power substation and transmission lines in southern Norway alone would be $12,500,000. The railways which preferably should be electrified first are the following: Christiania to the Swedish border, Christiania to Gjoevik, Christiania to Drammen and three smaller sections in the vicinity of Christiania Fiord. The total cost for electric railway equipment on these lines would be $8,000,000. Despite this high outlay, it is considered desirable to electrify these railways as part of an electric railway, lighting and power service for all Norway. Furthermore, the price of coal is tending steadily to rise, whereas the cost of electric energy will gradually decrease as the fixed charges are reduced. The electrification, of course, is also expected greatly to enlarge passenger and freight traffic through the more intensive development of the territories served. The Storthing has already approved trial electrical operation on the Christiania-Dramen line.

Report of Swiss Electrification Commission

The Commission, Which Was Appointed to Determine the Best System of Electrification for Switzerland, Compares the Several Systems and Gives Its Reasons for Favoring Single-Phase Operation

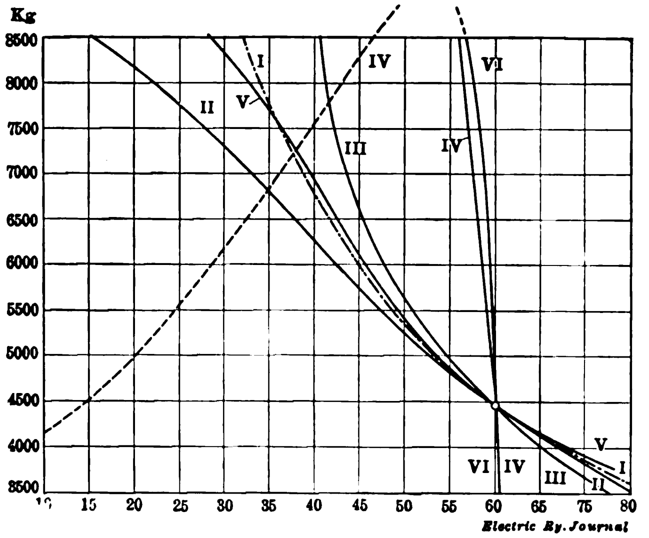
The Swiss Electrification Commission, headed by Dr. Wyssling, has recently made a report to the Swiss government on the choice of electrification systems. The following is a translation in abstract of the report as contributed by J. Reyval to the Jan. 10, 17 and 24 issues of *La Lumière Electrique:*

CHOICE OF SYSTEMS

For the Swiss conditions it is important to have a system which can use water-power to greatest advantage. The following systems were studied in connection with such exploitation:

Direct current with third-rail up to 800 volts and trolley up to 3000 volts, with the possible ultimate use of a 6000-volt, three-wire system. In this case the current would, of course, be converted from three-phase lines and three-phase machinery.

Three-phase alternating current with two overhead lines having 5000 volts to 8000 volts between phases and a frequency of fifteen cycles, the primary distribution to be at a higher three-phase voltage.



I—Ideal motor of constant output; II—steam locomotive; III—d.c. series motor; IV—d.c. shunt-wound motor; V—single-phase motor; VI—three-phase induction motor.

Fig. 1—Swiss Report—Mechanical Characteristics of Different Motors with the Same Normal Tractive Effort and Normal Speed

Single-phase alternating current with line voltage at 15,000 volts and a frequency of fifteen cycles to twenty-five cycles, the transmission current, whether single-phase or three-phase, to be lowered at transformer stations to this voltage.

The following limits were considered admissible for the propulsion apparatus itself: Direct current, 1500 volts per commutator and 3000 volts per motor; single-phase, 300 volts to 500 volts for purely series motors and 6000 volts for motors without commutators. A frequency of fifteen to forty-five cycles is held admissible for three-phase motors.

COMPARISON OF SYSTEMS ON PURELY TECHNICAL GROUNDS

After reviewing the development of motor cars and locomotives, the report states that any of the three systems would be capable of hauling trains of any desired length. The possibility of speed variation is then considered, and the curves (Figs. 2, 3, 4 and 5) are produced to demonstrate that the single-phase motor is the most efficient in giving the desired range of speeds and tractive efforts without loss in resistance. Further, the single-phase commutator motor is the only one which, because of transformer control, can maintain the service despite extremely heavy drops in voltage. It is superior to the d.c. motor and equal to the three-phase motor in operating at the maximum speed permissible on grades. The possibility of making up time is another advantage of single-phase apparatus, even if it is not the cheapest. It is true that an increase in speed could be obtained with d.c. field-control motors or with three-phase induction motors by using a special resistance, but the single-phase motor is the one that meets this condition to the greatest satisfaction.

Fig. 1 shows the characteristics of different motors based on the same normal tractive effort and normal speed, the output being taken on a one-hour basis. A curve has also been calculated for an ideal motor of constant output, namely, one which would exert a uniform demand on the hydroelectric plant. Table I gives some examples of tractive efforts and the corresponding energy requirements of the motors represented in the curves of Figs. 2 to 5 inclusive. Assuming that the energy required for acceleration is double that for normal running, it is found that the three types of motors are fairly equal in efficiency, but the single-phase motor calls for the least energy output from the hydroelectric station. The commission was satisfied that both d.c. and single-phase multiple-unit trains were practicable and also that the unequal division of load with three-phase equipment, due to unequal wear of wheels, could be corrected by the use of resistances.

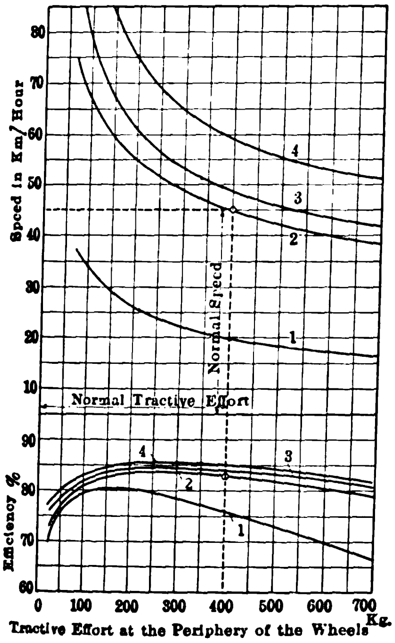
TABLE I—TRACTIVE EFFORT AND POWER TAKEN BY DIFFERENT TYPES OF MOTORS

	—Tractive Effort in Percentage of Normal Effort—					
	50	100	150	200	250	300
Alioth Motor, Type G.T.M. 65, 750 Volts, 65 Hp, One-Hour Basis						
Consumption in kw of the motor alone	2.4	4.7	7.0	9.4	11.7	14.0
Consumption in kw of the motor and resistances for acceleration at constant and normal voltage	10.0	14.8	16.1	18.6	22.0	24.0
Three-phase Locomotive Motor, Brown, Boveri & Company, Type D-16/6 500-320, 16 Cycles, 3000 Volts, 350 Hp, One-Hour Basis						
Consumption in kw	210	420	630	840	1050	1260
Consumption in kv-amp.	320	640	960	1280	1600	1920
Power factor	0.655	0.655	0.655	0.655	0.655	.0655
Single-Phase Commutator Motor, Deri Type, Brown, Boveri & Company, 16 2/3 Cycles, 1000 Volts, 300 Hp, One-Hour Basis						
Consumption in kw	65	92	122	154	190	228
Consumption in kv-amp.	265	395	530	670	810	950
Power factor	0.24	0.24	0.24	0.24	0.24	0.24
Series Commutator Motor, Oerlikon Type 12 WB, 15 Cycles, 500 Volts, 100 Hp, One-Hour Basis						
Consumption in kw	20	60	97.5	140	190	250
Consumption in kv-amp.	138	280	420	560	700	860
Power factor	0.15	0.19	0.23	0.25	0.27	0.29

COMPARISON OF SYSTEMS ON ECONOMIC BASIS

It was considered preferable to compare the motors on the basis of torque rather than horse-power because the latter varies so much with speed. Table II is a comparison of the three systems, indicating that their dead weight is much less than steam equipment. It also shows that they do not differ materially from one another, the slightly higher weight of single-phase equipment being considered an advantage in speed regulation. The report also points out that systems of electric traction should not be compared in single parts but as entities; further, that while the efficiency of the same motor varies greatly according to the condition of service and size, the actual efficiency of motors of the same output and in the same service does not differ materially despite differences in systems of energy supply.

The characteristic curves in Figs. 2 to 5 are based on the assumption that the speed regulation of the different motors is obtained without any resistance losses. Therefore, for d.c. and three-phase operation only a limited number of speed steps would be obtained, and it would be impossible to avoid the use of resistance if better regulation were wanted. Thus, if the total efficiency based on complete runs is considered, the d.c., as well as the three-phase, motor loses whatever superiority it might have if a limited number of fixed speeds were permissible. The commission states that while it is difficult to make an exact comparison of the efficiencies of entire trains, the following values may be admitted: direct current, 70 to 80 per cent; three-phase current, 65 to 70 per cent; single-phase current, 68 to 75 per cent.



1—Connected in series; 2—connected in parallel; 3—connected in parallel with 30 per cent of current in shunt; 4—connected in parallel with 60 per cent of current in shunt.

Fig. 2—Swiss Report—Characteristic Curves of Alioth D.-C. Series Motor, 66.5 Hp, 750 Volts

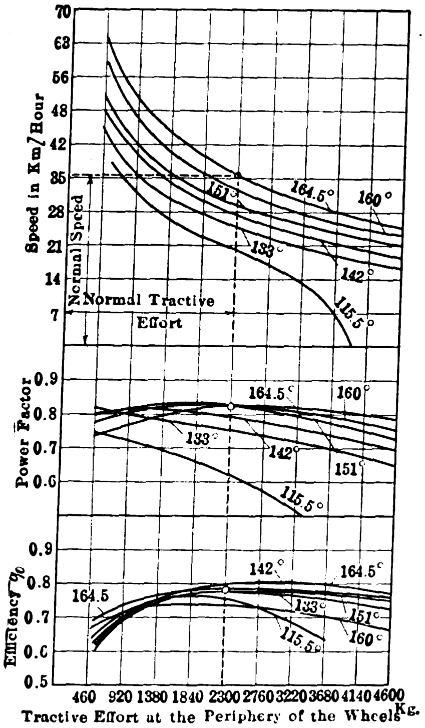


Fig. 3—Swiss Report—Characteristic Curves of Deri Type Brown-Boveri Single-Phase Motor, 300 Hp, 1000 Volts, 16 2/3 Cycles, with Six Brush Positions

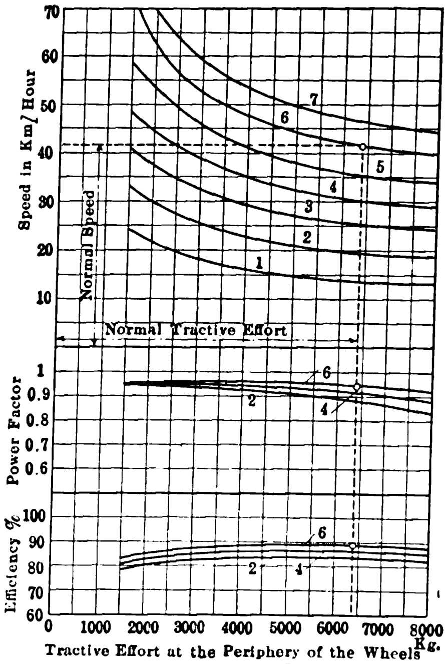


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Fig. 4—Swiss Report—Characteristic Curves of Oerlikon Single-Phase Motor, 1000 Hp, 500 Volts, 15 Cycles with Seven Voltage Steps

The efficiency of the transmission and feeder contact lines is much the same for the three systems. The substations for transforming the current exercise the greatest influence on the total efficiency. For direct current, rotating apparatus with or without storage batteries would be required, and the substation efficiency would vary from 70 to 90 per cent. As to three-phase and single-phase transformer stations, the improvements made in recent years would make the quotations on the efficiency of old equipment misleading. Table III, which compares the efficiency of the three systems, shows that the average percentage of the grand totals does not vary greatly.

The possibility of equalizing the hydroelectric demands is of predominating importance for the electrification of the Swiss railways. From this point of view, the commission finds that the system to choose is the one which will best permit this equalization. According to its calculations, the ratio between minimum and maximum energy requirements is as 1 to 3.5. Excess energy can be stored either in the form of impounded water or electric accumulators. The use of batteries has been assumed to take care of a variation of 1 to 4, and then the energy requirements of each system have been calculated on the basis of minimum and maximum needs. The comparison for the latter case is presented by the bracketed figures in Table IV. Although these figures are only approximations, the superiority of single-phase is held to be clear. Comparisons based on the storage of water instead of electricity show no important difference.

Owing to the heavy cost of accumulators, a study was made to see whether it would not be better to design the station machinery to give the maximum output when needed, avoiding all storage. A station assumed to have a minimum output of 500 kw and a maximum output of 2000 kw, utilizing a fall of 200 m (656 ft.), was taken as an example. The installation of extra-capacity machinery proved to be much cheaper. It was concluded, therefore, that the most economical system would be that which had the least variations in maximum energy requirements. The series motor, of course, is the most desirable because instead of taking more energy on up-grades it simply decreases in speed.

In theory, regeneration would seem to be of great importance in a mountainous country like Switzerland. In reality, regeneration in the form of braking is but a very small part of the total requirements, while regeneration in the form of liberated energy is of importance only on really severe grades which do not obtain generally on the trunk lines. The estimated energy saving of 4 per cent would not be great enough to justify regenerating apparatus on d.c. rolling stock, although its application to the a.c. systems might still be considered.

COMPARISON OF TRANSMISSIONS, EFFECT ON WEAK-CURRENT INSTALLATION AND CHOICE OF FREQUENCY

The reliability of the line is considered even more important than the reliability of the propulsion equipment because disturbances on the former cripple the entire system whereas disturbances on the latter cripple merely the individual train.

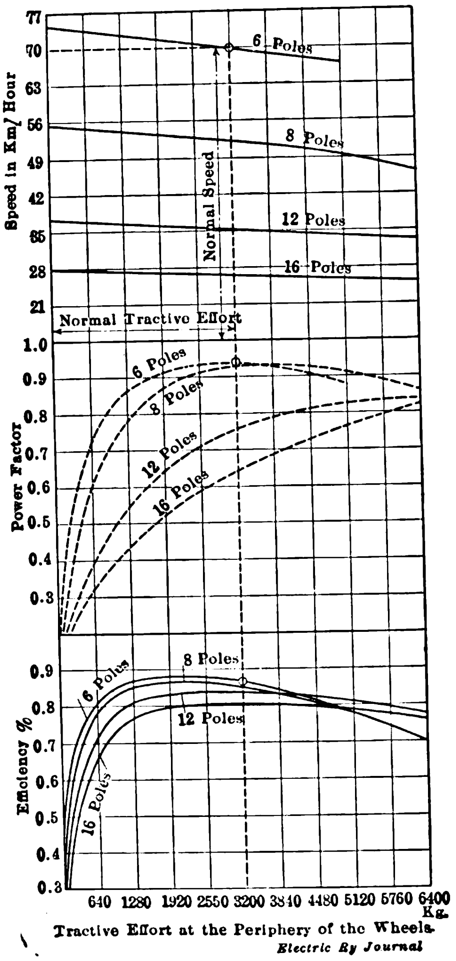

Fig. 5—Swiss Report—Characteristic Curves of Brown-Boveri Three-Phase Induction Motor, 850 Hp, 3000 Volts, 15 Cycles with Four Changes of Poles

The third-rail is substantial, easily accessible, less obstructive than an aerial line and free from wind troubles; but it is difficult to maintain the third-rail covering and impossible to use it when very high voltages are employed because of the danger to employees and passengers. On the other hand, overhead lines have been developed to such a degree of reliability that their construction and maintenance for high-tension work offers no disadvantages. Finally, in comparing aerial lines themselves, the single-phase trolley is certainly preferable to the double trolley of three-phase lines.

The possible influence of propulsion currents on nearby telephone and telegraph circuits received careful attention. Numerous studies were made on the Seebach-Wettingen line by the Federal Department of Telegraphs and by the Telegraph Inspection Department of the Federal Railways in collaboration with the Oerlikon Company. The results of the tests may be summarized as follows:

The elimination of disturbances produced in telephone, telegraph block signal and weak-current circuits generally by traction currents is a little more difficult if single-phase rather than d.c. traction is used, although the trouble may be cured in either case. With any system of traction whatsoever, it is necessary to eliminate stray currents by abolishing all ground return by the use of complete metallic circuits for all paralleling telephone or telegraph lines which cannot be removed out of the sphere of influence of the traction current. Telephone wires should be transposed as often as the local conditions require. For block-signal circuits, which are less sensitive, several outgoing wires may have a common return wire. To prevent static action, the capacity must be divided as equally as possible and the branching of overhead cables should be avoided. In any system of a.c. traction means must be taken to prevent the production of harmonics, but to-day this matter offers less difficulty with single-phase than with three-phase equipment. In conclusion, the commission states that there is no important difference in the influence of each system on weak-current circuits as a whole.

TABLE II—WEIGHT OF MOTOR PER HP OUTPUT AND TORQUE IN METER-KILOGRAMS

	D. C.	Three-Phase	Single-Phase
Electric locomotives for speeds of 40 to 60 km per hour........	50-55 kg/hp 11 mkg	45-60 kg/hp 10-12 mkg	50-75 kg/hp 11-13 mkg
Motor car equipment for speeds of 40 km per hour............	28-30 kg/hp 6-7 mkg	30-35 kg/hp 7-8 mkg	30-35 kg/hp 7-8 mkg

TABLE III—EFFICIENCY IN PERCENTAGE OF THE THREE SYSTEMS ON DAILY AND ANNUAL BASIS

	D. C.	Three-Phase	Single-Phase
Trains..................................	70 to 80	65 to 75	68 to 75
Contact line and rails..................	94 to 98	94 to 98	94 to 98
Transformation in rotating equipment....	70 to 90	94 to 98	94 to 98
Transformation in static equipment:			
Old transformers.......................	70 to 90	(70 to 80)	(80 to 90)
Recent transformers....................	70 to 90	80 to 90	90 to 95
High-tension transmission lines..........	90 to 95	90 to 95	90 to 98
Net efficiency from the generating plant to the wheels of the vehicle.............	42 to 67	44 to 63	53 to 63

The choice of frequency for single-phase operation was based upon the most efficient ratio, namely, 1 to 3, which could be obtained if it was necessary to install frequency changers. From existing forty-cycle and fifty-cycle central stations a frequency of thirteen and one-third cycles to sixteen and two-third cycles, or an average of fifteen cycles, could thus be secured. For three-phase traction forty to fifty cycles is admissible. Of course, fifteen cycles is too low for lighting, but the latter service requires but a trifling percentage of the entire output and can be furnished from a separate circuit.

Considering all technical features, the commission concludes that the single-phase system is the one most advantageous for Swiss conditions.

When the first comparisons were made no definite figures were available on the unit costs of energy at the power stations, but more detailed calculations later showed that the relations between the systems were not changed by more exact generating costs.

In general, it was found more advantageous for all systems not to use a storage battery power station auxiliary. The cost of energy for single-phase operation, as shown in Table VI, is less than for direct-current or three-phase. To remove all doubt, the comparative costs of car equipment were also considered. The commission concludes that the most advantageous system is single-phase, fifteen cycles, with 10,000 to

15,000 volts on the contact wire. Switzerland, it observes, can accept this conclusion all the more confidently as the decision simply confirms that already made by the Prussian, Bavarian, Austrian and Swedish State Railways and as it is also in line with practical demonstrations made on a large scale.

SPECIAL STUDY FOR ELECTRIFICATION OF THE OLD GOTHARD TUNNEL

Although the primary object of electrification is to free the Swiss railroads from the necessity of importing fuel, it is also expected that the change will produce better service than is now possible. The first object will be to increase the speed of trains, especially for local mixed service and for operation on grades. Complete data along these lines were worked out for the present Gothard line. Table VII shows the daily and annual gross ton-km hauled in the years 1904 and 1907 and the estimated electric ton-km. The estimated increase compared with the medium traffic of 1904 is 185 per cent, and compared with the medium traffic of 1907 is 130 per cent; the corresponding increases in maximum traffic would be 255 per cent and 150 per cent. The electrical maxima are very near the ultimate capacity of the Gothard line.

TABLE IV—LOSSES AND ADDITIONAL EXPENSES DUE TO THE USE OF ACCUMULATORS

	SYSTEM OF CURRENT		
	D. C., 3000 Volts, with Accumulators at All Stations	Three-Phase at 5000 Volts, with Accumulators at Central Stations (Without Change in Frequency)	Single-Phase at 5000 Volts, with Accumulators at the Central Stations
Kw-hr. necessary at the high-tension end to place 1 kw-hr. on the contact line	1.54 (1.40)	1.65 (1.55)	1.65 (1.50)
Comparative costs of kw-hr. furnished to contact line in percentage	100 (100)	107 (111)	107 (107)
Proportional cost of transformation in percentage	136 (64)	93 (50)	68 (43)
Cost per kw-hr. furnished, in percentage	236 (164)	200 (161)	175 (150)

Bracketed figures cover maximum requirements.

TABLE V—PROPORTION OF TOTAL ANNUAL EXPENSES FOR EXPLOITATION, MAINTENANCE, INTEREST AND AMORTIZATION OF THE POWER PLANTS WITH AND WITHOUT BATTERIES

	If No Batteries Are Used		If Batteries Are Used
Where long-distance distribution is not necessary the expenses are as	100	to	182
For distribution without transformation:			
To a distance of 50 km, as	100	to	142
To a distance of 100 km, as	100	to	132
To a distance of 150 km, as	100	to	124
For distribution with transformation at the point of use:			
To a distance of 50 km, as	100	to	180
To a distance of 100 km, as	100	to	144
To a distance of 150 km, as	100	to	134

TABLE VI—COMPARISON OF COSTS (IN FRANCS) FOR GIVEN TRAFFIC CONDITIONS WITH SINGLE-PHASE AND THREE-PHASE SERVICE

	A		B	
	Single-Phase, 15 Cycles	Three-Phase, 50 Cycles	Single-Phase, 15 Cycles	Three-Phase, 50 Cycles
Cost of installations:				
Central stations	27,150,000	24,865,000	30,450,000	27,865,000
Distribution system	2,531,000	6,717,000	2,531,000	6,717,000
Rolling stock, plus weak-current installations	28,641,000	32,211,000	28,641,000	32,211,000
Extra rolling stock due to expected growth in traffic	6,416,000	6,416,000	15,765,000	15,765,000
	64,738,000	70,209,000	77,387,000	82,558,000
	Total Annual Expenses			
Indirect expenses comprising installations for the railway itself:				
Interest	1,146,000	1,289,000	1,146,000	1,289,000
Amortization	93,000	111,000	93,000	111,000
Renewal	348,000	375,000	348,000	375,000
	1,587,000	1,775,000	1,587,000	1,775,000
Increased rolling stock for greater traffic: interest, amortization and renewals	329,000	329,000	819,000	819,000
	1,916,000	2,104,000	2,406,000	2,594,000
Direct expenses for electric traction:				
Cost of energy as generated	4,689,000	4,780,000	5,491,000	5,583,000
Cost of energy at the outgoing lines from the central stations	2,172,000	1,989,000	2,436,000	2,229,000
Cost of distribution	316,000	853,000	316,000	853,000
Total	9,093,000	9,726,000	10,649,000	11,259,000

POWER REQUIRED FOR ELECTRIC TRACTION ON GOTHARD LINE

The power requirement calculations are based upon the amount actually necessary at the wheels to meet the proposed timetable plus that required for lighting. The total requirements are based on the assumption that twelve to fifteen trains will be in operation at the same time on a headway of ten minutes for ten trains. Five-minute headways and even one-minute headways for certain short periods were also considered. Table VIII shows the estimated requirements for the different divisions of the railway. These figures cover the power applied at the wheels, and they are made up of the factors of train friction, grade climbing, acceleration and lighting. It was, of course, necessary to add to these figures the losses of the generating plants, substations, transmission lines and contact lines. Table IX shows some energy characteristics of the three classes of traction service, while Table X shows the efficiencies of each part of the electrification. In order to calculate the quantities of water for the generating equipment, the following turbine efficiencies were assumed: 73 per cent for maximum output, 68 per cent

TABLE VII—RECAPITULATION IN THOUSANDS OF TON-KM, GIVING GROSS WEIGHT OF TRAINS HAULED ON THE GOTHARD RAILWAY UNDER PAST STEAM AND ANTICIPATED ELECTRICAL CONDITIONS

	AVERAGE TRAFFIC ANNUALLY			AVERAGE TRAFFIC DAILY	MAXIMUM TRAFFIC DAILY		
Class of Trains	Steam, 1904	Steam, 1907	Electric	Electric	Steam, 1904	Steam, 1907	Electric
Express	213	296	418	1.145	643	1303	2033
Omnibus	122	135	226	0.620	320	558	874
Freight	441	670	793	2.470	1574	2504	3585
Total	776	1101	1437	4.242	2537	4365	6492

TABLE VIII—POWER REQUIREMENT AT THE WHEELS ON THE DIFFERENT SECTIONS OF THE GOTHARD RAILWAY

	Hr	
Section	Average Traffic	Maximum Traffic
Reuss basin	10,530	15,240
Tessin north	10,170	12,370
Tessin south	9,300	13,880
Tessin complete	13,700	20,760
Fifth district	21,820	31,840

TABLE IX—EFFICIENCY AND AVERAGE ENERGY CONSUMPTION OF ROLLING STOCK, GOTHARD LINE

	AVERAGE TRAFFIC				MAXIMUM TRAFFIC			
			Energy, Watt-hr./Ton-km				Energy, Watt-hr./Ton-km	
Type	Efficiency, per Cent	Power Factor	At Wheels	At Contact Wire	Efficiency, per Cent	Power Factor	At Wheels	At Contact Wire
Express locomotives	68	0.48	38	56	70	0.52	38	55
Motor cars	60	0.40	35	57	64	0.45	35	54
Freight locomotives	72	0.90	29	40	73	0.91	27	38
Total	68	0.58	32	47	70	0.62	32	46

TABLE X—EFFICIENCIES FROM TURBINES TO TRACTION WHEELS, GOTHARD LINE

	AVERAGE TRAFFIC		MAXIMUM TRAFFIC	
Parts	Daily Maximum	Daily Average	Daily Maximum	Daily Average
Rolling stock	0.75	0.68	0.78	0.70
Contact lines	0.05	0.98	0.94	0.97
Substation transformers	0.97	0.94	0.97	0.94
Transmission lines	0.93	0.98	0.90	0.96
Generators and station transformers	0.88	0.81	0.89	0.83
Total	0.56	0.50	0.57	0.51

TABLE XI—TOTAL ENERGY REQUIREMENTS, GOTHARD LINE

Section	Maximum Hp	Daily Maximum in Hp-hr.	Annual Work in Hp-hr.
Reuss basin	27,000	250,000	58,000,000
Tessin north	22,000	260,000	59,000,000
Tessin south	25,000	180,000	43,000,000
Tessin complete	37,000	440,000	102,000,000
Fifth district	56,000	690,000	160,000,000

TABLE XII—RATING OF MACHINERY FOR ELECTRIC TRACTION, GOTHARD LINE

	OUTPUT AT TURBINE SHAFTS		
Section	Maximum Output Necessary, Hp	Output of Turbines Installed,* Hp	Station
		20,000	Göschenen
Reuss basin	27,000	30,000	Amsteg
Tessin basin	37,000	37,500	Ritom-Piotta
Fifth district complete	56,000	87,500	

*Exclusive of reserve machinery.

for average daily output and 65 per cent for the average annual output.

LOCATION OF HYDROELECTRIC STATIONS FOR GOTHARD LINE

The most favorable locations for the hydroelectric stations would be at Göschenen, Amsteg and Ritom (Piotta), because they would supply energy for the tunnel from both ends. Table XI shows the total energy requirements for each division, while Table XII shows also the rating of the turbines necessary at each plant.

The Ritom station would require three flumes each of 15,000-hp capacity, seven 7500-hp turbines coupled to 6000-kw, 16,000-volt, single-phase generators and two groups of exciters. The transmission potential would be 45,000 volts. The Göschenen plant would have four turbines coupled to four 5000-kw generators and would be furnished with two groups of exciters. The Amsteg plant would contain five 7500-hp turbo-generator sets and two groups of exciters.

TRANSMISSION AND DISTRIBUTION

Part of the contact line would be supplied with energy directly from 16,000-volt, single-phase generators, and part would be supplied at the same potential from 45,000/16,000-volt transformer substations at Goldau, Giubiasco and Lugano. All stations would be tied together on the 16,000-volt circuit. The distribution line would be a multiple suspension comprising a copper trolley of 100-mm section (about 200,000 circ. mils), a steel catenary and lattice poles on concrete foundations. The poles would have brackets on the single-track sections and bridges on double-track and yard divisions. The feeders would be carried on the same poles as the catenary suspension. The maximum permissible drop in voltage has been fixed at 15 per cent.

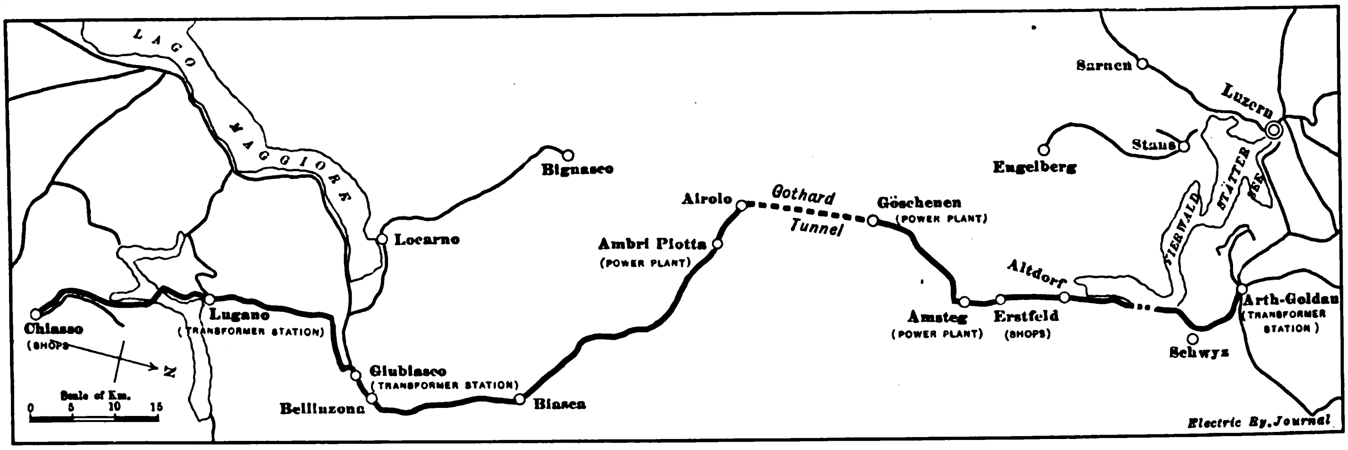

Fig. 6—Swiss Report—Map of the Gothard Line, Showing Section to Be Electrified, Location of Proposed Power Plants, Transformer Substations and Shops; also Connecting Standard-Gage Lines

ROLLING STOCK AND SHOPS—MODIFICATIONS FOR TELEGRAPHS, ETC.

Several classes of locomotives would be selected according to the different kinds of service. The "omnibus" service of local trains would be handled with motor cars, of light and heavy types according to service conditions. Steam locomotives would be retained for switching. The increase in the number of cars due to anticipated increase in traffic has been charged against the cost of electrification. Means have also been considered for the heating and lighting of such cars as cannot be supplied with electricity.

The changes necessary to adapt the shops for electric rolling stock have also been considered. Provision has been made to maintain the railway telegraph lines at 20 m (65.6 ft.) from the right-of-way, while the federal telegraphs would be located at a somewhat greater distance but within sight of the railway.

TOTAL COSTS

The following figures cover the electrification costs of the Gothard line on the basis of future assumed traffic as previously noted:

	Francs	
POWER STATIONS, HYDRAULIC PART		
Ritom-Piotta	6,800,000	
Göschenen	3,500,000	
Amsteg	6,950,000	17,250,000
ELECTRICAL AND MECHANICAL PART		
Ritom-Piotta	1,925,000	
Göschenen	920,000	
Amsteg	1,275,000	4,120,000
Total cost		1,370,000
DISTRIBUTION		
Lines:		
Material, engineering, interest, contingencies, etc		5,994,000
Substations:		
Transformer stations. 45,000/16,000 volts, at Goldau, Giubiasco and Lugano; special installations for 16,000-volt current at Amsteg, Göschenen and Piotta, engineering, interest and contingencies		1,636,000
Total cost for distribution		7,630,000
CONTACT AND FEEDER LINES		
Contact lines, feeder lines, bonding, special construction, signals, engineering, interest and contingencies		9,770,000
ROLLING STOCK		
Motor vehicles:		
15 locomotives for through trains	3,450,000	
38 locomotives for freight trains	6,840,000	
14 heavy motor cars	2,170,000	
7 light motor cars	672,000	13,132,000
Reserve material		600,000
Heating equipment, etc.:		
Heaters on the through locomotives, ten cars with heaters, heater equipment for passenger cars (on 854 axles*), electric heaters, modifications in present cars		1,007,000
Total cost of rolling stock for electrification		14,739,000
Additional rolling stock for expected increase in traffic:		
New passenger cars (on 256 axles*)	3,328,000	
New freight cars (on 753 axles*)	1,883,000	5,211,000
Total cost of rolling stock		19,950,000
MODIFICATIONS AT STATIONS AND REPAIR SHOPS		
Modifications at depots with new installations at Erstfeld and Chiasso, tools for electric line maintenance and increase in size of shops, etc	1,950,000	
Total cost of stations and shops		1,950,000
CHANGE IN TELEGRAPH CIRCUITS		
Railway telegraph lines, including contingencies	2,500,000	
Federal telegraph lines, including contingencies	1,000,000	
Total		3,500,000

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*There are usually four axles per car.

GENERAL CONTINGENCIES	
Miscellaneous contingent expenses (8 per cent of total)	3,330,000
RECAPITULATION OF EXPENSES	
Power station	21,370,000
Distribution	7,630,000
Total	29,000,000
Traction and feeder lines	9,770,000
Rolling stock	19,950,000
Stations and repair shops	1,950,000
Telegraphs, etc.	3,500,000
General contingencies	3,330,000
Total cost of new installations	67,500,000
Total cost, if no charge is made for extra rolling stock due to anticipated increase in traffic, say, 5,500,000 francs, less	62,000,000

WASHINGTON SECTION OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

The fourth company section of the American Electric Railway Association, the Washington Railway & Electric Company section, was organized at a meeting held on Feb. 25 at the offices of the Potomac Electric Power Company in Washington, D. C. E. F. Hunter, chief clerk of the claims department of the railway company, acted as secretary of the organization meeting. The following officers were elected for a period of one year except as stated: President, George G. C. Whitney, chief clerk; vice-president, Charles S. Kimball, engineer of way; director for two years, J. P. Moffett, superintendent of transportation; director for one year, William L. Clark, assistant secretary. About eighty-five persons were elected to membership.

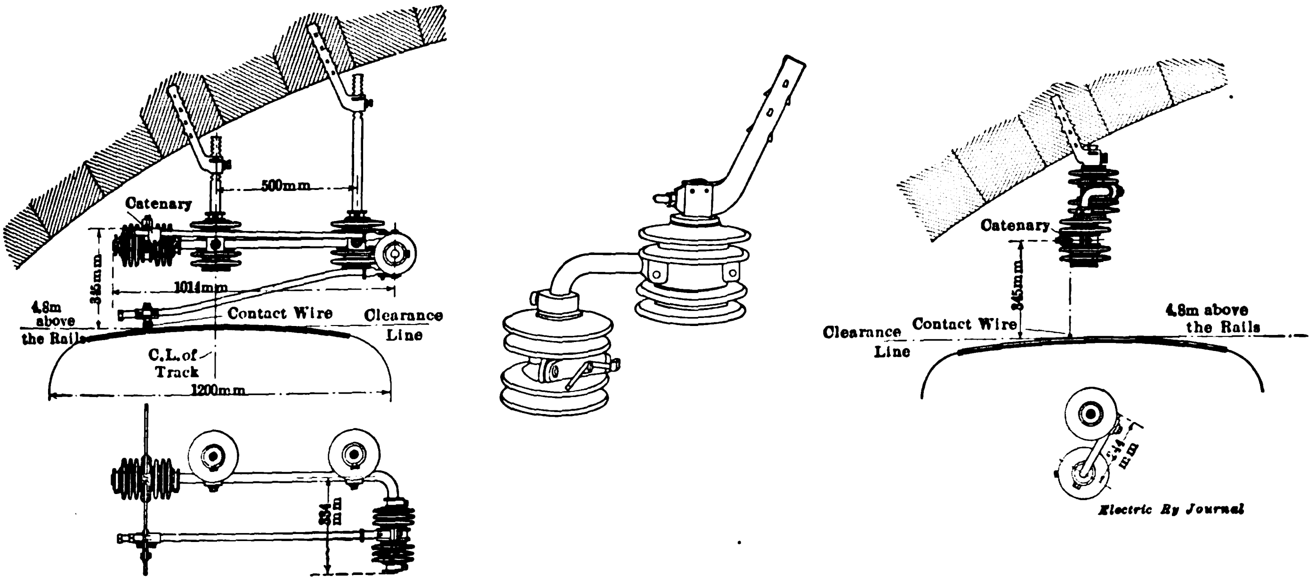
Addresses were delivered at the meeting by Henry L. West, former District commissioner; Clarence P. King, president of the railway company; William F. Ham, vice-president of the railway company; George Truesdell, former District commissioner, and W. F. Dement, assistant superintendent of transportation of the railway company. In his address Mr. West declared that, notwithstanding his services as District commissioner, he did not consider that he had learned much about railway operation and was of the opinion that no District commissioner can acquire a valuable knowledge of that subject during the term of office of commissioners. He said that a study of railway problems, therefore, had confirmed him in the belief that the people of the District have little to hope for in the way of improvement in the street railway facilities under municipal ownership.

CORRECTING DISTURBANCES ON THE LOETSCHBERG RAILWAY

In one of several articles on the electrical operation of the Lötschberg Railway written for the *Schweizerische Bauzeitung* by L. Thormann, chief engineer electric traction of this railway, some interesting data are presented on features of line construction and operation. On open sections the double catenary standard common on other European single-phase lines is used, but the construction in the tunnel is special. The tunnel catenary is of duplex wire, comprising a steel core of 6 mm (No. 3 B & S) diameter and plating of 1.25 mm (No. 11 B & S) copper. The height of the trolley wire above the head of the rails is 6 m (19.7 ft.) to 7 m (23 ft.) at stations and 4.8 m (15.7 ft.) in the tunnels. The method of carrying the double insulators and trolley in the tunnel is shown in the accompanying illustrations. The supporting points are 22 m (72.2 ft.) to 28 m. (91.8 ft.).

TELEPHONE AND TELEGRAPH CONDITIONS

Between Kandergrund and Ausserberg the telephone and telegraph wires were placed underground in paper-covered, air-insulated cables. Elsewhere these lines were placed on wooden poles, the wires being transposed every fifth pole to minimize induction from the neighboring high-tension lines. Three telegraph lines, three telephone lines and a signal line are installed along the railway right-of-way. The telephones in the tunnel are operated from a central battery and their receivers are equipped with signal sirens. Louder sirens, which give warning of the approach of trains, are installed at the same points. The latter sirens are operated from small transformers of high periodicity.



Lötschberg Railway—Details of Insulator, Showing Method of Carrying the Catenary from the Tunnel Roof

All telephone, telegraph and signal circuits have up to the present operated satisfactorily. Induction from the railway current is not noticeable because all lines are amply insulated; nor has single-phase railway operation impaired the clearness of conversation over the telephone in any way, despite the fact that the long cable used has a large number of parallel connections and no Pupin coils. Fuses are used where the cables pass to the aerial lines. These fuses have blown a number of times, but this has not proved embarrassing because they can be quickly replaced by nearby station attendants.

THE LOCOMOTIVES

On the trial trips the locomotives met all the conditions for which they were designed. Thus far, however, they have not been operated to capacity in actual service, partly for the sake of caution and partly because a few mechanical and electrical details of the apparatus were found incapable of carrying the maximum loads. As soon as these parts are reinforced the locomotives can be operated to full capacity.

The locomotive transformers gave trouble from static discharges both between the individual turns and between the apparatus and the ground. As these very places had been insulated with particular care, the fault is held to be due to extraordinarily high voltages generated in some unknown manner. The latter may be caused by lightning disturbances since the trouble decreased on the approach of winter. It is possible, however, that the trouble is due to high-tension discharges at the line insulators. To prevent a repetition of these troubles, the insulation at the entrance turns of the load transformers has been increased appreciably. It is considered remarkable that the twelve cases of disturbance did not occur during lightning storms or high-tension line disturbances, but, nevertheless, it is believed that there may be some connection between these phenomena.

THE OVERHEAD LINE

The overhead construction has behaved very well. A number of disturbances did occur at first, but they were to be expected in the early days of operation. Both the catenary suspension and the tension take-up devices have proved entirely satisfactory. The drop in voltage confirms the calculations of theory. This circumstance is important inasmuch as the most favorably situated power station is 31 miles from the end of the line and the long tunnel prohibited super-voltage transmission lines.

The insulators in the tunnel caused the greatest difficulties. On the open section, high-voltage discharges did not take place at all, whereas in the tunnel, "spill-over" discharges, commonly across both insulators, were quite numerous. Several discharges from the cover of the insulator to the pin were also observed. At first these troubles were ascribed to defects in the insulators. This might have been true in some instances, but it was necessary to seek other causes when the short-circuits continued. It was then found that the localities most subject to this trouble were those where the moisture on the tunnel roof was sufficient to form drops of water which fell on the insulators. In time this water built up a conducting path for discharges. It was also found that some damp insulators were scarred by particles of stone which had been blown against them with great velocity through the action of trains passing at high speed. To correct this trouble, the roof near the insulators has been waterproofed with lead wool and cement, and copper shields have been placed over the insulators. These changes were made without interfering with operation. The line inspectors now clear the insulators of dust at regular intervals, for even the precautions mentioned do not prevent the atmospheric conditions in the tunnel from vaporizing the insulators to some degree.

In view of the great length (5261 ft.) of the tunnel and the fact that insulators are installed at 3500 places, it is not remarkable that a very small percentage of them should have caused trouble. As the remedies have succeeded, Mr. Thormann believes that even very long tunnel sections with unfavorable moisture conditions may be operated safely at 15,000 volts, which is the potential recommended by the Swiss Electrification Commission for single-phase overhead lines.

PAST-PRESIDENTS' NIGHT AT THE NEW ENGLAND STREET RAILWAY CLUB

At the regular monthly meeting of the New England Street Railway Club, held at the American House, Boston, on Feb. 26, nine of the twelve past-presidents of the organization were the speakers of the evening, the program consisting of five-minute addresses on various phases of the general topic "Efficiency." Past-presidents H. E. Farrington, 1903, Paul Winsor, 1907, and Franklin Woodman, 1911, were unable to be present. President Elton S. Wilde occupied the chair, and at the close of the usual dinner twelve new members were admitted. About 150 members and guests attended the meeting, and at the close an informal reception was held to the former presiding officers of the organization.

H. E. Bradford, Providence, R. I., the first president of the club, described its organization in June, 1900, at Young's Hotel, Boston, and outlined the history of the Street Railway Superintendents' Association of Massachusetts, which preceded the New England organization by eight years, but which did not survive its first winter because of the restricted membership, the limited territory covered and the demands of operating problems. The New England Street Railway Club held its first annual meeting in Boston in 1901. Touching humorously upon the efficiency with which the club was organized, Mr. Bradford said that the ideal committee consists of one "hustler," one man to act as a balance wheel and one peacemaker, and closed by congratulating the organization upon its constant growth in numbers and influence.

Col. Edward C. Spring, Lehigh Valley Traction Company, Allentown, Pa., who occupied the presidency in 1902, emphasized the popular demand for higher speeds, which, he said, was of more importance than the frequency of the service under present conditions. The prevailing idea that an interurban trolley line must pass through the center of every important town which it serves is erroneous. On the Lehigh Valley line twenty-two minutes have been cut from the running time between Philadelphia and Allentown by a study of the sources of delay. Eight miles of track have been rebuilt, twenty-three stops cut out in 56 miles, and the total trackage has been reduced 1½ miles. The result is a notable increase in patronage, and the scheme of alternating limited and local cars has worked admirably. An increased charge of 10 cents for a trip on a limited car seems to be no deterrent to patronage. The interurban freight service is also successfully competing with the parcel post and old-line express companies. The ability of the electric railway to make connections with fast trains going outward from Philadelphia has won the business in competition with other transportation agencies. Effective co-operative work is also being done with the farmers. A municipal market has lately been established in Philadelphia, and farmers' organizations with selling agents in town following shipments by electric express are helping agricultural conditions materially. Closing, Colonel Spring urged the importance of studying safety in connection with high-speed operation, commending the use of signals and first-class dispatching facilities. He also paid a tribute to the unremitting labors of the late John J. Lane, whose work as secretary of the club from its early days to the termination of his life was a fundamental factor in the success of the organization.

J. Henry Neal, 1904, Boston Elevated Railway, contrasted the growth of the club in recent years with its early membership and voiced the benefits of its meetings in a semi-humorous vein.

E. E. Potter, Stone & Webster Management Association, Boston, president in 1905, discussed "Efficiency in the Development of the Individual," pointing out the importance of encouraging *esprit de corps* among employees and the possibility of educating the public by first training the employee. The failure to study the needs of the rank and file is responsible for much adverse legislation, dissatisfaction among employees, labor union difficulties and other troubles. The days of the small company are passing in many states, yet care must be taken not to lose in team play what is gained in departmental efficiency. Much good may be accomplished by wisely administered co-operative stores, safety and ,welfare committees, medical care, social intercourse, etc. Organized committee work in departmental administration is helpful in improving the temper of the employees, and it is better to make a practical start along welfare lines than to be forced to take such action as a result of outside pressure.

Henry C. Page, Worcester Consolidated Street Railway, who occupied the chair in 1906, spoke of the benefits of efficiency through consolidation. Taking the Worcester system as an example, the speaker said that the present lines serving the district were formerly split into twelve different roads, each with its own organization. One line 8 miles long had a superintendent who was paid $2,000 per year, a treasurer and other officials, but it was added to the Worcester system with scarcely a trace of additional work for the executives of the latter. The line had no shop facilities except commercial repair establishments in Worcester, which put in high bills for rolling stock maintenance. A number of these companies would have gone into bankruptcy if they had not been consolidated into the Worcester system. The saving in official salaries alone was $24,000 a year. Mr. Page contended that the public should be told of these advantages and brought to realize the improved service, increased transfer privileges, etc., that have resulted from the taking over of many small struggling roads and their effective centralization.

Matthew C. Brush, 1908, Boston Elevated Railway, spoke briefly upon "Efficiency in Transportation." He said that the whole secret of success in railroading is proper relations between the men composing the company organization, whatever their rank. The duty of the manager, superintendent and all executive officers is to help the men under them make a success of their work. By helping the man on the street and by giving the square deal everywhere the extra 10 per cent of effort which no money can buy can be obtained from the employee. "I would rather have a relatively inefficient man in my office who makes mistakes while doing his best," said Mr. Brush, "than one who does only that for which he is paid." In closing, he spoke feelingly of friendships formed through the club.

W. D. Wright, 1909, Providence, R. I., commented upon the importance of giving the human element due consideration and pointed out the influence of contentment on the part of employees in securing the best results in the shop and elsewhere. The odds are at present heavy against the street railway, but a better day is coming.

Charles H. Hile, Boston Elevated Railway, president in 1910, spoke upon "Efficiency in Relation to Maintenance of Way." Emphasizing the heavier burdens placed upon the road department as a result of the increasing size of cars, he urged giving greater attention to foundations and drainage, pointing out that efficiency in track maintenance depends mainly on the thoroughness of the original construction. The qualifications of the men responsible for the work are of fundamental importance. Great advances have been made in reducing troubles in rails and joints, particularly in connection with electric welding and cast-welding processes. Closing, the speaker sketched the effective patching up of special work and broken track now possible through welding, pointing out the tendency toward reduced maintenance cost accompanying such methods.

Thomas Lees, Bay State Street Railway, Lowell, Mass., who presided in 1912, was the last speaker, his subject being "Efficiency in Snow Fighting." Mr. Lees portrayed the sterling qualities necessary in the man behind the plow controller in order to keep ahead of falling snow. Preparedness is the vital point, and the importance of early inspection and renovation of equipment, the necessity of experience among crews and the advantages of full supplies of sand, salt and tools and of perseverance in the face of storms, were duly set forth.

During the meeting it was announced that the annual banquet of the club will be held at the Hotel Somerset, Boston, on the evening of March 26.

CHICAGO ELEVATED RAILWAY TRAFFIC CONDITIONS

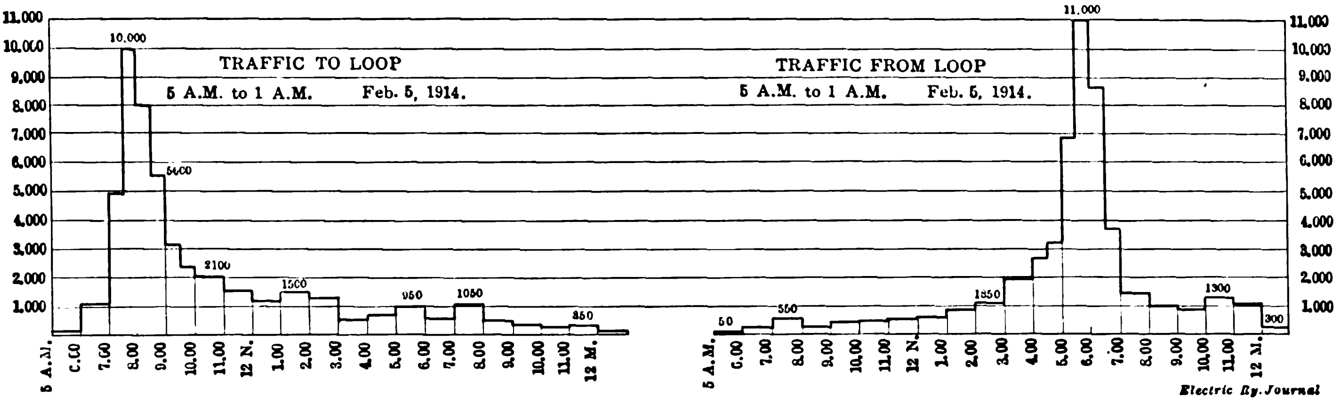
At the noon luncheon hour of the Engineers' Club of Chicago Garret T. Seeley, assistant general manager of the Chicago Elevated Railways, recently gave an illustrated talk on traffic conditions on the elevated system. In opening he described the character of traffic on the elevated railways of Chicago, which, he said, had a worse load factor than any other rapid transit line in this country.

The Chicago World's Fair was the real cause of the building of the first elevated railway in Chicago. There was sufficient traffic at the time of the fair to make operation profitable, but in the period which followed there was such a marked decrease in the passenger business that the South Side Elevated Railroad passed into the hands of a receiver. Following this date, however, the traffic centers began to move out, and the districts contiguous to the various branches of the elevated railway system became more densely populated. Now the elevated roads carried practically all the long-haul traffic, or about 45 per cent of all the passengers brought into the downtown "Loop" district. They had little of the short-haul business, however, so that at present they received only about 25 per cent of the total number of street railway fares paid in the city of Chicago.

The miles of elevated track in Chicago were about the same as those of the Manhattan Elevated Railway in New York, but the Manhattan Railway served only about one-third the area served by the elevated railways of Chicago; yet it carried approximately twice the number of passengers per year. Mr. Seeley explained this by stating that, in addition to the fact that the area served in New York City was much more densely populated than that served by the elevated railways of Chicago, there is a much larger two-way business which tended greatly to improve the load-factor.

To illustrate Chicago's bad traffic conditions, Mr. Seeley showed several diagrams indicating the fares paid by hours at all stations on the Chicago system. The Metropolitan Elevated diagram is shown in one of the accompanying illustrations and is typical of the conditions on the other three lines. To meet this great increase in traffic occurring during the peak-load hours was a very difficult operating problem, especially as regards the assignment of runs. It meant an increase during a six-minute interval from the two-car train necessary to handle the average day load to two five-car trains during the rush period. As a result, on a typical day, the number of passengers entering the cars of the Metropolitan Elevated Railroad between 4:30 and 4:35 p. m. was 350. This number increased to 2700 during the five-minute interval between 5:30 and

5:35 in the evening rush, then to more than 3000 passengers between 5:35 and 5:40. This was the peak. The load dropped off even more abruptly and was at the normal day-load at 6:30 p. m.

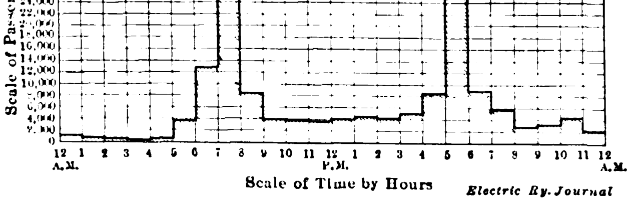


Northwestern Elevated Railroad—Count of Passengers Carried to and from Loop Feb. 5, 1914

To bring out the disadvantage under which the Chicago elevated roads are operating when compared with other similarly situated rapid transit lines, Mr. Seeley presented a comparative study of the five most important rapid transit lines in this country. In this comparison the number of cars owned, the passengers carried per year and the passengers carried per car per year were shown. This comparative table is as follows:

	Cars Owned	Passengers per Year	Passengers per Car per Year
Interborough subway	1,144	327,471,000	286,250
Manhattan elevated	1,781	306,845,000	172,280
Brooklyn elevated roads........	945	162,514,055	171,900
Philadelphia elevated	165	34,941,755	211,770
Chicago elevated roads	1,420	164,164,000	115,530

He stated further that probably the Brooklyn elevated lines were more nearly comparable than any other to the Chicago Elevated Railways from a traffic standpoint. In the tabulation it will be noted that approximately the same number of passengers were carried per year by the Brooklyn and by the Chicago roads, but that the Brooklyn lines required approximately 35 per cent fewer cars. This was accounted for by reason of the shortness of the Brooklyn lines. Consequently it was possible to obtain a larger number of trips per car operated, and at the same time there was a better two-way business and a better load-factor. In Brooklyn the average line is approximately 7 miles in length, while in Chicago it is 9 miles in length. Similar tables of the earnings per mile of track showed the effect of the long haul per passenger average in Chicago.



Metropolitan Elevated Railways—Fares Paid by Hours at All Stations on Typical Day

In closing Mr. Seeley stated that he thought the figures of the Chicago elevated roads showing the passengers per car per year, as well as the earnings per mile of track, indicated what might be expected if a comprehensive subway system was constructed. For the subway to increase the earnings it must go beyond the present terminals of the elevated lines and operate surface line feeders, which in the end would only tend to increase the cost of operation.

In the discussion which followed, Mr. Seeley stated that the present tendency was toward a longer and wider car for rapid transit lines. He also stated that he thought there was a possibility of increasing short-haul business on the elevated lines of Chicago by building cross-connecting lines between the existing elevated lines in the outlying district. As an evidence of this, since through-routing and universal transfers have been effected on the elevated lines, a transfer point has been established between the lines of the Metropolitan Elevated and the Chicago & Oak Park Railroads. The establishment of this transfer point, which in effect was somewhat like adding a cross-town line, had tended greatly to increase short-haul business on both lines.

EXECUTIVE COMMITTEE OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

In the report of the annual meeting of the Central Electric Railway Association received by telegraph and published in the ELECTRIC RAILWAY JOURNAL of last week the names of the new officers of the association were announced. At the same meeting the following were elected members of the executive committee for the ensuing year:

H. A. Nicholl, general manager Union Traction Company of Indiana.

W. S. Whitney, general passenger and freight agent Ohio Electric Railway.

C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway.

E. B. Peck, vice-president Terre Haute, Indianapolis & Eastern Traction Company.

F. W. Coen, general manager Lake Shore Electric Railway.

L. T. Hixson, president Central Electric Railway Accountants' Association.

John F. Keys, general passenger agent Detroit, Monroe & Toledo Shore Line Railway.

F. D. Carpenter, general manager Western Ohio Railroad.

S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company.

R. A. Crume, general manager Dayton & Troy Electric Railway.

S. D. Hutchins, representative Westinghouse Electric & Manufacturing Company, Columbus, Ohio.

W. H. Bloss, representative Ohio Brass Company, Indianapolis, Ind.

Hearing on Interstate Regulation

A Strong Protest Was Made by Interurban Railway Managers Before the Sub-Committee of the House on Interstate and Foreign Commerce Against the Proposed Increase of the Jurisdiction of the Interstate Commerce Commission

On page 487 of the issue for Feb. 28 we published a letter issued by the committee on federal relations of the American Electric Railway Association in connection with the steel car bill and other bills introduced in Washington. The letters refers to a hearing on these bills before a sub-committee of the House committee on interstate and foreign commerce on Jan. 23, 1914. An abstract of this hearing is presented below.

The representatives of the sub-committee present included R. B. Stevens of New Hampshire, chairman; W. A. Cullop of Indiana, J. H. Goeke of Ohio, C. A. Talcott of New York, J. J. Esch of Minnesota, and J. R. Knowland of California.

STATEMENT OF MR. BRADY

Arthur W. Brady, Anderson, Ind., was the first speaker among the electric railway men present. He said that those in attendance represented not only the railways with which they were connected but also the American Electric Railway Association. He regretted that he could not give the committee accurate statistics as to the number of electric railway companies or the mileage of those roads which would come within the operation of any federal bill as interstate carriers, because, while these companies had been required for six or seven years by the interstate commerce act to report to the commission, no report had been published by the commission, so far as he was aware, which gave any definite information in regard to the number or mileage of the interstate electric carriers. He represented urban as well as interurban roads, although he understood that in the Council Bluffs & Omaha case cited by the Supreme Court the jurisdiction of the commission under the existing law was held not to apply to urban electric railways even if engaged in interstate commerce. In spite of the absence of statistics, he believed that it was perfectly fair to assume that not more than 1 per cent of the business done by the interurban electric railways coming within the jurisdiction of the commission was business of an interstate character. If the urban lines were included, the amount of interstate business done by them was much less than 1 per cent. Moreover, this interstate business was not growing any more rapidly than the intrastate business of the companies. Thus his own line had shown no proportionate increase in interstate business during five years.

Mr. Esch, of the committee, said that a bill had been introduced in the House, No. 8367, to bring city railways engaged in interstate commerce under the commission and that this bill had received the approval of the commission. It had been introduced by the representative from Council Bluffs.

In continuing, Mr. Brady said that, according to the latest information, between 325 and 330 electric railway companies reported to the Interstate Commerce Commission, and most of them were small. He believed that one-fourth of the total number, representing about 17,000 miles of track, had a trackage of 50 miles or more. and of this number thirty-seven had a trackage of 100 miles or more. The remaining three-fourths of the companies had less than 50 miles. The business done by them was both passenger and freight, and all was of a local character. The speed was moderate, and as a rule single cars were run. The motorman was in front, where he had a good view of the track ahead, and the speaker believed that the hazards of interurban electric railway operation were not equal to the hazards of steam operation, and that in the accidents which had occurred the use of steel cars would not have reduced the injuries. On his own line the average speed between Muncie and Indianapolis, 57 miles, for limited cars was 26 m.p.h. and for local cars 20 m.p.h. Theoretically it was possible to travel long distances by electric car, but practically there was very little long-distance business. It was not enough to justify the running of through car trains or to attempt to make unusual efforts to get the business. In regard to block signals, a number of the electric railway companies in Indiana had installed block signals. Two signal manufacturing companies only supplied that type of signal in which the track circuits were used. This system cost between $2,500 and $3,000 per mile. A third signal company had equipped certain lines with a cab signal system. The manual control system used on certain steam lines was not practicable on the electric lines because on the steam lines the meeting points were usually at stations where there were agents to control these blocks. The electric railway companies did not regard the signal question as a solved problem.

Continuing, Mr. Brady said that practically all of the interurban lines now were regulated with great detail by state commissions. The companies had no objection to the present jurisdiction of the Interstate Commerce Commission, which applied to rates, rebates, discriminations, reports of accidents and financial reports, but as the present state commissions had full power to require specific kinds of equipment, such as steel cars and block signals, regulation on these points by the Interstate Commerce Commission was unnecessary and undesirable. The state commissions were very thorough in their work and in their inspections and could judge local situations better than the interstate commission. Again, it would be very expensive for the electric railway companies to be obliged to go to Washington every time they wished to discuss matters with the authorities, whereas they could with much less difficulty attend hearings before state commissions. In reply to a question, Mr. Brady said that the operation of the commissions in Indiana and Ohio had not embarrassed the companies in the efficient operation or development of their roads, but he could not say that the commission's oversight of the securities had added financial strength to them. The question of market value of securities depended upon the profits of operation, and investors would not accept a ruling of the commission upon that matter.

Continuing the discussion of steel cars, Mr. Brady said that his company had recently installed ten steel interurban cars. They were purchased from the Cincinnati Car Company and weighed much more than the present wooden cars, thus adding to the cost of operation. These cars cost his company between $15,000 and $16,000 each, and the speaker understood that this was less than their cost of manufacture. The life of the steel car and its cost of maintenance were still problematical. The wooden car to which he referred was one with a steel underframe, and he believed that it would be as safe, if not more safe, for passengers. If a law was passed requiring interurban companies to install steel cars within four years, as proposed, practically all of the interurban electric railway companies would go into the hands of receivers.

STATEMENT OF MR. SCHOEPF

W. Kesley Schoepf, the next speaker, said that he was president of the Cincinnati Traction Company, of the Ohio Electric Railway Company and of the Cincinnati Car Company. Therefore he appeared in the dual capacity of an electric railway operator and a car builder. The Ohio Electric Railway now had 170 cars, which represented an expenditure of about $10,000 per car. It would cost the company $2,000,000 additional to substitute steel equipment. The company had paid no dividends since it was organized. In 1908 there was a deficit after payment of operating expenses, taxes and fixed charges of $173,718; in 1909 there was a surplus of $2,534; in 1910, a surplus of $2,808; in 1911, a surplus of $41,856; in 1912, a surplus of $13,071, and in 1913, with December estimated, a surplus of about $50,000. The property was owned by a syndicate of which there were ninety-two members who had invested $7,379,905, which had now been in the property, on an average, more than three years. The syndicate owned $4,200,000 of the company's first mortgage bonds, taken at 85, this amount being included in the total cost mentioned above. Continuing, Mr. Schoepf said: "While every possible effort has been made to dispose of the $4,200,000 of first mortgage bonds, and although they were legally issued and the interest on them has been earned, we have been unable to find a purchaser. It finally became necessary for the syndicate, with the help of individual indorsers, to use them as collateral for loans to raise money to make extensions and complete the property, which, as above stated, has cost the syndicate $7,379,905, of which $3,570,000 represents the cost of the bonds at 85. We have received interest on the $4,200,000 of bonds, but we have not had one cent on the other money invested, and it is needless to say that, while the statement shows a small surplus earning, this has all gone back into the property."

In referring to Mr. Brady's remarks on the cost of manufacturing the ten cars built by the Cincinnati Car Company for the Union Traction Company of Indiana, he said that while they were sold for a little more than $15,000 per car, they represented a total loss to the car company above the price received for them of $7,800. This may have been partly due to the fact that they were new models, but he would not take a contract to build the same cars to-day for less than $17,000 each. His company had recently taken an order for the Northwestern Elevated Railroad of Chicago for 128 all-steel cars. These cars were some 16 ft. shorter than those of the Union Traction Company and had smaller motors and lighter trucks, and the contract price was about $12,500. As a car builder, be believed that the wooden car with the steel underframe, such as had been described, was as safe in the case of collision as the all-steel car, if not safer. He assumed that such cars would be equipped with anti-climbers to prevent telescoping. He agreed with Mr. Brady as to the undesirability of the interurban railways being regulated by the Interstate Commerce Commission. He added that he was satisfied that it had cost every company $1,000 to be represented at the present hearing.

In regard to the financial conditions of the other properties which he represented, he said that the Ohio Traction Company, which is a fairly prosperous corporation, had obtained permission about a year ago from the Ohio state commission to issue $750,000 of preferred stock at 85, but the company had been unable to sell this stock. It had also been difficult to sell any securities of the Cincinnati Street Railway Company, although there was no water in its capitalization. He thought that investors feared legislation at Washington similar to that now being proposed and also burdensome state legislation.

The difference of treatment by the state authorities of public utilities and of other corporations, such as manufacturing corporations, was marked. As an example, he cited the Cincinnati Traction Company, which in 1913 earned only $462,006.67 applicable to dividends, but in the same year paid taxes of $691,433.99. On the other hand, the Cincinnati Car Company in 1912 had net earnings applicable to dividends of $210,247.45 and paid only $5,674.93 in taxes. He could not give the 1913 figures of the car company, as the books had not yet been closed. Referring to the Ohio Electric Railway, he said that the company had been damaged by the flood approximately $400,000 and that personally he had never received any salary for his services as president.

STATEMENT OF MR. PERRY

S. S. Perry, assistant to the vice-president New York, New Haven & Hartford Railroad, described the conditions on the Connecticut and Rhode Island Companies' lines. He said that both of these lines operated largely on public highways and ran at very moderate speed. They did practically no through business. The questions before them were purely local and could properly be settled by the public service commissions of the different states.

STATEMENT OF MR. WEADOCK

Bernard F. Weadock spoke for the Detroit United Railway, whose only interstate line was between Detroit and Toledo. The company owns about 800 miles in Michigan and 2 miles in Ohio. The business was almost entirely local, and every one of the 163 municipalities through which the lines ran considered that it had as much authority over the lines within its limits as the State, and was not in the least bashful about exercising this authority. The Michigan Railroad Commission could require the company to install block signals, dispatching systems and determine the kind of equipment to be used. He understood, however, that while it had this regulative authority it did not have the constructive authority to increase rates. Last year the dispatcher's office issued 255,355 orders, but only six were misconstrued and those only in a minor way. No casualties resulted. The number of passengers carried was 323,917,637. He believed that the wooden car with steel underframe was as safe as any steel cars could possibly be.

STATEMENT OF MR. FISCHER

L. E. Fischer, St. Louis, said that he was in attendance at the meeting representing the Illinois Traction Company and the Chicago, Ottawa & Peoria Railway. To illustrate the extent to which the Interstate Commerce Commission considered it had jurisdiction over electric railways, he cited the system of the Choctaw Railway & Lighting Company, 14 miles in length, with five cars, and also doing a lighting business. As this little road has a freight contract with an interstate steam railroad, the Interstate Commerce Commission would be able, if the act passed, to compel it to install steel cars. It could also regulate the issue of its securities even to develop its local lighting business, although the Choctaw company was purely a local enterprise in Oklahoma.

The Illinois Traction Company had installed block signals at all danger points on about 100 miles of main line. These were installed on account of a wreck which occurred in 1910 in which approximately thirty-six passengers were killed by a head-on collision between two passenger cars. The speaker believed that these passengers would have been killed if the equipment had been steel cars, because of the great impact. At that time the anti-climber had not been developed. He did not think that these companies should come under the Interstate Commerce Commission, because it would then regulate 535 miles of operation merely because 3 miles of one 160-mile division was without the State of Illinois. It was almost as impossible a situation as that of the Choctaw railway already mentioned.

STATEMENT OF MR. HENRY

Charles L. Henry, president and general manager Indianapolis & Cincinnati Traction Company, also opposed the extension of the jurisdiction of the Interstate Commerce Commission over the interurban lines. All of his lines were within the State of Indiana, but through interline billing of freight and express about 1 per cent of the business of the company was interstate business. The road had been in operation for ten years. During that time only one passenger had been killed. The state commission had full power to require the company to make such improvements as were necessary. Mr. Henry also agreed with the other speakers that a single electric car could be stopped much more quickly than a long steam train.

It was financially impracticable, he said, for his company to scrap its wooden cars and install steel cars in their place. The road was not a prosperous one. The original investors in his company had put in $1,800,000 for $2,000,000 bonds. Later the road had gone into the hands of a receiver, and the bondholders canceled the bonds and took in their place common and preferred stock. Since Jan. 1, 1906, which was the last day on which any interest was paid on the bonds, they had received on their investment only 2¾ per cent.

STATEMENT QF MR. POTTER

A. E. Potter, general manager the Rhode Island Company, also spoke and described the business of that company, which he said was purely of a city and suburban character.

DISCUSSION ON RELATIONS BETWEEN CITIES AND RAILWAYS

A joint meeting of the Washington Section of the American Institute of Electrical Engineers and the Washington Society of Engineers was held at the Cosmos Club, Washington, D. C., on Feb. 10 when Bion J. Arnold, of Chicago, gave an illustrated talk on "Some Applications of the Principles of Conservation to the Readjustment of Relations Between Municipalities and Urban Railways."

Mr. Arnold showed slides taken from his recent reports which illustrated that the law of squares, as applied to electric railway traffic, was applicable to the thirteen largest cities of the United States and that the deviations from the law were small, although it should not be concluded that the law would hold in every case. Mr. Arnold also showed by maps that in the case of most of these large cities growth was retarded or prevented on one side by some natural topographical obstacle, and that the congested district in these cities was always on this natural city boundary. This necessitated a radial system of electric railway tracks. Mr. Arnold also discussed the problem of the adjustment of differences between municipalities and electric railways from a financial standpoint and referred to the solutions advanced by him in the cities of Chicago, San Francisco, Kansas City and elsewhere, all being plans evolved for the purpose of meeting the declared policy of these cities for municipal ownership, at the same time providing a solution which would fairly conserve the rights of the railway properties. Some economic principles were advanced based on the theory that the present generation is better able to pay a relatively high rate of return than the future generation will be and that the present generation should pay for the depreciation on the physical properties resulting from present-day wear and tear, for the reason that they are deriving the advantage of new equipment and from the further fact that the property never can be kept up to the original cost or to the "cost to reproduce new" value.

In the Chicago, San Francisco and Kansas City settlements Mr. Arnold brought out his plan of following the principles outlined above by the creation of an amortization fund which would apply toward amortizing the intangible values of the properties in question, this amortization fund to be used to build extensions and thus increase the gross revenue of the companies without increasing the capitalization of the companies. A new electric railway, with its equipment, becomes in a sense "second-hand" after the first cars are run and, so far as the physical property goes, is worth less than the initial cost of building. An amortization fund of sufficient magnitude to build such extensions and improvements as to keep physical valuation up to the highest state that it is practicable to maintain a property in was advocated, it being claimed that an electric railway which is constantly being extended can with proper maintenance be kept in such a condition that a physical valuation based on present or depreciated value will represent about 75 per cent of the capital required to reproduce the property new. Mr. Arnold also spoke about the plan adopted in Chicago which secures a perpetual valuation or purchase price, so that the municipality can know at any day the exact amount required by it to take the road over should it decide to adopt municipal ownership.

DISCUSSION

Colonel Harding, of the District of Columbia Public Utilities Commission, asked if the reports given as examples of satisfactory settlement and the conclusions drawn from them were based on a 5-cent fare and whether universal transfers were issued.

Mr. Arnold said that, although the figures given in his reports were based on a 5-cent fare, the conclusions drawn and the economic principles advanced would hold equally well for a fare other than a 5-cent fare. Universal transfers were given in Chicago, it having been found that, while about 70 per cent of the passengers used transfers, the percentage of passengers who availed themselves of the long ride made possible by the issuance of universal transfers was very small. Because of this fact it has been argued by some that if the population was as dense between New York and Boston as it is in New York City a street railway could be built and operated on a paying basis and agree to carry passengers from New York to Boston for 5 cents, owing to the profitable short-haul passengers and the slow average speed that would be made by the surface cars, which would divert most, if not all, of the long-distance passengers to other and more rapid lines.

Clarence P. King, president of the Washington Railway & Electric Company, on being asked to comment upon Mr. Arnold's paper, stated that he had not known the real purport of the matter or that he was to be called upon to say anything. He proceeded to enter a vigorous protest against the impression created, pointing out that in the instances cited by Mr. Arnold, namely, Chicago and Kansas City, the franchises had expired. He stated that about fifty years ago the people of the District of Columbia needed some method of transportation and that the District authorities had welcomed with open arms any set of men who had red blood and courage enough to risk their money in such an enterprise. Mr. King drew an analogy by supposing that a merchant fifty years ago had bought a lot on F Street or Pennsylvania Avenue, in a favorable location, and paid, say, $500 for it; then that he had built a building on it, which he had from time to time enlarged and improved, and, in addition, had built up and established a profitable business by expending capital and labor and taking great financial risk. Now, if some authority should come along and take possession of that property and business and pay back to the owner only his original investment and his expenditures made on the property from time to time and should not take into consideration the enhanced value as a going profitable concern, it was manifestly unfair, and such a policy would certainly throttle human endeavor and call a halt upon future undertakings. Mr. King concluded, however, with the statement that no such conditions existed in Washington for the reason that the franchises were perpetual and, all things considered, the fares were probably lower than in any other city in the United States with the exception of Cleveland, where, he understood, the fares would be higher in the near future for the reason that the 1-cent transfers would not be redeemed.

Mr. Arnold stated that Mr. King had not understood the principles he advocated, for his illustration was not in accordance with them, and he read extracts from his reports which showed that he had not only provided for conserving all proper investments but had also in some instances where the risk was great allowed a liberal promoter's share to the investors. He said that he believed that by the adoption of his principles both the municipality and the railroad interests would be treated fairly. Mr. Arnold then read from his Kansas City report an extract entitled "Fair Ordinance Provisions," which set forth clearly his position on these points. This was published on page 717 of the issue of the ELECTRIC RAILWAY JOURNAL for April 19, 1913.

Ralph W. Pope, honorary secretary of the American Institute of Electrical Engineers, gave a brief history of Mr. Arnold as an electrical engineer.

ELECTRIC TRACTION DEVELOPMENTS IN ARGENTINA

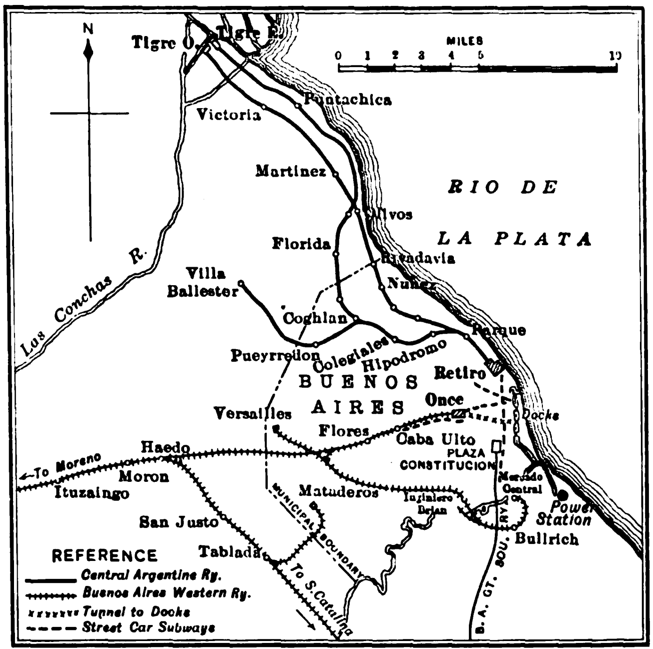
Several interesting features of traffic development in Buenos Aires and in Argentina generally are described in the Dec. 17, 1913, issue of the London *Times*.

SHALLOW SUBWAY AT BUENOS AIRES

According to this paper, the population of Buenos Aires is now 1,500,000, and the city will probably have 2,000,000 inhabitants within the next few years. The Anglo-Argentine Tramway Company, which owns 370 miles out of a total of 450 miles of surface tramway, has lines laid in nearly every street. But the limits of surface expansion in the heart of the city have been reached, and a beginning has been made with shallow subway tramways. The first of these subways, 2 miles in length, has already been placed in operation beneath the broad Avenida de Mayo, which extends from the terminus of the Western Railway toward the river. Other double-track subways to a total route length of 10 miles are in course of construction or projected, the intention being to link up all the railway terminals in this way. A deep-level tunnel is also being made by the Western Railway between the uptown terminus and the docks, and that company and the Central Argentine Railway are now electrifying suburban routes up to a total of about 150 track miles.

The sub-surface tramway which has been opened for traffic has a joint terminal station with the Buenos Aires Western Railway at Plaza Once. The subway is 25 ft. wide, and its height above the rail level 14 ft. 3 in. It has nine stations between Plaza Mayo and Plaza Once. The ventilation of the tunnel is effected by openings of about 16 ft. to the street, one or two of these being placed in each square. The trolley pole is carried at a minimum height of 13 ft. 1 in. underground and at 19 ft. 8 in. on the surface. The trains on leaving the tunnel run on the surface rails into the suburbs. These trains are made up of six to seven cars, each with a capacity of 100 passengers and run on a minimum headway of ninety seconds at a schedule speed of 14 m.p.h. In the tunnel passengers alight directly on the platforms, which are level with the floor of the carriages, but car steps are provided for surface operation. The trains are composed solely of motor cars, each car carrying two 115-hp, 1000-volt motors.

The first tunnel is now being extended from the Once station for an additional 2½ miles, and it is expected that this work will be completed about the middle of 1914. Another subway will connect the Retiro station of the Central Argentine Railway with the Plaza Constitucion, where the terminus of the Buenos Aires Great Southern Railway is situated, and beyond that point this line will in all probability be continued as an overhead or elevated tramway. In addition the company has powers for the construction of a subway beneath a new wide diagonal avenue which is now in course of construction, and the plans for this subway are in a fairly advanced stage.



Electric Ry. Journal

Map of Buenos Aires, Showing Lines to Be Electrified

CENTRAL ARGENTINE ELECTRIFICATION

On account of the increasing traffic and the high price of imported coal, the suburban lines of Buenos Aires are particularly suitable for electrical operation. It is anticipated that the first electrified section of the Central Argentine Company's lines will be in use before the end of 1914. The d.c. third-rail will be used. The equipment of a 22-mile section between the new Retiro terminus in Buenos Aires and Tigre and the erection of the power house and plant are now under way. Since the amalgamation with the Buenos Aires and Rosario Railway the Central company has two routes between Tigre and Buenos Aires, but it is the company's old line via Nunez and Victoria, a route length of 18 miles, which is the first to be electrified. At a later date it is intended to equip the line via Florida and the section of main line from Coghlan to Villa Ballester. In all, including sidings and additional lines at the terminals, about 100 miles of single track are comprised in the complete scheme.

The power plant, which is being erected at Canal San Fernando about 2½ miles from the Tigre terminal, will have a maximum capacity of 18,000 kw. Babcock & Wilcox water-tube boilers will supply steam to four 4500-kw Parsons turbo-generators. The steam consumption of the turbines is guaranteed to be about 12½ lb. per kw-hr. The condensing plant and transformers are being supplied by the Westinghouse company. Three-phase current will be generated at 2500 volts, transformed to 20,000 volts for transmission, and converted at the substations for use on an 800-volt d.c. rail. The transmission to the substations will be by Henley underground cable. The substations will be located as follows: one near the power station, a second at Olivos and a third at Palermo. When the second and third sections of line are converted an additional substation will be provided near San Martin between Belgrano and Villa Ballester. The substation plant, which, except for the Westinghouse transformers, is being supplied by the British Thomson-Houston Company, will include at least three, and perhaps four, 1000-kw rotary converter sets. About 120 motor and trailer cars have been ordered from the Metropolitan and the Birmingham Carriage & Wagon companies, England. The motor cars will have steel underframes and steel flooring. Each coach will accommodate sixty-eight passengers. The normal motor-car equipment will consist of two 250-hp motors, but some of the coaches will be equipped with four motors for trailer hauling. The coaches will be of the end and central door type.

BUENOS AIRES WESTERN RAILWAY

The electrification of the Buenos Aires Western Railway is in a less advanced stage than that of the Central Argentine, but it is anticipated that electric service will be inaugurated by the middle of 1915. The intention is to equip at the outset about 22 miles of line between the Buenos Aires terminus at Once and Moreno for electrical operation, and at a later date to convert several important branch lines which are mainly devoted to freight traffic. An important part of the scheme is the tube railway between the Once terminus and the docks at Buenos Aires, a distance of about 2½ miles. The tunnel, which contains a single track of 5-ft. 6-in. gage, is intended to deal only with freight traffic going to the docks for shipment, and there will be through freight services from Haedo, a point 10½ miles distant from Once, to the docks. Electric locomotives will be employed.

The power station for the Western system has been so planned that it will be able to supply energy to the suburban lines of the Buenos Aires Great Southern Railway should that company decide to adopt electric traction. The electrical system will also be d.c. third-rail. Babcock & Wilcox boilers will supply steam to three 3000-kw Westinghouse turbo-generator sets at the Dock Sud power house. Three-phase current will be generated for transmission at 20,000 volts and supplied through underground cables to four substations. Dick, Kerr & Company, England, are the contractors for the substation plant. Neither the rolling stock nor the train equipments have yet been ordered, but as the trains have to run into the new underground terminal at Once, it is intended to use steel cars.

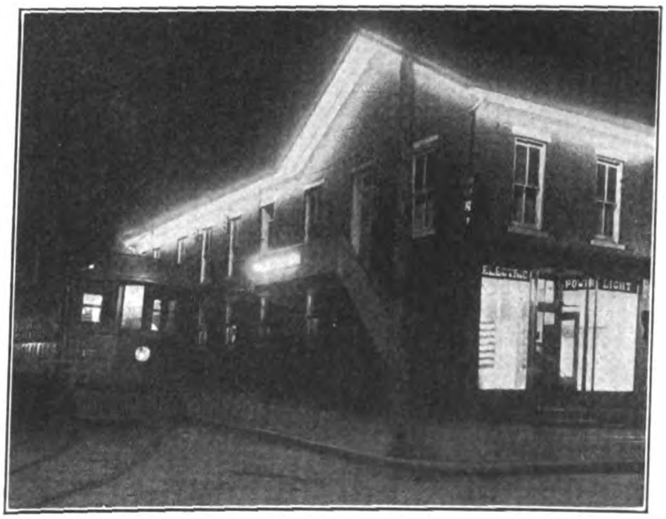
MR. HEGARTY RESIGNS AS PRESIDENT OF THE TRANSPORTATION ASSOCIATION

D. A. Hegarty, formerly manager of the railway electrical department New Orleans Railway & Light Company and now in charge of the Houston Lighting & Power Company, has resigned as president of the American Electric Railway Transportation & Traffic Association, a position to which he was elected at the annual meeting last October. In his letter of resignation to the executive committee Mr. Hegarty called attention to the clause in the constitution of the Transportation & Traffic Association which requires the officers of that association to be connected with a member company. This was the case with Mr. Hegarty when elected, but is not the case now because the Houston company is engaged in the lighting and power business only.

Mr. Hegarty's resignation was submitted to the executive committee for letter ballot and was accepted with regret. M. C. Brush, of the Boston Elevated Railway, who was elected first vice-president at the annual meeting, will be acting president of the Transportation Association for the remainder of the year.

A COMBINED TROLLEY STATION AND SALESROOM FOR LIGHTING SUPPLIES

The New Midland Power & Traction Company, of Cambridge, Ohio, operates twelve cars on about 15 miles of track. The power house and repair shops are located at West Cambridge. Until recently the interurban trolley station in Cambridge was situated in the lower end of the town in an out-of-the-way corner. The company has recently taken over a brick corner house in the part of the city opposite the court house and has fitted it up inside as a waiting room and also a salesroom for electrical appliances. The company does a lighting business and advertises this feature of its operations by means of attractive window displays and by a large number of lamps placed under the cornice. What was formerly a dingy corner is now bright and attractive and an excellent advertisement for the company. The interior of the ground floor of the building is fitted up with an attractive ticket booth, glass showcases, comfortable seats and desk for the manager. It is brilliantly lighted with Mazda lamps in Holophane globes.



New Midland Traction—Brilliantly Lighted Waiting Room and Salesroom

ELECTRIC RAILWAY REPORTS OF THE BUREAU OF THE CENSUS

Preliminary figures for the forthcoming five-year report of the electric railways of twelve additional states have been given out by the Bureau of the Census, Department of Commerce. Statistics concerning electric railways of Maine, Vermont, New Hampshire and West Virginia were published in the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914. Statistics concerning the District of Columbia, Delaware and Maryland were printed in the issue of Jan. 17, 1914, and statistics concerning Connecticut, Rhode Island, Virginia, Georgia, Florida, Alabama, Louisiana, Mississippi, Oklahoma, Kansas, Minnesota, Colorado and California in the issue of Feb. 7, 1914.

The statistics given in the accompanying table relate to the year ended Dec. 31, 1912. The totals include electric plants operated in connection with electric railways and not separable therefrom, but they do not include reports of mixed steam and electric railroads or railways under construction which had not begun operations during the census.

OPERATING AND FINANCIAL STATISTICS FOR ELECTRIC RAILWAYS IN TWELVE STATES

	Massachusetts	New Jersey	South Carolina	Kentucky	Tennessee	Indiana	Michigan	Wisconsin	Missouri	Nebraska	Montana	Oregon
Number of companies	60	43	7	10	12	45	23	25	[illegible]	10	[illegible]	[illegible]
Operating	43	24	6	....	....	34	22	24	19	7	[illegible]	[illegible]
Lessor	17	19	1	....	....	11	[illegible]	[illegible]	[illegible]	3	[illegible]	[illegible]
Miles of line	2,328	847	168	356	259	2,038	1,139	582	579	149	92	389
Miles of single track	(a) 3,010	1,319	202	493	370	2,301	[illegible]	806	[illegible]	243	99	[illegible]
Miles of single track in state†	2,950	1,308	228	503	360	2,323	1,526	849	959	214	[illegible]	567
Cars, number	9,116	3,061	276	1,010	872	2,408	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Passenger	7,877	2,697	214	850	806	1,612	2,268	1,012	2,325	490	139	722
All other	1,239	364	62	160	66	796	564	318	[illegible]	58	21	678
Electric locomotives	5	1	4	....	....	6	2	3	[illegible]			22
Persons employed	23,169	9,436	794	3,591	3,304	8,553	[illegible]	3,762	9,550	1,579	390	3,041
Salaried employees	1,259	918	105	181	306	797	[illegible]	[illegible]	[illegible]	108	[illegible]	[illegible]
Wage earners‡	21,910	8,518	689	3,410	2,998	7,756	[illegible]	3,418	9,035	1,471	351	[illegible]
Power:												
Horse-power, total	272,796	29,098	12,110	26,460	53,367	121,920	[illegible]	126,652	125,940	19,125	1,520	109,450
Capacity of dynamos, kw	197,504	29,732	8,578	15,805	36,050	92,947	[illegible]	83,055	97,145	13,425	1,070	38,740
Output of stations, kw-hr. (in thousands)	452,534	33,198	8,804	73,815	81,760	217,967	123,721	114,829	267,790	38,869	1,800	169,609
Current purchased, kw-hr. (in thousands)	33,085	183,471	9,071	15,059	18,312	59,369	[illegible]	10,051	94,203	790	8,426	[illegible]
Passengers carried (in thousands)	974,688	452,964	21,567	132,217	122,188	211,469	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Revenue (in thousands)	705,918	356,858	17,872	103,512	91,896	173,019	286,955	134,646	402,209	64,709	15,351	75,842
Transfer (in thousands)	257,021	86,315	2,804	26,903	27,368	33,462	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Free (in thousands)	11,748	9,790	800	1,801	2,923	4,988	9,271	1,118	6,390	587	473	3,435
Car mileage (passenger, express, freight, etc.) (in thousands)	125,893	60,991	4,657	22,274	19,935	47,797	61,189	26,596	72,573	12,613	2,901	19,509
Income statement:												
Gross income (in thousands)††	$37,490	$18,321	$1,355	$6,155	$6,151	$16,142	[illegible]	[illegible]	$21,240	$3,618	$1,665	$7,856
Operating expenses (in thousands)	24,889	10,552	914	3,556	3,257	9,132	[illegible]	4,105	13,070	2,021	770	3,736
Gross income less operating expenses (in thousands)	12,601	7,768	440	2,598	2,894	7,009	6,721	[illegible]	[illegible]	[illegible]	295	4,120
Deductions from income (taxes and fixed charges (in thousands)	9,047	7,232	300	1,315	1,919	5,727	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Net income (in thousands)	3,553	535	140	1,282	974	1,281	[illegible]	1,557	[illegible]	[illegible]	[illegible]	[illegible]

†Excluding track lying outside of State of companies within State and including track in State owned by outside companies.
‡Number employed Sept. 16, 1912.
††Includes income from sale of current for light and power.
(a) Excludes 7.82 miles not operated.

During the decade 1902-1912 the number of operating electric railways in Massachusetts decreased from seventy-five to forty-three. Miles of track increased 19 per cent during this period; passenger cars, 8 per cent; persons employed, 56 per cent; revenue passengers carried, 53 per cent; gross income, 58 per cent; operating expenses, 52 per cent; horse-power of power plants, 101 per cent, and the output of stations, 139 per cent.

The number of operating companies in New Jersey decreased 8 per cent between 1902 and 1912. The number of miles of track increased 53 per cent; revenue passengers carried, 89 per cent; gross income, 124 per cent, and operating expenses, 144 per cent.

South Carolina operating companies decreased in number from seven in 1902 to six in 1912. The miles of track increased 163 per cent; persons employed, 93 per cent; revenue passengers carried, 97 per cent; gross income, 107 per cent, and operating expenses, 129 per cent.

The number of companies operating electric railways in Connecticut decreased two during the decade 1902-1912. Miles of track increased 74 per cent; persons employed, 158 per cent; revenue passengers carried, 84 per cent; gross income, 110 per cent; operating expenses, 128 per cent; horse-power, 65 per cent, and output of stations, 197 per cent.

Reports from Tennessee show that the operating companies increased 50 per cent during the ten years. Miles of track increased 46 per cent; persons employed, 164 per cent; revenue passengers carried, 157 per cent; gross income, 230 per cent, and operating expenses, 202 per cent. The horse-power rating of power plants showed an increase of 378 per cent and the output of stations 550 per cent.

Electric railways in the State of Indiana showed the following increase during the decade 1902-1912: number of companies, 26 per cent; miles of track, 256 per cent; revenue passengers carried, 161 per cent; gross income, 328 per cent, and operating expenses, 311 per cent.

The number of operating companies in Michigan remained practically the same during the decade. There was an increase of 47 per cent in the miles of track, 176 per cent in the number of persons employed, 152 per cent in the number of revenue passengers carried, 174 per cent in gross income and 205 per cent in operating expenses. The horse-power of power plants increased only 49 per cent and the output of stations only 48 per cent.

The operating electric railways in Wisconsin increased 41 per cent during the decade; miles of track, 94 per cent; persons employed, 70 per cent; revenue passengers carried, 115 per cent; gross income, 120 per cent, and operating expenses, 106 per cent.

The number of operating companies in the State of Missouri was nineteen in 1912, as compared with sixteen in 1902. The following increases were made: miles of track, 31 per cent; number of persons employed, 75 per cent; revenue passengers carried, 90 per cent; gross income, 98 per cent, and operating expenses, 115 per cent.

Increases for electric railways in the State of Nebraska during the decade are noted as follows: number of operating companies, 75 per cent; miles of track, 115 per cent; persons employed, 188 per cent; revenue passengers carried, 191 per cent; gross income, 215 per cent, and operating expenses, 208 per cent.

The number of operating companies in Montana increased one during the ten years since 1902. Miles of track increased 57 per cent during this period; number of persons employed, 103 per cent; revenue passengers carried, 124 per cent; gross income, 117 per cent, and operating expenses, 111 per cent.

No gain was made in regard to the number of operating companies in the State of Oregon during the decade, but miles of track increased 299 per cent; number of persons employed, 479 per cent; revenue passengers carried, 305 per cent; gross income, 653 per cent; operating expenses, 471 per cent, and the total horse-power developed, 2475 per cent.

COMMUNICATIONS

ENTHUSIASM ESSENTIAL TO PERSONAL PROGRESS

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., March 3, 1914.

To the Editors:

In a recent editorial you comment on the announcement of Mr. Thornton's leaving the Long Island Railroad to become general manager of the Great Eastern Railroad of England. I understand that the purpose of your editorial was to direct attention to the importance of training men systematically for promotion. The subject which you broach is a complicated one, and I doubt the value of any formula that might be laid down. So much depends upon the personal equation, not only in the case of those who are to be educated but of those who are intrusted with the work involved. A certain number of employees will always be indifferent to their tasks, and no great headway can be made unless each likes his work and is interested in it. Assuming that this may be the fundamental condition, much, perhaps, can be done through a careful diffusion of statistics bearing directly upon the work at hand. The results of these statistics in affecting operation, their ultimate effect upon the cost of producing such results and the effect upon the earning capacity of the corporation should be made clear.

Enthusiasm must necessarily play a considerable part, and the official, through his own personality, his enthusiasm over his work and his efforts through personal contact, can often accomplish important results along educational lines. The systematic furnishing of information and data bearing upon the man's work and the results to be expected should be stimulating to the employee, provided that he is capable of doing more than merely working for his wages. Of course, with certain men no very great effort is required. With others who are none too conscientious in reporting promptly for work but are very particular about leaving promptly for their homes or elsewhere it is difficult to see how any effort, no matter how put forth, can develop them into much more valuable assistants. A railroad official told me some fifteen years ago that when he was on the payroll for $2 a day he endeavored to give in service at least $3, and later, when his salary was increased, he followed the same principle of giving in work at least 150 per cent of the amount which he received from the company. Of course, there are prominent examples of officials who obtain efficient work from an organization more through fear than through enthusiastic and kindly effort coupled with personal contact, but it is difficult to understand how employees under such a system will be benefited by any educational effort upon the part of the railroad or its higher officials.

WM. G. GOVE, Superintendent of Equipment.

PROGRESS IN APPRENTICE TRAINING

NORTHERN OHIO TRACTION & LIGHT COMPANY
AKRON, OHIO, Feb. 28, 1914.

To the Editors:

I have been much interested in the editorial in your issue of Feb. 21 on the apprenticeship system in this country and England. There is undoubtedly here a growing appreciation of the value of the modern ideas of training, especially among the large railroad companies. The Baltimore & Ohio Railroad began a school for apprentices about 1887, but the attempt failed for want of appreciation on the part of the company and of the scholars. The Lake Shore & Michigan Southern Railroad started a similar course about the same time. The Pennsylvania Railroad began its excellent work for apprentice instruction about 1905. More recently, the same company has instituted school instruction in connection with the regular apprentice system and the New York Central Lines have also an extensive school course. The success of the American Locomotive Works in this line is well known. From the experience of these companies, as well as from that of others, it was found that the only practicable way to carry on the work was by means of compulsory attendance. The results have been the development of high-grade intelligent mechanics in the railroad repair shops of the country and the creation of opportunities for ambitious young men not only to obtain a technical education but to receive pay for the time they devote to the acquirement of knowledge.

The instruction in these courses comprises arithmetic, elementary geometry, mechanical drawing, practical and theoretical mechanics and standard practices. This instruction is imparted by men of ability, and the class work is supervised by equally competent men. The practical side is cared for by instruction in lathe work, vise work, blacksmithing, electrical work, pipe fitting and molding. The value of all of this work is evident in the different kind of men now found in our workshops. To-day every young man entering the service of any steam railroad knows that the presidency of the road is a possibility to him. This change is due to the efforts being made in the line of education. Due credit for it should be given to such men as C. W. Cross and W. B. Russell, of the New York Central Lines, to George M. Basford and to Dean Herman Schneider, of Cincinnati, who with many others have made heroic and determined efforts for the practical and technical education of our apprentices.

There was a time when a college diploma was rated at more than its face value, but this is no longer the case. The methods now adopted in the shops are not based on a college course but are intended to develop the ordinary apprentice, first into the skilled workman, then into the foreman, and finally possibly into the administrative officer. There is no philanthropy in this plan. It is necessary for the development of the railroads.

It was predicted that this work would not last, but it has done so, and now we have the satisfaction of knowing that our young men are seeking instruction as the opportunity presents itself and that it is fast becoming unnecessary to enforce attendance at classes. In the schools operated in conjunction with the railroads the instructors are trying to make men by systematic work with individuals. It is a matter of personal touch in the endeavor to give a broader education. The dean of the Princeton University Graduate School recently referred to a "limitless supply of half-baked, half-trained men who can do one thing only," and his diagnosis is unfortunately supported by the facts here to some extent, but not to the same extent as in European countries. The conditions in this country now reflect the benefit of training apprentices and there are fewer "half-baked" men in the railroad business than was formerly the case.

In my early experience in the English railroad shops I knew of apprentices who started at boring out cylinders and continued on that kind of work for their whole apprenticeship and, in fact, for years after. One man, for instance, had been engaged in machining piston rods and had not moved the loose headstock on his lathe for fourteen years. Then he went out on strike, walked the streets of Leeds and finally died broken-hearted because his only means of a livelihood was gone. The realization of the all-too-limited nature of his ability killed him.

All of this is now changing, and the widespread effects of the change are felt not only on steam railroads and in electric traction circles but in all of our larger manufacturing centers. In the case of traction corporations, the training of efficient employees may help in the solution of the great problem of making both ends meet—a problem forced upon the roads by the slowly diminishing value of the purchasing power of the nickel.

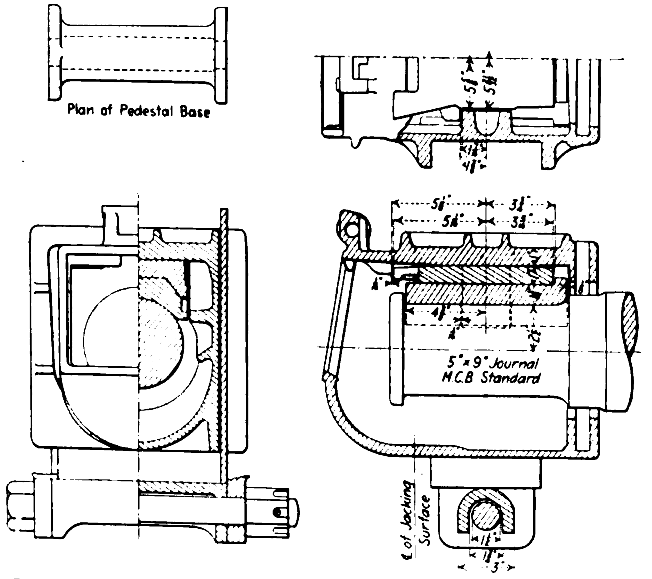
WILLIAM H. ROBERTS,
Superintendent of Motive Power.

THE WESTCHESTER JOURNAL BRASS

L. B. STILLWELL, CONSULTING ENGINEER
NEW YORK CITY, March 4, 1914.

To the Editors:

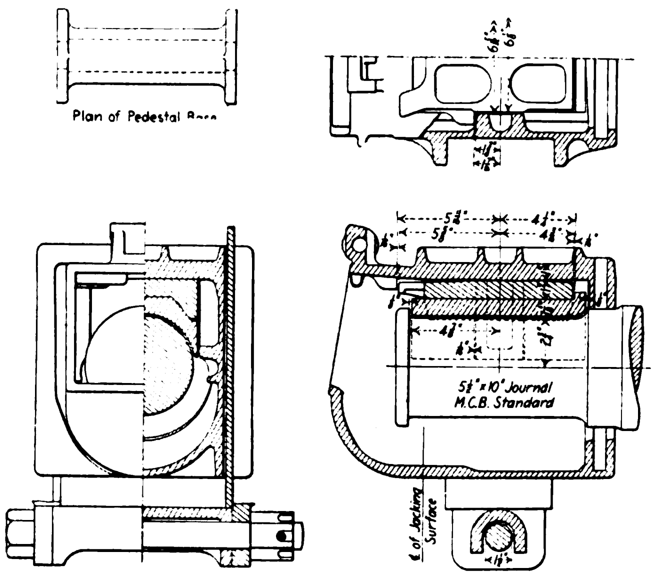
The interest aroused in the subject of journal brasses by your editorial of Jan. 31, 1914, seems to warrant a short description of the design of the journal brasses whose behavior in service on the New York, Westchester & Boston Railway motor cars excited your comments.



Journal Brasses—Standard M. C. B. Brass Used on Trailer or Non-Motor Axles

The accompanying illustration of the 5-in. x 9-in. journal brass and box shows the usual form of M. C. B. journal, used on the trailer or non-motor axles of the Westchester cars. The displacement of these journals when wheels are subjected to high brakeshoe pressure was well illustrated in your issue of Jan. 31. Repeated displacement of the journal brass in the manner illustrated eventually leads to distortion of the outline of the babbitted surface and to consequent heating of the journal.

In the case of the journal illustrated, the pressure on the single brakeshoe when emergency application of the brake is made amounts to about 150 per cent of the weight on the wheel, and regular operation has developed that the brass as designed is unsuitable for such service. This same design of brass would, however, be adequate for service with clasp-brake rigging where the pressure of the two shoes, applied on opposite sides of the wheel, practically balances and thus relieves the journal and brass of any specific pressure due to brake application.



Journal Brasses—Special Westchester Brass for Motor-Driven Axles

The accompanying illustration of the 5½-in. x 10-in. journal brass and box shows the special form of brass used on the motor-driven axles of the Westchester cars. The details of these 5½-in. x 9-in. brasses were illustrated in the article on page 224 of your issue of Jan. 31, 1914, describing the Westchester equipment. These brasses were made deeper than usual, in order to provide additional bearing area between journal and brass and between brass and box to transmit the tractive effort of the motors.

The design of deep-sided journal brass is not new, as similar brasses have been used with motor-driven axles in heavy electric traction service for many years and to the best of my information have always given satisfaction. The accurate finishing of the wearing surfaces of the journal and journal boxes, both inside and outside, and the accurate finishing and alignment of pedestal guides contribute greatly to their satisfactory operation.

The motor-driven wheels of the Westchester cars are fitted with two brakeshoes per wheel, the clasp-brake system, as the desired rate of retardation required shoe pressures per wheel in excess of what was considered good operating practice if applied to single shoes.

In my opinion, the deep-sided journal brass has distinct advantages for use with motor-driven axles and also where heavy brakeshoe pressure is to be applied with one shoe per wheel.

F. M. BRINCKERHOFF.

SYSTEMS FOR THE REDUCTION OF ELECTROLYSIS

NEW YORK, March 5, 1914.

To the Editors:

In your issue of Jan. 3 there is an editorial on "Electrolysis Mitigation versus Elimination" in which occurs the following: "As the drainage system has been heretofore so generally commended and possibly put to wider use than any other, this conclusion must come as a distinct surprise."

It seems to me that the words "distinct surprise" are hardly proper in this case in view of the report of the committee on electricity of the American Railway Engineering Association, which was presented at the annual meeting of that association in Chicago, March, 1913, and can be found in the proceedings of that month.

GEORGE W. KITTREDGE,
Chairman Committee on Electricity American Railway Engineering Association.

A. E. R. A. SECTION WORK AT MILWAUKEE AND NEWARK

In connection with the article elsewhere in this issue on company section work in the National Electric Light Association, it may be of interest to present the following particulars of the company sections of the American Electric Railway Association formed by The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and the Public Service Railway, Newark, N. J.

THE MILWAUKEE SECTION

The Milwaukee section was organized March 18, 1912, with forty-five charter members. Meetings are held monthly except during two of the summer months. The present membership is 120. The number in attendance during the meetings of the first year averaged between sixty and seventy-five, and this year the average is between ninety and 110. The present membership forms about 75 per cent of those who from their occupation or position are interested in this work.

J. D. Mortimer, president of The Milwaukee Electric Railway & Light Company, through whose courtesy the information on the work of this section has been made available, finds that the company sections are of great value in tending to develop a strong co-operative spirit on the part of the members. This spirit strengthens as time goes on and gradually spreads to other employees who thus become ambitious to join. As Mr. Mortimer puts it, "The company section movement is a cumulative one and brings results that are apparently at first intangible, but which can later be defined." The company is more than pleased with the results achieved by the Milwaukee section and believes that as the knowledge of the results accomplished spreads the number of A. E. R. A. sections will largely increase.

The splendid educational work of the Milwaukee organization cannot be explained more clearly than by quoting the list of subjects which have been considered. The list of dates, subjects and speakers follows:

Date	Subject and Speaker
March 18, 1912..	Organization meeting.
April 4, 1912...	Construction features of Cold Spring Shops. R. H. Pinkley.
	The chain department and its relation to other departments. M. S. Rausch.
May 2, 1912.....	Steel versus wooden construction of city cars. C. H. Cross.
	Transfers, their uses and abuses. J. E. White.
June 6, 1912....	Fire prevention. Mr. Glendening.
	Welfare work. Bert Hall.
Oct. 7, 1912.....	Electric railway problems. C. N. Duffy.
Nov. 7, 1912....	Observations on the annual A. E. R. A. convention. Messrs. Pinkley, Mullett, Fay, Kalweit and Stearns.
Dec. 5, 1912....	Observations on the annual A. E. R. A. convention. Messrs. Archambault, Lederer, Smith-Peterson, Groskopt, Burkholz, Witte, Austin, Hunzicker, Evans, Overholt, Hoehne, Wolf and Hinstorff.
Jan. 9, 1913....	The company's attitude on welfare work. R. B. Stearns.
	Safety work. Frederick S. Hughes.
Feb. 6, 1913....	The proposed reconstruction and construction of track for 1913. Mr. Childs.
	Our new cars. C. H. Cross and W. W. Hunzicker.
	Items of interest in foreign road operation. A. E. Wallace.
March 6, 1913..	Growth of the claim business. Dr. Lemon.
April 3, 1913....	Relation of the employee to the public and State. Edwin S. Mack.
May 8, 1913....	Wisconsin Railroad Commission. Commissioner David Harlowe.
June 12, 1913...	Good housing. Bert Hall.
	Rail and wire. C. W. Lamb.
September, 1913.	Company sections. J. D. Mortimer.
	University of Wisconsin. Chester Allen.
October, 1913....	Making of trainmen. Mr. Henningfeld.
November, 1913..	The printing shop. Mr. Rogers.
	Election—convention. Messrs. H. A. Mullett, R. H. Pinkley, Geo. Kuemmerlein, G. W. Kalweit.
December, 1913..	Shouldering responsibilities. C. M. Rosencrantz.
January, 1914..	Joint meeting of A. E. R. A. and N. E. L. A. sections.
February, 1914..	Developments in electric traction. Miles Lambert.

PUBLIC SERVICE RAILWAY SECTION

The Public Service Railway Company section now has a membership of 342. The attendance at the meetings averages from 150 to 200. The wide field of the company section appears from the following departmental classifications, as prepared by C. B. McCourt, president of the section, which show the number of members from each department:

Department	Membership
Transportation 108,	includes general superintendent, assistant, division superintendents, supervisors, clerks, inspectors and trainmen.
Mechanical 40,	includes mechanical engineer, superintendent of shops, clerks, draftsmen, shop foremen, storekeeper.
Engineering 34,	includes engineers, assistants, division engineers, clerks.
Maintenance of way...34,	includes superintendent, roadmasters, clerks, storekeeper.
Distribution 14,	includes superintendent, engineer and clerks.
Accounting 18,	includes general auditor, assistant, traveling auditor, bookkeepers, clerks.
Claim and welfare.....17,	includes general claim agent, assistant division claim agents, clerks.
Legal 10,	includes general solicitor, general counsel, attorneys.
Ferry 10,	includes captain, engineers, firemen, pilots, deckhands.
General and executive..57,	includes president, vice-presidents, comptroller, secretary, treasurer, general manager and clerks.

As at Milwaukee, the Public Service Railway section has enjoyed the benefit of papers on a great variety of electric railway subjects and, in addition, the program has usually been augmented by inviting some executive officer or outside speaker to talk about the broader problems of the industry. The following is a list of addresses and papers which have been delivered before this section at ten monthly meetings:

ADDRESS AND SPEAKER

"American Electric Railway Association Work Throughout the Country." Thomas N. McCarter, president.
"Growth of the A. E. R. A. and Its Advantages." H. C. Donecker, former secretary American Electric Railway Association.
"The Railway Business." R. E. Danforth, general manager.
"Welfare of Employees." J. J. Burleigh, second vice-president.
"Teamwork." J. M. Wakeman, general manager Society for Electrical Development, Inc.
"Organization and Teamwork." James H. McGraw, president McGraw Publishing Company.
"Accident Prevention." H. V. Drown, general claim agent.
"Car Derailment and Prevention." A. F. Thompson and D. H. Roszel.
"Operating Features Plank Road Shops. S. B. Cunningham, executive clerk mechanical department.
"Return Circuit." H. F. Burr, engineer distribution department.
"H. L. Control." A. J. Manson, Westinghouse Electric & Manufacturing Company.
"Standard Classification of Operating Expenses." C. B. McCourt, assistant to the general auditor.
"Train Operating in City Service." C. F. Bachman, engineer electrical department.
"Construction and Operation of High-Speed Interurban Railroads." D. C. MacDougall, engineer maintenance of way department, and J. W. Brown, assistant general superintendent.
"Maintaining the Way." P. F. Maguire, chief clerk maintenance of way department.
"Keeping the Company Department Store." R. S. Inglehart, general storekeeper.

The order of business at the meeting of the Public Service Railway section not only includes an address and a technical paper but written as well as verbal discussion on the topics considered. The technical papers are printed and distributed in advance of the meeting just as in a high-grade engineering society.

WORKING AGREEMENT ON T. H., I. & E. AND PERMANENT ARBITRATION BOARD

A new working agreement was entered into Feb. 24 between the Terre Haute, Indianapolis & Eastern Traction Company and the trainmen of its Terre Haute division, under which agreement the company gives its employees the same wage scale as was recently granted the car service men of the Indianapolis Traction & Terminal Company in the award of the Public Service Commission of Indiana. This new wage scale is 21 cents an hour for men in continuous service one year or less, 23 cents an hour for one year and less than two years, 24 cents an hour for two years and less than three, 25 cents an hour for three years and less than four, 26 cents an hour for four years and less than five, and 27 cents an hour for five years and over. The former rate paid the men of the Terre Haute division was graduated from a minimum of 20 cents an hour to a maximum of 25 cents an hour. The new agreement was made pursuant to what is known as the "Governor's agreement" of Nov. 11, 1913, and is to continue in effect for a period of three years from March 1, 1914. This agreement is not intended to cancel or take the place of the agreement of Nov. 11, which continues in force.

A provision contained in the new working agreement sets out that "no one now in the employ of the company or who may be hereafter employed shall be required to become a member of any labor organization. The company shall not discharge any man solely for the reason that he is a member of such organization." The paragraph also provides that there shall be no discrimination in any way among the employees either for or against any employees who may or may not be members of labor organizations. The agreement also provides for working boards for trainmen, one at the trainmen's clubroom and another at the carhouses, each of the boards to be posted not later than 6 p. m. of each day for regular work for the following day. Provision is also made that extra men working late runs shall not be required to make an early report the following day until they shall have had at least eight hours off duty.

The agreement was signed on behalf of the employees by the committee which they had appointed in December to represent them in any matters to be taken up with the company. A petition was then filed with the Public Service Commission by this committee asserting that it represented 80 per cent of the trainmen and asking that all grievances presented to the commission by the minority union men of the Terre Haute division be stricken out and that the new working agreement between the company and the men be allowed to stand. Attorneys for the union then filed appeals with Governor Ralston asking that a sweeping revision of the new working agreement be made, on the ground that it did not cover all the points which had been granted to the men of the Indianapolis Traction & Terminal Company in the decision of the Public Service Commission. Robert I. Todd, president Terre Haute, Indianapolis & Eastern Traction Company, advised the Governor of the agreement the company had made with the majority of its trainmen and stated that in case of any differences of opinion in the matter the entire situation was one for the Public Service Commission to pass upon under the terms of the agreement of Nov. 1, 1913.

Great dissatisfaction was felt among the union men over the action of the Public Service Commission in refusing reinstatement to all but three of the men whose cases have been the subject of hearings lasting for several days, both at Terre Haute and Indianapolis. These cases arose out of claims that a number of men were discharged, both by the Indianapolis Traction & Terminal Company and the manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, on account of their affiliation with the union or activity in its cause. J. J. Thorpe, international first vice-president of the Amalgamated Association, who has been in Indianapolis and vicinity for more than seven months attempting to perfect an organization of street railway and interurban employees, made a bitter arraignment of the Public Service Commission and stated that he would never agree to arbitrate anything before that commission again, but would insist that any new arbitration board should be appointed in the way such boards are usually constituted.

PERMANENT BOARD OF ARBITRATION

In the decision recently handed down by the Public Service Commission of Indiana, which sat as a board of arbitration in the settlement of grievances arising out of the street car strike in Indianapolis last November, it was provided that an impartial board of arbitration should be named, to be composed of three disinterested parties, one to be selected by the judge of the United States Court for the district of Indiana, one by the chief justice of the Indiana Supreme Court and the third member by the chief justice of the Indiana Appellate Court. This arbitration board was to decide all matters which might arise and not be adjusted between the company and its employees during the lifetime of the award. After the award was made the Public Service Commission notified the judges of the provision which had been made and requested that they select the members for the arbitration board.

After deliberation, Judges A. B. Anderson of the United States Court, M. B. Lairy of the Appellate Court and Douglas Morris of the Supreme Court declined to name such a board of arbitration. In their joint letter to the commission the judges stated: "It is impossible to know in advance what questions might arise in the respective courts of which we are judges. It may be that one of the courts might become invested with the duties of determining some question arising out of some action of the board of arbitration. No judge should voluntarily disqualify himself from determining any question likely to come before him, nor should he do anything that might embarrass him in acting. The board of arbitration will be a quasi judicial tribunal, and should ever the occasion arise to review its act, that duty should be performed by others than those who appointed its members. The discharge of our official duties constitutes our paramount obligation, and for the reasons above stated we are constrained respectfully to decline the performance of what would otherwise be a pleasurable duty."

An attempt was then made by union officials to have the Public Service Commission reopen the decision and arrange some other method for the appointment of an arbitration board. A request was also sent to W. H. Latta, attorney for the Indianapolis Traction & Terminal Company, asking that the company agree to the naming of an arbitration board, the company to select one member, the employees one member and the two thus chosen to select a third member. The Public Service Commission took the position that it could not reopen its decision in the arbitration of the street car case unless a request was received from the company as well as the employees. Mr. Clawson, attorney for the employees, admitted that at the present time there is no question which requires to be settled by an arbitration board, but he said they desired to prepare for an emergency. Mr. Latta, for the company, stated that it would be premature for an arbitration board to be named at this time, when no question is pending.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

RE-CUTTING AND TRANSFERRING WORN BRUSHES FROM MOTOR TO MOTOR

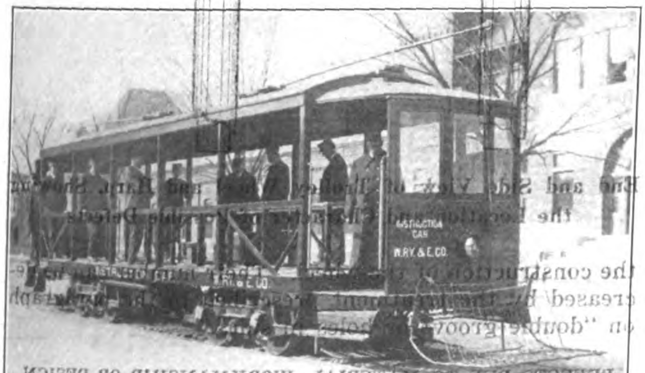
BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT ROCKFORD & INTERURBAN RAILWAY

The Rockford & Interurban Railway, Rockford, Ill., has effected a considerable economy in the use of carbon brushes, which may be of interest to other railways. It is our practice to use a GE-52 brush-holder on the Westinghouse No. 49 motors with a carbon brush ½ in. x 2¼ in. x 2 7/16 in. in size. When these brushes are worn down to 1⅞ in. they are squared up at the shops and then two of them are used on GE-88 motors. When they have worn down to 1⅜ in. on the latter motors they are cut again for use as compressor motor brushes. By following this practice, we have cut our carbon brush cost to a minimum. Last year, for example, the cost of this item was only a trifle more than 2 cents per 1000 car miles.

AN OPEN-SIDE CAR FOR PLATFORM INSTRUCTION ON THE ROAD

BY W. A. WENNER, MASTER MECHANIC WASHINGTON RAILWAY & ELECTRIC COMPANY

On Feb. 2 the Washington Railway & Electric Company placed in service the unusual open-side instruction car shown in the accompanying illustration. It is planned to take the student platform men on this car after they have received preliminary instruction in the regular instruction room. The condition that three separate methods of current collection—namely, metallic circuit conduit, double circuit overhead and ordinary single trolley overhead—are used made it desirable to build and equip the car in the way which would best show the men what to do in going from one part of the system to another.



Open-Side Instruction Car for Washington

In general this car is equipped like our standard cars, and like them can be operated on any part of the system. It is built of wood reinforced with iron bracing, as shown. Access to the main floor is obtained by way of the open vestibules and by walkways on each side of the car. All of the apparatus, except the motors, jam-cylinder and air-storage tanks, is above the floor line. The air tanks were left below the floor to permit draining the rest of the system of water and to prevent freezing in cold weather. The main dimensions and equipment are as follows: length of car over corner posts, 30 ft.; width of car over all, 8 ft. 6 in.; No. 14-B-3 Peckham trucks, with wheelbase of 4 ft. 6 in. and cast-iron wheels of 33 in. diameter; four GE-1000 motors, K-31-A double-end control, Westinghouse D-2 compressor and Parmenter fender.

The car was designed by the writer and built at the company's shops. The instruction of platform men is under the direction of J. T. Moffett, superintendent of transportation.

EQUIPMENT DEFECTS—THE TROLLEY WHEEL

BY C. W. SQUIER, B. S., E. E.

A large part of the work of an operating engineer consists of investigating the causes for the different troubles encountered in operation and of devising a means for reducing or preventing such troubles. In many cases the failure of a part destroys all evidence as to the initial cause for its breakdown, or the result of the failure may be so great as to distract attention from its real cause. Results are demanded, however, and excessive troubles must be reduced no matter how difficult the former are to obtain or how obscure the real cause of the latter may be.

In this and the articles that will follow on equipment defects some of the more frequent troubles will be enumerated, their causes will be discussed, and an endeavor will be made to point out some of the conditions that have been found to exist by those carrying on this class of work for a large corporation. The methods which they have used to reduce such troubles will also be described.

CAUSES FOR FAILURES

In analyzing the different causes for equipment failures the following are found to be the principal ones:

Defective material.

Faulty workmanship.

Errors in design.

Unsuitability for the service.

Lack of proper care.

Excessive wear before renewal.

The last cause is responsible for the greatest number of the troubles encountered, and its correction requires the keenest judgment on the part of the persons who are responsible for the maintenance of the equipment. It is to be expected that all parts will wear out, but the point at which the usefulness of a part ceases and at which its continued use will result in serious trouble is very hard to determine. After all has been said about the best methods for securing different results, the most important factor in this case is the human element.

CURRENT-COLLECTING APPARATUS—TROLLEY WHEELS

Three principal systems for conveying current to electric cars are in use, namely, the overhead trolley, the third-rail and the underground conduit. In the present article only the standard American trolley wheel with its harp, pole and base will be considered.

The greatest trouble with trolley wheels arises from the difficulty of securing satisfactory lubrication and of conducting the current from the wheel to the harp. Some of the most frequent defects are as follows: sides bent, broken or shipped; double groove; holes in sides; flat spots; bushing hole too large; burned wheels; sides loose and rim worn off.

BENT, BROKEN OR CHIPPED SIDES

Bent, broken or chipped sides usually result from wheels coming off the wire and striking some part of the overhead construction. The number of such troubles can be reduced by proper attention to the lubrication of the trolley stands so as to insure their free swiveling, by making sure that the wheels stand perpendicular to the car roof so as to make proper contact with the trolley wire, by keeping the side bearings properly adjusted so as to prevent the swaying of the car when operating at high speeds, by renewing the trolley bushings and axles before they become unevenly or excessively worn, and by keeping the trolley tension properly adjusted.

DOUBLE GROOVE OR HOLES IN SIDES

Double grooves or holes in the sides arise from the condition that the wheel is not following the wire properly, and this may be due to improper maintenance of the overhead construction. These defects also occur frequently on cars that are operated from one end on lines with frequent curves, caused by the wire riding the flange while rounding a curve. If the harps are not straight in the poles so that the wheel is maintained at an angle to the wire, or if the side springs are weaker on one side of the car than on the other so that the car body does not rest level when loaded, the trolley wheels are liable to wear unevenly. When a wheel is found wearing to one side it can be made to wear straight in some cases by reversing it in the harp.

FLAT SPOTS—BUSHING HOLE TOO LARGE

Flat spots are caused by the sliding of the wheel on the wire on account of imperfect rotation. Flanges frequently become slightly bent and rub against the harp, or the side springs and washers may be too tight or exert too great pressure against the side of the wheel. Flat spots usually start with a very slight slippage between the wheel and the wire, but when a spot is once started it increases rapidly.

Over-sized bushing holes are caused by lack of lubrication or by shunts and springs which have become so worn and loose that their pressure is too light properly to conduct the current to the harp. A slight burning or pitting results from the carriage of the excessive current through the bearing and axle. This causes the bushing to bind on the axle, and if it is not a very tight fit in the wheel, rotation will take place around the bushing instead of the axle. Under such circumstances only a few trips are required to wear out the bushing hole in the wheel.

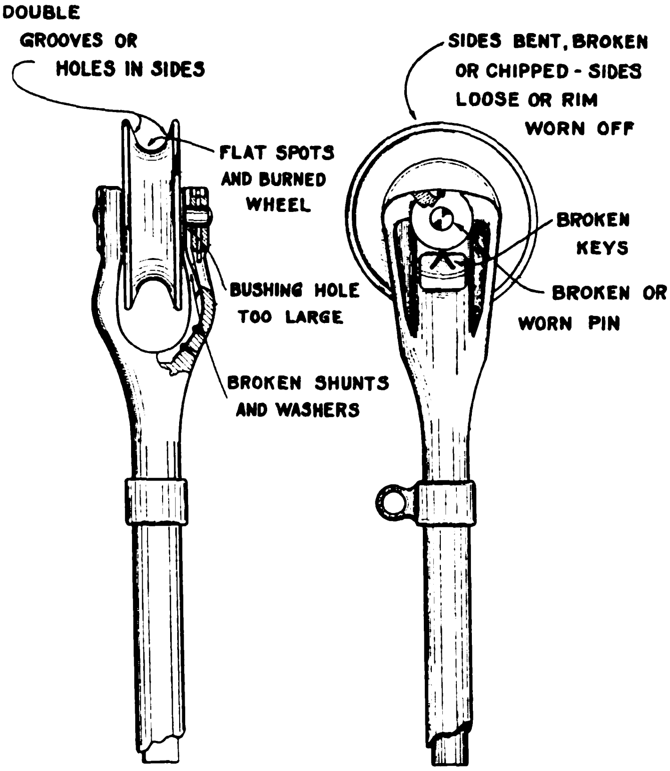
BURNED WHEELS AND SLEET TROUBLES

Burned wheels are caused when the wheel becomes separated short distances from the wire so that rapid arcing and destructive burning takes place. Sleet destroys the wheel very rapidly in this manner. At other times it is found that if a wheel is out of balance its centrifugal force as it rotates will break the contact with the wire. The trolley tension on cars found with burned wheels should always be tested carefully.

In sections where sleet storms are frequent sleet cutters are used to advantage. On large systems, however, the removal of trolley wheels and the installation of sleet cutters assume enormous proportions and come as an additional task for the shop forces at the very time when they are usually busy with snow equipment. Large city roads usually prefer to depend on the frequency of the service to keep the sleet off the wire, or they install sleet cutters on but a few cars of each line, depending on these to scrape the ice clean and thus prevent excessive burning on the wheels of the other cars.

SIDES LOOSE AND RIM WORN OFF

Loosened sides and worn rims are troubles experienced with built-up wheels such as those with steel flanges and a copper center, and they usually are due to the construction of the wheel. Their number can be decreased by the treatment prescribed in the paragraph on "double groove or holes in sides."


DOUBLE GROOVES OR HOLES IN SIDES
FLAT SPOTS AND BURNED WHEEL
BUSHING HOLE TOO LARGE
BROKEN SHUNTS AND WASHERS
SIDES BENT, BROKEN OR CHIPPED - SIDES LOOSE OR RIM WORN OFF
BROKEN KEYS
BROKEN OR WORN PIN

End and Side View of Trolley Wheel and Harp, Showing the Location and Character of Possible Defects

DEFECTS DUE TO MATERIAL, WORKMANSHIP OR DESIGN

When the troubles experienced with trolley wheels of different makes or designs are compared it will be found that some defects are confined to certain types and that the number of defects of any particular kind depends to a large extent on the design of wheel. All the troubles that I have mentioned are influenced by the material used in the wheel, and the workmanship is also an important factor. When the defects on one road were followed up it was found that the number of wheels with the bushing hole excessively worn increased suddenly. An investigation disclosed the fact that in one shipment of wheels the hole for the bushing was slightly larger than those previously used so that the bushing did not fit as tightly in the wheel as in previous wheels installed. This difference was but a few thousandths of an inch and so was scarcely noticeable until the investigation disclosed it. The shape and size of the groove, the diameter of the hub, the weight of the wheel, the accuracy of balance and the method of lubrication are points in design that have a marked influence on the number and type of defects.

TROLLEY WHEEL BUSHINGS AND AXLES

The most common method of providing lubrication for the wheel revolving about its axle is to employ graphite paste pressed into grooves in a brass bushing, but grease or oil applied in a variety of different ways is not uncommonly used.

The use of ball or roller bearings for trolley wheels has not proved entirely satisfactory, as they soon become pitted and rough unless insulated. Unfortunately, it is necessary to depend on the bearings to carry part of the current because the shunts and washers used for this purpose often become worn or exert too light pressure against the rotating part.

The principal trouble experienced with bushings is the falling out of the graphite. This is primarily a matter of design, but the life of a bushing will be very much increased if the shunts and washers are kept in good condition.

Wheels should be tried with the hand for lost motion between the axle and bushing on each inspection. If this motion is excessive the wheel should be removed and the bushing and axle gaged. If the condemning gage enters the bushing or fits over the axle at any point the worn part should be removed. As to the diameter of the axle, many railways consider that ½ in. to ⅝ in. gives the best service. The growing tendency, however, seems to be to go to a larger size, like ¾ in. to 1 in.

HARPS

Trolley harps should be as light and simple as possible, with all surfaces smooth, the edges and corners rounded and the axles and cotter pins inclosed in the harp without projections to catch in the overhead construction should the wheel leave the wire. The principal troubles are loose pins or cotter keys and worn or broken shunts and washers. Loose pins are usually the result of the wrong installation of cotter keys when changing wheels. The harps should be so constructed that the ends of the cotter keys can be clinched easily. The keys should also be so protected by the harp that they cannot catch and break.

Copper washers should be installed between the shunts and the wheel to take the wear and to provide good electrical contact. If these washers are properly maintained the shunts will not become worn. The breaking of shunts is sometimes attributable to the design of the harp. The shunts should be long and without sharp bends, and the spacing of the rivets used for fastening them to the harp should be such as to prevent the liability of their breaking through the rivet holes. Since the capacity of a trolley wheel is limited to the current that can be carried from the rotating part to the harp, the necessity of keeping the harps in the best possible condition is evident.

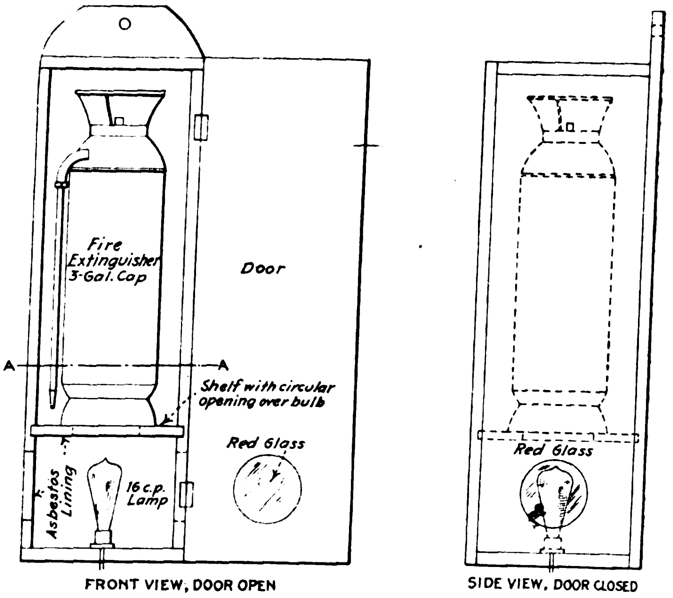
The policy of the Kansas City, Clay County & St. Joseph Electric Railway in having watches of car crews inspected weekly will be continued indefinitely, according to a recent announcement by General Manager J. R. Harrigan. Practically all of the steam roads operating in Kansas and Missouri regard two weeks as often enough for such inspections. Mr. Harrigan, however, believes too much care cannot be exercised along this line. Standard-make watches must be carried by crews.

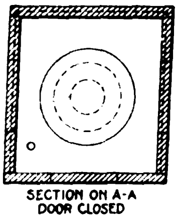
RED LAMP USED TO PROTECT FIRE EXTINGUISHERS FROM FREEZING

BY E. L. MATHEWS, FORMERLY ENGINEER OF WAY AND STRUCTURES CONEY ISLAND & BROOKLYN RAILROAD

Among the rules and regulations of the New York Fire Insurance Exchange referring to fire extinguishers is included one to the effect that a red light shall indicate the location of each extinguisher and another one which calls for their protection from freezing in cold weather. In order to comply with these regulations, as well as to obtain a measure of protection for its buildings, the Coney Island & Brooklyn Railroad Company devised a simple method of making one electric lamp accomplish the twofold purpose of heating and locating each extinguisher.

The extinguishers in question were the usual 3-gal. type and were placed in a wooden jacket or portable closet made for the purpose, as indicated by the accompanying sketches. The closets were built of ⅞-in. white pine and were suspended from the walls or columns of the building, according to the location desired.





Plan, Side and End Views of Cabinet with Red Glass Windows to Show Lamp Which Locates and Warms Extinguisher

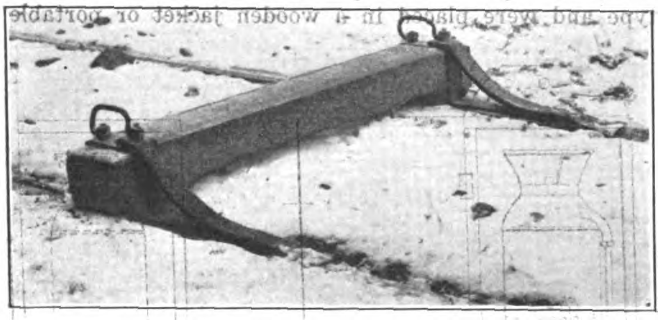
The extinguisher rested upon a shelf in which was a circular opening of a little less diameter than that of the base of the extinguisher and about 8 in. above the floor of the closet. In the chamber thus created we placed an ordinary 16-cp electric light bulb and connected it in such a manner that it could burn continuously. All walls of this chamber were lined with asbestos in order to obviate any fire risk. A circular hole of about 4 in. diameter was also cut in each side of the closet and in the door immediately opposite the light bulb, and ordinary window glass was inserted in these openings. The entire outside portion of the closet was then painted red, including the glass, thus furnishing the red light called for by the Fire Insurance Exchange.

This scheme has been in operation during the past five years. It has absolutely prevented the extinguishers from freezing, even in the most exposed places, and it has rendered them always accessible in case of need. It has met the requirements of the Fire Insurance Exchange, the inspectors of which have expressed their entire satisfaction with this method.

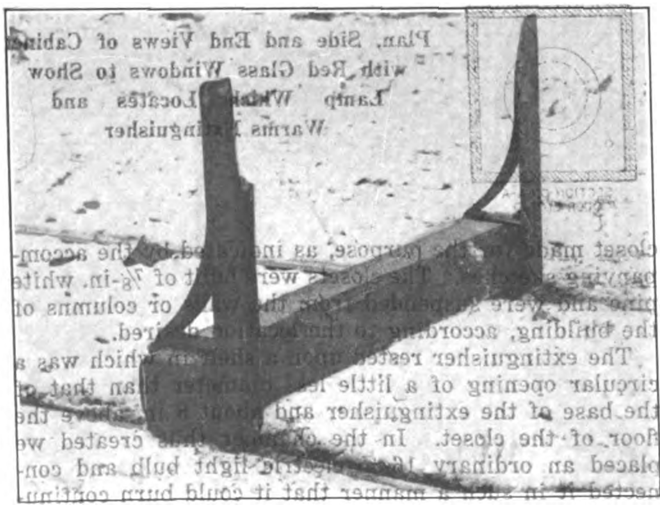
A HOME-MADE WHEEL SKID FOR BRAKING CARS ON GRADES

BY M. F. M. WERTH, ASSISTANT MECHANICAL SUPERINTENDENT BRITISH COLUMBIA ELECTRIC RAILWAY

When building operations were commenced on the provincial penitentiary buildings in the municipality of Burnaby, B. C., about 1 mile from the main interurban line between Vancouver and New Westminster, arrangements were made with the British Columbia Electric Railway Company whereby a spur track was to be built from the main line so that freight cars loaded with material could be delivered on the grounds. In building this spur it was found necessary to run the line down a 7.5 per cent grade at the bottom of which a curve with a 150-ft. radius was required. The danger of such a hill was enhanced by the local atmospheric conditions and the infrequency of service, which combined to cause a very slippery condition of the rails.



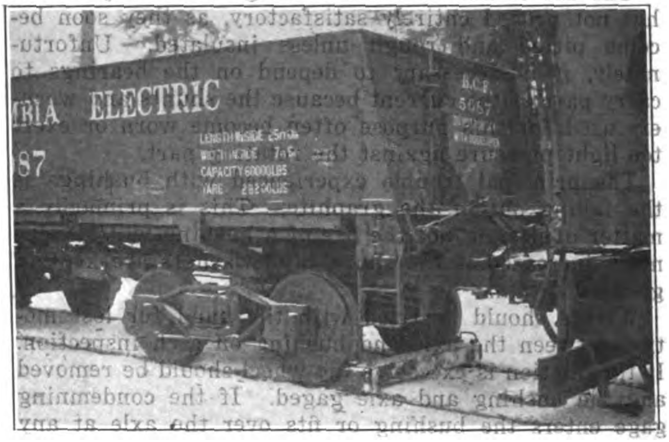
Wheel Skid in Position for Service



Wheel Skid with Pair of Runners Raised

Only one loaded car at a time was to be taken down the hill by a locomotive, but even so it was believed that operation would not be safe because of the possibility of skidding with locked wheels. It was first proposed, therefore, to install at the top of the hill a motor-driven hoist which would be braked so that a cable to the rear end of a descending train would retard the speed as much as desired. But this arrangement would have been expensive, and, moreover, the municipality of Burnaby was strongly opposed to allowing a cable to be operated down the center line of a street.

The mechanical department of the railway company then designed, under the supervision of the writer, the wheel skid shown in the accompanying illustrations, which has solved the problem to the satisfaction of all concerned and at an almost negligible cost. This device consists of a wooden tie to which short lengths of angle iron are bolted in such a way as to make a shoe or cradle for one pair of wheels on the loaded car. Each of the two runners of the skid was made from a 40-in. piece of 3-in. x 4-in. angle iron from which a strip 2 in. wide was first cut away from the 3-in. leg, thus leaving a 4-in. width of bearing on the rail and a 1-in. flange. These runners are fixed to the tie standard-gage distance apart, with the flange inside the rail. At the end farthest from the tie each runner is welded to a 1-in. x 4-in. iron strap, which is curved to fit the tread of a 34-in. wheel and bolted through the tie to the runner underneath.



Pair of Car Wheels Resting in the Skid

When a car is about to descend the hill this skid is placed on the rails between the locomotive and the car, and the car is then drawn forward so that its first pair of wheels rise and rest in the skid as shown in one of the accompanying views. In addition to the reactive effect of the runners, their large frictional surface tends thoroughly to clean the rail, rendering much more effective the braking power of the wheels following. When conditions are extremely bad the locomotive is attached to the rear of the loaded car so that the skid is placed at the head end of the descending train.

This device has now been in service for more than a year and has been found always to afford enough dragging effect to prevent the slightest difficulty in controlling trains on the grade. The locomotives used weigh about 35 tons and are provided with a 200-hp motor equipment. The loaded cars handled have a gross weight of about 44 tons.

The establishment of numerous factories near the harbor of Nynas and the rapid development of the town of Södertörn have led to the electrification of the Nynas-Södertörn Railway, and the construction of a new electric railway between Södertörn and Stockholm, Sweden. Single-phase current of 15,000 volts, fifteen cycles, will be used. The locomotives will develop 600 hp and weigh 42 tons. The expenditure of electric energy per ton-mile is estimated at 52 watt-hours for express trains, 69 watt-hours for ordinary trains and 40 watt-hours for freight trains.

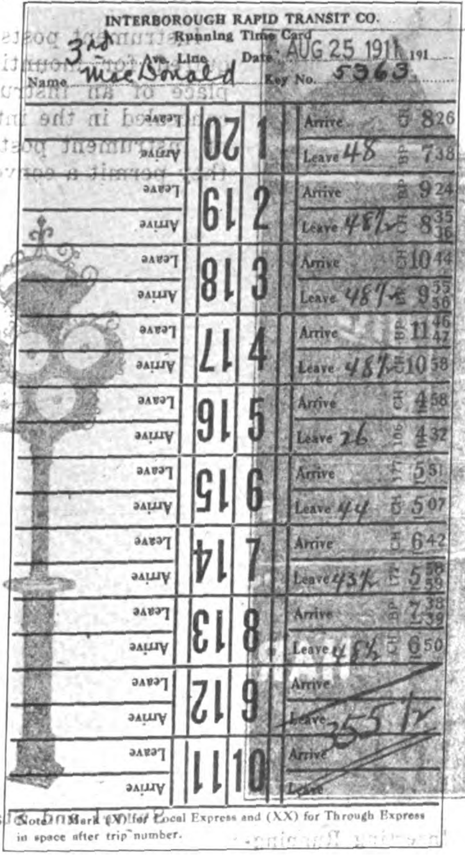
RUNNING-TIME TERMINAL CLOCK

The basis of economical transportation service is exact knowledge of the running time. In city service, especially, it is difficult to strike a fair average for given sets of conditions. One important reason for this is the fact that the reports of running time as made out by the conductors on their trip sheets are often deliberate or unintentional guesses and thus may prove of the most misleading character. For instance, the conductor's watch may not be correct; he may be unwilling to show on his trip sheet that he left the terminal three or four minutes late, and in the case of single-track or switchback lines the report will not show when the crew fails to go to the end of its run before turning back. Another defect of the ordinary penciled trip sheet is that it conceals those instances when a crew skips stops or hurries over one part of the line in order to loaf somewhere else, as at sidings. The employment of dispatchers does not eliminate the evil for they, too, are human and may often go so far as to make out ideal train sheets in advance. It is hardly necessary to emphasize the fact that doctored trip reports and train sheets do not help in the preparation of the best and most economical headways and in the correct payment of platform time.

To eliminate abuses of this nature and to insure an accuracy impossible even with perfectly honest employees, it is necessary to have some means for checking the movements of a car crew, just as watchmen's clocks are used to check the movements of a caretaker. The obvious thing to do is to have the motorman or conductor register his arrival and departure times at terminals and, if desired, at any number of intermediate time points. The three accompanying halftones show how this principle has been applied to three distinctly different kinds of electric railway service as follows: the interurban service of the British Columbia Electric Railway, the street city service of the Third Avenue Railway, New York, and the elevated (and subway) high-speed service of the Interborough Rapid Transit Company, New York. All of these clocks were installed by the Railway Improvement Company, New York, whose coasting-time recorders are well known.

The terminal clock, as previously indicated, is a most useful device when operated alone, but it is still more valuable to a railway which uses coasting-time recorders because the clock will prevent crews from understating their running time for the sake of showing a larger proportion of coasting time. On lines where the terminal running-time clock is installed each motorman is provided with a running-time card or envelope which may be of any type desired by the operating company. The one reproduced is that used by the Interborough Rapid Transit Company. Upon arriving at the clock station the motorman inserts his record, and the clock registers thereon his arrival and departure just as it would stamp an ordinary time card. The fact that such an incontrovertible record must be shown encourages the crew to make all terminals and intermediate points on time. The clock also gives the transportation department the desired accurate record of the movement of all cars and trains, thereby enabling the company to change the runs to greater advantage and to pay the men for the true platform time.

The record reproduced is a fac-simile of one made on the elevated lines of the Interborough Rapid Transit Company. The symbols shown represent stations as follows: C. H., City Hall; B. P., Bronx Park; 106, 106th Street; 177, 177th Street. The card shows that Motorman MacDonald left Bronx Park at 7:38 a. m.



INTERBOROUGH RAPID TRANSIT CO.
Running Time Card

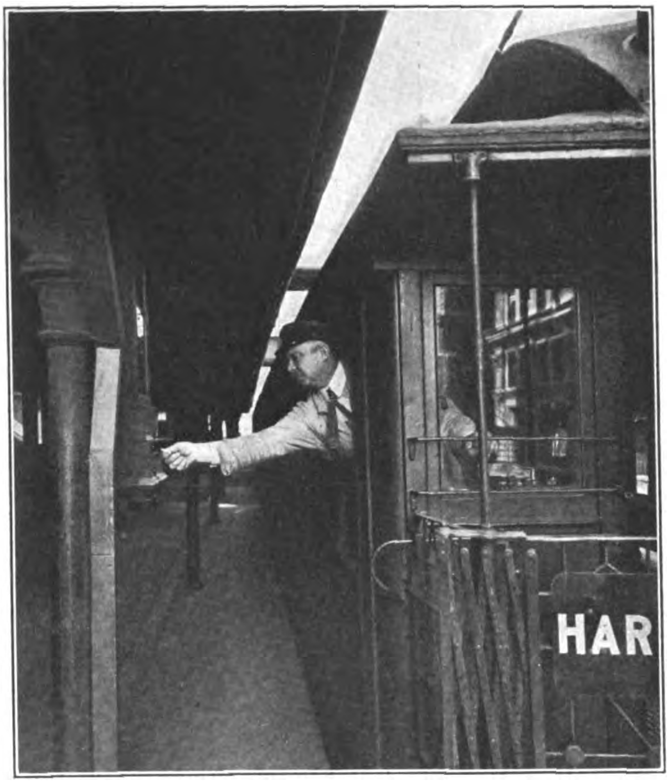
Name MacDonald 3rd Ave. Line Date AUG 25 1911 191
Key No. 5363

Leave	20	1	Arrive		[illegible]	8 26
Arrive			Leave	48	BP	7 38
Leave	19	2	Arrive		BP	9 24
Arrive			Leave	48½	CH	8 35 36
Leave	18	3	Arrive		CH	10 44
Arrive			Leave	48½	CH	9 55 56
Leave	17	4	Arrive		BP	11 46 47
Arrive			Leave	48½	CH	10 58
Leave	16	5	Arrive		CH	4 58
Arrive			Leave	26	106	4 32
Leave	15	6	Arrive		177	5 51
Arrive			Leave	44	CH	5 07
Leave	14	7	Arrive		CH	6 42
Arrive			Leave	43½	177	5 58 59
Leave	13	8	Arrive		BP	7 38 39
Arrive			Leave	48½	CH	6 50
Leave	12	9	Arrive			
Arrive			Leave	355½		
Leave	11	10	Arrive			
Arrive			Leave			

Note: Mark (X) for Local Express and (XX) for Through Express in space after trip number.

Application of Running-Time Terminal Clocks on an Outlying Line of the British Columbia Electric Railway and on a City Line of the Third Avenue Railway; Also Fac-Simile of Running-Time Card Made with These Clocks on Elevated Lines of Interborough Rapid Transit System and arrived at City Hall 8:26 a. m., the actual running time being forty-eight minutes. On his fourth run he left City Hall at 10:58 and arrived at Bronx Park at 11:46½, the actual running time in this case being forty-eight and a half minutes. The card also shows that his fifth run was not made until 4:32 p. m., at which time he left 106th Street, arriving at City Hall at 4:58, the running time being twenty-six minutes. The underscored figures on the record indicate p. m. time.

One of the halftone views shows how an elevated railway motorman makes his registration. The clock is placed at the end of the station just where the leading car stops. While the passengers are entering or leaving the motorman leans out of his cab window and makes the registration just before or on receiving the starting signals. All terminals on the Interborough and the Hudson & Manhattan systems are now equipped with these clocks. The terminal clocks on these railways act as a check on the dispatchers as well as on the motormen.



Motorman on New York Elevated Line Inserting Running-Time Card in Clock

A second illustration shows a motorman on the Third Avenue Railway system registering his time at a city terminal, while a third view shows the same operation on one of the outlying lines of the British Columbia Electric Railway, Vancouver, B. C. In the last instance the clock is locked in a cabinet to avoid tampering by outsiders. As the clock is placed at the end of the line, it is impossible for the crews to turn back without that fact being shown by their records.

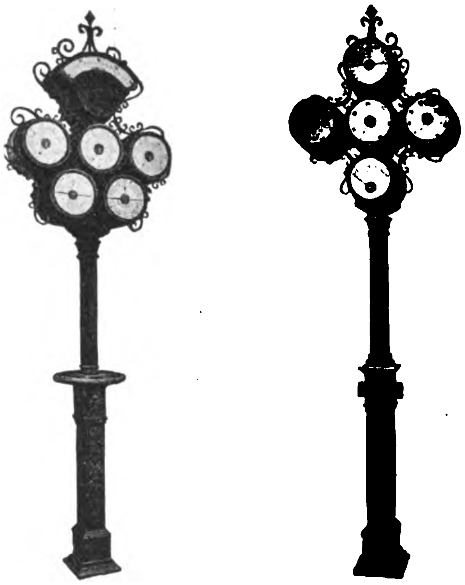
Walter Foreman, trainmaster of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, with headquarters in New Albany, Ind., on March 3 addressed a meeting of the Boosters' Club of the companies on the subject of automatic interlocking signal systems. A system of this type was recently installed on one section of the Louisville & Northern.

FROG BROOMS OF FLAT WIRE

The J. W. Paxon Company, Philadelphia, Pa., has long made a specialty of frog brooms which constitute a small but much appreciated part of track maintenance equipment, especially at this season of the year. The wire of the Paxon broom is flat and, while specially tempered to make it pliable, is stiff enough to handle mud and slush, whether loose or frozen. If the slush is frozen, the tool-steel chisel on the other end of the broom will loosen it. The chisel can be resharpened until worn away. The broom is easy to manipulate and is well balanced. It is so strong that switches can be thrown readily by inserting the chisel point in the groove without injury to the handle. This company also manufactures all kinds of wire brooms, brushes and bristle for other railway purposes.

INSTRUMENT POSTS FOR CONTROL OUTFITS

Instrument posts are used whenever a method is required for mounting meters in a power station in place of an instrument switchboard. The wiring is concealed in the interior of the posts. The advantages of instrument posts over panel switchboards are that they permit a convenient and ornamental mounting for meters and that they can be erected in positions where they can readily be observed without obstructing the general view of the operator.



Swivel and Stationary Type of Instrument Posts

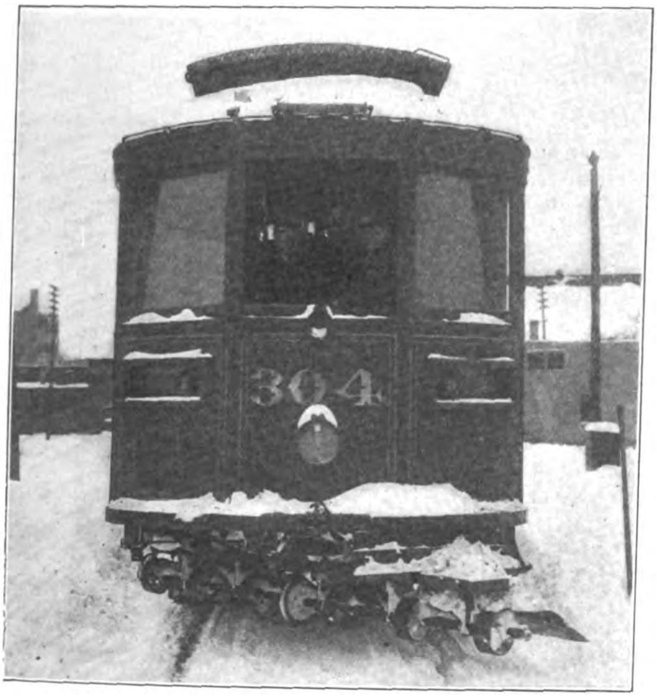
The common arrangement is to place these posts so as to form a support for the railing of an operating gallery, each post being placed in front of its respective controlling apparatus, which is usually installed on a suitable controlling pedestal. The posts may be secured to the floor either by bolting the shank to the side of channel-iron beams under the floor or by using a bolted flange collar, secured to the post and provided with holes for holding-down bolts. When a concrete floor is provided, a socket can be supplied which may be set into the floor and which is arranged for bolting to the flange collar.

The standard ornamental posts have plates provided at the places where hand railing is usually attached, but when required hand-rail bosses may be substituted. These bosses are drilled to take a standard 2-in. pipe, 2⅜ in. outside diameter. Posts with panel bases cannot be arranged for hand railing. The standard posts are finished in dead black. The posts having paneled bases are supplied with panels of slate with black marine finish.

Two styles of pedestals are made, with ornamental bases and with paneled bases suitable for mounting control apparatus. Each of these styles is also made with stationary top and with a swivel top which can be turned about by means of a hand-wheel just above the base. These instrument posts are manufactured by the Westinghouse Electric & Manufacturing Company.

TWO-SECTION STEEL-BLADE SNOW SCRAPER USED AT GRAND RAPIDS

The Grand Rapids (Mich.) Railway has recently purchased from the Root Spring Scraper Company, Kalamazoo, Mich., a new-style snow scraper which has been applied under the front and rear vestibules of one of its general utility cars. This scraper consists of a steel blade, 12 ft. long, divided into two sections and attached to a shaft in a manner similar to that employed with the Root spring scraper. The scraper blades and spring mounting are supported on a plank by cast-steel hangers, and this in turn is installed under the vestibules of the car at an angle of 45 deg. to the track. The blades are raised to the clear or lowered to the operating position by means of an ordinary hand-brake wheel, dog and ratchet mechanism. This mechanism is the terminal of a chain which passes over a sprocket keyed to the shaft which supports the scraper blades. By dividing these blades into two sections and lapping them where they join, the scraper is made to conform to the crown in the paving, thus insuring the removal of snow to the ball of the rail. If the blades meet an obstruction in the pavement, the supporting springs are brought into action, allowing the blade to spring back and clear itself. In operation the scraper has been found to work very satisfactorily, and it has the advantage that the railway is able to use it during the daytime without frightening horses. Further, it is not limited as to the speed at which it will operate successfully, and it will remove wet packed snow as readily as any other scraper. In the accompanying illustration the scraper is shown applied to a single-end car on the Grand Rapids Railway and raised to the clear position.



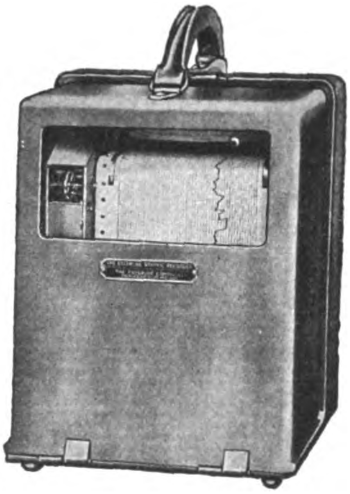
Two-Section Steel-Blade Scraper in Use

GRAPHIC METERS

A complete line of continuous-writing curve-drawing instruments has recently been placed on the market by the Esterline Company, Indianapolis, Ind. These instruments are furnished to measure all electrical quantities such as volts, amperes, watts, etc. Electric speed recorders, service recorders, pyrometers and graphic counters are also included. The meters are furnished in switchboard rear-connected type, wall or front-connected type, and portable type. Their general construction is the same except for the case and the method of making connections.

These instruments are of the direct-writing type. The pen is in contact with the paper at all times when writing. It is placed in the end of a tubular pointer which is pivoted and provided with a counterweight. The pressure of the pen on the paper is regulated by this counterweight, which is adjusted to give just sufficient pressure to hold the pen on the paper without creating heavy friction.

The ink supply is retained in a stationary well provided with a cover to prevent spilling when instruments are moved about. The ink, after being started through the pointer and pen, will continue flowing owing to capillary action as long as the supply lasts. This construction gives a light moving element and constant friction no matter how much ink there is in the meter.



Portable Graphic Meter

The clock is of the eight-day jewel balance-wheel type. It has two driving springs and a third spring which operates the re-rolling device provided for winding up the finished chart. On some types the re-roll is omitted and the finished record is allowed to feed through a slot in the bottom of the case. The clock is fitted with a driving roll equipped with pins at each end which engage perforations along the margins of the record chart. The driving roll is geared through the two idlers to the clock stud which furnishes the driving power.

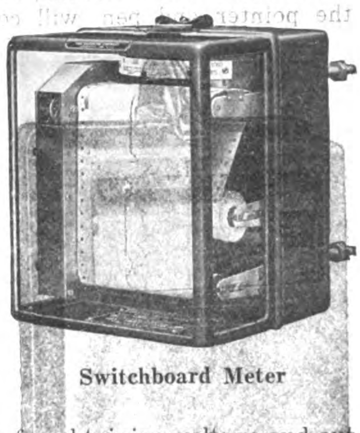
By putting on the proper gears, five chart feeds, ¾ in., 1½ in., 3 in., 6 in. and 12 in. per hour, may be obtained on any clock. For rapid chart feeds a special attachment is provided on the clock, arranged so that shifting a small lever on the front of the clock case instantly changes the chart feed from a given number of inches per hour to the same number of inches per minute.

The meter elements are assembled complete in one unit and may be removed from the instrument without dismantling. For d.c. ammeters and voltmeters a powerful d'Arsonval permanent magnet-type movement is used. For d.c. and a.c. wattmeters, a.c. voltmeters and ammeters a dynamometer type construction is employed. No iron is used in the magnetic fields of the dynamometer movements so that meters of this type are accurate on all frequencies and respond promptly to voltage or load variations. The armature shaft of the meter element has a bracket which carries pivots in which rest the pointer carrying the pen.

Record charts are of the tape type, being 6 in. in width and having a ruled portion 4½ in. wide. The time divisions are in the nature of arcs across the paper spaced ¾ in. apart. Range numbers are provided across the chart to facilitate the interpretation of curves. Hour numbers corresponding to the gears on the clock are printed along the margin opposite the time arcs. Voltmeters are furnished with suppressed zero scales, 90-140 volts, or standard scales, 0-150 volts. D.c. ammeters are also furnished with the suppressed zero scales for special uses or may be furnished with zero center charts for battery charging or other applications where reverse currents are encountered. Indicating scales are provided so that meters may be used either for indicating or curve-drawing purposes.

A.c. instruments have adjustable damping devices which consist of a rotating vane immersed in a small cup containing oil or some other viscous liquid. The amount of damping is varied by adjusting the height of the cup, the quantity of oil or the quality of the liquid. D.c. meters do not require damping as the armature is wound on a metallic frame in which the eddy currents are induced when the armature rotates in the magnetic field of the permanent magnet.

The energy consumption of these instruments is so low that they may be operated from existing shunts or transformers. Voltmeters and wattmeters require from 4 watts to 5 watts for each voltage element on 110 volts. D.c. ammeters consisting of millivoltmeters and shunts require only about 1/3 amp for the instrument. Owing to the direct-writing construction, no extra control circuits of any sort whatever are used.



Switchboard Meter

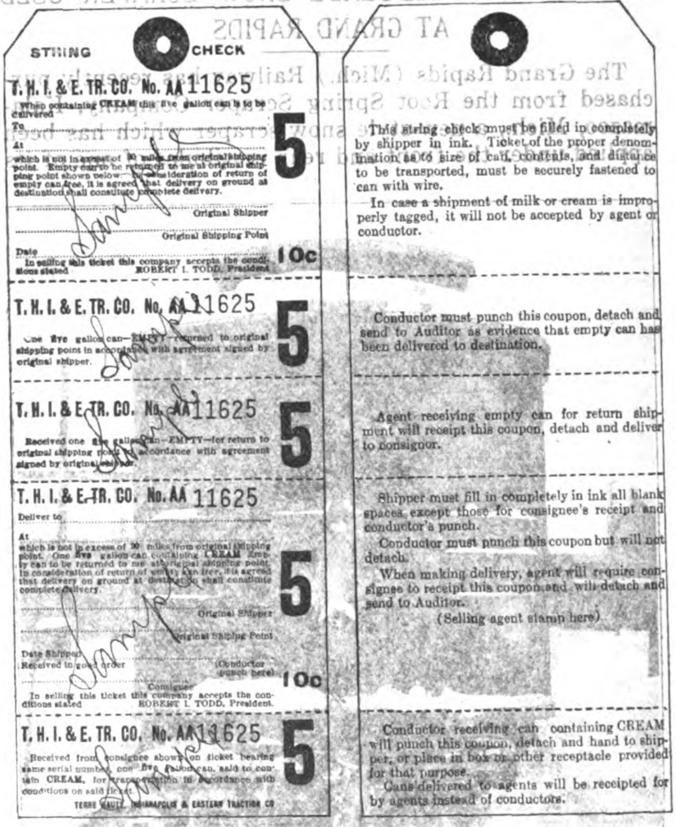
These instruments are used on switchboards for obtaining voltage and output curves, for getting the energy consumption of machine tools and for general efficiency engineering.

COASTING TIME RECORDERS FOR THIRD AVENUE RAILWAY SYSTEM, NEW YORK

The Third Avenue Railway System through President F. W. Whitridge recently placed an order for 1000 coasting time recorders and thirty-six terminal clocks for use on all the lines of this system. The company operates under almost every kind of surface railway conditions, from the heavily blockaded streets of Manhattan to long free-running stretches on many of its suburban divisions. The order for the coasting clocks was placed after careful tests had shown that they would produce substantial savings under this range of operating conditions. The terminal running time clocks will be used to insure the correct registration of running time from terminal to terminal and, if desired, also the running time to intermediate points. In this way the reported proportion of coasting time to running time will be absolutely correct, because the running time will not depend upon guesses made by the conductor. To secure the greatest possible benefit from the installations of both types of clocks, the company has created an efficiency department in charge of J. F. Anglin, as noted in the department of "Personal Mention" elsewhere in this issue. This department will devise forms of records for making just comparisons of results obtained under different conditions and will provide for suitable rewards to encourage economical operation.

MILK TAG USED BY INTERURBAN RAILWAY ENTERING INDIANAPOLIS

In order to provide a uniform milk ticket to be used in connection with the transportation of milk on the interurban lines entering Indianapolis, the Terre Haute, Indianapolis & Eastern Traction Company, Union Traction Company of Indiana and Indianapolis & Cincinnati Traction Company have adopted a standard form of string check which was put into use last autumn. The ticket is in two forms. The "A" form of ticket is used in transporting milk and the "AA" form for transporting cream. Each class of ticket is issued in nine denominations covering distances from 30 to 115 miles and quantities from 5 to 10 gal.



STRING CHECK

T. H. I. & E. TR. CO. No. AA 11625

When containing CREAM this five gallon can is to be delivered

To

At

which is not in excess of 30 miles from original shipping point. Empty can to be returned to me at original shipping point shown below. In consideration of return of empty can free, it is agreed that delivery on ground at destination shall constitute complete delivery.

Original Shipper

Original Shipping Point

Date

In selling this ticket this company accepts the conditions stated ROBERT I. TODD, President

5

10c

T. H. I. & E. TR. CO. No. AA 11625

One five gallon can—EMPTY—returned to original shipping point in accordance with agreement signed by original shipper.

5

T. H. I. & E. TR. CO. No. AA 11625

Received one five gallon can—EMPTY—for return to original shipping point in accordance with agreement signed by original shipper.

5

T. H. I. & E. TR. CO. No. AA 11625

Deliver to

At

which is not in excess of 30 miles from original shipping point. One five gallon can containing CREAM. Empty can to be returned to me at original shipping point. In consideration of return of empty can free, it is agreed that delivery on ground at destination shall constitute complete delivery.

Original Shipper

Original Shipping Point

Date Shipped

Received in good order

(Conductor punch here)

Consignee

In selling this ticket this company accepts the conditions stated ROBERT I. TODD, President.

5

10c

T. H. I. & E. TR. CO. No. AA 11625

Received from consignee shown on ticket bearing same serial number, one five gallon can, said to contain CREAM, for transportation in accordance with conditions on said ticket.

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION CO

5

This string check must be filled in completely by shipper in ink. Ticket of the proper denomination as to size of can, contents, and distance to be transported, must be securely fastened to can with wire.

In case a shipment of milk or cream is improperly tagged, it will not be accepted by agent or conductor.

Conductor must punch this coupon, detach and send to Auditor as evidence that empty can has been delivered to destination.

Agent receiving empty can for return shipment will receipt this coupon, detach and deliver to consignor.

Shipper must fill in completely in ink all blank spaces except those for consignee's receipt and conductor's punch.

Conductor must punch this coupon but will not detach.

When making delivery, agent will require consignee to receipt this coupon and will detach and send to Auditor.

(Selling agent stamp here)

Conductor receiving can containing CREAM will punch this coupon, detach and hand to shipper, or place in box or other receptacle provided for that purpose.

Cans delivered to agents will be receipted for by agents instead of conductors.

Opposite Sides of Milk Tag Adopted by Interurban Lines Entering Indianapolis

Milk Tickets			Cream Tickets		
A	5 gal.	30 miles	AA	5 gal.	30 miles
B	8 gal.	30 miles	BB	8 gal.	30 miles
C	10 gal.	30 miles	CC	10 gal.	30 miles
D	5 gal.	60 miles	DD	5 gal.	60 miles
E	8 gal.	60 miles	EE	8 gal.	60 miles
F	10 gal.	60 miles	FF	10 gal.	60 miles
G	5 gal.	115 miles	GG	5 gal.	115 miles
H	8 gal.	115 miles	HH	8 gal.	115 miles
I	10 gal.	115 miles	II	10 gal.	115 miles

The tariff established for handling milk and cream from platform at shipping point to platform at destination, including return of the empty cans by freight, is as follows:

	Milk	Cream
1 to 30 miles	1½ cents per gal.	2 cents per gal.
31 to 60 miles	2 cents per gal.	2½ cents per gal.
61 to 115 miles	2½ cents per gal.	3 cents per gal.

The use of the new form of ticket, although it has been in effect little over three months, is proving very satisfactory, and it is expected that the forms of receipts provided by this new string check will obviate a great deal of trouble in the handling of claims for loss or damage. Both sides of the "AA" form of ticket are reproduced on this page.

LONDON LETTER

(From Our Regular Correspondent)

The London County Council, in endeavoring to fight what it considers the unfair competition of motor omnibuses, has asked the Board of Trade to sanction a by-law prohibiting omnibuses from stopping at the same places as the cars of the tramway. The tramway cars have to stop in the middle of the street and motor omnibuses have been going in between the cars and the pavement, making alighting from cars and boarding them not only difficult but dangerous. The Home Secretary has written to the London County Council stating that he proposes to instruct the commissioner of police to invite the various public bodies and companies controlling tramways and omnibuses within the metropolitan police district to confer with representatives of the commission and of the different road authorities with a view to arriving at an agreement on stopping places within the area of each such road authority. The highways committee of the Council states it is considering the use of return tickets for penny stage journeys. Return tickets have been in general use on the longer routes for some time and have undoubtedly led to an increase in the tramway traffic receipts.

The successful working of the Liverpool tramways and electric supply department has resulted for many years past in a substantial contribution annually toward the reduction of rates. This year it is announced that the committee has decided to recommend the City Council to place the sum of £125,000 to this purpose, £100,000 from the tramways and £25,000 from the electric light department. Last year the amount received from the tramways was £66,000 and from the electric light supply £30,000, so that the additional relief received this year will equal about 1½d. in the pound.

The annual report of the Paisley District Tramways shows an increase in traffic receipts of more than £4,000, but expenditures show an increase of nearly £6,000, due to increased cost of track and roadway maintenance caused by the heavy traffic of motor lorries. The question has been agitated of passing a law to compel all users of a road to contribute equally to its maintenance. This would relieve the tramways of a portion of their present burden at least.

The Bristol Tramways & Carriage Company has issued its report for the year. The gross receipts increased £54,000, and the net £12,000. This has enabled the company to increase the dividend from 4 per cent to 4½ per cent, with substantial allocation to reserve.

The Glasgow Corporation has decided to proceed as rapidly as possible with the construction of its new generating station at Balmarnock. This station will be the largest in the west of Scotland. It will have a capacity of 150,000 hp, and will carry practically the whole power load for the city every day, and help out with the other stations when necessary for lighting purposes. The stations in Govan and Partick, which were taken over recently when these burghs were incorporated in the city of Glasgow, will be used as transforming centers.

Agitation is still proceeding in Birmingham for an all-night tramway service. The attitude of the tramway committee is unsympathetic and no progress has been made. The committee has decided to run first-class cars upon the Hagley Road route, and it will be put into immediate operation. The first of the new cars for this purpose has arrived. It differs externally but slightly from the ordinary vehicles, except in color. Internally the difference is mainly in the upholstery, which is of a more luxurious character. Double the ordinary fare will be charged inside passengers.

The Colne Corporation has purchased the Colne & Trawden Light Railways, and the arbitrator has just awarded the company the sum of £92,880, the costs of the arbitration to be divided. The arbitrator for the company valued the property at £170,000, while the corporation valued the undertaking at £25,000. The company's claim included £94,000 for present value and £76,000 for prospective profits.

The Hull tramways committee has decided to experiment with halfpenny fares during the whole of the day. The uniform penny fare which has been in existence on the Hull tramways for about fourteen years, has proved exceedingly popular, but for the past year or two this universal fare has been reduced to a halfpenny before nine o'clock in the morning. It has now been determined to experiment on one route with halfpenny stages, three halfpenny stages to cover the route and one penny to be the fare over the whole route. Halfpenny fares have been decided on in preference to transfer tickets, as the tramways manager states that tramway practice is almost unanimously against transfers, which are complicated in their issue, difficult to control, and liable to much abuse. Last year 43,000,000 people used the Hull cars, and of these 11,000,000 were the morning halfpenny passengers.

The Nelson Town Council reports that the sub-committee which inspected trolley omnibus systems in several towns has recommended such a system for part of the borough. The extension of the present system was opposed on account of the narrow roadways and the cost per car mile, while motor buses were disapproved on account of the cost of operation.

The Manchester tramways committee has decided to continue the all-night service of tramway cars with which it has been experimenting for three months. The committee reports that this service has not been a success financially and many of the people who signed the requisition for an all-night service have failed to use the cars to the extent that was expected. The committee feels, however, that the night cars have proved a great boon to workers whose duties terminate during the early hours of the morning, and has determined that there shall be no reduction in the number of cars on the all-night service. There may, however, be some slight alteration of the time on certain routes. The loss from the service has been small and the committee feels confident that the cars will in the future be better patronized.

The report issued by the tramways manager of Keighley deals with the operating expenses of trolley buses as opposed to petrol-driven motor buses. The motor buses resulted in considerable losses to the Corporation, which has commenced the substitution of trolley buses with success. The tramways manager strongly urges the commencement of the electrification of all the other routes on which motor omnibuses are at present in use. A full statement of the expense of the operation of the trolley vehicle is not available at present.

As previously stated in the ELECTRIC RAILWAY JOURNAL, the Great Eastern Railway has appointed H. W. Thornton, general superintendent of the Long Island Railroad of America, its general manager. Mr. Thornton will take up his duties the first week in April. While the chairman has stated that there is no immediate project of electrification, it would appear a certainty that the suburban routes of this railway will have to be electrified to cope with its enormous suburban traffic.

It is expected that the Midland Railway will soon announce that it has decided to electrify its lines from St. Pancras to Hendon. The directors of this company have decided to ask Parliament to grant them a further period of two years in which to formulate their scheme for the electrification of the London, Tilbury & Southend Railway.

A new type of carriage is being adopted on the underground tubes, similar in many respects to the cars which are now being operated by the District Railway. Hitherto the cars on the tubes have had only two doors, but it has been found that the congestion of passengers at interchange stations is so great that a further door has become a necessity. The new cars are fitted with hinged double doors opening inward, which can be opened by the passenger when the train is at rest, and closing automatically. The gateman can lock and unlock the doors from his platform by operating switches, and small red and green lamps tell the gateman when the doors are locked before starting the train. The cars are of steel, except for the interior finish.

The contract has been awarded for two 5000-kw turbo-alternators for the electrification of the Lancashire & Yorkshire Railway, which affects the line between Manchester and Bury. It is believed locally that further conversion in this center will probably proceed more rapidly than in the London area, and Manchester does unquestionably invite electrification on a large scale to enhance the public usefulness of the railways which serve a neighborhood containing millions of regular travelers.

A. C. S.

News of Electric Railways

Committee and Surface Lines Accept Arnold Chicago Subway Plans on Rental Basis

Following the refusal of the Chicago Surface Lines to join in the proposed plan of financing Chicago's initial subway system, the Board of Supervising Engineers at the meeting of the subcommittee of the local transportation committee of the Chicago City Council on Feb. 23 was instructed to prepare estimates along the line suggested by Bion J. Arnold which would meet the objections of L. A. Busby, president of the surface railway company. Estimates on the financing of this revised routing have accordingly been presented to the subcommittee on subways by Mr. Arnold and Mr. Weston, of the Board of Supervising Engineers, giving the revised estimated total cost as $33,885,000. A summary of the plans and estimates recommended by the Board of Supervising Engineers follows:

Routes	Cost	Date of Completion
Clark Street, Nineteenth Street to Elm Street	$10,500,000	Feb. 1, 1917
North leg of large U loop in Milwaukee Avenue, Randolph Street and Michigan Avenue to Adams Street	8,000,000	Feb. 1, 1917
Robey Street, Ashland Avenue and California Avenue connecting links	7,885,000	Feb. 1, 1919
South leg of large U loop in Harrison Street and Michigan Avenue to Adams Street	7,500,000	Feb. 1, 1921
Total	$33,885,000	

If the companies contribute the 55 per cent of their net receipts which is paid to the city in quarterly instalments during 1919, instead of contributing the sum in a lump in April of the following year, the subways can be built by Feb. 1, 1920, according to Mr. Weston. He also estimated that there would be $16,000,000 available for extensions which could be completed by Feb. 1, 1924, and $18,000,000 for extensions to be completed before Feb. 1, 1927, leaving a balance in the city's traction fund at that time of more than $7,000,000. Following the presentation of this estimate, it was approved by the committee and Mr. Busby of the surface lines was requested to state whether or not he would be willing to operate through the initial subways as revised and upon what terms.

On Feb. 28 Mr. Busby for the Chicago Surface Lines offered to pay to the city of Chicago as rent for the use of the revised downtown system of subways the entire amount of saving effected by subway operation. This was in line with Mr. Arnold's and Mr. Weston's recommendations to the local transportation committee as to the best course to pursue. In his statement to the subcommittee Mr. Busby estimated that this saving would range from $387,450 in 1917 tc $565,930 in 1927. The total for this ten years being $4,741,340, or the equivalent of 1 per cent annually on the gross receipts. This amount is lower than that estimated by the Board of Supervising Engineers, which totaled $9,840,000 for the same period.

Some of the Aldermen insisted that the surface line companies should pay 5 per cent on the total subway investment. In reply Mr. Busby stated that the company had reached the limit in the burdens it could carry. If the companies paid 5 per cent on the total subway investment their loss would be approximately $3,000,000. Under the arrangement proposed by Mr. Arnold and accepted by the company the latter would neither make nor lose any money by reason of subway construction.

In a letter conveying the offer of the Chicago Surface Lines to the subcommittee the company said:

"There is no question but that in the city of Chicago a 5-cent fare, if all of it is used for transportation, is sufficient to afford a fair return upon capital and give the fullest possible measure of service. That, however, is not the theory of the 1907 ordinances. The entire nickel is not used for transportation purposes. The companies under these ordinances are annually required to expend millions of dollars for public benefits which are in no way a direct transportation cost. In the seven years during which the companies have been operating under these ordinances they have expended the following amounts: paving streets, $7,360,435; maintenance of paving, $1,433,657; cleaning, sprinkling and sweeping of right-of-way, $2,691,897; 55 per cent to the city, $13,161,391; total, $24,647,381.

Record of Eastern Companies in Blizzard

The standard by which the severity of storms in the East is judged is the great blizzard of March 12, 1888, which so far as recollections and records go was the worst ever experienced. Second to it, it is generally agreed, is the storm which was general over the Atlantic Coast States from New York to Maryland on March 1 and 2. Early on March 1 a soft, clinging snow began to fall in large flakes. As the day advanced the temperature increased so that toward evening the snow which fell throughout the day was converted into slush. Late in the evening the wind increased and the temperature fell to a few degrees below freezing, so that the snow and water on the ground was quickly converted into ice to an average thickness of about 3 in. Meanwhile the snow continued to fall all night and during the greater part of March 2, in all about thirty-six hours. In New York the official forecaster placed the fall at 12 in. This, added to the remnant of the snow from two previous storms already in the streets, almost completely prostrated all transportation service and inflicted great damage on the light, power and telegraph systems, many of the transmission lines of which gave way under wires overburdened with the clinging ice and snow.

In the metropolitan district of New York the borough of Manhattan was the only one in which street railway service was not disrupted by the blizzard. In Brooklyn, Queens, Richmond and the Bronx the tie-up was one of the worst in the city's history. The New York Railways, warned by the Weather Bureau, kept its lines in operation and almost on schedule, using 125 pieces of snow-fighting apparatus on its 160 miles of single track. The worst annoyance encountered by the company, according to Theodore P. Shonts, president of the company, was the blocking of traffic by vehicles which took to the tracks. He said:

"The conditions are abnormal and most difficult for the street-cleaning department and the traffic officers of the police department to deal with, but it seems only reasonable to expect that trucks, delivery wagons and vehicles of all sorts should not be sent out loaded to capacity. Most of the interruptions to our service have been caused by trucks too heavily laden for the horses to draw or for motors to propel."

The Brooklyn Rapid Transit service was entirely or partially interrupted all through the borough. Thirty-eight surface lines of the company were abandoned during the storm on Sunday night and service remained to be resumed on twelve of the surface lines on Tuesday at noon. The service on the elevated lines was also paralyzed on Monday morning. It required three hours to get from East New York to Adams Street over the Lexington Avenue line on Monday morning, a trip which usually takes about forty minutes. Bridge service was very poor over all the bridges, although cars and trains ran with more regularity over the Brooklyn Bridge than over any of the other bridges. At midnight on Sunday no line in the Bronx was pretending to handle cars on schedule. All of the north shore of Queens and much of Nassau County were isolated. There were also serious delays on the trolley lines in Staten Island and in New Jersey.

Many of the steam railroads around New York canceled all outgoing trains on Sunday night. Service over the Long Island Railroad was practically at a standstill for many hours on some divisions, notably on the north shore and east of Jamaica. Even on the third-rail electric line between Brooklyn and Jamaica, one of very heavy traffic and equipped part of the way with four tracks, the company was able to keep open only the express tracks. Up to Tuesday noon the company was still operating both express and local trains between Brooklyn and Jamaica over one set of tracks, having been unable to clear the tracks used ordinarily for local trains.

In and around Philadelphia the same difficulties were experienced by the transportation interests as at New York. The Philadelphia Rapid Transit Company did not report the abandonment of service on any of its lines, but service was disrupted. The abandonment of cars was reported on the suburban lines outside the city. The Philadelphia *Ledger* said that "a remarkable record of successful operation was made throughout the city by the Philadelphia Rapid Transit Company." A car of the Lehigh Valley Transit Company which left Allentown at 4 p. m. on Sunday was marooned all night in a drift near Coopersburg. At Reading the local railway lines were forced to suspend for a time. Even in Atlantic City there was 10 in. of snow and the local trolley service was badly crippled.

In Baltimore the United Railways & Electric Company maintained its service with the greatest difficulty. The principal cause of delay reported there was from obstructions on the tracks. The wind attained a very high velocity at Baltimore and many houses were unroofed and the débris piled on the company's tracks.

Reports from New York State indicate a remarkable record by the public service companies in the face of almost impossible conditions. The Rochester, Syracuse & Eastern Railroad, which operates through sparsely settled territory for a considerable distance, kept cars running, but about two hours behind time. Sixteen inches of snow fell in twenty-four hours at Rochester. Tuesday morning saw the restoration of service on schedule on all of the local Rochester lines except the one to Sodus Bay, on which particularly trying conditions were encountered near the lake front. The Albany *Knickerbocker Press* says that the one bright spot on the weather map was the manner in which the United Traction Company kept cars on its lines close to schedule. According to James F. Hamilton, general manager of the United Traction Company, the road suffered very little on account of the storm. He reported that not a single one of the overhead wires had come down and that the only trouble from this source was from falling telephone wires becoming entangled with the trolley wires. The night service on every line of the company was doubled after midnight Sunday and all Monday night sweepers and plows were kept working on the road in an effort to bring the service up to normal. The Albany Southern Railroad, a third-rail road, experienced considerable difficulty on account of transmission line troubles caused by falling telephone and telegraph wires. The company cut its train schedule in two as a matter of expediency.

The following words of praise were meted out to the management of the local lines in Syracuse in an editorial, "A Brave Fight," which appeared in the Syracuse *Post-Standard* of March 3, 1914:

"That Manager Tilton and his men succeeded in maintaining some car movements on most of the lines Sunday night and were able to carry passengers with an approach to normal regularity Monday morning is a feather in their caps."

All of the electric railway lines in and radiating out of Syracuse had been dug out of the snow drifts late on Monday night with the exception of the Jamesville branch of the Syracuse & Suburban Railroad. The Empire United Railways, Inc., operating 138 miles of suburban and interurban electric railway, had cars on its various lines running approximately on time late Monday afternoon.

Panama-Pacific International Exposition

The management of the exposition announces that installation of exhibits may begin as early as July 1 of this year. The exhibitors will thus have nine months to devote to the preparation of their displays. Facilities have been provided for transporting material about the grounds with maximum ease, a railroad having been constructed upon the grounds and passing through all of the exhibit buildings. President Moore announces that on the opening day, Feb. 1, 1915, everything will be in place. There will be approximately 60,000 exhibits in the main exhibit palaces and over 7000 applications for concessions have been received. Two hundred and twelve national and international congresses have already voted to meet in San Francisco during 1915, and it is estimated that the total number of meetings of organized bodies will be fully 500.

The Making of a Technical Journal

The following remarks on the making of a technical journal are from an address on the subject delivered recently before the Western Society of Engineers by E. J. Mehren, editor of the *Engineering Record*, one of the papers of the McGraw Publishing Company, Inc.:

"The object of a technical journal being to gather from all parts of the country—and of the world, for that matter—data and news of value to its clientele, the collecting organization must evidently be an extensive one. The machinery for gathering this material can be classified under three heads: (1) a permanently employed editorial force; (2) correspondents and contributors, and (3) a comprehensive clipping service. The permanently employed editorial staffs of the larger engineering journals have as many as nine or ten editors, supplemented by as many trained clerical assistants. All of the editors have an engineering training. Most of the editors are located at the main office of the journal, while the character of the specialty covered governs the points at which the others are located. The staff generally includes four or five specialists, confining their attention to one, or, at most, two lines, and a number of general men. Correspondents are located in every large city throughout the country and are relied upon to furnish promptly news of special interest to the journal. The clipping service is supplied in part by clipping bureaus and in part by a department in the head office of the journal, which reads representative newspapers from every part of the country. The clippings, however, are used simply as clues, to be followed by letter or telegraphic verification, and, in the case of important matters, by personal attention of a correspondent or member of the staff. The secret of prompt and reliable news gathering lies in the development of a strong and interested clientele. Such a clientele is the chief asset of a technical journal.

"Every reader of a technical publication should be a potential contributor. Certainly at least once a year something occurs in his practice that is worth while passing on to his brothers. If he will put it in the shortest possible form, his effort will receive a hearty welcome from the technical editor. Five one-column articles are preferable to one five-column article.

"As to the editorial staff itself, no single problem in technical journalism offers so much difficulty. The men must be engineers by education and preferably by experience, must have ability as writers, and last, but not least, must have strong personalities, because only such can deal forcefully with situations and make the impression necessary to secure the confidence of the engineers with whom they deal. If some formula could be devised by which such men could be infallibly picked, the saving of time to the editor-in-chief would be very large. As it is now, only men of apparently special aptitude obtain a trial, and even then the mortality is at least 50 per cent. The work of training is laborious and long.

"Some of the difficulties experienced by the technical editor may help to a clearer comprehension of the work involved in the making of a technical journal. Probably the chief difficulty is presented by the tremendous amount of material which daily must pass over the editor's desk. This consists not only of routine letters but of contributed and staff articles, with their accompanying blueprints and photographs; special and annual reports, press bulletins, proceedings of technical societies, clippings, catalogs and a mass of miscellaneous material. It is a conservative estimate, leaving aside bulky printed reports, that fully twenty times as much printable material passes over the editor's desk as is actually used. But whatever the material, it must be examined by some one familiar with the policy of the journal and the history of each of the principal engineering specialties, in order that the new may be separated from the old, the correct from the incorrect.

"It is true that the technical journalist does not originate. It is for those in professional practice to make the advances. The journalist's duty is to observe and interpret them. While, therefore, he is likely to lose his appreciation of details, that loss is more than compensated for by the advantage of being able to stand off at a distance and to observe a movement or a new process without the warping tendencies which come from too close attention to details. In this way the technical editor should be able to see the philosophy of the development going on under his eye and to present aspects and relations that will be an inspiration to those whose duties keep them closely confined to details or to one specialty.

"In recent years there has been a marked tendency to emphasize the news pages of the technical journal. Ten years ago these were quite subordinate. When important events occurred they were duly chronicled, because it was quite evident that the field would be interested in them. It was not appreciated, however, that a bird's-eye view of the field for the week came not from the mere reporting of the outstanding events, but from gathering up from the four corners those little items which more surely denote the general tendencies. For that reason the development has been toward a great many short items, written in newspaper style, so that they could be passed over readily, leaving the reader in an hour with a complete survey of the field for the week.

"The sentiment in the offices of technical journals is changing rapidly. More and more appeal is being made through pictures rather than through the printed word. The picture gives an immediate impression—the word is a slower medium. Moreover, the printing art itself has undergone rapid changes and standards have been erected which have raised typography to the level of an art. The changes are being made, too, without detracting from the technical excellence of the journals.

"It is hardly necessary to point out that if magazines did not have advertisers the technical journal, as we know it to-day, could not exist. It costs from $12 to $17 per annum to send a high-class technical journal to a subscriber, yet he pays but $3 or $5 for it. While the best papers from their very foundation, thirty-five to fifty years ago, have not permitted the prostitution of their reading pages by the advertiser, it is only recently that advertisers have seen the light and have concluded that a journal which does sell itself editorially cannot gain or hold the confidence of its readers and is, therefore, not a good advertising medium."

Key Route System Changes

A. W. McLimont, the new general manager of the San Francisco-Oakland Terminal Railways, which has recently passed into the hands of the George C. Moore interests, is now located in Oakland, perfecting the organization, and planning changes and betterments. Mr. McLimont is not yet ready to announce all of the changes in the officers of the company, but has announced several changes, as follows, some of which have been referred to previously in the ELECTRIC RAILWAY JOURNAL:

George H. Harris has been appointed general superintendent in charge of all matters pertaining to operation. Mr. Harris was formerly at Birmingham, Ala.

John Wells, former purchasing agent, has resigned and is succeeded by Pomeroy La Due, who was formerly with the Michigan United Railways.

Robert Morrison, Jr., also formerly of the Michigan United Railways, is the newly elected secretary and assistant treasurer.

J. Q. Brown, who has been mechanical and electrical engineer for the past fourteen years, is to retire. The work of Mr. Brown's department is to be divided. George W. St. Pierre, at present master mechanic, is to be made superintendent of equipment. He will have charge of the maintenance of all rolling stock and marine equipment, ferry boats, etc. The new electrical engineer has not yet been decided upon.

A coasting recording department has been established in charge of W. E. Hendley. Coasting recorders made by the Railway Improvement Company, New York, N. Y., will be installed in the 400 or more cars of the company. The company has been testing the effect of these clocks during the past eight months.

The Key System consists essentially of electric railways in the municipalities of Haywards, San Lorenzo, Alameda, Oakland, Piedmont, Emeryville, Berkeley, Albany and Richmond, with interurban lines running out on the long Key Route pier, and a steamer ferry connection with San Francisco. A twenty-minute ferry service is maintained during most of the day, with extra boats during the rush hours of commuter travel.

The first improvements to the system will be a rehabilitation of the electric railway lines. Track and roadway will be improved where found necessary, and feeder lines augmented. The old type of cars will be replaced as rapidly as possible by the semi-convertible type of pay-as-you-enter cars. A very heavy travel is expected during the Panama-Pacific International Exposition in 1915, and the efforts during 1914 will be to get in readiness for the large demands anticipated. The capacity of the pier will be greatly enlarged. At present there is one slip. Two more slips will be constructed. The company now owns five ferry boats, each with a seating capacity of 1200 and a carrying capacity of 2000. These boats will be put in excellent shape and three new ferry steamers will be purchased. These new boats will each have a normal seating capacity of 2200 people and a carrying capacity of 3000. The present pile structure of the pier will be replaced by an earth and rock fill and an entirely new electric interlocking plant will be installed with the pier. This improvement is made necessary by the increased track facilities and the rapid train movements which will be necessary for increasing traffic. The extension of the railway to San José is a project which has been proposed for some time. George C. Moore, who effected the purchase of the properties and who represents the English syndicate, is now on his way to Europe. Nothing definite as to extensions and construction of interurban lines will be decided until Mr. Moore's return.

Plans for Advertising Toledo Franchise Delayed

At the regular meeting of the City Council of Toledo, Ohio, on the evening of Feb. 25, the action on the plan of the administration was delayed by three members who voted against a resolution appropriating $500 to pay for advertising for offers for a street railway franchise in that city. It was proposed to put the resolution through that evening under a suspension of the rules. Unless the votes are changed, the resolution may have to go through in regular order.

Councilman Kilbury offered a resolution directing the employment of an expert at a salary of not more than $50 a day to value the property of the Toledo Railways & Light Company for the city. The matter was referred to the finance committee and laid over for a week.

In addition to Mayor Keller and Vice-mayor Hassenzahl, the members of the special committee which will have the franchise matter in charge are Councilman Ruppel, Brown, Dotson and Hein and City Solicitor Thurstin. The first meeting of the committee was scheduled for Feb. 26. It was decided to advertise for franchise bidders in the newspapers of New York, Chicago, Philadelphia, Boston, Toronto, London, Paris and Berlin. The rate of fare was not to be mentioned in the advertising and it was intended that the best bid should be submitted to a vote of the electors for approval, the city to reserve the right to purchase the property after a certain period, probably ten years.

City-Built Road to Be Operated by Private Company

Mayor W. W. Seymour of Tacoma, Wash., has informed the other members of the City Commission that the Tacoma Railway & Power Company has "practically accepted" the proposition made by the city to operate cars over a city-built car line through the tideflats district. The Mayor declined, however, to discuss the matter for publication until the agreement has been signed. Instead of dividing the earnings of the line above 6 per cent equally between the city and the company, the company asked that it be given a larger percentage. This has tentatively been agreed to. The city's proposition in detail is as follows:

"1. The city to construct the railway in South Eleventh Street, Tacoma, from Pacific Avenue to Sitcum Avenue and the eastern city limits at an expense of, say, $35,000.

"2. The Tacoma Railway & Power Company to equip and operate the railway above mentioned and any extension thereof which the city may make in a first-class manner, with cars running at sufficiently short intervals reasonably to accommodate the travel.

"3. The company to connect its St. Paul Avenue line with the Eleventh Street line and operate cars from Pacific Avenue.

"4. The company to extend its present transfer system to and from the Eleventh Street line to and from all other lines operated by it in the city, including the Pacific Traction Company line.

"5. The time of operation to be seven and one-half years from the time when the Eleventh Street line is tendered by the city ready for equipment and operation.

"6. The company to pay to the city each six months a sum equal to 4 per cent upon the cost of the railway to the city.

"7. All net earnings in excess of 6 per cent per annum upon the company's investment of the Eleventh Street line, and over the cost of operation, maintenance of the line and depreciation of equipment, to be divided equally between the city and the company; provided, that if any difference arises between the city and the company as to the sum to be so divided, the members of the State Public Service Commission shall be a board of arbitration finally to decide the question.

"8. Operation by the Tacoma Railway & Power Company not to preclude running of cars by other licensees of the city; that is, tracks to be 'common user' tracks.

"9. Only passenger cars, express or package freight cars and repair cars to cross Eleventh Street bridge."

Municipal Railway Retrenching.—The Brandon (Man.) Municipal Electric Railway has found it necessary to curtail its expenditure on account of an increasing deficit, and hereafter the cars will be operated as one-man cars. It is also understood that the schedule will be reduced and that the program for extensions will not be carried out at this time.

Injunction Restraining Collection of Franchise Tax Dissolved.—Judge Stout, sitting in the Franklin Circuit Court at Frankfort, Ky., has dissolved the temporary injunction granted the South Covington & Cincinnati Street Railway, Covington, Ky., to enjoin the collection of its 1912 franchise tax on a valuation above $801,000. The suit involved $160,000 of state taxes.

Bus Line in St. Louis.—The Rapid Transit Company has placed a gasoline bus in operation between the West End and down-town St. Louis. The car is 21 ft. 6 in. long and seats thirty passengers. The seats are arranged longitudinally. Five other buses are in course of construction for the company. The new buses will have cross seats and will accommodate thirty-six passengers seated.

Important Development in East St. Louis.—The St. Louis & East St. Louis Electric Railway Company, East St. Louis, Ill., of which A. J. Purinton is general superintendent, has placed in operation its new terminal station at the west end of the Eads Bridge. The company has also started the new inverted magnetite arc lamps on the Eads Bridge. There are fifty of them, some on brackets attached to the iron poles which carry the span wires. On the east approach roadway the lamps are placed on top of iron poles.

Chicago Cannot Require Universal Transfers.—The Supreme Court of Illinois, in affirming the decision of the Cook County Circuit Court, recently decided that the City of Chicago is without authority to pass an ordinance requiring universal transfers on the lines of the Chicago Elevated Railways. The decision did not state that the city could not have universal transfers, but merely sustained the decision of the lower court in stating that the Legislature had never delegated to the city the power to enforce such an ordinance.

Plans for Opening New California Line.—The Pacific Electric Railway, Los Angeles, Cal., expects, despite the recent unprecedented floods, to place its new line between Los Angeles and San Bernardino in operation by May 1, 1914. The new line will extend from Upland through Alta Loma, Eliwanda, Wade, Fontana and Rialto to San Bernardino, a distance of 21 miles. The distance between Los Angeles and San Bernardino is 60 miles. The residents of all the towns along the line will participate in a celebration upon the occasion of the opening of the road.

Electrification of Altoona Main Line of Pennsylvania Under Consideration.—The management of the Pennsylvania Railroad is considering the advisability of electrifying that portion of the main line between Altoona, at the foot of the eastern slope, and Conemaugh, on the western slope of the Allegheny Mountains, a distance of about 35 miles, where there is a frequent and heavy train movement over heavy grades. The carrying out of this work, however, is largely dependent upon an improvement in the revenues of the company to warrant raising the new capital which will be required.

Proposed Appraisal of Cincinnati Traction Company Property.—On Feb. 26, 1914, Walter M. Schoenle, city solicitor of Cincinnati, called upon the members of the Public Utilities Commission of Ohio to arrange for the physical valuation of the property of the Cincinnati Traction Company and the Cincinnati Street Railway. He was asked to request the City Council to furnish experts, if possible, to work with the commission's experts in checking up the inventory and making a complete appraisement. W. Kesley Schoepf, president of the companies, has offered to furnish experts and have an inventory prepared for the convenience of the examiners.

Rehabilitation of Lake Burien Railway.—A resolution, introduced by Mr. Erickson of the Common Council of Seattle, Wash., authorizing the board of public works to rehabilitate the Lake Burien Railway, so that it may be put in operation by the city not later than April 15, and authorizing the expenditure of $25,000 for this purpose, has been adopted by the Council. Superintendent of Public Utilities Valentine estimates that these repairs will cost not less than $15,375, and that construction of a substation and equipment for a six-car service will cost an additional $11,670. This will deplete the Lake Burien fund, which now has $27,000 to its credit.

Ohio Public Utility Tax Law Upheld.—The United States Supreme Court on Feb. 24 handed down a decision upholding the constitutionality of the Ohio law taxing public utilities. This measure proposes at varying rates a tax on the gross earnings of all public service corporations in the State. When the latter was first enacted it placed an equal tax on all public service corporations, but a few years ago it was amended and the corporations were classified. The Ohio River & Western Railway contended that the classification was unreasonable and that the 4 per cent tax on railroads was particularly detrimental. The decision of the court involves the payment of approximately $3,500,000 a year by the various public utilities of the State.

Motor Bus Lines Ask Franchise in Chicago.—Two motor bus companies have applied to the Public Utilities Commission of Illinois and to the park boards of Chicago for grants to operate omnibuses on the streets of Chicago. If the Utilities Commission decides that the vehicles are a necessity or a convenience, a permit in the form of a certificate will be issued to the companies, after which the park boards will decide which of the two companies shall receive the right to operate. The companies intend to charge a 10-cent fare, for a service which will include trips through the park systems and will carry passengers from their homes to the Chicago loop district. A motor bus similar to those now in use on Fifth Avenue, New York, will probably be adopted.

Allegheny Valley Employees Return to Work.—On the morning of Feb. 11, 1914, the former motormen and conductors of the Allegheny Valley Street Railway, Pittsburgh, Pa., who had been out on a strike for exactly two months to enforce their demands for the reinstatement of the president of the union, who had been discharged for insubordination, returned to work without contract and without conditions and were restored to their old places by the company. The company had been operating the road on schedule by new men employed as motormen and conductors since Dec. 16, 1913. In addition to demanding the reinstatement of their representative, the old men insisted upon the recognition of the union and a contract providing for arbitration, etc. The strike was handled under the direction of V. L. Edmunds, efficiency and labor expert of the Railway Audit & Inspection Company, Philadelphia, Pa.

Boston Elevated Railway Pays Retroactive Wages.—The Boston (Mass.) Elevated Railway distributed $243,510 in retroactive wages to its present and many former employees on March 2, as a result of the finding of the arbitration board whose sittings in relation to various labor matters closed a few weeks ago. The payment covered wage increases extending between May 1, 1913, and Feb. 14, and 10,140 persons were affected, many of whom are not now in the company's service. Sixteen automobiles and two teams under police guard distributed the money, which was drawn from Boston banks on Feb. 28 and inclosed in pay envelopes by a special force of clerks on the Sunday following. The individual payments ranged from a few cents to more than $100. The calculations of retroactive pay have been made under the general direction of J. Henry Neal, general auditor, and a maximum of sixty extra clerks has been at work in addition to the regular staff. The money was distributed according to the company's divisional organization.

Subway Track Material Contracts Awarded.—During the week ended Feb. 28, 1914, the Public Service Commission for the First District of New York awarded contracts for track materials for the Fourth Avenue subway, in Brooklyn, to cost $306,923. These materials are to be used in equipping the subway with tracks, ties and roadbed from the Brooklyn end of the Manhattan Bridge to Fourth Avenue and Eighty-sixth Street, Brooklyn. The contracts in every case went to the lowest bidders as follows: open hearth rails, Bethlehem Steel Products Company, $127,108; manganese rails, Manganese Steel Rail Company, $43,199; splice bars, The Rail Joint Company, $19,035; end inclines, Eastern Malleable Iron Company, Inc., $1,032; adjustable separators, American Brake Shoe & Foundry Company, $1,822; cut track spikes, Lackawanna Steel Company, $3,569; screw spikes, American Iron & Steel Manufacturing Company, $2,560; bolts and nuts, American Iron & Steel Manufacturing Company, $6,308; washers, American Brake Shoe & Foundry Company, $1,488; rail braces, Eastern Malleable Iron Company, Inc., $1,524; anti-creepers, The Creepcheck Company, $2,736. The commission has also called a public hearing for March 17 on the form of contract for the work of installing the tracks in this subway. After this hearing the contract for the installation will be advertised for bids.

PROGRAMS OF ASSOCIATION MEETINGS

Mississippi Electric Association

The annual meeting of the Mississippi Electric Association will be held at Meridian, Miss., on April 27, 28, 29, 1914.

Arkansas Association of Public Utility Operators

The seventh annual convention of the Arkansas Association of Public Utility Operators will be held in Little Rock, Ark., April 21, 22 and 23, 1914.

New England Street Railway Club

The fourteenth annual meeting and banquet of the New England Street Railway Club will be held at the Hotel Somerset, Boston, Mass., on March 26, 1914. The annual meeting will be held at 3 p. m., the reception at 6.30 p. m., and the dinner at 7 p. m. Seats for the banquet will be assigned on March 19 in the order of the receipt of the applications by H. A. Faulkner, the secretary, but the committee will, so far as possible, endeavor to consider personal preferences when expressed in writing by the applicant. The cost of tickets is $4 each and the tables will seat six.

Illinois Electric Railways Association

The annual meeting of the Illinois Electric Railways Association was called for Mar. 6, 1914, at the Leland Hotel, Springfield, Ill. The first session was to convene at 10 a. m. on March 6, and the program included the following papers:

Paper, "Development of Water Power at Marseilles, Ill.," by C. W. Humphrey, consulting engineer, Chicago.

Paper, "The New Public Utilities Commission Law of Illinois," by William J. Norton, of Norton & Bird, engineers, Chicago.

Paper, "Railway Motors," by J. L. Layng, of the General Electric Company, Schenectady, N. Y.

The session was to close with the election of officers and the appointment of committees for the ensuing year.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The committee on railroads has voted leave to withdraw the petitions providing for the purchase by the State of the New York, New Haven & Hartford Railroad, for the electrification of all railroads within the Boston metropolitan district, and for the election of members of the Public Service Commissioners in place of their appointment by the Governor. Representative McInerney has presented a set of inquiries which have been referred to the committee on rules regarding the engineering experience of members of the Boston Transit Commission, the duration of meetings and conduct of business. A hearing will be held by the committee to permit discussion of the board's composition and duties.

NEW YORK

The Assembly on Feb. 26, 1914, unanimously adopted the Murtaugh resolution to adjourn finally on March 27. It had been adopted already by the Senate.

A bill rendered by the commission and approved by Judge Hale, its counsel, is now pending before the Legislature, which if adopted will give the commission the jurisdiction to deal with proposed rate increases in advance of the rate taking effect.

A bill has been introduced in the Senate to extend for three years the time of the Frontier Electric Railway to begin the construction of its proposed road between Buffalo and Niagara Falls.

A bill has been introduced in the Senate amending the railroad law by providing that passenger cars propelled by gasoline or oil engines may be heated in such manner as approved by the Public Service Commission notwithstanding the prohibition against the use of stoves or furnaces in passenger cars on railroads. A bill has been introduced in the Senate amending the railroad law by providing that the names of railroad stations may not be changed without the consent of the Public Service Commission. The commission is authorized to restore names heretofore changed or to otherwise change the names.

A bill has been introduced in the Assembly inserting in the railroad law a new section providing that any railroad corporation organized under the laws of the State which has been placed in the hands of a receiver by the Supreme Court is to be entitled to five years' time, after the Public Service Commission shall have authorized the issuance, sale and disposition of its stocks and bonds, within which to begin the construction of its road and expend 10 per cent of its capital, and ten years within which to complete the road and put it in operation. The charter of such a railroad corporation is not to be forfeited by failure to commence and complete its road within the time prescribed if the Public Service Commission has heretofore granted it a certificate of convenience and necessity, and the time the corporation is in the hands of a receiver is not to be computed as a part of the time for commencing and completing its road.

A bill has been introduced in the Assembly inserting in the railroad law a new section extending for five years after the act takes effect the time the railroad corporations organized under the laws of the State and now in the hands of receivers shall have in which to expend 10 per cent of the amount of their capital and complete their roads. The charter of such corporations is not to be forfeited by reason of their failure to commence construction, expend 10 per cent of their capital and complete their roads within the time originally limited for such purposes. They may proceed to build and complete roads within five years provided the routes do not extend within the corporate limits of New York City.

A bill has been introduced in the Senate to amend the railroad law in relation to rates for commutation tickets on certain steam railroads operating out of New York.

Financial and Corporate

Stock and Money Markets

March 4, 1914.

By to-day prices on the New York Stock Exchange had recovered from the temporary interference caused by the storm, and gains were substantial in some of the leading issues. There was nothing, however, to indicate a material expansion in the demand for stocks. Brooklyn Rapid Transit was a strong feature. Rates in the money market to-day were: Call, 1¾ per cent; sixty days, 2¾ @ 3 per cent; four months, 3¼ @ 3½ per cent; six months, 3¼ @ 3½ per cent.

The Philadelphia trading continued light to-day, few traders being on the floor on account of poor wire service with New York.

On the Chicago exchange the volume of sales was small. Bonds were steady, Chicago Railways and Chicago City Railway figuring in small amounts in the sales.

The Boston market to-day was fairly broad and generally firm.

The Baltimore market was fairly active to-day, United Railways & Electric Company stock leading the list of transactions.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 25	Mar. 4
American Brake Shoe & Foundry (com.)	97	95
American Brake Shoe & Foundry (pref.)	144	143½
American Cities Company (com.)	36	36
American Cities Company (pref.)	61¾	61¼
American Light & Traction Company (com.)	352	352
American Light & Traction Company (pref.)	106	107
American Railways Company	39	39
Aurora, Elgin & Chicago Railroad (com.)	*39¼	36¾
Aurora, Elgin & Chicago Railroad (pref.)	80¾	78¼
Boston Elevated Railway	82	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	39	39
Brooklyn Rapid Transit Company	92	93¾
Capital Traction Company, Washington	109	109½
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	93	92
Chicago Railways, ptcptg., ctf. 2	32¾	32½
Chicago Railways, ptcptg., ctf. 3	7	6½
Chicago Railways, ptcptg., ctf. 4	3	2⅞
Cincinnati Street Railway	110	110
Cleveland Railway	105	104½
Cleveland, Southwestern & Columbus Ry. (com.)	*5	*5
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	*26
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	80¼	80
Denver & Northwestern Railway	71	71
Detroit United Railway	a85	a85
General Electric Company	148	147
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	85½	87
Interborough-Metropolitan Company (com.)	14½	14¾
Interborough-Metropolitan Company (pref.)	59¼	60
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	*19½	*19½
Kansas City Railway & Light Company (pref.)	*35	*35
Lake Shore Electric Railway (com.)	*5	*5
Lake Shore Electric Railway (1st pref.)	*82	*82
Lake Shore Electric Railway (2d pref.)	*20	*20
Manhattan Railway	131⅛	130¼
Massachusetts Electric Companies (com.)	11	11¼
Massachusetts Electric Companies (pref.)	*61½	61
Milwaukee Electric Ry. & Light Co. (pref.)	*95	*95
Norfolk Railway & Light Company	*24½	*24½
North American Company	70	70
Northern Ohio Traction & Light Co. (com.)	60	63
Northern Ohio Traction & Light Co. (pref.)	98¼	98½
Philadelphia Company, Pittsburgh (com.)	43	44
Philadelphia Company, Pittsburgh (pref.)	43	43
Philadelphia Rapid Transit Company	18⅜	18¾
Portland Railway, Light & Power Company	*53	*53
Public Service Corporation	112	112
Third Avenue Railway, New York	42¼	44½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	80
Twin City Rapid Transit Co., Min'apolis (com.)	106	106½
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*80	*80
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	25¾	26½
United Rys. Inv. Company (com.)	21½	20½
United Rys. Inv. Company (pref.)	45	45½
Virginia Railway & Power Company (com.)	53	53
Virginia Railway & Power Company (pref.)	95	95
Washington Ry. & Electric Company (com.)	87	87
Washington Ry. & Electric Company (pref.)	87	87
West End Street Railway, Boston (com.)	71	71
West End Street Railway, Boston (pref.)	92	93
Westinghouse Elec. & Mfg. Company	70	71
Westinghouse Elec. & Mfg. Co. (1st pref.)	116	116¼

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* Last sale. a Asked.

ANNUAL REPORT

Geary Street Municipal Railway

According to a report made to the Board of Supervisors of San Francisco by the finance committee, the net profits of the Geary Street Municipal Railway for the year ended Dec. 31, 1913, the first twelve months of its operation by the city, amounted to $85,346. The total revenue for the year was $446,076, and the total operating expenses, depreciation and interest amounted to $360,730. More than $77,000 of the above net profit accrued during the last six months of the year, during which time the road was in operation from the beach to the ferries.

The statement of income, profit and loss for the six months ended Dec. 31, 1913, follows:

Operating revenues		$309,794
Operating expenses:		
Operation and maintenance	$134,007	
Depreciation and renewals	55,763	
		189,770
Net operating revenue		$120,024
Interest on bonds owned		1,328
Gross income, less operating expense		$121,352
Interest on bonded debt		44,302
Net profit—six months ended Dec. 31, 1913		$77,050

In figuring the profits the finance committee stated that it added such charges as would have been made against a private corporation, as required by the charter. These include legal and clerical services furnished by various departments of the city government and taxes. Such charges are not shown, in proportionate form, in the preceding statement of income, profit and loss, but they are included for the entire year in the balance sheet of the company.

The balance sheet as of Dec. 31, 1913, prepared in compliance with charter provisions for comparison with privately owned utilities and showing profit on operations for the year as $45,304, follows:

ASSETS		
Cost of road and equipment		$1,657,251
General expenditures		181,890
Municipal bonds, owned		93,300
Cash in city treasury		547,628
Other current assets		53,228
Total assets		$2,533,297
LIABILITIES		
Funded debt—bonds sold		$1,969,000
Contribution from premium on bonds sold		2,341
Contribution from taxes		238,692
Current liabilities		161,312
Obligatory charter reserves:		
Depreciation and renewals	$80,054	
Taxes	35,454	
Insurance	1,137	
		116,645
Total		$2,487,992
Surplus—Profit on operations for the year		45,304
		$2,533,297

The Geary Street Municipal Railway does not actually pay taxes, and no payment is made for services rendered to it by other departments of the municipal government. The comparison charges required by the charter are shown as follows:

Profit as shown in balance sheet	$45,304
Comparison charge for legal and clerical services	4,588
Comparison charges for taxes	35,454
Net profit for year as per income statement	$85,346

During the year the company operated 1,300,868 passenger car miles. Total passengers carried amounted to 9,723,177, including full-fare revenue passengers 8,882,996, half-fare revenue passengers 49,035, revenue transfer passengers 49,543, non-revenue transfer passengers 631,363 and non-revenue passengers 110,240. The total cars in daily operation number thirty-nine; the number of platform men is 130 and the track mileage operated is 15.08 miles (single track).

Hearing on Plans for Reorganizing Ithaca Companies

The Public Service Commission of the Second District of New York on March 3, 1914, heard the application of the Ithaca Street Railway and the New York, Auburn & Lansing Railroad for approval of the plan of reorganization proposed by the bondholders. Charles A. Hotchkiss, New York, appeared in behalf of the applicants. He stated that the Ithaca Street Railway had been purchased under foreclosure by H. W. Fitz, the chairman of the committee representing the bondholders, who made a payment of $50,000 on account. It was proposed to form the Ithaca Traction Corporation as soon as the deed for the property was delivered to Mr. Fitz. The latter company desired to issue $250,000 of 5 per cent fifty-year first refunding mortgage gold bonds subject to 275 of the present underlying bonds of that system. The company also requested the commission to approve the issue of $475,000 of capital stock of the Ithaca Traction Corporation and the acquisition by the new steam railroad of the aforesaid $250,000 of bonds and $475,000 of stock. Mr. Hotchkiss stated that the new steam railroad would be called the Central New York Southern Railroad Corporation. This corporation desired permission to issue $1,450,000 of preferred stock and $750,000 of common stock. The plan of the new steam railroad was to extend over the property of the New York, Auburn & Lansing Railroad, run south from Auburn to Renwick, and to construct from that point on its own right-of-way into the heart of Ithaca within 1000 ft. of the Lackawanna Railroad, and there build a new passenger station. Mr. Hotchkiss explained that this would permit two railroads to enter the railroad center of Ithaca. The company proposes to operate a fast passenger service at least every two hours, and has ordered two gasoline cars. The hearing was adjourned pending the receipt by the commission from Mr. Hotchkiss of certain financial information after the sale of the New York, Auburn & Lansing Railroad on March 6, 1914.

Canadian-American Power Corporation Authorized to Issue Stock

The Public Service Commission for the Second District of New York has rendered a decision on the application of the Canadian-American Power Corporation to engage in business, to issue stock and to acquire the Niagara Falls Electrical Transmission Company. The company sought to acquire a contract with the Electrical Development Company for furnishing 46,000 electrical hp produced in Canada and providing for the sale of this power in the United States, principally on or near the Niagara frontier. The company desired to issue $3,000,000 stock on account of the contract and $435,000 for the purchase of the Niagara Falls Electrical Transmission Company stock, bonds and debt.

The decision of the commission is that the applicant shall be restricted to a total of $1,250,000 stock on account of the contract and the acquisition of the Niagara Falls Electrical Transmission Company, of which $435,000 may be 7 per cent cumulative preferred, on condition that before any stock shall be issued the applicant shall secure authority for the location of its transmission and distributing systems and shall file a stipulation as follows: (1) Every contract with purchasers of energy shall provide that the price, terms and conditions affecting price and duration shall be subject to revision by the commission upon complaint or upon motion of the commission, any ruling of the commission to be subject to judicial review. (2) That charges for all of the service and customers shall not, on the average, exceed $19 per hp sold, but this shall not prevent the commission from requiring a lower price for particular kinds of service on just cause shown. (3) Until further order of the commission the company shall reserve at least 23,000 electric hp for sale to consumers of energy for light or power. (4) Upon merger of the two companies the stock, bonds and floating debt of the Niagara Falls Electrical Transmission Company and the third mortgage bonds, floating debt and $92,000 first consolidated mortgage bonds of the Niagara Falls Gas & Electric Light Company shall be canceled.

Commissioner Sague, in a dissenting opinion, says that the amount of securities issued is practically a capitalization of the power contract, and that the amount of tangible property of the new company will be considerably in excess of the amount of 7 per cent cumulative preferred stock authorized. He dissents from the opinion that stock may in some cases be issued for organization purposes and yet disregarded in future rate proceedings, and believes that all stock authorized by the commission for new companies must be considered as entitled to a fair rate of dividend as measured by the stocks of similar companies.

The decision follows a contest before the commission in which those who advocated the utilities contract for the 46,000 of hp at $12.50 a year sought to capitalize and make use of that contract. First it was made part of a merger plan including the Buffalo & Lake Erie Traction and the Buffalo-Rochester trolley systems, but opposition stopped the merger. Then the plan was put before the commission a second time in the application for permission for the Canadian-American to sell stock and do bsuiness.

Proposed Reorganization of New York Crosstown Line

The Public Service Commission of the First District of New York has approved a plan for the reorganization of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad as the Mid-Crosstown Railway, which provides for the issuance by that company of $150,000 of capital stock in payment for all the franchises, tracks, etc., of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad free from all liens and claims, the Third Avenue Railway to issue for the acquisition of said stock $187,000 of its 4 per cent bonds, including not more than $37,000 thereof on account of the compensation of the receiver, his counsel and the committee of bondholders. The proceeds of the remaining $150,000 of bonds are to be applied to the liens and claims against the property and the debts of the receiver and of the Mid-Crosstown Railway, Inc., and the committee and such part of the compensation of the receiver and counsel as are not paid by the Third Avenue Railway. Any residue will be distributed pro rata among the depositing bondholders, along with the proceeds of the notes mentioned below. The balance of the purchase price will be received in the form of a 4 per cent promissory note of the Third Avenue Railway for $250,000, payable within one year from date, with the right at maturity to renew $166,666.66 thereof for one year at 4 per cent, and again at the second maturity to renew $83,333.33 for another year at the same rate.

The claims which are to be paid by the committee out of the proceeds of the $150,000 of bonds received by it amount at their face value with interest and penalties to July 1, 1913, to approximately $106,621. It is expected, however, that some of these claims will be reduced. The committee is to have full power to adjust all claims against the New York Railways, the Metropolitan Traction Company and the persons who were at one time directors of the last mentioned company and to satisfy the claims of bondholders, creditors and stockholders of the Mid-Crosstown Railway from any moneys which may be realized on such claims. The plan will be binding on all stockholders unless within twenty days from Feb. 17 more than one-third in interest dissent in writing to the Central Trust Company, New York, N. Y., which is designated as depositary under the agreement.

Binghamton Railway Sale

As noted briefly in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, page 496, the Public Service Commission of the Second District of New York has granted the application of the Scranton & Binghamton Railroad to purchase the stock of the Binghamton Railway. G. Tracy Rogers, president of the Binghamton (N. Y.) Railway, states that the officers of the Scranton & Binghamton Railroad, of their own volition, suggested that if they were allowed to secure the stock of the Binghamton Railway no further dividends would be declared on the stock of the company until two years from July 1, 1914, in accordance with the following resolution passed by both the Scranton & Binghamton Railroad and the Binghamton Railway.

"That for a period of two years the entire net receipts of the Binghamton Railway shall be applied to the payment of interest on its debt and the improvement and equipment of that road and its property, and that no further dividend shall be declared by the Binghamton Railway for a period of two years from July 1, 1914."

It is further stipulated by the Scranton & Binghamton Railroad that no contracts as to power for the Binghamton Railway, or traffic agreements, either freight or passenger, or payments of mileage for use of cars by one company to the other, are to be made except with the approval of the

Public Service Commission. The intention of the Binghamton Railway and the commission is to have the Binghamton Railway continue to be operated as a New York State company independent of the Scranton & Binghamton Railway, except as to ownership. It is understood that the entire stock of the company is to be placed in trust with the trustee under the mortgage of the Scranton & Binghamton Railroad.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway on Feb. 26 petitioned the Public Service Commission of Massachusetts for authority to issue $281,000 of refunding first mortgage 4 per cent bonds of the Boston & Northern Street Railway and $247,000 of similar bonds of the Old Colony Street Railway. The proceeds of these issues are to be used to pay for expenditures made on additions to property. The stockholders of the Bay State Street Railway have approved the issue.

Cincinnati (Ohio) Traction Company.—The Public Utilities Commission of Ohio on Feb. 24, 1914, authorized the issuance by the Cincinnati Traction Company of $253,500 of equipment trust certificates, with interest at 5 per cent. These certificates are to be sold for the highest price obtainable and for not less than the par value. The proceeds arising from the sale are to be used to purchase sixty double-truck, center-entrance, arch-roof passenger trail cars of steel at a price of $4,225 each.

Cleveland (Ohio) Railway.—According to the annual report of the Cleveland Railway, the proceeds of the sale of the stock under the last two offers of the company amounted to $6,337,200. Of this amount, $4,505,000 was used to retire bonds of the Cleveland Electric Railway and the remainder was taken up by bonds of the Cleveland Railway. All underlying bonds, viz., the bonds of the Brooklyn Street Railroad, the South Side Street Railroad, the Cleveland City Cable Railway, the East Cleveland Railroad and the Cleveland Electric Railway, have been paid in full, and the only bonds now outstanding are those of March 1, 1911, amounting to $5,495,000, a part of an authorized issue of $35,000,000 secured by a mortgage of that date.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—Hodenpyl, Hardy & Company, New York, N. Y., have purchased and are offering at 99 and interest $1,500,000 of convertible 6 per cent five-year bonds of the Commonwealth Power, Railway & Light Company, dated May 1, 1913. The bonds are part of an authorized issue of $10,000,000 which, with the present offering, are now all outstanding.

Dominion Power & Transmission Company, Hamilton, Ont.—W. C. Hawkins, managing director of the Dominion Power & Transmission Company, has announced that the company will not purchase the Brantford Street Railway.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has received an application from the Harrisburg Light & Power Company for permission to purchase from the Elmira Water, Light & Railroad Company 3148 shares of its preferred capital stock of the aggregate par value of $314,800 and 3476 shares of the common stock of the Elmira Water, Light & Railroad Company of the aggregate par value of $347,600, and to pay therefor the sum of $500,000. This sum is to be paid by the issuance and delivery by the Harrisburg Light & Power Company of $500,000 par value of its fully paid and non-assessable common capital stock. The application sets forth that in the event of permission being granted by the commission proceedings will be instituted to increase the common capital stock of the Harrisburg company from $1,250,000 to $1,750,000. The Elmira Water, Light & Railroad Company has an authorized capital stock of $2,000,000, consisting of 20,000 shares of the par value of $100 each, of which 10,000 shares are 5 per cent cumulative preferred stock, and 10,000 shares are common stock. The application further sets forth that $683,000 par value of said preferred stock and $1,000,000 par value of said common stock are now issued and outstanding.

Hudson & Manhattan Railroad, New York, N. Y.—The syndicate composed of Kuhn, Loeb & Company and Harvey Fisk & Sons, New York, N. Y., and Robert W. Fleming & Company, London, Eng., which was formed about a year ago to buy the new first mortgage bonds and adjustment income bonds of the Hudson & Manhattan Railroad in order to be able to take up the outstanding collateral trust notes and participate in the readjustment plan, expired by limitation on Feb. 27, 1914, and was dissolved. It was stated that there had been no public offer on the issue on account of radical changes in conditions since the formation of the syndicate. The completion of the details in connection with the underwriting occupied several months, and by the time offering could have been made conditions were unfavorable. It was deemed best, therefore, to dissolve the syndicate and permit each member to take his share of the underwriting.

Jacksonville (Fla.) Traction Company.—A special meeting of shareholders of the Jacksonville (Fla.) Traction Company was held on Feb. 26, 1914, at which it was voted to increase the authorized capital stock by $500,000 of preferred stock and $500,000 of common stock, making the capital stock as now authorized $1,000,000 preferred and $1,500,000 common. The holders of the common stock will be offered the right to subscribe for $200,000 of the new common stock at par in the ratio of one new share for every four old shares, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914.

New York (N. Y.) Railways.—The directors of the New York Railways on Feb. 26 declared an interest payment of 2.345 per cent on the $30,626,977 of 5 per cent adjustment income bonds for the six months ended Dec. 31, 1913, payable on April 21, 1914. This payment, with the 1.636 per cent paid on Oct. 1, 1913, for the six months ended June 30, 1913, makes a total of 3.981 per cent for the calendar year 1913. Swartwout & Appenzellar, New York, N. Y., brokers, have issued the following statement: "The declaration just announced will not be satisfactory to the bondholders. No interest declaration would be satisfactory based on the present method of bookkeeping under which unexpended reserves are not automatically returned to income. The bondholders have pointed out to the company and to the directors the statement of the income bond indenture on this point, and all that the bondholders expect or ask is that the terms of the indenture be followed. Some of the largest holders of the income bonds have got together with a view of having the court rule on the failure of the company to live up to the terms of the indenture." Darwin P. Kingsley, president New York Life Insurance Company, William A. Day, of the Equitable Life Insurance Company, and Haley Fisk, vice-president of the Metropolitan Life Insurance Company, have been appointed a committee by the trustees of their respective companies to investigate the interest payment. It is reported to be the purpose of the committee to carry the case up for a legal decision. The companies mentioned own, it is stated, about $2,000,000 of the income bonds.

Northern Ohio Traction & Light Company, Akron, Ohio.—On Feb. 19, 1914, the Public Utilities Commission of Ohio authorized the Northern Ohio Power Company to sell and transfer to the Northern Ohio Traction & Light Company all its property franchises, rights and privileges. The consideration therefor is the cancellation of the indebtedness of the Northern Ohio Power Company to the Northern Ohio Traction & Light Company created by the latter's advancing and paying all the money necessary for the acquisition and development of the property of the Northern Ohio Power Company. This indebtedness amounts to approximately $1,979,549.

Ohio Electric Railway, Cincinnati, Ohio.—On Feb. 24, 1914, the Public Utilities Commission of Ohio authorized the Ohio Electric Railway to issue $123,800 of equipment trust certificates bearing interest at the rate of 5 per cent, to be sold for the highest price obtainable, but for not less than the par value. The proceeds arising from the sale of the certificates are to be devoted to the purchase of the following: five all-steel interurban center-entrance motor passenger cars, costing $12,000 each; four motor express cars, costing $10,000 each, and fourteen freight trail cars, costing $1700 each.

Ottawa (Ont.) Traction Company.—Announcement has been made of the incorporation of the Ottawa Traction Company, with $10,000,000 capital stock. It will take over the stock of the Ottawa Electric Railway, exchanging three shares of stock in the new corporation for one share in the old company. The Ottawa Electric Railway last year paid 12 per cent regular yearly dividends, with an extra dividend of 3 per cent. The old stock, which has been selling around $265 a share, at this rate would yield about 5.66 per cent on the investment. It is controlled by the same interests as the Ottawa Light, Heat & Power Company, which has a capitalization of $2,000,000 of stock and $1,000,000 of bonds. All the stock and $500,000 of bonds are outstanding.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has called for payment on March 25, 1914, all of the outstanding $5,000,000 of 6 per cent gold notes dated July 1, 1913. Payment will be made in New York, London and Geneva, Switzerland.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has sold to Lee, Higginson & Company, Boston, and Drexel & Company, Philadelphia, $5,800,000 of 5 per cent first and refunding mortgage bonds due in 1942. The proceeds will be used to pay for completed improvements. They are part of an authorized issue of $75,000,000, of which $21,800,000 are now outstanding and $18,000,000 are reserved for retiring underlying bonds. The remainder can be issued for not exceeding 80 per cent of cash costs of additions and improvements under restrictions of the mortgage. The issue has a cumulative sinking fund of 1 per cent annually, 1915 to 1926, inclusive, and 1½ per cent annually thereafter, figured on the total amount issued.

St. Louis, Springfield & Peoria Railroad, Peoria, Ill.—N. W. Halsey & Company, New York, N. Y., are offering at 95 and interest a block of first and refunding mortgage 5 per cent gold bonds of the St. Louis, Springfield & Peoria Railroad, dated 1909, due Dec. 1, 1939, but redeemable at 105 on any interest date. These bonds are guaranteed by indorsement on each bond, unconditionally, as to principal and interest, by the Illinois Traction Company. The interest is paid without deduction for United States taxes.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—A. B. Leach & Company, New York, N. Y., are offering for sale 6 per cent cumulative preferred stock of the South Carolina Light, Power & Railways Company at 97 and accrued dividend to yield about 6.2 per cent. This stock is free from all taxes in Massachusetts.

Springfield (Vt.) Electric Railway.—According to an appraisement of the properties of the Springfield Electric Railway recently completed by French & Hubbard at the instigation of the company itself, the replacement value of the road is shown to be $406,162, with a present depreciated value of $338,556. This latter amount is $38,556 in excess of the company's entire bond and stock liability. The appraisal included a detailed examination of all the physical property of the company. The calculation of the replacement value of all was based on present market prices for material and labor. The values ascertained for the property are exclusive of such items as going concern and other intangibles.

Third Avenue Railway, New York, N. Y.—Judge Lacombe, in the United States District Court, on Feb. 28 handed down an opinion denying the motion of the Third Avenue Railroad and its receiver to increase its claim against the New York City Railways and others. Judge Lacombe said: "So long a time has elapsed since the filing of this claim, and in the interim so much has taken place with the details of the claim before all parties interested in negotiations and adjustments, that to allow it to be now amended so as to increase it to the extent of nearly $3,000,000 seems wholly inequitable."

United Railroads, San Francisco, Cal.—The United Railroads of San Francisco offered to pay on March 1, 1914, the $650,000 of Ferries & Cliff first mortgage 6 per cent bonds due at that time at the Anglo-London & Paris National Bank or the office of N. W. Halsey & Company. The company has already purchased $50,000 of the bonds for retirement. The $250,000 of Park & Ocean first mortgage 6 per cent bonds which matured on Jan. 1, 1914, have been paid and the mortgage canceled.

United Railways Investment Company, San Francisco, Cal.—The committee of stockholders of the United Railways Investment Company appointed in May, 1913, to work out a plan to liquidate the back dividends on the preferred stock has decided to recommend the exchange of the present stock for 50 per cent new 6 per cent preferred and 75 per cent common, accrued dividends on which are to be relinquished.

Washington-Virginia Railway Company, Washington, D. C.—The Philadelphia Stock Exchange on Feb. 8 listed the stock of the Washington-Virginia Railway. This company was incorporated on Oct. 15, 1913, to take the place of a former company of the same name, which was merged with the Washington Utilities Company in November, 1912, but which was obliged to resume separate existence owing to the refusal of the subsequently created Utilities Commission of the District of Columbia to allow the corporation to issue securities in accordance with the merger agreement. The company has the same financial and corporate organization as the former one.

West End Street Railway, Boston, Mass.—R. L. Day & Company, N. W. Harris & Company, Estabrook & Company, Blodgett & Company and Merrill, Oldham & Company on Feb. 24 offered publicly for sale the issue of $2,000,000 of 5 per cent bonds of the West End Street Railway, dated March 2, 1914, and due March 1, 1944. These bonds are sold to refund $2,000,000 of 4½ per cent bonds maturing on March 1, 1914. The sale took place at 106 and interest, yielding 4⅝ per cent.

Wisconsin Railway, Light & Power Company, Milwaukee, Wis.—N. W. Halsey & Company, New York, N. Y., are offering at 88¾, yielding about 6 per cent, first mortgage and refunding 5 per cent gold bonds of the Wisconsin Railway, Light & Power Company, par value $1,000, and also certificates of $500 and $100 each, dated Feb. 1, 1913, and due Feb. 1, 1933. These are callable, all or in part, on any interest date at 105 and interest. The interest coupons on these bonds and certificates will be paid in full, without any deduction of the normal income tax.

Dividends Declared

Chicago (Ill.) Elevated Railways, quarterly, $1.50, preferred participating certificates.

Monongahela Valley Traction Company, Fairmont, W. Va., 1½ per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BATON ROUGE (LA.) ELECTRIC RAILWAY					
1m., Dec., '13	$16.386	*$9,541	$6,845	$2,100	$4,745
1 " " '12	14,384	*7,651	6,733	1,734	4,999
12 " " '13	163,128	*102,382	60,747	24,775	35,972
12 " " '12	147,381	*87,907	59,475	20,768	38,707
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.					
1m., Dec., '13	$7,689	*$7,836	$147	$1,080	†$1,226
1 " " '12	7,849	*7,469	379	1,076	†696
12 " " '13	124,403	*98,727	25,675	13,043	12,632
12 " " '12	120,008	*90,872	29,136	12,554	16,582
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.					
1m., Dec., '13	$36,169	*$17,632	$18,537	$6,367	$12,170
1 " " '12	34,387	*16,124	18,264	5,682	12,582
12 " " '13	380,952	*209,953	170,999	72,913	98,086
12 " " '12	360,177	*194,881	165,296	68,105	97,191
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Dec., '13	$59,870	*$32,903	$26,967	$8,244	$18,723
12 " " '12	483,125	*270,592	212,532	71,177	141,355
EL PASO (TEX.) ELECTRIC COMPANY.					
1m., Dec., '13	$87,721	*$47,452	$40,269	$4,210	$36,059
1 " " '12	81,228	*40,382	40,847	3,920	36,927
12 " " '13	896,115	*478,359	417,756	48,015	369,741
12 " " '12	793,320	*430,217	363,103	69,661	293,442
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.					
1m., Dec., '13	$166,503	*$92,814	$73,689	$50,973	$22,716
1 " " '12	154,113	*86,451	67,662	47,768	19,894
12 " " '13	1,831,040	*1,068,664	762,376	586,763	175,613
12 " " '12	1,713,098	*1,003,649	709,449	566,523	142,926
HOUGHTON (MICH.) COUNTY TRACTION COMPANY.					
1m., Dec., '13	$24,833	*15,449	$9,383	$5,610	$3,773
1 " " '12	26,421	*15,960	10,461	5,740	4,721
12 " " '13	296,853	$180,260	116,593	67,592	49,001
12 " " '12	307,506	*174,735	132,771	67,592	65,539
JACKSONVILLE (FLA.) TRACTION COMPANY.					
1m., Dec., '13	$64,485	$47,704	$16,781	$12,872	$3,909
1 " " '12	48,626	33,183	15,442	10,762	4,680
12 " " '13	679,622	438,588	241,033	143,717	97,316
12 " " '12	562,537	378,512	184,026	118,986	65,039

*Includes taxes. †Deficit.

Traffic and Transportation

Aurora, Elgin & Chicago Railroad Offers Prizes for Efficiency Suggestions

Edwin C. Faber, vice-president and general manager of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., addressed a letter to the employees of the company on Feb. 1, 1914, in which he offered a series of cash prizes for the best efficiency suggestions. The letter reads as follows:

"In the fiscal year ended June 30, 1913, this company spent $1,238,641 in the operation of its property for wages, maintenance and other expenses incident to operation, not including the large amount of money expended for improvements, betterments and additions to property. We believe our employees as a class are loyal, intelligent and capable, and that practically all of them make honest endeavor to give full service for their pay.

"We also believe that our property is well managed and that the money is wisely expended; yet it is next to impossible for the general manager and the various heads of departments to follow every dollar of expenditure personally and it is, therefore, quite likely that there may be some waste of material or supplies—some money needlessly spent.

"Some of this waste, if any exists, would, in the natural course of events, come under the eyes of some of the employees.

"The purpose of this letter is to ask each one of you to assist the management in the prevention of any waste of material, supplies or property of the company. We do not ask for criticisms of persons; what we want is frank, unprejudiced criticism of such methods and practices, the improvement of which would prevent waste of money and material, and result in a saving in the operation of the property in which we are all interested. Items which in themselves seem petty may in the aggregate amount to a considerable sum. The Chicago, Rock Island & Pacific Railroad has figured that if each one of its employees who use lead pencils would wear out an additional inch of each pencil before throwing it away the saving to the railroad would amount to $4,000 in a year. The Pennsylvania Railroad has recently issued a circular letter to the employees of its various offices asking them to close ink wells when they are not in use, because when the covers are left open the ink evaporates, dust settles in the wells and thickens the ink, and a considerable loss ensues.

"To encourage the elimination of waste, we have, therefore, decided to ask each employee to make such suggestions or recommendations as may seem to him to be likely to result in a saving to the company. On May 1, 1914, the company will distribute $150 in prizes to those offering the most helpful and most profitable suggestions. This sum will be divided as follows: For the best suggestion, $50; for the second best suggestion, $25; for the third best suggestion, $20; for the fourth best suggestion, $15; for the fifth best suggestion, $10; for the next six best suggestions, each, $5.

"A committee consisting of three employees, one department head and one senior officer will be appointed to award the prizes. When writing please give your home address so that prompt acknowledgment may be made. Each individual may make as many suggestions at one time, or from time to time, as seem to him to be justified. In case of doubt as to comparative merit, preference will be given to the suggestion received first. The competition will close on April 1, 1914, and the prizes will be distributed on May 1, 1914. All letters should be addressed to Edwin C. Faber, vice-president and general manager, Wheaton, Ill."

Shore Line Electric Railway to Further Agricultural Development

R. W. Perkins, president of the Shore Line Electric Railway, Norwich, Conn., has announced a campaign on the part of the company in behalf of the farmers in the territory which the company serves. The state has $1,000 which it is prepared to appropriate to New London County for agricultural development, provided a sufficient amount can be raised by the people of the county to defray the expense of a demonstrator or demonstrators in the field. The Shore Line Electric Railway, through Mr. Perkins, has offered to make an unconditional annual contribution of $500 toward the expense of this demonstrator and a guarantee of $500 additional, provided the organization which it is proposed to create is not able to care for the full amount above the $1,000 given by the State and the $500 by the company.

Plans have already been made by the Shore Line Electric Railway to alter an old factory in New London into a commodious freight terminal, and Mr. Perkins has offered to furnish quarters to be used in connection with the New London County Farm Bureau, the name under which the farmers will probably organize. Permission to extend the company's tracks from the Parade to the terminal in Water Street, New London, has already been obtained from the Common Council. The company has also been granted permission to run steam cars on its Water Street line only. There will be two 44-ft. entrances to the freight terminal, one on Water Street and the other on a strip of land running from Potter to Water Street on the south side of the building. Double tracks will run into the building from the Water Street entrance and between them will be a platform for loading and unloading freight. The side entrance will be paved with granite for the use of teams which come down the private way from Potter Street. A platform will be run close to the tracks inside this entrance, making it a simple matter for teamsters to load and unload. A portion of the second floor will be removed to permit the entrance of the electric railway freight cars and steam railroad cars. Offices for the employees of the company will be located at the rear of the second floor. All space in the building not required for other purposes will be devoted to storage.

In addition to the $1,000 which the company has offered to contribute toward the New London County Farm Bureau for the first year, with $500 for each year thereafter, the company proposes to turn over a portion of the second floor in the new freight terminal for an electric railway express station as an assembling and distributing point for such farm produce as is brought in. There will be connections with the tracks of the Central Vermont Railroad and through them to the New York, New Haven & Hartford Railroad system.

C. D. Jarvis, of the Connecticut Agricultural College at Storrs, Conn., who is directing the farm bureau work for the State, said recently that a great opportunity had been provided for New London County, especially in the offer of the storehouse by the company and the facilities and support offered by the Shore Line Electric Railway. He saw no reason why New London County could not operate such an organization as had been suggested. Mr. Jarvis, who is also a representative of the federal government, said that an appropriation would be available from that source after July 1, and that naturally the counties that were organized would get the first allotments. A public meeting was called for March 7 for the purpose of organizing the New London County Farm Bureau.

Extending Trailer Service in Topeka.—Trailer service is to be used more generally by the Topeka (Kan.) Street Railway in the future. Three new trailers have been ordered for the Gage Park extension.

Bus Service Being Considered in Toronto.—Commissioner of Works Harris, of Toronto, Ont., is to report upon the cost to the city of purchasing ten motor buses to be run in conjunction with the Toronto Civic Car Lines, and upon the advisability of establishing a regular service with the automobiles as feeders to the railway lines.

Order Against Smoking in Atchison.—J. W. Waggener, superintendent of the Atchison Railway, Light & Power Company, Atchison, Kan., has issued an order prohibiting smoking on street cars in that city. The order took effect on Feb. 20. Smoking will be permitted on neither the front nor the rear platform. Smoking has been permitted on both platforms in the past.

Letters to Team Owners in "Safety First" Movement.—The Northern Ohio Traction & Light Company has addressed a letter to all owners of teams in Akron, Ohio, asking that they co-operate with the company to secure the greatest possible degree of safety to themselves and others while on the streets in the interest of making the movement notably successful.

Order Against Passengers Riding on Front Platforms.—At a meeting of the Public Service Commission of Pennsylvania on Feb. 20, 1914, the following order was issued: "No passenger shall be permitted to ride on the front platforms of closed cars, and on open cars the carriage of passengers on the front platforms shall be strictly limited to the number that can be conveniently accommodated upon and do occupy the seat provided on said platforms; and those occupying said seat shall be prohibited from engaging the attention of the motorman, by conversation or otherwise."

New Terminal Station in Lexington, Ky.—The Kentucky Traction & Terminal Company, Lexington, Ky., has completed its new terminal station in the heart of Lexington. The first floor is used for a general waiting station for interurban passengers and as a utilities sales room. The station provides both white and colored passengers with the necessary accommodations, and contains the cashier's office and the new-business department of the lighting company, all on the first floor. The second floor is used for trainmen's quarters, reading and billiard room, etc. The third floor is used for general offices of the company.

Respective Rights of Street Cars and Automobiles.—The Division Court at Toronto, Ont., held recently that a street car can stop at any place along the line, not being constrained to stop at the regular white posts, and that the driver of an automobile must be on the lookout. The case was one in which E. E. Wheeler sued the Toronto Railway for damages to his automobile, sustained in collision with one of the company's cars. The car stopped between white posts, and Mr. Wheeler, in order to avoid running down a passenger, who had just stepped off, steered his auto to one side and broke the front axle by striking the rear of the car. The court held that he had no redress.

Advertising Special Events in Topeka.—The Topeka (Kan.) Railway's advertising in connection with special events has attracted much favorable comment at the Kansas capital recently. One of the most recent examples was in connection with the appearance of Paderewski at the Auditorium in Topeka. In a two column, 6-in. advertisement the company, of which A. M. Patten is general manager, announced that it would have cars for all parts of the city in waiting on East Eighth Avenue to enable those in attendance at the concert to reach home, or their train, with the least possible delay and inconvenience. Mr. Patten announced recently that advertising all special service would continue.

New Freight Rates on the Puget Sound Electric Railways.—The Public Service Commission of Washington has authorized the Puget Sound Electric Railway to file a tariff showing reductions in practically all freight rates between Seattle and Tacoma, and has waived the long-and-short-haul clause to make this possible. The new tariff indicates that the company is prepared to enter into competition for freight business with the boats of the Inland Navigation Company, operating between Tacoma and Seattle. A feature of the proposed tariff is that it provides rates either by weights or measurements. A rate of $2 a ton of 2000 lb. is made for packages, when a ton package occupies 40 cu. ft. or less, but if bulkier than this the charge is to be made at the rate of $2 for 40 cu. ft. In addition, the new tariffs provide a series of commodity rates on such articles as berries and eggs at so much the case.

"Safety First" Instruction Car in Detroit.—In furtherance of the "safety first" campaign of the company a "safety first" instruction car will be taken over all of the lines of the Detroit (Mich.) United Railway. The car is equipped with a number of demonstrating devices which are used to show the safe and unsafe methods of railway operation in its various phases. Short talks and demonstrations will be made by men connected with the various departments in order that the employees may have the fullest knowledge of the proper and safe manner in which to handle their respective lines of work. Instruction in first aid to the injured will be coupled with the "safety first" educational campaign to be conducted through the medium of the instruction car. The first trip of the car was made recently over the Rapid Railway. Stops were made at Roseville, Canfield, Baltimore, Marine City, St. Clair and Port Huron.

Center-Entrance Cars in Manila.—The first of the new center-entrance cars of the Manila Electric Railroad & Light Company, Manila, P. I., was placed in operation on Jan. 21, 1914. On its first trip the car carried a number of the officers of the company, city officials and representatives of the press. C. L. Stone, the retiring manager of the company, and C. Nesbitt Duffy, his successor, were among the officers of the company in charge of the car. The car was designed by Francis J. Tew, master mechanic of the company, and was built under his supervision in the Meralco shops by the company's employees, principally Filipinos. The cost of the car, fully equipped, is approximately $5,500. The car has a steel frame and the body is mounted on the company's standard trucks, equipped with 50-hp motors. The company has five other cars of the same type under construction and it is expected that all of them will be ready for service by April 1, 1914.

Present Mail Arrangements to Continue in Kansas City.—The same arrangement which now exists between the Metropolitan Street Railway and the post office authorities in Kansas City, Mo., will continue in force when the new depot is put into commission some time within the next few months. The Metropolitan will provide five mail cars, as in the past, to handle mail between the depot and the post office, as well as to and from branch postal stations. Two deliveries daily are made to the latter. The Metropolitan provides the car crews, and the cars are run on schedule, just as the ordinary passenger cars are. All of the mail cars now used are of the single-truck variety, containing a big center door which expedites the handling of the mail pouches. The Metropolitan also will continue to carry some pouch mail on regular passenger cars, though the bulk will be handled by cars designed for that purpose. Just how the mail cars will get into the new depot has not yet been determined. The company has its own tracks into the post office, the mail being loaded on to platforms and run into the building with expedition under this arrangement.

New Company Publication.—The Northern Ohio Traction & Light Company, Akron, Ohio, has begun the publication of *Traction Bulletin* under the direction of James A. Braden, general passenger agent of the company. The first issue of the paper, dated Feb. 25, 1914, contained four pages of general news in regard to the activities of the company. The purpose of the bulletin as set forth in the first issue follows: "This little paper is placed in the hands of the car riders of Akron and its environs for two purposes. One is to give information concerning the electric railway lines and their operation, and to discuss street car problems in a frank and open way. The other has in view enlisting cooperation in the safety work systematically carried on by the company and its employees. These purposes, then, constitute the mission of the *Traction Bulletin*. Its only promises are a strict fidelity to truth and a spirit of frankness and fairness, granting always to the utmost all that it asks for itself—a square deal." The paper will be issued twice a month and it will be placed in boxes in the city and interurban cars of the company for distribution among the company's patrons.

P. N. Jones on the Abuse of Transfers.—P. N. Jones, general manager of the Pittsburgh (Pa.) Railways, conferred recently with the members of the City Council sitting as a committee of the whole in regard to the rule of the company that transfers must be asked for when a cash fare is paid. Mr. Jones stated that establishing stops and the rules regarding transfers must be in the hands of the company. If they were left to the public the cars would stop in front of every house and people would ride free. Mr. Jones read to the Council a letter explaining the position of the company, and this was followed by a general discussion. In the letter the company recited in detail the abuses of transfers by the public. The letter of the company was concluded as follows: "We feel that as soon as the Pittsburgh public becomes familiar with the requirement that transfers must be asked for when paying cash fare there will be absolutely no complaint from any well-meaning passenger. This is now a general rule in all large cities and in some cities the transfer must be paid for and a rebate is received by the passenger when the transfer is taken up by the second conductor. Until such time as some method is discovered by means of which a conductor can decide at the transfer point who is actually entitled to a transfer and who is not we do not see any better method than the one now in use here."

Personal Mention

Mr. Joseph W. Folk has resigned as solicitor of the State Department to become chief counsel to the Interstate Commerce Commission.

Mr. Hugh M. Wilson, first vice-president of the McGraw Publishing Company, Inc., sailed on the S. S. *Minnewaska* on Feb. 28 for an extended trip in Europe.

Mr. George H. Binkley has been appointed engineer of the maintenance of way department of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

Mr. W. L. Wilson has been appointed assistant engineer of the maintenance of way department of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

Mr. Richmond Talbot has been elected assistant treasurer of the Federal Light & Traction Company, New York, N. Y., to succeed Mr. Harvey N. Wadhams, resigned.

Mr. W. E. Mandelick, secretary of the Underground Electric Railways, Ltd., London, Eng., who has been in New York for the last few weeks, has returned to London.

Mr. W. V. Griffin, treasurer of the Chicago (Ill.) Elevated Railways, has been appointed secretary and treasurer of the Illinois Electric Railways Association to succeed C. E. Flenner, deceased.

Mr. R. S. Stangland will continue as operating engineer of W. S. Barstow & Company, Inc., New York, N. Y., with supervision of the operations of the subsidiary companies of the Eastern Power & Light Corporation.

Mr. T. Russell Robinson has accepted the position of operating engineer with W. S. Barstow & Company, Inc., New York, N. Y., and will have supervision over the operations of the subsidiary companies of the General Gas & Electric Company.

Mr. William Buchsbaum has tendered his resignation as treasurer of the Reading Transit & Light Company and the Metropolitan Electric Company, Reading, Pa., to accept the position of auditor in charge of the auditing department of W. S. Barstow & Company, Inc., New York, N. Y.

Mr. E. D. Gault has been elected treasurer of the Reading Transit & Light Company and the Metropolitan Electric Company, Reading, Pa., to succeed Mr. William Buchsbaum, who has become auditor in charge of the auditing department of W. S. Barstow & Company, Inc., New York, N. Y.

Mr. D. A. Hegarty, formerly manager of the railway and electrical departments of the New Orleans Railway & Light Company, New Orleans, La., has been appointed general manager of the Houston Lighting & Power Company, Houston, Tex., which is controlled by the United Gas & Electric Corporation.

Mr. H. M. Clark, who has been private secretary to Mr. C. J. Franklin, general superintendent of railways of the Portland Railway, Light & Power Company, Portland, Ore., has resigned from the company to become associated with Mr. Franklin in his independent consulting work, referred to elsewhere in this column.

Mr. John F. Anglin has been placed in charge of the newly created efficiency department of the Third Avenue Railway System, comprising lines in New York City and Westchester County, including Yonkers, New Rochelle and Mount Vernon. This department will have direct charge of the coasting time recorders and terminal running time clocks which are being installed on the entire system.

Mr. George H. Harris has been appointed general superintendent of the San Francisco-Oakland Terminal Railways, Oakland, Cal., in charge of all matters pertaining to operation. Mr. Harris was formerly superintendent of the railway department of the Birmingham Railway, Light & Power Company, Birmingham, Ala. A biography of Mr. Harris was published in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914.

Mr. Henry E. Huntington, president of the Los Angeles (Cal.) Railway Corporation and an officer and director in many other corporations, is the subject of a character study, "A Little-Known Master of Millions—The Story of Henry E. Huntington, Constructive Capitalist," by Isaac F. Marcosson, issued in pamphlet form by E. H. Rollins & Sons, bankers, Boston, Mass. The sketch is accompanied by a portrait of Mr. Huntington.

Mr. Robert M. Feustel has been appointed chief engineer of the Illinois Public Utility Commission. He was graduated from Purdue University in the civil engineering class of 1905, and after about two years in railroad construction work joined the engineering staff of the Wisconsin Railroad Commission. He severed his connection with that commission recently to become a member of the firm of Sloon, Huddle, Feustel & Freeman, Madison, Wis., appraisal and valuation engineers.

Mr. John Dickson has been appointed general master mechanic of the Spokane, Portland & Seattle Railway, the Oregon Trunk Railway, Oregon Electric Railway and the United Railways, with headquarters at Portland, Ore. Mr. Dickson began railway work as machinist apprentice with the Great Northern Railway. He was subsequently until 1899 machinist, air brake man and draftsman, leaving that road to become instructor in the Mechanic Arts High School at St. Paul, Minn. He remained in that position for two years, returning to the Great Northern Railway as general air brake instructor, and was successively superintendent of shops at Everett, Wash., and master mechanic of the Dakota division. He has been with the Spokane, Portland & Seattle Railway as master mechanic since the road was first put in operation.

Mr. Pomeroy Ladue, who has been appointed purchasing agent of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was born in Detroit, Mich., attended the schools of Detroit and Ann Arbor, and continued to reside in Ann Arbor as a member of the faculty of the school of engineering there after he was graduated from the University of Michigan. In 1895 Mr. Ladue removed to New York City, where he remained an active member of the faculty of the school of engineering and applied sciences of New York University until 1905. In this year he returned to Michigan as an official of electric railways which later became merged into the Michigan United Railways. For three years Mr. Ladue was treasurer of the Michigan United Railways, retiring in 1908 to become connected with the Whiting Manufacturing Company, Philadelphia.

Mr. Joseph H. Brewer, who was recently elected president of the American Public Utilities Company, Grand Rapids, Mich., was born thirty-eight years ago in that city. At the age of fourteen he entered the employ of the Michigan Central Railroad as a stenographer. At sixteen he was stenographer for the general superintendent of the Chicago & Western Michigan Railroad, and in 1891 he went to Detroit and opened a stenographic office for court reporting. In 1892 he returned to Grand Rapids, associating himself with Mr. Charles H. Bender, then the leading court stenographer in western Michigan. He retired from this partnership and devoted himself to the public utility business which he had inaugurated in 1904 by the purchase of the Holland (Mich.) Gas Company. Later he purchased the Winona (Minn.) Gas Light & Coke Company and the Red Wing Gas Light & Power Company, Red Wing, Minn. His work with these properties brought about an affiliation with Mr. Charles B. Kelsey, who controlled the gas companies in Albion, Mich., and Valparaiso, Ind. The new firm acquired several other properties, and in 1912 the American Public Utilities Company was formed as a holding company.

Mr. J. G. Swain, who has been superintendent of power and shops for the Cleveland, Painesville & Eastern Railroad and the Cleveland, Painesville & Ashtabula Railroad, Willoughby, Ohio, for more than three years, has recently taken a position as general superintendent of power and shops of the Northern Ohio Traction & Light Company, with headquarters at Akron, Ohio. Mr. Swain has charge of the power houses, the substations, the lighting and power department, shops, overhead and underground distribution. He was graduated from the electrical engineering department of Purdue University in 1897, and has been active in electric power work since that time. He was connected with the Mahoning Valley Railroad as assistant superintendent for three years, and after this spent three years with the Westinghouse Electric & Manufacturing Company in various capacities. Three years more were spent with the St. Joseph Railway Light, Heat & Power Company, St. Joseph, Mo., as superintendent of light and power previous to the term spent on the Cleveland properties. In addition to the above work, Mr. Swain has been and still is consulting engineer for the Everett-Moore interests. He has invented a number of practical devices to facilitate work in shops and has made a special study of power-house design and construction.

Mr. B. F. Wood, who recently resigned as assistant engineer of the Pennsylvania Railroad in charge of electric railway equipment to become chief engineer of the United Gas & Electric Engineering Corporation, New York, N. Y., was the guest at a dinner given in his honor on March 5. The hosts were the members of the Importation Club, of New York, and the dinner was held at the Martinique, where between fifty and sixty of Mr. Wood's friends in the electrical and railway industries gathered to wish him success in his present occupation. Mr. Frank Hedley acted as toastmaster.

Mr. W. E. Hendley, whose appointment as superintendent of economy of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was referred to recently in the ELECTRIC RAILWAY JOURNAL, was born in Ohio forty-six years ago. He commenced his railroad career as night operator on the Lake Erie & Western Railway, afterward being promoted to dispatcher of the Cincinnati Northern Division of the Big Four Railway, at Vanwert, Ohio. In 1898 he became associated with the Central Construction Company, Detroit, as auditor and assistant treasurer. This company built the Detroit, Ypsilanti, Ann Arbor & Jackson Electric Railway between Detroit and Jackson, Mich., and in 1899 Mr. Hendley was appointed auditor of the railway, which position was held for five years. In 1904 he was appointed auditor and assistant treasurer of the Detroit & Toledo Construction Company, organized to build a double-track electric railway between Detroit, Mich., and Toledo, Ohio. During 1906 he was auditor and treasurer of Mahoning Construction Company, Youngstown, Ohio, which built the Youngstown Southern Railway. In 1907 Mr. Hendley became associated with the George G. Moore interests of Detroit, as assistant to Mr. J. Peyton Clark, then general manager of the Michigan United Railways. Upon Mr. Clark's retirement from the Michigan company Mr. Hendley was sent to Atlanta, Ga., to represent the financial interests of the Moore syndicate in the building of a 90,000-hp hydroelectric plant on the Vallulah River, which was completed on Jan. 1, 1914. As superintendent of economy with the Key System, Mr. Hendley will have charge of the coasting recording department.

Mr. C. J. Franklin has resigned as general superintendent of railways of the Portland Railway, Light & Power Company, Portland, Ore., to open an office in the Wilcox Building, Portland, as a consulting expert in all matters embracing operating problems, construction, valuations, rate situations, etc., in connection with public utility properties. During the last two years Mr. Franklin has given close attention to methods of operation and studies of details for new business, and his services have been retained upon special occasions by some of the principal public utility companies on the Pacific Coast. Previous to becoming connected with the Portland Railway, Light & Power Company Mr. Franklin passed five years with Stone & Webster at Tacoma as general superintendent of the Tacoma Railway & Power Company and the Puget Sound Electric Railway, operating between Tacoma and Seattle. Mr. Franklin went to the Pacific Coast after he had served thirteen years with the Virginia Passenger & Power Company, Richmond, Va. He first became associated with the electric railway business in Richmond, Va., where as a boy he started at work in the shops.

C. J. Franklin

Mr. R. W. Spoffard, who has been general superintendent and purchasing agent of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has been appointed acting general manager of the company to succeed Mr. E. C. Deal, who, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, has retired from the company to become connected with W. N. Coler & Company, New York, N. Y.

Mr. Robert Morrison, Jr., who has been elected secretary and assistant treasurer of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was born in Canada. His early life was spent in steam railroad service. Later he engaged in banking in Michigan for several years, which business he left in order to enter the service of the Michigan United Railways in 1906. He held the office of secretary and treasurer with that company until the property was leased to the Michigan United Traction Company on Jan. 1, 1912. He continued with the successor company, the Michigan United Traction Company, as secretary until July 1, 1912, when he resigned to enter the service of Mr. George G. Moore, Detroit, Mich. Mr. Morrison was elected vice-president and secretary of the Lincoln (Neb.) Traction Company in February, 1913, but resigned in November of the same year to re-enter the service of Mr. Moore.

Robert Morrison, Jr.

OBITUARY

James McArdle, general foreman of the Broadway and Seventh Avenue divisions of the New York (N. Y.) Railways, died suddenly on March 1, 1914. Mr. McArdle had been connected with surface-car transportation in New York City for about twenty-five years. Before being appointed to the position of general foreman of the Broadway and Seventh Avenue divisions he held a similar position on the Sixth and Ninth Avenue divisions and on the Central Crosstown division. Mr. McArdle was forty-nine years of age. He leaves a widow, a son and three daughters.

Robert F. Cummins, one of the promoters of the Marion, Bluffton & Eastern Traction Company and the Bluffton, Geneva & Celina Traction Company, Bluffton, Ind., and general manager of the companies for a number of years, is dead. Mr. Cummins was educated in Bluffton and at Valparaiso and Terre Haute. He edited the Decatur *Democrat*, and subsequently engaged in the drug, clothing and insurance business during his residence in Bluffton. In 1894 he was elected County Clerk of Wells County, in which Bluffton is located. At his retirement from that office Mr. Cummins engaged in the oil business. He was one of the founders of the Midway Oil Company, but sold his holdings in 1901. He was also connected with the promotion of the Kokomo, Marion & Western Traction Company.

Edward J. Dunne, superintendent of overhead distribution of the Public Service Railway of New Jersey, died on March 4, 1914. He had gone to the hospital for what was considered a slight operation for a growth in the mouth and died while under the anesthetic. Mr. Dunne had been connected with the Public Service system since 1903, going there with Mr. Albert H. Stanley, on whose staff he had previously been in Detroit. For a period during his early life he had been a sailor, but about thirty years ago left the sea to engage in overhead construction with the Cleveland Telephone Company. He then went with the Cleveland Electric Company, and upon the development of the electric railway joined the forces of one of the early electric railway lines in Cleveland. From Cleveland he went to St. Louis and from St. Louis to Detroit, in each city being engaged in electric railway work. He was a member of the committee on power distribution of the American Electric Railway Engineering Association from 1909 to 1911 inclusive. He was about fifty-two years of age.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Tampa, Atlantic & Gulf Railway, Tampa, Fla.**—Application for a charter has been made by this company to build an electric or steam railway through the counties of Polk, Manatee, De Soto, Palm Beach and Dade to some point on the east coast of Florida. Capital stock, $250,000. Officers: W. J. Epperson, Bronson, president; W. J. Boling, St. Louis, Mo., vice-president, and T. C. McEachin, Meredith, Fla., secretary and treasurer.

Caldwell County & Southern Railway, Kingston, Mo.—Application for a charter has been made by this company to build a 9-mile electric railway from Kingston to Hamilton. Capital stock, $100,000. Directors: F. L. Bowman, H. C. Shively and S. C. Rogers, Kingston; Perry Roberts, Hamilton, and David Miller, Kansas City. [E. R. J., Feb. 28, '14.]

Columbia-Camden Railroad, Columbia, S. C.—Chartered in South Carolina to build a 30-mile electric railway from Columbia to Camden. Capital stock, $250,000. Incorporators: B. L. Abney, F. H. Weston and W. B. Evans. [E. R. J., Feb. 17, '12.]

Baraboo, Devil's Lake & Western Railway, Madison, Wis.—Application for a charter has been made by this company in Wisconsin to build a 100-mile electric railway to connect Baraboo, Portage, Kilbourn, Plain and Devil's Lake. Among those interested are T. Edward Mead, T. F. Risley and W. H. Marriott, all of Baraboo. [E. R. J., Feb. 28, '14.]

FRANCHISES

Stockton, Cal.—The Stockton Terminal & Eastern Railway has asked the Council for a franchise on Miners Avenue and across McLeod Lake in Stockton.

Glendora, Cal.—The Pacific Electric Railway has received a franchise from the Council on Electric Street in Glendora.

***West Palm Beach, Fla.**—Edward B. Garretson and M. J. Hoenig will ask the Council and County Commissioners for a franchise in the city and county of West Palm Beach.

Middlesboro, Ky.—On April 30 a franchise providing for the construction of an electric railway within the city limits of Middlesboro will be offered for sale. J. L. Manring is Mayor.

Kansas City, Mo.—The Metropolitan Street Railway has received a franchise from the Council for a line on Twenty-fourth Street from Main Street to Grand Avenue in Kansas City.

Summit, N. J.—The Tri-County Power & Traction Company has asked the Council for a franchise to operate a trackless trolley through West Summit.

Nowata, Okla.—The Oklahoma Northern Railroad, Vinita, has asked the Council for a franchise in Nowata. This railway will connect Vinita and Nowata, Okla., and Coffeyville, Kan. J. W. Tolliver, Centralia, Okla. [E. R. J., March 8, '13.]

Morrisburg, Ont.—The Ottawa & Morrisburg Electric Railway has asked the Council for a franchise in Morrisburg.

Portland, Ore.—The Portland & Oregon City Railway has asked the Council for a twenty-five-year franchise from East Twenty-eighth Street to Hoyt Street in Portland.

Hazel Dell, Pa.—The Mahoning & Shenango Valley Railway & Light Company has asked the Council for a franchise in Hazel Dell.

Tacoma, Wash.—The City Council recently approved of the plans of the Seattle-Tacoma-Olympia Railway for a temporary monorail railway system, to be constructed along Eleventh Street, on the tideflats. The Council has given the company six months in which to construct and place in operation the temporary system, after which a franchise will be given if same is approved by the Council. This is part of a plan to build a railway between Seattle and Olympia via Tacoma.

TRACK AND ROADWAY

Birmingham-Tuscaloosa Railway & Utilities Company, Birmingham, Ala.—This company is reported to have issued $600,000 bonds to build a central generating station and gas holder, extend its gas-distributing system and electrify and extend its steam belt line railway. It also plans to erect wharves and loading docks. [E. R. J., Feb. 14, '14.]

***Jonesboro, Ark.**—J. R. Brown and associates are considering plans to build an electric railway between Jonesboro and Paragould.

Northern Electric Railway, Chico, Cal.—The construction of the first unit of the Sacramento Eastern Railway, which will provide North Sacramento with an electric line, has been arranged in a contract between the officials of the Northern Electric Railway and the North Sacramento Land Company. The first unit will provide for 1½ miles of railway through the center of the tract from the Northern Electric Railway to the Southern Pacific Company's lines. The new line will leave the Northern Electric Railway between the Globe and North Sacramento stations, about 1/3 mile beyond the Globe Iron Works, and, extending easterly across the tract, will reach the Southern Pacific Company's main line. Work on this road will, it is expected, be begun within a month.

***Oroville, Cal.**—Paul Riecker and associates are considering plans to build an electric railway from Oroville to Wyandotte and Bangor. Ultimately this line would be extended into Sierra County.

Washington Railway & Electric Company, Washington, D. C.—This company is asked to extend its lines in Anacostia from Nichols Avenue and Good Hope Road to Benning.

***St. Petersburg, Fla.**—Edward T. Lewis, Central Avenue, St. Petersburg, and associates have begun work on the construction of an electric railway in Lewiston.

Tampa (Fla.) Electric Company.—This company is asked to consider plans to build an extension along Six-Mile Creek Road to Six-Mile Creek Bridge in Tampa.

Southern Traction Company of Illinois, East St. Louis, Ill.—The first division of this company's line, from East St. Louis to Belleville, has been completed.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—Plans are being made by this company to begin work soon on its electric line between Marion and Harrisburg, via Herrin, Benton and Johnson City. William Rothman, Chicago, is interested. [E. R. J., Feb. 7, '14.]

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is asked to consider plans to extend the South Wayne line to Rudisill Boulevard in Fort Wayne.

Tri-City Railway, Davenport, Ia.—A 1½-mile extension will soon be built by this company on the Iowa side of the Ohio River between the east limits of the city of Davenport and Bettendorf. Heretofore the company has been using the track of the Iowa & Illinois Railway between Davenport and Bettendorf.

Hutchinson & Northern Railway, Hutchinson, Kan.—An election will soon be held at Hutchinson to vote terminal bonds to aid this company to build its 14-mile line. Construction will begin in the spring, the first section being from Hutchinson to Burrton. From Burrton the line will be extended west to Nickerson, Sterling and Great Bend, with Dodge City as the eventual terminus. W. S. Thompson, Hutchinson, is interested. [E. R. J., Feb. 21, '14.]

***Lawrence, Kan.**—About half of the right-of-way has been secured between Eudora and De Soto, Kan., by Hocker & Dixon, who plan to build an electric railway between Zarah and Lawrence. Construction will be begun in the spring.

Topeka (Kan.) Railway.—Grading has been begun by this company for the extension to Gage Park. The company is asked to extend its tracks from Washburn College to Mount Hope Cemetery in Topeka.

Boston (Mass.) Elevated Railway.—This company is asked to consider plans to build a new line from Medford Square to connect with the Cambridge subway in Medford. Plans are being made for an extension to Everett and Malden.

Detroit (Mich.) United Railway.—At a hearing in regard to the construction of the proposed Junction Avenue line in Detroit by this company the Michigan Railroad Commission, refused to permit crossings at grade with steam road tracks. It was suggested by the commission that the city and the company decide on some other route to avoid the necessity of grade separation, and some action toward this end will be taken within a short time.

Metropolitan Street Railway, Kansas City, Mo.—This company placed in operation on March 1 its new line to Waldo on the Dodson line of the Kansas City & Westport division. The name of the new line will be the Waldo-Country Club line.

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—During the next eight weeks this company will award contracts to build about 4 miles of new track.

Big Horn Canyon Irrigation & Power Company, Billings, Mont.—It is reported that this company will award a contract about July 1 to build a 68-mile electric railway from the mouth of Big Horn Canyon, Mont., north via St. Xavier and Hardin to Custer on the Northern Pacific Railway. There will be one steel bridge over the Big Horn River, about 600 ft. long. The company also plans to build a dam 200 ft. high. A. W. F. Koch, Hardin, Mont., chief engineer. [Jan. 24, '14.]

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—This company is double-tracking on private right-of-way its line from Fort Johnson to the west city limits of Amsterdam.

Stark Electric Railroad, Alliance, Ohio.—During the year this company plans to build about 25 miles of new track.

City Railway, Dayton, Ohio.—This company is asked to consider plans to extend its tracks east on Third Avenue to Overlook Avenue in Dayton. Another branch contemplated is the extension of its Kammer Avenue line to Westwood Plat, West Dayton and into the territory west of Kammer Avenue and north of Westwood.

Toledo Railway & Light Company, Toledo, Ohio.—Plans for several extensions of its lines in the East Side in Toledo are being planned by this company. Among the extensions will be a branch line to Cottonwood and a loop on Oakdale Avenue to East Broadway. The Woodville line may be extended to Willow Cemetery, thence via Brandville and Metzger's Corners to connect with the Starr Avenue line at Wheeling Street.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—An extension of the local lines in the North Hill district is contemplated by this company in the near future.

Ardmore & Western Interurban Railway, Ardmore, Okla.—Grading will be begun at once by this company from Ardmore north to within 1 mile of Springer and west via Woodford, Milo and Oil City. F. B. McElroy, Ardmore, president. [E. R. J., Jan. 31, '14.]

***Miami, Okla.**—Work has been begun on the survey for an electric railway from Miami, Okla., to Columbus, Kan. At North Miami it will connect with the lines of the Oklahoma, Kansas & Missouri Interurban Railway and enter Miami over this line.

Fort William (Ont.) Electric Railway.—The city of Fort William has applied to the Ontario Legislature to sanction a by-law to expend $30,000 to build and equip an extension to the corporation stone quarry near Mount McKay, and also a by-law to expend $238,000 for further improvements and extensions of its lines in Fort William.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—The construction of an electric railway from Welland to Port Colborne and along the shore of Lake Erie to Fort Erie, and from there along the Niagara River to Niagara Falls, was decided upon at the annual meeting of this company held recently in Toronto. Extensions of the Welland Street Railway on North Main Street to Parkaway Heights and to Rosedale are also to be built at once. C. J. Laughlin, vice-president.

***Sarnia, Ont.**—Plans are being considered to build an electric railway from Sarnia to Wallaceburg. It is also planned to distribute power along its right-of-way and operate other public utilities.

Toronto & Eastern Railway, Toronto, Ont.—Surveys have been completed for the extension of this company's line from Pickering, Ont., to a point in Scarboro, 15 miles. It is understood that this line will connect with the Canadian Northern Ontario Railway and enter Toronto over that line.

Southern Oregon Traction Company, Medford, Ore.—This company plans to build 3 miles of new track into the suburban districts during the next few months. S. S. Bullis, Medford, president. [E. R. J., Dec. 20, '14.]

Oregon Short Line Railway, Portland, Ore.—Plans are being considered by this company to build an extension of the Twin Falls line from Rogerson, Idaho, south to Valley Pass., Nev., about 85 miles.

Portland Railway, Light & Power Company, Portland, Ore.—C. J. Holloway, J. Cook and other residents of Saginaw Heights and Cadwell Park, representing property owners in this section, recently petitioned the Portland Railway, Light & Power Company for an extension of the company's Hawthorne line into the territory named.

Pittsburgh & Butler Street Railway, Pittsburgh, Pa.—Plans are being made to build soon a 2-mile extension from Butler to East Butler.

Reading (Pa.) Transit Company.—Preliminary surveys will soon be made by this company to extend its line in De Kalb Street in Reading to North Wales, with a spur to Ambler and an extension later on to Doylestown and Willow Grove. A new line from Norristown to Doylestown is contemplated.

Wilkes-Barre (Pa.) Railway.—This company is asked to consider plans to extend its line over Academy Street and down the Old River Road to the section of the city known as Riverside.

Montreal (Que.) Tramways.—This company has informed the Outremont Town Council that it plans to begin work early in the spring on the extension of the Van Horne Avenue line to the town limits.

Sioux Falls (S. D.) Traction Company.—During the summer this company plans to build 1 mile of new track, pave about 2 miles of track and put in a lot of special work on its lines in Sioux Falls.

***Clarksville, Tenn.**—A project to build a 35-mile electric railway from Clarksville, Tenn., into southern Kentucky via Christian and Trigg Counties, Ky., and Stewart County, Tenn., is being planned. Edward Martin, Big Rock, Tenn., is one of those interested.

Jackson Railway & Light Company, Jackson, Tenn.—Work will be begun at once by this company on its 2-mile extension from Main Street and Market Street via Poplar Streeet in Jackson to the Country Club site.

Murfreesboro (Tenn.) Electric Railway.—Surveys have been completed by this company for its line between Nashville and Murfreesboro. G. B. Howard & Company, engineers.

***Signal Point, Tenn.**—A route for an electric railway from Signal Point Mountain, near Chattanooga, northwestwardly through the middle of Walden's Ridge is being surveyed, with the probable ultimate destination at Louisville. Ky. An effort is now being made by the business men of Pikeville to have the line pass through their town, as the survey has now reached Morgan Springs, on the mountain opposite Pikeville.

Ogden (Utah) Rapid Transit Company.—Assembly of material for construction of the loop for this company in the business district, including new lines on Wall Avenue and Twenty-fourth Street and improvement on the Twenty-fifth Street line in Ogden, has been begun by the J. P. O'Neill Construction Company and work will be begun as soon as the weather permits.

Yakima Valley Transportation Company, North Yakima, Wash.—Surveys have been completed by this company for its extension into the Wide Hollow District, a distance of about 12 miles. Work will be begun in the immediate future.

Madison & Janesville Traction Company, Beloit, Wis.—Preliminary corporation stock to the extent of $25,000 has been subscribed by citizens of Madison to build an electric railway from Beloit to Whitewater and Elkhorn and from Janesville to Madison. A. W. Shoelkemp, Madison, is interested. [E. R. J., Feb. 28, '14.]

SHOPS AND BUILDINGS

Geary Street Municipal Railway, San Francisco, Cal.—This company has awarded the contract to build the new addition to the carhouse at Geary Street and Presidio Avenue to James L. McLaughlin, San Francisco.

Shore Line Electric Railway, Saybrook, Conn.—This company has opened a new passenger station at the entrance of Griswold Avenue and the Layville Road in New London.

Southern Traction Company of Illinois, East St. Louis, Ill.—This company has completed its new carhouses, yards and repair shops in East St. Louis.

Hutchinson (Kan.) Interurban Railway.—A new passenger station has been built by this company at the terminus of the new Fourth Avenue line in Hutchinson.

International Railway, Buffalo, N. Y.—This company has purchased the property at 24-30 West Avenue in Lockport on which it plans to build soon a new terminal for the interurban line from Buffalo to Lockport, Rochester and other points east. The property cost upward of $25,000, and it is said the new passenger and freight terminal will cost between $30,000 and $40,000. No contracts have been awarded.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company on the new passenger station on the Mount Hood Railway at the Stanley Crossing in Portland.

Chattanooga (Tenn.) Traction Company.—This company has moved its offices to the ground floor of the James Building in Chattanooga.

Jefferson County Traction Company, Beaumont, Tex.—Work has been begun by this company on the construction of a new passenger station in Pear Ridge.

POWER HOUSES AND SUBSTATIONS

Kansas City & Western Railway, Kansas City, Kan.—This company will erect a new pumping plant at Twenty-ninth Street and New Jersey Avenue in Kansas City to replace that recently destroyed by fire with a loss of $2,000.

Central City, Greenville & Drakesboro Traction Company, Central City, Ky.—Plans are being made by this company to build a new steam-driven electric plant on Green River about 2 miles from Central City.

Caldwell County & Southern Railway, Kingston, Mo.—This company has purchased a tract of land west of Hamilton on which it plans to build a new power plant in the near future.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—This company is installing Jones underfeed stokers on ten Springfield boilers and a new 10,000-gal. Worthington pump in its Tribes Hill power station. It is also installing a 20,000-kva motor generator set, ordered from the General Electric Company, at its Amsterdam substation.

Orange County Traction Company, Newburgh, N. Y.—This company has awarded a contract to the Central Hudson Gas & Electric Company, Newburgh, to supply the company with power for its electric railway in Newburgh.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—During the early summer this company plans to install a rotary converter set at Niagara-on-the-Lake, consisting of a 750-kw Westinghouse unit, 375 volts on the alternating-current side and 600 volts on the direct-current side. Power will be supplied by a 13,000-volt line which parallels the company's track from St. Catharines to Niagara-on-the-Lake, where reducing transformers are installed.

Toronto (Ont.) Suburban Street Railway.—This company has let a contract to the Canadian General Electric Company for the substation apparatus for the line from Lambton to Guelph, Ont., 46 miles. The catenary type of overhead construction will be used, and there will be three substations, at Islington, Georgetown and Guelph respectively. Fifteen-hundred-volt rotary converters of 500-kw capacity each will be used, power being transmitted to the substations at 25,000 volts. Provision will also be made for the supply of power from a separate bank of transformers in each substation for distribution along the line for miscellaneous power and lighting purposes.

Manufactures and Supplies

ROLLING STOCK

Sioux Falls (S. D.) Traction System expects to purchase two cars.

Regina (Sask.) Municipal Railway expects to purchase eighteen garbage cars.

San Diego (Cal.) Electric Railway has ordered forty cars from the St. Louis Car Company.

Johnstown (Pa.) Traction Company has ordered two cars from the Niles Car & Manufacturing Company.

Republic Railway & Light Company, Youngstown, Ohio, is reported to be considering the purchase of ten cars.

London (Ont.) Street Railway, at its recent annual meeting, decided to take up matter of purchasing six more cars.

Stroudsburg (Pa.) Passenger Railway is reported to be considering the purchase of about five single-truck passenger cars.

Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark., is reported to be considering the purchase of new cars.

Northwestern Pacific Railroad, San Francisco, Cal., will add six new motor cars by installing motor equipment under cars that are now trailers.

Stark Electric Railway, Alliance, Ohio, is expecting to purchase two interurban cars, to be equipped with steps attached to the back end of the cars.

Mobile Light & Railroad Company, Mobile, Ala., is considering the purchase of several steel arched-roof closed cars, length 21 ft. over corner-posts, with 5-ft. platforms, making approximately 31-ft. car bodies.

Sunbury & Susquehanna Railway, Sunbury, Pa., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as being in the market for four cars, has ordered through W. R. Kerschner four 42-ft. all-steel interurban passenger cars from the Cincinnati Car Company.

Cincinnati (Ohio) Traction Company has received authority to issue $253,500 of equipment trust certificates, the proceeds arising from the sale of which are to be used to purchase sixty double-truck, center-entrance, arch-roof, steel passenger cars at a price of $4,225 each.

Ohio Electric Railway, Cincinnati, Ohio, has received authority from the Public Utilities Commission of Ohio to purchase five all-steel interurban center-entrance passenger cars, costing $12,000 each; four motor express cars, costing $10,000 each, and fourteen freight trailer cars, costing $1,700 each.

Cumberland & Westernport Electric Railway, Cumberland, Md., has ordered two double-end, double-truck combination and baggage cars from The J. G. Brill Company. These cars will be 44 ft. 9 in. over bumpers and will be equipped with General Electric control and four-motor equipment, and Westinghouse combined automatic air-brake equipment, schedule AMN.

Toronto (Ont.) Suburban Street Railway is preparing specifications for cars for its line which is being built from Lambton to Guelph, Ont., and it is probable that an order for about ten 65-ft. cars will be placed in the near future. The electrical equipment will be supplied by the Canadian General Electric Company. The cars will be equipped with four 85-hp motors of the latest type, fully ventilated, and the control will be of the multiple-unit type to permit of train operation. The cars will operate on 600-volt line at approximately half normal speed, and changing from 1500-volt to 600-volt trolley or vice versa will involve no loss of time in adjustment of control apparatus.

TRADE NOTES

Railway Steel Spring Company, New York, N. Y., has appointed John P. Munn and Phillip B. Jennings as directors to fill vacancies created by resignations of William Barnum and W. H. Marshall.

National Carbon Company, Cleveland, Ohio. held its eighth annual salesmen's convention last week at the general offices in Cleveland. At the banquet Thursday night about 120 employees were present.

Westinghouse, Church, Kerr & Company, New York, N. Y., have established a laboratory for the purpose of testing concrete aggregates and waterproofing materials and investigating paints and preservative coatings for steel and concrete.

M. H. Hovey, Madison, Wis., consulting signal engineer, has arranged with the Fort Wayne & Northern Indiana Traction Company to act as its consulting engineer in connection with the installation by the company of 20 miles of block signaling on its lines this year.

Standard Paint Company, New York, N. Y., is commemorating the thirtieth anniversary of its P & B paints and compounds, the development of which has grown in a parallel manner with the development of electricity, arising and developing from the need of an efficient insulating material.

H. W. Johns-Manville Company, New York, N. Y., owing to the necessity for larger space and better facilities to handle its increased business, has obtained larger quarters for the Indianapolis, Ind., and Louisville, Ky., branches. The new address of the Indianapolis branch is 408-410 North Capitol Avenue; that of the Louisville branch, 659-661 South Fourth Avenue.

John L. Foster has been appointed chief electrician and superintendent of power of the Western Gas Construction Company, Fort Wayne, Ind., builder of gas apparatus and using electrical power throughout the plant. Mr. Foster was formerly with the Rapp & Zollinger Electric Company, Fort Wayne, Ind., and subsequently with the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind.

Western Electric Company, New York, N. Y., made sales for the year 1913 amounting to approximately $78,000,000, an increase of $6,000,000, or over 8 per cent, over the 1912 sales of $71,727,329. In 1911 sales amounted to $66,211,975. The company added upwards of 4000 customers last year, bringing the number to approximately 36,000. The export business in 1913 was the largest in the history of the company, notwithstanding the conditions in Mexico.

O. P. Wilson, of the purchasing department of the Westinghouse Electric & Manufacturing Company, has resigned to accept the position of assistant general manager of the Norma Company of America, 20-24 Vesey Street, New York City, manufacturer and importer of high-grade ball bearings, roller bearings, precision instruments, etc. Mr. Wilson has been connected with the Westinghouse Company for fourteen years and for the last ten years has been one of its head buyers.

Puget Sound Traction, Light & Power Company, Seattle, Wash., has established an industrial department for the sole purpose of getting in touch with Eastern manufacturers, calling their attention to the possibilities existing in its territory, furnishing any and all kinds of information in regard to markets, transportation, labor, raw materials, power and any other essentials needed in a particular line, with the idea of eventually attracting these manufacturers to that part of the country.

McConnell, Thurman & Company, Grand Rapids, Mich., have been formed to deal in investment securities in Grand Rapids, Mich. The firm is composed of H. F. McConnell and Fred W. Langhorst, of H. F. McConnell & Company, New York, N. Y., and Allen G. Thurman and Eugene Gray, of Eugene Gray & Company, Columbus, Ohio. Direct connection will be had with H. F. McConnell & Company's New York house and that of Eugene Gray & Company in Columbus; also connections with firms in other cities dealing in public utilities and other securities.

A. M. Byers Company, Pittsburgh, Pa., manufacturer of pipe, has recently received several striking testimonials to the value of its product. One of these is from B. L. Smith, owner of a large office building in Seattle said to be the tallest office building in the world outside of New York City. Mr. Smith says: "Byers genuine wrought iron pipe was specified throughout. Every influence within reason was brought to bear upon the architects and myself to change to steel, but the more I looked into the merits of wrought iron versus steel the more convinced I became that Byers pipe was by far the best."

ADVERTISING LITERATURE

Stow Manufacturing Company, Binghamton, N. Y., has issued a catalog describing its portable electric tools.

National Tube Company, Pittsburgh, Pa., has issued Bulletin No. 15A, describing and illustrating its pipe for drilling purposes.

Sprague Electric Works of General Electric Company, New York, N. Y., has issued Catalog No. 329, describing and illustrating its various types of electric fans. Bulletin No. 49,000 describes portable ozonators.

Esterline Company, Indianapolis, Ind., has issued a folder illustrating its "Golden Glow" headlights and containing a testimonial letter in regard to the adoption of this headlight as a standard by the Detroit United Railway.

Stone & Webster, Boston, Mass., have issued their manual for 1914. This is a collection in compact and convenient form of financial information upon the properties in which the Stone & Webster Companies are interested. The book includes a map of the larger systems, a table showing when the interest and dividends of the different companies are paid, a summary of the earnings and expenses of all of the different companies, bond tables, etc. The same firm has issued a list of securities of companies managed by the Stone & Webster Management Association which are recommended for purchase at this time. Among the securities mentioned are the 6 per cent cumulative preferred stock and the common stock of the Galveston-Houston Electric Company, the 6 per cent cumulative preferred stock of the Puget Sound Traction, Light & Power Company, the 6 per cent cumulative preferred stock of the Railway & Light Securities Company and the first mortgage 5 per cent gold bonds of the Tampa Electric Company.

NEW PUBLICATIONS

Statistics of Freight Traffic. By J. H. Parmelee. 32 pages. La Salle Extension University, Chicago.

The Industrial Traffic Department. By W. N. Agnew. 30 pages. La Salle Extension University, Chicago.

These treaties are part of the series of publications forming the basis of the La Salle Extension University course of instruction by correspondence in interstate commerce and railway traffic. While written primarily for the benefit of steam railroad traffic men, they contain general information regarding the traffic department and traffic statistics that will be interesting to the operating officials of electric railways doing freight business. Mr. Parmelee's book throws much light on the development and operation of freight traffic and the reader will secure much valuable information concerning such topics as railway mileage, equipment, capitalization, revenues and expenses. Mr. Agnew's treatise takes up such questions as the quoting of rates, routing of consignments, supervision of shipping and receiving and general traffic supervision. Each of the books contains suitable test questions at the end.

Electric Car Maintenance. By Walter Jackson. 275 pages. McGraw-Hill Book Company, New York, N. Y. Cloth, $3 net.

This book is a compilation from the ELECTRIC RAILWAY JOURNAL of several hundred articles on methods of electric car maintenance. It was prepared to put into more accessible form the many shorter, practical articles which are likely to be forgotten or mislaid. Republication in book form has made it possible to classify the articles, omit all material of temporary interest and use larger and clearer cuts than in a weekly periodical. In fact all of the cuts in this book were made anew, and in some cases illustrations made from drawings have replaced the original halftones. The mechanical and electrical practices described cover work done by electric railways of all sizes, but as a rule they are applicable almost anywhere. For example, the article on the seating practices of the Brooklyn Rapid Transit System gives to any user of rattan seating the valuable experiences of a company which is large enough to employ a seating expert. A special feature is the chapter on instruction prints, which contains a large number of simplified circuits of controllers, motor connections, etc. On the whole, this book is one which should be in the possession of every car equipment and maintenance man for it is a work of the kind that more than repays its cost if use is made of any one of its hundreds of kinks.

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CHOICE OF SYSTEM AT MONTREAL

The announcement last December that the Canadian Northern Railway was planning to install a 2400-volt direct-current system is followed this week by an article describing the reasons for the adoption of this system. The author is the mechanical and electrical engineer of the contractors building this line, so that the reasons for the adoption of the system selected are authoritative as well as convincing, when the circumstances are considered. The description in this issue of the Butte, Anaconda & Pacific electrification, the most important 2400-volt road yet installed, adds to the interest of Mr. Lancaster's article. The success of the system for the conditions existing in Butte seems assured, and the experience developed there promises to have an important bearing on the more extended future use of high direct-current voltage for railway operation. The interpole motor has certainly effected a revolution in our ideas on the permissible limit of voltage on a commutator, and if those who are enthusiastic in regard to high d.c. operation are to be believed the limits have not been reached even in the Butte installation. As we stated in an editorial recently, we believe that where a railroad has investigated the suitability of different systems of electric traction for use under certain conditions and has reached a definite conclusion in favor of one or another it should make public its reasons for the adoption of the particular system selected. So many claims are made in favor of this system, that system and the other that the average railway manager is confused in trying to decide which is best in any particular set of circumstances, although this ought to be a matter which could be clearly set forth in terms which any engineer could understand. We hope that those responsible for the choice of system on other electrifications will be as ready as Mr. Lancaster to give the reasons for their choice.

AUXILIARY FRONT-END COLLECTION

It is a common feature of electric railway car-loading practice at terminals and other places which are congested during the rush hours to see a large number of inspectors at work trying to regulate the onrushing passengers to move in orderly fashion toward the rear entrance of the cars. In the meantime, a few passengers may be leaving more or less leisurely by way of the front platform, which thereafter remains unused. One company, however, has departed successfully from the beaten path in employing its experienced men to aid the regular conductors by serving as fare collectors at the front platforms. Such auxiliary fare collectors have now been employed on the lines of the Metropolitan Street Railway, Kansas City, for three years, so that the practice is very far from being an experiment. These front-end collectors record the fares on a register hung around their neck. They also issue and collect transfers, but always remain in the street. The saving in time which this method has achieved at Kansas City is indicated by a test in which 213 passengers were handled at the rate of 1.37 seconds per person with the aid of front-end collectors, while 2.2 seconds per person was required to handle 144 passengers on the same day and at the same place without the front-end collectors. A saving of 0.83 second per passenger is certainly worth while wherever the loading tracks are crowded to maximum capacity and where there is a possibility of thereby raising the schedule speed and reducing the number of cars. The Kansas City company now employs thirty-five collectors in the evening and half a dozen in the morning. All of these men are trained conductors. Of course, some difficulty may be met in finding good men to work but three or four hours a day, but, as previously noted, the regular traffic inspectors could be assigned to this work of doubling car-entering capacity at a greater net usefulness to the railway than if they were engaged in forming people in line to enter at the rear platform only. From the standpoint of car economics, it is surely desirable to take full advantage of the double-platform car instead of keeping the front platform idle when it can be made a most effective help.

WHERE GOVERNMENTAL OPERATION FAILS

In these days of agitation on behalf of governmental operation, municipal ownership and other propaganda of delusive promise a recent editorial in the London *Daily Mail*, one of the most popular newspapers in Great Britain, strikes to the very root of the question why private ownership and operation of utilities result in the best service at the lowest cost, given a reasonably intelligent management. The editorial in question was directed against the poor quality of telephone service in Europe under government ownership and operation, but its general conclusions are equally adaptable to every field of public utility service which can be developed by private enterprise. The *Mail* says: "The broad answer to all these questions is that the alertness and enterprise that are essential to telephone development cannot be expected from a government department. The characteristics of the bureaucratic mind and temperament forbid it. The organization of a government office, with a virtually irremovable staff, forbids it. The spirit of officialdom, with its traditions of subordination, its narrow professional outlook, its unwillingness to concentrate responsibility, its insensible stifling of initiative, forbids it. A government department cannot raise and discipline its staff to the same level of efficiency as a commercial company; it cannot act with the same freedom and directness as a private board; it cannot pursue a business object without deference to a hundred influences and considerations that have nothing to do with business; it cannot advertise with anything like the same boldness; it naturally seeks efficiency through economy instead of economy through efficiency; it has to think of politics and political reactions; its whole constitution prevents it from proving as enterprising as private initiative, as prompt to discard obsolete methods and apparatus, as quick to adopt new inventions, as skilful and aggressive in gathering in subscribers." These comments are in no sense directed against the faithful work of individuals in governmental service, but they hit the nail squarely on the head when it comes to the matter of municipal, state or national ownership and operation of utilities which will best develop under private control, subject, of course, to wise regulation by commissions or other designated tribunals capable of limiting their tasks to supervision and of avoiding the pitfalls of public management.

THE COST OF REGULATION

When the New York public service commission bill was before the Legislature it was opposed by Joseph H. Choate on the ground that nothing less than a commission of archangels could sucessfully administer the law that it was proposed to enact. Mr. Choate's remark is now recalled in connection with some rather uncomplimentary criticisms which have been published in certain of the daily papers in New York, based upon the fact that the commission for the First District has asked for an appropriation of $2,200,000 for the present year. This sum is more than twice the commission's cost to the city of New York for the year 1908. In the six years 1908-1913 the commission has spent $7,559,778, and the question is now asked, "What is there to show for the money?"

This is not a fair question if it is meant to imply that the commission has done little or nothing, for it has done much. The greater part of this sum, of course, has been spent in connection with the development of the plans for rapid transit in the city. This is the work which was formerly performed by the Rapid Transit Board of New York. Regulatory work, speaking from the standpoint of expenditure, has occupied only a comparatively small portion of the time of the commission. The trouble is not that the record of the board has been one of "futility, inefficiency and extravagance," as has been charged, but that the present critics of the commission expected too much from it in the first place. They would not listen to Mr. Choate's description of the sort of commission that would be needed to give the people what they wanted. All that was necessary, it was claimed, was to pass a law and appoint a commission and our transportation problems would be solved.

Similar ideas have prevailed elsewhere, and similar disappointments are in store. Along with these disappointments may come realization, perhaps, that members of a public service commission are only human; that they can no more work miracles than can the officers of public service corporations, and that railway regulation is only less difficult than the most difficult of all things, namely, to run railways in a manner to satisfy an appetite for parlor-car express transportation at freight-rate fares.

THE CIRCULAR INCH VERSUS THE CIRCULAR MIL

We print in this issue a letter from Carl Hering advocating the use of the circular inch instead of the circular mil in expressing the area of wires and cables. The circular mil is a very small unit for use in connection with the large wires and cables now used. The inconvenience of the use of the term "circular mil" is evident by reference to articles appearing in recent issues of the ELECTRIC RAILWAY JOURNAL. In a recent discussion before a technical society the statement was made that the copper equipment of one of the steel elevated structures in New York as a return conductor is as great as 16,000,000 circular mils. It would certainly be easier to say 16 circular inches. Many references are made to large cables, of 1,000,000 circular mils area and upward. It is only necessary to compare the two expressions "The cable has an area of 1 circular inch" and "The cable has an area of 1,000,000 circular mils" to show the convenience of the larger unit. While this detail may seem insignificant, it is typical of many inconsistencies in phraseology which exist in electric railway and other lines of work and which will, in the aggregate, be sufficient to warrant careful attention. If those who see the consistency of Mr. Hering's suggestion will adopt it in spite of possible mild ridicule, this trifling reform can be speedily accomplished.

It is hardly to be expected that uniformity in a language and an industry which are alive can be secured, but there should be a consistent effort to obtain some degree of uniform practice. The circular mil is a queer unit, anyway. It is a unit of area which does not belong in any system, and of course the circular inch is no better from this point of view. However, this circular unit is so well established that it cannot be easily dislodged if, indeed, such dislodgment is desirable. It is certainly very convenient to be able to obtain the diameter of a wire by taking the square root of the area, or vice versa. If the average user of electric wires would stop to analyze his meaning when he uses the expression "the circular mil" he would probably find some difficulty in doing so. The fact is, however, that he is in the habit of associating, from experience, a certain type of cable with its area in circular mils, without evaluating the circular mil in terms of the square inch.

LABOR CONDITIONS UNDER MUNICIPAL OWNERSHIP

In a statement made last August the president of the Amalgamated Association of Street and Electric Railway Employees spoke enthusiastically of the blessings of municipal ownership and operation from the viewpoint of the electric railway employee. He was referring to conditions in Canada "where the Amalgamated has jurisdiction over the street railway employees." In a later report to the Salt Lake annual convention some very pessimistic comment was made by the same official as to experiences with municipally owned and operated railway properties in Canada, which indicated to him that "municipal slavery of the worker" might be as objectionable as "corporate slavery."

It is a fair inference that there will now be a return of the yearning for "municipal slavery" following the making of an agreement last month between the city of Edmonton, Alta., Canada, and the employees of the Radial Railway, owned and operated by the city. The Edmonton Mayor and Council are described as being of and for "labor." This, of course, makes a difference. The preceding administration supported the superintendent of the railway in his refusal to make an agreement which turned over many essentials of management and control to the Amalgamated Association. The "labor" administration has no such scruples and has approved an agreement which follows the familiar lines of iron-clad union agreements here, but introduces some improvements, that is, from the labor standpoint.

In the first place, one is struck by the fact that the Edmonton contract, though dated Feb. 17, 1914, is made effective as of Aug. 31, 1913, so far as the wage scale is concerned. This scale runs from 27½ cents per hour for the first six months of employment up to 37½ cents beginning with the third year and thereafter. The working day is based on nine and one-half hours, with time and a half for all over ten hours' work. There is something naïve, aside from the English, about Section 7 of the agreement, which provides "that preference shall be given to citizens of Edmonton for positions in the department, who must be able to read and write English, provided he passes his examination satisfactorily before a committee composed of two members of the association, approved by the superintendent and officials of the department, the training period being left to the discretion of the department." Section 17 states that "the department prefers that all employees affected by the agreement should be members of this association." The following section provides that trades of position may be made "with approval of association." The omission of specific provision as to rate of pay for the mechanical men who may be kept on duty at all times opens the way for claims of time and a half, or double time in many instances.

As a whole, the agreement is about what one would expect if the management of a railway handed a pen to the president of a trades union and told him to write his own agreement and to help himself while doing so. With a "labor administration" in a city enjoying the blessings of municipal ownership this contract shows what would be very likely to happen—namely, concession of whatever demands the employees of the city might choose to advance. Considering that they had no opposition on the part of the city government, and that the railway manager was overruled in the drawing of the Edmonton agreement, those who secured it may well repeat the words of Lord Clive and say that when they think of their opportunities they are astonished at their moderation. Of course, the Edmonton public will have to provide for the city's generosity to its workers. If it and other cities municipal-ownershiply inclined are willing to do this, so be it. But the Edmonton experiment and San Francisco's Geary Street Railway pay of $3 for eight hours' platform work is fair warning of what may be expected.

CAR EQUIPMENT AS SEEN FROM THE PIT

Under the title of "Real Maintenance," we discussed in our issue of Dec. 27, 1913, the need on many railways for a more intelligent car maintenance staff and for more liberal expenditures in car upkeep. Perhaps no better argument for a higher grade of shop service could be afforded than by a review of the situation from a sometimes neglected vantage ground, namely, the pit.

In the early days the underside of most cars carried the simple rigging of a spindle brake, a set of grids, a fuse box and a few exposed cables between the motors and K controllers. How different are the conditions to-day! A tangle of pipes, rods, chains and levers extends from end to end to serve the four-motor equipment and its contactor control, the air brakes, the slack adjuster, the air-dropped fender, the door and step devices, the ventilation and heating control, the lesser electrical circuits—and even the long-distance operation of the fare register. Is it wise to put all of this costly gear into the hands of ignorant laborers and untrained foremen or to be miserly in funds for inspections and renewals?

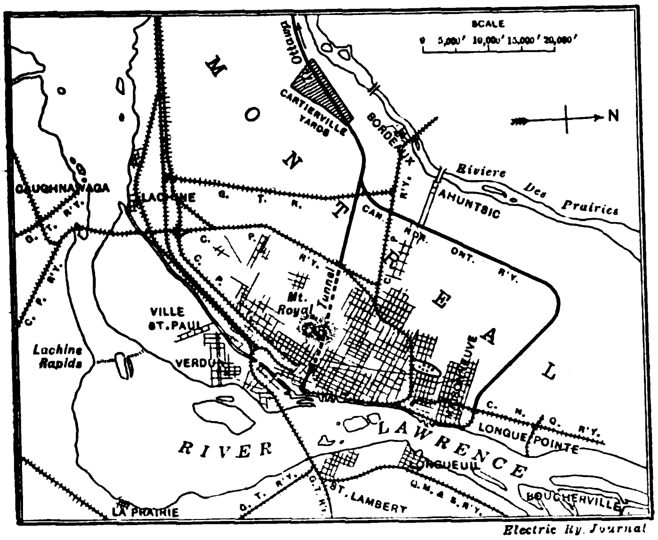
It is true that in the modern surface car one specialty has been piled upon another to a most amazing degree, but increasing complexity has always been the price of progress. Gutenberg's press was very simple indeed, but no one complains of the design of its thousand-membered successor. Complex as the car of to-day may be, everything on it has at least one good reason for its being. The use of contactor control frees the platform of clumsy equipment and eliminates flash-overs, the air brake brings quicker schedules, the slack adjuster gives better shoe wear and lengthens inspection from daily to weekly periods, the air-served fender saves life through its faster action, the joint movement of door and step make platform mishaps nil, while such auxiliaries as automatic ventilators and thermostatic control promote the public health in ways hitherto deemed impossible on a moving and crowded vehicle. No railway would willingly dispense with these improvements, costly as they may be at first, but directors must understand that these devices cannot take care of themselves nor be maintained at the same price as cars with less equipment but with smaller earning capacity.

Electrification of the Canadian Northern Montreal Tunnel and Terminal

The Writer Points Out that the 2400-Volt Direct-Current System Was Chosen as Most Economical for a Combination of Trunk-Line Locomotive and Suburban Motor Car Service

BY W. C. LANCASTER, ELECTRICAL AND MECHANICAL ENGINEER, MACKENZIE, MANN & COMPANY, LTD., MONTREAL

The Canadian Northern Railway when completed during the present year will be the second transcontinental system to be operated in Canada and will have a total track of more than 10,000 miles. Most of this mileage is in the provinces of Alberta and Saskatchewan, from whose vast grain fields is drawn the traffic which has made the harbor of Montreal the second in importance in the American continent. On this new route from Montreal to Vancouver the grain traffic in a single day often amounts to more than 1,000,000 bushels of wheat. With Montreal the destination for most of this enormous and ever-increasing traffic, it became necessary to provide terminal facilities adequate to prevent any possibility of congestion.



Electric Ry. Journal

Fig. 1—Montreal Tunnel—Map of the Canadian Northern Railway at Montreal, Showing the New Line with Tunnel Under Mount Royal to a Central Passenger Station

SUBURBAN AS WELL AS TRUNK-LINE SERVICE

A general idea of Montreal and vicinity may be had by reference to the map, Fig. 1. The principal commercial and financial section of the city lies between Mount Royal and the St. Lawrence River. To reach this district it was necessary to drive under the mountain a tunnel a little more than 3 miles long. This work was begun in the summer of 1912 and has progressed rapidly, the headings meeting on Dec. 10, 1913. The tunnel, which is of double-track construction (see Figs. 4 and 5) will not only serve as an entrance into Montreal for trunk-line trains, but will also bring the country to the west, lying between the mountain and the Rivière des Prairies, within a few minutes of the heart of the city. This district, which now consists of farm land, will be developed as a suburb of Montreal and a quick and frequent service will be maintained for commuters by means of multiple-unit trains. Already the choice section of this land, that near the west portal of the tunnel, has been subdivided into city lots and is known as Mount Royal or the "Model City." (See Fig. 2.)

FREIGHT AND PASSENGER TERMINALS

At Cartierville, a small town on the Rivière des Prairies, a large yard will be established for the sorting of freight, and there also the incoming and outgoing trains will change from steam to electric locomotives, and vice versa, this being the present end of the electrified zone.

Fig. 3 is a "bird's-eye" view of that portion of the electric zone from the Model City to the St. Lawrence River. The passenger terminal will be built at the east portal of the tunnel, right in the heart of Montreal. From this point it is planned to run tracks down to the water front, where a freight station will be located and where connection will be made to the Harbor Commissioners' tracks, which extend throughout the whole shipping district, thus giving access to the docks.

REASONS FOR ELECTRIFICATION

Electrification of the tunnel was necessary for comfort and safety. It was also necessary for the operation of the trains in the passenger terminal, where the tracks will be beneath the terminal buildings and about 45 ft. below the street suface. As this amount of electrification had to be installed, it was decided to extend the electric zone to a point about 5 miles beyond the tunnel, so that multiple-unit trains could be run, and because the Cartierville yard would provide a convenient place for changing locomotives. Thus when work on the tunnel and terminal was started the problem was not whether steam or electricity should be used, but rather what system of electrification would best suit the conditions.

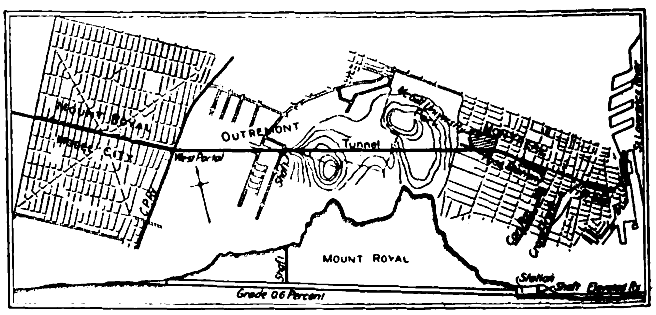


Fig. 2—Montreal Tunnel—Route of Tunnel

As a basis for the study of this question, train schedules and train weights were assumed that, it was thought, would probably be used. No exact operating data were available at the time this study had to be made, as the railroad entering Montreal from the west was not completed and the traffic department's plans were not definitely settled. Recourse was therefore had

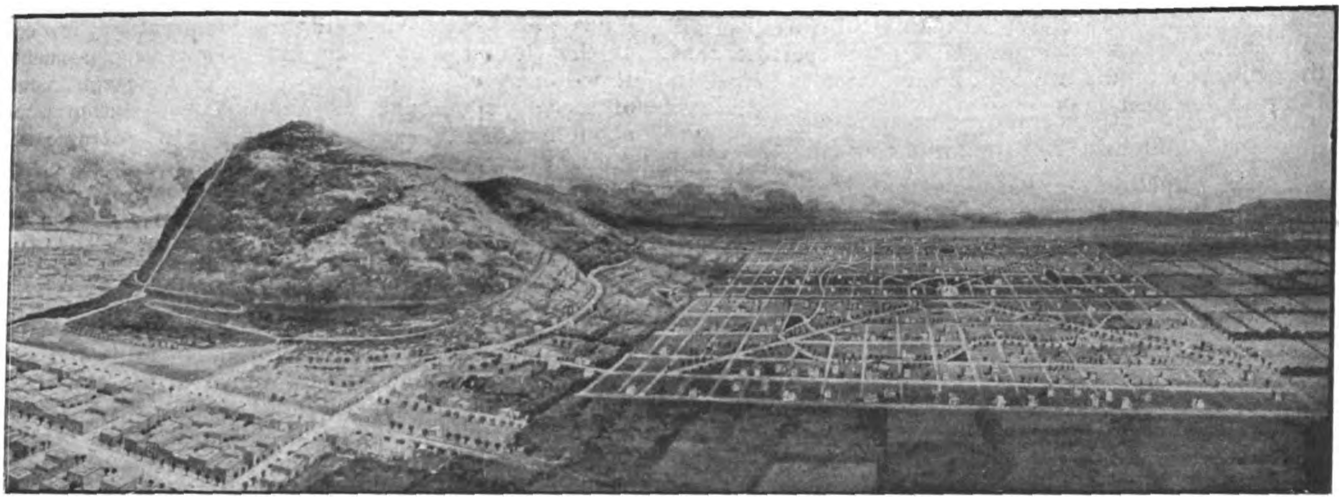


Fig. 3—Montreal Tunnel—Bird's-Eye View Showing How the Tunnel Will Develop the Territory on the Far Side of Montreal

to the statistics of the two other large railroads that have been bringing traffic into the city for many years. The train sheets and load curves were worked up largely on this basis, due allowance being made for future growth.

The train weights and some of the other data assumed are given in the accompanying table. Portions of the calculated daily load curves are shown in Fig. 6.

TRAIN WEIGHTS AND SPEEDS ASSUMED FOR MONTREAL TERMINAL ELECTRIFICATION

Class	Trailing Tons	Speed Level	0.6 per Cent Up Grade	Schedule
Transcontinental	1130	37.0	26.5	21.2
Express and local	556	37.5	27.1	21.6
One motor coach	60	50.0	41.5	22.2
Three motor coaches	180	50.0	41.5	22.2
Three motor coaches and two trail coaches	260	47.8	34.8	21.8
Freight	1000	32.5	23.5	...

Four systems of electrification were considered:

Three-phase, 3300-volt to 6600-volt trolley.

Single-phase, 11,000-volt trolley.

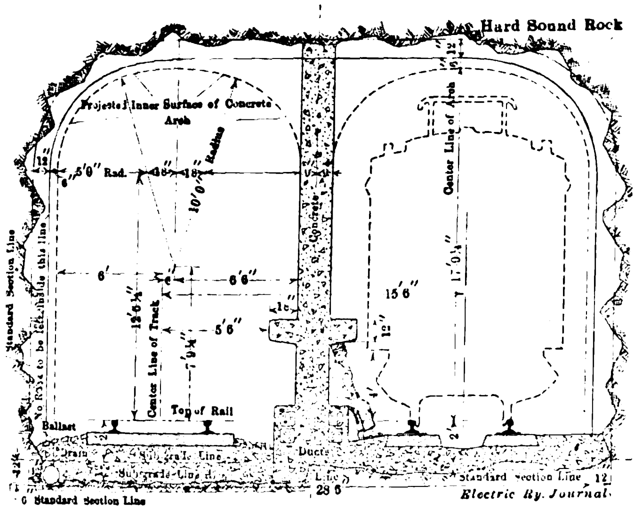

Hard Sound Rock
Projected Inner Surface of Concrete Arch
5'0" Rad.
10'0" Radius
Standard Section Line
6'
6'6"
15'6"
17'0¼"
12'6¾"
5'6"
7'0¼"
Center Line of Track
Center Line of Arch
Concrete
Top of Rail
Ballast
Drain
Sub-grade Line
Ducts
Standard Section Line
28'0"
Electric Ry. Journal

Fig. 4—Montreal Tunnel—Typical Tunnel Section in Hard Rock

Low-voltage direct current, 600-volt, third-rail.

High-voltage direct current, 1200-volt to 2400-volt trolley.

CONSIDERATION OF THREE-PHASE

The chief arguments in favor of the three-phase system are the regeneration of energy on steep grades and the resulting economy both in energy consumption and wear of brakeshoes and tires, and also, in common with other alternating-current systems, the economy of transformation by means of stationary transformers instead of rotating machinery.

In this case, however, the first of these advantages did not apply, as the maximum grade throughout the whole of the electric zone is only 0.6 per cent. As regards the last advantage, it was expected that electric energy would be purchased rather than generated by the railroad company, and as all the available power in Montreal was at sixty cycles, whereas fifteen cycles or twenty-five cycles is required for this system, rotating machinery in the shape of frequency changers would have been necessary. This, of course, would have eliminated the greater economy of transformation that this system claims over direct current.

The chief disadvantages of this system appeared to be:

Necessity for two trolley wires and two collectors insulated from each other.

Complicated and inefficient speed control.

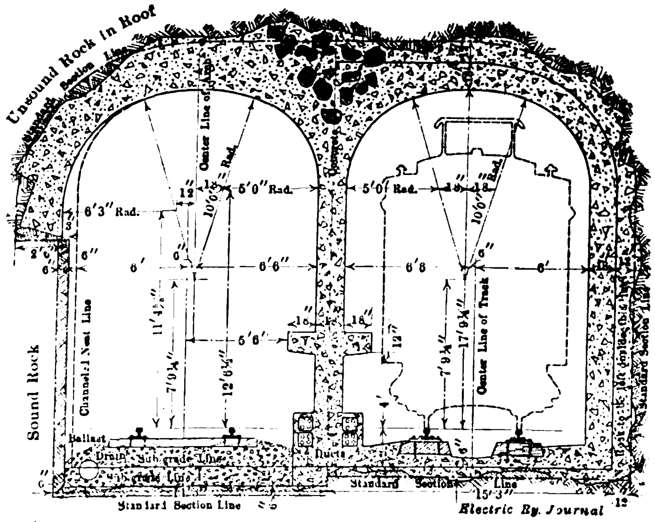

Unsound Rock in Roof
Standard Section Line
6'3" Rad.
5'0" Rad.
10'0" Rad.
Center Line of Arch
6'
6'6"
11'4½"
12'6¾"
7'0¼"
5'6"
17'9¼"
Center Line of Track
Sound Rock
Channel Neat Line
Ballast
Drain
Sub-grade Line
Ducts
Standard Section Line
15'3"
Electric Ry. Journal

Fig. 5—Montreal Tunnel—Typical Tunnel Section—Bad Rock in Roof

High peaks on the substation due to the constant-speed characteristic independent of the torque.

Constant-speed characteristic unsuitable for multiple-unit trains.

Low power-factor.

To balance these disadvantages there remained only the absence of commutators as an argument in favor of the three-phase system. This is not so strong an argument now as it would have been a few years ago. The modern d.c. railway motor with commutating poles is so reliable, and its commutation so nearly perfect, that the objection to the use of a commutator is largely a thing of the past.

CONSIDERATION OF SINGLE-PHASE

The principal reason that seems to make single-phase electrification attractive is the high efficiency of transformation and transmission. As has already been pointed out, however, the use of any a.c. system for the Montreal terminal would mean frequency-changer sets which would at once put this system, so far as the substation apparatus is concerned, on a par with direct current.

At first sight an 11,000-volt trolley promised considerable economy, especially when the possibility of future extensions some distance beyond the present electric zone were considered; but after careful calculations were made it was found that no such voltage was necessary, 2400-volt direct current being ample, even for 25-mile substation spacing, without excessive feeder copper.

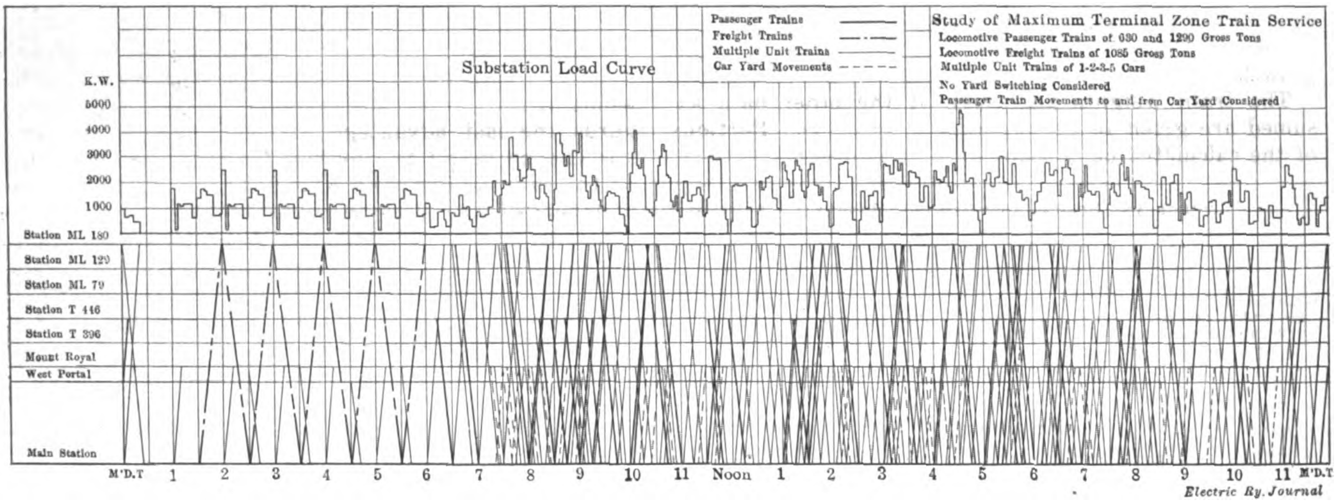


Fig. 6—Montreal Terminal—Estimated Substantial Load Curve

A very serious handicap to single-phase electrification was the large number of multiple-unit motor cars required for the suburban service. It was found that the cost of these would be very high compared with d.c. equipments, owing chiefly to the motors being heavier and more complicated for the same output.

As regards operation, it was thought that the cost of maintenance of the single-phase system would be somewhat greater than either low-voltage or high-voltage direct current, especially when the interference, due to induction, with neighboring telephone and telegraph lines was considered.

CONSIDERATION OF LOW-VOLTAGE DIRECT CURRENT

It might seem, without going fully into the question, that a 600-volt contact system would be ample for this electrification of only 9 miles length. When the heavy trains are considered, however, it was found that two substations instead of one would be necessary, and also that a third-rail would have to be used on account of the heavy current. Trouble from snow and ice in the deep cut west of the tunnel was feared if a third-rail should be installed, and it was thought that the maintenance of this type of conductor in the two yards and in the passenger and freight terminals would be higher than that of an overhead trolley.

Undoubtedly there were two very important points in favor of this low-voltage direct current, namely, its absolute reliability, proved by years of use on electric roads all over the world, and the comparatively low cost of the electric motor car and locomotive equipments. However, it was found that the cost of the large amount of feeder copper and the additional substation would about balance the saving in the cost of rolling stock. As this low voltage was obviously unsuitable on account of the excessive cost for extensions of any considerable length beyond the 9-mile zone, it was thought best to use a higher trolley voltage.

CONSIDERATION OF HIGH-VOLTAGE DIRECT CURRENT

The chief objection to the 2400-volt d.c. system is that it is experimental, but this is not so serious as it might appear. The first railways to use the higher direct-current voltage obtained a trolley potential of 1200 volts by the use of two 600-volt generators wired together in series, the 600-volt railway motors also being wired in permanent series.

There was practically no difference in the design of these 600-volt generators and motors, so connected, and that of the old standard 600-volt generators and motors, except that they had to be insulated for 1200 volts and were furnished with commutating poles. The matter of insulation was not difficult, as much higher voltages have been used for many years on a.c. machinery. The commutating poles, which are of comparatively recent development, have done more to make high-voltage direct current successful than anything else, as they completely overcome commutating difficulties which would otherwise be serious at the higher voltages.

For the first 1200-volt systems, then, the motors and generators were wound for 600 volts and insulated for 1200 volts. This was a comparatively simple step. The next step was to wind these machines for 1200 volts so that one could be used instead of two in series. This was an important matter. It has been done and done successfully. At the time this study was made seven roads in the United States were using either motors or generators wound as well as insulated for 1200 volts and 1500 volts. Abroad there were at least six roads using machines wound for 1000 volts or higher. On these roads this high-voltage d.c. machinery had been thoroughly tried out and had been in operation quite long enough to prove its entire success.

It seemed, therefore, a comparatively simple matter to go one step further and wire two of these motors or generators wound for 1200 volts in series and insulate them for 2400 volts, this being comparable with the first simple step of connecting two 600-volt machines in series to obtain 1200 volts. That this could be done satisfactorily has been abundantly proved by the Butte, Anaconda & Pacific Railway, in Montana, which has had its 2400-volt system in successful operation since last July. With convincing proof that the use of 2400 volts direct current would not be experimental and would prove to be reliable, it soon became evident that this higher voltage was better suited to the heavy electrification contemplated for the Montreal terminal than 1200 volts and 1500 volts.

After the somewhat greater cost of the 2400-volt locomotives and car equipments was balanced against the extra copper and extra substation required for these lower voltages, it was found that 2400 volts would not be any more costly for the 9-mile zone only, and in case of any large extensions it worked out far cheaper than 1200 volts and 1500 volts.

POSSIBILITY OF HIGHER D.C. VOLTAGE

There is another advantage in the use of 2400 volts which some may criticise as being too visionary but which in the opinion of the writer is a very real point.

The tendency in electric railway development seems to be strongly toward d.c. potentials even higher than 2400 volts. In England a 3500-volt electrification is already in operation. The writer has seen factory tests with 5000 volts direct current that indicate the practicability of this voltage. Much experimental work is being done along this line. While 2400 volts is quite high enough in certain instances, it must be admitted that where grades are steep and loads are heavy an even higher voltage would be desirable.

The advantage of 5000 volts for long trunk-line electrification would be enormous. It is chiefly a very high trolley voltage which makes single-phase current appear so attractive. Undoubtedly the successful development of 5000 volts direct current would mean that many railroads would find it exceedingly profitable to electrify for long distances where just the reverse would be the case if a lower voltage had to be used. This is especially true in Canada, where cheap water-power can frequently be obtained along the right-of-way and where the expense of operating steam locomotives during the bitterly cold winters of the country is so great.

Thus if a 5000-volt system is developed, which seems likely, and a 1200-volt system had been chosen for Montreal, the railroad could never have adopted this higher voltage as standard for its long-distance electrifications, except with the decided disadvantage of having to operate its 5000-volt equipment at half speed over the 1200-volt trolley. By using 2400 volts now, if 5000 volts should ever become desirable, the motors for the higher voltage being wound for 2400 volts and operated two in series on 5000 volts, could readily be operated in multiple on 2400 volts at full speed, just as 1200-volt equipments are now run at full speed on 600 volts.

EQUIPMENT ORDERED

After a careful study of the four systems that have been briefly discussed, the conclusion was reached that, all things considered, the 2400-volt d. c. system would be the most economical for the Montreal tunnel and terminal. The initial order for equipment, amounting to more than $540,000, was then placed with the Canadian General Electric Company. This included six locomotives, eight multiple-unit car equipments and two 1500-kw motor-generator sets with switchboard and auxiliary apparatus. A brief account of this equipment has already been given in the ELECTRIC RAILWAY JOURNAL of Oct. 11, 1913. In subsequent articles it is intended to give complete descriptions of both the rolling stock and substation.

The single substation will be at the west portal of the tunnel, where three-phase, sixty-cycle, 11,000-volt energy will be purchased and transformed by means of the two synchronous motor-generator sets into 2400 volts direct current. Each of these units has a continuous rating of 1500 kw and a five-minute overload capacity of 200 per cent. Space will be provided in the building for a third unit, which will be installed when required by increase in traffic, so that ultimately the total station rated output will be 3000 kw continuously and 9000 kw for five minutes. As one unit will always be held in reserve as a spare, this ultimate station capacity is based on the rating of two of the motor-generator sets rather than all three.

THE MERCURY VAPOR TURBINE

At the present time W. L. R. Emmet, of the General Electric Company, is conducting experiments on mercury boilers and turbines with a view to determining the practicability of the use of mercury vapor in the production of mechanical power. Mr. Emmet's preliminary calculations and tests indicate that with the most efficient oil firing of boilers the mercury turbine should result in a fuel economy very near that commercially obtainable in Diesel engines. The mechanical simplicity and freedom from the probability of deterioration should, in his opinion, give the mercury turbine a very decided advantage over the Diesel engine. The theoretical saving in the use of mercury as a vapor instead of steam results from the wide range of temperature variation possible. Mercury boils at 677 deg. Fahr. at atmospheric pressure and condenses in a 28-in. vacuum at 455 deg. It is therefore well adapted, at least by pressure and temperature conditions, for use in a temperature cycle above that now used with steam.

Mr. Emmet has built a small experimental equipment of a capacity of about 100 hp with which experiments are now being made. Two boilers are used, a pressure boiler for producing the vapor and a condensing boiler for exhausting the mercury from the turbine. The condensing boiler produces steam which is used in the ordinary way. In the experimental plant a special pressure boiler has been constructed with flat curved tubes, the flattening being resorted to to reduce the volume of mercury required and the curving to take care of expansion and contraction. The condensing boiler used was made from a standard high-pressure feed-water heater having a water space at top and bottom connected by tubes in the manner customarily used in such devices. This is not considered a suitable permanent design since the temperature differences impose excessive strains on the expanded tube sheet.

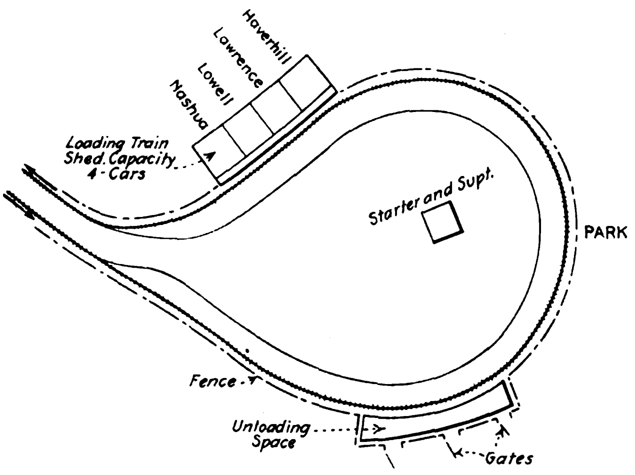
Mr. Emmet makes the statement that the use of mercury turbines would not result in a permanent increase in the price of mercury as the sources of supply appear to be ample. His estimate shows also that by the use of 15 per cent additional fuel the output of a steam plant can be increased 66 per cent by adding mercury turbines with a mercury vapor pressure of 10 lb. per square inch and a vacuum of 28.5 in.

Recently published results of tests of locomotives of about 500-hp capacity for a plant in Wiborg, Finland, show fuel consumption of from 1.06 lb. to 1.11 lb. per hp-hour and steam consumption of about 9¼ lb. per hp-hour with a load of about 540 hp. Three of these units will be operated in conjunction with a small hydraulic plant to supply light and power to the city. This remarkably low fuel consumption is secured by the use of high-pressure, high-temperature steam in a compound engine mounted directly on the boiler. The locomobile type of power-generating unit is in extensive use abroad and has been introduced in America.

Operation of Canobie Lake Park

This Park Serves a Number of the Popular Cities in the Merrimac River Valley—The Experience of the Company with Various Attractions Is Described

Canobie Lake Park, at Salem, N. H., on the lines of the Massachusetts Northeastern Street Railway, is one of the best known pleasure resorts along the lower Merrimac River Valley. It can be reached in between thirty and forty-five minutes from Lowell, Lawrence and Haverhill, Mass., and from Nashua, N. H., and it is yearly increasing in popularity. The Massachusetts Northeastern system is a consolidation of fourteen roads aggregating about 150 miles of track, with headquarters at Haverhill, Mass. The company operates cars in the northern half of the Merrimac Valley between Nashua and Hampton Beach, with connecting lines to important points in eastern Massachusetts and southern New Hampshire. It also operates Central Park, Somersworth, N. H., and handles an extensive through service to Hampton and Salisbury Beaches from Newburyport, Amesbury and the cities previously mentioned.



Canobie Lake Park—Plan of Terminal

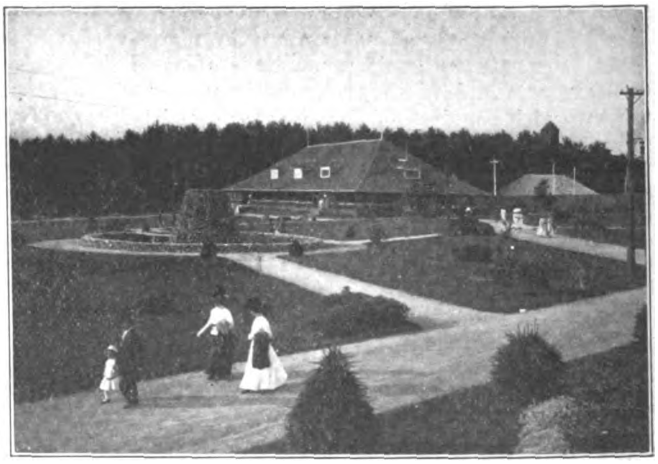
Canobie Lake Park is situated about 1½ miles off the company's main line, but it is connected with the latter by a track terminating in a loop at the park entrance. The park covers about 50 acres and is laid out on a level stretch bordering the lake for which the resort is named, the central portion of the grounds being tastefully divided by gravel walks and lawns, with shrubbery along the borders. Pine and chestnut trees form attractive groves for picnic parties, and in addition to the aquatic pleasures available, a large athletic field is a prominent feature. The attractions include a merry-go-round, circle swing, roller coaster, bowling alleys, deer park, theater, inclined slide, shooting gallery, penny arcade, ice-cream pavilion, dancing pavilion, lunch room, electric fountain, photograph gallery, boathouse, swimming pool and power launches.

The loop track at the park entrance is doubled to provide for car storage and flexibility of operation. Incoming cars discharge passengers at an unloading platform on the opposite side of the loop from the loading space, the latter being divided into four separate sections covered by a train shed and marked with the destinations of outgoing cars. The loading platform is 120 ft. long. In summer a thirty-minute headway is maintained on the principal lines, with a minimum headway of fifteen minutes under heavy traffic conditions. The standard car is a fourteen-bench open equipment. Immediately outside the grounds are a hotel and a number of summer cottages which are well patronized during the season. Although the park is inclosed, no admission is charged. The management caters especially to societies, churches and organizations. The park is kept free from objectionable characters by special police, and no intoxicating liquors are sold.

TRAFFIC ARRANGEMENTS

The park season opens May 30 and formally closes on Labor Day, but the grounds are open until mid-October for picnic parties. Through car service to the park is discontinued one week after Labor Day, and with the exception of a half-hourly service rendered to and from Lawrence, the schedule is placed on an hourly basis at this time. About 250,000 persons visit the park yearly, the accounts being kept separately from those of the railway company. Concessions are leased upon a fixed price plus a percentage basis, and a cashier on the grounds makes daily collections from each concessionaire and turns the receipts into the main office at Haverhill. All car movements are in general charge of the local division superintendent, whose offices are at Salem, but arrangements for the hiring of special cars are made at the manager's office in Haverhill. A dispatcher at Salem handles special cars running between the park, Haverhill and Lawrence, and a dispatcher at Pelham, N. H., handles the cars running between the park, Nashua and Lowell.

The fares are 10 cents per trip from Lawrence and Haverhill, 15 cents being charged from Nashua and Lowell. No single round-trip rates are in force except when large parties of 500 or more are concerned. In such cases a round-trip rate of 17½ cents per passenger is made from Lawrence and Haverhill and a round-trip rate of 27½ cents per passenger from Nashua and Lowell. The distances from the park of the principal cities on the system are: Haverhill, 10.4 miles; Lawrence, 8.5 miles; Lowell, 14 miles; Nashua, 16.2 miles, and Newburyport, 28 miles. The special car rate is $5 per car round trip in a fare zone, seventy passengers being allowed in summer and fifty in the winter. All the company's fares are not based upon a 5-cent unit.



Canobie Lake Park—Center of Park, Showing Electric Fountain

ATTRACTIONS

On account of the diversity of attractions, it is difficult to accord popular preference to individual features, but the dance hall is the best patronized. The theater seats about 2000 persons, many benches being provided. In former years 10-cent and 20-cent seats were sold. Last year the entertainment consisted of moving pictures only, 5-cent and 10-cent seats being sold. These were a failure, the popular preference being for the usual vaudeville entertainment of former seasons. The lack of success of the "movies" was probably due in part to the necessary use of canvas curtains at the sides of the theater to produce the requisite darkness, this arrangement rendering the auditorium uncomfortably warm on many days. The theater has a roof over the stage and the central seats. The roller coaster is patronized at 10 cents per person and is 565 ft. long, with two tracks, giving a total ride of about half a mile in two revolutions. The dancing hall floor is 44 ft. by 105 ft. and will accommodate about 250 couples.

Canobie Lake Park—Lake Front, with Ice-Cream Pavilion Built Over Lake

The larger restaurant on the grounds seats about 700 and the smaller one, which is used as a lunch counter, souvenir store, etc., seats about a dozen. Thirty boats and twenty canoes are maintained in livery on the lake, and the latter has an area of about 6 sq. miles. The gasoline launches at the park hold thirty and twenty persons, the larger boat making regular 10-cent trips around the lake, occupying about half an hour each, while the smaller launch is rented to private parties. There are ten bowling alleys. The swimming pool has a capacity of 250,000 gal. and is lined with white enameled tile, being 4 ft. in depth at one end and 9 ft. deep at the other. A life rope is carried around the nk and it is equipped with springboards and life preervers. Twelve deer are maintained in the deer park, and monkeys are a usual attraction at the park. Soda and refreshment booths are located at various points, and a women's cottage, with matrons in attendance, is a much appreciated feature.

Canobie Lake Park—Walks and Lawns

The groves accommodate parties of 2000, 400 and 600, the trees being principally firs. A Sunday band concert is given weekly at 4 p. m. and lasts two hours. On July 4 fireworks are displayed, the railway company and the concessionaires sharing the cost. An annual feature at the park is a music festival of choral societies of Nashua, Manchester, Lowell and Lawrence, in which 400 voices give two daily concerts on the Saturday and Sunday following Labor Day. At the athletic field no admission is ordinarily charged, and this contains a baseball diamond and 0.2 mile running track. The field is fenced in and two grand stands are provided so that events with admission fees can be properly handled. Ten arc lamps are installed on standards bordering the running track when night events are scheduled. The lamps are taken down when not in regular service. All the principal buildings in the park are outlined in incandescent lamps. Energy for lighting service is supplied by the railway company with an auxiliary connection to the lines of the Lawrence Gas Company. Advertising is begun in the local press one week in advance of the park opening, and throughout the season 4-in. advertisements, with weekly changes, are run in the local dailies. A traffic solicitor is also employed for the park service during the season.

Canobie Lake Park—Large Restaurant; Roof Outlined with Incandescent Lamps

Canobie Lake Park—Pine Grove for Picnics

The park is looked after by a superintendent who resides on the grounds the year through, three regular uniformed police (with two extra police on Saturdays, Sundays and holidays), from ten to twelve gardners and caretakers, two matrons and a cashier. E. F. Bowser is superintendent.

A few words about the beach resorts on the company's lines may be added. Through cars are operated in the summer from Haverhill to Hampton Beach on thirty-minute headway, a distance of about 25 miles via Salisbury Beach, the fare being 35 cents. Direct cars to Hampton are run hourly. The attractions at Salisbury are of a more popular order, although at Hampton a large casino owned by the Exeter, Hampton & Amesbury Street Railway, a baseball diamond and summer hotel and cottages in large numbers, with regular band concerts and theatrical performances, draw large crowds. Hampton is a natural stopping point en route from Boston, Lowell, Lawrence and Haverhill by trolley to Portsmouth and the Maine coast, and the Massachusetts Northeastern company handles a large through business yearly to and from this resort. Central Park, Somersworth, N. H., is on the Dover, Somersworth & Rochester Street Railway, operated by the Massachusetts Northeastern company. It is 4 miles from Dover, N. H., and contains a theater and baseball grounds as noteworthy features. Franklin Woodman is general manager of the Massachusetts Northeastern company.

MOTION PICTURES FOR INSTRUCTIONS ON RULES

The Pacific Electric Railway, Los Angeles, Cal., is using motion pictures very successfully in connection with the instruction of its trainmen. Originally the plan, as developed by the instruction department of the company, contemplated the production of views indicating simply the wrong and the right ways of complying with operating rules. To this plan the company has adhered in the main, but in some instances it has been expanded to show the consequences in cases of accident caused by violations of the different rules. In other cases the pictures show simply the proper method of procedure under the rule. No attempt is made to present equipment views in motion pictures as this feature of instruction work is fully and satisfactorily covered by practical instruction while the employees are "breaking in" and by lectures which are illustrated by stereopticon views as well as charts.

Practically 4000 ft. of film has been produced. For the most part, regular employees of the company have been used as actors, as it was found easier to make actors out of railroad men than railroad men out of professional actors.

In carrying out the original idea one crew was used to depict the careless, incompetent and negligent observation of the rules, while another crew was exhibited in the pictures as alert, competent and vigilant in its work. To complete the lesson the incompetent crew is shown carelessly attired, with caps on one side, collars turned up, etc., while the second crew is neat in dress and erect in bearing.

The pictures, following in a general way the rules of the transportation department, show first the meeting of the two crews in front of a saloon. The members of the first crew invite those of the second into the saloon to have a drink, but the latter crew refuse and go about their business, while the other crew enters the saloon. In connection with this picture a slide is shown quoting the rule concerning the uniformed employee entering saloons.

Throughout the pictures sub-titles are shown explaining them, and a lecture by the instructor is also given, which adds much to the interest. In addition to the sub-titles, slides have been prepared to illustrate the various rules, and these rules are interpreted by the pictures in so graphic a way that no mistake can be made by any employee in his understanding of them.

Thus the rule concerning the flagging of railroad crossings at grade is illustrated by pictures which show the negligent conductor in conversation with the motorman while the car is approaching the crossing. When the car stops the conductor swings off the front platform, although the rule requires him to alight from the rear platform and walk forward across the railroad track. He then mechanically gives a proceed signal without looking in either direction. The motorman, whose mind is still intent on the subject of the conversation, acts on the signal without looking for an approaching train, and the car is almost on the crossing when the crew awakens to the fact that a train is almost upon the car, and an accident is narrowly averted.

A similar scene with the second crew gives the proper procedure under the same conditions.

A thrilling picture is made of the failure of a motorman to slow down on a slow-speed curve which is protected by a fixed signal. Just around this curve is a high railroad bridge, and the motorman discovers a pedestrian on the bridge but is unable, on account of his speed, to stop. The result is that the pedestrian is run down and killed. This scene was accomplished with the aid of a dummy. The second motorman rounds the curve at proper speed and thus is able to stop on seeing the pedestrian. The latter is allowed to escape from the bridge without accident, but not without a warning.

Another view shows a motorman in conversation with a conductor, who, of course, is not in his proper place, and both are so interested in the matter under discussion that the motorman runs past a landing where a passenger is waiting to board the car. Then, instead of backing up to the landing, the motorman allows the passenger to follow the car and the conductor lets him climb up on the rear end without assistance, although he has heavy baggage with him and is standing on the shoulder of a fill.

A similar scene shows the car backed up after running by a landing, while the conductor is still on the front end. But in this case the passenger, in following the car, has caught his foot in the slat cattle-guard and is run down by the returning car.

In another set of views the proper procedure at meeting points on single track is shown, as when trains of the same class meet and when an extra train on short time meets a regular train coming in under protection of a flag.

The proper and improper ways to protect the rear end are also shown. In this case insets have been made in the film to give close views of the placing of torpedoes on the rail, the lighting of fuses and similar operations.

The proper protection of a car with a two-man crew in using a four-track crossover is also illustrated in such a way that the man who sees the picture once will never be at a loss to handle a situation which to those accustomed to single-track operation is sometimes puzzling.

The use of manual staff machines is clearly shown in another set of views. All signals, both hand and lantern, are given, including many of the signals common to the yard, but not found in the rule books.

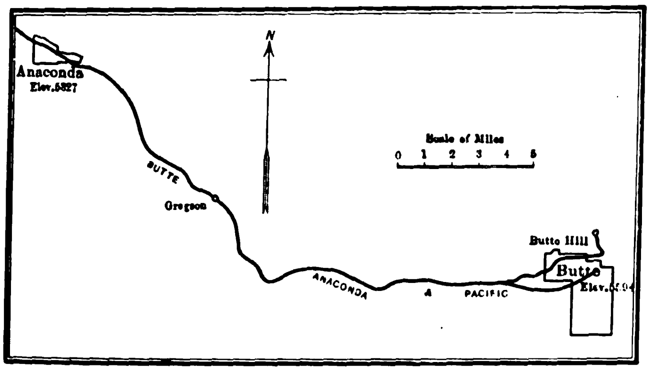
The list of scenes mentioned is illustrative and comprises only a few of the views presented at the lectures. To show all of the pictures with the accompanying lecture requires two hours or more. These views are now shown at all evening classes of the company. The classes occur three times per week, and one or two reels are thrown on the screen at the close of each class. They have been found to add greatly to the interest of the men in the regular instruction.

Butte, Anaconda & Pacific Railway Electrification

This Ore-Carrying Road Is the Largest 2400-Volt D. C. Electrification—Seventeen 80-Ton Locomotives Are in Use—Current Is Furnished from Great Falls, Mont.

The Butte, Anaconda & Pacific Railway electrification has attracted unusual attention on account of the use of 2400 volts, direct current, on a large scale. Out of a total of 114 miles of single track, 75 have been electrically equipped and full electrical operation commenced about five months ago. A preliminary account of this project was printed in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 10, 1912. Details of the overhead construction were given in the issue for Aug. 31, 1912, and a full account of the type of locomotive selected appeared in the issue of Jan. 7, 1913. A brief review of the essential features of the equipment will suffice as an introduction to some of the operating details.

There are seventeen 80-ton locomotives in use, two for passenger and fifteen for freight service. The freight locomotives are geared for a free running speed of 35 m.p.h. The passenger locomotives are able to draw three loaded passenger coaches at 45 m.p.h., and the freight locomotives produce a tractive effort of 25,000 lb. at 15 m.p.h. The maximum tractive effort for five minutes is 48,000 lb., based on a tractive coefficient of 30 per cent.



Electric Ry Journal

Butte Electrification—Map of Electrified Line

The locomotives are of the articulated double-truck type with all of the weight on the drivers. Four 1200-volt motors of the GE-229-A type are used. They are commutating-pole motors with supplementary forced ventilation, the blower for this purpose forming part of the dynamotor equipment used for lowering the voltage to 600 for the auxiliary apparatus. The blower on each unit has a capacity of 7200 cu. ft. per minute at 4-in. pressure. The motors are connected in two series groups which are operated like single motors in the usual series-parallel control. Nine steps are provided in the series connection and ten in the parallel. Overhead roller pantographs, pneumatically controlled, are used.

OVERHEAD CONSTRUCTION

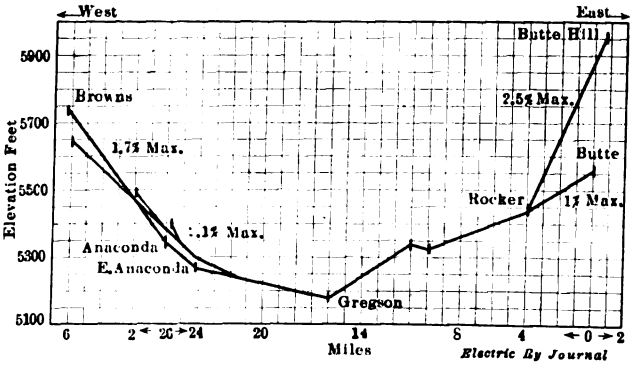
The overhead contact wire is No. 0000 grooved wire, supported by an eleven-point catenary suspension, hung from steel messenger cable. Both side bracket and cross-span supports are used as required. In one case twelve yard-tracks are spanned, requiring an intermediate pole support for the span cable. A rolled-steel strap hanger looped loosely on the messenger wire is used to hang the contact wire with the necessary flexibility.

The contact wire is made up of the usual sections connected by circuit-breakers, but the interruption of power supply is prevented by overlapping the contact wires at breaking points. They are separated by the distance necessary for insulation, which is easily bridged by the roller. Lightning arresters are installed on poles every third of a mile.

The contact wire is reinforced by two 500,000-circ. mil bare copper cables, tapped in every 1000 ft. These normally connect the substations, permitting an interchange of power.

CAR HEATING AND LIGHTING

Current for car lighting is drawn from the dynamotor at 600 volts, each passenger and baggage coach being wired for five groups of five series lamps each. The electric heating is furnished in each coach from a 25-kw heating unit from which warm air is distributed by means of a motor-driven blower having a capacity of 500 ft. to 1000 ft. per minute. Cool air is drawn into the heater from a point on the car roof and distributed through ducts under the floor to radiators placed between alternate seats. The heating unit is in sections for the purpose of graduating the power consumption. The temperature is controlled by means of the usual thermostats.



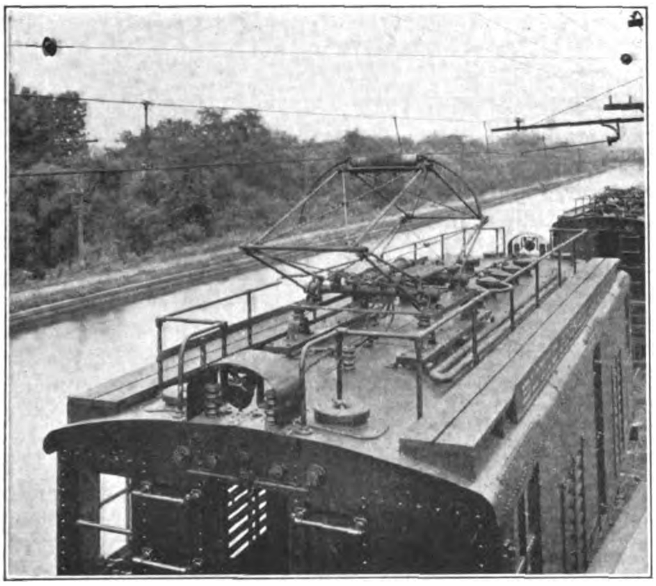
Electric Ry Journal

Butte Electrification—Profile of Electrified Line

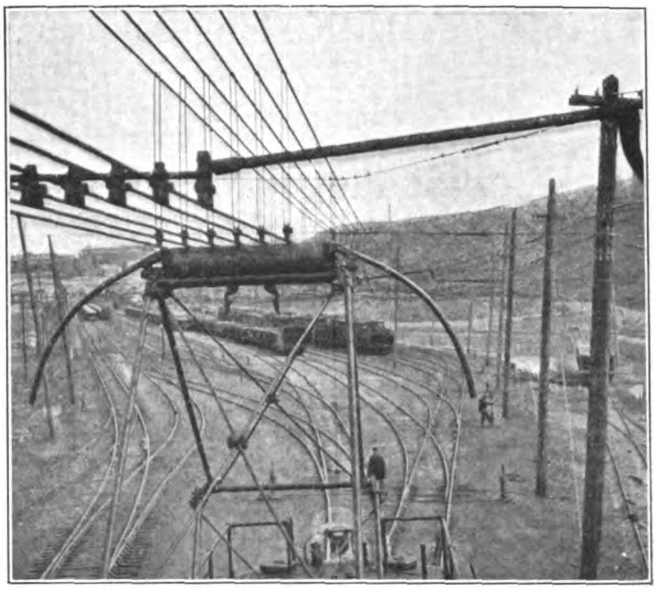
POWER SUPPLY

The energy needed for the operation of the electrified zone is obtained from the Great Falls Power Company's plant at Great Falls, about 125 miles distant in an air line. The capacity of the six generating units in the plant is 21,000 kw, and they produce electric power at 6600 volts, three-phase. The voltage is stepped up for the 130-mile transmission to Butte to 102,000, while power is from this point supplied to Anaconda, 26 miles farther on, at 60,000 volts. The Butte substation forms the center of the extensive power system operated by the Montana Power Company, which has several power plants to draw upon.

The only substations in use are at Butte and Anaconda. Here 2400-volt, sixty-cycle synchronous motor-generator sets, three in each substation, transform 2400-volt, three-phase power to the 2400-volt d.c. form. Each set contains one motor and two 500-kw, 1200-volt, commutating-pole generators, operating in series. These generators are compound-wound and have compensating pole-face windings. The series fields are connected on the grounded sides of the armatures, and the main fields are separately excited from 125-volt exciters.



Butte Electrification—View of Apparatus on Roof of Locomotive Cab

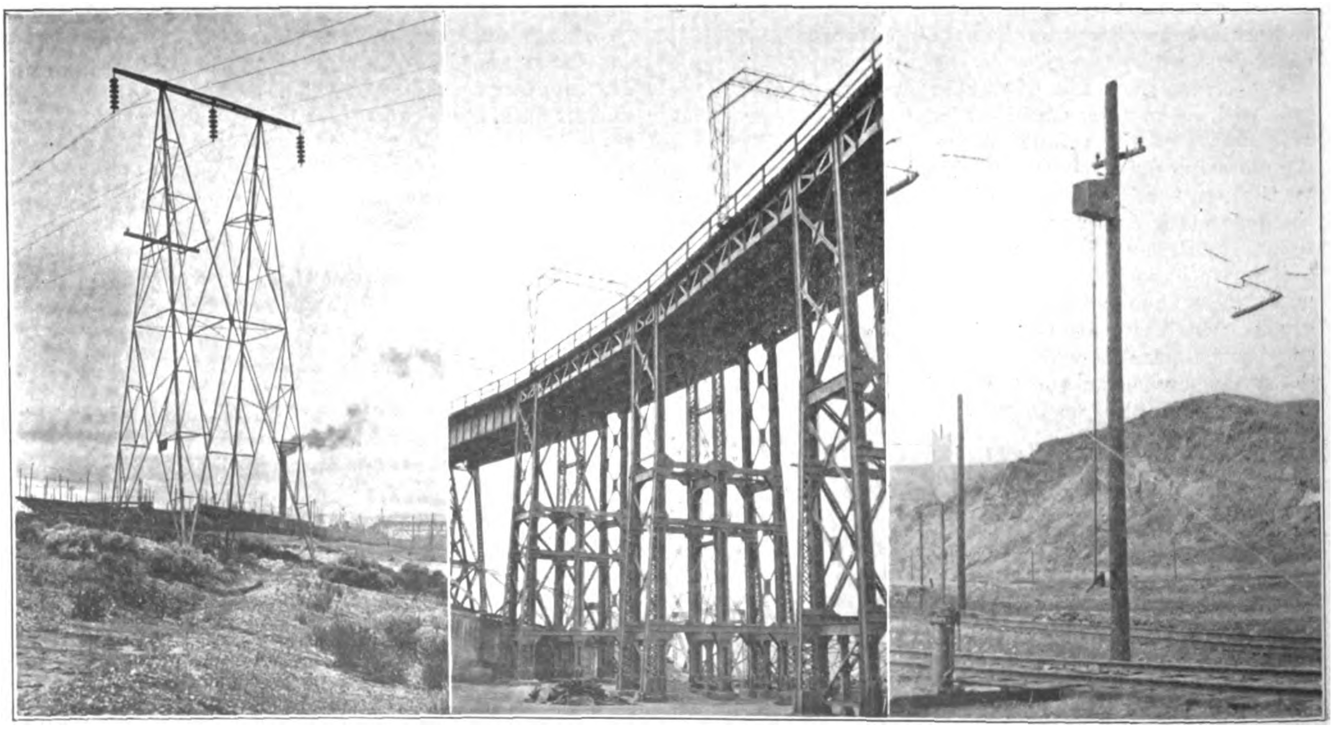


Butte Electrification—Section Where Pantograph Engages Six Trolley Wires

2400-VOLT SWITCHING

On account of the use of such a high voltage, special switchboard apparatus had to be designed. The circuit-breakers are provided with arc chutes with magnetic blow-outs of great intensity, the pole faces being so designed as to distribute the magnetic flux uniformly over the whole arc chute, thus insuring that the direct-current arc will be ruptured when the circuit-breaker opens. Low-voltage protection is secured by means of a low-voltage release coil, which, forming a part of the breaker and acting in conjunction with a speed-limiting device installed on the corresponding machine, prevents overspeeding by tripping out the breaker as soon as the speed for which it is set is passed. The low-voltage release and a reverse-current relay are connected in the 2400-volt circuit through high resistance and are insulated from the circuit-breakers so that the speed-limit device on the generator may be kept at ground potential. The low-voltage release must be set before the circuit-breaker will remain closed. This is done by lifting the plunger with a wooden rod connected through a bell-crank mechanism to an operating handle on the front of the switchboard. The breaker may be shifted manually by pulling the operating handle out to the limit of its travel. Lever switches and circuit-breakers are mounted on insulators for the purpose of effectively insulating them against the high voltage of the system.

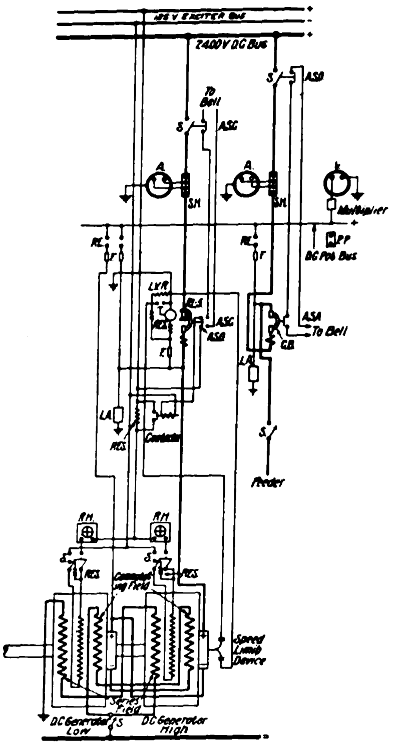
The main buses are located above and to the rear of the circuit-breaker panels and are protected by asbestos lumber covering which inclines upward from the top of the circuit-breaker panel to the wall behind the switch-



Butte Electrification—Steel Transmission Tower Carrying 100,000-Volt Lines—Trestle at Washoe Smelter, Showing Steel Bridge Construction—Section Switch and Operating Lever

board to form a barrier. This prevents circuit-breaker arcs from reaching the buses and also protects the buses from objects which might fall from above.

The ammeters are incased in insulating covers, while the voltmeter, mounted on a swinging bracket, is connected to the circuit on the grounded side with the separate resistance on the positive side, thus making the potential from meter to ground a minimum. Every precaution possible is taken to insure the safety of operators by covering live parts of the board.

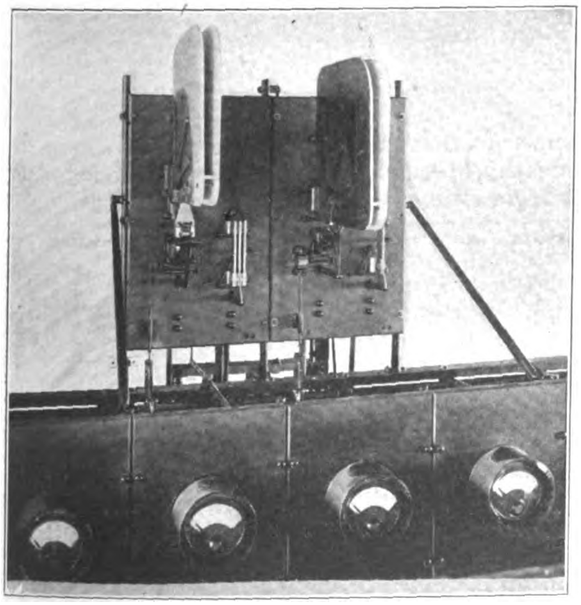


Butte Electrification—Substation Wiring Diagram

OPERATING DETAILS

Eight passenger trains are operated per day between Butte and Anaconda, four each way. Single locomotive units are used for this purpose. During the first seven months of service, the freight service having been begun some months earlier than the passenger service, the freight locomotives made approximately 201,000 miles and hauled 2,365,000 tons of ore.

The freight traffic consists largely of copper ore and amounts to more than 5,000,000 tons per year. This material is handled in steel ore cars weighing about 18 tons and having a capacity of 50 tons each. Trains of thirty loaded cars weighing 2000 tons are made up at the Butte Hill yards and hauled by two-unit locomotives to the Rocker yards, where 4000-ton trains are made up for the main line. At the West Anaconda yards the trains are again broken up, and 1400-ton trains are sent up Smelter Hill to the ore bins. All of the shifting and "spotting" of cars at the smelters and in the sorting yards is done by single locomotive units.



Butte Electrification—2400-Volt Circuit-Breakers

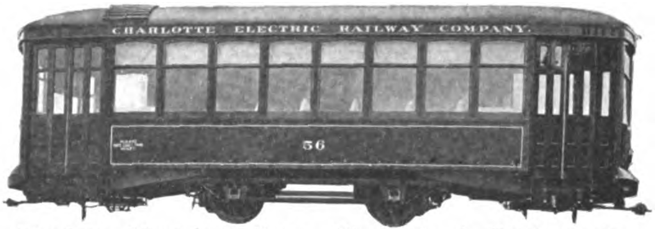
CONDENSED INFORMATION ON FREIGHT MOVEMENT

	West Bound			East Bound		
	Butte Hill Line	Main Line	Smelter Hill	Smelter Hill	Main Line	Butte Hill Line
Trailing load in tons	2000	4000	1400	1000	1260	650
Number of cars	30	60	20	55	70	35
Number of 80-ton locomotives per train	2	2	2	2	2	2
Approximate grade against load in per cent	2.5	0.3	1.1	1.1	1	2.5
Approximate speed on level tangent track, m.p.h.		21			25	
Approximate speed on maximum grade	12	16	16	20	16	16
Average trolley voltage	2200	2200	2200	2200	2200	2200
Length of run in miles	4.6	20.1	7	7	20.1	4.6

The steam locomotive crews, consisting of engineman and fireman, easily acquired proficiency in handling the electric locomotives. In fact, two or three days' instructions from a competent electrical man were ordinarily sufficient. The change from steam to electric haulage was made without any change in the personnel of the train crews and without any delays or alterations in the schedule. The engineers, without exception, have expressed themselves as being greatly pleased with the easy operation of the locomotives.

LIGHT VESTIBULED CARS FOR CHARLOTTE, N. C.

The Southern Car Company, High Point (N. C.), has recently furnished to the Charlotte (N. C.) Electric Railway four cars, and to the Greenville (S. C.) Spartanburg & Anderson Railway six cars, of the single-truck, arch-roof, full-vestibuled type shown in the accompanying illustration. These cars have no bulkheads, and the swing-type vestibule doors are arranged to operate in connection with the steps. The car bodies proper are 21 ft. 2 in. long over the corner posts, 32 ft. 6 in. over the vestibuled sheeting, 34 ft. 6 in. over the bumpers, 8 ft. 3 in. wide over the sills and 8 ft. 5½ in. high over the drip rails. The longitudinal sills are of long-leaf yellow pine with channel reinforcement. The cross timbers and the end sills are of oak reinforced with ⅜-in. x 4½-in. plate. The side sills and end sills are tied together with corner angle-irons. The posts and roof framing are of white ash while the top rails and the intermediate rails in the roof are of long-leaf yellow pine. The sides of the car are sheathed up to the window rail with 3/16-in. steel. The arch roof is made up of white ash rafters and a concealed steel rafter.



Charlotte Electric Railway—Single-Truck Vestibule Car

The vestibuled platforms are each 5 ft. 8 in. long. They are carried on oak platform knees, which are reinforced with steel. The interior finish of the cars is in natural mahogany, and the ceilings are of agasote. Six pairs of transverse seats are installed on each side in addition to short longitudinal corner seats. The cars are equipped with Consolidated electric heaters and Crouse-Hinds incandescent headlights.

Stepless Double-Deck Car for Columbus, Ohio

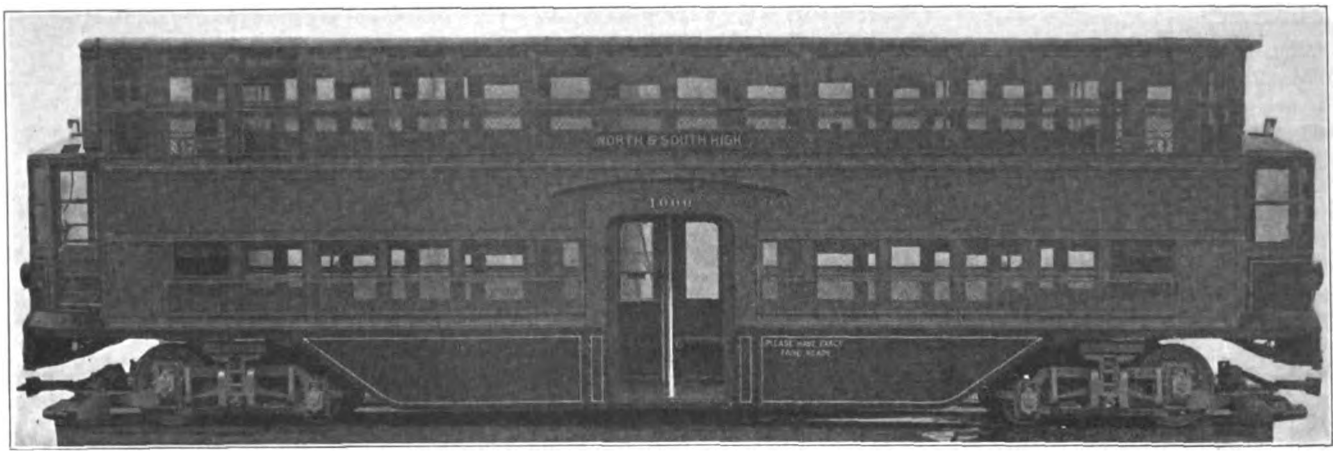
The Writer Explains the Traffic Conditions in Columbus, Compares the Cost of Different Transportation Units and Describes the Car Selected as Most Suitable for the Service

BY ARTHUR ST. GEORGE JOYCE, E. W. CLARK & COMPANY, PHILADELPHIA

Westward the trail of the modern "double-decker" takes its way. Pittsburgh and New York started the innovation, Washington followed suit, and now Columbus, Ohio, has one of the cars in operation along its principal business street. There are certain features about the Columbus car which commend it to the attention of those interested in the problem of providing the maximum capacity at a minimum operation outlay.

TRAFFIC CONDITIONS AT COLUMBUS

The street railway situation in Columbus differs from that of any other city in the country in having only one street along which there is traffic congestion. Into the electric railway cars that traverse this street there crowd during the rush hours almost all the persons in Columbus who want to ride to or from their homes and places of business.



Columbus Double-Deck Car—Side View of Car

During the morning and evening rush hours traffic congestion on High Street throws all the traction lines of the Columbus Railway, Power & Light Company off schedule, since ten out of the sixteen routes operated by the company converge on that thoroughfare through its busiest section—Broad Street to Long Street—a distance of only two blocks. In an effort to relieve this congestion, several years ago, the company got permission from the municipal authorities to re-route some of the lines so that they traversed the next parallel streets east and west of congested High Street. The riding public, however, had become so accustomed to "taking the High Street cars" that it refused to violate traditions and declined to patronize any other line. So the relief plan was abandoned. The situation which confronts the company has become more serious each year. Two-car train operation was recently tried, but this did not prove satisfactory because of delays due to long stops. Again, the operating expenses of the two-car plan were considered too large, since, with seating capacity for only eighty passengers, the train required a crew of from three to four men to operate it.

The Columbus Railway, Power & Light Company, managed by E. W. Clark & Company, Philadelphia, operates under a franchise which demands next to the lowest unit fare charged by any company in the country. It is obliged to furnish eight tickets for a quarter with free transfers. It has become imperative, therefore, for the company to provide a car having the largest carrying capacity coupled with the greatest degree of efficiency. The low-level stepless double-deck car was decided upon as the type which most nearly comes up to the requirements.

COMPARISON OF OPERATING UNITS

The reasons for choosing double-deck operation are contained in the following comparative table, which contrasts the operating expenses, initial cost and carrying capacity of the double-deck car with other types.

The contrast with the single-ended combinations does not mean much as far as Columbus is concerned, since there are very few loops there. It is only when loops are numerous that this scheme of operation can be used economically, because without loops annoying delays result from switching movements at terminals.

COMPARISON SHOWING COST AND EFFICIENCY OF DIFFERENT TYPES OF OPERATING UNITS

	Double-Deck	Single Motor Car	Two Motor Cars with Multiple Unit Control	Single-Ended Two-Car Trains, Both Motor Cars	One Motor Car, One Trailer, Stepless
Cost of equipment (estimated)	$6,500	$4,903	$9,933	$8,773	$7,203
Seated passengers	83	40	80	80	100
Seated and standing passengers	171	100	200	200	210
Total weight without passenger load, lb.	46,000	35,773	71,546	68,209	61,773
Depreciation per train mile in cents	1.100	0.830	1.681	1.485	1.219
Cost of energy in cents per kw-hour	1.602	1.144	2.288	2.038	1.976
Maintenance in cents per mile	2.058	1.470	2.940	2.940	2.940
Platform wages in cents per mile	5.227	5.227	7.841	7.841	7.841
Total cost in cents per train mile	11.121	9.526	16.483	15.835	15.232
Cents per passenger capacity per train mile	0.0650	0.0952	0.0824	0.0792	0.0725

It will be noted also that the wages paid the conductor and motorman on the new double-deck car are the same as those of the single-motor cars and represent a much smaller outlay than the sums paid to operators of the other types. The cost per passenger capacity per train mile is lower than that of the other contrasted types.

Selection of the double-deck car was also influenced by these economic features:

Additional safety to passengers by elimination of dangers incident to entrance and exit.

Greater convenience in entering and leaving car.

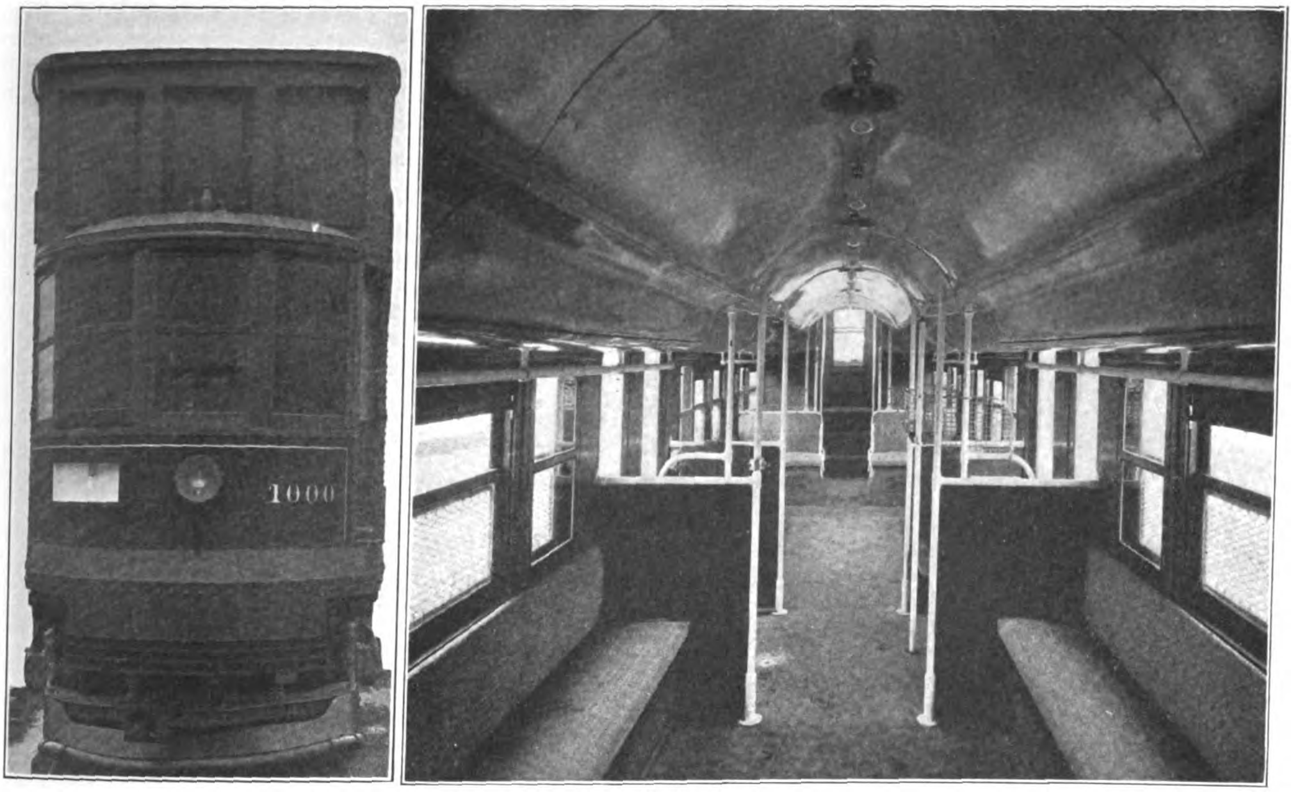
Improvement in working conditions of motormen and conductors.

Better sanitation through scientific ventilation.

Elimination of dangers due to premature starting of cars, since they cannot start until the doors have been shut.

Greater facilities for passengers who want to smoke.

Traffic congestion reduced by increase of almost 100 per cent in the carrying capacity per foot of street occupied.



Columbus Double-Deck Car—Views of Front of Car, Showing Motorman's Cab and Fender Arrangements, and of Lower Deck Interior

Decreased maintenance and operating expenses in the handling of passengers.

GENERAL FEATURES

The new car, built by The J. G. Brill Company, is 45 ft. 6 in. long over all, having an extreme width over the belt rails and eaves of 8 ft. 3 in. The over-all height from top of rail is 13 ft. 2½ in. The trucks are on 29-ft. centers. The framing throughout is of rolled-steel or pressed-steel sections.

The lower-deck floor extends from the center of the car to the edge of the semicircular seats at each end, rising slightly from the center to clear the truck axles. The space underneath the end and cross seats is not floored and the wheels and truck frames extend up under these seats. This arrangement permits the truck to swing sufficiently to pass around a curve of a minimum radius of 37 ft.

The upper deck extends only between the bulkheads which separate the motormen's cabs from the seating space of the lower deck. The stairways are at the extreme ends. Each stairway extends up with three steps to a platform and branches to the right and left with four more steps to reach the walkway of the upper deck. The stairways are provided with hand rails.

The walkway of the upper deck extends clear around the car except at the stair wells and is 5 ft. 1½ in. above the floor at the semicircular end seats of the lower deck. The floor at this point is 19 in. above the rail and is reached by a ramp from the floor level at the entrance doors. The floor at the entrance is 11 in. above the rail. The upper walkway extends over the longitudinal seats of the lower deck, and it is not necessary, therefore, to have it high enough to permit a man to stand erect, it being only 6 ft. 8½ in. above the track rails. The seats on the upper deck are placed at the proper elevation to provide ample headroom along the center aisle of the lower deck, but are so high that it is necessary to provide a footboard along the full lengths of the seats, which, in giving space for passengers' feet, keeps them from blocking the walkway.

The upper deck is closed in winter and will be opened during the summer months by taking out the removable sash and sections of sheathing. The ends of the upper deck are protected against the weather by extension of the first-floor bulkheads, and are fitted with outward-swinging windows. The upper-deck roof is of agasote covered with No. 6 cotton duck. The lower-deck headlining is of agasote. Advertising card racks are provided for both decks.

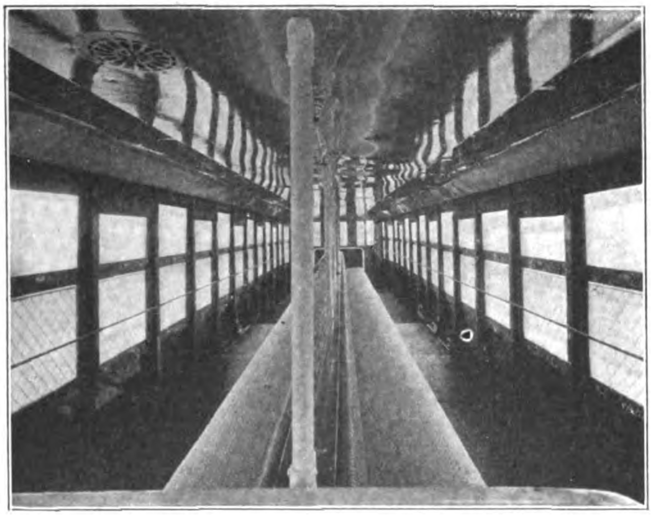
The floors of both decks are of long-leaf yellow pine covered with ¼-in. agasote. Carborundum safety treads are used at the center doorways and at the doorways of the motorman's cabs, and narrow sections of this tread are used to face the stairway steps and the front edge of the upper-deck foot seats.

The car is equipped with Brill maximum traction trucks of the low-bolster type with outer bolster bearings outside of truck side frames. The axles are of Carnegie heat-treated steel and the wheels of Carnegie rolled-steel single-wear type. The driving wheels are 33 in. and the pony wheels of 18 in. diameter. The truck wheelbase is 5 ft. The brakes are the inside-hung type. Each truck is designed to receive one outside-hung motor.

MOTOR AND CONTROL EQUIPMENT—AIR BRAKES

Two GE-201-A motors are used with the manufacturer's grade L gears and grade K pinions. The gear ratio is 71:15. The motors are rated at 55 hp at 500 volts or 65 hp at 600 volts. The equipment is designed for a schedule speed of 8.5 m.p.h. with seven stops per mile, but the gear ratio will give a maximum speed of approximately 25 m.p.h. on level tangent track. All calculations were made on a total weight of the car, with eighty-eight seated and eighty-three standing passengers, of 69,085 lb.

The control equipment is suitable for double-end operation with K-36 controllers. The contactors are fitted with interlocks in connection with the control system in order to interlock the latter with the operation of the car doors. The motor rheostats are of special design in view of the low level of the car.



Columbus Double-Deck Car—Interior of Upper Deck

GE straight air brake equipment is used. The C-P-27-A compressor has a piston displacement of 15 cu. ft. per minute when operated against a tank pressure of 90 lb. (gage) per sq. in. The equipment is provided with two brake cylinders, also five reservoirs of special dimensions, because of their location under stairways and longitudinal seats of the lower deck.

SEATING ARRANGEMENT AND WEIGHTS PER PASSENGER

The seats of both decks are longitudinal except for the semicircular seats and the two cross seats at each end of the lower deck. The seats on the upper deck are set back to back and the feet of the passengers seated on them are almost directly over the heads of the passengers who are seated on the longitudinal seats of the lower deck. The latter seats extend from the center entrance space to the end wells of the car. At the end of these seats are two permanent cross seats. The semicircular end seats extend from the cross seats around the end wells. All seats are rattan.

On a basis of 17 in. per passenger, the upper deck will seat forty-two passengers and the lower forty-one, making a total of eighty-three. It is expected that the car will take care of 171 seated and standing passengers. The total weight of the car completely equipped is approximately 46,000 lb., giving a weight per seated passenger of 554.2 lb. and a weight per passenger standing and seated of 269 lb.

ENTRANCE AND EXIT FACILITIES

The only opportunity for entrance and exit is by the center side doors. These doors are made in halves. The total door width is 50 in. and is divided into two passages by a rail so that two streams of passengers may leave or enter the car at once. The doors are electro-pneumatically operated and are controlled by the conductor.

The entire center of the car for a width of 50 in. is devoted to receiving and discharging passengers. The conductor is seated on a folding seat along the unused center door and before him is a swinging change desk. Space for ten passengers is provided on the loading platform. Entering passengers line up before this desk, and after depositing their fares in the fare box pass on toward the seats and stairways at both ends of the car. The door and step devices were supplied by the Prepayment Car Sales Company, New York, which also controls the Hedley-Doyle stepless car patents incorporated in this car.

VENTILATION AND HEATING

A forced-draft ventilator system is provided for the ventilation of both decks. The foul air is drawn through ventilators which are placed along the center line of the ceilings of both decks and is carried along longitudinal ducts to the motor-operated fan at the end of the car, where it is discharged. The duct for the lower deck is carried between the seat backs of the upper deck, and at the center of the car a riser connects this duct with the one running along the roof of the upper deck. Heat for the car is supplied by electric heaters, fourteen being installed in the lower deck and twelve in the upper deck.

ELECTRIFICATION WORK OF THE LANCASHIRE & YORKSHIRE RAILWAY

As noted in the "Personal Mention" columns of this issue, Messrs. Gobey, Halliwell and Povey, of the Lancashire & Yorkshire Railway, are visiting the United States for the purpose of studying high-tension electric railways. This company has been operating for the past six months an experimental line between Bury and Holcombe Brook, a distance of nearly 4 miles, with a 3500-volt d.c. catenary and car equipments carrying four motors coupled in series. This experimental line is one which was formerly operated with self-propelled steam-motor cars. It is considered an excellent piece of track for tests inasmuch as it has grades of 2½ per cent, a viaduct 360 ft. long and numerous sidings out of Bury.

In the meantime the company has already decided to electrify a branch line between Manchester, Victoria and Bury with a 1200-volt third-rail. This company has been operating for years a 600-volt third-rail between Liverpool and Southport. The new electrification will comprise 9½ miles of route and 20 miles of single track. There are six stations between Manchester and Bury, but three more stations are planned for use as the suburban traffic increases because of the electrification. This particular line has suffered from the competition of tramways, but the company is confident from its experience with the Liverpool & Southport electrification that the service will be greatly improved after the proposed changes have been carried out and that increased traffic will follow. It is expected that the new line will be in operation early in 1915

Annual Meeting Illinois Electric Railways Association

Travel Bureau Will Be Established in Chicago—Abstracts of Papers on Hydraulic Development at Marseilles, Ill., and Features of the Illinois Public Utility Law

The annual meeting of the Illinois Electric Railways Association was held at the Leland Hotel, Springfield, Ill., on March 6, 1914. The morning session opened with about fifty members in attendance and President Sampsell presiding. Secretary Griffin read the minutes of the previous meeting, following which H. E. Chubbuck, vice-president executive of the Illinois Traction System, briefly reported the work done by the executive committee during the past year. The membership committee reported applications from four railway companies which were accepted for membership.

The report of the secretary and treasurer for the past year showed that the association was in excellent financial condition. This report also contained a summary of the bills affecting electric railways presented in congressional committees and called special attention to those on steel cars, the safe operation of trains and the regulation of the issuance of securities of interstate carriers. At the close of the reading of this report, Mr. Chubbuck spoke of the hearing conducted by the committee on interstate and foreign commerce, reported in the issue of the ELECTRIC RAILWAY JOURNAL for March 7, at which different railway managers protested against certain of these bills.

Resolutions were drafted expressing the sympathy of the association and were sent to the families of C. E. Flenner, formerly secretary and treasurer of the association, and B. E. Merwin, both having died since the last meeting.

At the close of the business session a nominating committee was appointed, and after a brief recess its report was received and unanimously passed, electing Britton I. Budd, president of the Chicago Elevated Railways, president; F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Railway, first vice-president, and J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, second vice-president; executive committee, Marshall E. Sampsell, E. C. Faber, H. E. Chubbuck, W. C. Sparks, L. C. Haynes and F. J. Baker.

Following the annual election of officers, retiring President Sampsell addressed the association, urging complete co-operation with the Illinois Public Utilities Commission in an effort to gain its confidence. He stated that the association should not fail to realize that the real essence of the whole situation was the personal equation. The commission has great responsibilities and is in need of all the aid the association members can give it, as well as fair play on the part of all the companies coming under its jurisdiction. In line with this work the railway association should work more closely with the electric light association of the State; in fact, the executive committees of the two associations should work as one so that there would be no overlapping. The incoming president, Mr. Budd, was then introduced, and he addressed the association in a few earnest and well-chosen remarks. He emphasized the remarks of Mr. Sampsell concerning co-operation between the executive committees of the electric light and railway associations of the State. A vote of thanks of the association was extended to the officers and executive committee of the association for the past year.

Before continuing the regular program, President Budd urged each of the members to study carefully the question of public relations and referred to the exceptionally strong papers on this subject presented at the last midyear meeting of the American Electric Railway Association. Along this line Mr. Budd said that the effect of re-routing the elevated lines in Chicago had necessarily changed the riding habits of many of its patrons and had meant more convenience to some and had inconvenienced others. Where a complaint was received the company had made it a policy to explain its position. It was found quite difficult to meet all the complainants singly, but representatives of the company were sent to attend the various club and committee meetings at which time the attitude of the company was set forth. As usual, the complaints were of all kinds, some reasonable and some unreasonable, but the result of these personal visits to explain matters was 95 per cent effective. Women representatives of the company were sent to answer the complaints of women, either individually or in clubs, and when doing so always requested suggestions for remedying the difficulties. This policy resulted in not only clearing the trouble but in winning many new friends for the company.

Continuing his address, President Budd suggested that the association should establish an electric railway bureau in Chicago to supply information about the transportation which could be supplied by all the roads in the State. He offered to distribute literature of this character at all the elevated railway stations in Chicago, but this formed only a part of his idea of what could be done to cultivate the riding habit throughout the State. He suggested along this line that the publicity committee be instructed to proceed with the purchase of a map showing all the electric lines in the State of Illinois, indicating prominently the special points of interest on each road. Upon motion the publicity committee was instructed to proceed along this line. The executive committee also was instructed to take up the question of establishing an electric railway bureau for the dissemination of information regarding electric travel in Illinois or on connecting lines, which if approved could be established by the proposed publicity committee.

C. W. Humphrey, consulting engineer, Chicago, then read his paper on "The Development of Water Power at Marseilles, Ill." William J. Norton, of Norton & Bird, engineers of Chicago, followed with a paper describing some of the features of the Illinois public utilities law, and J. L. Layng, of the General Electric Company, Schenectady, N. Y., closed the regular program with an illustrated talk on railway motors. The papers of Messrs. Humphrey and Norton are published in abstract on the following pages.

Just before the meeting adjourned, President Budd appointed the following standing committees for the ensuing year: membership committee, Frank E. Johnson, Garret T. Seeley and A. J. Purinton; traffic committee, R. Breckinridge, G. W. Quackenbush, A. M. Farrell, W. M. Brown and E. W. Gregory; signal committee, J. Leisenring, E. F. Gould, W. F. Carr and B. J. Fallon; program committee, W. V. Griffin, C. A. Willoughby and H. A. Fisher; publicity committee, E. E. Soules, Fred Bayless, J. M. Strasser and C. E. Patten.

HYDROELECTRIC DEVELOPMENT AT MARSEILLES, ILL.

The paper by C. W. Humphrey related to improvements in the hydroelectric power station of the McKinley system on the Illinois River at Marseilles, Ill., described in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 24, 1912, page 300. One of the principal features of interest of the plant is the low head, 11 ft., at which it operates. Mr. Humphrey stated that while this was not the first low-head hydroelectric plant, it nevertheless was one of the largest low-head plants and one of the earliest for such a low head. He felt that it was a forerunner of a great many low-head projects and called attention to the fact that water-powers in the Mississippi Valley have been neglected until recent years, attention having been confined first to the extremely high-head plants of the Western mountainous country and later to the medium-head plants of the East.

The plant contains six new 74-in. Samson turbines, two new 40-in. Samson turbines and six 62-in. Samson turbines which were formerly in the plant of the Consolidated Water & Light Company. The 74-in. turbines operated at 75 r.p.m. rated at 450 hp each, at 11-ft. head. These vertical units drive direct-connected Westinghouse generators, two being sixty-cycle and four twenty-five-cycle. The 62-in. turbines are arranged in two groups of three each, one driving a 450-kw, sixty-cycle generator, the other a 500-kw, twenty-five-cycle generator. These geared units will later be replaced by more modern types. The small turbines are directly connected to 90-kw exciters, while a 100-kw motor-driven exciter is used for relay purposes. The twenty-five-cycle and sixty-cycle systems are tied together by means of a 750-kw, 300 r.p.m. frequency-changer.

The power plant supplies two general transmission systems, one a twenty-five-cycle system furnishing all power requirements for the Chicago, Ottawa & Peoria Railway, the other the sixty-cycle system, supplying the Northern Illinois Light & Traction Company, which furnishes light and power in Marseilles and Ottawa, the LaSalle Lighting Company at LaSalle and also power and light in the towns of Spring Valley, Utica, Seneca and Morris. The hydraulic plant operates in parallel with three steam plants, one at LaSalle, one at Ottawa and one at Marseilles. It is thus possible to maintain a high load factor on the hydraulic plant while water is plenty and so to utilize the full capacity of the stream.

A feature of the sixty-cycle transmission line is the fact of a large portion of it being constructed with concrete poles. This line is built on a right-of-way along the bank of the Illinois-Michigan Canal. The poles were all made up at Marseilles, seasoned and loaded on a barge on which was erected a small derrick for placing the poles.

As the head under which this plant operates is so low, special care was taken to conserve it by reducing losses at every point. Trash racks with wide bars, pointed on both sides, were specially designed and these were set against a concrete apron 1 ft. below water level for the purpose of preventing the transmission of heat from the cold air down into the water along the steel bars and causing ice to form on them. The forebay, tailrace and river excavations were all laid out to minimize friction losses, and the speed of the wheels was so selected as to give maximum efficiency at the head used. Special generators had to be designed for the low speed of 75 r.p.m., but this was considered justifiable in view of the higher hydraulic efficiency obtained.

STATE REGULATION OF UTILITIES

BY WILLIAM J. NORTON, CONSULTING ENGINEER, CHICAGO

The Illinois Public Utility Commission Law, in spite of the stress and turmoil under which it was adopted and the general indifference of the Legislature as to the actual wording of the law, is a well-balanced and efficient piece of legislation.

The general regulatory powers of the commission over utility rates, capitalization, accounts, service and valuation are not materially different from those conferred by the laws of other states. The actual duties of the commission, however, are given in as much detail as possible in the law and are made very strict and drastic from the utility standpoint. In the regulation of the franchises granted by local authorities the law is clearly defective, in that it gives no jurisdiction whatsoever over municipal utilities. There is no doubt, however, that the public will soon realize, as it has in Wisconsin, that municipal utilities need more regulation than privately owned utilities, and the commission must ultimately obtain such jurisdiction.

The method of procedure before the commission requires full hearings in all cases, but a distinct attempt has been made to limit appeal to the courts as far as possible. The penalty provisions are perhaps a little more drastic than is usual, but as most commissions have attempted regulation in the spirit of co-operation, these provisions have practically but little effect.

A peculiar situation exists in the State of Illinois relative to regulation, for there is no real public sentiment behind public service regulation. The regulatory act as it stands to-day represents personal and political ambition, and its passage is mainly the result of a majority of the Legislature being unwilling to go on record against a bill supposed to be popular. Such opposition as was manifested against the bill was entirely the opposition of the city of Chicago, which was in favor of local regulation for its utilities. The public clamor in Chicago, however, was of no avail. The bill became a law, and to-day Illinois has a public utility commission law which, if properly administered (and Governor Dunne's appointments to the board give promise that this will be a fact), will be the most important law upon the statute book of the State.

The relative merits of state and local regulation of public utilities, however, are still an important question in Illinois. The citizens of Chicago will on April 7, 1914, vote upon the following referendum: "Shall the State Legislature amend the act creating a state Public Utilities Commission approved June 30, 1913, so as to provide for home rule and the control by the city of Chicago of public utilities in the city?" In view of this fact, an analysis of the fundamental points involved in the regulation of utilities will be quite timely.

The progressive public utility of to-day refuses to confine itself to a single local community. Hydroelectric and steam central station properties now stretch out over an area with a radius of at least 100 miles. Electric railways, while they may for legal purposes stop at the city limits, in reality continue far out into the suburbs and often to the borders of the state. The telephone is probably as important from its long-distance and toll connections as it is for local purposes. Even the source of supply of the common municipal waterworks is outside of the city limits. Natural gas is in general an interstate matter, and even artificial gas companies often serve more than one community.

Fundamentally, therefore, modern utilities have lost all of their local significance. The argument is sometimes offered that such railroads as the Grand Trunk and the Michigan Central are international utilities and that if the power of regulation is taken from municipalities it should not go to the state but to the federal or international authorities. Such an argument has no weight, for regulation is a complex practical problem, and the responsibility must be divided in the most logical manner. Steam railroads and telephones are mostly interstate in scope and in the end will fall under federal jurisdiction alone. But street and interurban railways and gas, electric and water companies, for practical reasons, must eventually be left entirely to state commissions.

Regulation naturally divides itself into control over the following: competition, capitalization and intercorporate relations, accounts, rates, service and extensions, franchises. Each of these subdivisions may be taken up with reference to whether the primary interest involved is a local or a state interest, as follows:

COMPETITION

While a city should have the right to determine whether a utility may use its streets and under what conditions, the determination of the question whether convenience and necessity require a duplicate use is a matter over which the state itself should have a veto power. The cities have always shown, and this is true in Chicago, that they are entirely too near to the problem, too much involved in the issue, to be able to reach a fair determination as to whether competition should be allowed.

CAPITALIZATION

Intercorporate relations and the issue of stocks and bonds are matters which relate to the corporate entity of the utilities.

Corporate life depends upon a grant from the state, and it naturally follows that any change in the corporate existence or in the corporate relations should be also controlled by the state.

ACCOUNTS

The regulation of utility accounts strives to accomplish two purposes: (1) uniformity; (2) statistical information. Uniformity would never be acquired under a great number of municipal regulations, and if there is not uniformity, accounts have very little statistical value. Hence here again it appears that the regulation of accounts should be a state function.

RATES

There are two methods of rate regulation, occasional regulation and continuous regulation. Most cities have attempted occasional regulation. The commissions, as a rule, have attempted continuous permanent regulation. State regulation of rates assumes the form of an arbitration between a corporation and the public which it serves. Municipal regulation is the attempt of one party of a controversy to settle it. If any one should propose that all disputes between capital and labor should be settled by a committee appointed entirely from labor, the idea would seem ridiculous, but this is analogous to what municipal regulation would mean. Even if the political element did not enter into the regulation of rates by a municipality, it would still mean an arbitration decided by one party in the controversy. There can be absolutely no doubt that the regulation of utility rates should be in the hands of an arbitration board or jury having as little personal connection with the issue as is possible. The municipality, however, is the last authority which should have such an important judicial function.

SERVICE AND EXTENSIONS

When a city gives up its streets to a private corporation for the benefit of the public, the matter of local service is fundamentally most important. There is a great tendency for municipalities to exaggerate the importance of rates, but really they are more interested in the matter of service and in the proper extension of the utilities. The local authorities should have something to say in the matter of service and extensions, but a state commission should have a veto power and a general authority over such requirements in case they should prove unfair and unreasonable.

MUNICIPAL OPERATION

There is no regulation of municipal utilities under the Illinois law. It has been found in Wisconsin that municipal utilities have required at least twice as much regulation as privately owned utilities. The fact is that unless there is a strong state commission having the confidence of its citizens the public will never receive fair treatment from utilities operated by the municipality itself. Municipal utilities have always been more drastic and overbearing in exacting deposits and service charges and in discontinuing service than have privately owned utilities, and unless there is some regulation of the former the public in the end must suffer.

Thus in only one of the important functions of regulation is there found any interest that is purely municipal in connection with service and extensions. All other functions belong to the state and should be exercised and controlled by the state.

ELECTRIC RAILWAY ECONOMICS RESEARCH AT BOSTON "TECH."

As already mentioned in this paper, a comprehensive investigation of the economics of the 5-cent fare unit on electric railways is now under way at the Massachusetts Institute of Technology, Boston, the work being in the hands of the research division of the electrical engineering department. The funds for this study are being supplied through the co-operation of the firm of Stone & Webster, Boston, Mass., the General Electric Company and the Public Service Railway Company of New Jersey. The department has been guaranteed the sum of $3,600 per year for five years, and it is probable that other concerns will be contributors to the fund in the near future. The original sponsors of the investigation were Stone & Webster, but in view of the importance of the subject interest is being manifested in other public utility circles.

The fundamental object of the studies now being conducted is to determine a method of fixing the economic possibilities of the 5-cent fare unit on city electric railways, particular attention being given to the relations between the length of ride and the fares in force, and also to the effect of transfers, length of routes, etc., upon the return upon the capital investment. The work has been in progress for about three months under the supervision of Dr. Harold Pender, director of the research division, and H. F. Thomson, secretary of the division, and has thus far been chiefly confined to the exhaustive study of existing data on the fare question and the analysis of operating results on forty representative electric railways serving purely urban communities. Tabular summaries have been made of capitalization, traffic, earnings, expenses, car-hour, car-mile, per-passenger and other unit data; an extensive bibliography of fare problems and their discussion has been prepared, and a number of plots have been made to show the changes with respect to the past twenty years in unit operating results. In these latter tabulations the revenue passenger has been selected as the fundamental unit.

The plots thus far made indicate that the ratio between expenses and receipts is about the same on large and small roads. It also appears that the average net earnings per total passenger are somewhat smaller in the larger cities on account of the greater transfer traffic. A study of the operating records of two representative street railways in Massachusetts, not including that at Boston, indicates that in the past twenty years the fixed charges per passenger have increased more than the operating cost, and that the diminishing rate of return upon the investment is due in large measure to the greater outlays for construction and equipment per passenger as compared with former years. No general conclusions are as yet available regarding the relations between fares and hauls, and the research division is devoting much attention to the best lines of approaching this complex problem. The immediate conduct of the work is in the hands of David J. McGrath, a graduate of the civil engineering department of the institute in 1912. Mr. McGrath's field experience includes work in the engineering department of the Boston & Albany Railroad, hydroelectric work with the Power Construction Company of Shelburne Falls, Mass., subway work with the Hugh Nawn Contracting Company, Boston, Mass., and electric vehicle statistical research and mechanical engineering laboratory instruction at the institute.

TENTATIVE I. C. C. UNIFORM SYSTEM OF ACCOUNTS

The Division of Carriers' Accounts of the Interstate Commerce Commission has just issued a tentative uniform system of accounts for electric railways for consideration and criticism by such carriers before the system is finally prescribed by the commission. Printed copies of this system were mailed to all electric interstate carriers Feb. 28, and the accompanying letter, which is printed below, says that replies and criticisms should reach the chief examiner of accounts on March 21. It is understood that these criticisms will be considered by the representatives of the commission jointly with the classification committee of the American Electric Railway Accountants' Association at a meeting to be held probably on March 25. Mr. Sweney, chief examiner of accounts, has authorized this paper to say that any criticisms received before that date will receive consideration.

INTRODUCTORY LETTER

Interstate Commerce Commission, Division of Carriers' Accounts
Washington, Feb. 16, 1914.

To Accounting Officers of Electric Railways:

This circular contains, in tentative form, the first revised issues of the electric railway classifications of expenditures for road and equipment, operating revenues and operating expenses, and, also in tentative form, the first issues of the classifications of income, profit and loss, and general balance-sheet accounts. It has been the purpose in revising the three first-named classifications to modify the present effective accounting rules to conform with the rules contained in other classifications of later issue, to include as a part of the text of the accounts affected the interpretations published in accounting cases, and to make such further changes in the details of the existing rules as will clarify or add to the usefulness of the system of accounts as a whole. These classifications practically complete the system of accounts to be used by electric railways subject to the jurisdiction of the Interstate Commerce Commission. Attention is particularly directed to the general instructions preceding several of the classifications.

To each classification has been given a separate series of account numbers as follows:

Operating expense accounts, beginning at 1.
Operating revenue accounts, beginning at 101.
Income accounts, beginning at 201.
Profit and loss accounts, beginning at 301.
Balance-sheet accounts, beginning at 401.
Road and equipment accounts, beginning at 501.

The following changes should be noted in the tentative revised classifications:

In *Operating Expenses* a new general account, "Power," has been provided, in order to bring together, under one general account, the expenses incident to the maintenance and operation of power plant buildings and power plant equipment (including transmission lines). The expenses includible under this head have been eliminated from other general accounts and necessary primary accounts have been added. (See Section 3 of general instructions for operating expense accounts.)

Three new primary accounts have been provided for equalization of expenses under the general accounts "Way and Structures," "Equipment" and "Power," respectively. As explained in their texts, the adoption of these accounts is optional with the carrier. Another new primary account for equipment retired has been added under the general account "Equipment." This account, as more fully explained in its text, is intended to include the cost, less depreciation accrued and accounted for, of equipment retired, whether replaced or not.

The text of the proposed account No. 32, "Locomotives," now includes maintenance of electric equipment of locomotives, and the account "Electric Equipment of Locomotives" has been eliminated. An account called "Parks, Resorts and Attractions" has been provided for in traffic expenses. Under "General and Miscellaneous" accounts have been provided to include amortization of franchises and valuation expenses.

In *Operating Revenues* attention is called to Account No. 103, "Parlor, Sleeping, Dining and Special Car Revenue," the title and text of which have been amended to include revenues derived from sleeping and dining cars.

In *Road and Equipment Expenditures* several accounts have been added to the classification and a number of the retained accounts slightly changed for the purpose of making their titles more representative of the items of expenditure includible therein. There has also been provided a new general account called "Power," under which have been included all primary accounts representing expenditures for power plant buildings and equipment. It should be noted, however, that Account No. 546, "Interest During Construction," provides that, in addition to interest, a proportion of discount on funded debt issued for construction or addition and betterment purposes is includible as a part of the cost of construction.

It is proper publicly to acknowledge the hearty cooperation of the committee on a standard classification of accounts of the American Electric Accountants' Association in working out the details contained in these classifications. With but few exceptions the rules as now promulgated conform to the recommendations of that committee, and the assistance of its members in the consideration of the questions involved herein has been invaluable.

Accounting officers are invited to offer such criticisms and suggestions regarding this circular as in their opinion may be helpful to the commission in the preparation of the system of accounts for authoritative issue. In order to be given consideration replies to this accounting circular should reach this office not later than March 21, 1914.

(Signed) Fred W. Sweney,
Chief Examiner of Accounts.

COMMUNICATIONS

CO-OPERATIVE TRAINING FOR ELECTRIC RAILWAY EMPLOYEES

UNIVERSITY OF CINCINNATI
CINCINNATI, OHIO, March 7, 1914.

To the Editors:

The editorials in your issues of Feb. 7 and Feb. 21 referring to the training of men for responsible positions in railway operation and maintenance are of peculiar interest in some respects. The unsatisfactory situation indicated by Mr. Basford, and referred to in your editorial of Feb. 7, has been known for some time. About ten years ago I remember reading communications to the *American Engineer and Railroad Journal* by technical graduates who had gone into the special apprentice courses offered by railroads. In nearly every case the results, so far as these graduates were concerned, were unsatisfactory. Railroad officials also have indicated more or less dissatisfaction with the results obtained from these courses. Evidently the dissatisfaction is thorough enough on both sides to indicate that the problem is not solved in an entirely satisfactory way by the educational methods in general use at the present time.

Since large numbers of men are engaged in the business of transportation and since technical training is becoming more and more necessary to the men who are to be responsible for the satisfactory maintenance and operation of railroads, both steam and electric, this problem must be solved one way or another.

It seems as though the co-operative principle in education, as enunciated by Herman Schneider about twelve years ago, and as applied at the University of Cincinnati during the past seven or eight years, can solve this problem. The principle is really a very old one, but it has remained for educators of recent years to apply it. It is inherently simple enough, namely, that education should not take students out of intimate contact with the practical affairs of life. There should be actual productive work done along with the work of the classroom. In the practical application of this principle the students alternate, by two weeks' periods, between the shops and the university. For each position there are two men. While one man is at the university the other is at work.

Practical operation for more than seven years has shown that this principle is sound and practical. At present the university is co-operating with the Pennsylvania and Big Four railroads and with the Cincinnati Traction Company as well as with many other manufacturing and operating companies.

The co-operation is on a purely business basis. The students are paid the same rate as is paid to any one else doing the same grade of work. With many companies definite arrangements are made regarding wage scale, which assure a progressive development on the part of the student.

One great advantage of the co-operative system is that students discover their fitness for engineering work earlier in life than would be possible under the regular methods of education. For instance, one young man who entered the co-operative course last year had a good shop record, but his work at the university was not up to the standard. The result is that he has decided to devote his entire time to becoming a good blacksmith and is doing efficient work in which he finds satisfaction and profit. The scope of this brief comment will not permit an extended discussion of examples. The point is that when students are brought into direct contact with actual engineering practice there is less likelihood of their investing time and money inefficiently in education.

When the proposition is made to a manufacturer, a merchant or a railroad official to employ co-operative students, some explanation is necessary to clear away the doubts which always arise. In practice, the troubles which are anticipated from two students working alternate two-week periods on the same job rarely ever materialize. In fact, it has been found that the two viewpoints are a distinct advantage in some lines of work. To many concerns the advantage is apparent of having, with a given number of jobs, twice as many ambitious young men from whom to choose possible foremen and other officials as would be possible under the old methods.

Organized labor has seen the advantages of the co-operative principle and has gone on record as favoring it. As a matter of fact, one argument which appeals to the ambitious artisan living in Cincinnati is that his son has the opportunity to get a technical training which would be out of the question with the regular four-year college course. The only criteria by which students are selected for advancement are their abilities in the shop and in the university.

When the course of training is completed there can be no illusions regarding the ability and effort necessary for success in engineering. There can be no feeling on the part of the graduate that he has invested time and money in a field with which he was unfamiliar. And the officials who may have occasion to use the services of such a graduate can determine his value in a relatively short time.

A. M. WILSON, Professor of Electrical Engineering.

THE CIRCULAR INCH VS. THE CIRCULAR MIL

PHILADELPHIA, PA., March 5, 1914.

To the Editors:

When so much thought, effort and money are spent in "scientific management," which might also be termed the lessening of waste efforts, it is rather curious that engineers continue to waste their own personal mental and physical energy by blindly following old practice in their own personal work when more efficient methods are within their grasp. The writer has frequently called attention in print to numerous ways in which the daily work of the engineer may be reduced and made more efficient in simplifying his numerous daily calculations by using more convenient units. The saving in each calculation may be small, but the aggregate number of daily calculations is very large.

In this connection the writer desires to call attention to the useless daily waste in effort and space by continuing to use circular mils in referring to large cables, in which their number is in the millions, as in 1,500,000 circ. mil or 500,000 circ. mil, etc., when it would be so much simpler to use the circular inch instead, hence shortening these figures to 1.5 or 0.5 circular inch.

In calculations on electrical matters when the numbers run into thousands and millions, or thousandths and millionths, it is customary to substitute for ciphers the prefixes kilo- and mega-, or milli- and micro-. A circular inch would then be a mega-circular-mil, but as the name circular inch already exists for this unit, no new name is necessary.

Although electrical engineers in the past have been noted for their progressiveness in adopting simpler methods and looking after greater efficiencies, the present case is one in which other engineers have been more progressive, as I understand the circular inch and circular foot have been in use for many years for small and large pipes, rods or other structural materials whose section is always circular. CARL HERING

GEORGE WESTINGHOUSE: A BIOGRAPHY

George Westinghouse died in New York City on March 12 from heart failure. During a year or more he had been suffering from troubles brought on presumably by indigestion, which affected his heart. For some months he has been obliged to desist from his business activities. His affairs have been left in the hands of trustees, his brother H. H. Westinghouse, president of the American Brake Company; Charles A. Terry, vice-president of the Westinghouse Electric & Manufacturing Company, and W. D. Uptegraff, director of the Westinghouse Air Brake Company. Mr. Westinghouse had always possessed a strong physique and was a prodigious worker. He had the ability to concentrate his attention and to turn it from one important subject to another without distraction.

During the past few years Mr. Westinghouse has received recognition of his achievements such as comes to but few men. In 1913 he received the Grashof medal, in 1912 the Edison medal from the Institute of Electrical Engineers, still earlier the John Fritz medal, the Cross of the French Legion of Honor and other foreign decorations. In 1906 the Koenigsliche Technische Hochschule bestowed on him the honorary degree of Doctor of Engineering. In 1890 Union College, at which he studied when a boy, gave him the honorary degree of Doctor of Philosophy. Several technical societies showed their appreciation of Mr. Westinghouse by making him an honorary member.

George Westinghouse

At the time of his death Mr. Westinghouse was at the head of a large number of important manufacturing concerns in the United States and abroad. Of these, the principal ones were the Westinghouse Machine Company, the Westinghouse Air Brake Company and the Union Switch & Signal Company. These companies have an aggregate capital of more than $100,000,000. The organizations for which he was primarily responsible are capitalized at twice this sum and give employment to some 50,000 men.

Mr. Westinghouse was born at Central Bridge, Scoharie County, New York, on Oct. 6, 1846. His father's ancestors came from Germany and settled in Massachusetts and Vermont before the Revolution. His mother was of Dutch-English origin. His father was an inventor, and in 1856 he took his family to Schenectady, N. Y., where he established the Schenectady Agricultural Works in a building still standing, opposite the present General Electric Works. George was one of five sons. He attended the Schenectady public schools, spending his leisure time in his father's machine shop, and before he was fifteen had invented a rotary engine.

On the outbreak of the war he was anxious to enlist, but as he was far under age, found it impracticable to do so. However, by June, 1863, when he was less than seventeen, he was able to overcome the barriers to admission to the Twelfth New York National Guard and was admitted on account of his strapping size, without undue inquiry as to his age. He soon afterward joined the Sixteenth New York Cavalry and served until honorably discharged in November, 1864. He was always interested in the engineering side of whatever work he took up and a month after discharge joined the navy as third assistant engineer. At the close of the war he entered Union College and remained in school until the end of the sophomore year. He was very proficient in mathematics and had secured all of the training in this and scientific lines that the college then afforded. On the advice of the president of the college, who saw that young Westinghouse was not getting what he required in preparation for the engineering career for which nature had evidently intended him, he went into practical work.

Then began the remarkable series of inventions which in a few years made Mr. Westinghouse famous and wealthy, although he started with practically no resources excepting his own ability. In 1865, following his usual habit of observing the ordinary events of everyday life, he noticed the clumsy method used for replacing railroad cars on the track. He was able quickly to invent a replacing frog which he patented and developed. While making a trip in connection with the manufacture of this device, his attention was attracted to a delay caused by a collision between two freight trains due to the inability of the brakemen to stop them in reasonable time. The idea of originating some device by means of which the engineer could apply the brakes along the entire length of the train immediately appealed to him as worthy of development. He had some time before been interested in the operation of railroad signals and switches by means of compressed air and this means seemed to be the most practicable for braking purposes. He at once patented devices for accomplishing this purpose, securing his patents on April 13, 1869. Three months later he formed the Westinghouse Air Brake Company and was soon successful in introducing the brakes on the Pennsylvania and other important roads. In 1871 he went abroad and introduced the new brakes in England. A dozen years were required to develop inventions to overcome the difficulties of air-brake practice as they arose. By 1882 this had been practically accomplished, but it still remained to invent the automatic features of the brakes, which were patented in 1886. The history of the application of this device records an unbroken line of accomplishment.

Mr. Westinghouse early became interested in the electric lighting industry, and he formed a company in 1886, known as the Westinghouse Electric Company, to manufacture lamps and electric lighting apparatus. This concern developed rapidly and two large pioneer companies, the United States Electric Light Company and the Consolidated Electric Light Company, were absorbed between 1889 and 1890. The company was reorganized in 1891 under the present name, the Westinghouse Electric & Manufacturing Company. This company was a pioneer in the development of electric lighting business and was also prominent in the application of the electric motor to traction.

At about the time the Westinghouse Electric Company was formed, Mr. Westinghouse became interested in the a.c. system which had been invented in England by Goulard and Gibbs, who had devised transformers for changing a.c. voltage. The transformer was immediately developed on a commercial basis against great commercial obstacles. Mr. Westinghouse also backed Tesla in his experiments on induction motors and commercialized this important invention. In the early nineties the company took the contract for the building of ten generators for Niagara Falls which were of epoch-making importance. Mr. Westinghouse's interest in a.c. apparatus is reflected at the present time in the activity of the company in developing a.c. traction.

for heavy railroading. While he did not take as much personal interest in the light electric traction as in other branches of his business, he encouraged his engineers to do so. Late in his life he gave much study to this subject and by public utterance showed his mastery of this department of engineering.

As Mr. Westinghouse's first invention was an engine, his interest in the later development of the gas engine and steam turbine is easily understood. The Westinghouse Machine Company for a time devoted its energy largely to the building of high-speed, single-acting engines, and this business was succeeded by the gas engine. Mr. Westinghouse saw the possibilities of the Parsons type of steam turbine and secured the American rights together with technical assistance from England. Later he became interested in a reducing gear for adapting the turbine to drive low-speed machinery. In the *New York Times* of March 13 Mr. Westinghouse's close friend, Arthur Warren, summarized his career in the following words:

"Physically he was a big man. Character was crowded into him, a great, fine, sturdy character that makes a great man. His mind was big. So was his good-heartedness. He did not suffer fools gladly. If patience ever snapped, he controlled his temper. Angry he might become, but he kept the brakes on anger. He did not show it. And not once in his life did he ever show the white feather. There was not a mean streak in his nature. He despised pettiness. But within that big physique, with its powerful will and unbreakable spirit, there was a sensitiveness which he strove to conceal. Never was his honor tarnished. As he grew older, his considerateness grew broader. He mellowed well. And men became more and more loyal to him, if that were possible in the case of a man who had a rare capacity for inspiring loyalty and achievement in other men. It has often been said that he dominated. It was true, but he did not domineer. Sum up the man in this: George Westinghouse, what he was, no less than what he did, must be remembered as one of the best assets of a nation."

QUICK RECUPERATION FROM STORM IN NEW JERSEY

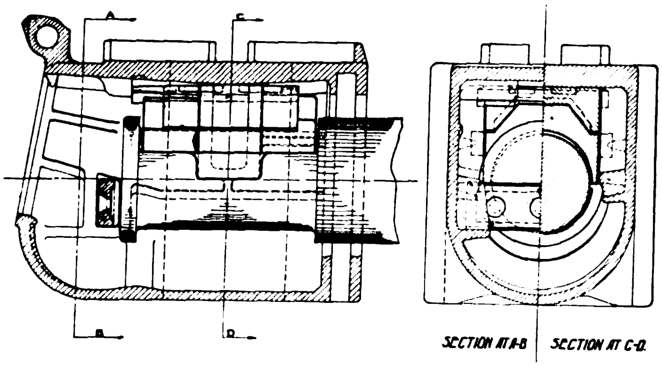
The Public Service Railway Company, which operates some 300 miles of interurban and suburban track, in addition to 550 miles of city track, in the State of New Jersey, suffered severely by the recent storm. Its interurban cars were stalled from one to three days, and snow drifts in many places 12 ft. in depth had to be encountered. One 12-ft. drift was one mile in length. No such storm has been encountered in New Jersey since 1903, when there was one very similar in character. The Public Service Railway lost very little pole line, not more than fifty poles, but the lines were put out of commission by those of other companies which fell across them. In one place 5 miles of pole line of the Postal Telegraph & Cable Company were down, putting the Public Service Company's signals out of commission. Six miles of new trolley wire will replace the loss in this direction.

Within a week of the storm dispatching lines were in operation. The Public Service track parallels in places the track of the Lehigh Valley, West Shore and Pennsylvania Railroads, all of which had practically all of their pole lines down. It will still require two weeks or more to get all of the Public Service telephone lines into operation.

The company was gratified by the manner in which the car and plow crews stood by their tasks. Residents all along the line showed very friendly feeling, furnishing food for the men. In one case a resident cooked a chicken dinner for a plow crew at 2 o'clock in the morning. The loyalty of the crews was one evidence of their appreciation of the expenditure of money and thought on the part of the company in welfare and social work.

END THRUST ON JOURNAL BRASSES

In the issue of Feb. 28 E. W. Holst, superintendent of equipment Bay State Street Railway, described a device for overcoming end thrust of journals as well as the side thrust due to heavy applications of the brake on one side of the wheel. Since this communication was published a drawing of the assembled journal box and brass has been obtained, and this is reproduced in the accompanying illustration. From this it will be seen that the end-thrust bar, which is 7/8 in. x 1 7/8 in. in cross-section, is supported at the ends in recesses formed by lugs cast in the sides of the journal box. The bar may be lifted out when worn and replaced with a newly babbitted bar whenever necessary.



Bay State Journal Box with Semi-Circular Brass and End-Thrust Bar

The extended wings on the journal brass, which make complete the full semicircular cross-section, are limited in length to a short section at the center of the brass. The remainder of the cross-section of the brass is approximately the same as the standard M.C.B. design. This arrangement reduces the weight of the additional metal in the journal brass and at the same time aids somewhat in the removal of a brass from the box.

The new design as shown is reported to have overcome the difficulty with excessive end-play on journals with small collars and, in addition, to have eliminated the tendency on the part of the journal to draw to one side under heavy applications of the brake.

With this design as well as with the hooded wedge and hooded brass the end thrust from the journal has to be absorbed at one side of the truck, and the result in some cases has been reported to involve spreading the truck sides out of line. With the standard arrangement the end thrust is carried by both boxes alike, as on one side the thrust comes on the collar of the journal and on the other side on the shoulder of the axle. In consequence there is no tendency to spread the truck sides. However, with trucks having end frames this objection naturally does not hold.

The March issue of the *Canadian Railway and Marine World* contains the following total statistics for the fifty-seven different electric railways in Canada: First main track mileage, 1356.63 miles; gross earnings from operation, $28,216,110; operating expenses, $17,765,372; taxes, funded debt, etc., $5,334,905; net income, $6,434,742; total car mileage, 90,819,638 miles; fare passengers carried, 597,863,801.

Equipment and Its Maintenance

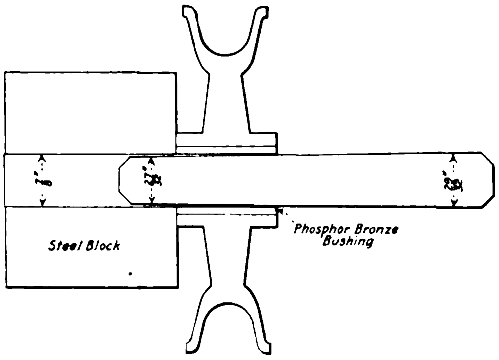
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

MAXIMUM WEAR FROM TROLLEY WHEELS

BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT ROCKFORD & INTERURBAN RAILWAY

For the past year the Rockford & Interurban Railway, Rockford, Ill., has been able to average approximately 10,000 miles on its trolley wheels by getting the maximum possible wear out of them. We use a 6-in., 4-lb. wheel with a ⅞-in. hollow shaft, for which we pay $1.05. The new wheels are installed in interurban service, and as they wear down are transferred to city cars until worn out. We had much trouble at first because the hub would become badly worn before the rim. Now when this occurs we bore out the hub 1⅛ in. scant and press in a ⅞-in. inside diameter, 1⅛-in. outside diameter phosphor-bronze bushing, which is swaged at both ends with a tapered pin (1/16-in. taper to fit). This makes the bushing tight in the wheel and allows it to run freely on the ⅞-in. axle. At a cost of 7 cents for labor and material we frequently obtain from 3000 to 4000 miles additional life from a wheel, and in all cases we attain the limit of wear.



Expanding Bushing for Trolley Wheel

RED STRIPES PAINTED ON WALLS TO LOCATE FIRE-FIGHTING EQUIPMENT

BY W. H. BOYCE, SUPERINTENDENT BEAVER VALLEY TRACTION COMPANY, NEW BRIGHTON, PA.

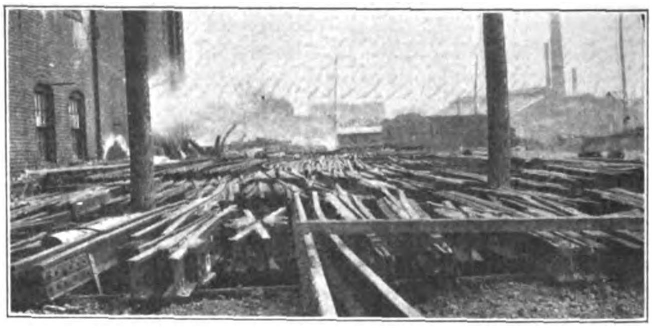
We have read with much interest the article by E. L. Mathews entitled "Red Lamps Used to Protect Fire Extinguishers from Freezing," as published in your issue of March 7, 1914. After four and one-half years' use of a box of practically the same type as that described by Mr. Mathews, we have found that it is all that he claims for it. In addition to this method of marking boxes, the location of which is obscured to a person standing in the center of a carhouse, because several cars are often between the person and the fire extinguisher, we have found the following practice to be helpful. We paint one bright red stripe 10 in. in width on the wall from the top of the fire extinguisher box up to the eaves of the building. A second bright red stripe 5 in. in width painted on the wall from each sand bucket to the eaves has also proved to be of help.

It is well that Mr. Mathews has stated in his article that "an ordinary 16-cp electric light bulb" is used in the fire extinguisher box for we have found that while in severe weather a 23-watt or 35-watt lamp does not furnish enough heat to keep the extinguisher from freezing, a 16-cp 60-watt carbon lamp does do so.

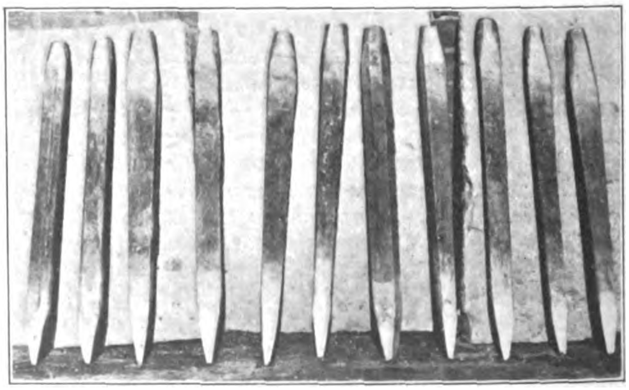
RECLAIMING OLD SWITCH TONGUES AND GENERAL SPECIAL WORK

BY "CONTRIBUTOR"

The Connecticut Company makes a practice of saving all tongues from old switch pieces removed from the streets. When scrapped special work is sold these tongues are removed and those fit for re-use are hung on a special rack provided for this purpose. The remainder are made over into "bull-points" by a blacksmith for use in breaking up old concrete. The heel-tightening device is also removed and placed in a closet where all repair parts for switches are kept. The material thus reclaimed furnishes the company with tongues and switch parts which are sufficient for all ordinary repairs.

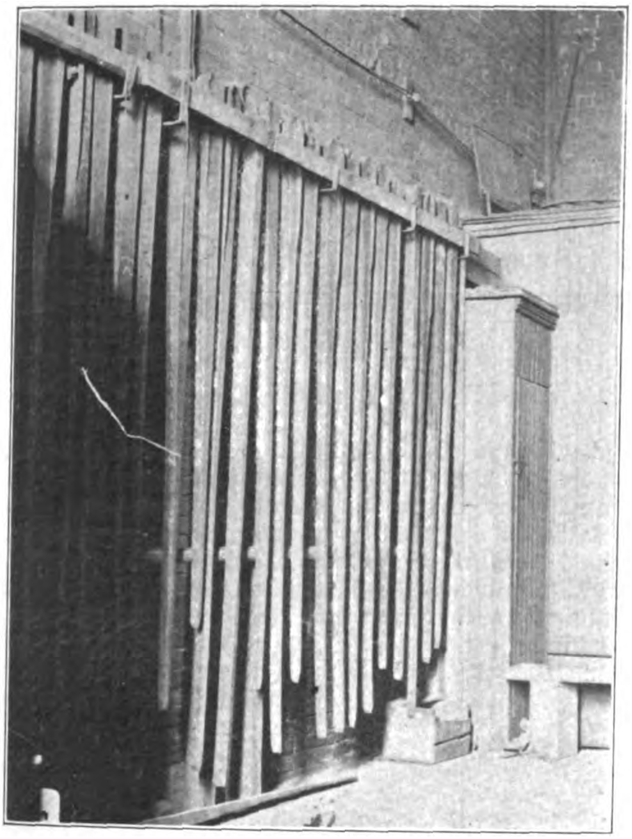


Section of Yard Showing Special Pieces Reserved for Use



"Bull-Points" or Chisels Made from Old Switch Tongues for Use in Breaking Up Old Concrete

Old special work fit for use is placed in the yard in a section reserved for this purpose. This includes frogs, switches, mates, compromise rails, curved rails and occasionally a complete layout. Each piece is numbered and measured and its condition noted. This information is then recorded in a card index system. By this method a great many old pieces in fair condition are available for repairs. The record shows clearly just what pieces are in the yard, and when a piece fails under service the company can make sure that there is nothing suitable in stock before purchasing new material. We use old partly worn pieces by preference as we find that the wear on the layout is more even. When the time comes for a renewal of the complete layout, no great loss is suffered by reason of having to discard comparatively new pieces.



Rack for Holding Old Switch Tongues Fit for Use

ANOTHER PAPER ON RAIL CORRUGATION

A paper discussing the causes of rail corrugation and the possible remedies was read at a meeting of the British Institution of Civil Engineers on Feb. 24. The author was S. P. W. D. Sellon. Briefly, he was of the opinion that the steel now used for rails is not hard enough or tough enough for its work. Some evidence is also given from the experience of himself and others that rails of higher carbon offer more resistance to corrugation. The possibilities of rails receiving initial corrugation in the process of rolling and cooling was briefly discussed, but the author believed that if such initial corrugation ever existed it was uncommon.

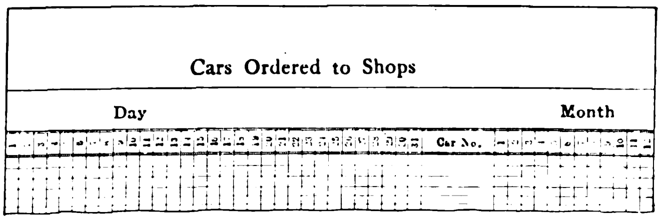
In conclusion he said that the British standard specification for rails requires an ultimate tensile strength of 40 tons per square inch and that the compressive strength was probably about the same as the tensile strength. The author recommended that this ultimate tensile strength should be increased to from 50 to 60 tons per square inch. This should make the rail hard enough to resist wear imposed upon it by street railway operation, but it should not have very great ductility.

PEG BOARD FOR ORDERING CARS TO THE SHOPS FOR INSPECTION

BY O. P. CHUBBUCK, SUPERINTENDENT OF SHOPS, ILLINOIS TRACTION SYSTEM

The accompanying sketch shows the form of a peg board which we use at our office in connection with our system of ordering cars to the shops for inspection. This board measures 56½ in. x 15½ in., and is laid out in ¼-in. squares with white paint on a black background. A ⅛-in. hole is bored in the center of each square for pegs. The board is numbered from 1 to 31 inclusive across the top on the left side for days and from 1 to 12 on the top on the right side for months. A 1-in space runs vertically the entire length of board, between the days and months, for car numbers. The pegs are made of finishing nails and are painted orange and yellow, so that the board can be read at a distance. An orange and a yellow cord run vertically the entire length of the board to assist in placing the pegs in the proper holes. The orange peg and cord is used to order cars to the shops and the yellow peg and cord to show the last date that the car was in the shops. Cars are ordered to the shops for general inspection every sixty days.

A daily report of the cars which are being repaired is sent to the office by the shop foreman, and yellow pegs are placed opposite the car number the following morning to show the last dates the cars were in the shops. The peg on the right is then moved ahead sixty days from date, the orange peg and cord being kept six days in advance of the yellow cord and peg for ordering cars in. For example: A yellow cord is on the board under date of Feb. 12 and an orange cord under date of Feb. 18. Car No. 259 is in the shops and repaired on Feb. 12. When the report comes in on Feb. 13, a yellow peg is placed in the hole opposite the car number under the number 12 at the top of the board, and the yellow peg to the right of the car number under the number 2 in the "month" section is moved under the number 4, making sixty days. The yellow cord is then moved under the number 13 on the "daily" side, and the orange cord is moved under the date of the 19th on the "daily" side. Thus if we follow an orange cord from top to bottom, and find a yellow peg opposite car No. 235, and a yellow peg to the right of the number under 2, this shows that the car was in the shops last on Dec. 19. The yellow peg is then removed, an orange peg is put in the same hole, and request is made on the transportation department to send the car to the shops. In case a car comes to the shops on account of certain defects, the pegs are moved ahead sixty days, just as if the car was ordered in for inspection.



Electric Ry. Journal

Part of Peg Board Used on Illinois Traction System to Keep Track of Shopped Cars

We began to use this board in November and find that it gives satisfactory results, as it enables us to see, in most cases, that the cars are inspected before they become defective. In case a car is ordered in and does not appear within six days, the attention of the transportation department is called to this fact.

DETAILS OF BEVELED-TIE PRACTICE ON ELEVATED STRUCTURES

BY M. BERNARD, ASSISTANT ENGINEER IN WAY AND STRUCTURE DEPARTMENT, BROOKLYN RAPID TRANSIT SYSTEM

The use of tapered ties to secure superelevation for curves when these form part of overhead structures may be advisable at times. The following particulars relate to one method applied in such cases.

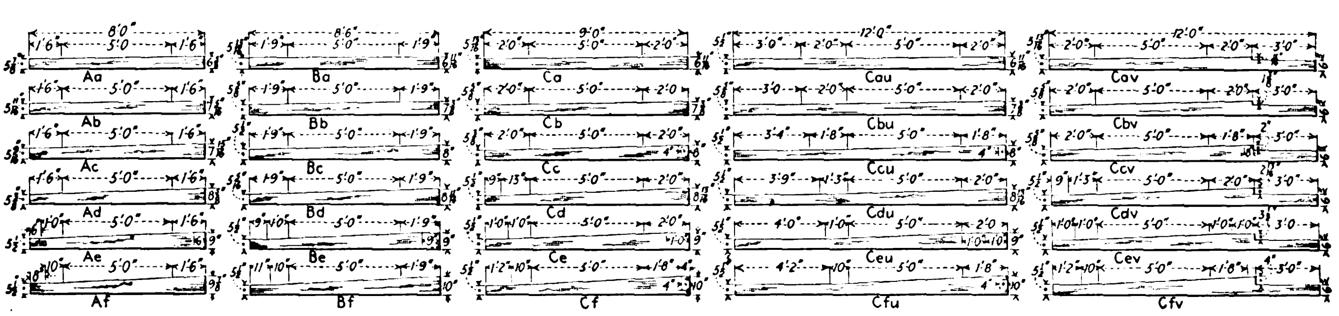


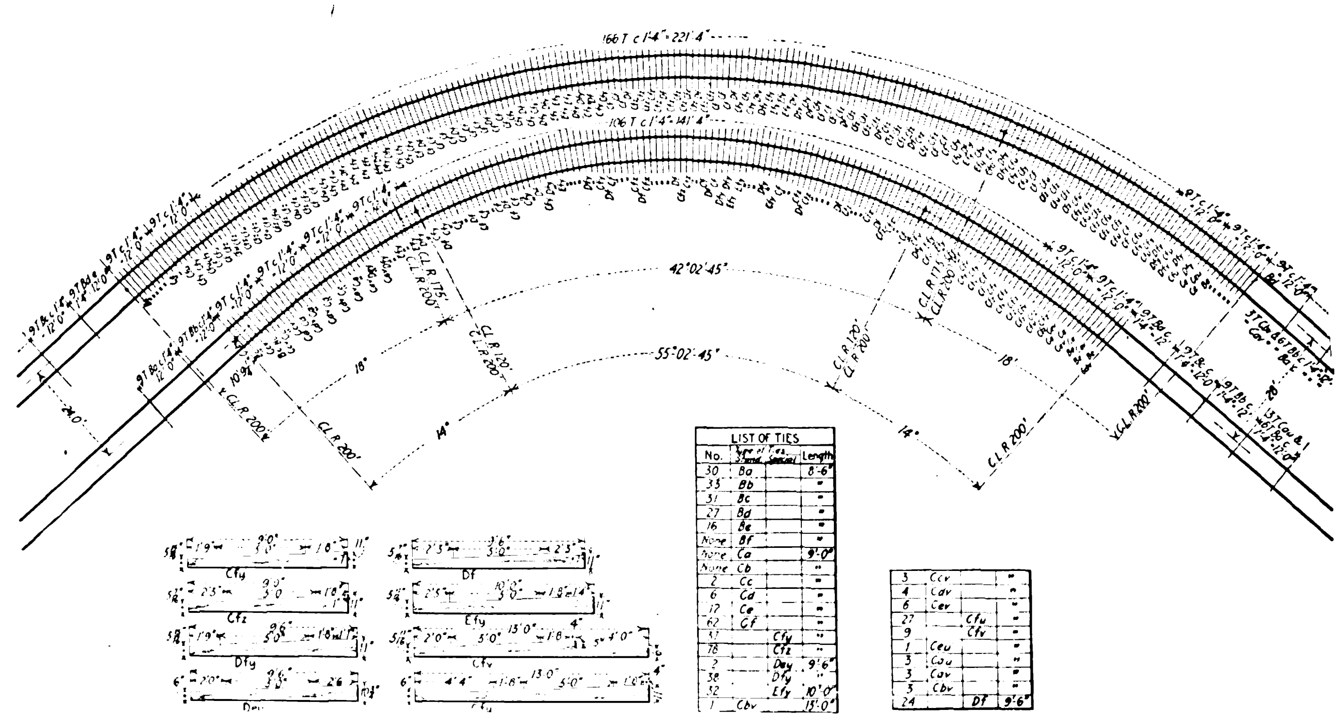
Fig. 1—Complete List of Standard Beveled Ties, Brooklyn Rapid Transit System

It is necessary, in view of the impracticability of using the theoretical superelevation for curves, to assume some arbitrary maximum superelevation, in this case 3 in., and to make the superelevation at the point of tangency two-thirds of that assumed for the main portion of the curve. In order to lead up gradually to the point of the assumed superelevation, the outer rail is raised 1/16 in. for each tie. To illustrate: If we have assumed 3 in. for the proper superelevation of a curve, the superelevation at the point of tangency would be 2 in.; with a tie spacing of 18 in. the lead would be: 48 ties = 72 ft.

Since the longitudinal girders are chords of the curves supported by them, it follows that the length of the ties will vary. Three lengths of ties, 8 ft., 8 ft. 6 in. and 9 ft., have been adopted as standard. These three lengths are subdivided into six different types, one for each variation of ½ in. superelevation. The ties are adzed to get proper superelevation. The standard length of ties which support the footwalks is 12 ft. There are two classes of such ties, one where the footwalk is on the side of the low rail and one where the footwalk is on the side of the high rail. These ties are also subdivided into six different types, one for each variation of ½ in. in superelevation. Fig. 1 illustrates both types of ties in detail.

All standard ties are sawed yellow pine dressed four sides to 6 in. x 8 in. This cross-section is adhered to under the low rail for all ties, the slope being extended beyond the high rail to a depth in inches next above the normal thickness of tie plus the superelevation. The ends of all ties must be marked by the manufacturer with letters for designating the beveled ties on general working drawings like that shown in Fig. 2. The beveled ties are of such length as to extend 9 in. beyond the center line of the supporting girder and not less than 1 ft. 9 in. from the gage line of the nearest rail in order to allow the use of guard timber and standard fastenings. In addition, every sixth tie must extend not less than 2 ft. 3 in. beyond the gage line of the rail next to the third-rail. The length of the ties is denoted by capital letters beginning with "A," which identifies a length of 8 ft., each additional 6-in. length being marked with the succeeding letter. Thus "E" would denote a tie 10 ft. long.

In the same way every difference of ½ in. super-



LIST OF TIES

No.	Type of Ties Stand.	Type of Ties Special	Length
30	Ba		8'-6"
33	Bb		"
31	Bc		"
27	Bd		"
16	Be		"
None	Bf		"
None	Ca		9'-0"
None	Cb		"
2	Cc		"
6	Cd		"
17	Ce		"
62	Cf		"
37		Cfy	"
78		Cfz	"
2		Dey	9'6"
38		Dfy	"
32		Efy	10'0"
1	Cbv		15'-0"
3	Ccv		"
4	Cdv		"
6	Cev		"
27		Cfu	"
9		Cfv	"
1	Ceu		"
3	Cau		"
3	Cav		"
3	Cbv		"
24		Df	9'-6"

Fig. 2—Layout of Beveled Ties for an Elevated Railway Curve, Brooklyn Rapid Transit System

elevation is denoted by small letters, the initial ½ in. being marked "a," while every succeeding difference of ½ in. superelevation is denoted by the next succeeding small letter. Thus small "e" would denote 2½ in. superelevation. The combined markings "Ee" would therefore denote a tie 10 ft. long and with 2½ in. superelevation. The foregoing statements refer to symmetrical ties, namely, ties whose center is the center of track. In case unsymmetrical ties are required, another mark, "y" or "z," is added to denote whether the long end of the tie is under the low or high rail. It will be seen from the typical working drawing (Fig. 2) that the track foreman has only to look at the designating mark on the end of a tie to discover the proper location. No checking of dimensions is required. This method of handling the installation of beveled ties has been followed in Brooklyn for a number of curves with very good results.

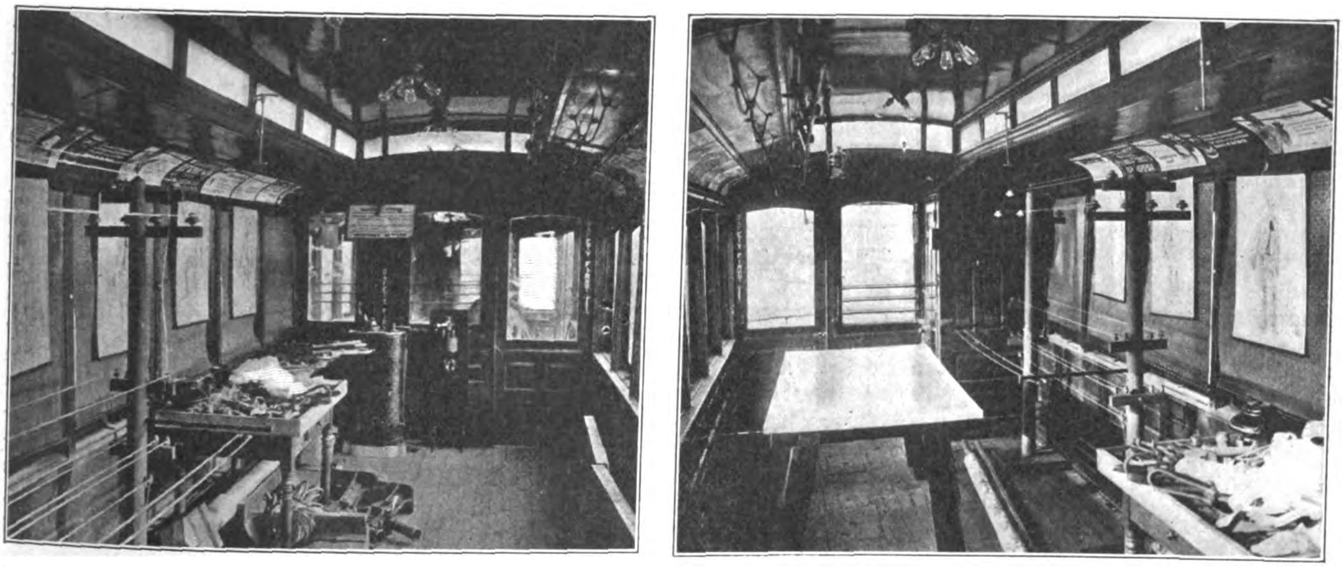
A "SAFETY FIRST" INSTRUCTION CAR

BY A. H. SARVIS, DETROIT UNITED RAILWAY

To keep alive the "safety first" campaign and to impart to employees practical knowledge of safety methods, the Detroit (Mich.) United Railway has equipped a "safety first" instruction car, which is to be taken over all of its interurban and city lines. One trip has been made with the car over the Rapid Railway as an experiment and the interest which was displayed along that line has guaranteed the continuance of the car in this educational service.

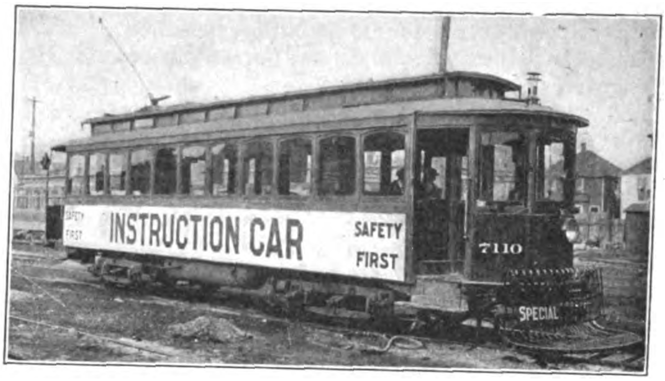
It is planned to make trips at least once each month over all of the Detroit United Lines and to give demonstrations in the city carhouses. The course of instruction will be changed from time to time so that a varied knowledge of all departments of operation may be given to the employees.

The car is equipped with miniature trolley poles and wires, and a practical electrician explains the uses of the various wires and the dangers connected therewith. A representative of the mechanical department explains the operation of air brakes, controller and other mechanical devices on the cars. Safe and unsafe methods of operation are demonstrated. In this connection instruction is given in the proper method of flagging and placing fuses and torpedoes protecting trains. Such matters as the use of jacks, the proper handling of tools and the necessity of having safe tools in all carhouses and in the track department are taken up in the form of a demonstration or in short talks.



Detroit United Railway—Two Views of the Interior of the "Safety First" Instruction Car, Showing the Variety of Equipment Used for Teaching—These Views Were Taken Before the Installation of "Circus" Seats for the Students

One of the features is the instruction in first aid to the injured in addition to the "safety first" suggestions. A company physician gives a half-hour lecture at each stopping place on the treatment of all classes of injuries, with a demonstration of the various practical methods of handling the results of accidents. In this connection the general safety board has issued a first aid primer containing general instructions. Copies of this primer are distributed to all employees.



Detroit United Railway—Standard Car Fitted Out for Instruction in Safe Operation

The car which is used is an ordinary interurban car with the seats and bulkhead removed. A circus-seat arrangement is provided to enable the employees to be seated while demonstrations are being made in the car. Where the number of employees is too large to be accommodated within the car demonstrations and lectures are given in the carhouses, the equipment of the instruction car being easily removed.

In equipping the car and starting it over the lines, the general safety board appreciated that it was purely an experiment. The interest which has been manifested by the employees, however, insures that the car will be maintained and operated for some time.

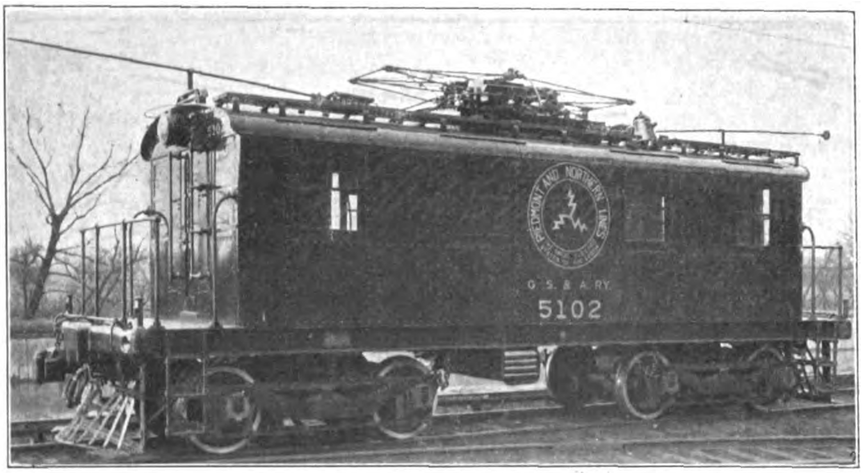
The report of the Brighton Railway, Brighton, England, for 1913 states that good progress is being made with the single-phase section put in hand, from Balham to Walington, via West Croydon.

SIX ELECTRIC LOCOMOTIVES FOR THE PIEDMONT & NORTHERN LINES

The Piedmont & Northern Lines, Charlotte, N. C., are placing in commission six new 1500-volt d.c. box-type locomotives on the Greenville, Spartanburg & Anderson division of their system. These locomotives weigh 63½ tons, with all the weight on drivers, and are designed for heavy freight service. At the normal rating of the four GE-212-F motor equipment, operated on 1500 volts, two in series, each locomotive will develop a tractive effort of 17,500 lb. and a speed of 21 m.p.h. The locomotives will handle trains of 800 tons to 1000 tons gross weight.

MECHANICAL FEATURES

The locomotives were designed and built by the General Electric Company and are designated class 404-E-120-4-GE-212F machines. The all-steel box cab extends nearly the whole length of the underframe, railed outside platforms of suitable width being left at each end for the switchman to handle the trolley poles. While the operating mechanism is grouped in the central section of the cab, it is not placed in a compartment separate from the engineer's operating cabs. Convenient passageways run along each side and connect with the operating positions in each end.



Piedmont 1500-Volt Locomotive—General View of Box-Type Locomotive for Trains of 1000 Tons Gross Weight

The underframe consists of four 10-in. steel channels extending the entire length of the platform. These channels are tied together by heavy end-frame box girder castings and bolster plates, each channel being riveted to the webs of the end-frame castings and to the top and bottom bolster plates. The bolsters are built up of 18-in. x 1-in. plates, the top bolsters being carried clear across the platform and riveted to all four longitudinal sills. The two center channels are inclosed throughout with steel plates riveted to the under sills and carry the center-pin castings, which are bolted to them. The space between the center sills serves as a reservoir for distributing air from the blowers to the motors. Openings in the floor of this reservoir admit air from it through suitable intake pipes into the back end of each motor.

The drawhead castings are bolted to the center sills, which in turn are riveted to the end frames. The draft gearing consists of MCB No. 3 couplers with 5-in. by 7-in. shank and standard yoke, twin springs and follower plates. The whole platform is floored and braced by heavy steel plates running the width of the locomotive and riveted to the longitudinal sills. In the cab this is covered with the usual wood flooring. The necessary ballast required to bring the locomotive up to its rated weight consists of steel bars running the whole length of the platform, notched over the bolster plates and bolted to the longitudinal sills.

The side frames of the two four-wheel trucks are built of heavy rolled bars for top and bottom members with cast-steel pedestals. The bolster, or center transsom, is bolted rigidly to the side frames, and the entire weight of the truck framing is supported on semi-elliptic springs hung by links to the double side equalizer bars, which in turn rest on the journal boxes. The journal boxes are a standard design with MCB bronze bearings and wedges. The wheels are solid rolled steel, 36-in. diameter, with MCB treads and flanges. The axles are forged open-hearth steel, 6-in. diameter between the wheels and with 5½-in. x 10-in. journals. The air brakes are the combined straight and automatic type. The brakeshoes are inside-hung, and the brake rigging is proportioned for a brakeshoe pressure of 85 per cent of the weight on the drivers with 50 lb. pressure in the brake cylinders. Hand brakes are also provided. The outside of the locomotive has grab-handle and other standard safety fittings.

ELECTRICAL EQUIPMENT

The locomotive is driven by four 600-1200-volt box-frame commutating-pole motors insulated for operation on 1500 volts. Each motor is geared to an axle. All the axles are therefore driving axles. A forged pinion is mounted on each armature shaft and meshes into a corresponding solid steel gear mounted on the axle. The gear ratio is 65 : 18. The continuous capacity of each motor is 200 amp under forced ventilation and 269 amp at the one-hour rating. For the four motors this is equivalent to a continuous tractive effort of 11,200 lb. at the rail head. The control equipment is the well-known Sprague-General Electric Type M multiple-unit control, arranged to operate the four motors with seven steps in series and five steps in series-parallel.

One of the new and distinctive features for a locomotive of this type is the convenient manner in which the apparatus is arranged in the central section of the cab. The main motor rheostat boxes are mounted in banks in an inclosed sheet-steel compartment in the cab center. This compartment extends from the floor to the roof and is accessible through doors opening into the passageways on each side. The floor in the compartment is open and it is surmounted by an open monitor deck. Thus there is a continuous draft of air rushing up through the compartment while the locomotive is running, which affords exceptionally good ventilation. The rheostats are formed of the usual cast-iron grids assembled in frames and insulated with mica.

The contactors and reversers are grouped at each end of the rheostat compartment and suspended from the roof of the cab in laterally inclosed steel frames, accessible through lift doors at the sides. Beneath these are installed on the floor the dynamotor, the blower and one of the air reservoirs in one end, and the two air compressors and the other air reservoir in the other end.

The blower set for ventilating the motors has a capacity of 2000 cu. ft. per minute and is driven by a series-wound motor of the railway type. Air is taken from the exterior through a suction box with side louvers underneath the platform at the center. Current at 600 volts for the operation of the blower, and also the air compressors, the contactors and the lights, is furnished from a 2/5 tap taken from the dynamotor. The contactors are of the same general design as that employed in the standard 600-volt type M control. The principal modifications are embodied in the greater insulation distances and more effective methods of insulating where the contacts and magnetic blow-outs make and break on the 1500-volt circuit.

The air compressors are two-stage motor-driven compressors, type CP-30, and have a total piston displacement of 70 cu. ft. per minute when pumping against a tank pressure of 90 lb. per square inch. Air is taken in from the interior of the cab through strainer screens and is delivered into the two air reservoirs, each 28 in. x 60 in., connected in series, thereby affording an opportunity for radiation of heat and condensation of moisture before entering the air-brake cylinders.

At the operating positions in each end of the cab are the engineer's seat, controller, air-brake valves, bell and whistle ropes, ammeter, air gages, sander valves and other parts of the control apparatus that should be within immediate reach of the engineer. A tool box is also provided.

Current is collected by an overhead US-13 pantograph trolley, which is pneumatically controlled and can be put into service from either engineer's station by a manually operated valve. The trolley is arranged for a minimum operating height of 14 ft. 6 in. and a maximum height of 22 ft. On local lines where the overhead construction is not adapted for the pantograph trolley the locomotives use pole-type trolleys and trolley wheels. Some of these local lines are operated on 600 volts and even 500 volts. A change-over switch is installed to cut out the dynamotor while the locomotive is operating on low-voltage circuits, so that in such cases the current for the auxiliary control and supply circuits is obtained direct from the trolley circuit. This change-over switch is protected by an automatic relay, which makes it impossible to connect 1500-volt trolley current to the auxiliary circuits of the locomotive.

The main switch has a powerful blow-out to handle heavy currents without damage. There is also furnished a complete equipment of auxiliary switches, one each for controlling the lighting, compressor and blower circuits, two each for the headlight and control circuits, the motor cut-out switches already mentioned, and also two manually operated main auxiliary switches for cutting around the 1500-600 volt automatic relay.

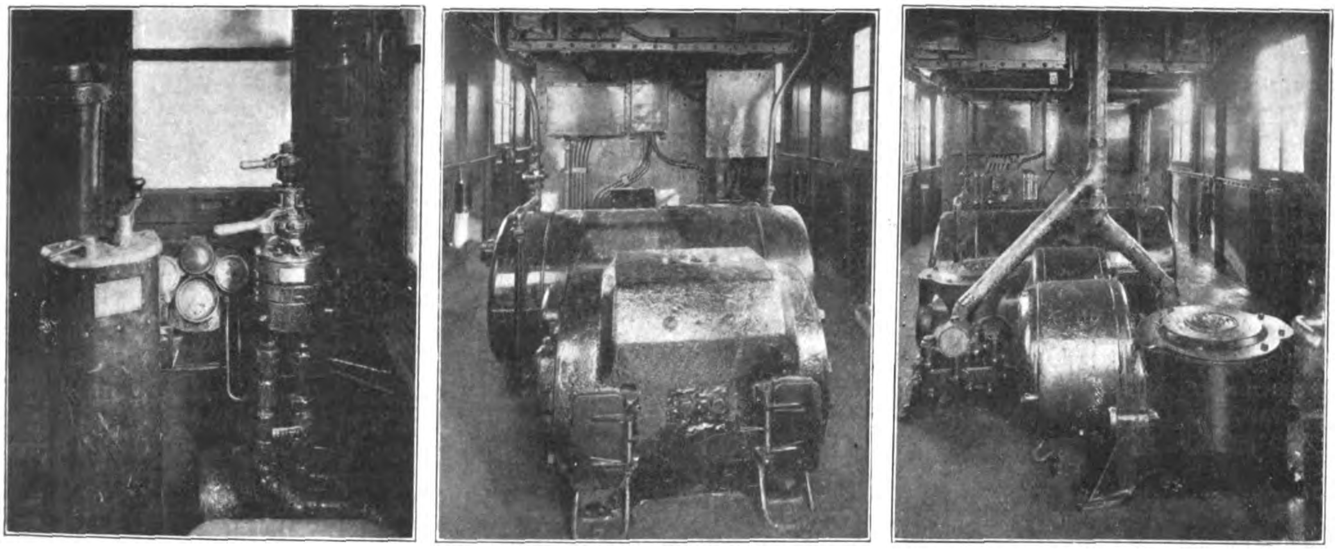
The protection of the locomotive against short-circuit includes one main fuse for the trolley circuit, two fuses for protecting locally the circuits of the pairs of motors and smaller fuses for the auxiliary circuits. The main fuses are of the copper ribbon type and are fitted with hinged covers to facilitate fuse renewals. All fuse boxes have magnetic blow-outs, energized by current passing through the fuse to insure proper rupture of the arc. The main fuse box is placed as near as possible to the overhead trolley to protect the wiring circuits near the source of supply. An aluminum-cell lightning arrester is also installed in the cab.

The locomotive is equipped with standard luminous arc headlights fitted with semaphore lenses. The brackets and plugs are arranged so that one headlight may be installed on each end or two on either end as desired. Trolley retrievers are used for the pole collectors, and the edge of the cab roof has projecting guard rails to prevent the trolley rope from cutting on the edge or catching in the lamps. The ammeter at each engineer's station indicates the current in the circuit of one pair of motors, and with the air gages is illuminated by a gage light connected in the headlight circuit, so that the headlight switch turns on simultaneously the headlight and gage lights in corresponding ends of the locomotive.

The sanders at each end are pneumatically operated. The incandescent lamps in the cab include two portable lamps with extension cords installed at the center in the side passageways. The bell is fitted with an automatic bell ringer, and the whistle is air-operated. All wiring is drawn through conduits and carefully protected from mechanical injury. Two air signals are supplied, one in each end of the cab, to enable the switchmen to signal the engineer.

Data and dimensions apply to the locomotive follow:

Length inside of knuckles	37 ft. 4 in.
Length over cab	27 ft. 0 in.
Height to trolley base	13 ft. 0 in.
Width over all	9 ft. 7 in.
Total wheelbase	26 ft. 8 in.
Rigid wheelbase	7 ft. 2 in.
Track gage	4 ft. 8½ in.
Tractive effort at 25 per cent coefficient	30,000 lb.
Tractive effort at one-hour rating	17,500 lb.
Tractive effort at continuous rating	11,200 lb.
Weight per driving axle	31,750 lb.
Weight electrical equipment	37,500 lb.
Weight mechanical equipment	89,500 lb.
Total weight on drivers	127,000 lb.



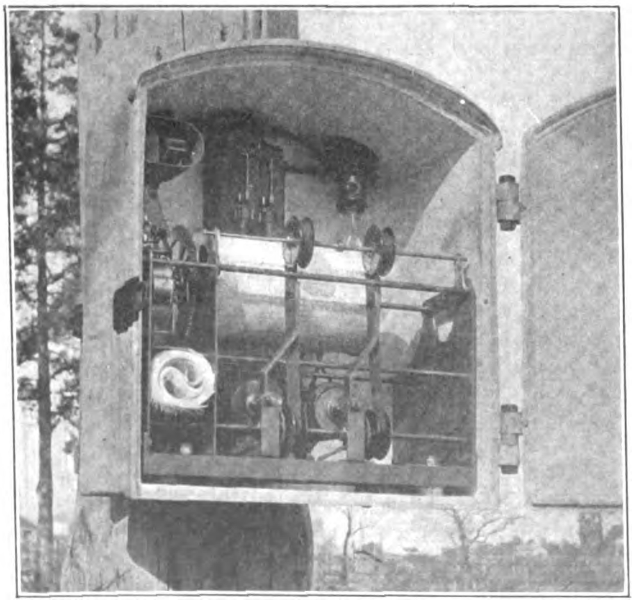
Piedmont 1500-Volt Locomotive—Motorman's Cab Showing Operating Equipment and the Location of Apparatus at No. 1 and No. 2 End, Respectively

AUTOMATIC HEADWAY RECORDER

A device much needed in the electric railway field, known as the automatic headway recorder, designed to improve the car schedule and to lighten the work of the inspectors, is being placed on the market by the Nachod Signal Company, Inc., New York.

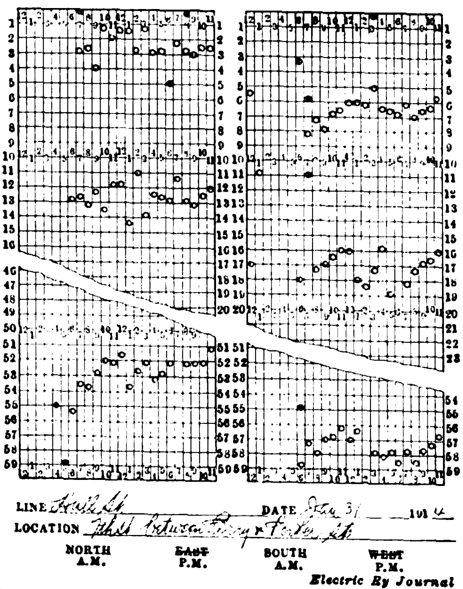
The recorder is inclosed in a cast-iron box attached to the pole at the point where the record is to be taken, at which point a Nachod trolley contactor is placed in the trolley wire and connected to the recorder. Every car which passes that point prints a mark on a paper record showing the exact time of its passage. The original of the record reproduced is about 7 in. x 13 in. in size, ruled horizontally in hours and vertically in minutes. The record is double; that on the left side of the sheet is, say, for north (or east) bound cars, and that on the right for south (or west) bound. Each half represents twenty-four hours, the left of each half representing the a. m. hours and the right the p. m. hours. Thus the time of any mark can be read by its position both in the vertical hour space and in the horizontal minute space, as, for instance, the mark of the car at 7:06 p. m. northbound. The scale is a very open one, a minute being represented by almost 1/4 in. and in all there are 53½ ft. of record space on one sheet. If the cars, for instance, are due to pass the recorder point ten minutes apart at the 3's, then on a perfect schedule all the cars at three minutes after the hour would make marks lying on the horizontal line 3, and those at thirteen minutes after the hour on the horizontal line 13. Any departure or scattering of the marks away from this line shows the irregularity of the schedule in the most graphic manner. The recorder does not indicate the particular car which made the record, but this information is obtained from the run number or the predetermined succession of cars.

The most valuable operating feature of the headway recorder is the improvement in the schedule due to the definite location of the causes of irregularity. On the Virginia Railway & Power Company, Richmond, Va., these recorders have resulted in a remarkable betterment of the schedule. In one instance, which was taken at random, only seven cars were more than two minutes off schedule out of the entire number passing the point in twenty-four hours.



Headway Recorder Installed with Cover Swung Open

The recorder will show such operations as the following: A motorman may reverse his car without proceeding all the way to the end of a single-track line, in which case a recorder at the end of the line would not show the mark for that car; the car crews may lie over too long at a point and run at a dangerously high speed to get on schedule again; a motorman may run ahead of his schedule; the car crew may "drag" the car at the peak load in order to obtain a larger number of fares, some of which would otherwise have been collected on the next car, but the first crew might turn in only the usual amount.



Electric Ry Journal

Part of Record Made on Headway Recorder

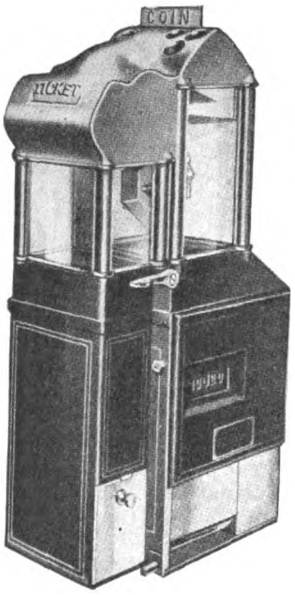
The record is given in a compact form convenient for filing, and it obviates a large amount of clerical work. The recorder is free from any favoritism and relieves the inspector of the fatiguing work of making an equally accurate record by checking. The attention required is winding the recorder clock daily, putting on a new paper record and removing the old record. A number of these recorders would be required on most lines and their location can be easily changed, as desired.

The mechanism, as shown in the accompanying cut, consists of a clock with a wide-faced pinion driving a drum in the manner of a traveling nut, one end of the drum having a gear meshing in the pinion. The drum travels on a fixed thread and therefore has two movements. It makes one revolution in an hour and moves forward at the same time about 1/8 in. into the next hour line on the record. A printing bar is operated by a magnet to print the mark through a typewriter ribbon which has a feed on the backward stroke of the bar. This obviates the use of liquid ink, the wear of a perforating device and makes a clearer mark than an embossing. Two magnets are used, one for each direction of car movement. A perforation in the blank record slips over a locating pin on the drum while the edges of the record are further aligned by the shrouded ends of the drum. The end of the record paper is gummed and perforated. To remove the record, a knife is run under it, cutting through the perforations and leaving the overlapped part gummed to the back. On this are filled out the line, date, location and north (east), south (west).

The contactor through which the printing magnets receive temporary current as the car passes them is easily installed, has no moving parts, and requires no maintenance.

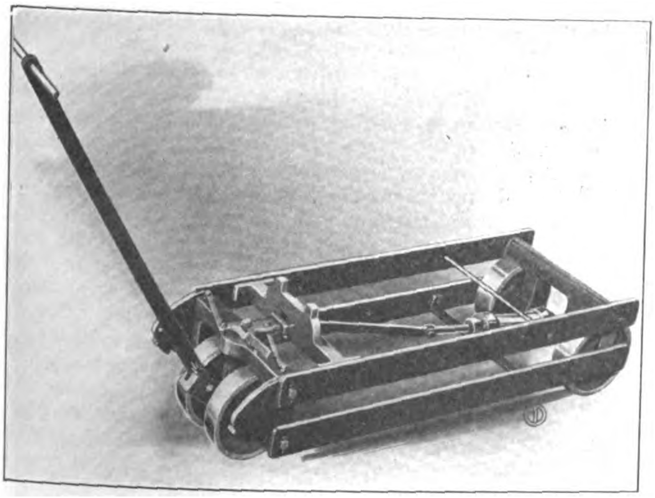
TICKET RECEPTACLE ADDED TO FARE BOX

A recent development in recording fare boxes is the addition of a receptacle for holding tickets as perfected by the Johnson Fare Box Company, Chicago and New York. This receptacle is incased beside the recording fare box and requires but 2½ in. more floor space on one side. It incloses a canceling device installed so near the top of the receptacle that tickets are actually seized as they are inserted in the slot provided for that purpose. This canceling device is composed of a pair of hollow rolls each containing about 1 oz. of indelible ink which is sufficient to cancel at least 100,000 tickets. The ink is drawn to the surface of the rolls by capillary attraction through a series of felt rings. These rings come in contact with the tickets as they are drawn between the rolls, which are revolved continuously by a small motor. A continuous run of a month showed no wear or change in the rolls. The ink is made by the same formula as that used by the United States government in canceling postage and revenue stamps.



Fare Box for Tickets and Cash

The small motor which drives the roll mechanism receives its energy from one of the car circuits. It may be operated in series with the lamps or other suitable resistance and consumes about 0.2 amp at 70 volts. A test of one of the small motors running continuously 457 days without relubrication or other attention proved its durability conclusively. As shown in the accompanying illustration, the entire device is extremely compact and so simple in construction that its care can be left to any mechanic with perfect safety.

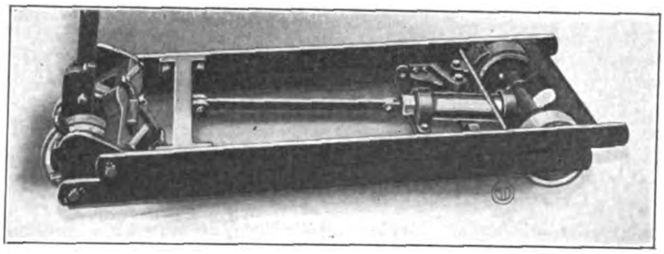


The Truck Raised

In addition to adding the ticket receptacle and canceling compartment, the coin-receiving hopper has been redesigned. It now consists of a gabled hopper with holes just large enough to permit the passage of a nickel. The usual form of crooked chute, funnel and inverted bell used in the standard box was adopted in the new one. The new hopper prevents the deposit of tickets therein, for a ticket placed on the gabled top will slide to the floor. Then, too, the gabled top lends itself more readily to being manufactured as a single bronze casting for both the coin and ticket compartments. Each compartment is provided with the usual inspection chamber and trap doors operated by separate levers.

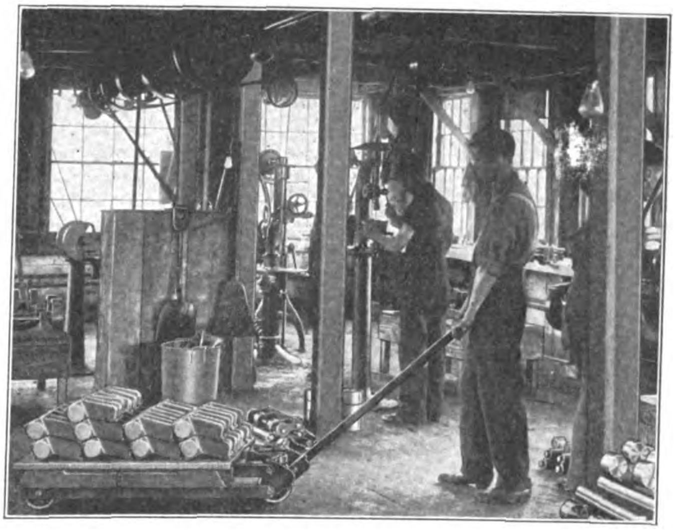
HAND-DRAWN TRUCKS OF ELEVATING TYPE

An effective labor-saving device for shops and storerooms is the "National-Chapman" elevating truck, the construction and use of which are shown in three accompanying halftones. This truck, as made by the National Scale Company, Chicopee Falls, Mass., eliminates all unnecessary handling in loading and unloading material between different levels. When the material is stored originally it is placed on small wooden platforms of the user's manufacture. When it is to be moved the shopman simply runs the truck under the platform and so transports the load without any piece by piece transfer. To raise the load the operator simply presses a pedal and moves the handle. The mechanism locks automatically, and then the loaded truck is pulled away for deposit where wanted. The lowering movement is effected without shock with a hydraulic check.



The Truck Lowered

Aside from special designs, these four-wheel trucks are made in nine sizes with lifts varying from 1⅝ in. to 2¼ in. The capacity ranges from 2500 lb. to 4000 lb., and is limited only by the hauling power of two men. The operator rolls the front wheels beneath the load, thereby obtaining great leverage with little effort. The steering gear is effective at any position of the handle, and it is impossible for the handle to fly backward.



The Truck Used in a Machine Shop

News of Electric Railways

New York Traction Officials and Street Cleaning Department Confer on Snow Problem

A conference regarding snow removal was held on March 6, 1914, in the office of Street Cleaning Commissioner John T. Fetherston, in the Municipal Building, New York City. After the meeting Commissioner Fetherston said that for the first time there was light ahead for the snow problem, and that there was reason to believe that the co-operation of all the snow-fighting forces of New York with modern equipment would be brought about before the following winter.

There were present at the meeting Mr. Fetherston, Superintendent Gunther of the snow removal bureau, Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company and the New York Railways; E. A. Maher, vice-president and general manager of the Third Avenue Railway, and officials representing the Brooklyn Rapid Transit Company, the Union Railway, the New York Central Railroad and the Second Avenue Railroad.

It was suggested to the railways that they should take control of cleaning every street in the city through which they operate cars. This would take from the street cleaning department officials practically every important business street in the city except Fifth Avenue and a few important crosstown streets, notably those in the downtown financial district.

Commissioner Fetherston gave out the following statement:

"We were agreed that with proper co-ordination of the snow-fighting forces the snow problem could be greatly simplified provided we are able to get the modern equipment needed. For instance, the railways reported that already they were experimenting with a new type of sweeper which would not only clear the tracks, but would clean the roadways also for a distance of 12 ft. on each side of the tracks.

"We also discussed the possibilities of flat cars, operated on the street car lines as a means of snow disposal, and we took into consideration two minor problems—namely, the problem of loading the flat cars without causing too great delay to passenger traffic, and the question of terminals for the dumping of the snow from the cars. The representatives of the railways also pointed out that the situation can be improved by a greater co-operation on the part of the Police Department in keeping the railway tracks clear and where possible compelling trucks and other vehicles to keep to the sides of the roads and off the tracks."

One of the chief objections raised to the plan was that with present methods of handling snow it would tie up traffic, since shovelers would take from twenty to twenty-five minutes to load a car. Commisioner Fetherston said mechanical loaders had been used successfully in loading snow in other cities, and that they did the work in a fraction of the time taken by men.

A letter from F. W. Whitridge, president of the Third Avenue Railway, was read by Mr. Maher. Mr. Whitridge said that in future storms he would be glad to let the railway do anything it can for the city, such as transporting snow at cost. He suggested that the city should have a number of storage battery sweepers, and said that fifteen such sweepers would keep Fifth Avenue clear up to 110th Street, it being possible thereby to bank the snow in the center of the street.

Mr. Whitridge's other suggestions were that removal should begin at the river; that carts and laborers should be proportioned so that the men would not have to waste time waiting for carts, as he had seen them doing; that more use should be made of the sewers; that the police should prevent trucks from getting in the way of the trolley cars; that overloading of vehicles should be made an offence, and that the dock department should provide more dumps and the removers be shown where the rivers are.

Detroit Valuation Estimate Submitted

The Detroit (Mich.) United Railway estimates the value of its physical property within the one-fare zone at $31,028,982, exclusive of franchise values, material on hand and several large construction and reconstruction operations now under way. The appraisal was presented on March 12, 1914, to the Municipal Street Railway Commission, which will ask the company to fix a selling price for the property. Based on the inventory, with the franchise values and the supplemental estimates, the company's final appraisal will approximate $37,000,000. The appraisal is figured as the reproduction value of the property. The commission will make no comment pending the study of the inventory by its engineers.

The Common Council of Detroit has voted to place in the city budget for the year the sum of $100,000 for the use of the Street Railway Commission appointed by the Mayor following the adoption of a municipal ownership amendment to the city charter a year ago. The commission is empowered to negotiate with the Detroit United Railway for the purchase of the lines of the company within the city.

Chairman of District Sub-committee Advocates Municipal Ownership

Representative Robert Crosser, chairman of the street railways sub-committee of the House District committee, advocated municipal ownership of the District of Columbia electric railway systems before the Study Club in Economics at the Public Library in Washington, D. C., on March 4, 1914. The sub-committee of which Mr. Crosser is chairman has been holding hearings on the question of the advisability of taking over the lines in Washington and is expected to report soon. Mr. Crosser's address was taken to mean that if his recommendations are followed the sub-committee will report in favor of municipal ownership. He was quoted in part as follows:

"Any one who has studied the question, even superficially, will see that the matter of transportation is inseparably connected with the problem of congestion, slums and tenements. I think there can be no doubt that the operation of street railways is an entirely proper function of a municipal government. I insist that the private ownership and operation of street railways is not the best thing for the public. In the first place, in order to be satisfactory to the people there must be only one system. That, of course, leaves out of question the possibility of competition, and makes it necessary for the people to accept the service offered by that system or do without, which is a practical impossibility.

"It is objected by some that this is socialism. The fact is that there is no essential difference between the service being supplied and that which we are now proposing. Cities now operate waterworks, electric light and power plants and furnish police and fire protection, but very few yet furnish street railway service. Proper! It is indeed the only method which is absolutely proper, and it is the only method which absolutely insures justice to the public in the use of the streets. As soon as we undertake private ownership and operation we are compelled to grant the private concerns the special privilege to the use of such streets. Throughout the entire country this right has been capitalized by private interests at more than the physical property used by the companies. The people are then required to pay sufficient fare to make possible the payment of dividends on this franchise value or what is sometimes called 'water.' My examination into the Washington street railways has satisfied me that they are shining examples of the very thing of which I speak.

"If the reports which I have examined and studied are correct, and if the testimony of the companies' own officials is even approximately correct, then I am satisfied that the whole system of street railways in Washington could be reproduced for a little over $20,000,000, whereas the total capital liabilities amount to $50,000,000; that is to say, the two principal companies. I feel sure that a municipal street railway system in Washington, managed as efficiently as the waterworks department and other District instrumentalities, could be operated at a 2½-cent fare, with universal transfers."

Subway Section Contracts in New York

With the exception of two small connections and the two-track spur to Brooklyn, the Seventh Avenue subway in Manhattan, for operation by the Interborough Rapid Transit Company, is now entirely under contract from Vesey Street, on the south, to Times Square, on the north, the Public Service Commission for the First District having let the contract for the last section, namely, Section No. 4, during the week ended March 7. This section extends under the Seventh Avenue extension and Seventh Avenue from Commerce Street to Sixteenth Street, and embraces a local station at Christopher Street and an express station at Fourteenth Street. The contract went to the lowest bidder, the United States Realty & Improvement Company, for $1,887,726. The total amount of the contracts awarded for this road up to date is $11,776,562. North of Park Place the line will be a four-track underground railroad, with two tracks south of that street. The contract for Section No. 5, extending from Sixteenth to Thirtieth Street, originally awarded to the Canavan Brothers Company, has been assigned to the United States Realty & Improvement Company, the successful bidder on Section No. 4, the adjoining section on the south.

The Public Service Commission has begun advertising for bids, to be opened on March 27, for the construction of Section No. 1-A of Route No. 12, the Eastern Parkway subway in Brooklyn. This line, which will be operated by the Interborough Rapid Transit Company, is to be an extension of the existing subway from its present terminus out Eastern Parkway as far as Buffalo Avenue, as a four-track underground railroad. Beyond Buffalo Avenue there will be a three-track elevated railroad through East Ninety-eighth Street and Livonia Avenue, as far as New Lots Road. There will also be a two-track branch from Eastern Parkway under Nostrand Avenue as far as Flatbush Avenue. Section No. 1-A covers that part of the line in Flatbush Avenue between St. Marks Avenue and Plaza Street. For the greater part of this distance the road will be a six-track structure. Four of the tracks are to be devoted to the Interborough Rapid Transit Company line, and two will be used by the New York Municipal Railway Corporation for the connection between the Fourth Avenue subway and the Brighton Beach line.

Plans and form of contract for the construction of Section No. 1 of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan, have been approved by the Public Service Commission and sent to the Interborough Rapid Transit Company, which is to operate the line, for its suggestions.

The Public Service Commission has authorized the New York Municipal Railway Corporation to let the contract for the steel to be used in the third-tracking and reconstruction of the Fulton Street elevated railroad in Brooklyn to Milliken Brothers, Inc., the lowest bidders. The contract calls for approximately 12,000 tons, at $38.90 per ton, or a total of $466,800. At the same time the commission approved the plans and specifications for the steel work. The lot covered by this contract is intended for the railroad between Nostrand Avenue and Sackman Street, a distance of 12,368 ft. The commission also has awarded the contract for the supply of ties and timber to be used in equipping the Fourth Avenue subway in Brooklyn to J. H. Burton & Company, Inc., the lowest bidders, for $96,540, delivery to be made in from 100 to 240 days. The commission has also authorized the chairman and the secretary to advertise for bids for the supply of tie-plates, felt-pads and ballast for the Fourth Avenue subway, in Brooklyn, bids to be opened March 26. In the general proposal for track materials for this subway, received about a week ago, no bids were submitted for the three items mentioned, and it was necessary for the commission to readvertise as to those items.

On March 12 the commission opened bids for the construction of the short stretch of the Seventh Avenue line from Forty-second Street to Forty-fourth Street. The bids ranged from $305,261 to $737,835.

Providence Subway Plan Submitted

The plan for a subway system for the city of Providence, R. I., upon which a joint special committee of the City Council, assisted by William W. Lewis, a Massachusetts engineer, has been at work for months past, was submitted to the Board of Aldermen on March 7, 1914, and by it referred back to the committee for a series of public hearings. The plan submitted proposes a system of subways with branches running from the Seekonk River, Trinity Square, Olneyville Square and the North Burial Ground to Exchange Place, with central underground transfer stations at that point. The estimated cost is placed at $13,600,000, but this figure includes the cost of purchasing the new East Side tunnel, which is rapidly nearing completion. The committee suggests an extension of the East Side tunnel to the Seekonk River, to be completed by 1916. It is proposed to finish the Trinity Square tube by 1918, the tube to the North Burial Ground by 1920 and the Olneyville subway by 1923.

The committee proposes to finance the project by the issuance of city bonds outside the debt limit, the interest on the bonds to be paid from rentals to be received from such companies as may obtain the right to operate in the subways. This rental is to be sufficiently high also to establish a sinking fund to retire the bonds. It is proposed that the system shall be placed under the control of a board of nine members to be known as the Providence Transit Commission, with the Mayor and the commissioner of public works as ex-officio members. Accompanying the report of the committee is a draft act which it is proposed to submit to the Legislature under which the authority to finance and construct the lines may be obtained.

Agreement Reached on Terms for Extension in Akron

Charles Currie, general manager of the Northern Ohio Traction Light Company, Akron, Ohio, addressed a letter to the board of control of that city, dated March 3, 1914, in which he expressed the company's willingness to make such extensions as the board suggested in its communication of Feb. 25, 1914, with one or two exceptions. The company objects to the construction of tracks on Exchange Street between the railroad tracks and East Market Street until certain conditions are complied with. Then it is willing to build a double track, as desired. In return the company asks the Council to grant a franchise for the operation of these extensions on the same terms and conditions as on the other lines to which it holds grants.

Mayor Frank W. Rockwell has expressed his approval of the company's proposal, concluding his communication to Council as follows:

"Mr. Currie, the general manager, has authorized me to say that the tracks will be completed within three years if Council will pass ordinances allowing the company to operate on the streets under the same terms and conditions as the company's present franchise, the new grants to expire at the same time that the present franchise expires. While under this agreement the city will not get all the extensions that were asked for in the negotiations of last year it does get the larger part of them and those of which we are in the most urgent need, and I therefore recommend that ordinances granting the necessary franchise be passed with as little delay as possible."

Report Upon Workmen's Compensation Acts

August Belmont, chairman of the workmen's compensation department of the National Civic Federation, announces the publication of the report upon the operation of state workmen's compensation laws made by the commission created in July, 1913, by the National Civic Federation and composed of employers, legal experts and labor representatives appointed by the American Federation of Labor. The workings of the various compensation laws in states having had any important experience are reviewed and analyzed in a way to bring out distinctly the strong and weak provisions. The findings are based upon personal conferences and hearings in different sections of the country, and upon replies to thousands of letters of inquiry and questionnaires, the answers representing a payroll of $358,640,383. The labor viewpoint as to the benefits derived from workmen's compensation laws was sought and opinions were secured from employers, public officials and insurance men. The report presents the facts impartially, with no attempt to offer theories or to make recommendations. This volume, which is practically a working handbook of 200,000 words, may be had, free of charge, upon application to the workmen's compensation department of the National Civic Federation, New York City. The United States Senate has ordered the volume to be reprinted as a government document.

Chicago Surface Lines Refuse to Accept the Committee's Initial Subway Rental Demand

At the meeting of the local transportation committee of the City Council of Chicago and the officers of the surface railways on March 4 it developed that there was little likelihood that an agreement could be reached for the use of the initial subway by the surface railways. In their report to the subcommittee Messrs. Arnold and Weston recommended three plans for renting the proposed initial subway system, namely, that the city invest its traction fund in subways or other extensions to the surface line properties in such manner as to increase the service and charge no rental, that it limit the net receipts to the surface companies to 7 per cent on the capitalization and fix the rental charge to the companies at the amount saved by their using the subways instead of the street, or that it rent the lines on a basis which would return 5 per cent interest to the city on the $26,000,000 investment in the initial subway scheme.

At the meeting of the committee on March 4 Messrs. Weston and Arnold submitted a letter recommending that the city demand a flat 5 per cent rental for the subways, or a rental equivalent to the saving from subway operation plus all earnings above a fixed percentage allowed the company, which was set tentatively at 7 per cent. The committee adopted the recommendation carrying with it a straight 5 per cent rental. It became apparent at a meeting on March 9 that the ordinance could not be passed by the City Council prior to the spring election on April 7, when the subway question was to be submitted in referendum vote. At the regular meeting of the Chicago City Council held on March 9 a resolution was submitted by the local transportation committee to the effect that the board of election commissioners be requested, if it was within its power, not to include the question of constructing an initial system of municipally owned subways upon the ballot submitted to the voters at the April election.

Decision in Chicago Car License Case.—According to a decision of the Supreme Court of Illinois the Chicago & Oak Park Elevated Railroad, now included in the Chicago Elevated Railways, must pay the city of Chicago license fees accruing since May 1, 1896, on cars for which the company is alleged to have made no accounting.

Vote on Municipal Ownership in Superior.—The electors of Superior, Wis., are to be asked to vote at the election on April 7, 1914, on the question "Shall the city buy and operate its street car lines?" If the vote is favorable the plan of the City Commissioners is to avail themselves of the recent legislative amendment and conduct negotiations with the end in view of taking over and operating the lines of the Duluth-Superior Traction Company in Superior.

Engineering Experiment Station at the University of Wisconsin.—An engineering experiment station has been created by the Board of Regents of the University of Wisconsin to have general charge of the testing and research work of the college. The staff of the station will consist of the dean as director and members of the instructional staff. They will be assisted by fellows, scholars and assistants, who may be engaged in experimental and research work. The results of experiments conducted at the station will be published in the form of bulletins. Dean F. E. Turneaure, of the College of Engineering of the University of Wisconsin, has long been engaged in research work of various kinds.

Serious Gas Explosion in New York.—Three gas explosions wrecked Twenty-third Street, at Broadway and Fifth Avenue, New York, on Sunday morning, March 8, causing the injury of nine persons. They endangered the Fifth Avenue Building, caused two large breaks in the water mains at that place, partly wrecked the trunk sewer that runs under Twenty-third Street, broke scores of windows and plate-glass fronts of stores and offices in the neighborhood, flooded the new Broadway subway to a depth of about 10 ft., threw out of commission for the entire day the street car lines that run past the point where the explosions occurred and partly wrecked a car of the New York Railways which was in the danger zone.

Reconstructing an Indiana Property.—Through the medium of a bondholders' protective committee represented by F. Y. Keator, J. C. Cavender and C. D. Kellog, the Gary, Hobart & Eastern Traction Company has been refinanced and the work of electrifying the line has commenced under the supervision of E. O. Sessions, consulting engineer of Chicago. The line was built between Gary and Hobart, Ind., a distance of 10 miles, for operation as a gas-electric motor road. It has been out of service since October, 1912. The work now being carried out includes all the necessary overhead lines, substations, carhouses and the purchase of three passenger motor cars and one express car. B. J. Schramm, formerly superintendent of overhead of the Kankakee & Urbana Traction Company, Urbana, Ill., is superintendent in charge of the reconstruction work for the company.

Low Fare Vote Enjoined.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., attacks the constitutionality of the initiative and referendum law in a petition which it filed recently in the District Court at Omaha for an injunction to prevent the holding of the seven-fares-for-a-quarter election. The suit is against Harley G. Moorhead, as election commissioner, and Gurdon W. Wattles and William A. Smith are plaintiffs, as taxpayers. Mr. Wattles is president and Mr. Smith is vice-president of the company. It is claimed that the initiative and referendum law is in conflict with a constitutional amendment adopted in 1906 creating the State Railway Commission and delegating to that commission power to regulate rates charged by common carriers, and that a case is now before the State Railway Commission in which the commission is asked to require the company to establish a rate of six fares for a quarter.

Objection to Kansas City Depot Franchise.—Clyde Taylor, associate counsel for the receivers of the Metropolitan Street Railway, Kansas City, Mo., appeared before the street, alley and grade committee of the lower house of the City Council recently and presented ordinances necessary to carry out the Kealy-Ash plan for routing street cars to the new Union Depot. The chief difference between the receivers and the Council committee is over the clause providing that any competing line shall be allowed the use of track up to three blocks. Mr. Taylor served formal notice that if this clause was included in the depot ordinance, it would not be accepted by the receivers. He maintained that if every ordinance passed by the Council for extensions stipulated that three blocks might be used by other car lines it would not be long until competing companies would be able to use a substantial part of the Metropolitan Street Railway's lines.

Safety Medals for Electric Railways.—Three medals, of gold, silver and bronze, to be known as the Anthony N. Brady memorial medals, will be awarded for the first time this year by the American Museum of Safety for the best work done during the year by an electric railway in America in accident prevention and industrial hygiene. The medals have been donated by Nicholas F. Brady, son of Anthony N. Brady, who succeeded his father as president of the New York Edison Company. They will be awarded at the next annual meeting of the Museum of Safety, and thereafter each year. The gold medal is to be awarded to the company which makes the best record. The silver medal will be awarded to the department of the railroad winning the gold medal which, in the judgment of the railroad's directors, has done the most in obtaining the results for the award of the gold medal. The bronze medal will be presented to the employee who individually, in the judgment of the directors, has done the most to promote safety of life and conditions for good health.

Findings of Montpelier Arbitrators.—The arbitrators who have been considering the differences between the officers of the Barre & Montpelier Traction Company, Montpelier, Vt., and the employees have reported their findings. The new schedule of wages which has been proposed is as follows: From Feb. 1, 1914 to Feb. 1, 1915—First six months, 19 cents an hour; second six months, 21¾ cents an hour; third six months, 24 cents an hour; fourth six months and thereafter, 25 cents an hour. Feb. 1, 1915, to Feb. 1, 1916—First six months, 20 cents an hour; second six months, 23 cents; third six months, 25 cents; fourth six months and thereafter, 26 cents an hour. Feb. 1, 1916, to Feb. 1, 1917—First six months, 21 cents; second six months, 24 cents; third six months, 26 cents; fourth six months and thereafter, 27 cents an hour. The new agreement expires on Feb. 1, 1917. The men are granted a nine-hour working day and will receive full day's pay for Sunday work, even though the day be shorter than nine hours. The spare men will receive additional opportunity to earn a day's pay. The work car will hereafter be run by trainmen instead of by carhouse employees.

Wage Readjustment in Des Moines.—Emil G. Schmidt, president of the Des Moines (Ia.) City Railway, has signed the new wage scale agreed upon by the company and employees. The men have agreed to accept an increase of 1 cent an hour. The original request was for a 7-cent increase. The contract will run from March 1, 1914, to March 1, 1915. Motormen and conductors will receive 5 cents an hour additional instead of 3 cents for overtime. Carhouse men and line drivers will receive time and a half for overtime. Snow plow men will get 5 cents an hour increase and meals. The minimum wage for extra men is to be $50 a month. The demand for fifteen minutes' extra time at the end of each day's run to check in was not allowed. Under the new scale motormen and conductors will receive 24 cents an hour the first year, 25 cents the second, and 29 cents the third. Carhouse men will receive 26 cents the first year and 27 cents thereafter. Line drivers will receive a straight 26 cents. Shop men and general repairers will receive 31 cents and helpers 26 cents. Pipemen will receive 36 cents and their helpers 26 cents. Airbrake men will be paid 34 cents and their helpers 26 cents.

Banquet of Westinghouse Interests in Pittsburgh.—On March 7, 1914, the Westinghouse interests of the Pittsburgh district held their fourth annual banquet at the Fort Pitt Hotel, Pittsburgh, under the auspices of the Westinghouse Club. The interests represented were the Westinghouse Air Brake Company, the Westinghouse Electric & Manufacturing Company, the Westinghouse Machine Company, The Union Switch & Signal Company, the R. D. Nuttall Company and the Pittsburgh Meter Company. The toastmaster was W. A. Bole, assistant general manager of the Westinghouse Machine Company and director of the Trafford City foundry. A. L. Humphrey, vice-president and general manager of the Westinghouse Air Brake Company, spoke on the product and the possibilities of the Air Brake Company. Col. H. G. Prout, vice-president of the Union Switch & Signal Company, called attention to the value of automatic signal system as an aid to travel. C. A. Terry, vice-president of the Westinghouse Electric & Manufacturing Company, spoke of the recent achievements of that company. Guy E. Tripp, chairman of the board of directors of the electric company, discussed the administration bills now before Congress looking to the regulation of trade.

Seattle Company Opposed to Extensions Under Modified City Charter.—A bill directing the Puget Sound Traction, Light & Power Company, Seattle, Wash., to construct an extension of its lines from their present terminus at West Sixty-fifth Street to West Eighty-fifth Street has been introduced in the Council by Oliver T. Erickson and has been referred to the city utilities and the franchise committees. Because of a charter provision that common user privileges shall be incorporated in all franchise grants and that the city shall receive the right to take over the property at any time, the company has refused to extend its existing lines, particularly as it fears that the provisions covering an extension might be construed by the court to mean that the same provisions applied to any line so extended. Mayor George F. Cotterill, who drafted the amendment, has since admitted that it was the intention to make the provision retroactive. The company announced recently that it will make no extensions except where application is made by the company in the usual way and where the grant is similar to the franchise under which the original line was constructed. This is the fourth attempt that has been made by the city to force the company to extend its lines under the terms of the charter.

Mr. McLimont as Pacificator.—A. W. McLimont, the new general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., who has been notably successful in his relations with the public and his staff, received much praise in an editorial "In the Right Spirit" which was published recently in the Oakland *Enquirer*. The *Enquirer* said in part: "Yesterday's conference between a committee of the Merchants' Exchange and A. W. McLimont, general manager of the terminal properties, was notable for the feeling of amity and good-will evinced upon the occasion. It was remarked by members of the committee, at the close of the conference, that they had met with the utmost courtesy and assurances that the matters brought to Mr. McLimont's notice would receive immediate attention. The main achievement of this interchange of views was the establishment of cordiality and mutual respect. Once mutual confidence and a spirit of co-operation are established all problems will be found easy of solution. Most problems approached in this spirit can not only be most quickly solved but most thoroughly worked out. Friendly relationships are a solvent for almost all woes. Mr. McLimont is practically a stranger to the local conditions, having been in charge of the traction system for only a very brief time, but it is his purpose, we are assured, to address himself with alacrity to these and other problems."

Campaign in the Interest of Home Purchases.—The employees of the Portland Railway, Light & Power Company, Portland, Ore., have organized a club for the purpose of encouraging the purchase of home-made goods. It has taken for its name, "P-R-L-&-P Made-in-Oregon Club." Its main object is to increase the opportunity for labor in Portland. The company has 3000 employees and it is estimated that they expend $1,500,000 yearly for the purchase of supplies for the home. It is the largest number employed by any single concern in Portland, and one of the largest on the Pacific Coast. The club members believe that by the proper application of instructive talks and presenting of information as to who are the manufacturers of Portland and the character of goods made by them a considerable portion of $1,500,000 can be devoted to the purchase of home-made goods. In furtherance of its purpose the club is sending out a letter to manufacturers in Portland and Oregon asking for the name of the factory and the trade name of the goods made, so that a member of the club may call for them. The answers are to be analyzed and the information given to the members, so they can make the proper inquiry. Records are to be kept by individual members as to their experience in buying home-made goods, so that full information may be had with regard to the real difficulties in buying the goods made in Portland. The club has for its president Frederick Cooper, superintendent of transportation. Mr. Cooper, A. C. McMicken, sales manager; F. D. Hunt, traffic manager, and B. F. Boynton, claim agent, form the executive committee.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

KENTUCKY

The chances for the passage of proposed workmen's compensation legislation in Kentucky at the present session are practically nil. The manufacturers of the State were opposed to State insurance, while representatives of organized labor insisted on a State insurance feature, and succeeded in killing a bill in the House which was a revised form of the measure introduced by the manufacturing interests. Efforts to eliminate common law defenses, without limiting the liability of the employer, were defeated, so that the situation, as far as employer and workman are concerned, remains in statu quo.

NEW YORK

Senator McClelland has introduced a bill amending the stock corporations law relative to reorganizations. Every corporation organized under the sections is required to issue stocks and bonds provided for in reorganization plan, or in any agreement with a public authority respecting the organization, if it has not already done so prior to Jan. 1, 1914. It also gives beneficiaries under reorganization, or a committee acting in behalf of all similarly situated beneficiaries, right to apply to the Supreme Court for an order enforcing reorganization plans and agreements, or construing their terms and determining reasonableness of requirements imposed on any party. The bill provides that at least six months must be allowed all beneficiaries to accept and participate in such a plan or agreement after final adoption by the necessary parties and approval by public authorities. Stocks and bonds or funds provided for in reorganization are declared trust funds for the beneficiaries, subject to supervision and control of equity courts.

The following bills have been introduced in the Assembly: An act to amend the railroad law in relation to extending the time for the commencement of construction or the completion of certain railroads in the hands of the receivers; an act to amend the railroad law in relation to removing certain disabilities of railroad corporations now in the hands of receivers; an act making an appropriation for the elimination of grade crossings and authorizing the state comptroller to issue bonds of the State to pay such appropriations; an act to amend the railroad law in relation to the application of grade crossing provisions; an act to amend the railroad law in relation to the discontinuance of regular passenger trains; an act to amend the general city law in relation to electrical inspectors; an act to amend the railroad law in relation to the number of motormen to be employed on certain subway trains; an act to amend the railroad law in relation to the minimum number of employees to be employed in the operation of street surface railways.

The following bills have been introduced in the Senate: An act to amend the railroad law in relation to heating passenger cars propelled by gasoline or oil engines; an act to amend the railroad law in relation to the names of railroad stations; an act to amend the railroad law in relation to the application of grade crossing provisions; an act making an appropriation for the elimination of grade crossings and authorizing State bonds for this purpose.

RHODE ISLAND

An act which would compel street railways to furnish seats to both motormen and conductors operating their cars has been introduced in the House and has been sent to the judiciary committee for consideration. The Rhode Island Company has already equipped most of its suburban cars with stools for motormen.

Senator Munroe, of Providence, has introduced a bill in the Senate by request, which provides that motormen and conductors shall be instructed by competent persons before taking up their duties and that they shall be residents of the State for sixty days.

PROGRAMS OF ASSOCIATION MEETINGS

New York Railroad Club

The regular monthly meeting of the New York Railroad Club, which will be held on March 20, 1914, will be the annual "Electrical Night." The speakers of the evening will include Emil Huber-Stockar, head of the department for the introduction of electrification on the Swiss Government Railways. The subject will be "Heavy Electric Traction."

Massachusetts Street Railway Association

The regular monthly meeting of the Massachusetts Street Railway Association has been postponed until March 18, 1914, at Young's Hotel, Boston, Mass. John N. Cole, Andover, Mass., former Speaker of the Massachusetts House of Representatives, will address the members on "The State as the Big Father."

Central Electric Railway Accountants' Association

A special meeting of the Central Electric Railway Accountants' Association was called to be held at the Hollenden Hotel, Cleveland, Ohio, on March 13, 1914, at 8 a. m., to consider the tentative classification of accounts for electric railways issued by the Interstate Commerce Commission and known as Accounting Series Circular No. 41. All criticisms according to the official notice contained in the circular must reach the office of the commission not later than March 21, 1914, Each member was urged to study the classification carefully and to come prepared to take an active part in the discussion.

Pennsylvania Street Railway Association

The semi-annual meeting of the Pennsylvania Street Railway Association will be held in Harrisburg on May 12 and 13, 1914. This will be the first meeting since its amalgamation with the Keystone Railway Club. Under the new constitution and by-laws it is provided that manufacturers and supply men may become associate members of the association upon the payment of $10 annual dues, which entitles them to two representatives at any regular meeting of the association. A charge of $5 is made for each additional representative above two. Associate members do not have the voting privilege, but are entitled to representation on the executive committee. The program for the meeting will be announced later.

Railway Signal Association

A joint meeting has been arranged between the Railway Signal Association and the Chicago section of the Illuminating Engineering Society to be held at 8 p. m. on April 10, 1914, in the auditorium of the Western Society of Engineers, Monadnock Block, Chicago, Ill. The following papers will be presented:

Paper, "Fundamentals of Illumination," by William A. Durgin.

Paper, "Illumination of Signals," by Thomas S. Stevens, signal engineer of the Santa Fé Railroad, Topeka, Kan.

Paper, "Signal Lenses," by William Churchill, of the Corning Glass Works, Corning, N. Y.

Paper, "Physiology of the Eye and Its Relation to Signal Affairs," by Nelson M. Black, Milwaukee.

An informal dinner will be held at the Grand Pacific Hotel, Chicago, Ill., preceding the meeting.

New York Electric Railway Association

The nineteenth quarterly meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, N. Y., on the evening of Friday, March 20, 1914, and on Saturday, March 21, 1914. The session on Friday evening will be opened with an informal dinner at 8 o'clock at the hotel, after which several speakers will deliver addresses. There will be a business session on March 21 at 10 a. m., at the Fort William Henry Hotel, at which addresses on the general subject "Safety" will be delivered. The names of speakers follow:

J. S. Doyle, superintendent of car equipment of the Interborough Rapid Transit Company, New York, N. Y.

Harry A. Bullock, secretary of the New York Municipal Railway Corporation, Brooklyn, N. Y.

Edward A. Maher, Jr., assistant general manager of the Third Avenue Railway, New York, N. Y.

Allison J. Van Brunt, director of safety education of the Public Service Railway, Newark, N. J.

An open discussion will follow.

Requests for hotel accommodations should be made to Albert Thieriot, manager of the Fort William Henry Hotel, Lake George, N. Y.

Plans for this meeting were arranged at a meeting of the executive committee of the association held on March 10 at the Engineers' Club, New York, N. Y. Those present were Frank Hedley, president; James F. Hamilton, vice-president; Charles C. Dietz, secretary, and James P. Barnes, John J. Dempsey and Wilbur C. Fisk, executive committee members. W. H. Collins, J. S. Doyle, Charles R. Ellicott and Charles V. Smith were also in attendance.

Mr. Hedley appointed the following committee on hotel arrangements: James F. Hamilton, chairman, Albany; W. H. Collins, Gloversville, and A. E. Reynolds, Glens Falls.

Financial and Corporate

Stock and Money Markets

March 11, 1914.

In the trading on the New York Stock Exchange to-day the important railroad and industrial issues failed to maintain the strength shown at the close of trading yesterday, and nearly all the issues yielded one point or more under pressure. New Haven was strong in the early trading, reacted and in turn was strong at the close. The market closed steady. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¾ @ 3 per cent; four months, 3½ @ 3¾ per cent; six months, 3½ @ 3¾ per cent.

In the trading in Philadelphia to-day odd lots of Union Traction sold at 45, while 18¼ was bid for Philadelphia Rapid Transit.

In Chicago the market for stocks to-day was narrow and the trading dull. The feature of the bond market was the sale of $10,000 of Chicago Railways 5's.

The Boston market was not very active to-day and generally heavy in tone.

The active issue in a narrow and dull market in Baltimore to-day was United Railways & Electric, sales of which total 586 shares. The bond transactions totaled $44,200, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 4	Mar. 11
American Brake Shoe & Foundry (com.)	95	93
American Brake Shoe & Foundry (pref.)	143½	141½
American Cities Company (com.)	36	36
American Cities Company (pref.)	61¼	61½
American Light & Traction Company (com.)	352	365
American Light & Traction Company (pref.)	107	107
American Railways Company	39	38
Aurora, Elgin & Chicago Railroad (com.)	36¾	38
Aurora, Elgin & Chicago Railroad (pref.)	78¼	79½
Boston Elevated Railway	82	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	39	39
Brooklyn Rapid Transit Company	93¾	92⅜
Capital Traction Company, Washington	109½	109½
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	92	92
Chicago Railways, ptcptg., ctf. 2	32½	31
Chicago Railways, ptcptg., ctf. 3	6½	6½
Chicago Railways, ptcptg., ctf. 4	2⅞	3
Cincinnati Street Railway	110	105
Cleveland Railway	104½	104
Cleveland, Southwestern & Columbus Ry. (com.)	*5	4
Cleveland, Southwestern & Columbus Ry. (pref.)	*26	23
Columbus Railway & Light Company	13	20½
Columbus Railway (com.)	53	62
Columbus Railway (pref.)	80	81
Denver & Northwestern Railway	71	71
Detroit United Railway	a85	85
General Electric Company	147	148
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	87	87
Interborough-Metropolitan Company (com.)	14¾	14⅝
Interborough-Metropolitan Company (pref.)	60	59¾
International Traction Company (com.)	*30	30
International Traction Company (pref.)	*85	a85
Kansas City Railway & Light Company (com.)	*19½	10
Kansas City Railway & Light Company (pref.)	35	25
Lake Shore Electric Railway (com.)	*5	5½
Lake Shore Electric Railway (1st pref.)	*82	85
Lake Shore Electric Railway (2d pref.)	*20	22
Manhattan Railway	130¼	131
Massachusetts Electric Companies (com.)	11¼	11
Massachusetts Electric Companies (pref.)	61	62
Milwaukee Electric Ry. & Light Co. (pref.)	*95	95
Norfolk Railway & Light Company	*24½	25¼
North American Company	70	76
Northern Ohio Traction & Light Co. (com.)	63	63
Northern Ohio Traction & Light Co. (pref.)	98½	98¼
Philadelphia Company, Pittsburgh (com.)	44	42⅛
Philadelphia Company, Pittsburgh (pref.)	43	42⅛
Philadelphia Rapid Transit Company	18¾	18¼
Portland Railway, Light & Power Company	*53	54
Public Service Corporation	112	112
Third Avenue Railway, New York	44½	44¼
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	80	75
Twin City Rapid Transit Co., Min'apolis (com.)	106½	105¾
Union Traction Company of Indiana (com.)	*11½	11½
Union Traction Company of Indiana (1st pref.)	*80	80
Union Traction Company of Indiana (2d pref.)	*14	14
United Rys. & Electric Company (Baltimore)	26½	27
United Rys. Inv. Company (com.)	20½	20
United Rys. Inv. Company (pref.)	45½	43¾
Virginia Railway & Power Company (com.)	53	53
Virginia Railway & Power Company (pref.)	95	96
Washington Ry. & Electric Company (com.)	87	87⅜
Washington Ry. & Electric Company (pref.)	87	87
West End Street Railway, Boston (com.)	71	72
West End Street Railway, Boston (pref.)	93	94
Westinghouse Elec. & Mfg. Company	71	73
Westinghouse Elec. & Mfg. Co. (1st pref.)	116¼	116½

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* Last sale. a Asked.

ANNUAL REPORT

Lake Shore Electric Railway System

The following is a comparative statement of the results of operation of the Lake Shore Electric Railway System (comprising the Lake Shore Electric Railway, the Lorain Street Railroad and the Sandusky, Fremont & Southern Railway), the principal office of which is in Cleveland, Ohio, for the years 1913 and 1912:

	1913	1912
Gross income	$1,416,983	$1,326,883
Operating and taxes	837,497	754,821
Net income	$579,486	$572,062
Interest	421,447	419,450
Surplus	$158,039	$152,612
Dividend, first preferred	60,000	60,000
Net surplus	$98,039	$92,612

E. W. Moore, president of the above companies, says in part in the statement which is addressed to the stockholders:

"The overhead system through Clyde was rebuilt on account of the track being shifted from the side to the center of the street. The making of this change required span construction and the building of a new double pole line.

"A new siding was built near the Vermilion River at Vermilion, this work being required on account of the erection of a new bridge. The contract with the King Bridge Company made in 1912 for the erection of steel bridges was completed during the past year. On the Toledo division new steel bridges over Sugar, Big Muddy and Tousaint Creeks were installed. On the Cleveland division Chappell, Vermilion River and Oak Point bridges were completed early in the summer. On West Main Street, Bellevue, for 1200 ft. new 100-lb. T-rail was laid on white oak ties and crushed stone and paving completed. On East Main Street, Norwalk, 2500 ft. of 100-lb. T-rail was laid on white oak ties and crushed stone and pavement completed. At Clyde the track was moved from the side to the center of the street from East Street to Birdseye Street, a distance of 3800 ft. From East Main Street to the northerly city limits of Norwalk on the Old State Road, a distance of 1700 ft., the track was moved from the center of the road to the easterly side of the road. On the bridge over Black River at Lorain the company laid 2000 ft. of new rail on treated white oak ties, the use of ties being required on account of the elevation of the floor.

"On the morning of June 16 the substation and machinery installed in it at Berlin Heights were very badly damaged by fire. This loss, however, was covered by insurance. In order that the service might not be affected a temporary floating substation was placed in service. The damaged building was rebuilt, contracts were made for new electrical equipment to take the place of that damaged and the delivery of same was made late in December.

"In order to furnish current from the high-tension lines for the Bellevue lighting plant, two 250-kw frequency changers, with three 185 kw transformers, complete new switchboard and other necessary equipment, were purchased. One 25-kw transformer was installed in the substation at Hessville for the purpose of furnishing power for lighting to the village of Lindsay. One 25-kw transformer was installed in the substation at Dover Bay for the purpose of furnishing lighting service to the village of Bay.

"Five double-truck passenger cars for use in Sandusky were purchased. These cars are of the cross-seat type, equipped with Brill trucks, Westinghouse motors and air brakes. One Thew automatic electric shovel was purchased for use in new construction and trestle filling work. A new 100-hp Ideal boiler was installed in the shops at Sandusky for the purpose of heating the carhouse and shops.

"On Feb. 7, 1913, rights of the company over the County bridge across Black River at Lorain were extended for twenty-five years. On March 24, 1913, the franchise over the Huron River bridge at Huron, on Columbus Avenue from the Soldiers' Home to Sandusky city limits, and on

Hancock Street from the Soldiers' Home to Sandusky city limits, were renewed for twenty-five years. On Dec. 9 the company's franchises in Fremont were extended for twenty-five years.

"In accordance with the sinking fund provision of the first consolidated mortgage of 1923, there was acquired during the past year and delivered to the Citizens' Savings & Trust Company, Cleveland, Ohio, trustee, $10,000 of bonds for cancellation, making $60,000 bonds canceled in all, and leaving the total amount of bonds outstanding $1,690,000.

"The March flood caused heavy losses to the company through loss of business and damage to property. This was particularly true on the Toledo division, the power plant and shop at Fremont being out of service for nearly two weeks. On account of the severe snow and ice storm beginning Nov. 9, the Cleveland division was practically out of service for a period of three days thereafter. These cessations of service not only caused a severe loss in business but also largely increased the operating charges of the company."

The comparative statement of gross earnings and operating expenses of the Lake Shore Electric Railway for the years 1913 and 1912 as contained in the report is as follows:

	1913	1912
Gross earnings	$1,119,312	$1,052,518
Operating expenses and taxes	670,605	605,063
Net earnings	$448,707	$447,455
Other income	25,000	25,000
Surplus	$473,707	$472,455
Interest paid	324,697	322,701
Net surplus	$149,010	$149,754

During the year 1913 the operating ratio of The Lake Shore Electric Railway was 59.91 per cent as compared to 57.49 per cent in 1912. The number of car miles decreased from 3,333,070 to 3,303,012. The income per car mile rose from 31.58 cents to 33.89 cents, which, although the operating expenses and taxes increased 2.15 cents per car mile, was sufficient to give an increase of 0.16 cents in net earnings per car mile, or 13.59 cents. Passengers carried in 1913 were 5,647,440 as compared to 5,366,013 in 1912.

The comparative earnings and expenses of the Lorain Street Railroad for 1913 and 1912 were as follows:

	1913	1912
Gross income	$196,947	$179,249
Operating expenses and taxes	118,216	105,624
Net earnings	$78,731	$73,625
Interest paid	64,500	64,500
Net surplus	$14,231	$9,125

Comparative statistics of the Lorain Street Railroad for the years 1913 and 1912 as contained in the report include the following:

Operating ratio in 1913, 60.03 per cent; in 1912, 58.92 per cent. Car miles in 1913, 651,201; in 1912, 648,170. Income per car mile in 1913, 30.24 cents; in 1912, 27.65 cents. Operating expenses and taxes per car mile in 1913, 18.15 cents; in 1912, 16.29 cents. Net earnings per car mile in 1913, 12.09 cents; in 1912, 11.36 cents. Passengers carried in 1913, 3,399,490; in 1912, 3,034,318. Earnings per passenger in 1913, 5.80 cents; in 1912, 5.91 cents.

The earnings and expenses of the Sandusky, Fremont & Southern Railway for 1913 as compared with the previous year follow:

	1913	1912
Gross income	$75,723	$70,116
Operating expenses and taxes	48,675	44,133
Net earnings	$27,048	$25,983
Interest paid	32,250	32,250
Deficit	$5,202	$6,267

During 1913 the operating ratio of the Sandusky, Fremont & Southern Railway increased from 62.94 per cent to 64.28 per cent. Car miles increased from 239,299 to 240,455; income per car mile from 29.30 cents to 31.49 cents; operating expenses and taxes from 18.44 cents to 20.24 cents, and net earnings per car mile from 10.86 cents to 11.25 cents. Passengers carried increased from 311,620 to 349,710, but earnings per passenger dropped from 21.80 cents to 20.53 cents.

Pennsylvania Electrification Plans

The sixty-seventh annual report of the Pennsylvania Railroad for the year ended Dec. 31, 1913, contains the following statement in regard to electrification by the company:

"To relieve congestion by increasing the yard and track capacity at Broad Street Station, Philadelphia, the electrification of the main line to Paoli for suburban passenger trains is under way and will be followed by the electrification of the New York division to North Philadelphia and thence to Chestnut Hill. About 1 mile of overhead construction on the main line has been completed between Radnor and St. Davids, which will enable the company to decide by actual tests the type of overhead construction best adapted to its train service.

"In keeping with the policy of the company to promote efficiency and economy in operations, the management has been considering the advisability of electrifying that portion of the main line between Altoona on the foot of the eastern slope and Conemaugh on the western slope of the Allegheny Mountains, a distance of about 35 miles, where there is a frequent and heavy train movement over heavy grades. From preliminary estimates, it would appear that a saving would be effected which would compensate the company for making the expenditure, but the subject must still receive much further examination and is also largely dependent upon an improvement in the revenues of the company to warrant raising the new capital required for this project."

During the year the Fourth Street passenger station at Harrison, N. J., was completed and placed in operation on the Newark rapid transit line.

According to the report the operating revenue of the Long Island Railroad for the year ended Dec. 31, 1913, was $12,879,967 and the operating expenses, including taxes, were $10,187,747, leaving a total income of $2,692,220. Other income amounted to $559,867 and interest and other charges to $4,239,072, giving a deficit of $977,984.

Purchase-Money Mortgage Disapproved by the New Jersey Public Utility Commission

The plan of the Public Service Railway, Newark, N. J., to pay for thirty-five cars by the issuance of a purchase-money mortgage for $200,000 has been disapproved by the Board of Public Utility Commissioners of New Jersey. The board based its findings on the fact that the proposed issue would not constitute in reality a purchase-money mortgage and, therefore, the holders of the bonds should not be permitted to acquire a right to which they are not properly entitled.

The thirty-five cars proposed to be subjected to the mortgage are now the property of the company and were not purchased by it. The motor equipment was bought by the company from outside sources. The cars, however, were constructed by the company in its own shops by men engaged in general repair work and through use of the same plant and equipment which the company maintains for the repair of its cars. The commission stated that its investigation showed that the company had through the construction of the cars in its own shops effected a material saving and that the cars in question considerably exceeded in value the sum of $200,000. This sum the company would be entitled to capitalize.

Commenting upon this situation, the Board of Public Utility Commissioners said in part:

"The cost of material, work and labor involved in such construction has been met by the company out of available funds. It is now indebted to no one on account thereof. The purpose of the proposed mortgage and issue of bonds thereunder is to capitalize the expenditures so made and in such capitalization to create a debt which does not now exist. Clearly a mortgage cannot under such circumstances be said to be a purchase-money mortgage, or have the effect of such a mortgage. Some other method of capitalizing the expenditures which were made in the construction of these cars must therefore be devised by the company."

J. P. Morgan & Company and the New Haven

On March 9, 1914, J. P. Morgan & Company, in response to a request from Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad, issued a detailed record of all the transactions between that road and the Morgan banking house during the last twenty years. The record shows that the firm participated in the handling of $333,082,803 in securities of the New York, New Haven & Hartford Railroad and its subsidiaries. On these transactions the Morgan house realized a net profit of $350,265, after taking count of losses incurred on the resale of some of the securities purchased from the railroad.

The correspondence with Chairman Elliott is made public in full by J. P. Morgan & Company. It sets forth that neither the firm of J. P. Morgan & Company nor any of its members ever had any interest in the New York, Westchester & Boston Railway, the steam railways, electric railways, or steamship companies acquired by the railroad or any of its subsidiaries, with the exception of a small interest which the late J. P. Morgan had in a wharf and terminal company.

The report contains a copy of "Account No. 2," which details in a general way the lending of $11,155,000 of New Haven money to the Millbrook Company for the purchase of the New York, Westchester & Boston Railway. The ledger account, however, being unsupported by journal explanations, gives no definite information concerning the debits and credits, and it does not show what finally became of the $11,155,000 of New Haven money after it had been paid over to Oakleigh Thorne and Marsden J. Perry, the promoters of the Millbrook Company.

The examiners of the Interstate Commerce Commission are gathering information for the public investigation of the New York, New Haven & Hartford Railroad, recently ordered by the United States Senate. The scope of the inquiry will not only embrace the circumstances by which the New York, Westchester & Boston Railway was taken over by the New Haven, but also the details of the acquisition of electric railways in Massachusetts, Connecticut and Rhode Island, and various steamship corporations.

In a statement which he made at Boston on March 10, Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford Railroad, said that an expert accountant was at work upon the company's books preparing a statement which will show "where every dollar of the $175,000,000 of new capital raised from 1903 to 1913 has gone." He intimated that the results of the investigation would be given to the public and to the newspapers.

Compliance with I. C. C. Accounting Rules

The decision recently rendered by the Interstate Commerce Commission in the case of the Chicago, Milwaukee & St. Paul Railway and its subsidiary, the Chicago, Milwaukee & Puget Sound Railway, although dealing primarily with steam lines, is of general interest to interstate electric railways as indicating the attitude of the commission toward compliance with its prescribed accounting rules and regulations. In reviewing the history of its classifications the commission states that practically all carriers subject to the act have manifested a cheerful acquiescence in the rules of the commission and a spirit of co-operation, but that in some instances there have been serious departures from the prescribed regulations.

In 1905 the Chicago, Milwaukee & St. Paul Railway began construction of a line to the Pacific Coast. Under the accounting rules of the commission it was permitted to include in its accounts a proper revenue for transportation, rents for equipment and other facilities used in the construction of this road, as well as interest on the funds advanced. Instead of doing this periodically, however, the railway included in its income accounts for 1910 all the interest, rents and revenues assignable to the period prior to July 1, 1909, a total of $4,600,000, thus overstating its income for 1910. The next year there was an apparent falling off of $2,000,000 in income, which the company in its annual report stated was due to the inability to obtain increased rates and the great increase in the cost of labor. Investigation of the commission, however, based on the company's own figures, showed that expenditures for labor were $50,000 less than during the previous year. Another point of criticism of the Chicago, Milwaukee & St. Paul Railway was that, having established a percentage of depreciation of equipment of 1½ per cent a year, it began on Jan. 1, 1913, to set up a charge of only 1 per cent. This reduction meant an inflation of net income of $500,000 a year. This depreciation rate, omitting the annual salvage, gave the equipment of the company an estimated life of approximately 100 years, a position which the commission stated was wholly indefensible and unjustifiable.

The commission also condemned the delinquencies in the accounting of the Chicago, Milwaukee & Puget Sound Railway, stating that large amounts included in the cost of the construction of the road should have been entered as expenses of operation, and that net income was overstated by including in the cost of construction interest items accruing after the road was open for public service. Moreover, revenues were overstated by including charges for transportation of construction material at rates higher than those exacted under published tariffs. No charges whatever were set up for depreciation of equipment. If these different items had been carried to the books, the commission stated that the income of the company for its first year, reported at $2,250,440, would have been practically eliminated.

After reviewing these facts the commission made a statement in part as follows in regard to its future attitude concerning accounting delinquencies:

"We have regarded the interval since the promulgation of the earlier and more important classifications as a formative period, during which we have not invoked the penalties of the law against carriers and their officials for errors and failures to observe our rules and regulations. This period, however, must now be considered as having come to an end, and we shall hereafter expect a more exact observance of the prescribed system. Accounting officers understand the true functions of accounts, but in many instances they have not been left free to follow their natural inclinations. Their hands or the hands of ones immediately under their authority, however, make the wrongful record, and it is they whom the commission will first hold responsible when it becomes necessary to invoke the penalties of the law. We shall not hesitate, however, to call to account with even greater severity higher officers who share in the responsibility for any violation of the accounting rules."

Competitive Public Sale of Bonds Successful

Bids aggregating $18,872,000 were received from fifty bidders for the $4,000,000 of first refunding 4 per cent bonds of the Third Avenue Railway, New York, N. Y., offered direct to the public on March 10, 1914. The successful bidders were Clark, Dodge & Company and J. & W. Seligman, bidding jointly; Bernard Baruch, George Ehret, Seasongood & Haas and Lazard Frères. They took the entire issue at an average price netting the company 83.0437. The individual bond awards showed that $1,506,000 went to Lazard Frères at 82.815; $1,000,000 to Bernard Baruch at 83.53; $1,000,000 at 83 to J. & W. Seligman & Company and Clark, Dodge & Company, the joint bidders; $450,000 to Seasongood & Haas at 82.83, and to George Ehret $44,000 at 83. Other bids were $400,000 in lots of $50,000 each at prices ranging from 82¼ to 82⅛, $600,000 at 80.333, $100,000 in lots of $10,000 ranging from 82½ to 81⅝, $100,000 at 82¾, $100,000 at 79 and $100,000 at 81. There were many miscellaneous bids, ranging in amount from $3,000 to $50,000, at prices from 82.27 to 77.26.

F. W. Whitridge, president of the company, said: "I am pleased down to the ground. I sold my bonds at a better price than I expected and at a better price than I could otherwise have received."

Report of Board of Railroad Commissioners of Iowa

The thirty-fifth annual report of the Board of Railroad Commissioners of the State of Iowa just published contains the decisions of the board during the year 1912 on important interstate rate cases and cases involving other points, together with general financial and operating returns for various public utilities under the jurisdiction of the commission. Comparative statistics are presented for steam railroads, electric interurban railways, terminal and bridge companies, showing the annual figures for mileage earnings, expenses, employees' accidents, etc., from 1878 to 1912, inclusive. The financial statements are given for the year ended June 30, 1912. For the year 1912, gross earnings from operation for electric interurban railways in Iowa amounted to $1,823,191; operating expenses, $1,272,340; net earnings from operation, $550,851; net earnings per mile, $1,607; outstanding stock, $16,225,905; outstanding bonds, $13,272,544.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—It is reported that by an agreement of claimants for liens on the Alton, Jacksonville & Peoria Railroad reached at a conference at St. Louis on Feb. 24, 1914, all suits will be dismissed and an order for the sale of the road under foreclosure may be entered in the Madison County Circuit Court. There are mortgage claims of $600,000, receiver's certificates of $100,000 and other liens of $60,000. It is reported that the creditors have agreed to take securities in the reorganized company, and that the line will be purchased by the Clark interests of Philadelphia, a tentative proposition from these interests having been made and considered acceptable by the creditors. J. J. Cummings, Chicago, Ill., holder of the $100,000 of receiver's certificates, has resigned as a member of the bondholders' committee in order to take up the matter of the reorganization of the road.

American Cities Company, New York, N. Y.—At the annual meeting of the stockholders of the American Cities Company on March 9, 1914, the retiring directors were re-elected with the exception of Harry Bronner and Maurice Stern, who were succeeded by Marshall J. Dodge and G. G. Westfeldt.

Berwick & Nescopeck Street Railway, Beaver Falls, Pa.—On Feb. 27, 1914, Judge S. J. Straus, Wilkes-Barre, Pa., dismissed the injunction brought by A. C. Sickles to restrain the foreclosure of the mortgage of the Berwick & Nescopeck Street Railway by the Wyoming Valley Trust Company. The plaintiff asserted that if the lines were properly managed it would not be necessary to foreclose the mortgage, but the court decided that the plaintiff had failed to establish his case. The financial management of the road, however, was criticised, it being stated that a little over a mile of road was represented by $100,000 in stock and $43,500 in bonds.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission for the Second District of New York recently took action ratifying the pledging by the Buffalo & Lackawanna Traction Company of $100,000 of its first mortgage 5 per cent twenty-year gold bonds with the Columbia National Bank, Buffalo, N. Y., as collateral security for a loan of $75,000.

Capital Traction Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia has authorized the Capital Traction Company to sell $350,000 of 5 per cent bonds for the purpose of providing funds for improvements and extensions to property. The bonds are the unsold balance of the $6,000,000 issue of June 1, 1907, which was authorized by Congress.

Chicago & Milwaukee Electric Railway, Highwood, Ill.—Judge Geiger in the United States District Court at Milwaukee on Feb. 27, 1914, ordered the resale of the Wisconsin division of the Chicago & Milwaukee Electric Railway and denied the petition of John Griffiths, who holds about $200,000 of stock, to intervene to become a party to the suit to prevent the reorganization committee from being permitted to bid at the next sale. Judge Landis of the federal court in Chicago has announced that he will set a date for the sale of the Illinois division coinciding with that which may be set by Judge Geiger for the sale of the Wisconsin division. At the former sale, which was set aside by the court after a plea of suppression of bids had been made by some of the creditors, the Illinois division sold for $1,600,000 and the Wisconsin division for $1,650,000. The property was bid in at that time by the reorganization committee representing the bondholders.

Cumberland (Md.) Electric Railway.—A bill has been introduced in the Legislature authorizing the consolidation of the Edison Electric Illuminating Company, Cumberland, and the Cumberland Electric Railway. At present the companies have a combined capital of $150,000. The bill authorizes the consolidated company to issue $1,000,000 of common stock in exchange for the present shares.

Des Moines (Ia.) City Railway.—The Illinois Trust & Savings Bank, Chicago, Ill., as mortgage trustee, on Feb. 28, 1914, brought suit in the United States District Court to restrain the city authorities of Des Moines from ousting the Des Moines City Railway from the streets, on the ground that it is operating under a perpetual grant from the city.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—An application from the Dry Dock, East Broadway & Battery Railroad for the approval of a mortgage and the issue of $2,800,000 in bonds failed of approval recently, at a meeting of the Public Service Commission for the First District, by a tie vote.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York heard on March 9, 1914, the application of the Harrisburg Light & Power Company for permission to purchase from the Elmira Water, Light & Railroad Company 3146 shares of its preferred capital stock of the aggregate par value of $314,600 and 3476 shares of the common stock of the Elmira company of the aggregate par value of $347,600, and to pay therefor the sum of $500,000. William M. Clark, of the firm of Beekman, Menken & Griscom, New York, explained that the main purpose in view was a matter of investment, but a secondary consideration was the gradual liquidation of the obligations of a certain holding company. After considerable discussion it was decided that further information and data pertaining to the companies involved should be produced at Albany on March 16, 1914, and acted upon as a supplemental petition to that heretofore filed.

Galveston-Houston Electric Company, Galveston, Tex.—Stone & Webster, Boston, Mass., state that the entire issue of $1,000,000 of Galveston-Houston Electric Company common stock offered to stockholders at par has been subscribed for. Rights to subscribe to this stock expired with a bid price equivalent to 106.9 for the stock, carrying a semi-annual dividend of 3½ per cent payable on March 16, 1914.

Lake Shore Electric Railway, Cleveland, Ohio.—The Public Utilities Commission of Ohio on March 6, 1914, authorized the Lake Shore Electric Railway to issue general mortgage 5 per cent gold bonds of the aggregate principal sum of $70,000, the bonds to be sold for the highest price obtainable but not for less than 85 per cent of the par value. The proceeds from the sale are to be used to reimburse the income account for expenditures made therefrom during the year ended Dec. 31, 1913, for the construction of additions, extensions, improvements and betterments to the railroad system.

Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.—The Little Rock, Pine Bluff & Eastern Traction Company has an option on the Argenta Railway with the end in view of making that line part of its proposed interurban system.

Metropolitan Street Railway, Kansas City, Mo.—A protective committee, composed of J. B. Dennis, J. J. Storrow, P. M. Warburg and W. K. Wigham, has been formed in the interests of the holders of the 5 per cent mortgage gold bonds of the Central Electric Railway, which is owned by the Metropolitan Street Railway. These bonds mature on May 1, 1914, and are upon property also covered by certain issues of the Kansas City Railway & Light Company and the Metropolitan Street Railway. Holders of the bonds are requested to deposit them, on or before April 15, 1914, with the New York Trust Company, New York, N. Y., or with the Old Colony Trust Company, Boston, Mass.

Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va.—A mortgage has been filed with the Maryland Trust Company, Baltimore, Md., as trustee, by the Newport News & Hampton Railway, Gas & Electric Company to secure an issue of $7,500,000 of bonds. As noted in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914, this is a consolidated company including the Newport News & Old Point Railway & Electric Company, the Citizens' Railway, Light & Power Company, the Hampton

Roads Traction Company, the Hampton, Phoebus & Fort Monroe Gas Corporation and the Newport News Gas Company.

New York, Westchester & Boston Railway, New York, N. Y.—The New York, Westchester & Boston Railway has applied to the New York Stock Exchange to list $1,290,000 additional first mortgage 4½ per cent guaranteed bonds, Series "I," due 1946.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—W. Arnstein, president of the Oakland, Antioch & Eastern Railway, has issued a circular, in part as follows, in reference to a recent assessment on the stockholders of $4 per share: "In a circular letter of Aug. 12, 1913, it was stated that if in addition to the assessment of $5 per share then levied $1,000,000 of bonds could be sold, the railway would be put in a strong financial condition. Unfortunately the bond market remained very depressed and only $540,000 of bonds were underwritten by the shareholders. It was therefore necessary to raise part of the money needed by a $4 assessment, the balance to be raised by a short-term note issue of $700,000 secured by deposit on $1,167,000 of bonds of the Oakland, Antioch & Eastern Railway." On Feb. 6, 1914, the Railroad Commission of California issued a supplemental order approving the detailed engineering data and specifications for the additions and betterments and equipment to be acquired from the sale of $500,000 of first mortgage 5 per cent thirty-year bonds. The original order, referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914, provided that the bonds, while approved, should not be sold until the engineering data and specifications had been examined.

Pennsylvania Railroad, Philadelphia, Pa.—The Pennsylvania Railroad stockholders, at their annual meeting on March 10, 1914, authorized the board of directors to create a mortgage under which bonds may be issued in such amounts and at such times as may be required properly to finance the company. The mortgage is to cover "the whole or such portions of its railroad, property and franchises as the directors may authorize," and the aggregate amount of the bonds "at any time outstanding shall not exceed the par value of the then outstanding capital stock of the company."

Pittsburgh & Butler Street Railway, Pittsburgh, Pa.—Governor Tener of Pennsylvania has approved the action of the Public Service Commission of Pennsylvania on March 9, 1914, granting the petition for a merger of the Pittsburgh & Butler Street Railway and the Butler Passenger Railway.

Porto Rico Railways, Ltd., Ponce, P. R.—The Porto Rico Railways, Ltd., has just issued £65,000 of additional refunding general mortgage 5 per cent bonds, making a total of £265,000 outstanding.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—E. W. Clark & Company, Philadelphia, Pa., former managers of the St. Joseph Railway, Light, Heat & Power Company, have issued a statement to the effect that the Cities Service Company has made a payment of $15 a share on the common stock of the former company to March 1, 1914, together with interest on the unpaid amount of the purchase price. This payment is ready for distribution pro rata to holders of deposit certificates. A deduction of $1 a share is made to reimburse the bankers for services in connection with the sale of the property to Henry L. Doherty & Company. The distribution, therefore, including interest to March 1, 1914, will amount to $15.75 a share.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—On Feb. 26, 1914, the California Railroad Commission was petitioned by John S. Drum and W. I. Brobeck to authorize the San Francisco-Oakland Terminal Railways to issue and pledge $1,000,000 of five-year 5 per cent bonds as additional security for $2,500,000 of notes issued by the Oakland Railways in 1912 and now due as extended, Sept. 14, 1913, and also for a new issue of $500,000 of 7 per cent notes due Sept. 12, 1914. It is reported that these notes have been subscribed for by a syndicate of local bankers at par, and that the proceeds are to be used to replace money taken from income for capital expenditures and for other capital investment immediately necessary. Commissioner John M. Eshelman said that approval of this additional issue must not be construed as an approval of outstanding issues and that a complete refinancing plan should be presented to the commission as soon as possible. The decision was taken under advisement, with the understanding that more complete details of how the money was to be expended would be furnished. Protests were filed on behalf of stockholders of the San Francisco-Oakland Terminal Railways and owners of bond certificates of the United Properties Company.

Southern Traction Company of Illinois, East St. Louis, Ill.—Following the failure of efforts to float a large bond issue with the Ethelburga Syndicate of London, England, receivers were appointed on March 6, 1914, in Danville, Ill., for the Southern Traction Company of Illinois. The receivers are former Senator William Lorimer of Chicago, John A. Hamilton of Marissa, Ill., and W. E. Crane of St. Louis. The application for the receivership was made by former Governor J. Y. Sanders of Louisiana, representing the construction company that furnished the funds to build the line from East St. Louis to Belleville and the portion completed beyond Belleville. The road has been building for the last seven years, hauling passengers by electricity and planning to use steam for the purpose of moving freight.

Third Avenue Railway, New York, N. Y.—The holders of the fifty-year adjustment mortgage income bonds of the Third Avenue Railway have been notified that the United States Mortgage & Trust Company, trustee, will pay the semi-annual instalment of interest of 2½ per cent, due on April 1, 1914, on that date at the office of the trust company upon presentation and surrender of coupon No. 3.

Union Traction Company of Indiana, Anderson, Ind.—At the annual meeting of the stockholders of the Union Traction Company, held on March 3, 1914, all the directors were re-elected with the exception of J. Levering Jones, Philadelphia, who was succeeded by Courtland Van Camp, Indianapolis.

United Railroads, San Francisco, Cal.—Arrangements have been made for the United Railroads of San Francisco to extend until Dec. 31, 1914, the unpaid $600,000 of the $650,000 of Ferries & Cliff House 6 per cent bonds which matured on March 1, 1914, and were called for delivery at the Anglo-London & Paris National Bank and the office of N. W. Halsey & Company, as noted in our issue of March 7, 1914. No public offering will be made of the extended bonds as the present holders will be permitted to join with the bankers in carrying the bonds for the extended period. The property covered by these bonds formerly carried $1,700,000 of first mortgages. It is expected that the extended bonds will be paid off at maturity out of earnings for 1914. The Park & Cliff House Railway 6 per cent bonds, amounting to $350,000, were canceled by the company on Jan. 14, 1913.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—Application has been made to list the securities of the Washington, Baltimore & Annapolis Electric Railroad on the Washington Stock Exchange.

Washington Railway & Electric Company, Washington, D. C.—A quarterly dividend of 1¾ per cent was paid on March 1, 1914, on the $6,500,000 of common stock of the Washington Railway & Electric Company to holders of record of Feb. 13. This compares with 1½ per cent paid in June, September and December, 1913, with 1 per cent extra in December.

West Virginia Traction & Electric Company, Wheeling, W. Va.—Ten bonds issued under a mortgage made by the Wheeling & Elm Grove Railroad and dated March 1, 1898, were paid by the West Virginia Traction & Electric Company on March 2, 1914, at the office of the Germania Half Dollar Savings Bank, Wheeling, W. Va.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—The Wisconsin Supreme Court recently sustained the State Railroad Commission by upholding the indeterminate permit law in the suit of the Wisconsin Traction, Light, Heat & Power Company against the city of Menasha. The city, which had been furnishing its own street lighting service for some time, began to do a regular commercial lighting business in competition with the plaintiff and without the necessary authority of a certificate of convenience and necessity. The Supreme Court, reversing the lower court, held that a municipality as well as a private corporation would be obliged to secure a certificate from the State Railroad Commission showing that public convenience required the proposed service.

Dividends Declared

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Chicago (Ill.) City Railway, quarterly, 2½ per cent.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¾ per cent.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, 3 per cent.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

West Penn Traction & Water Power Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILWAY, WHEATON, ILL.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$145,484	*$100,888	$44,596	$34,828	$9,768
1 " " '13	140,578	*90,967	49,611	32,065	17,547
7 " " '14	1,244,564	*776,888	467,675	238,196	229,479
7 " " '13	1,191,064	*685,613	505,451	224,531	280,920

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$75,568	*$83,790	$8,059	$15,473	†$23,533
1 " " '13	72,592	*68,042	4,550	12,531	†7,981
7 " " '14	617,934	*534,744	83,191	106,354	†23,163
7 " " '13	589,959	*524,047	65,912	87,585	†21,673

CONNECTICUT COMPANY, NEW HAVEN, CONN.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$613,199	*$460,336	$152,863	$88,374	$64,489
1 " " '13	592,924	*452,771	140,153	86,495	53,638
7 " " '14	5,027,512	*3,573,768	1,453,744	625,527	828,217
7 " " '13	4,687,123	*2,179,084	1,508,040	605,892	902,148

DETROIT (MICH.) UNITED RAILWAY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$972,275	$682,844	$289,431	$176,765	$112,666
1 " " '13	1,005,366	677,776	327,570	178,500	149,070

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$22,612	*$24,129	$1,516	$7,801	†$9,317
1 " " '13	23,448	*23,704	256	7,327	†7,584
7 " " '14	233,031	*179,723	53,309	53,893	†584
7 " " '13	229,457	*203,710	25,747	49,391	†23,644

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$32,375	*$49,867	$17,492	$9,226	$26,718
1 " " '13	29,478	*45,488	16,010	13,992	30,002
7 " " '14	256,216	*345,873	89,656	64,866	154,522
7 " " '13	175,868	*328,686	152,818	87,942	240,760

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$257,978	*$152,278	$105,699	$43,089	$62,610
1 " " '13	244,341	*148,566	95,775	45,816	49,958
12 " " '14	3,001,307	*1,847,676	1,163,631	533,538	630,093
12 " " '13	2,710,158	*1,633,306	1,076,852	529,986	546,866

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$431,160	*$350,635	$80,525	$109,389	†$28,864
1 " " '13	433,461	*292,915	140,545	102,056	38,489
7 " " '14	3,326,446	*2,372,088	954,358	747,857	206,501
7 " " '13	3,266,188	*2,077,832	1,188,357	714,390	473,967

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$746,309	$412,638	$336,671	$232,436	$101,235
1 " " '13	690,510	375,758	314,753	238,117	76,636

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Dec., '13	$457,372	*$216,658	$240,715	$135,435	$105,280
1 " " '12	424,422	*196,322	228,099	123,166	104,933
12 " " '13	2,666,244	*1,313,156	1,353,089	802,818	550,271
12 " " '12	2,488,442	*1,207,977	1,280,465	741,793	538,672

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Jan., '14	$17,528	*$21,226	$3,698	$1,164	†$4,862
1 " " '13	17,487	*20,778	3,291	925	†4,216
7 " " '14	154,684	*149,692	4,992	7,580	†2,588
7 " " '13	145,883	*149,327	3,444	5,768	†9,212

*Includes taxes. †Deficit.

Traffic and Transportation

New Transfer System for Brooklyn

The Public Service Commission for the First District of New York on March 6, 1914, ordered the Brooklyn Rapid Transit Company to put in force a new transfer system which will add 287 places to those at which it was already possible to transfer free from one car to another. There will now be 1008 transfer points, and it is asserted by the traffic experts of the commission that it will be possible to go from any point in the borough to any other point for a single fare, without walking more than two long or four short blocks.

The railway was not satisfied with the plan worked out by the commission and submitted an alternative, which provided transfers between the cars of the Coney Island & Brooklyn Railroad and those of the Brooklyn Rapid Transit lines, retained the feeder privileges and existing feeder lines, but did not provide some additional feeder lines, connecting feeders and feeder privileges desired by the commission. It was unanimously decided by the commission, however, to insist on its own scheme.

The system of transfers as finally adopted includes a transfer privilege between all lines of the company, including the recently absorbed Coney Island & Brooklyn Railroad, at every point of intersection. Besides the one transfer, a second transfer is provided by means of the establishment of feeder lines and connecting feeders, notably Fulton Street and Church Avenue. Altogether there are twenty-two feeder lines and fifteen connecting feeders thus created. The only exceptions to the transfer privilege are a few intersections where a round trip would thus be made possible.

A feeder line may be defined as a line upon which a passenger upon starting gets a ticket which entitles him to a transfer. In the case of a passenger getting on a car by a transfer, he would always be entitled to a ticket for any intersecting feeder line.

A connecting feeder may be distinguished from the above only in that it is a line upon which a passenger who presents a ticket is entitled to a continuing trip ticket. A connecting feeder line would be the second of three lines one traveled on, while an ordinary feeder would either be the first or the third.

It is expected that the formal order of the commission will require the adoption of the new system by May 1, 1914. The company has not announced whether or not it will accept the order.

Letters to Team and Automobile Owners

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, page 561, of the letters addressed by the Northern Ohio Traction Company, Akron, Ohio, through E. H. Clindinst, supervisor of safety, to owners of teams and of automobiles asking that they cooperate with the company to secure the greatest possible degree of safety to themselves and others while on the streets. The letter to team owners follows:

"Every effort to promote safety in the city streets is of direct importance to you as it also is to us. Every careless act, by whomsoever committed, is a menace to life and to property.

"We believe you are interested, both from humanitarian motives and the preservation of your own teams and vehicles from damage, in eliminating so far as possible every chance of accident. That is exactly our position. We are striving constantly among our own employees to the end that they shall obey every rule, have every regard for the rights of others and that they do not 'take chances.' They are expected to keep mind and muscles alert to prevent accidents.

"Your co-operation is of utmost importance if the best results are to be obtained. Will you give it? Will you urge your teamsters or drivers to avoid taking chances and to use all reasonable care at all times? Every man of them is playing an important part in the movement of the enormous business and traffic that uses the streets. Every man of them should respect the duties and responsibilities of the other fellow. The street car man who unnecessarily delays or obstructs other vehicles is wronging himself and many others. Just so, too, does the driver whose wagon unnecessarily delays the street cars do a wrong to the riders in that car. Your own customers may be among them.

"It is a case of 'pull together' if we are to avoid these things. If we do this, very much can be accomplished. Your interests and our own are so nearly identical we confidently count on your aid and the entire public will be the gainer.

"SAFETY FIRST. It is far better to be safe than sorry."

The letter addressed by the company to automobile owners follows:

"Your interests as a citizen and as an automobile owner are so identical with our own as regards avoidance of accidents that we offer a suggestion.

"Our car men are earnestly and frequently cautioned and instructed to think of safety first, to keep their cars under control, to have every regard for the rights of others. There is no doubt this work is productive of good results.

To be sure accidents will sometimes occur, and the purpose of this letter is to appeal to your own good judgment and to your personal interest to the end of having your co-operation in reducing accidents to the lowest possible minimum.

"Will you not think carefully of this, instruct your drivers to use all possible care and caution every member of your family, yourself included, as only by watchfulness and the barring of every unnecessary risk can the chance of accident be avoided?

"With the coming of fall and winter weather and dangerous street conditions, the necessity of thoroughly efficient brakes is more than ever apparent. The danger from skidding is also greater in these seasons. Very many 'dont's' with all of which you are familiar, if you but call them to mind, might be mentioned. 'Don't take chances' is the chief of them.

"The co-operation we solicit is vitally necessary if results are to be as you would yourself wish to have them. All concerned, and this includes the entire public, will appreciate your aid."

"Don'ts" Addressed to Subordinate Officers of Fort Dodge, Des Moines & Southern Railroad

C. E. Carson, superintendent of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., has compiled the following list of "Don'ts" to be used, not by the men under him, but by his fellow officers:

"Don't nag. Many a good man has been nagged into inefficiency.

"Don't humiliate a man by advertising his shortcomings from the housetops, but quietly point them out to him. He will lose an arm for you.

"Don't treat your men as if they belonged to the kindergarten class. Chances are they are better posted than you are.

"Don't be afraid to compliment an employee for some commendable service. He is made of precisely the same kind of stuff that you are.

"Don't forget that if the subordinate had as much gray matter as you have he might be holding your job. Try to be bigger than any man on your payroll.

"Don't forget that where some of your men may be making mistakes that cost dollars, you may be costing the company thousands of dollars by pursuing a mistaken policy.

"Don't forget that a man who will stand for a 'cussing' because of some mistake or oversight is not the kind of a man who is able to help your administration. He should be fired.

"Don't forget that while you are checking everybody else up it might be a good thing for the company you represent to make a careful inventory of yourself. You may be twenty-five years behind the times.

"Finally, let each action be sweetened by a little of the milk of human kindness. It will cause you to have pleasant recollections after you have been laid on the shelf and enable you to look your old associates in the company in the eyes."

Sunday Operation in London, Ont.—An agitation that has been conducted in London, Ont., resulted on Feb. 22, 1914, in the installation of a Sunday service within the city limits on the London Street Railway.

Fare and Service Complaint in Buffalo.—Complaint against the rates and service of the International Railway, Buffalo, N. Y., has been filed with the Public Service Commission of the Second District of New York by the Progressive Club, which desires the commission to inquire into the advisability of ordering the company to reduce its fares during rush hours.

Folding Doors on Chattanooga Cars.—The Chattanooga Railway & Light Company, Chattanooga, Tenn., has decided to equip its cars with folding doors at entrances. As soon as the 100 or more cars of the company can be renovated so as to conform to this change, every car on all lines will be operated in such a way that no one can board or leave a car while it is in motion.

Draft of Michigan Uniform Rules Completed.—The first draft of the proposed uniform rules and regulations for the operation of electric railways in Michigan has been practically completed by the special committee of operating officials and will be presented to officials of the various companies and the members of the Michigan Railroad Commission at a meeting to be held in Detroit on March 18, 1914.

Commutation Tickets to Be Discontinued.—The Railroad Commission of California has granted the application of the Glendale & Eagle Rock Railway, Glendale, Cal., to discontinue the sale of twenty-ride commutation tickets at 50 cents and to substitute in lieu thereof a regular fare of 5 cents. The special commutation ticket will be applicable, however, to children under the age of eighteen years.

New System of Signs in Buffalo.—E. J. Dickson, vice-president of the International Railway, Buffalo, N. Y., has announced a new system of signs for the cars of the company in Buffalo. Hereafter the destination of the near-side cars will be shown in large letters on the front transom of the center window at the front. The route number will be maintained on the right-hand window at the front, as heretofore.

Toronto Purchase Agreement to Be Submitted on March 30.—Mayor Hocken, of Toronto, Ont., announced on March 6, 1914, that the agreement between the city and the Toronto Railway for the purchase of the railway by the city would be ready for submission to the City Council on March 30, 1914. He explained that the delay in completing the agreement on the part of the company was due to its lawyers being engaged in Ottawa.

Car Gates a Precaution in Louisville.—The rules of the Louisville (Ky.) Railway, which refuses to permit prospective passengers to board cars after the gates have been closed and the car is in motion, have been upheld by Judge W. M. Smith, of the Jefferson Circuit Court at Louisville, who sustained a demurrer of the company to the petition of William Caufield, who sued for damages for injuries alleged to have been received while he attempted to get on a car after the gates had been closed.

Joint Traffic Agreements of California Roads.—R. M. Rodenbaugh, traffic manager for the Oakland & Antioch Railway, Oakland, Cal., has announced that a traffic agreement has been signed by the Southern Pacific, Santa Fé, Western Pacific and the Oakland & Antioch lines, providing for joint through freight service to all parts of the United States and to all points touched by the electric lines running out of Sacramento. An agreement has also been reached which will make it possible for persons living along the line of the Oakland & Antioch Railway to buy through tickets to any point.

Express Service in Albany.—The United Traction Company, Albany, N. Y., has established an express service on its Pine Hill line during the rush hours. James F. Hamilton, general manager of the company, in announcing the details of the service, said: "A plan similar to the one in Albany has worked very well in Schenectady. The Schenectady Railway some time ago put on two express cars from the works of the General Electric Company to the suburbs, and the service was so acceptable that eighteen cars are now running on the same schedule. Should the experiment with the Pine Hills line prove successful it will be extended to West Albany and other lines which are operated by the company."

Safety First Campaign in Buffalo.—Mayor Louis P. Fuhrmann of Buffalo, N. Y., sent to the Board of Aldermen recently the names of a committee appointed to co-operate with him in a "safety-first" movement. Among those on the committee is Thomas Penney, chief counsel of the International Railway, who, it is stated by the Mayor, will be the real directing force of the movement. The police record shows that forty-seven persons were killed and 1831 injured on public highways of Buffalo during the last year, and that the number of automobile accidents was 1042. The Mayor thinks that nearly all of the accidents which occurred were to some extent due to carelessness.

Boston Elevated Telegraphers Ratify Agreement.—The wage and working hours agreement reached recently between telegraphers on the rapid transit lines of the Boston (Mass.) Elevated Railway and the company has been unanimously ratified by the members of the union. An increase of 3 cents an hour in wages, dating from May 1, 1913, to March 14, 1914, has been granted, with an additional increase of 1 cent an hour after the latter date. The new wage scale will terminate on Sept. 14, 1915. About $72 in retroactive pay will be received by each of the thirty-four telegraphers in the company's service. The company is considering a plan to grant one day off in thirty to each man without loss of pay.

Team Work in Kansas City.—The transportation department of the Metropolitan Street Railway, Kansas City, Mo., recently arranged to hold monthly luncheons for the twenty-one heads of departments of the Metropolitan Street Railway, the Kansas City Railway & Light Company and its subsidiary companies. The luncheons are to be held at the Mid-Day Club in the Commerce Building on the first Saturday of each month. The meetings are chiefly to afford an opportunity for the discussion of topics affecting the company and for the exchange of opinions by department heads. While every department head is efficient in his own work, it was believed that his value to the company would be greatly enhanced if he could secure an insight into the workings of other departments, and the arrangements which have been made for the monthly luncheons followed.

Smokers to Be Ejected from Bodies of Chicago Cars.—Leonard A. Busby, president of the Chicago (Ill.) surface lines, has instructed conductors of the company to eject smokers from the body of the car when violations of the rules against smoking are brought to their attention. Mr. Busby said: "So long as smoking is permitted in one part of the car it is almost a physical impossibility to prevent some persons from taking advantage of the privilege and smoking elsewhere in the car. Only with constant vigilance and the co-operation of the public it is possible to prevent the spread of the smoking nuisance. It does not require a very strenuous exercise of imagination to learn that a 'half dead' smoke is the equivalent of at least two live ones, from an olfactory standpoint." The Council committee on health has prepared an ordinance to prohibit all smoking on cars, and has presented the measure to the City Council. Under the rules of the Council this ordinance will be held over until March 16, 1914, when final action will be taken.

Safety Cards in Language Study.—The principal of an evening school in Brooklyn has devised a method of safety co-operation that is attracting attention. This school has a large foreign enrolment and one of the most important lines of instruction is English. The principal therefore requested the bureau of public safety of the Brooklyn Rapid Transit System to supply his school with copies of its "danger" cards and warning signs. In this way foreigners seeking instruction in English have their attention forcibly called, for example, to the ordinance against spitting in public places and the orders of the Public Service Commission in regard to smoking in cars and on station platforms. The dashboard signs containing the injunction "Avoid accident—Wait until the car stops," are also included, and for those who may be poetically inclined, there is the poem by another school principal, telling how to get on and off a car in safety. The principals of one or two other evening schools have taken up the idea.

Ordinance Against Smoking in Atchison, Kan.—The City Council of Atchison, Kan., recently passed an ordinance against smoking on street cars. The Atchison Railway, Light & Power Company ordered smoking on cars stopped, but found itself unable to enforce the prohibition without an ordinance. The city authorities co-operated by passing the necessary measure. The case recalls that of the Metropolitan Street Railway, Kansas City, Mo., which eliminated smoking on the street cars a year ago or so ago. The public of Kansas City paid little attention to the order against smoking, and the company instructed its car crews to halt the cars as soon as a passenger began smoking. As soon as the smoker ceased the car resumed its journey. Later, cars were sidetracked when the public ignored the order regarding smoking. In Kansas City, however, the City Council took a hostile attitude and announced that the Metropolitan had no authority to prevent smoking. The officers of the company, however, held to their course, and the public finally acceded to the orders which had been issued regarding smoking.

Service Complaint Satisfied.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of residents of the village of Walden against the Orange County Traction Company alleging insufficient car service between Walden and Newburgh, overcrowded condition of cars at certain times and other matters pertaining to the general service of the company. After an investigation by Charles R. Barnes, inspector of the commission, it was found that because of the peculiar conditions affecting the operation of the line some of the conditions complained of could not be changed to meet the views of complainants and at the same time fully meet the requirements of travel during certain periods over portions of the line between Newburgh and Walden. Since the investigation the roadbed has been improved, waiting rooms have been established at Walden and Newburgh, double-truck cars have been put in operation between the points mentioned, a block signal system has been installed, through cars have been put in operation on Sundays and holidays during the summer season, and various other improvements have been established. All these changes have been received by the complainants with satisfaction.

Differences Regarding Entrance to Kansas City Settled.—The disagreement between the Metropolitan Street Railway, Kansas City, and the Kansas City & Western Railway, running to Leavenworth, Kan., has been settled by the leasing of the Kensington branch by the Metropolitan Street Railway. The interurban will continue to operate its cars over the line, but will not pick up city passengers. Heretofore residents of Kensington desiring to enter Kansas City, Mo., have paid 5 cents to the Kansas City & Western Railway and an equal amount to the Metropolitan Street Railway, which completed the trip. The Public Utilties Commission held that the trip from Kensington, which is in Kansas City, Kan., to the Missouri side should be made for one fare of 5 cents. The two companies disagreed as to the division of the 5-cent fare, and the Metropolitan Street Railway ordered the interurban to cease using its tracks after a certain date. The Metropolitan Street Railway tracks were necessary for the interurban to complete its trip into Kansas City. The trouble was settled when the interurban leased the Kensington branch to the Metropolitan Street Railway, which will get the entire fare and in return pay the Kansas City & Western Railway a fixed sum annually. The Metropolitan Street Railway probably will operate twelve-minute service over the Kensington branch, which will connect with the Central Fairmount line at Eighteenth Street and Central Avenue, Kansas City, Kan., and which will be operated under the universal transfer. The agreement went into effect on March 9. Following the settlement, the City Council of Kansas City, Kan., passed an ordinance requiring the Kansas City & Western Railway to stop its cars at the following points: Seventh and Central Avenue, Tenth and Central, Eighteenth and Central, Chelsea Junction, and Reidy Road.

Personal Mention

Mr. Jacob M. Vogdes has resigned as president of the St. Petersburg & Gulf Railway, St. Petersburg, Fla.,

Mr. D. Warren has been appointed master mechanic of the Cortland County Traction Company, Cortland, N. Y.

Mr. Charles C. Tennis, vice-president of the Pittsburgh & Butler Street Railway, Butler, Pa., is acting as general manager of the company.

Mr. R. E. Sprenkle, secretary and treasurer of the Pittsburgh & Butler Street Railway, Butler, Pa., is acting as purchasing agent of the company.

Mr. F. W. De Mart has been appointed chief engineer of the power station of the Altoona & Logan Valley Electric Railway, Altoona, Pa., to succeed the late James Honor.

Mr. Charles A. Edwards, of Huntington, Ind., assumed his duties as a member of the Indiana Public Service Commission March 1, taking the place of Mr. Frank E. Payne, of Jeffersonville.

Mr. L. B. Cramer, formerly connected with the Hill lines of the North, has been appointed electrical engineer in charge of the electrical department of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

Mr. F. Roher has been appointed master mechanic of the Slate Belt Electric Street Railway, Pen Argyl, Pa., to succeed Mr. William Hipple. Mr. Roher was formerly connected with the Lehigh Valley Transit Company, Allentown, Pa.

Mr. M. J. Harrington, formerly secretary of the Dock Department of New York, has been appointed assistant secretary of the Public Service Commission of the First District of New York, succeeding Mr. W. L. Ransom, now a City Court justice.

Mr. R. Vance Pearson, who has been connected with the electric line and service department of the Utah Light & Railway Company for the past ten years in Salt Lake City and Ogden, Utah, has been appointed to represent the company in the commercial field at Ogden.

Mr. M. A. Stainer has resigned as general superintendent and chief engineer of the Nashville-Gallatin Interurban Railway, Nashville, Tenn., to become chief engineer of the Central City, Greenville & Drakesboro Railway, Central City, Ky., which is about to begin active construction on its proposed road.

Mr. Harry E. Funk, formerly assistant engineer assigned to building construction in the department of maintenance of way and structures of the Brooklyn (N. Y.) Rapid Transit System, has been appointed superintendent of buildings in the same department. He will continue to report to Mr. C. L. Crabbs, engineer of way and structure.

Mr. Britton I. Budd, president of the constituent companies of the Chicago (Ill.) Elevated Railways, was elected president of the Illinois Electric Railways Association at the annual convention of the association in Springfield, Ill., on March 6. A portrait and a biography of Mr. Budd were published in the ELECTRIC RAILWAY JOURNAL of Aug. 12, 1911.

Mr. Seymour Van Santvoord, whose appointment as a member of the Public Service Commission of the Second District of New York was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, has been designated as chairman of the commission to succeed Mr. Martin S. Decker, who resigned that office on March 11, 1914, but continues as a member of the commission.

Mr. B. J. Schramm has been appointed superintendent of construction in charge of electrifying the Gary, Hobart & Eastern Traction Company's line between Gary and Hobart, Ind. He was formerly employed as superintendent of overhead of the Kankakee & Urbana Traction, Urbana, Ill. A biography of Mr. Schramm was published in the ELECTRIC RAILWAY JOURNAL at the time of his appointment to the latter position.

Mr. G. C. Fields has been appointed general superintendent of interurban lines of the Portland Railway, Light & Power Company, Portland, Ore. Mr. Fields is a native of Oregon City. He entered railway work in 1892 with the East Side Railway, Portland. In 1896 he was made freight agent at Oregon City. In 1898 he was selected freight manager at Portland and held this position until 1908, when he went into business for himself.

Mr. C. S. Sims, vice-president of the United Traction Company, Albany, N. Y., and vice-president and general manager of the Delaware & Hudson Railroad, has been elected a director of the Hudson Navigation Company. Mr. Sims is also vice-president of the Cohoes (N. Y.) Railway, vice-president of the Hudson Valley Railway, Glens Falls, N. Y.; vice-president of the Plattsburg (N. Y.) Traction Company, president of the Schenectady (N. Y.) Railway, and vice-president of the Troy & New England Railway.

Mr. Emil Huber-Stockar, head of the department for the introduction of electricity on the Swiss Government Railways, is visiting this country for the purpose of studying the operation of heavy electric railways, especially terminal electrifications at New York. Mr. Huber was formerly manager of the works of the Oerlikon Company, Oerlikon-Zurich, Switzerland. He will deliver an address on heavy electric traction before the New York Railroad Club on March 20. This meeting will be the annual "electrical night" of the club.

Mr. Francis Edward Gobey, carriage and wagon superintendent of the Lancashire & Yorkshire Railway, Manchester, Eng., is visiting the United States in company with Mr. David Halliwell and Mr. S. C. Povey of the same company. The party arrived on the *Lusitania* on March 6 and is planning to remain in the United States about a month. The principal object of the trip is to study the high-tension electrified lines in the United States, especially high-tension third-rail work, with a view to gaining information for further electrifications of the Lancashire & Yorkshire Railway, as described elsewhere in this issue.

Mr. W. B. McKinley, president of the Illinois Traction System, Peoria, Ill., is expected in New York on March 17, 1914, on his return from a trip around the world. Mr. McKinley left Seattle, Wash., on July 10, 1913. He is accompanied by his two nieces, the Misses Mary and Julia Mattis, also of Champaign. The party has visited Japan, China, India, the Nile country and southern and central Europe. During the trip Mr. McKinley sent to friends in all parts of the United States several thousand postal cards and also newspapers containing interviews with him. These interviews are in newspapers published in many countries and printed in many languages.

Mr. W. S. Murray has been appointed by the New York, New Haven & Hartford Railroad to be consulting engineer in general charge of all electrical engineering and construction, reporting to President Hustis, with offices at New Haven, Conn., effective on March 16, 1914. Following the substantial completion of the construction of the system for complete electrical operation west of New Haven Mr. Murray will enter into closer relations with the railroad company. His jurisdiction will hereafter be extended to include the electrical features of operation in addition to electrical construction. He will continue with the firm of McHenry & Murray in general consulting practice as before.

Mr. George P. Wilson, of Philadelphia, has been appointed chief of the bureau of tariffs by the Public Service Commission of Pennsylvania, the appointment to date from March 16. Mr. Wilson has been in the freight department of the Pennsylvania Railroad for the past two years and for five years previous to that time was chief of the freight tariff bureau of the Pennsylvania Railroad. He started his railroad service as a boy in the employ of the Philadelphia & Reading Railway, for which company he worked eleven years. The commission will soon issue an order requiring all utility companies subject to its jurisdiction to file all rates and tariffs.

Mr. R. F. Kelker, Jr., formerly in charge of the track and roadway department of the Board of Supervising Engineers, Chicago Traction, has been placed in charge of office drafting in the Central District of the Division of Valuation, Interstate Commerce Commission, Chicago. Mr. Kelker's previous experience in engineering work was obtained with the Brooklyn (N. Y.) Rapid Transit System, the International Railway, Buffalo, the Baltimore & Ohio Railroad and on the Chicago street railways, where he was in charge of track rehabilitation work for six years. At the time of his resignation from the Board of Supervising Engineers, Chicago Traction, he was principal assistant engineer to Mr. George Weston, engineer of the board.

Mr. H. Doughty, superintendent of the Regina (Sask.) Municipal Railway, has notified the members of the City Commission of Regina of his intention to accept an offer made him by an English railway syndicate operating in Japan and in Hongkong. It is understood that Mr. Doughty will leave the service of the city of Regina about April 22. He will not take up his new duties until June, and will spend the intervening time in studying the railway systems in the coast cities. Mr. Doughty was appointed to the Regina Municipal Railway in the fall of 1912. He had previously been superintendent of the Lethbridge (Alberta) Municipal Railway, in charge of construction. Before that he was engaged in street railway construction work in Western Ontario for three years. Mr. Doughty was also engaged in similar work in England and on the Continent for about eight years.

Mr. E. D. Gault, whose election as treasurer of the Reading Transit & Light Company, Reading, Pa., was noted in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, has also been elected treasurer of the Metropolitan Electric Company, the Oley Valley Railway and the Neversink Mountain Railway, Reading, Pa. Since he left school Mr. Gault has been engaged continuously in accounting work, first with a wholesale dry goods concern, and later with gas, electric and street railway properties. For sixteen years he was continuously in the employ of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, or some of its underlying companies, and for a period of five years occupied the position of auditor of that company. Mr. Gault has always taken an active interest in the work of the Central Electric Railway Accountants' Association and the American Electric Railway Accountants' Association and has served on the executive and other committees of both of these associations.

Mr. J. Q. Brown, whose resignation as assistant manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, became connected with the electric railways at Oakland, Cal., on May 1, 1900, five years after he was graduated from the Ohio State University. These five years were spent in the employ of the Emerson McMillin interests, chiefly in Columbus, Ohio, with the railway and electric light companies. His first appointment at Oakland was as assistant general manager and engineer of the Oakland Rapid Transit Company, the property of which has since become a part of the larger Key Route System. During his fourteen years of service with the San Francisco-Oakland Terminal Railways Mr. Brown had charge of the design and erection of distribution systems, signals, rolling stock, shops, and power stations, including the Yerba Buena power station, one of the most complete and economically operated stations of its kind in the West. He also had charge of the maintenance of everything mechanical and electrical on the Key Route System, including the buildings and ferry steamers. Mr. Brown is a stockholder in the company, and was formerly a director. He is now a director of the Petaluma & Santa Rosa Railway. Mr. Brown invented and patented the movable railing now used in the prepayment cars in Oakland and San Francisco, and also invented and patented the roller pantograph trolley, in use of the Key Route System, Southern Pacific and other roads.

J. Q. Brown

Mr. F. W. Brown, whose appointment as traffic manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, began his railway career as a telegraph operator for the Lake Shore & Michigan Railroad in 1883, continuing with that company in the capacity of operator, agent and ticket agent until 1896, when he was appointed to the position of purchasing agent for the Ohio State Reformatory. At the conclusion of his service with the reformatory in 1900 Mr. Brown became an agent for the Michigan Central Railroad at Lansing, Mich. In 1907 he resigned from the Michigan Central Railroad to become general passenger and freight agent of the Michigan United Railway, Lansing, Mich., and in July, 1913, in addition to his duties with that company, he was appointed traffic manager of the Michigan & Chicago Railroad, a steam line operated in connection with the Michigan United Railway. In February, 1914, he severed his connection with the Michigan United Railway and the Michigan & Chicago Railroad to become traffic manager of the San Francisco-Oakland Terminal Railways.

OBITUARY

Edward Franklin Adams, a foreman for the Metropolitan Street Railway, Kansas City, Mo., died in Kansas City recently. He was thirty-eight years old.

John Y. Boyd, one of the first members of the State Railroad Commission of Pennsylvania, died at his home in Harrisburg, Pa., on March 9, 1914, aged fifty-two.

Edwin R. Mitchell, superintendent and chief electrician of the Fort Madison (Ia.) Street Railway, is dead. Mr. Mitchell had been connected with the company for nineteen years. He was a native of England.

James Honor, chief engineer at the power plant of the Altoona & Logan Valley Electric Railway, Altoona, Pa., is dead. Mr. Honor had been a resident of Altoona for the last ten years. He was born in Schuylkill County on April 10, 1866, and was educated in the schools of that county, and soon afterward entered upon an apprenticeship in a machine shop. He entered the employ of the Logan Valley Railway in 1904.

Prof. E. J. Houston, joint inventor with Prof. Elihu Thomson of the Thomson-Houston arc-lighting system and widely known as an author and educator, died at his home in Philadelphia on March 1 of heart failure. Although well known as one of the pioneers in the electric lighting field, Prof. Houston was pre-eminent as a teacher. He wrote numerous text books, among the fifty-four works bearing his name being "Electric Street Railways." He was professor emeritus of the Philadelphia Central High School, past president of the American Institute of Electrical Engineers and a member of numerous scientific societies. A brother and two sisters survive him.

Benjamin W. Porter, formerly general manager of the Derby (Conn.) Street Railway, died suddenly in Boston on March 6, 1914. Mr. Porter was a native of Freeport, Ill. He entered street railway service as a clerk at Derby in 1888, and rose to the managership of the company in twelve years. When the property was acquired by the United Gas Improvement Company, Philadelphia, Pa., Mr. Porter was offered the position of assistant general manager of all the street railways under the control of the syndicate in Connecticut. At the time of his death Mr. Porter was prominent in mill and banking circles and was president of the Western New England Chamber of Commerce.

S. Reed Anthony, of the banking firm of Tucker, Anthony & Company, Boston, Mass., died at his home in Boston on March 10, after an illness of a few weeks. Mr. Anthony was born in Boston in 1863. His early business life was passed as a member of the staff of Kidder, Peabody & Company, Boston, with whom he was associated for eleven years. In 1892 he organized, with Mr. W. A. Tucker, the firm of Tucker, Anthony & Company, which became identified with the financing of various interurban railways in the Middle West. More recently the firm has been identified with water-power development near Duluth, Minn., and at Stanislaus Falls, in California. Mr. Anthony was a director in many corporations and at the time of his death he was president of the Manchester (N. H.) Street Railway, treasurer and a director of the Manchester Traction, Light & Power Company and treasurer and a director of the Mascoma Light & Power Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Atlanta & North Georgia Railroad, Atlanta, Ga.**—Incorporated in Georgia to build an electric or steam railway from Atlanta to Creighton, a distance of 50 miles. Capital stock, $1,200,000. A. B. Kellogg, Atlanta, is interested.

***Olathe, Winfield & Arkansas City Railway, Topeka, Kan.**—Incorporated in Kansas to build a 175-mile electric or steam railway between Olathe and Arkansas City. Capital stock, $1,000,000. Incorporators: J. W. Gettel, W. A. Powell and F. A. Nickel, Enid, Okla.; P. E. Wiles, Lamont, Okla.; J. E. Jones, Atlanta, Kan.; P. H. Guy, P. H. Albright, W. H. Perry and C. M. Wallace, Winfield, Kan.

***Sudbury, Kippawa & Bell River Railway, Ottawa, Ont.**—Application for a charter has been made by this company in Ontario to build an electric or steam railway from Sudbury to the foot of Lake Temiskaming and from Kippawa Junction, in Quebec, to connection with the National Transcontinental Railway at the point where it crosses Bell River.

FRANCHISES

Phoenix, Ariz.—The Phoenix Street Railway has asked the Council for an extension of its lines down East Washington Street. Construction will begin immediately.

Pasadena, Cal.—The Pacific Electric Railway will ask the Council for a franchise for its proposed new short line between Pasadena and Los Angeles, via South Pasadena.

Rialto, Cal.—William G. Henshaw, as proprietor of the Crescent City Railway Company, has made application to the Railroad Commission for a certificate of convenience and necessity authorizing the company to construct electric lines in Rialto, San Bernardino County. The company operates between Riverside and Bloomington and the line has recently been extended to Rialto, authorities of which have granted an application for a franchise.

Miami, Fla.—An electric railway franchise in the city of Miami is offered for sale and proposals for construction will be received for thirty days by Mayor John W. Watson. It is stated that enough subscriptions have been made to build 2½ miles of tracks.

Louisville, Ky.—The Council has been asked to grant a twenty-year franchise in Louisville for an electric line on Twenty-seventh Street from Chestnut to Madison Street and west on Madison Street to Shawnee Park. It is understood the franchise will be used by the Louisville Railway for an extension of its Chestnut Street line.

St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has asked the Council for a franchise to extend its Frederick Avenue line in St. Joseph to Thirty-sixth Street.

Batavia, N. Y.—Stephen W. Brown, Batavia, has received a fifty-year franchise from the Board of Aldermen in Batavia. This is part of a plan to have Mr. Brown take over the present street railway in Batavia from the Buffalo & Williamsville Railway and relay it with new track, build sidings and equip it with modern pay-as-you-enter cars.

***Canton, Ohio.**—Philadelphia capitalists and citizens of Canton have asked the Council for a franchise in Canton. Storage battery cars will be operated. No names are yet given of those interested in the project.

Sharon, Ohio.—Mahoning & Shenango Railway & Light Company has asked the Council for a franchise for the construction of extensions in Sharon.

Ardmore, Okla.—The Ardmore & Western Interurban Railway has asked the Council for a franchise in Ardmore. This line will connect Ardmore, Springer, Woodford, Milo, Oil City, Cornish, Orr and Brock. F. B. McElroy, Ardmore, president. [E. R. J., March 7, '14.]

Portland, Ore.—The Portland Railway, Light & Power Company has received a franchise from the Council for the East Side crosstown line from East Twenty-fourth Street and Broadway south to East Twenty-ninth Street and Hawthorne Avenue in Portland.

Nashville, Tenn.—The Nashville Railway & Light Company has asked the Council for a franchise to extend its tracks in Nashville.

Dallas, Tex.—The Dallas Southwestern Traction Company has received from the Council a second extension of time on its franchise in which to build its line from the western end of Commerce Street in Dallas to the county line. This 80-mile line will connect Dallas, Glen Rose, Grand Prairie, Mansfield, Alvarado and Cleburne. E. P. Turner, Dallas, president. [E. R. J., Nov. 29, '13.]

Salt Lake City, Utah.—The Utah Light & Railway will ask the Council for a franchise for a 5-mile extension of its Centerville line in Salt Lake City.

Cashmere, Wash.—Hyman Harris, Wenatchee, has received a franchise from the Council in Cashmere. This is part of a plan to build a line to connect Leavenworth, Wenatchee and Clockhum. Work will be begun within the next few months. [E. R. J., Feb. 28, '14.]

Centralia, Wash.—The City Council has passed an ordinance to submit to voters at an election on April 1 the question of granting a franchise to the Washington Electric Company to operate over certain streets in Centralia.

TRACK AND ROADWAY

Alberta Metropolitan Railway, Calgary, Alta.—This railway when completed will be operated by the company and not, as has been reported, by the Calgary Municipal Railway. It is said that gasoline electric cars will be used. W. J. C. Madden, Calgary, general manager.

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.—This company has awarded a new contract to the Middle West Construction Company to build a line in substitution for the contracts entered into Nov. 17 and 24, 1913, and has applied for an agreement to be made between the company and the Alberta government under the light railways assistance act. Eight miles of grading have been completed and contracts for ties and rails have been awarded. The section of line under construction extends from Lacombe to Gull Lake, 10 miles, but the contract provides for a further 20 miles from Gull Lake to Rimbey. J. B. McBride, Lacombe, secretary. [E. R. J., Jan. 17, '14.]

Phoenix (Ariz.) Street Railway.—Plans are being made by this company to extend several of its lines in Phoenix.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Work will soon be begun on the extension from Pittsburgh to Antioch.

Geary Street Municipal Railway, San Francisco, Cal.—Bids for the construction of the Van Ness Avenue and Chestnut Street lines of this company are to be received by the Board of Public Works on March 18. The contract will provide for building the roadway and installing the trolley poles and the conduits for the electric feed wires. The Van Ness Avenue tracks will extend to North Point Street and the Chestnut Street line will run from Van Ness Avenue, along Chestnut, Greenwich, and Steiner Streets to Union Street, where it will connect with the company's Union Street line. The construction is to be begun within fifteen days after the contract is signed.

Capital Traction Company, Washington, D. C.—The Public Utilities Commission has authorized this company to sell $360,500 of bonds for extensions and improvements of its lines in Washington. D. S. Carll, general manager.

Atlanta & Carolina Railway, Atlanta, Ga.—Application for the appointment of a receiver for the Atlanta & Carolina Railway Company has been made by the Chicago Title & Trust Company, trustee representing the holders of $1,000,000 of the company's bonds. Judge George L. Bell, before whom the action was brought, reserved his decision. The railway already had begun laying tracks between Atlanta and Augusta, Ga. It was planned to extend the line into South Carolina.

Chicago & Joliet Electric Railway, Joliet, Ill.—Plans are being made by this company to extend its lines through Forest Park.

Tri-City & Northeastern Interurban Street Railway, Port Byron, Ill.—This company has been dissolved.

Manhattan City & Interurban Railway, Manhattan, Kan.—Work will be begun at once by this company on the line between Manhattan and Fort Riley. The company has purchased 12,000 tons of 75-lb. steel rails, and will close a contract within the next few days for 20,000 ties and enough poles to complete the line to Fort Riley. It is planned to have this extension in operation by July 1.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has secured most of the right-of-way for its 22-mile line between Halstead and Hutchinson.

Shreveport (La.) Traction Company.—A one-mile extension from the present terminus of this line to the City Park in Shreveport is being contemplated by this company.

***Transcona, Man.**—A by-law has been approved by the legislative railway committee granting power to Transcona to construct and operate an electric railway in that place.

Linden, Mich.—Oliver H. Lau, Detroit, has asked the Railroad Commission for permission to issue $50,000 of stock in a company soon to be incorporated for the purpose of building an electric railway from Holly to Linden. Ultimately this line will connect with an electric line to be constructed from Owosso to Detroit. [E. R. J., May, 10, '13.]

Mesaba Electric Railway, Virginia, Minn.—Plans are being made to begin work soon on the extension to Nashwauk.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—The Union Switch & Signal Company has secured a contract for the installation of a block system on the two divisions of the Kansas City, Clay County & St. Joseph Railway. The company has purchased 12,000 yd. of ballast for its St. Joseph division and 5000 yd. for the Excelsior Springs division.

Springfield (Mo.) Traction Company.—A ½-mile extension of its Center Street line will soon be built by this company in Springfield.

Red Lodge (Mont.) Electric Railway.—Preliminary arrangements are being made by this company to begin work in the spring on the line to connect Red Lodge, Washoe and Bearcreek. C. C. Bowlen, president. [E. R. J., Jan. 21, '14.]

St. John (N. B.) Railway.—This company has officially announced that it has under consideration the following extensions: From Fairville to Manawaganish Road, 1 mile, and from Kane's Corner to Crouchville, 2 miles.

Binghamton (N. Y.) Railway.—This company plans to expend approximately $100,000 this year in new equipment and improvements of its lines in Binghamton.

***Durham, N. C.**—Plans are being made to organize a company to build an electric railway between Durham and Chapel Hill, a distance of 12 miles. It is reported that the Southern Power Company is interested in the project.

***Drake, N. D.**—The Commercial Club of Drake is considering plans to build an electric line from Drake to Guthrie and Brush Lake.

Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio.—During the next few weeks this company will award contracts for 1000 white oak ties, 6 in. x 8 in. x 8 ft., and several cars of poles 6 in. at the top x 30 ft. long.

Toledo & Western Railroad, Toledo, Ohio.—An extension from Adrian to Jackson via Rome Center, Manitou Beach, Wild Water Beach, Devil's Lake station, Addison, and thence on to Jackson, is being contemplated by this company.

Belmont, Ont.—The citizens of Belmont and surrounding townships have declared themselves in favor of the proposed hydro-radial railway from London to Port Burwell via Belmont and Aylmer.

Fort William (Ont.) Street Railway.—The plan in connection with this railway system for the year 1914 includes an auxiliary line right across the city. Sufficient money has been voted for the work.

Ontario West Shore Railway, Goderich, Ont.—The four corporations of the townships of Ashfield and Huron and the towns of Kincardine and Goderich will each ask the Legislature to have the charter of this company, which expires on April 13, renewed for another four years.

London & Lake Erie Railway & Transportation Company, London, Ont.—Representatives of St. Thomas, Aylmer, Yarmouth and Malahide met in St. Thomas on Feb. 24 to consider a proposal to guarantee the bonds of this company for an extension of the line from St. Thomas to Aylmer and from Union to Sparta. It was agreed to guarantee the bonds to the extent of $20,000 per mile, but there is a difference as to apportioning the amount to be borne by the municipalities.

Peterboro (Ont.) Radial Company.—W. H. Munro, manager of this company, has announced to the Peterboro Council that the company is prepared to expend about $40,000 on improvements to its lines in Peterboro.

***Thamesville, Ont.**—An electric railway line to connect Thamesville and Sombra is reported to be in prospect. T. M. Little, one of those interested, is said to have stated that work will be begun in the spring.

Southern Oregon Traction Company, Medford, Ore.—With the completion of the first 2-mile unit of this railway it is stated that plans are being made to build 3 miles of new track south from Medford toward Ashland this spring. S. M. Bullis, Medford, president. [E. R. J., Dec. 20, '13.]

Portland, Ore.—George F. Heusner, Portland, has filed complete plans with the Board of Public Works for the proposed electric railway in Portland, for which a franchise was granted last fall. This is part of a plant to build a line from the Kenton district to the West Side business district in Portland. [E. R. J., Jan. 10, '14.]

Montreal & Southern Counties Railway, Montreal, Que.—During the next few weeks this company will award contracts to build about 15 miles of new track between St. Cesaire and Granby.

Saskatoon (Sask.) Municipal Railway.—The City Council at a recent meeting decided to extend its electric railway through the Nineteenth Street subway in Saskatoon.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has proposed to the city authorities that it be allowed to cover the paving between its tracks on Market Street in Chattanooga with concrete, leveling the surface, instead of being required to repave with wood blocks, as has been proposed.

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made by this company to replace with reinforced concrete bridges the only two wooden trestles on its Fountain City line and to double-track its line from Knoxville to Fountain City.

Cumberland Valley & Interurban Electric Railway, Nashville, Tenn.—Preliminary arrangements are being made by this company to begin work soon on its line from Nashville to Sparta, via Greenvale, Auburn, Liberty, and Alexandria. The following officers were elected: W. G. Baird, Lebanon, president; Lee Baker, Mount Juliet, vice-president; W. W. Myers, Mount Juliet, treasurer, and Horace Osment, Nashville, secretary and general counsel. [E. R. J., Dec. 20, '13.]

Shelbyville, Petersburg & Decatur Railroad, Shelbyville. Tenn.—Within the next few weeks this company plans to begin work on its 20-mile line to connect Shelbyville and Pulaski, Tenn., and Petersburg, Decatur and Florence, Ala. The power plant will be at Ocoee and its repair shops will be at Shelbyville, Tenn. The company will supply power for lighting purposes. Capital stock authorized, $600,000; bonds authorized, $600,000. Officers: S. P. Kirkpatrick, Shelbyville, president; H. H. Nelson, Shelbyville, vice-president; T. G. Cunningham, Shelbyville, secretary; R. W. Clark, treasurer, and G. B. Howard, Franklin, Tenn., chief engineer. [E. R. J., Feb. 28, '14.]

Dallas Southwestern Traction Company, Dallas, Tex.—This company, which plans to construct an interurban line between Waco and Austin via Temple, announces that only 16 miles of the right-of-way of 110 miles remains to be secured. The route from Temple will virtually parallel the Missouri, Kansas & Texas Railway north of Temple, unless the company decides to build through Hillside and Robinsonville into McLennan County, in which event the line will diverge from the Missouri, Kansas & Texas Railway and not enter the town of Lorena and others north of Bruceville. H. J. T. Witt, 606 Praetorian Building, Dallas, chief engineer. [E. R. J., Nov. 29, '13.]

El Paso (Tex.) Electric Railway.—Plans are being considered by this company for improvements and extensions of its lines. An extension to Las Cruces and Roswell is contemplated.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Work has been begun on this 35-mile line to connect Fort Worth, Denton, Keller and Roanoke. William Capps, Fort Worth, is interested. [E. R. J., Feb. 14, '14.]

San Angelo Street Car Company, San Angelo, Tex.—Improvements to cost at least $35,000 are being planned by this company. Several extensions will be built.

San Antonio (Tex.) Traction Company.—This company is asked to consider plans to extend its lines through the Prospect Hill and Lake View section in San Antonio.

Utah Light & Railway Company, Salt Lake City, Utah.—Announcement has been made by this company that it will extend its interurban line into Davis County from Centerville on to Farmington, 5 miles, during the year, and that ultimately the line will be continued through to Ogden.

Yakima Valley Transportation Company, North Yakima, Wash.—Plans are being made by this company to build a 7-mile extension to Tieton and an extension of its reservation branch to White Swan, Wash.

Oregon-Washington Railroad & Navigation Company, Seattle, Wash.—Announcement has been made by officials of this company that between $5,000,000 and $6,000,000 has been authorized by the directors of the Union Pacific system to be expended for improvements on the company's lines in Washington and Oregon.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—This company is asked to consider plans to relay its track to the east city limits of Puyallup and extend it ¾ mile.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—Preparations are under way to begin the construction of an electric line between Eau Claire and Altoona.

La Crosse & Onalaska Street Railway, La Crosse, Wis.—During the next two months this company expects to award contracts to build 1 mile of new track with 70-lb. rails, six completed 70-lb. Dimond switches, and two 70-lb. curves.

Superior, Wis.—Plans are being made by the City Commissioners of Superior to take over that part of the Duluth Street Railway operated in Superior and establish a municipally owned electric railway there.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company plans to move its headquarters from San Francisco to Sacramento at once.

POWER HOUSES AND SUBSTATIONS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Plans are being made by this company to build a new substation in connection with Lock 12 of the hydroelectric development of the Alabama Power Company. Machinery has been ordered. The cost is estimated to be about $125,000.

Somerset Traction Company, Skowhegan, Maine.—In May this company plans to build a new substation in Skowhegan. It will install a 300-kw rotary converter. Orders have been placed for all electrical apparatus.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company's power house at Chatham was partly destroyed on Feb. 24 by an explosion in the boiler room. The whole rear part of the building was blown down.

Montreal & Southern Counties Railway, Montreal, Que.—During the next few weeks this company will award contracts to build a new power house in Granby.

San Angelo Street Car Company, San Angelo, Tex.—Preliminary plans are being made by this company to build a new power plant in San Angelo. New machinery will be installed.

Manufactures and Supplies

ROLLING STOCK

Escanaba (Mich.) Traction Company is in the market for two or three cars.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is expecting to buy or build twenty-five cars.

Atlantic Shore Electric Railway, Sanford, Me., expects to purchase probably two cars during the year.

Jackson (Tenn.) Railway & Light Company, is reported to be considering the purchase of four new cars.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, expects to purchase additional freight cars.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, is figuring on getting two new 57-ft. steel cars of latest pattern.

Ohio River Electric Railway & Power Company, Pomeroy, Ohio, expects to purchase during the year one single-truck closed car.

Electric Short Line Railway, Minneapolis, Minn., is reported to be considering the purchase of several gasoline-electric cars.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., has ordered two package freight cars from The J. G. Brill Company.

Gary, Hobart & Eastern Traction Company, Chicago, Ill., expects to be in the market shortly for three interurban motor passenger cars and one motor express car.

Republic Railway & Light Company, Youngstown, Ohio, is considering the purchase of six trailers, in addition to the ten motor cars noted in the ELECTRIC RAILWAY JOURNAL of March 7, 1914.

Nipissing Central Railway, North Cobalt, Ont., which is operated by the Temiskaming & Northern Ontario Railway Commission, expects to place an order shortly for two interurban motor cars.

Richmond Light & Railroad Company, New York, N. Y., has ordered twenty National Brake & Electric air-brake equipments, to be installed on twenty of its fifteen-bench cars already in service.

Centerville Light & Traction Company, Centerville, Ia., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as expecting to purchase two passenger cars, has ordered two cars from the American Car Company.

St. John (N. B.) Railway has ordered twelve 20-ft. pay-as-you-enter cars from the Tillsonburg Electric Car Company, Ltd., Tillsonburg, Ont. Brill 21-E trucks, arched roofs and cherry interior finish, are specified.

Alberta Metropolitan Railway, Calgary, Alta., which is under construction, is reported to be considering the question of using gasoline-electric cars upon completion of its line. The manager is W. J. C. Madden, Calgary, Alta.

British Columbia Electric Railway, Vancouver, B. C., will rebuild for general service in its own shops at New Westminster, B. C., the cars which the company is displacing with new cars from the Preston Car & Coach Company, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914.

Pittsburgh (Pa.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as having issued specifications for 225 cars, has ordered 100 low-floor, baby-motor, center-entrance, end-door cars, fifty of which will be built by the Standard Steel Car Company and fifty by the Pressed Steel Car Company.

Imperial Government Railways of Japan, Yokohama, Japan, is building forty motor cars and fourteen trailers, which are to be placed in operation next fall on the 600-1200-volt Keihin electrification now under construction between Tokyo and Yokohama. GE-244 four-motor equipments have been ordered through Mitsui & Company, Ltd., New York, N. Y., exporters.

Geary Street Municipal Railway, San Francisco, Cal., has been authorized by the public utilities committee to purchase twenty-five new cars, in addition to the 100 cars which have recently been ordered from the Jewett Car Company. The extra cars will cost a total of about $152,775.

This amount is available out of the surplus in the bond funds of the railway company.

St. Louis Southwestern Railway, St. Louis, Mo., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, as having ordered eight 70-ft. gas-electric motor cars from the General Electric Company, has specified the following details for this equipment:

Seating capacity	62
Weight, approx.	49 tons
Bolster centers, length,	53 ft. 7 in.
Length of body	70 ft.
Width over sills	10 ft.
Width over all	10 ft. 6⅝ in.
Body	steel
Interior trim	statuary bronze
Underframe	steel
Air brakes	West.
Axles	Wason
Bumpers	Wason
Cables	Gen. Elec. Co.
Conduits and junction boxes	Wason
Control,	Two-motor, series-parallel, generator field control
Couplers	M.C.B.
Curtain fixtures	Cur. Sup. Co.
Curtain material,	Cur. Sup. Co.
Gears and pinions,	Gen. Elec. Co.
Hand brakes	Lindstrom
Heaters	hot water
Headlights	GE Type J-3
Journal boxes	M.C.B.
Motors	2 GE-205
Seats, style,	Scarrit-Comstock Co.
Seating material	rattan
Springs	Ry. Stl. Spring Co.
Trucks,	Plate frame swing bolster
Ventilators	Burt
Wheels	33 in. M.C.B.

TRADE NOTES

Bemis Car Truck Company, Springfield, Mass., has appointed D. L. Beaulieu, formerly with the Westinghouse Electric & Manufacturing Company, as New England sales agent. T. S. Adams, who has previously covered this territory, has been assigned to the New Jersey, Pennsylvania and New York territory.

Street Railway Signal Company, Philadelphia, Pa., has been organized and incorporated under the laws of the State of Delaware, with a capitalization of $100,000, $50,000 paid in, with the object of manufacturing and selling automatic signals for electric railways. Officers are: Robert W. Withington, president; Fred W. Kulicke, vice-president; H. R. Stadelman, secretary, and James H. McGurk, treasurer.

Acme Supply Company, Chicago, Ill., announces the appointment of Stanley W. Midgley as general sales manager, with offices at 1103 Steger Building. Mr. Midgley has been in the railway supply business for the last twelve years, beginning with the National Car Coupler Company as general sales representative, and for the past six years he has been with the Curtain Supply Company as Western representative and Western sales manager, until his appointment to the present position.

Eccles & Smith Company, Los Angeles, Cal., has secured the following orders to equip the forty center-entrance pay-as-you-enter car bodies recently ordered by the San Diego (Cal.) Electric Railway from the St. Louis Car Company: Hale & Kilburn rattan and slat seats, Chicago City Railway type of pressed steel aisle and oval pedestal base, Pantasote curtains, Curtain Supply Company curtain fixtures, Sterling-Meaker double registers and Wearproof Mat Company mats. Specifications also include American Mason safety treads and Peacock hand brakes.

General Railway Signal Company, Rochester, N. Y., has received an order from the Wheeling & Lake Erie Railroad for selector equipment, to operate in connection with three telephone circuits. The selector equipment will be installed as follows: Brewster to Toledo, including branches to Huron, Dalton and Orrville, dispatching circuit, comprising 33 selector stations; Brewster to Norwalk, including branch to Huron, message circuit, comprising 23 selector stations; Brewster to Terminal Junction, including branch to Steubenville, message circuit, comprising 20 selector stations. The order specifies standard equipment, including selectors, bells, key cabinets and the necessary reactance and capacity units, which will be delivered at an early date.

Edison Storage Battery Company, Orange, N. J., has appointed W. F. Bauer as assistant manager of the railway department of the Edison Storage Battery Company at Orange, N. J. In the early days of electric car lighting Mr. Bauer was connected with the Pullman Company, of Chicago and Jersey City, and with the Wagner Palace Car Company. He was chief electrician of the Missouri-Pacific Railway at St. Louis from 1903 to 1905. Later on he became sales manager for the Electric Storage Battery Company at Chicago, and in 1907 he was appointed to a similar position with the National Battery Company. Later on he became manager of the United States Light & Heating Company's railway department at Chicago. He will make his headquarters at 2025 Michigan Avenue, and will have immediate supervision over the sales of the railway department for the West and Southwest for the Edison company.

ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago., Ill., has issued Bulletin No. 150, describing and illustrating its coal drills.

Electric Weighing Company, New York, N. Y., has issued a catalog describing Messiter conveyor sales for belt and pan conveyors.

Canton Culvert Company, Canton, Ohio, has issued Bulletin No. 350 illustrating the installation of its corrugated culverts under steam and electric railway roadbeds.

National Tube Company, Pittsburgh, Pa., has issued a catalog describing in detail its regrinding valves. The valve stem is cast from a special brass composition. The diaphragm is heavy and permits many regrindings.

Nungesser Carbon & Battery Company, Cleveland, Ohio, has issued Catalog No. 5, entitled "Brush Grades," which is supplemental to its previous price list and gives data and information in regard to its various grades of carbon, graphite and composition metal brushes.

Electric Service Supplies Company, Philadelphia, Pa., has issued a folder illustrating its "safety first" signs, of effective use near exposed electric wires, switches or third rail, also a folder describing an improved type of car-lighting switch necessitated by the increased capacity required for modern cars.

National Tube Company, Pittsburgh, Pa., has issued Bulletin 14 A on the subject of its tubular steel poles. Attention is called to the current tendency of progressive cities to substitute steel poles for the old wooden street poles. Numerous photographs show the installations of various types of tubular steel poles for railroad, street railway, electric light and power service.

Gold Car Heating & Lighting Company, New York, N. Y., has issued a catalog describing its electric thermostatic control of steam heating in cars. This apparatus gives an automatic control which will practically hold the temperature in the car constant. The lowering of the car temperature by changes in outside weather, as, for example, when a car runs from a low altitude up into the mountains, or by the opening of doors., etc., will cause the thermostat to open the valve, and the warming of the car above this point will operate to close the valve.

William H. Dentzel, Philadelphia, Pa., has issued a catalog describing and illustrating its various types of carrousels and organs for electric railway parks. All gears used in connection with the motor-drive and galloping animal mechanism of the carrousels are cut gears, thereby reducing the noise of the machine in operation to a minimum. All upright rods are incased in heavy brass tubing, which adds to the brightness of the machine. The mirrors used in the decorations are all of heavy plate, thus greatly benefiting the lighting effect. The organs supplied are of the latest German manufacture.

Atlantic Gas & Electric Company, New York, N. Y., has issued a catalog containing a general description of its properties. Attractive illustrations are shown of the territory in New Jersey and eastern Pennsylvania which is served with electric light, power and gas through its subsidiary affiliated companies. The subsidiary companies are: Eastern Pennsylvania Power Company, Easton Gas Works, Interurban Gas Company, Pennsylvania Utilities Company, Binghamton Light, Heat & Power Company, Sayre Electric Company, The Jersey Corporation. Through its subsidiaries the company furnishes all the electric current used for commercial lighting and power in thirty-five cities and towns, and numbers among its power customers six electric railways operating 123 miles of railway.

Electric Railway Journal

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WESTINGHOUSE AND ELECTRIC TRACTION The recent death of George Westinghouse removed from the world a personality which has indirectly but powerfully affected the progress of electric traction. The history of the Westinghouse Electric & Manufacturing Company exhibits the application of the principles which he impressed upon it when the company's operations were simple and few and when he could personally know what his engineers were doing in technical lines. Electric traction began to command attention at about the same time as the alternating-current transformer and soon after the invention of the incandescent lamp. At that time Mr. Westinghouse had completed his pioneer and monumental work on the air brake and was busily engaged in building up a successful organization to manufacture electric lighting and power apparatus. When this work was finished an extension of the activities of his company into the traction field came as the next logical step. A motor of the then temporarily standard bipolar type was designed in 1890, and a few months later an inclosed motor with four salient poles was developed and successfully marketed. This was followed by one successful type of motor after another, produced to meet the rapidly expanding requirements of the field. In all of this work the characteristic feature has been the Westinghouse pioneer spirit, and this has been true even in those lines in which the founder was not primarily interested. Just as the transformer, the induction motor and many other electrical devices were taken up in incipient form and developed in spite of great obstacles, so in later years the series a.c. motor, the high-voltage d.c. motor, and latest of all the phase converter, have been carried intrepidly through the experimental stage. The company is famous for its ability to commercialize an idea promptly and effectively. In this is reflected the spirit of the pervasive personality who so long dominated the organization.

HEATING NON-BULKHEAD CARS The present trend in the construction of city cars is to make wider use of the non-bulkhead car. The advantages of this car over one with bulkheads are so pronounced that some companies have even gone to the point of rebuilding platform prepayment cars to the non-bulkhead type. As some operating men believe that such a car is much more difficult to heat, it may be of interest to mention the experience during the very severe weather early this March of a large Eastern city railway which operates both classes of prepayment cars. It was thought that the non-bulkhead cars would require much more heating current, but this belief was easily put to the proof since both types of cars were equipped with exactly the same capacity in heaters. Temperature readings, therefore, were taken at the rear, middle and front of a large number of cars of each type. Much to the surprise of all concerned, the non-bulkhead cars were found to be generally warmer than those with bulkheads. This paradox finds its solution in habits of the motormen and conductors which are contrary to the rules. The motorman nearly always keeps the side exit door partly open, and drafts get into the body of the car because the bulkhead doors are so far behind him that he does not turn around to close them every time some departing passenger leaves them open. In like manner, the conductor, who does not stand on a fully vestibuled platform, likes to keep the rear bulkhead doors open far enough to secure a warm draft from the car. Thus, in practice, such a car may not be as comfortable as a fully vestibuled, non-bulkhead car the doors of which are always closed while it is in motion. Of course, this condition would not be likely to hold on an interurban line where bulkheads are desirable to cut off the drafts inevitable in high-speed operation. It is worth adding that the doors of the non-bulkhead cars on the system mentioned extend slightly below the platform level so that door drafts are excluded even after the cars have been in service for a long time.

THE NEW HAVEN ELECTRIC LOCOMOTIVE SHOPS The electric locomotive shops for the New York, New Haven & Hartford, which have just been built at Van Nest and are described elsewhere in this issue, are novel not only on account of the size but also on account of the general plan of design. Generally speaking, the arrangement of the main shop building impresses the observer with the idea that it has been designed more along the lines customary for steam locomotive repairs than for the lesser needs of the electrically operated unit. This is evidenced by the longitudinal arrangement of tracks in the erecting shop with 60-ton transverse cranes overhead. Undoubtedly the overhead crane is an invaluable piece of equipment in any modern shop, but the necessity for two cranes of such large capacity for electric locomotives with easily removable cabs and with articulated frames is not readily apparent. On the other hand, it is reasonably safe to say that, no matter what changes in the design of electric locomotives may come up within the next decade, these shops will be prepared to handle them. But one point of marked difference from steam locomotive practice will be noticed in the absence of pits. Only one of the three longitudinal tracks in the erecting shop is thus equipped, and in this case the pit extends for only about one-third of the total shop length. The advantage of this innovation obviously lies in the fact that a continuous floor is afforded and that the transportation of material and the movements of the workmen transversely with the shop are greatly facilitated. On the other hand, it is difficult to see wherein the electric locomotives can differ from their predecessors in obviating any necessity for going underneath to dissemble and assemble equalizers, binders and brake rigging. In fact, the practical omission of pits can hardly be considered as an obviously satisfactory experiment. In the matter of equipment the shops are remarkably complete, and the arrangement of tools shows that an exceptional degree of thought has been devoted to this important feature. This indication is borne out also by the fact that an unusual number of novel and ingenious labor-saving devices of all kinds have been provided, and the brief descriptions of these are well worthy of perusal by anyone interested in economical maintenance.

This applies also to the design of the pits in the inspection shed. A depth of 5 ft. for inspection pits is certainly a novelty, but the ease with which one can walk through them is ample evidence of the value of the scheme as a time-saver for inspectors, and this innovation is one which appears well worthy of consideration.

MAINTENANCE AND DEPRECIATION

One of the most striking facts apparent to the close observer of electric railway reports is the great variation in maintenance and depreciation charges made by different companies operating under more or less equal conditions. The evil is an old one. As long ago as 1901 T. S. Williams, now president Brooklyn Rapid Transit Company, read a paper before the Street Railway Accountants' Association pointing out the danger of charging ordinary maintenance expenses to capital account, and a modern instance of this practice on a steam railroad recently brought down scathing criticism from the Interstate Commerce Commission. While we recognize these delinquencies and would not be considered as attempting to offer any extenuations for them, yet we believe that part of the past and existing variation is due directly to the confusion among public service commissions, experts and railways as to the best accounting treatment to be used.

Strange as it may seem, on this question and upon the dividing line between "maintenance" and "depreciation" accountants are greatly divided. According to Halford Erickson, of the Wisconsin Railroad Commission, depreciation, defined as a lessening in value, includes maintenance or upkeep as well as the general decrease in value usually termed "depreciation." Others claim that maintenance includes depreciation. Most accounting systems, however, keep these outlays apart, but there is an undesirable variety of practical treatment of the two in view of the popularity of standardization at the present time.

The recently issued tentative Interstate Commerce Commission classification for electric railways provides the usual maintenance expense accounts. Depreciation accounts are also provided in order that carriers who are required by the state authorities to do so may create reserves to meet or reduce the amounts otherwise chargeable to operating expenses or to profit and loss to cover the cost of the property retired. According to the accounting directions, repairs go to the maintenance expense accounts, but if the depreciation account is used, charges for renewals must be excluded from all accounts affected by the depreciation account and must be charged directly to an appropriate reserve which is maintained by the charge to the depreciation account.

The Public Service Commission of Montana understands the depreciation expense account to cover "all expenditures for ordinary repairs, renewals or replacements resulting through wear and tear and incidental casualties, such expenditures being necessary to keep the productive capacity of the plant to its original state of efficiency." Yet this commission orders a depreciation expense account sufficient to set up a depreciation reserve, by a periodic charge in operating expenses, of an amount equal to the total original cost. The practices of the Railroad Commission of Wisconsin and the Public Service Commission of Indiana are similar to that followed by the Montana Commission.

On the other hand, the Board of Public Utility Commissioners of New Jersey and the Public Service Commission of Maryland deduct the amounts charged to the maintenance accounts for repairs from the amount estimated to cover the wear and tear, obsolescence and inadequacy for the period and credit only this difference to the depreciation reserve. The Public Service Commission for the First District of New York makes a similar deduction of actual repairs from the estimated deterioration based on the life of the property, but it goes one step farther in that in the case of assets not capable of satisfactory individualization, such as tracks, all renewals and replacements are considered repairs, so that little depreciation reserve need be carried. In the case of individual structures, a depreciation reserve must be set up sufficient to equal the original cost less salvage at the end of the estimated life. As a final variation, we might mention Mr. Erickson's recent statement that it is quite possible that the best way to deal with the subject is to determine the total cost of both repairs and renewals, set into a reserve the entire amount and charge to the reserve all expenses for repairs as well as renewals.

These examples are sufficient to show the lack of concerted action on the part of public service commissions in accounting for repairs, renewals and replacements—in short, for "maintenance" and "depreciation." We believe that the abstruseness of the subject would be greatly lessened if the accounting technique in regard thereto were standardized. This is a subject which the Accountants' Association could well consider. By taking a definite standpoint on this question that body could do much to clear up the present hazy situation.

GOVERNMENT OWNERSHIP AND OPERATION

Theodore N. Vail's discussion of government ownership and operation in the annual report of the American Telephone & Telegraph Company, referred to elsewhere in this issue, will prove to many the most interesting part, because of its discussion of the advantages and disadvantages of government ownership of public utilities.

Nothing truer can be found than his statement that "government and administration is more or less a game of politics, and while with government operation it may sometimes be possible to have efficiency, it will always be impossible to have economy." Any government report upon government operations that does not disclose wasteful and unscientific methods is rarer than Halley's comet, and while in theory there is no reason why government operation should not be as economical as private operation, in actual performance it is impossible to overcome the effect of the political favoritism, dilatory action and finished mediocrity that exist in our governmental departments. In European countries, where there is a more conservative trend of mind and where even the minor public offices carry with them a certain honor and prestige not only for the holders but also for their families, it has generally been considered that conditions more favorable to successful governmental operation exist. Hence, even more impressive is the statement made by Mr. Vail that nowhere in Europe under governmental operation are the rates so low and the service so good as under the privately operated Bell system in this country.

This fact is highly illuminating in itself, but its importance is further emphasized by the statement that in the foreign countries in question there are two sources of revenue to the governmentally operated companies—the payment of those who use the service and the payment of the deficit of operation out of the general revenue. It is absurd, of course, to use as a criterion of the success of government ownership the part payment made by a citizen as a user of the service and to eliminate the part payment made by him as a taxpayer. The total cost is the determinative element, and if advocates of municipal ownership were to take this into consideration, their use of foreign analogies would be doubly untenable.

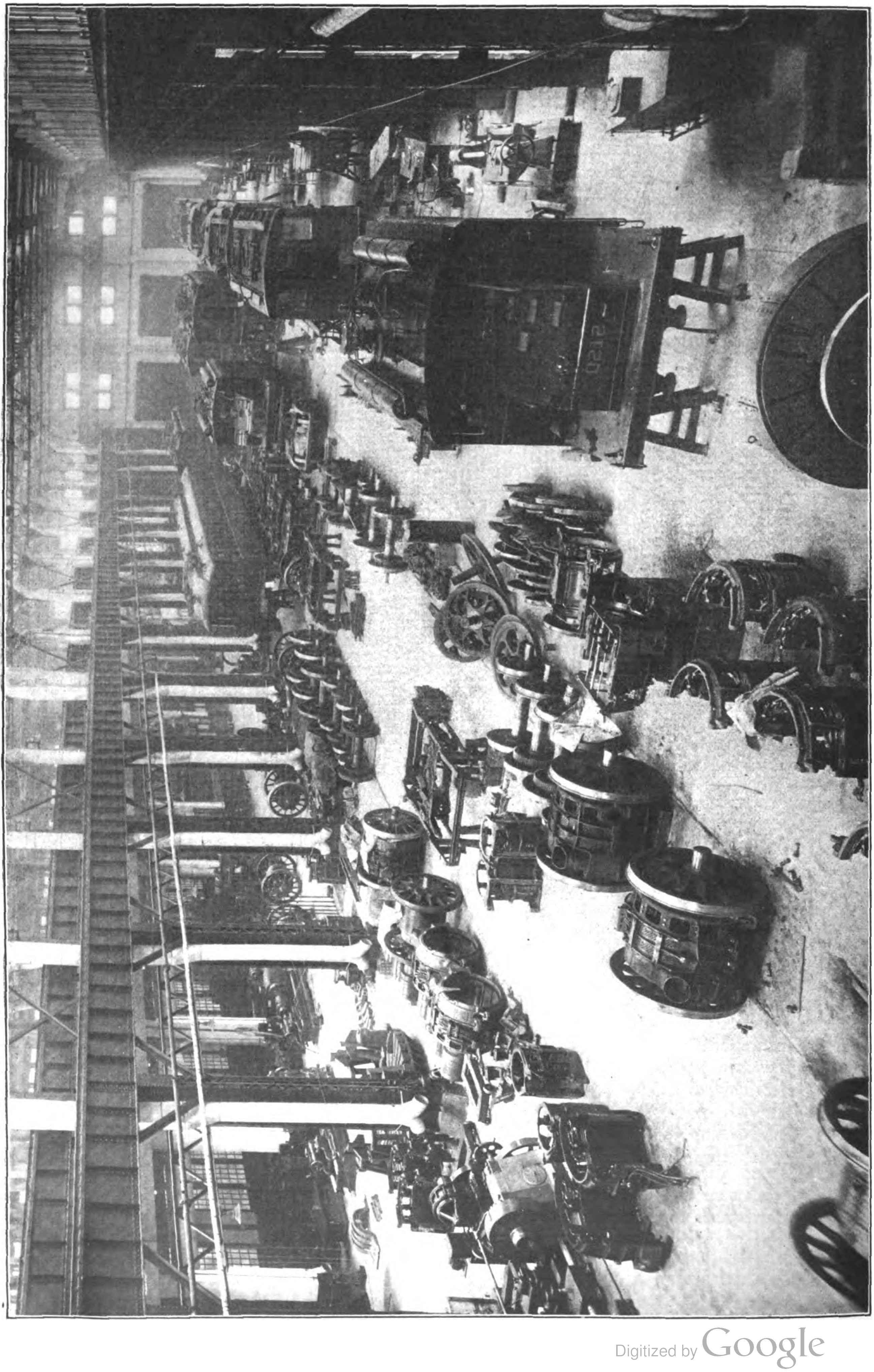
The crux of the whole question of government ownership and operation in our country is this, that the narrow margin existing between economy and waste cannot be traversed properly without a responsible organization with individual initiative, watchfulness and permanency of interest. Successful operation requires superior methods, expert executives, heavy responsibility and undisputed directive authority—attributes that cannot be found under governmental ownership in a country where, as James Bryce says, "there are imperfect powers of control over the administrative departments, and the nation does not always know how or where to fix responsibility for misfeasance or neglect, no one acting under the full sense of direct accountability." What, then, would we advocate for this country? Simply governmental regulation. This is not an administrative function, but rather a judicial review, having for its purpose the conservation and protection of the interests of all. Our government is far better qualified to perform this service than that of administration, and we believe that commissions of high standing would be a greater protection to public interests against private exactions than government ownership with its inevitable lack of economy.

RUSH-HOUR FALLACIES

Electric railway managers are so concerned with the handling of the rush-hour traffic that they do not always place a fair value on the importance of midday traffic. If a transportation man is asked what is the proportion between the two kinds of travel, he will be pretty sure to state it in terms of one-way movement. But it is a serious mistake not to remember that, while a rush-hour car is overloaded one way, it is practically empty the other way, while the midday cars usually carry a fairly equal number of passengers in both directions. The reason for this is evident. The rush-hour travel is between home and a fixed place of employment, while midday travelers are agents, house mechanics, shoppers, school children and others, some of whom are traveling in one direction and some in the other. It is likely, then, that the construction of two-way traffic curves would show some really astonishing figures in favor of inter-rush-hour travel.

This question has a most important bearing on the maintenance of good relations with the public. It is not hard to convince a fair-minded man that it is always financially impossible and frequently technically impossible (as in cases of limited track capacity) to have a seat for everybody during the rush hour. But the same excuse cannot be offered for making people stand in the middle of the day when fewer cars are run. In some cities women will postpone their shopping until late in the afternoon since they prefer to return when cars are plentiful instead of waiting a long time for a car which will be crowded anyway. Another good reason for giving adequate service throughout the day is that it reduces the extra list, which in turn will make more and better men available during the peak periods. The platform expense will, of course, be in a larger ratio than during the heavy hours, but the service will be given under conditions which tend to more economical operation and greater safety.

The foregoing remarks are not based on theory but rather on the observation of a line in a large city on which a splendid midday traffic has been built up from small beginnings through a recognition of the principle that such riding is better balanced than rush-hour business and because it has been found that more riding will follow a more frequent service. It is worth emphasizing that this result was obtained in a city of more than 350,000 population, for it is commonly assumed that in communities of such size the distance between business and home is too great to encourage lunch-hour travel in addition to the other sources of traffic.



New Haven Shops—General View of Erecting Shop Bay in Main Building

Electric Locomotive Shops for the New Haven

The Largest Electric Locomotive Shop in the Country Has Just Been Placed in Service by the New York, New Haven & Hartford Railroad Company and a Description of the Arrangement of Buildings and Their Equipment Is Given

Since the installation of single-phase electrification on the New York, New Haven & Hartford Railroad in 1907 all of the repairs to the equipment on the electrified zone extending between New York City and Stamford, till within the last few months, have been made at a small shop in the latter place. With the plans for the extension of the electrified zone to New Haven, however, the necessity for a larger shop became obvious, and a remarkably complete plant has just been constructed at Van Nest, some 4 miles from the New York terminal of the Harlem division at 133d Street and Harlem River. This location was selected for the reason that the Harlem division of the road handles practically all of the freight originating in New York City, and within the next few months, when the electrification is completed to New Haven, a majority of the locomotives will pass the shop on their regular runs. In addition to this, a large number of switch engines are operated in the freight yards along the Harlem division, and their requirements, together with those of the multiple-unit cars for the commuting traffic out of New York, make the location of the shop peculiarly advantageous.

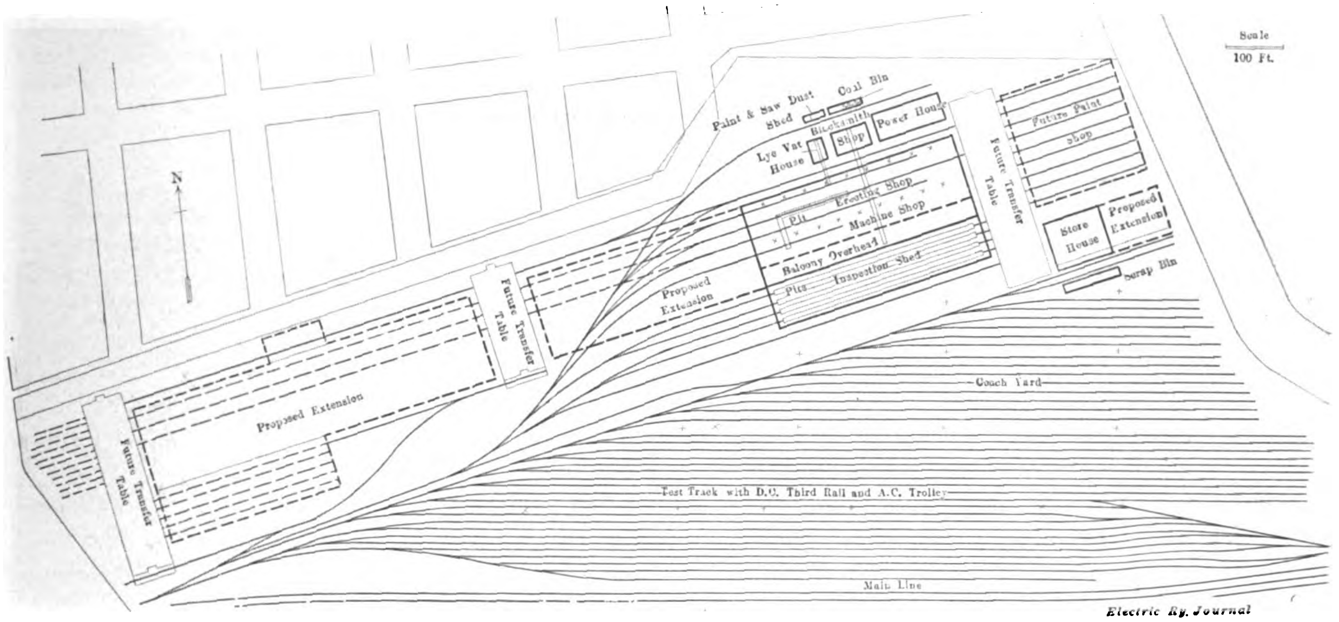
The facilities of the original shop at Stamford have been inadequate for several years past, as the extraordinary growth of passenger traffic on the New York, New Haven & Hartford since electrification has exceeded all of the estimates. In fact, the a.c.-d.c. locomotives operating over the present electrified zone and over the tracks of the New York Central to the Grand Central terminal in New York are very heavily overworked, being required to handle trains approximately 390 tons in weight, although they were designed for a load of but 250 tons. The old shop will, of course, be replaced absolutely by the new Van Nest plant for heavy repairs, but it will be continued in use as an inspection shed for engines and multiple-unit cars on the local trains terminating at Stamford.

Although the new shop is just beginning operation, it is already being heavily worked on account of the desire of the management to overhaul spare equipment, such as trucks, driving wheels, motors and the like, so that it may be kept on hand ready to install quickly upon disabled locomotives without involving the necessity for holding the engine out of service. At present the shop has to take care of forty-eight a.c.-d.c. locomotives and fifty-two straight a.c. locomotives. The multiple-unit cars number twenty-seven, of which twenty-one are a.c.-d.c. and six straight a.c.

GENERAL ARRANGEMENT

The shops, as shown in the accompanying line cut, are situated to the north of a large coach yard alongside of the six-track main line. The southern part of this yard is used by the transportation department for a freight yard, but its northern part is to be used as a coach-cleaning yard and storage yard for multiple-unit cars and trailers. In the middle of the freight yard there is to be a test track having standard third-rail charged with direct current at 600 volts and also a New Haven standard overhead a.c. trolley wire carrying 11,000 volts. On this track all locomotives and multiple-unit motor cars will be tested out as soon as they leave the shop, the third-rail being provided so that a.c.-d.c. locomotives and multiple-unit cars which are obliged to run over the tracks of the New York Central Railroad in New York City may have a thorough trying out before being placed in service.

The present buildings consist of a main structure which covers the erecting shop, machine shop and inspection shed; a storehouse at the rear, reached by a track alongside of the coach yard, and, at the side of the main building, a power house, a blacksmith shop and a small structure covering the lye vat. The three last-named buildings contain no inflammable materials and are of strictly fireproof construction, so they are set very close to the main building to reduce work of



New Haven Shops—General Arrangement of Existing and Future Buildings transporting pieces of apparatus to and from the latter.

As shown by the lay-out diagram, ample provision has been made for an extension of the present shops when future requirements of the road demand it. The extension that will have the earliest consideration, according to present plans, is the future paint shop shown at the east end of the main building and separated from it by a transfer table. The need for this, however, is dependent largely upon the growth of the commuting traffic on the division. The painting of the locomotives is carried on at present in the erecting shop as no special attempt is made to produce a high finish on the locomotive cabs. The extension of the main shop building will be made toward the west at such time as this may prove necessary, because in this direction the opportunity exists for 100 per cent additional shop space.

All of the buildings are of a characteristically simple style with brick walls and steel roof trusses. Permanent construction has been carried out to a most complete degree, all structures resting on heavy concrete foundations and having concrete floors, except in the blacksmith shop and lye vat house, where cinder floors are laid down. One of the ingenious features in this regard is the fact that the pipe tunnel used for carrying the exhaust steam and return for the heating system of the storehouse from the corner of the inspection shed is made of concrete, and as the trench is comparatively shallow, the top is made flush with the level of the top of the rail and serves as a walk between the storehouse and the main shop building.

The yard outside of the building is, of course, equipped throughout with 11,000-volt single-phase overhead construction. The conductor wires are single and are carried by single overhead cables strung between latticed steel posts in accordance with the New Haven standard construction for slow-speed or switch-yard service. No high-tension wires are taken into any of the buildings, and all switching of dead locomotives and multiple-unit cars is done by a steam switch engine which is kept at all times ready for service in the shop-yard.

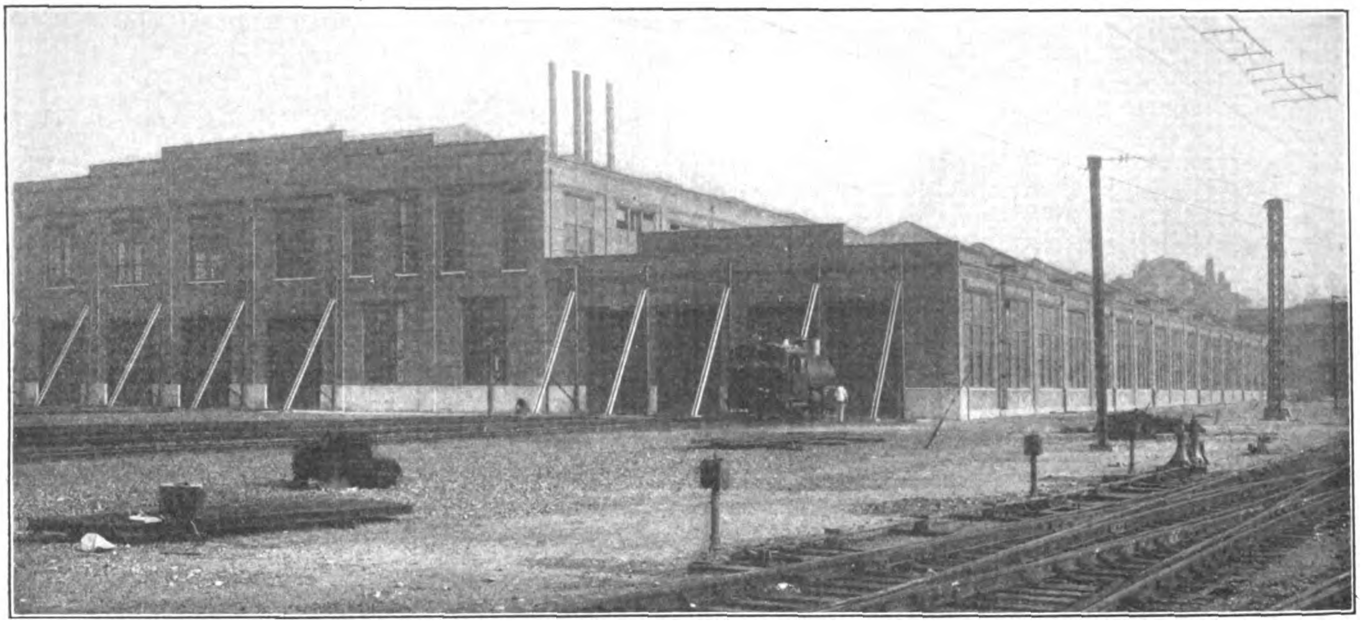
MAIN SHOP BUILDING

The main shop building is approximately 375 ft. long by 175 ft. wide, exclusive of the inspection shed on its south side. It includes an erecting-shop bay, a heavy-machine-tool bay and a light-machine-tool bay, the latter having a balcony over it for the manufacturing department. There are three longitudinal tracks in the erecting shop which extend practically the entire length of the building, the center one being extended through the east wall to provide connection with the future transfer table in the back of the main building. There is also a longitudinal track in the heavy-machine-tool bay which extends half the length of the building and serves as a repair track for engines that come in for breakdowns or for special repairs. This track, in addition, provides the means for bringing in heavy pieces of apparatus on freight cars so that they can be lifted off and carried to any desired part of machine shop by the overhead crane. Overhead cranes are provided in the erecting-shop bay and in the heavy-machine-tool bay. In the light-machine-tool bay 1½-ton electric hoists are provided, and these run upon a system of I-beam rails hung from the ceiling and provided with switches so that material can be transported to any desired part of the space served. Similar electric hoists are provided in the balcony.

All of the main doors are of the rolling steel type, one of them being provided with small entrance doors for individuals to pass in and out when the main doors are closed. The high-tension conductors, as mentioned above, are stopped off outside of the building, being dead-ended with insulators attached to uprights made of heavy angle-iron not in contact with the building wall.

All of the buildings are heated by the indirect hot-air system, three sets of steam coils with centrifugal fans being provided. The coils take exhaust steam from non-condensing air compressors and auxiliaries in the power house. Lighting is accomplished by numerous 500-watt Mazda lamps in the two main bays and 250-watt Mazda lamps in the balcony and underneath it. No arc lamps are installed anywhere in the shops, but both the artificial and the natural lighting are surprisingly good. Liberal skylight area is provided in the roof.

No shafting is to be seen anywhere in the shop, as all tools are driven by individual induction motors, auto-transformers for starting them being mounted on angle iron stands by each machine. Even the grindstone is run by a small induction motor. Another of the novel features of the shop is the fact that no direct current is used in it, since every motor is of the constant-speed induction type. Speed changes, where required, are effected by mechanical means.



New Haven Shops—West End of Main Building with Dead-End Supports for High-Tension Trolley Wires

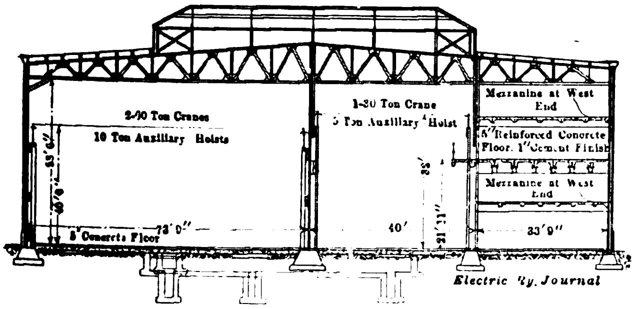
ERECTING SHOP

The three tracks in the erecting shop are served by two 60-ton transverse electric cranes with 10-ton auxiliary hoists on each trolley. Only one of the tracks is equipped with a pit, and in this case the pit only extends for about one-third of the track length. At each one of the building columns and in the pit in the erecting shop, and also in the machine-tool bays, is a male connection for air-hoses and a lighting plug. The couplings on the air-hoses are of novel construction, as they are made with an unusually coarse thread cut back at the outer edge so that dragging on the floor will not hurt it. The couplings are made of cheap malleable iron so that there is no incentive for any one to steal them. The lighting plug is supplied with single-phase current at 110 volts, the connections being made from different legs of the three-phase power line supplying the shop. These plugs also supply power for small portable tools such as electric drills, taping machines and portable commutator slotters.

Two of the erecting-shop tracks are served by a drop pit which extends across the shop and includes the short track in the machine bay, making a total of three tracks furnished with drop-pit facilities. There are hydraulic jacks in the pit at the center of each track. The jacks are operated by high-pressure water supplied by an electric pump from the main floor. This is started whenever pressure is required so that the strain on the hydraulic fittings as well as the use of current is reduced to a minimum. In the pit are three cars equipped with roller bearings which may be pushed along a narrow-gage track in the center of the pit to transfer wheels from under engines, after they have been dropped, to a point between the tracks where they can be picked up by the crane.

The drop pits are used for all wheel repairs not requiring the removal of the cab from the engine, the latter being lifted off only for the purpose of general overhauling. It should be noted that all except one of the New Haven locomotives are equipped with articulated frames so that they have to be picked up at four points longitudinally, each truck being raised as a unit. Therefore it is impossible to lift the engine off its wheels complete as in steam locomotive practice, because the transverse cranes have but one trolley each.

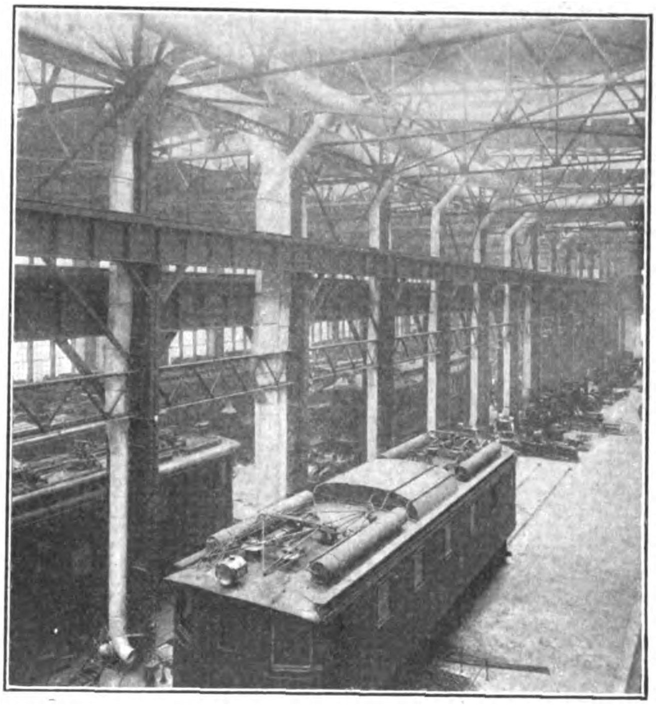
With engines brought in for general overhauling the procedure is, first, to take off the cab and rest it upon horses in another part of the erecting-shop bay. Then the trucks are lifted from the wheels and moved to one side, after which the driving wheels are taken to the driving-wheel lathe for tire turning.



New Haven Shops—Cross-Section of Main Shop Building

In the erecting shop portable, steel-topped benches are placed along the walls. These have vises at each side and are equipped with lockers formed by wire netting fastened between the cast-iron feet upon which the benches are supported.

The lye vat takes up two-thirds of a separate building just outside of the erecting shop and having dimensions of 43 ft. x 30 ft. It is of concrete waterproofed on the inside. The building connects by a transfer track to the erecting shop so that material may be handled with a minimum of labor between the two points. The lye vat is especially necessary on account of the free use of graphite grease on the gears and bearings of the locomotives and also because of the fact that a considerable amount of carbon dust from the brushes is continually blowing around. This makes it difficult to clean the various parts of the locomotive and makes the lye vat even more useful than it is in a steam locomotive shop.



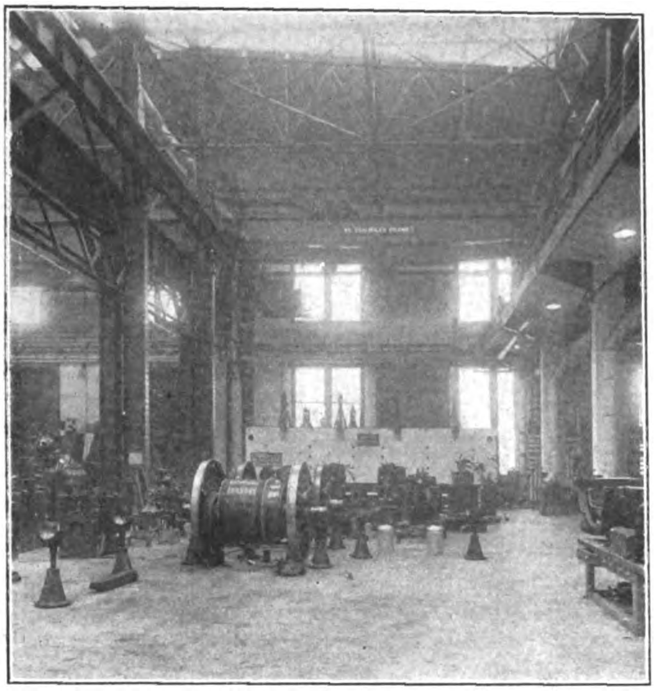
New Haven Shops—Stub Track in Machine Tool Bay

The transportation of material for immersion in the lye vat is accomplished by 2-ton storage-battery trucks. In the lye-vat house the various parts are picked up by a single I-beam crane with an air-operated hoist and then they are immersed in the solution of lye, after which they are washed off with cold water. Driving wheels are cleaned by hand outside of the shop building.

In the erecting shop are several of the heavier machine tools especially intended for work that seldom requires handling or else involves but one machine operation. These include driving-wheel lathes, of which one is installed at present with space for a future machine; a large vertical boring mill for tires, wheel centers, etc.; a 600-ton wheel press, and a car-wheel lathe. There as also a novel portable electric riveter for truck work and the light framing of car bodies and cabs. This consists of a frame, such as is used with the ordinary gap-riveter, having a hand-operated rivet set, the two sets being supplied with alternating current of large amperage through a pair of heavy leads. The machine has a bail so that it may be moved by the overhead crane to any desired place in the shop, power being obtained from one of the numerous large-capacity junction boxes and transformed to the desired voltage at the machine. Another desirable novelty in the erecting shop is a portable sand-blast outfit for cleaning parts that are covered with old paint or rust. A large oil filter with a capacity for 275 gal. of oil per day is installed at one side of the shop. This is used for reclaiming motor oil, and it is installed in the erecting shop rather than the inspection shed, because in the latter the bearings are refilled but the oil in them is seldom exchanged for new.

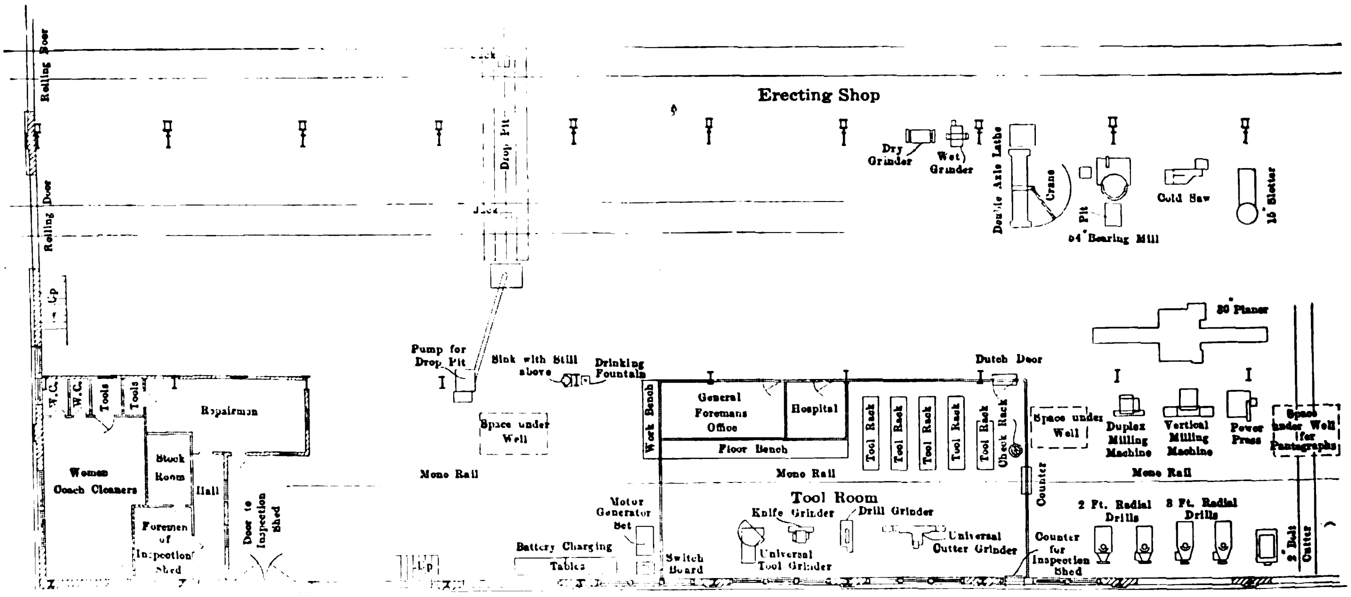
MACHINE SHOP

The machine shop, which as usual is not separated from the erecting shop by a wall, has a heavy-machine-tool bay, served by a 30-ton overhead crane equipped with a 5-ton auxiliary hoist, and a light-machine-tool bay with a balcony over it. As shown by the accompanying line cut, the two bays are respectively 40 ft. wide and 34 ft. wide, the former extending for the full length of the shop.



New Haven Shops—View of Armature-Winding Department, with Baking Oven at the Rear

As mentioned before, the heavy-machine-tool bay is served by a track that extends for about half the length of the shop and there are no machine tools in this end of the bay. The list of tools installed and the manner in which they are distributed over the east end of the shop is in accordance with the arrangement shown on the two accompanying line cuts.


Rolling Door
Rolling Door
Up
Jack
Drop Pit
Jack
Erecting Shop
Dry Grinder
Wet Grinder
Double Axle Lathe
Crane
Pit
64" Boring Mill
Cold Saw
16" Slotter
80" Planer
Pump for Drop Pit
Sink with Still above
Drinking Fountain
W.C.
W.C.
Tools
Tools
Repairman
Women Coach Cleaners
Stock Room
Hall
Foremen of Inspection Shed
Door to Inspection Shed
Space under Well
Mono Rail
Motor Generator Set
Battery Charging Tables
Up
Switch Board
Work Bench
General Foremans Office
Hospital
Floor Bench
Tool Rack
Tool Rack
Tool Rack
Tool Rack
Tool Rack
Check Rack
Dutch Door
Mono Rail
Tool Room
Knife Grinder
Drill Grinder
Universal Tool Grinder
Universal Cutter Grinder
Counter
Counter for Inspection Shed
Space under Well
Duplex Milling Machine
Vertical Milling Machine
Power Press
Space under Well for Pantagraphs
Mono Rail
2 Ft. Radial Drills
3 Ft. Radial Drills
2" Bolt Cutter

New Haven Shops—West End of Machine Shop

One of the features in the tool equipment will be found in the large baking oven at the extreme east end of the heavy-machine-tool bay. This is built of brick, and it has a removable roof of transite board in addition to doors in the side, the removable roof permitting the heavy pieces to be placed in the oven by means of the 30-ton overhead crane. The floor is made up of a strap-iron grating with the strips set on edge, and underneath it are coils supplied with high-pressure steam from the boiler plant, giving a temperature of over 200 deg. in the oven. Racks for small pieces of material are installed along the sides of the oven.

Adjoining the baking oven is a dipping vat capable of holding armatures for the largest type of propulsion motor in use. In consequence a complete armature and fields can be dipped at once. Armatures for propulsion motors of the direct-connected type are dipped at present by rolling them in a pan containing baking varnish so that only the coils are immersed.

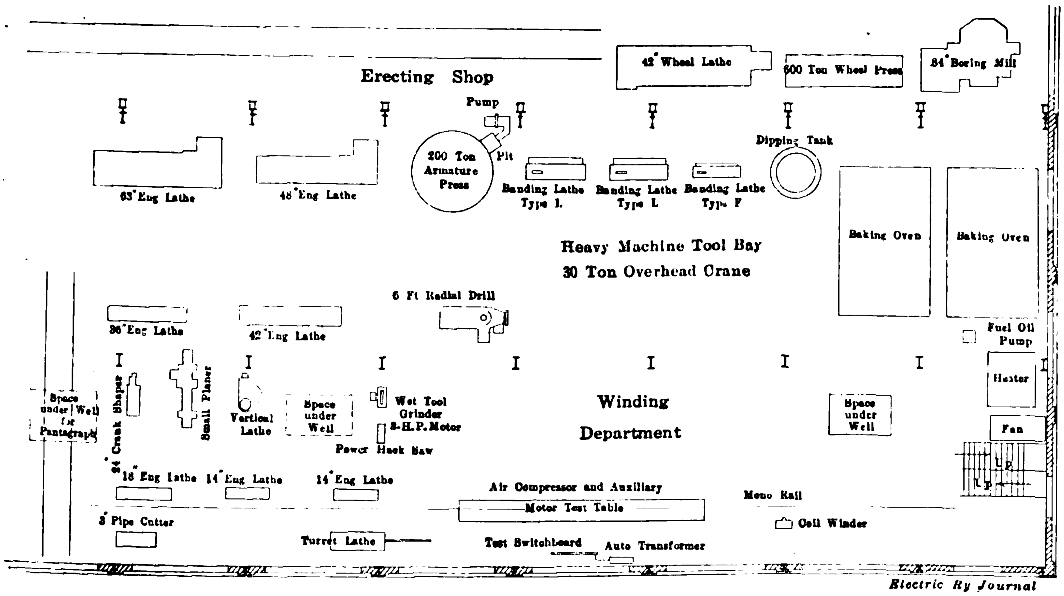
The practice in the baking and dipping process is, first, to heat the pieces in the oven at from 90 deg. to 115 deg. C. for a period ranging from twelve hours to seventy-two hours, or long enough to drive out all moisture. Then the pieces are immersed in baking varnish until all air has left the interstices in the material, as indicated by a complete stoppage of the rising stream of bubbles from the piece in the dipping vat. After saturation the pieces are drained for half an hour, and then they are again placed in the oven and baked at the correct temperature for seventy-two hours, the temperature being determined by a pyrometer. On the armatures for the locomotives of the latest type, in which there are two motors geared to each driver, there is no canvas hood at the ends of the armature, and after the clips are on the coils and soldered in place the whole is sealed up with Bakelite cement and baked for seventy-two hours at about 100 deg. C.

The front or west end of the light-machine-tool bay is occupied by the offices and quarters for the employees in the inspection shed. Next to this comes a space used for storage battery charging and testing, and next to this, approximately in the center of the shop longitudinally, are the tool room and general shop foreman's office. One of the interesting features of this section of the shop is a completely equipped emergency hospital with a cot, stretcher and small operating table in addition to a remarkably complete outfit for first aid to the injured.

In the toolroom a novel checking system is employed, the men being charged with tools by numbered checks, which are kept in the tool room and not by the men. Each man, however, has a number, with which the numbers on the checks correspond. When a man draws a tool a check is taken from the board upon which they are all kept and left in the rack in place of the tool, thereby showing that the tool is in the possession of some particular workman.

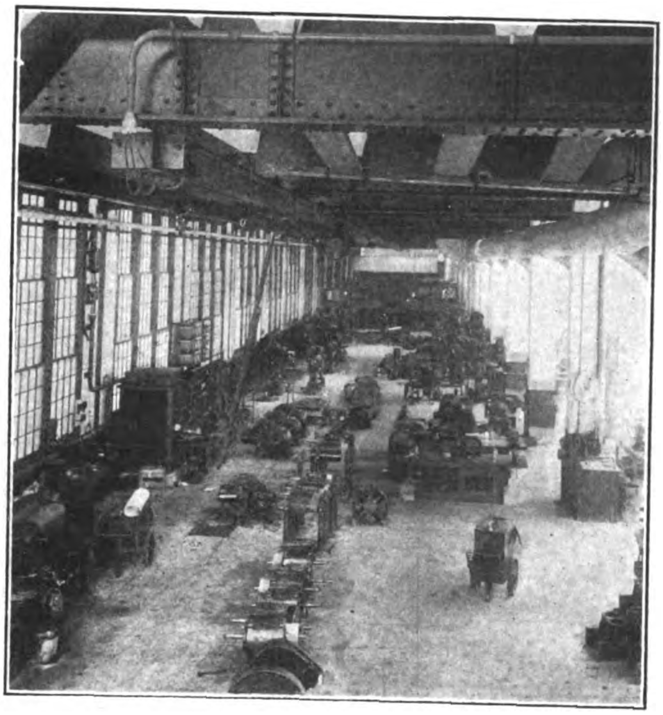
An elaborate testing system is installed for auxiliary apparatus. This is installed along the wall at the south side of the light-machine-tool bay and consists of a 175-kva auto-transformer and a motor-generator set, the latter supplying direct current at 550-volts for testing d.c. relays and the operation of auxiliary motors under d.c. conditions. The auto-transformer is equipped with taps for 643 volts for the motor-generator and for a.c. relays in the a.c.-d.c. control, for 360 volts for air-compressor motors, and for 300 volts for blower motors. Taps for 500 volts, 250 volts and 125 volts are installed in case their use is demanded on account of apparatus requiring these voltages. All of the taps are led to a single switchboard and connected to one side of two-position feeder switches, which are also supplied from the motor-generator. Therefore, when the switch handle is thrown in one direction direct current is obtained in the feeders, and when it is thrown in the other direction single-phase current is obtained. The d.c. terminals of the motor-generator set are connected through an adjustable grid resistance, and the d.c. voltage is controlled by a hand wheel on another panel of the switchboard. On the switchboard is also a ground connection, as all circuits are brought back at ground potential.

The 362-volt taps and the 300-volt taps for air-compressor and blower motors respectively are connected to separate busbars so that a number of these auxiliaries may be tested at one time. These busbars, on the outgoing side, are connected through additional two-position switches to feeders that extend out to different points along a testing bedplate upon which may be bolted the auxiliaries to be tested. Ten outlets are provided along the edges of this bedplate and with the outlets are also provided air connections to four receiving tanks along the wall, so that air compressors may be operated under actual service conditions. Each tank is equipped with a standard electro-pneumatic governor mounted near the bottom of the switchboard which automatically cuts off current when pressure in the tank reaches any predetermined point. The testing bedplate is made of cast iron and is equipped with key slots for bolting the auxiliaries to it while they are under test.


Erecting Shop
42" Wheel Lathe
600 Ton Wheel Press
84" Boring Mill
Pump
Pit
200 Ton Armature Press
63" Eng Lathe
48" Eng Lathe
Banding Lathe Type I.
Banding Lathe Type L
Banding Lathe Type F
Dipping Tank
Baking Oven
Baking Oven
Heavy Machine Tool Bay
30 Ton Overhead Crane
6 Ft Radial Drill
36" Eng Lathe
42" Eng Lathe
Fuel Oil Pump
Heater
Fan
Space under Well for Pantagraph
24" Crank Shaper
Small Planer
Vertical Lathe
Space under Well
Wet Tool Grinder
3-H.P. Motor
Power Hack Saw
Winding Department
Space under Well
Up
Up
18" Eng Lathe
14" Eng Lathe
14" Eng Lathe
Air Compressor and Auxiliary Motor Test Table
Mono Rail
Coil Winder
3" Pipe Cutter
Turret Lathe
Test Switchboard
Auto Transformer
Electric Ry Journal

New Haven Shops—East End of Machine Shop

At the extreme west end of the light-machine-tool bay is a mezzanine floor containing offices, lockers and toilet rooms for the men on the ground floor.



New Haven Shops—East End of Light Tool Bay

MANUFACTURING DEPARTMENT

In the balcony over the light-machine-tool bay is the manufacturing department. This is one of the most interesting features of the shop. It is served by 1½-ton traveling electric hoists operated by pendent cords and running longitudinally on I-beam tracks with switches at several traverse tracks to serve all sections of the balcony floor. There are several wells in the balcony floor so that material may be handled by the hoists to and from the main floor with a minimum of physical effort. In addition to this the balcony is extended out beyond the line of columns on the heavy-machine-tool bay side so that material may be picked up by the auxiliary hoist of the 30-ton crane in the heavy-machine-tool bay and landed at any desired point along the edge of the balcony.

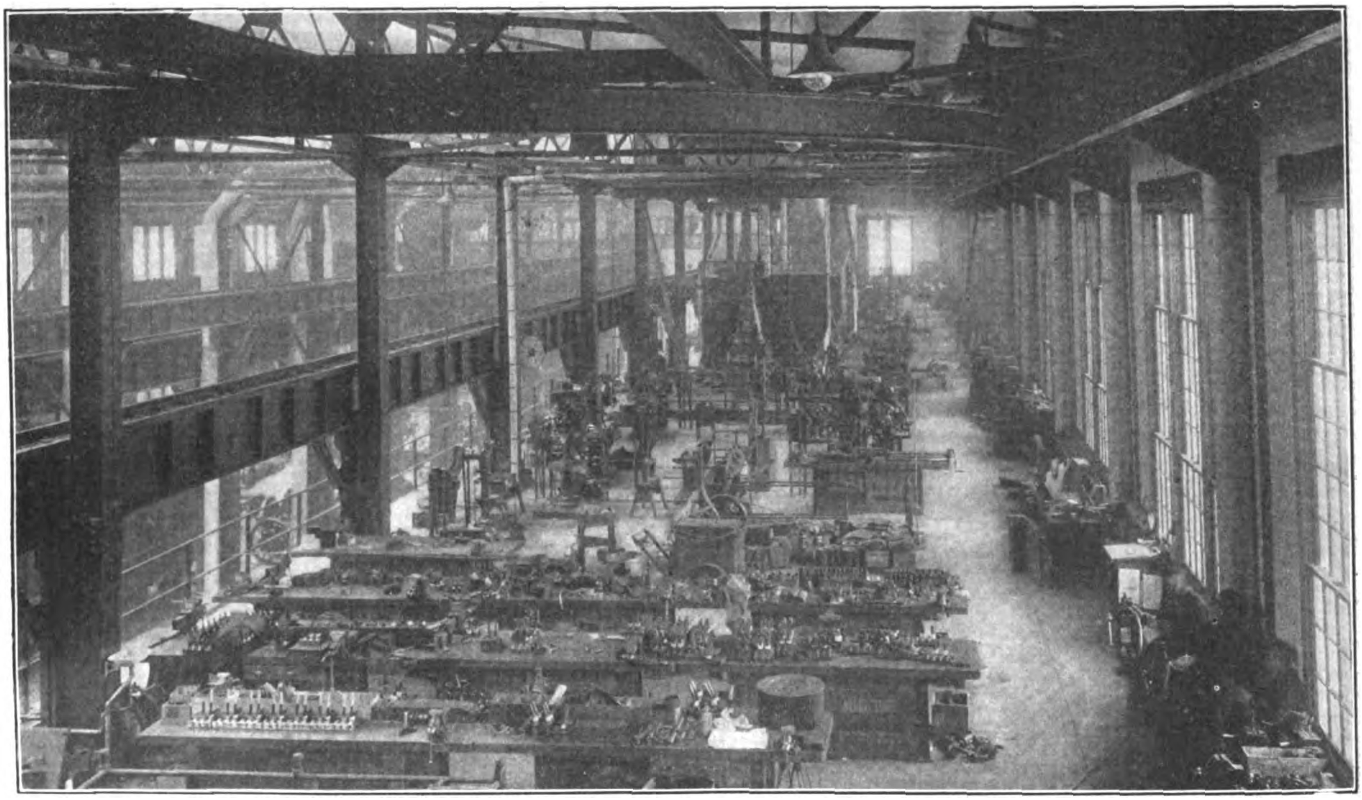
Starting at the extreme east end of the balcony, there is a babbitting department where brasses and bearings are rebabbitted. In this department are four babbitt-melting furnaces operated with crude oil, the babbitt being melted in heavy crucibles. Hoods with doors of sheet iron completely inclose the top of each crucible to limit oxidation. In addition, there is a furnace for melting babbitt out of old journal brasses, and this has a fire-brick-lined chamber set on a cast-iron table. There is a hole in the table at the center of the furnace, and grooves are cut in the top of the table so that the babbitt, when it is melted out of the old brasses, will flow through the hole into a mold on the floor. The waste gas from the furnace passes through the hollow top of the table and keeps it hot so that after the babbitt has been melted out the brasses can be laid on it and thus kept at a high temperature for tinning. There is a canopy with a stack leading to the roof over the oil furnace and also an air hoist which travels the full length of the table. This hoist serves in addition another table which stands beside the first one and which is used for babbitting the brasses. A third table is also provided for extra babbitting work. All three tables are of heavy cast-iron construction with gas-pipe legs.

Adjoining the babbitting department is an electric welding outfit with motor-generator set and switchboard. This is served directly by the electric traveling hoists. It is planned to handle at this point all light material requiring electric welding. Leads will be run to other parts of the shop to provide electric welding facilities on parts too cumbersome to be transported to the balcony. Next to the electric welding department comes a small woodmill for making doors, steps and floor boards, third-rail shoebeams for the a.c.-d.c. locomotives and other light woodwork.

At about the center of the balcony in a longitudinal direction is the pantograph department. In the middle of the space devoted to it is a well over one of the transverse tracks in the shop so that the complete pantographs may be lowered through the well onto a truck standing on the transverse track beneath it and from there pushed across the main shop floor. From the trucks, of course, the pantographs are picked up by the cranes in either the machine or the erecting shop bay and placed upon the locomotive roofs. Near this bay is the department for third-rail shoes and direct-current overhead collectors. There is also a small assembling department for the springs used on the geared locomotives to hold the driving-wheel quills in place. Adjoining this there is a space for tinners. It is equipped with the usual tinner's tools for repairing and rebuilding headlights, gear cases, sirocco blower runners and the like, and next to this space is a large area devoted to the manufacture and repair of small electrical parts, the grinding of burnt contact fingers and the assembling of brush holders, contacts and other pieces of brass or fiber. A large amount of work is done here, as practically no replacements of small parts are made by the purchase of new ones.

All of this material is manufactured on store order and then turned into the store department, from which it is drawn as needed. Old pieces are turned in in the place of the new ones drawn out as required by the erecting-shop men.

At the west end of the balcony is an air-brake department and next to this a locker and washroom, the latter being kept in spotless condition by a janitor. There is a mezzanine floor for the balcony as well as for the ground floor, and this contains the general office, the telephone exchange and the draftsmen. Another novelty in this repair shop is the presence of a shop specialist to design jigs and templets.

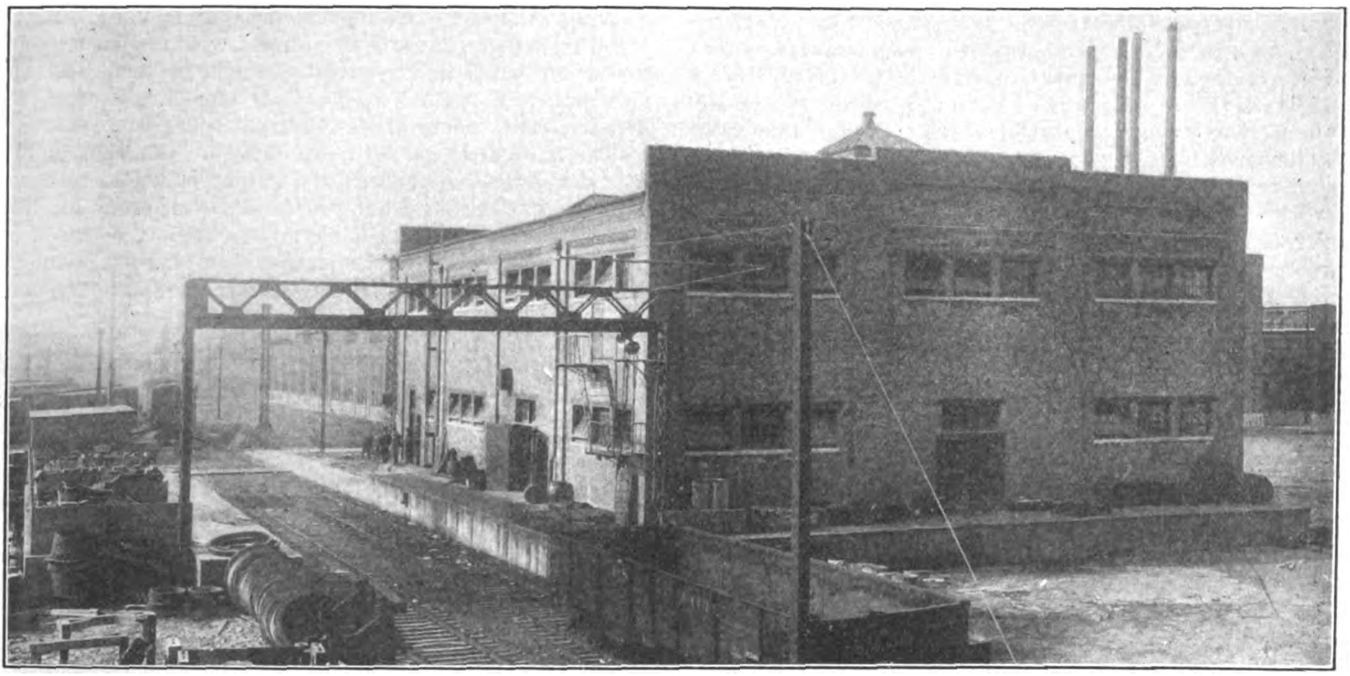


New Haven Shops—Manufacturing Department in West End of Balcony

STORE HOUSE

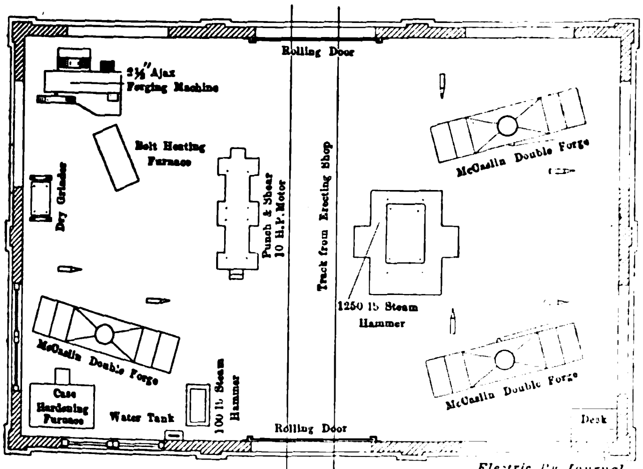
The storehouse, which is just back of the main shop buildings, is two stories in height, the first being at the level of the car floor. A platform is built along the building wall at one side, and this is paralleled by two railroad tracks. The second story is reached by a freight elevator. Pressed-steel bins are used throughout for the storage of practically all material. These bins are numbered in accordance with a filing scheme and a record of the location of each piece in the stock is kept in the office.

The oil is stored in tanks in the basement, oil pumps being provided on the main floor along the wall next to the two supply tracks. The tanks may be filled from barrels or tank cars as desired, a connection being made outside of the building and distributed into any of the tanks desired from tank cars. Gasoline, which cannot be kept in the building on account of fire risk, is stored in an underground tank some distance away from the building, and a pipe is laid from it to a pump inside of the building so that it can be drawn as needed.


New Haven Shops—View Looking West from Back of Storehouse to Show Scrap Platform and Bridge for Traveling Hoist

One of the features of this department is the fact that brass castings and copper are kept in bins locked up in a heavy netting inclosure, so that no opportunity exists for stealing even if the door of the storehouse should be left open.

These scrap bins are built with much more care than is usually found on railroads. They are constructed on a concrete platform at car-floor level, and the separation between the bins for the different materials is made by 3-in. planks bolted to old rails set up in the concrete floor of the platform. Brass and copper scrap is kept locked up in a house over the two bins. As the scrap bins are at car-floor level they are reached by means of a ramp from ground level, a concrete walk being provided for trucking material to the scrap bin either from the main shop building or from the storehouse.



Electric Ry. Journal

New Haven Shops—Arrangement of Blacksmith Shop

A bridge carrying a triplex hoist spans the two tracks alongside of the storehouse and also the platforms of both storehouse and scrap bins. This is used for handling very heavy material between the storehouse platform and the scrap bin or for handling material out of cars to the storehouse or to or from the bins. At the east side of the storehouse is a fixed crane with a triplex hoist for handling material from wagons, which are brought in at this side of the storehouse when they make deliveries of material purchased locally.

BLACKSMITH SHOP

The blacksmith shop is a plain brick building well lighted by high windows. The work done here includes forgings of the heaviest type, and provision for this is indicated by the installation of a 1200-lb. hammer and two cranes with triplex blocks serving it from each of the two forges near by. The shop is also equipped for tool dressing with a small steam hammer, this being installed instead of the usual power hammer so that it can be used for general light welding and other small forgings. With the Ajax forging machine will be manufactured the spring hangers and other pieces peculiar to the electric locomotives. Bolts are also to be reclaimed, although the standard work is all done in the main shop of the New Haven Railroad at Readville.

A large case-hardening furnace, burning crude oil, is installed, and alongside of this is a concrete quenching vat which takes the place of the unsightly tubs used for that purpose in a great many cases. A considerable amount of case-hardening of material such as pins and bushings is done at this point, and this accounts for the liberal provisions for the work. One of the transverse tracks from the erecting shop extends across the narrow space between the main building and the blacksmith shop, and over this heavy material is handled on 2-ton storage battery trucks. The tools installed in the shop are shown in the accompanying line cut showing the floor plan of the buildings and the arrangement of the various tools.

INSPECTION SHED

The inspection shed, which is on the south side of the main shop building, has four longitudinal tracks extending the whole length of the building. Doors are provided at each end. These tracks will connect to the future transfer table at the rear of the building. The floor of the inspection shed is depressed about 1 ft. to permit easy inspection of multiple-unit car trucks and journals from the outside. There is a pantograph gallery for the use of men working on the roof of the cars between each pair of tracks, and this is set at the level of the car roof, hanging from supports from the roof trusses.

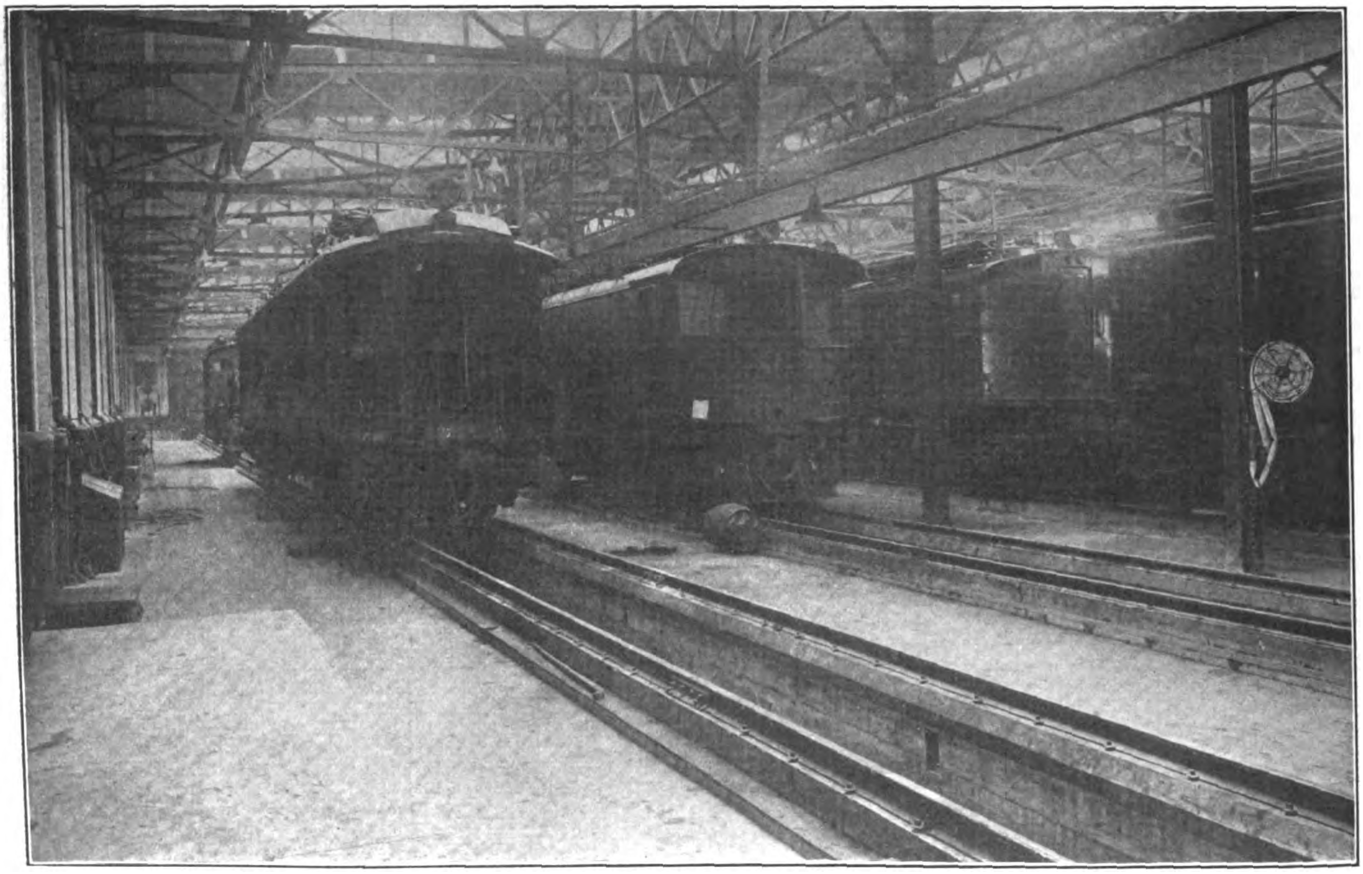
Pits are provided for all tracks, the rails being carried on 8-in. x 12-in. timbers with screw spike fasteners. The pits are of the unusual depth of 5 ft., but shelves 18 in. high are provided on each side of the pit so that the workmen when engaged in repair work or inspection underneath cars can stand with one foot on each shelf and raise their heads to the level best adapted for their work. On the other hand, when a man wishes to walk through the pit the depth provides practically clear head room and thus eliminates the great difficulty of movement in the ordinary shallow pit.

The building is well lighted by skylights spanning two tracks each. Plug connections for portable lamps and small tools are provided along the walls of the building together with drop pipes from overhead compressed air mains. Lighting plugs are also provided at short intervals in each pit. The building is heated by the indirect system, the heating ducts opening into the pits at intervals so as to provide hot air under the cars where it is most needed for melting ice and snow in winter.

POWER HOUSE

The power house is installed to provide steam for heating and other uses and also compressed air to the shop for portable tool operation. It contains four 250-hp Babcock & Wilcox boilers installed in one end and set with their fronts parallel to the long dimension of the building. Coal is shoveled direct from the track at the rear of the building into the storage hoppers. The boilers are equipped with Taylor stokers in order to avoid smoke, as the power house is in a residence district. For this reason also each boiler is equipped with a stack 125 ft. in height to prevent gas from the boilers being discharged at such a low level that it might enter the windows of nearby dwellings.

There are two 2000-ft. Laidlaw-Dunn-Gordon cross-compound, two-stage air compressors operated non-condensing so that the exhaust steam may be used in heating the shops. These are equipped with a novel outside air cooler which is composed of small vertical pipes on two manifolds with a by-pass for use in case of emergency. The compressed-air and live-steam exhaust pipes between the power house and the main shop building are carried overhead at a height sufficient to clear a man standing on a car roof. A novel intake for the air compressors has been installed. This consists of a bonnet over the end of the intake pipe, the top 18 in. of which is fitted with a screen under the bonnet. Dry air for the compressors is by this method always assured.



New Haven Shops—Interior of Inspection Shed

High-tension current in three-phase form is brought into the power house through outside switches. These are controlled from the inside switchboard, where the voltage is reduced to 550 volts for shop use.

A novel muffler for the exhaust from the large steam hammer has also been designed. This is made up of a length of 5-in. pipe, slipped over the 3-in. exhaust pipe from the hammer and provided with slots to permit air to be drawn into it by the action of the exhaust. The result of the admixture of a large volume of air is very successful in cutting down the noise of the exhaust. Another feature of the power equipment of the shop is a boiler blow-off tank 6 ft. in diameter and 12 ft. long, with an overflow to the sewer and a 3-in. vent to the roof of the main shop. No baffles are installed in the tank, but no water is thrown from the exhaust.

Efficiency Engineering in the Shops of the Milwaukee Electric Railway

An Account of the Shop Practices and Accounting Methods Employed by This Company in Conjunction with the Operation of Its Planning Department and Premium System of Paying Shop Employees

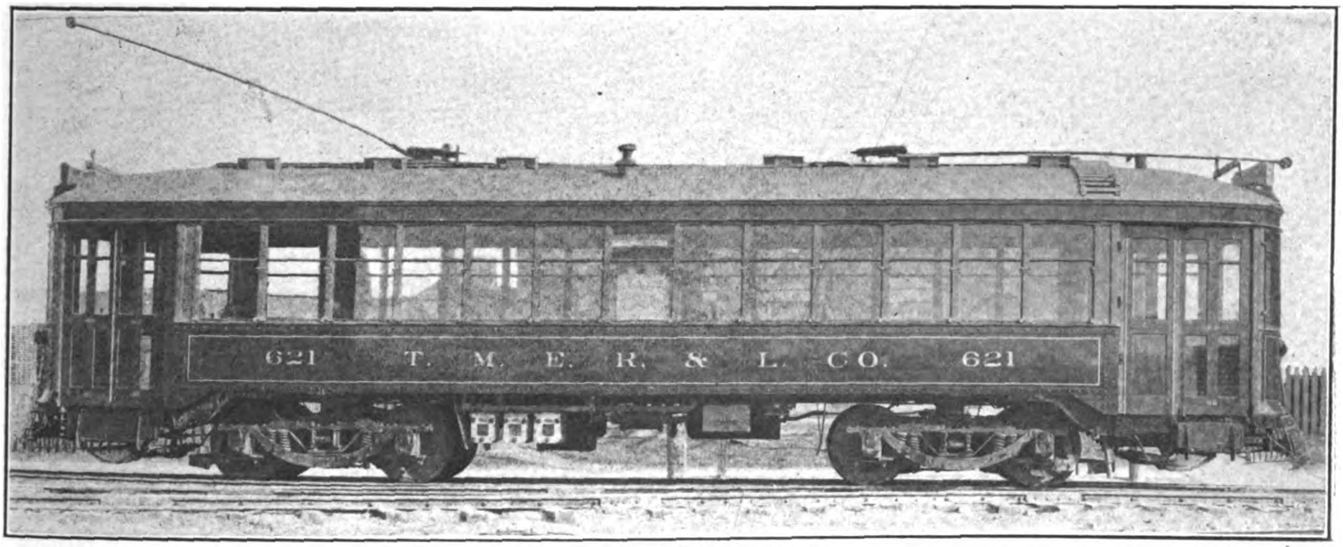
Efficiency engineering in the shops of The Milwaukee Electric Railway & Light Company is pursued along two definite lines. One includes the work of checking the wearing life of materials and equipment as compiled by the engineer of equipment. The other covers the methods developed by the shop accountant in the planning department and forms a part of the premium system of paying employees. Excellent work is done in each field and many shop economies have resulted.

The work under the direction of the engineer of equipment is largely that of compiling equipment records. Forming a part of records are photographs of each of the different types of car in service. These include three views, a front, an interior and a full side view, the latter giving briefly a description of the car, its number, type, the name of the builder of the body and the trucks and the year purchased. These photographs are of a standard size and are prepared by the company's photographer when the different types of cars are built. In order that duplicate photographs may be obtained easily, each photograph of a car has a plate and file number which may be used in referring to it.

Another set of photographs is being developed, and these will be distributed among the offices of the several stations and stores. The set includes photographs of various equipment parts such as contactors, trucks, control details, stoves, fenders, etc., of such size and in such position that the correct name of each part may be shown. In many instances the department heads and the storekeepers have different names for the same part of a car's equipment, consequently more or less difficulty has been experienced. Under the new scheme all departments, as well as the storekeepers, will be supplied with these charts, so that there can be no question as to just what it desired. As a result, quicker as well as more accurate delivery is anticipated, and as fast as repeated errors occur with other parts of car equipment, similar charts will be prepared to remove the difficulty.

PULL-IN AND DEFECT RECORDS

The manner of compiling pull-in and defect records conforms to that generally adopted. The defect system includes a triplicate report from the motorman in charge of the car on which various forms of defects are shown, so that he can check off all car defects as they develop on a car in service. One of these reports is given to the station foreman and is an immediate notification of existence of trouble. Another is sent to the office of the superintendent of rolling stock, and the third is sent to the transportation department. The back of the station foreman's copy of this report contains space for his explanation of the defect as reported by the motorman. The purpose of this is to check the motorman's ability to discern and properly locate the car trouble, and at the same time it serves as a record of repairs made.

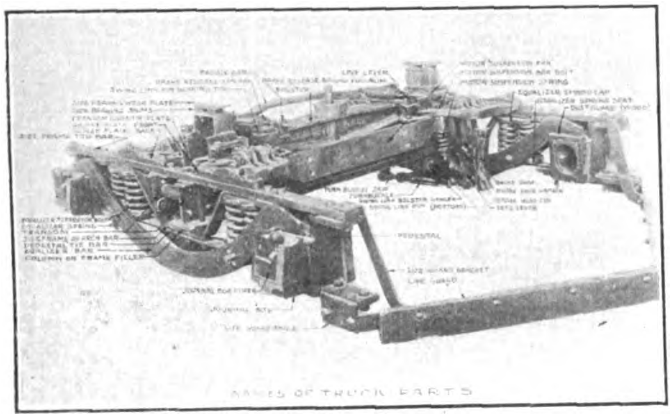


Milwaukee Efficiency Engineering—Side-View Type of Car Built for Which Standard Time Is Shown in List of Operations

After the station foreman's repair report has been checked against the motorman's defect report, all reports are forwarded to the claim department for its record. Each station foreman also keeps a record of car pull-ins on a daily report form, setting down each pull-in against a classified record of causes. This report in turn serves as the basis for a daily pull-in report which the office of the superintendent of rolling stock prepares for the general manager.

While the pull-in report serves in a general way as a check on various types of equipment, it is not sufficiently specific to produce the desired results, and other report forms have been prepared by the engineer of equipment. One, on electrical failures, covers the period of a month and gives a list of the various types of motors and controllers in service. This list of equipment is repeated five times on a sheet, and a blank space beside each complete list is filled in by the equipment engineer. If it is desired to check brush holders, short-circuited armatures, grounded armatures or field trouble, he indicates it in the blank space, and it is checked against the various types of motors. From the foregoing check it is possible to locate exactly the trouble with any particlar type of equipment and take such steps as are necessary to remove the cause. In order that this report may be accurate, the actual defect checks are made in the armature room at the time repairs are made. Similar checks and tests are made on all other new material and devices, as well as that in regular use, when the pull-in records indicate an unusual number of failures.

In order to carry further the problem of explaining car defects and recording pull-ins, a monthly report of pull-ins is made on the thousand-car-mile basis. This indicates the number of pull-ins for the current year compared with those of the year previous, a similar comparison of the total car miles run, the pull-ins per 1000 car miles, the number of cars operated and the average mileage per car. All of these items are charged against the five carhouses and thereby to a certain extent serve as a check against the efficiency of the repair and inspection force at each station. A similar report is kept to compare the car defects for each month. This distributes them against each carhouse and classifies them under six headings, namely, carbody, air-brake and hand-brake, truck, controller, motor and miscellaneous troubles. In addition to indicating the number of cases of trouble, the record also shows the per cent increase or decrease for each class of trouble in each carhouse.



Milwaukee Efficiency Engineering—Typical Correct-Name Chart for Shop Use

The foregoing reports are somewhat general and are used primarily for the information of the general manager in the monthly report. A more detailed report of car pull-ins also is compiled for each month, taking the various classifications shown on the general report and charging them against the particular class of trouble, as well as against the other departments, namely, transportation and track and roadway, which also contribute to the total number of pull-ins. This detailed classification also is compared with the corresponding month of the year previous, and the per cent increase or decrease is indicated. This information is tabulated again on a second report form, charging the various classes of defects against the different carhouses. The latter record form is sent out to the various carhouse foremen, and their record of efficiency is shown in the net pull-ins per 1000 car miles operated. The moral effect of this report is materially to increase car station repair and inspection efficiency.

That part of the efficiency work relating to increased cost of production with particular reference to the introduction of shop kinks and jigs to increase the output of the various machines and at the same time reduce the cost of various mechanical operations is under the direction of the shop production foreman. Considerable time is devoted to this particular work and much good has been accomplished. Descriptions of the various kinks and jigs used in the shops of The Milwaukee Electric Railway & Light Company are described and illustrated in another article in this issue.

PLANNING DEPARTMENT AND PREMIUM SYSTEM

Payment of labor in the company's shops is largely made upon the basis of a premium or bonus system, although piece-work had been previously given several years' trial. The strongest objection to the piece-work system was the belief that it was unjust to the best men. For instance, if a particular job cost $2.25 and a good mechanic could do the work in six hours, it was sometimes found that an apprentice could do a similar job in eight hours. If the good mechanic received $3.25 per day and the boy received $1.50 per day, the boy under the piece-work system received a much greater per cent increase in his wages than the mechanic. This discrimination was considered unfair to the older man, as the two hours' reduction in time necessary to perform a certain operation might require years of experience and practice.

PULL-IN REPORT FOR MONTH ENDED JANUARY 31, 1914, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

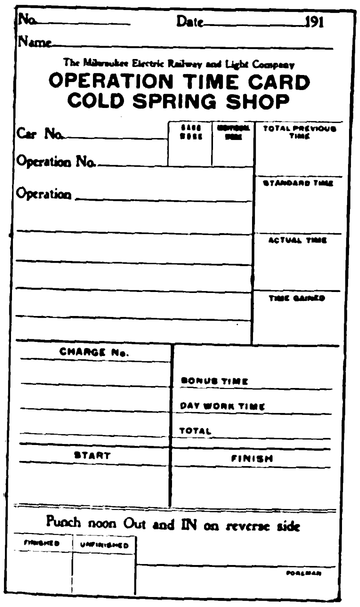
	—MILWAUKEE CITY CARS—			—INTERURBAN MOTOR CARS—		
Item	This Year	Last Year	Per Cent Increase or Decrease	This Year	Last Year	Per Cent Increase or Decrease
Hot bearing	2	3	33.33 D	6	10	40.00 D
Brake and truck trouble	20	64	68.75 D	5	7	28.57 D
Slack brakes	32	117	72.64 D	3	..	..
Air trouble	48	131	63.35 D	30	18	11.11 I
Heater trouble	23	28	17.85 D	16	11	45.45 I
Control trouble	25	101	75.24 D	3	3	00.00 ..
Wiring trouble	31	83	62.28 D	1	23	95.65 D
Motor trouble	69	274	74.81 D	30	18	66.66 I
Gear and pinion trouble	3	11	72.72 D	..	6	100.00 D
Broken glass	30	49	38.77 D	3	2	50.00 I
Door trouble	22	21	100 00 I	1	..	.. I
Collisions	32	29	10.34 I	..	1	100.00 D
Split switch and jumped track	14	23	39.13 D	..	..	00.00 ..
Miscellaneous	211	110	91.81 I	40	9	344.44 I
Total	562	1037	45.80 D	128	108	18.51 I
Chargeal le to Transportation Department:						
Pulled in, found O.K.	39	32	21.87 I	2	2	00.00 ..
Broken glass	30	48	37.50 D	2	3	33.33 D
Due to trailer operation	21	..	.. I	..	..	00.00 ..
Collisions	32	29	10.34 I	..	..	00.00 ..
Miscellaneous	80	16	400.00 I	21	..	.. I
Total	202	125	61.60 I	25	5	400.00 I
Chargeable to Way and Structure Department:						
Split switch and jumped track	14	22	36.36 D	..	..	00.00 ..
Miscellaneous	..	1	100.00 D	..	..	00.00 ..
Total	14	23	39.13 D	..	..	00.00 ..
Grand total failures, other than equipment	216	148	45 94 I	25	5	400.00 I
Net equipment failures	346	889	61.07 D	103	103	00.00 ..
Failures per equipment operation	0.644	1.7603	69.99 D	2.06	2.06	00.00 ..
Failures per 1000 car miles	0.2872	0.7289	60.59 D	0.6933	0.6681	3.77 I

Under the premium or bonus system each employee is always entitled to his regular day's wages, but the standard time adopted for any particular operation serves as a guide to the foreman on the workman's ability to do certain work, and in case the operation is performed in less than the standard time set he shares one-half in the money saved the company. In other words, the time saved is multiplied by one-half his hourly wage and is added to his regular earnings. The system has been in operation for about two years.

Beginning the first of this year, the mechanical department broadened the scope of the planning department to include the planning of all shop work. This department now separates the work into definite operations, records the time and adds the bonus, where earned, to all operations on which a standard time has been fixed. It also determines the unit costs of all stock manufactured in the company's shops.

The establishment of the bonus system at first met with considerable opposition on the part of the employees. They believed that it was a means by which the company would profit, and there was a grave possibility that they might not receive the total daily wage they had been paid in the past. The first operation to be put on the premium basis was that of wiring a car. No doubt the formality with which this job was instituted had much to do with the slowness with which the premium system was accepted by other employees. A detailed contract was prepared and signed by the employee in charge of this first job, but this required more or less dickering before the exact terms could be decided. In order to eliminate this formality and at the same time simplify the work, an operating time card was adopted to serve the purpose of a long formal contract. The first operations under the new system were performed by loyal employees, but it was even then a little difficult to get them to accept the first job. The trouble appeared to be that the men could not estimate their ability, but they finally agreed to "take a chance" as there was apparently nothing to lose and everything to gain. Fortunately, the men who were selected "made good" and received a bonus for their work. This greatly influenced others to fall in line.

The result of the first job was about as follows: The standard time for three men in a gang in wiring a car was fixed at 300 hours and the work was actually done in 210 hours. This meant that each man received a bonus of 23 per cent increase in his daily wage. Under the present arrangement employees' bonuses are limited to a 40 per cent increase over their regular daily wage. To date, a maximum of 115 men out of a total shop force of 360 men have worked in accordance with the premium system of pay.


No.________ Date____________191

Name______________________

The Milwaukee Electric Railway and Light Company

OPERATION TIME CARD

COLD SPRING SHOP

Car No.______________

Operation No.______________

Operation ______________

TOTAL PREVIOUS TIME

STANDARD TIME

ACTUAL TIME

TIME GAINED

CHARGE No.

BONUS TIME

DAY WORK TIME

TOTAL

START

FINISH

Punch noon Out and IN on reverse side

FINISHED

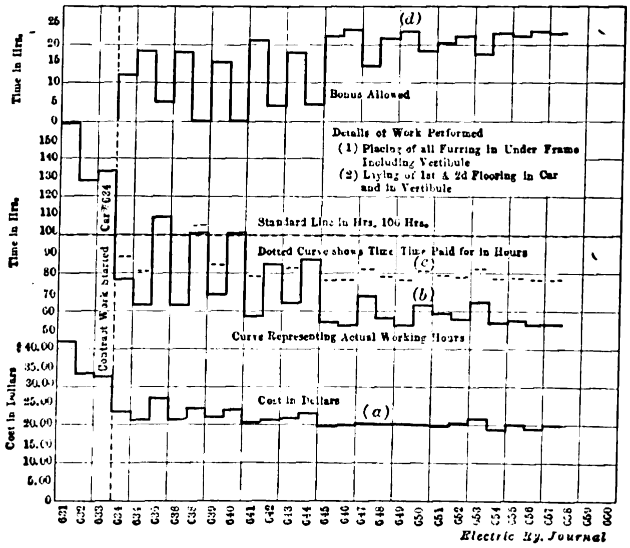
UNFINISHED

FOREMAN

Milwaukee Efficiency Engineering—Operation Time Card

Probably one of the most interesting tests of the premium system was made in connection with the construction of thirty car bodies. The time necessary to construct the floors and underframes of the first three cars was carefully observed and found to be 160 hours on the first car, 128 hours on the second car and 133 hours on the third. At the close of these observations it was decided to put this work on a premium basis, and accordingly a contract was let with the standard time fixed at 100 man-hours. This reduction in time was considered advisable, as careful observations indicated that all the men in the gang were not working up to their capacity, and, as a matter of fact, the fourth car was completed in seventy-six man-hours and the fifth car in sixty-two man-hours. The term man-hours indicates the total time worked by all the employees in the gang.

The curves shown in one of the illustrations are an example of what was accomplished by the adoption of the premium system in constructing the floors and underframes of thirty cars. Curve *A* represents the total cost of labor on floor and underframe construction for each car, curve *B* represents the actual working hours of each gang on this work, and the dotted lines shown on this curve indicate the total time paid employees. Curve *D* indicates the actual bonus time allowed on each car. Further reference to these curves shows that as the working time for the gang decreases the cost to the company also decreases and at the same time the bonus allowed to the men incretses.



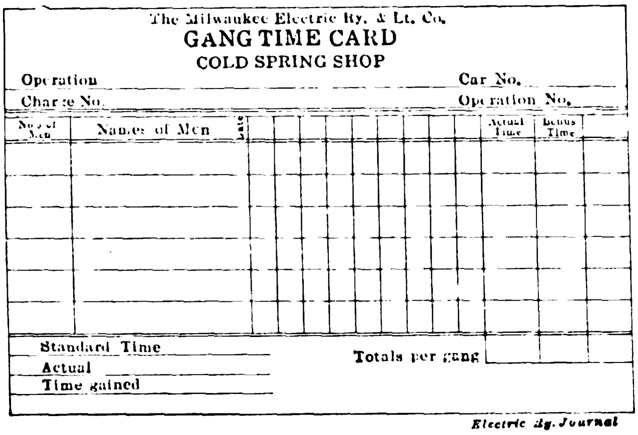
Milwaukee Efficiency Engineering — Diagram Showing Savings on Flooring Thirty Cars

TIME DISTRIBUTION

Each of the various departments in the Milwaukee Railway company's shops is equipped with employees' time-card cases and time clocks controlled through a master clock. Instead of the daily time cards assigned to each employee, as used under the ordinary system, the planning department prepares operation cards specifying a single unit of shop operation and the standard operating time allowed for the work. These slips are forwarded to the various department offices in the form of individual operating cards or gang cards, accompanied by the inter-department order and the manifests for the necessary material. These cards in turn are assigned by the foreman to the various employees, each card being inserted in its proper position in the time-card rack. Accordingly, when the men arrive in the morning and punch in at the time clock they receive notification as to just what work they have to do, either as individuals or in a gang.

In case the operation card assigned does not keep an employee engaged throughout his day, as many operation cards are assigned to him as are necessary to do this. At the completion of each operation, however, the employee punches the time clock which records the time of completion on the operation card, and at the same time he takes down his new card and punches it for the beginning time. Under this system it will be seen that the time is automatically distributed against each operation, it being necessary only for the clerks to compute the elapsed time.

On the contrary, if a specific operation provides work for an employee or a gang extending over several days, a sufficient number of operating cards to cover these periods are issued to the various members of the gang and each punches in and out in the morning, noon and in the evening in the usual way. In the case of individual work, the actual time put in is carried forward from day to day until a job is completed and the bonus earned computed. In the case of gang work, the regular time cards are turned in to the timekeeping department where the time is recorded and then forwarded to the planning department. As the cards indicating unfinished work are accumulated in the planning department, the time is entered on a gang time card until the final card is sent in showing that that particular job has been completed. At that time the bonus earned by each man is computed and amount of extra time allowed is forwarded to the timekeeping department. Each operating time card instructs the workmen that the punch in and out time is to be recorded on the back of the card, and the beginning and finishing time on the face of the card, in order that no confusion may arise in computing the elapsed time.


The Milwaukee Electric Ry. & Lt. Co.
GANG TIME CARD
COLD SPRING SHOP

Operation Car No.
Charge No. Operation No.

No. of Men	Names of Men	Late									Actual Time	Bonus Time	

Standard Time
Actual
Time gained

Totals per gang

Electric Ry. Journal

Milwaukee Efficiency Engineering—Gang Time Card

At the close of each day all time cards are forwarded to the main office where the time clerk enters the time on the pay-roll distribution, allowing the bonus time if it has been earned as indicated in the difference between the elapsed time and the standard time shown on the operation card. After the time has been recorded the distribution cards are forwarded to the planning department clerk, who attaches them to the shop order made out when the work was authorized.

The foregoing is the procedure in cases where the work has been standardized and placed on the premium basis. Prior to the standardization and adoption of the premium basis for a particular operation, each workman receives the standard unit operation time slip, punching it in and out at the time clock in the usual way. The unit operation time slip gives the number of hours spent by each man classified according to the operation. This card serves as a basis for standardizing the time of various unit operations. It gives a series of operation costs covering the same work on which an average may be computed to arrive at the standard time.

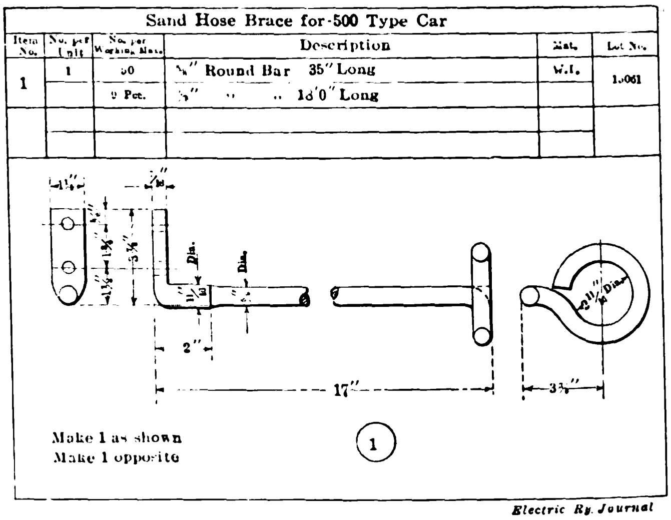
ESTABLISHMENT OF STANDARD TIME

In connection with stock manufacturing and other shop operations, the generally accepted method of determining proper time is followed by one or more of the planning department observers. These observers carefully check the work from start to finish and with a stop watch if necessary. While time observations are being made, the observers carefully study the movements of the workers with a view to determining whether they are working up to capacity or not. The results of both these observations enter into the establishment of a standard time. In the case of stock manufactured for shop use, preliminary data are available in the form of the costs shown by the purchasing department's records, as well as the records obtained for the past two years in the rolling stock department's determination of the various costs of production.

Planning department observers who collect the data from which the standard time for each operation is computed necessarily must be mechanics of considerable experience and better educated than the average shop worker. While they are making observations of a particular operation as the work proceeds on the regular day-rate basis, they not only check the actual time required and draw conclusions as to whether the men are working up to capacity, but suggest moves for reducing lost motion.

Prior to the time when actual observations were taken, considerable data had been collected on gang operations from the regular time cards. These gave an exact line on the work that was being done, and when several men's reports for an operation reached a point where the time was about constant, a single observation of this operation served as a check, which if it agreed with the recorded time fixed the standard time. Many operations, however, vary with each car. Consequently it will be impossible to put them on a premium basis, but the work of this character must be done by the regular wage men. Where similar operations are performed on the different types of cars, it is necessarily to be expected that the time will vary and, consequently, each type of car requires a standard time of its own.

It has been a rule since the establishment of the premium basis of paying shop employees that no standard time is fixed closer than the nearest one-half hour. It has also become a rule, or a policy of the company, that when the standard time is once fixed for any operation, it is not reduced. It is believed that the moral effect on the men would be bad if, after it was found that they were making a good bonus for a particular operation, the standard time was reduced so as to reduce their bonus. In all cases, however, the company will increase the operating time when it has positive assurance that, when the men are working up to their limit capacity, they cannot at the same time make a reasonable bonus for their efforts.


Sand Hose Brace for-500 Type Car

Item No.	No. per Unit	No. per Working Max.	Description	Mat.	Lot No.
1	1	50	[illegible]" Round Bar 35" Long	W.I.	1,061
		9 Pcs.	[illegible]" " " 18'0" Long		

Make 1 as shown
Make 1 opposite

Electric Ry. Journal

Milwaukee Efficiency Engineering—Typical Drawing Accompanying Operation Card

The method of obtaining standard drawings for the manufactured articles for which drawings have not already been made is about as follows: When an order is placed by any department with the storekeeper for a certain article, he in turn prepares an inter-department order which is passed on to the planning department. After being handled in the usual way the original order is sent direct to the department about to do the work and the duplicate is sent to the drafting room. At this time the chief draftsman is notified that a drawing is required if a blueprint number is not shown on the order. Each of these standard drawings contains all dimensions necessary to manufacture the article, together with a brief specification, as well as a complete bill of material. Some typical standard drawings are shown in the illustrations. A set of these standards or blueprints is retained in the planning department, and the general foreman's office also has a complete set to give out to the employees as they are needed.

To centralize further the work of the planning department as well as to increase shop efficiency, it is proposed to place the work of ordering material in connection with the premium system of paying employees in the hands of the planning department. All material requisitions which should accompany each standard-operating time card, either for individual or gang employees, are to be prepared by the planning department. The detailed bills of material necessary to make out these manifests or requisitions will be obtained from standard drawings on file in the repair shop drafting department. Hundreds of detailed bills of material have been made out for the use of the various department foremen, so that the centralizing of material orders in the planning department can readily be started. All copies of material manifests, in the same manner as the operating time cards, after they have been filled by the stores department, are to be forworded to the planning department, where they will be attached to the particular job order and filed.

UNIT COST SYSTEM

Along with the adoption of the premium system of paying employees, the rolling stock department has established a unit cost system to obtain the correct unit costs of all manufactured material. This was done to determine whether it was more economical to manufacture specific items in stock than to purchase them in the open market. At the same time it eliminated the possibility of errors in charging material such as frequently occur when charges are made directly against a lot number. In other words, it was a check against the manufacturing efficiency of the shop and would determine whether it was possible to effect further economies.

Lot No. .... S .... Date of Order ....

DESCRIPTION

No.

PAY ROLL CHARGE			
Date	Amt.	Date	Amt.

Date comp. ....

Tot. pay roll chg. ....

Tot. cost est. as per P.D. ....

Est. cost (shop) ....

Lab .... Mat .... Tot .....

Actual cost ....

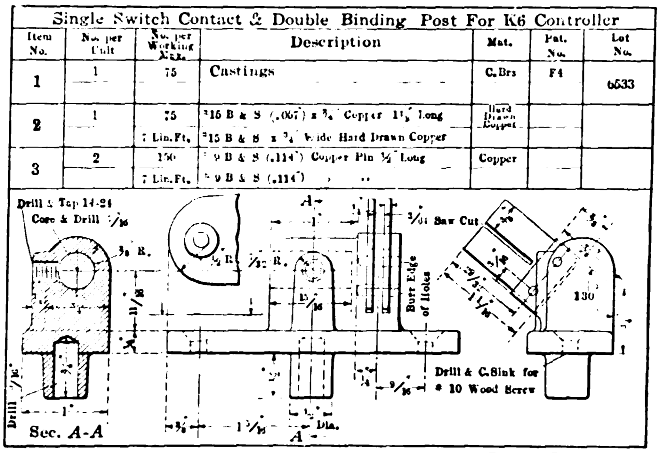
Lab .... Mat .... Tot ......

No. items mfd ....

Unit cost ....

Milwaukee Efficiency Engineering—Card Record for Unit Cost System

Under the new system, all orders for stock manufactures are made out by the stores department, which assigns each a shop order number. After these orders are approved by the superintendent of rolling stock, the order is turned over to the planning department, where a card record is made of the shop order number, inter-department order number, the lot number charge, amount to be manufactured, description of item and the date of the order. Space is also left on this card record for entering the estimated cost of the item as furnished by the purchasing department and from past records, and for pay-roll charges against the order, so that when the card record is complete the estimated cost as compared with the actual cost is available. In case the work has been standardized the operating time cards are made out for each order.



Single Switch Contact & Double Binding Post For K6 Controller

Item No.	No. per Unit	No. per Working [illegible]	Description	Mat.	Pat. No.	Lot No.
1	1	75	Castings	C. Brs	F4	6533
2	1	75 7 Lin. Ft.	#15 B & S (.067") x ¾" Copper 1⅛" Long #15 B & S x ¾" Wide Hard Drawn Copper	Hard Drawn Copper		
3	2	150 7 Lin. Ft.	#9 B & S (.114") Copper Pin ¼" Long #9 B & S (.114") " "	Copper		

Electric Ry Journal

Milwaukee Efficiency Engineering—Typical Drawing Accompanying Operation Card

At the same time a blueprint of the article is obtained from the drafting room, from which requisitions on the stores department for the different shop departments can be made from the bill of materials shown there. In case no print is available, an estimate of the material required is made, and a requisition is issued accordingly. If the shops find that the material estimate is not correct, additional requisitions are placed by them, or if the material is in excess the surplus is returned to the stores department.

ROUTING SHOP WORK

One of the duties of the planning department includes routing all shop orders through the various shop departments. All shop departments are numbered for convenience, and the number of the shop in which the work is started is the first shop noted on the order. Other shop numbers follow in proper sequence as the work progresses. This shop order is made in as many copies as there are shops interested, and each is accompanied with a requisition for the material required to do the work specified.

At the time the operating time cards and requsitions are made out, they are dated by the planning department, and copies of all orders, together with labor and material tickets, are sent to the production department or general foreman's office to be distributed. Where the operations have been standardized one labor ticket is made out for each unit operation, and if the work in any department is not completed by one man in a day a labor ticket for the following day will be made out by that department's clerk.

Material delivered from department to department according to the routing given on the shop order is accompanied by a delivery slip. Only one charge appears on any one delivery slip, and these slips are made out in triplicate and distributed. The original accompanies the material, the duplicate is sent to the planning department where it is attached to a copy of the shop order, and the triplicate is retained by the department issuing the delivery slip for its record.

As soon as work is completed in each department, copies of the shop orders are returned to the general foreman's office and held there until all the departments interested in a particular job have returned their shop orders marked completed, at which time this information is conveyed to the planning department. In the planning department the labor tickets are attached to the completed shop orders and the complete labor charge computed for the information of the purchasing and stores departments. If this labor and special material cost is approved, it is returned to the planning department, where a record of the estimated cost is taken off for future use.

To give an idea of what is being done in the way of defining unit operations as well as determining unit cost, the operating cost data for the electroplating and the oil and waste reclaiming departments are shown in the accompanying tables.

DIVISION OF COST OF ELECTROPLATING OPERATION

Labor Cost	Misc. Sup.	Misc. Exp	Fixed Charge	Power	Tot. Exp.	O. H. per Hour Elec.	O. H. per Hour Help	Tot. Ch. Hr. Elec.	Tot. Ch. Hr. Helper	Tot. Hrs. Mon.	Tot. O. H. Chge. Mouth
November $ 86.10	$14.15	$0.96	$9.50	....	$141.40	$0.071	$0.026	$0.421	$0.151	246	$17.92
30.75										246	6.63
$116.85											$24.55
December $ 82.60	10.33	2.31	9.50	3.02	136.01	0.078	0.03	0.428	0.151	236	$18.36
28.25										236	6.80
$110.85											$25.16

In the accompanying tabulations, which are typical of the methods used in arriving at a unit cost, it will be noted that in the electroplating operation the basis of the unit cost is the charge per hour. Necessarily, this will vary with the quantity of work passing through the electroplating department. If it is assumed, however, that a sufficient amount of work is on hand at all times to keep the department working up to full capacity, the charge per hour as indicated on the detailed unit cost statement is about as fair a way to arrive at the cost of this work as can be found. The check on the operation of this department began in June, 1913, but only the last two months, namely, November and December, are shown as typical.

Similarly, in the oil and waste cleaning operation, unit cost data have been collected since June, 1913. For reclaimed oil the saving has been about 66 per cent, for reclaimed cotton waste about 40 per cent and for reclaimed woolen waste a little less than 70 per cent. In all of these calculations it is assumed that the oil and waste reclaimed has no value when it comes into the reclaiming department. Therefore, the item actual saving in money shown in the last column is the difference between the cost new of oil and waste and the actual cost of reclamation. The operation of the oil-reclaiming department regularly shows a net saving of approximately $125 per month. In order to be certain that all charges against this work are credited to the proper account, a special account number has been entered for time and material distribution.

RESULTS OF ADOPTING PREMIUM SYSTEM

Many direct and tangible economies have been effected since the adoption of the premium system by the Milwaukee Electric Railway which at the same time have been profitable both to the employees and the company. As indicated on the summary of contract work, the employees' wages have been increased from 18 to 24 per cent and the company has profited from between 14 to 16 per cent on the original cost of all operations now under the premium system. In addition, inaccuracies and direct loss of time resulting from the men distributing their own time have practically been eliminated. The operation time cards permit the foremen to devote their entire time to supervising work instead of directing their clerks or doing clerical work themselves. Each evening the foreman and clerk distribute the operation cards for the following day, assigning specific jobs to various employees. At the same time the accounting department is automatically supplied with complete labor data from which it compiles as many records and unit costs as are found economical.

DIVISION OF COST OF OIL AND WASTE CLEANING OPERATION

RECLAIMED OIL

Am't Recla. Gals.	Labor Cost	Misc. Supplies	Misc. Exp.	Fixed Chge.	Steam	Total Exp.	Unit Cost New	Unit Cost Recla.	Saving per Unit	Per Cent Saved	Actual Saving
October 522.8	$14.55	$2.81	$0.07	$3.48	$0.45	$21.36	$0.12	$0.0404	$0.0796	66.3	$41.37
November 630	16.97	5.20	0.17	4.10	0.56	27.00	0.12	0.0428	0.0772	64.3	48.64
December 561	17.63	.....	.....	3.82	0.66	22.11	0.12	0.0394	0.0806	67.2	45.21
January 620	19.40	2.97	0.07	2.87	0.98	26.29	0.12	0.0424	0.0776	64.7	48.11
RECLAIMED COTTON WASTE											
October 1225	$27.11	$9.50	$0.07	$4.68	$2.45	$43.81	$0.07	$0.0358	$0.0342	48.6	$41.94
November 1003	25.01	9.75	0.07	3.81	2.00	40.64	0.07	0.0402	0.0298	42.5	29.89
December 1035	20.72	16.92	.....	4.49	2.07	44.20	0.07	0.0426	0.274	39.2	28.25
January 955	14.80	18.52	0.07	4.44	1.91	39.74	0.07	0.0416	0.0284	40.5	27.12
RECLAIMED WOOLEN WASTE											
October 660	$10.86	.....	$0.07	$2.93	$0.38	$14.24	$0.08	$0.0216	$0.0584	72.5	$38.56
November 730	11.92	.....	0.07	3.17	0.71	15.87	0.085	0.0217	0.0633	74.5	46.21
December 610	11.46	.....	.....	2.78	0.465	14.70	0.08	0.0241	0.0559	70.0	34.10
January 815	10.62	.....	0.07	3.78	0.74	15.21	0.08	0.0186	0.0614	76.7	50.04

The moral effect upon the men has been to increase their pride in the time required to accomplish a given operation, which results in benefit to themselves and to the company. Under the old system, when a workman completed one job and received another invariably there was an appreciable loss of time. This, too, has been eliminated, or at least minimized, by the new system, as the men upon completion of a particular job are immediately notified without hunting up the foreman what the next job will be. Moreover, all time elapsed must be accounted for on the cards, consequently workmen lose little time in punching in completed jobs and taking out the cards for the new one. Other tangible economies have been effected in the manner of making out the material requisitions, because workmen are held strictly to account for any extra material over and above the specified order.

STANDARD TIME FOR SPECIFIC OPERATIONS

Special interest should be attached to a number of specific operations upon which a standard time has been fixed. This standard time is indicated in man-hours, that is, the total number of hours required to do the work regardless of the number of men assigned to it. As a rule this work was done by a gang operation, it being found that three or four men could work to a better advantage than one. Details of several gang operations, some in connection with construction of new cars and some in connection with regular maintenance work, are as follows:

The work of stripping "300" and "400" type cars is called Operation No. 1 and includes removing (1) destination sign boxes; (2) boards under window pockets, clean-out window pockets and replace boards; (3) sash lifts and springs; (4) strap-hanger poles and brackets; (5) bells, bell cord and bell cord hangers; (6) stanchion posts; (7) entrance chain holders; (8) motorman's curtain; (9) grab-handles; (10) conductor's seats; (11) hand-brake handles; (12) Hunter sign index frames; (13) arm rests with clips; (14) "Please leave by front door" sign; (15) metal seat-back moldings and corner grab handles; (16) removing clips and catches on side destination sign boxes.

JANUARY, 1914, SUMMARY OF CONTRACT WORK IN CARPENTER SHOP

		Jan. 1-15	Jan. 16-31
(1)	Total number of contracts issued	95	105
(2)	Average number of contracts issued per working day	7.3	7.5
(3)	Total number of contracts completed	90	107
(4)	Average number of contracts completed per working day	6.9	7.65
(5)	Number men paid bonus	43	39
(6)	Total amount of bonus allowed	$199.08	$182.82
(7)	Average bonus allowed per man	$4.63	$4.68
(8)	Average day rate per hour of men working on contract	$0.2585	$0.255
(9)	Average hourly rate of men while working on contract	$0.3198	$0.3
(10)	Maximum amount of bonus earned by one man	$13.80	$9.
(11)	Minimum amount of bonus earned by one man	$0.47	$0.11
(12)	Number of contracts started during half month and completed in same period	56	70
(13)	Total standard time for all contracts completed during half month	4802	4992
(14)	Total actual time for all contracts completed during half month	3246	3903
(15)	Total number of hours gained for all contracts completed during half month	1560.5	1447.5
(16)	Total number of hours' bonus allowed for all contracts completed during half month	771.25	715.25
(17)	Number of hours actual time paid for jobs, for all contracts completed during half month being bonus time plus actual	4017.25	4618.25
(18)	Per cent salary increase	23.7	18.3
(19)	Per cent company profit	16	14.3
(20)	Per cent increase in speed of work output	32.5	29

The standard time for this operation is 12.50 hours, and the average time required for five cars to be completed on day work was 13.88 hours.

The work of finishing "300" and "400" type cars is called Operation No. 6 and includes installing (1) transom sash and transom-operating mechanism; (2) sash (one) in each vestibule where destination sign boxes have been removed; (3) sash lifts and springs; (4) strap-hanger poles and brackets; (5) bells, bell cord and bell-cord hangers; (6) stanchion posts; (7) remove plain brass door hinges, and replace with statuary bronze finished ones; (8) entrance chain holders; (9) motorman's curtains; (10) grab handles; (11) conductor's seats; (12) hand-brake handles; (13) Hunter sign index frames; (14) trip-sheet holders; (15) arm rests with slips; (16) "Please leave by front door" sign; (17) metal seat-back moldings and corner grab handles; (18) placing clips and catches on side destination sign boxes; (19) storm sash in vestibule; (20) all statuary bronze finished screws.

The standard time for the above operation is 38 hours, and the average time required for four cars to be completed on day work was 38.8 hours.

New construction of floor and underframe of "600" type cars included (A) all furring to be placed in underframe, including vestibule knees; (B) first and second floors in car and floors in vestibule. The standard time for this work is 100 hours.

New construction on car body frame of "600" type cars includes the erection of (A) bulkheads; (B) body posts and roof frame; (C) post caps; (D) window sills; (E) body letterboard. The standard time for the work is 280 hours.

The application of roof sheathing on "600" type cars includes (A) vestibule hoods; (B) roof sheathing on body and vestibules; (C) drip molding and car-line molding, including iron molding around vestibules. The standard time is 185 hours.

The erection of vestibule frame on "600" type cars includes (A) vestibule fronts, top frames and posts; (B) bulkhead sheet-iron panels; (C) sheet-iron dash panels, including one-half oval iron moldings; (D) vestibule post plates; (E) vestibule letterboards; (F) wood molding around entire car, including one-half oval iron molding, also one-half oval belt rail molding. The standard time is 185 hours.

The application of inside finish to "600" type cars includes (A) wire molding; (B) head lining; (C) advertising molding; (D) side sheathing; (E) destination sign boxes; (F) bulkhead and vestibule finish; (G) sheet iron in vestibule (inside); (H) longitudinal seat frames; (I) curtain holders; (J) air gage and signal light blocks; (K) floor matting and door treads. The standard time for this work is 200 hours.

TELEGRAPH VS. TELEPHONE IN TRAIN DISPATCHING

At the regular monthly meeting of the American Institute of Electrical Engineers held on March 13 M. H. Clapp presented a paper comparing the telegraph and the telephone as a means of communication in steam railroad operation. As the situation in that field was contrasted with electric train dispatching, a few of the comments of the author and those who took part in the discussion have value to electric railway operators.

The telegraph obtained its hold in steam railroad dispatching because it was the only means available in the early days of railroading. Had the telephone been available there is no doubt that it would have been adopted, just as it was later in interurban electric railway work. The extra expense involved in the telephone system is, therefore, considered justifiable. Mr. Clapp's summary of the situation, as far as the steam railroads are concerned, follows:

The advantages of the telegraph are: (1) flexibility in handling circuits; (2) simplicity of installation, operation and maintenance; (3) best adapted for long-distance service; (4) least affected by distance, in respect to transmission efficiency; (5) low cost of installation and maintenance; (6) the necessary standard of maintenance is not difficult to secure.

The advantages of the telephone are: (1) universality; (2) saving of time; (3) rapidity of transmission or dispatch of business; (4) psychological effects; (5) minimum delay in getting offices to answer calls; (6) lack of necessity of trained specialists to operate the service; (7) saving in total expenses of railroad operation; (8) minimum impairment of transmission efficiency in heavy weather.

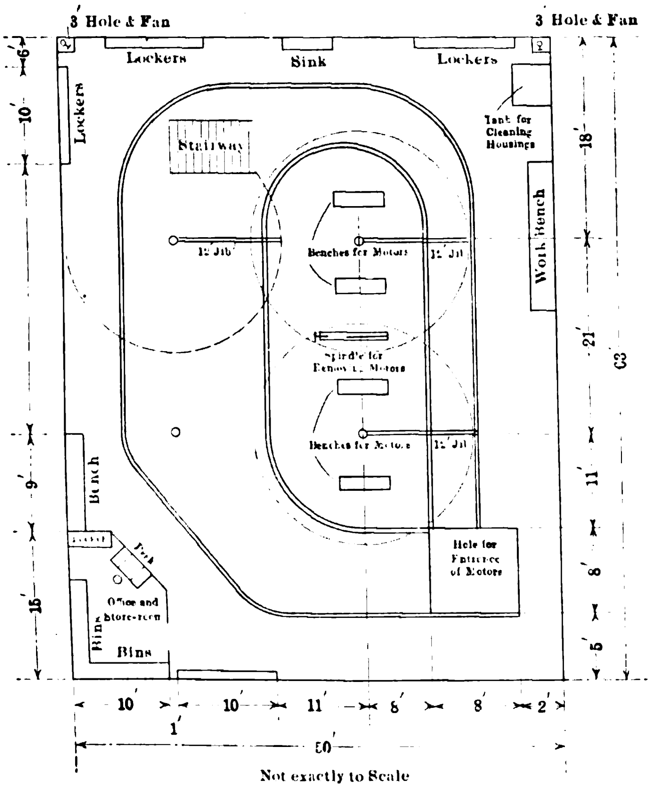
The provision of a means of selective signal for calling different telephone stations was a problem which required some time to solve satisfactorily. The selectors used have, in general, a step-by-step mechanism, and they are very efficient up to 125 stations. An incorrectly styled "booster" effect is utilized in dispatching sets by means of a switch which cuts out the receiver when the operator is talking and the transmitter when he is listening. In the dispatcher's office, special telephone sets are used which are wired like the sets at way stations, except that breastplate transmitters are provided to facilitate work on train sheets. Loud-speaking apparatus is being experimented with in the hope of doing away with this apparatus.

The Motor Repair Shop of the Third Avenue Railway, New York

The Installation Is in a Basement Directly Under the Truck Shop and Is Notable for the Very Extensive Use of Overhead Electric Hoists and Jib Cranes for Handling Motors and Other Parts—The Methods of Overhauling and Testing Are Also Described

BY R. H. PARSONS, ELECTRICAL FOREMAN

Owing to the need for overhauling a greater number of cars daily on account of the increased car mileage, the Third Avenue Railway, New York, found that it was necessary to enlarge its truck and motor repair quarters at its Sixty-fifth Street shops. This has been accomplished by removing the motor repair section from the truck department to a new room directly beneath the truck shop. This room, which is 63 ft. long and 50 ft. wide, with a head space of 13 ft., was formerly used for storage purposes. It is also adjacent to the room used for electric welding, which fact, while not influencing the decision, was fortunate as the motor-overhauling foreman also has charge of the electric welders.



Third Avenue Motor Shop—Plan, Showing Location of Equipment and Track Runs

VENTILATION, LIGHTING AND SWITCHBOARD

Ventilation and light were the first points to be considered, and both have been satisfactorily provided for. Originally, this room had at one corner of the ceiling an aperture 8 ft. square for getting motors in and out. This hole now aids in ventilation. Additional ventilation is provided by the 6-ft. x 10-ft. opening of a stairway built near the diagonally opposite corner. One hole 3 ft. square was cut in each corner farthest from the large opening through the ceiling of the motor room into the truck shop. A fan, which is pointed in the direction of the 8-ft. square hole, is placed under each of these openings close to the ceiling so that the air is drawn down through the two 3-ft. openings and forced toward and out of the large opening. Thus the air is circulated overhead all the way across the motor room, carrying away the smoke and odors without subjecting the workmen to drafts. The temperature of this room is practically uniform the year round, varying from 60 deg. to 70 deg. Fahr. Of course, this mild temperature produces the best working conditions both in winter and summer.

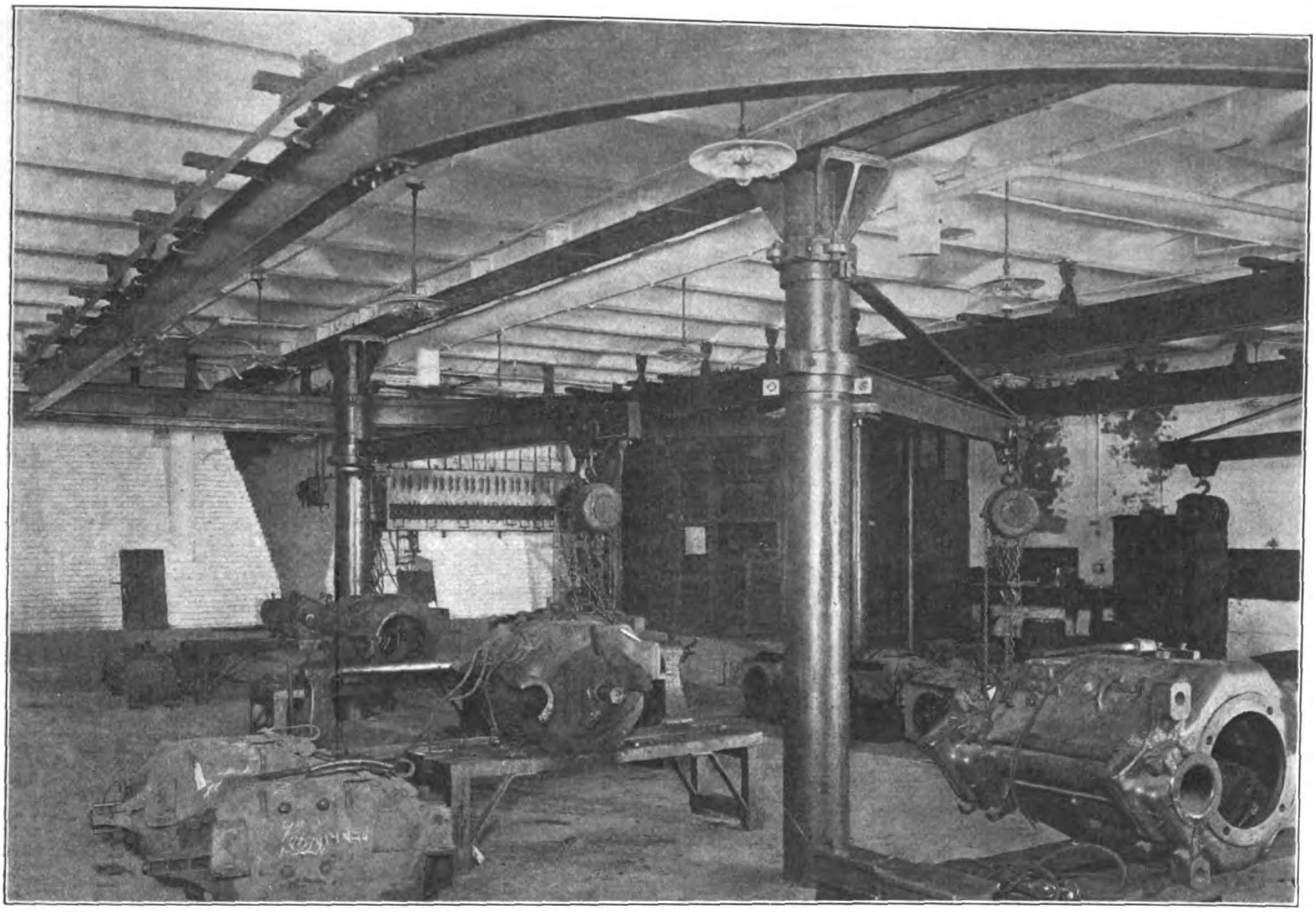
Light is provided by twenty-five five-lamp 600-volt circuits, arranged in three rows, each containing five five-lamp wireless clusters, and two rows, each containing five four-lamp wireless clusters, the two outside rows of clusters being four-lamp. The four-lamp clusters are in series with a two-way switch which is placed on the wall opposite the cluster, thereby completing the five-lamp circuit by lighting either a lamp placed on the side wall about 6 ft. above the floor or an extension lamp which is connected to a plug on the wall. This arrangement does away with drop lamps attached to clusters, while the simple turning of a button switch will light the lamp on the wall when the drop light is not needed. All lamps are of tungsten 40-watt rating.

A panelboard was installed with a switch for each row of clusters, for each fan, for the motor running test, for the light ground-testing circuit, for each of the telpher track trolley circuits and for the alternating current used for testing, thus centralizing all circuits used in this room. Each switch is double pole, fused on both sides and marked as to its connection.

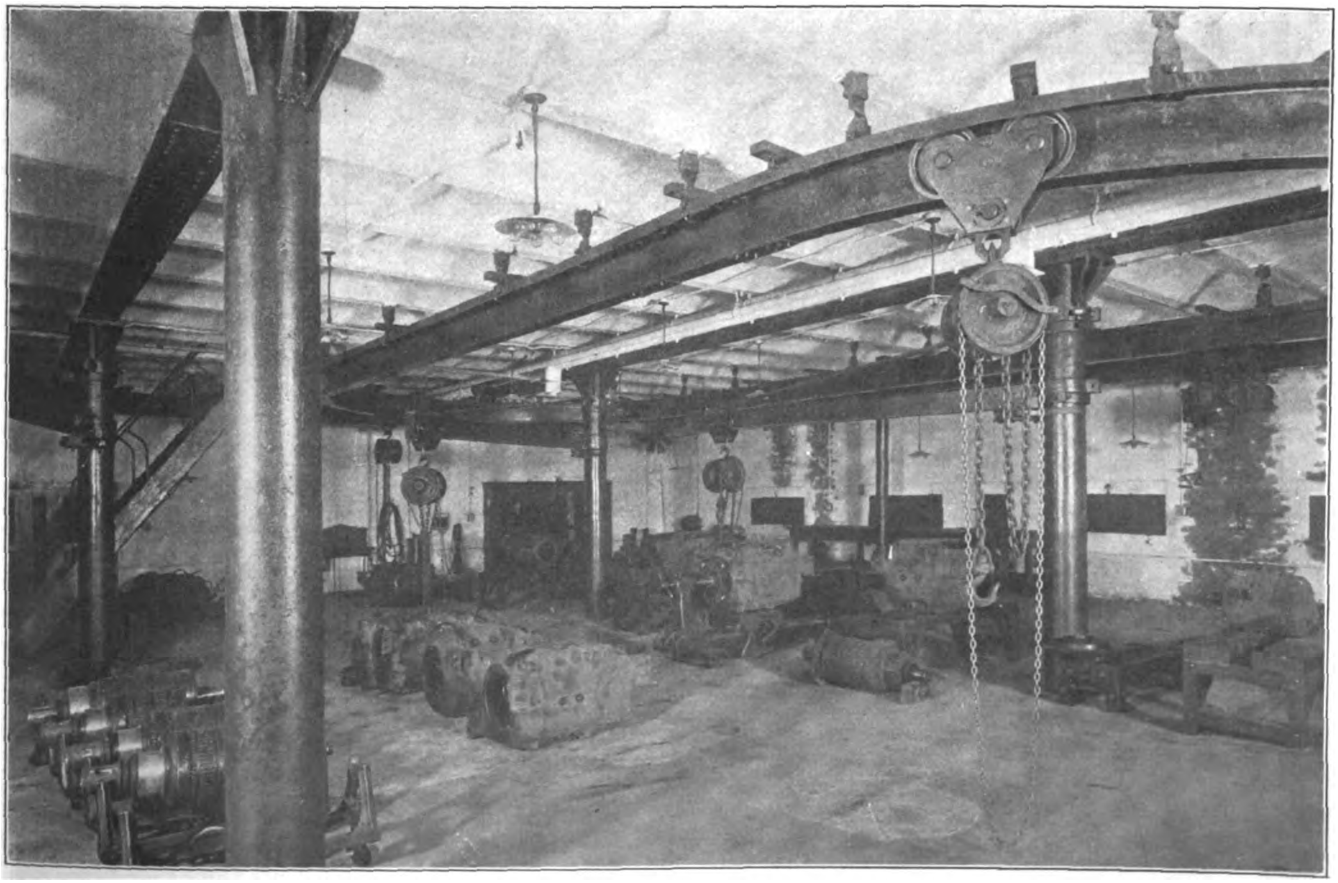
TRANSPORT EQUIPMENT

The motors are removed from the trucks in the truck shop by a large traveling crane and are lowered through the 8-ft. opening into the motor room. The latter is equipped with two overhead tracks. Each track starts and ends at this opening, making a complete circuit of the room, one track inside the other, as shown in the accompanying halftones and floor plan. The track comprises a 12-in. I-beam suspended by clamps from the I-beams which carry the floor above. Each track has one Sprague electric hoist and one plain traveler with a 2-ton chain hoist by means of which the motors are lifted from the floor after they have been lowered by the crane and moved to any part of the room as desired.

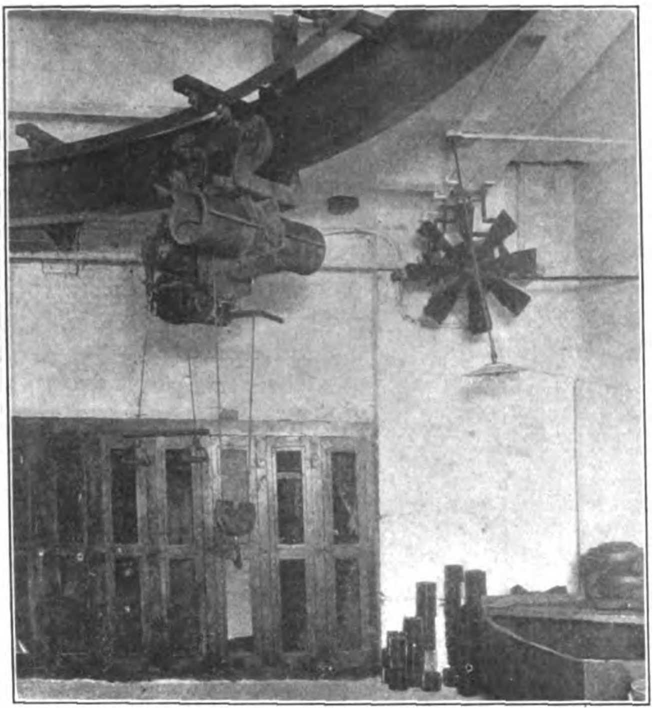
This room has four 12-in. iron pillars which sustain the floor overhead, and three of these are used as supports for the jibs illustrated in an accompanying sketch. These jibs can be turned under the overhead tracks in a complete circle. Two jibs reach three tracks and one jib reaches two tracks, so that a motor can be lowered from almost any part of the track for pick-up by a jib. The motors are overhauled almost entirely with these jibs, each of which has a traveler and 2-ton Yale & Towne hoist. Although some of the old split-shell type



Third Avenue Motor Shop—View Showing Foreman's Office in Background, Ventilating Ducts, Jib Hoists and Overhead Track Which Serves the Entire Shop



Third Avenue Motor Shop—The Portion of the Shop Seen by the Foreman from His Office Window motors are opened under the main telpher tracks, the latter are used primarily to get the motors in and out and to place them. The sketch of the jibs shows that they are fitted with solid wheels on the sides where the weight is taken and that the roller-bearing effect obtained, although simple in make-up, permits motors weighing 2600 lb. to be handled easily.



Third Avenue Motor Shop—Telpher Hoist, Ventilating Fan and Lockers.

GENERAL LAYOUT FEATURES

One advantage of having the electric welding room adjacent is that a low four-wheeled hand truck can be used to haul material to and from the same. Another is that a set of welding leads can be extended into the motor room so that all light welding jobs can be performed there under a shielded arc.

Originally, each side wall had four recesses 2 ft. high, 4 ft. long and 3 ft. deep, placed there for some reason unknown to the present generation but now found useful, nevertheless. By fitting each with a door, these niches were converted into excellent places for storing sledge hammers, wrenches, furnaces, paint, waste, oil, etc.

One corner of the room is partitioned off with ½-in. mesh for use as a storeroom and office. The office window is placed toward the middle of the shop and the foreman's desk in front of the window so that he has every man in sight. The storeroom has sixty bins, 12 in. x 12 in. x 12 in., and twenty bins about three times as large to keep all material for immediate use. Supplies are drawn from the main storeroom in quantities and are taken from this sub-storeroom as needed.

The foreman's desk has three drawers of card cabinet type on each side for the motor record cards, which are kept by the foreman himself. He has a card for every motor, each type arranged in one drawer and each in its proper numerical order. The card shows the motor number, type, date, armature numbers removed, whether it was brought in for mileage overhauling or for trouble and the repairs made. Every morning the foreman spends, say, thirty minutes to enter on the cards the work done the day before. The idea of having the foreman watch the cards is that, to him, each motor is an individual instead of being just a motor. If one comes in for trouble, he can quickly tell by looking at his cards when it was last in shop; if it shows a defect repeated, he will look deeper than ordinarily to overcome the trouble. Special test data on any particular motors are also recorded on these cards.

The mill room of the Sixty-fifth Street shop is equipped with a powerful vacuum system for removing shavings, etc. An extension was made from the ducts to the motor room so that when a motor is blown out a vacuum hood is placed over it to draw the dirt to the boiler several hundred feet away. The vacuum line is closed when not in use but it can be opened during periods of excessive smoke, or when bad-smelling waste is being removed from the bearings of a motor which has been running ten or twelve months.

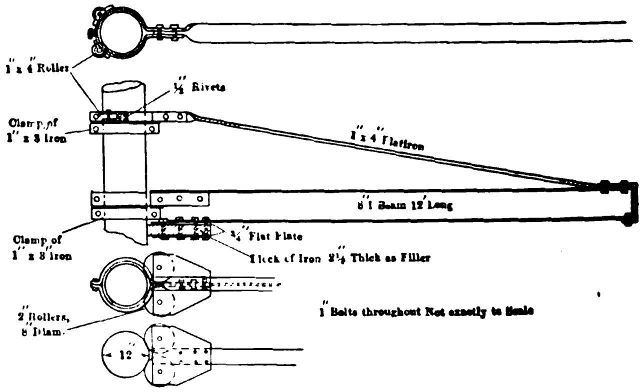
The box-frame motors, which are most numerous on our road, are overhauled on the four heavy benches shown in the general view. Each bench is 22 in. high, 26 in. wide and 72 in. long. The legs are 4 in. x 4 in., and the top planks 3 in. thick by 12 in. wide, all of oak. One spindle for removing the armatures of box-frame motors, placed midway between the two jibs, and one bench placed on each side of both jibs provide enough means for four gangs to overhaul box-frame motors.

The floor is cement. Instead of the lime generally used in similar places to take care of drip oil, white sand is sprinkled lightly all over. This sand keeps the floor white and clean at all times, regardless of the grease and dirt brought in on the motors.

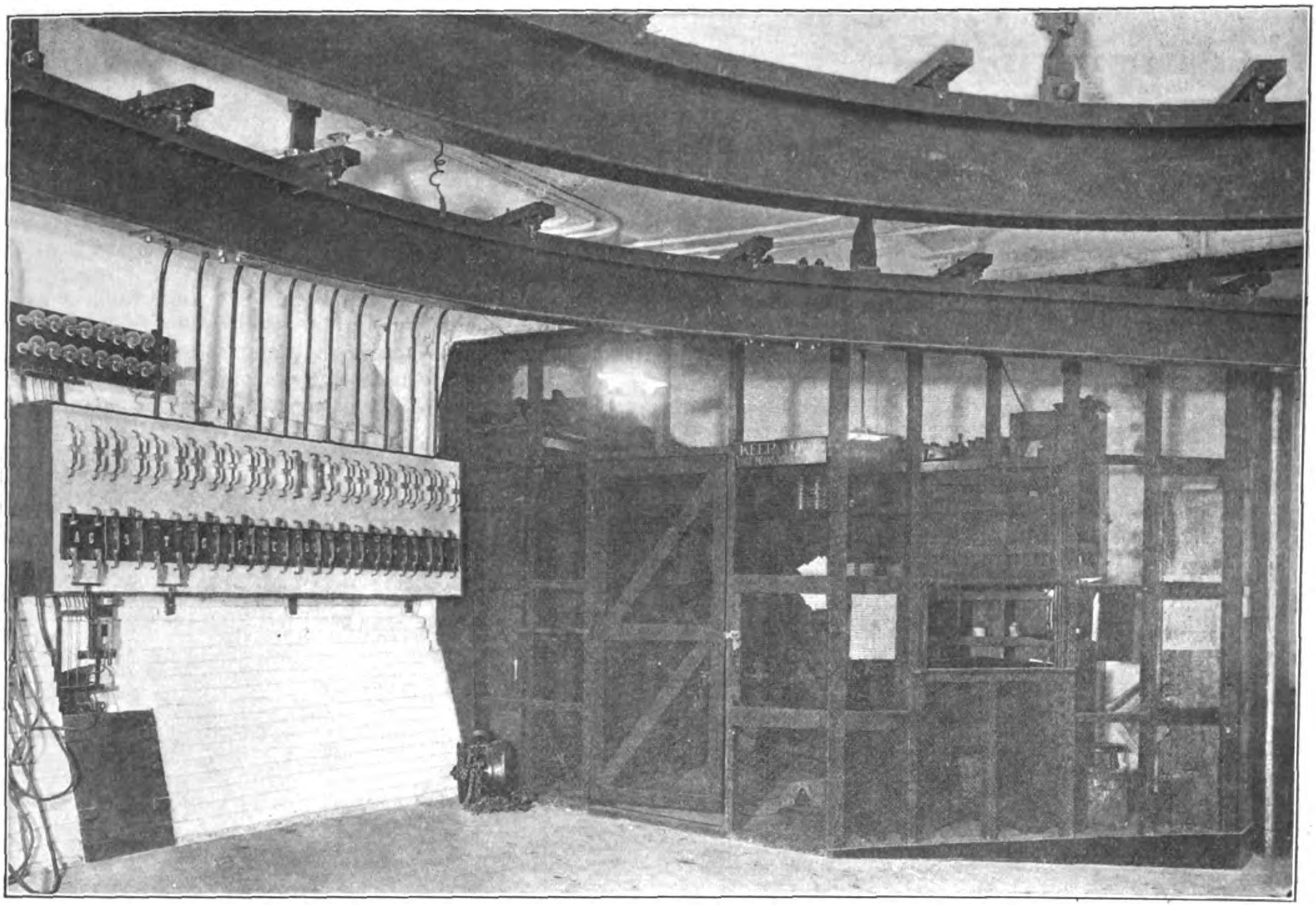
COURSE OF MOTOR OVERHAULING

As the motors are brought in, the outside of the shell is scraped and cleaned before any other work is done. A pan is placed below the shell so that the dirt drops into the pan instead of on the floor.

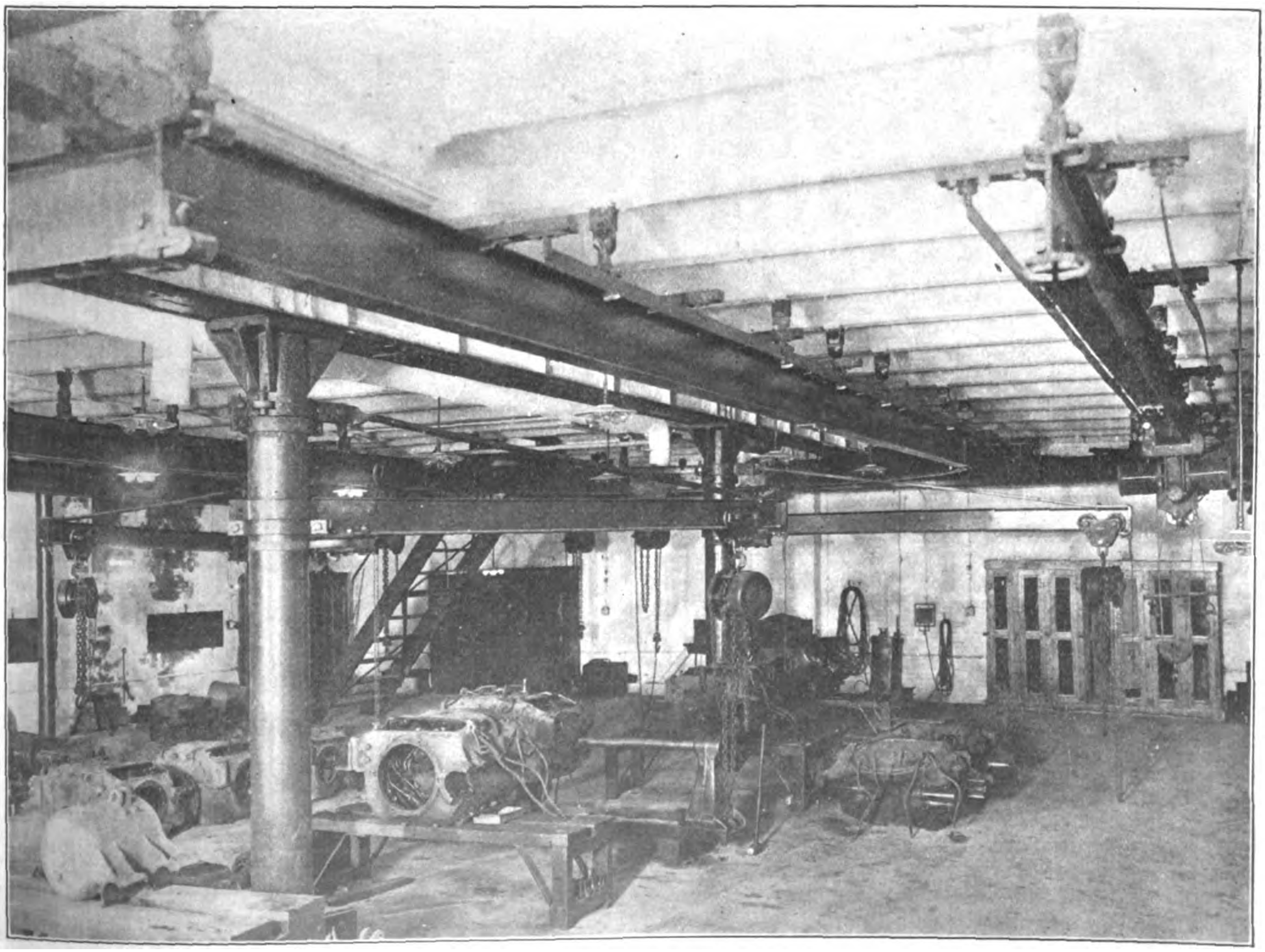
It is this company's custom to do all the motor overhauling at the general repair shop and none at the carhouses. All cars with box-frame motors are brought to the shop for overhauling. Cars with old-style motors are cared for in the carhouses by keeping in reserve two or three extra motors of the type used on their division. Defective motors are thus replaced complete and forwarded to the shop for repairs. This practice eliminates all need for storing motor repair parts at the carhouses and insures a "shop" job in repairing motors instead of the ordinary carhouse method. It is rare even for a carbon brush to be changed at the carhouses. Each motor on its arrival at the shop is inspected by the foreman. If the motor needs a general overhauling, it is entirely stripped, the shell is cleaned and painted inside, and the armatures, fields and brush holders are sent to the electrical repair shop for individual over-



Third Avenue Motor Shop—Sketch of Jib Hoist Built to Turn in a Complete Circle



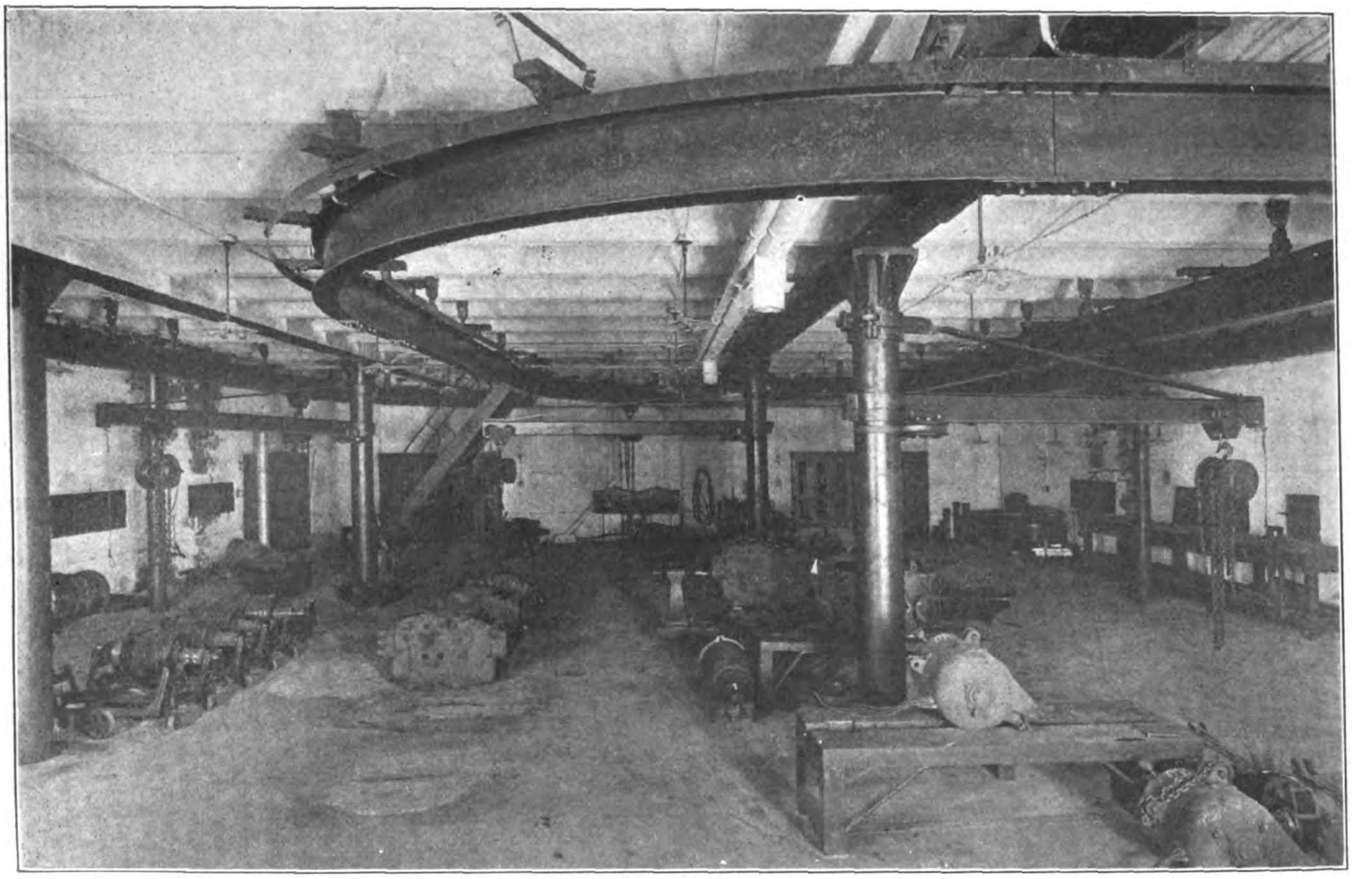
Third Avenue Motor Shop—Detail Showing the Foreman's Office and the Operating Switchboard with Test Lamps Above



Third Avenue Motor Shop—View Taken Under the Opening from the Truck Shop hauling. When a motor is completely overhauled the fields are tested with a compass for polarity. The other tests are mentioned in the next paragraph and under "Testing Equipments."

If all but the bearings of the motor are in good condition, the armature is removed and the fields are tested with the voltmeter and ammeter for short-circuits and loose connections and then with 1000 volts a.c. for grounds. Upon this the fields are cleaned and painted. The motor finally is reassembled with an overhauled armature and supplied with other bearings.

Each motor is handled by a man and a helper, who strip and reassemble the machine complete except that all brush holders are handled by a specialist. The brush-holder man also smooths the commutators with fine sandpaper, fits the brushes, examines the work of the men ahead of him, subjects the motors to the a.c. and light-running tests and gives them final touches with the paint.



Third Avenue Motor Shop—View of the Shop as Seen from Operating Switchboard, Showing Work Benches, Jibs, Armature Trucks, Etc.

TESTING EQUIPMENTS

The testing equipment of the motor room provides for an a.c. test, running test, volt-ammeter test and light ground test. A transformer with 330-volt primary supply from the substation and 1000-volt and 2000-volt secondaries is used for the final trial of all motors. We use 1000 volts ordinarily, but 2000 volts when the work is new and special.

The running test comprises a K-11 controller and a set of resistances which are made up of heater coils and car grids. These resistances are so connected that the first point reduces the voltage enough to run a 110-volt storage battery traction motor at a speed of 600 or 700 r.p.m. At the second point all the heater coils are cut out, whereby the resistance is reduced enough to run a 600-volt motor at about the same speed. The third, fourth and fifth points have correspondingly lower resistance so that a motor can be speeded up, but when the fifth point is reached enough resistance is left to hold the motor to a safe speed.

Two meters for the volt-ammeter test are placed compactly in a box for service in connection with the same controller and resistance which are used for the running test. Leads are attached from the controller to the box, and from the box to the fields of the motor under test. As the controller is moved to the first or second points, the current which is passing through the field is shown on the ammeter. A special table is used to show what the drop in voltage should be across the fields of each type of motor at different amperages. These figures were secured by testing a number of fields which were known to be good. With the combined aid of the meters and table, the operator can quickly detect a short or open circuit.

The light ground test is very simple. A pair of leads are connected with a set of heaters which have resistance enough to reduce the voltage to a point where the leads can be placed together and pulled apart with only a small arc. This test is used by the workman to check up his job and to locate trouble.

GENERAL

The shop has fifteen up-to-date lockers and a wash-basin with hot and cold water connection for the comfort and convenience of the men. The tracks, jibs and other equipment were installed by the motor-overhauling force with the aid of the blacksmith shop, which made up the parts of the jibs.

The Argentine government has approved the plans of the Buenos Aires Western Railway for electrifying the route between Plaza Once and Moreno.

Maintenance Costs and Records with Single-Phase Equipment

Operating Records and Costs of the Car Equipment Department on the New York, Westchester & Boston Railway Are Published Complete in Tabular Form, Showing That Remarkably Low Figures Have Been Attained During the Past Year

In the past there has been a widely expressed belief that a high cost of maintenance for single-phase equipment was inevitable. Much of this has been due to the fact that no accurate records have been available for publication, and for this reason the complete costs on the New York, Westchester & Boston Railway have been obtained. These are published herewith. The accuracy of the figures is undeniable, as they have been furnished direct from the auditor's books and their totals checked with the reports of the company to the Public Service Commission of New York State. The records are of especial interest, not only because they demonstrate positively that the cost of maintenance of straight single-phase equipment on multiple-unit cars is not necessarily high, but also because they present interesting records of performance, which may in many cases establish standards for the consideration of other roads.

The cars to which these records apply were described in detail in the ELECTRIC RAILWAY JOURNAL for March 30, 1912, page 492. They are built entirely of steel and have full-vestibuled patforms and center side doors. All are 70 ft. 4 in. long over platform end sills, 9 ft. 7¾ in. wide over side posts and 13 ft. 3½ in. high from rail to top of roof. The seating capacity is seventy-eight. The estimated weight of a car completely equipped for service is 120,000 lb. Both motors are on one truck, the other truck being an idler. The motor and trailer trucks are similar in design, but the trailer truck has smaller wheels and axles and a different arrangement of brake rigging from that on the motor truck, the former having a clasp brake with two shoes to each wheel. The motor truck on each car is equipped with two Westinghouse six-pole, single-phase, forced-draft motors, having an hourly rating of 175 hp. The continuous rating is 145 hp. These motors provide an

TABLE I—MAINTENANCE COSTS ON NEW YORK, WESTCHESTER & BOSTON RAILWAY

Repairs—Labor and Material

	A. C. Eqpt.	Motors	Cont. Equipment	Car Body	Trucks, Wheels, Axles	Gears, Pinions	Pantos.	Air Brakes	Brake-shoes	Misc. Shop Exp. and Supervision	Total	Cents Cost per Car Mile
1—1913 ...	$234.29	$1557.06	$282.92	$116.05	$87.87	$40.94	$122.31	$168.71	$123.82	$659.37	$3393.34	3.04
2—1913....	209.21	169.49	319.84	162.66	117.87	85.82	110.05	111.53	46.50	675.74	2008.71	2.00
3—1913....	336.41	270.38	215.73	418.54	103.81	23.81	216.02	80.18	170.75	1312.16	3147.79	2.61
4—1913....	410.81	230.98	307.72	203.94	74.32	181.83	119.48	75.45	62.91	699.54	2366.98	2.02
5—1913....	45.62	102.95	47.55	57.70	75.03	6.00	159.03	101.36	221.51	835.65	1652.40	1.27
6—1913....	86.61	129.37	77.21	107.90	180.65	39.07	219.00	97.47	140.25	605.64	1683.17	1.30
7—1913....	159.44	94.22	106.46	115.39	277.91	6.00	157.39	66.31	228.12	421.54	1632.78	1.25
8—1913....	140.26	85.20	95.83	161.59	282.26	29.05	160.83	74.44	162.41	436.03	1627.90	1.28
9—1913....	126.03	105.27	71.85	276.48	193.29	....	119.43	108.35	164.81	439.37	1604.88	1.31
10—1913....	94.02	136.65	101.77	139.08	165.57	13.25	95.37	82.33	152.14	366.72	1346.90	1.07
11—1913....	79.25	68.66	97.36	234.42	117.55	7.25	68.69	77.65	137.72	465.18	1353.73	1.12
12—1913....	150.04	105.03	191.40	213.55	112.27	28.99	169.65	60.91	177.78	300.00	1509.62	1.17
Average	$172.66	$254.61	$159.64	$183.95	$149.04	$38.50	$143.10	$92.05	$149.06	$601.40	$1944.01	1.62

Inspection—Labor and Material

	A. C. Eqpt.	Motors	Cont. Eqpt.	Car Body	Trucks, Wheels, Axles	Gears, Pinions	Pantos.	Air Brakes	Brake-shoes	Misc. Shop Exp. and Superv'n	Term. Insptrs.	Oilers	Total	Cents Cost per Car Mile
1—1913..........	$50.25	$52.98	$83.46	$40.50	$37.30	$16.15	$31.15	$29.75	$15.25	$150.00	$300.00	$58.73	$865.52	0.77
2—1913..........	48.50	47.25	75.75	35.55	37.50	15.00	30.50	32.60	22.00	135.50	241.50	49.30	770.95	0.76
3—1913..........	52.00	55.50	78.75	38.90	40.25	12.00	32.50	34.75	24.23	125.00	337.00	45.00	875.88	0.73
4—1913..........	60.82	83.29	40.56	33.62	73.12	11.75	55.23	37.35	60.52	138.99	357.00	65.00	1017.25	0, 86
5—1913..........	57.81	95.06	40.00	50.00	76.41	44.42	75.00	41.41	28.86	156.10	372.00	48.55	1085.62	0.83
6—1913..........	34.16	30.72	33.28	16.83	58.90	17.58	26.53	26.17	26.85	77.96	358.00	73.58	790, 56	0.61
7—1913..........	60.73	26.34	47.00	20.00	73.93	2.85	50.59	58.96	38.60	103.68	363.00	90.57	936.25	0.72
8—1913..........	75.41	19.35	42.38	23.05	83.94	29.05	39.00	64.13	32.56	120.70	376.65	61.49	967.71	0.76
9—1913..........	35.25	26.24	19.64	45.01	44.01	3.00	34.00	75.13	32.11	110.90	363.90	74.54	863.73	0.70
10—1913..........	30.30	61.51	41.52	42.01	86.12	12.28	29.00	30.37	25.11	113.68	372.00	96.96	940.86	0.74
11—1913..........	36.19	48.00	45.30	30.01	63.32	7.28	36.74	53.00	26.00	111.40	360.00	88.42	905.69	0.75
12—1913..........	53.17	52.97	83.46	40.53	37.29	16.08	31.00	29.98	23.92	151.75	366.00	57.25	943.40	0.73
Average..........	$49.55	$49.93	$52.59	$34.67	$59.34	$15.62	$40.10	$42.80	$29.67	$124.65	$347.25	$67.45	$913.62	0.74

NOTE.—Costs of car cleaning, lubricating materials and incandescent lamps not included in the above figures.

TABLE II—DELAY IN MINUTES CHARGEABLE TO DIFFERENT PARTS OF EQUIPMENT, NEW YORK, WESTCHESTER & BOSTON RAILWAY

1913	Brakes	Minutes, Brakes	A. C. Equipment	Minutes, A. C. Equipment	Control Equipment	Minutes, Control Equipment	Pantographs	Minutes, Pantographs	Miscellaneous	Minutes, Miscellaneous	Total Delays	Total Minutes' Delay	Miles per Delay	Miles per Minute Delay	Cars Taken Out of Service	Total Miles
January	2	8	0	0	4	34	2	32	2	10	11	84	10,129	1,326	8	111,421
February	6	27	0	0	0	0	3	20	1	12	10	59	10,010	1,686	17	100,182
March........	3	10	0	0	3	23	5	72	0	0	10	105	11,860	1,127	8	118,608
April.........	3	19	0	0	2	4	1	15	0	0	6	38	19,527	3,083	5	117,166
May.........	1	6	0	0	3	16	0	0	1	5	5	27	25,889	4,779	2	129,449
June.........	2	7	2	7	0	0	3	20	1	1	8	35	16,174	3,690	7	129,184
July..........	1	12	0	0	1	9	1	22	0	0	3	43	43,258	3,018	7	129,776
August.......	0	0	0	0	0	0	0	0	0	0	0	0	126,198	126,198	7	126,198
September.....	0	0	1	8	0	0	1	8	0	0	2	16	60,956	7,619	5	121,913
October.......	2	10	0	0	1	5	0	0	1	23	4	38	30,678	3,229	9	125,682
November....	6	49	0	0	1	11	0	0	0	0	7	60	16,737	1,952	10	119,835
December.....	0	0	1	20	0	0	0	0	0	0	1	20	128,239	6,412	11	128,239
Totals......	26	148	4	35	15	102	16	189	6	51	67	525	21,756	2,776	96	1,457,653
Average per month....	2.1	12.3	.3	.3	1.2	8.5	1.3	15.7	.5	4.2	5.6	43.7	41,638	13,343	8	121,471

Cars in service, 30.

acceleration for the car of 1 m.p.h.p.s. on level and straight track. The weight of the electrical equipment is 24,500 lb., including one transformer, two pantographs, one switch group, one blower outfit, two motors and the miscellaneous electrical control and lighting equipment.

MAINTENANCE COSTS

The total costs of maintenance are shown in Table I. These costs are divided into two parts, namely, repairs and inspection, this being the form of records required by the New York Public Service Commission. The figures include both labor and material but do not cover the cost involved in cleaning cars, the cost of material for lubricating purposes and the cost of lamps replaced in the cars owing to breakage or deterioration. The costs of car-cleaning and lubricating material are shown in Table VI, and the number of lamps replaced each month during the past year is shown on Table IV, the cost per lamp being 23 cents. In Table I the figures shown in the column headed "A.C. Equipment" cover all a.c. wiring, the blowers, the transformers and the switch groups, in fact, everything except the propulsion motors and the pantographs. The figures under the heading "Control Equipment" cover all d.c. apparatus, such as the batteries and the d.c. side of the switch-group and control, the a.c. side of the switch group being included with the figures for a.c. equipment.

The cost of the motor repairs shown during the month of January is high because the expense of rewinding four armatures during the previous summer was charged out during that month. These four armature failures were mentioned in the article on the maintenance of electrical equipment published in the ELECTRIC RAILWAY JOURNAL for Feb. 21. Three of the failures were due to overworking and overheating during hot weather, while the other was caused by a defective commutator bar which grounded on the armature shaft through faulty insulation.

The high cost shown under the heading "Miscellaneous Shop Expense" during the month of March was caused by the fact that the entire coal bill for heating the shops during the winter of 1912-13 was charged out in that month. The shop, it may be said, is in a residence district, and it is necessary to burn anthracite coal in the heating boilers, the price of this fuel being extremely high. Obviously both of these single items of high cost could have been distributed, one over the year before and the other over the entire winter, but this procedure would have necessitated making reports which were different from the figures as shown in the auditor's books. This, in many respects, has not been considered to be desirable.

The total cost of maintenance and inspection expressed in cents per car mile may be found by adding together the last two columns of each part of Table I, the average for the year being 2.36 cents. For the different months the total figures are as follows:

TOTAL COST OF MAINTENANCE AND INSPECTION BY MONTHS IN CENTS PER CAR MILE

January	3.81	July	1.97
February	2.76	August	2.08
March	3.34	September	2.01
April	2.88	October	1.81
May	2.10	November	1.87
June	1.91	December	1.96

DELAYS AND DEFECTS

In Table II, which shows delays in minutes chargeable to the different parts of the equipment, the column headed "Cars Taken Out of Service" means the cars taken off trains for any reason whatever. This does not mean, however, that the car broke down on the road but simply that some defect was discovered and the car was turned in at the inspection terminal at either end of the road and was replaced by another car. Not more than one car is ever held out of service at any one time for more than twenty-four hours, and this one car is held for painting, the cars going through the paint shop in regular rotation. The requirements of the present schedule are twenty-seven cars out of the total of thirty with which the road is equipped.

Table III, which shows the car-defect report for the year 1913, is made up from a monthly car-defect-report sheet that shows the same information by days instead of the totals for each month. These car-defect-report sheets, it may be said, are watched very closely by the superintendent of equipment, and he investigates any marked case of trouble in person, his attention being called to these cases whenever an exceptional number of defects of any one class is shown. As an example, in the month of October eleven doors were reported defective, and upon investigation the trouble was found to be insufficient lubrication by the inspectors. In consequence orders were issued to devote more time to oiling, and more elaborate instructions for the inspectors were posted in the inspection sheds.

TABLE III—CAR DEFECT REPORT FOR 1913, NEW YORK, WESTCHESTER & BOSTON RAILWAY

	January	February	March	April	May	June	July	August	September	October	November	December	Tota
Compressors	1	..	3	..	..	..	..	..	..	1	4	2	11
Governors	..	3	1	..	1	..	1	..	..	1	3	3	18
Control valves	4	5	3	..	..	..	8	1	4	..	1	..	26
Brakes leak-off	..	3	..	2	..	1	..	..	..	..	..	..	6
Stuck brakes	1	8	6	3	..	3	4	1	2	1	3	2	34
Electric brakes	4	4	..	3	3	5	8	..	2	..	2	1	32
Feed valves	..	..	1	3	2	2	1	..	..	1	3	6	19
Brake valves	5	9	2	2	..	3	2	..	1	..	1	..	25
Brakes release slow	1	7	1	..	..	2	2	1	3	3	7	1	28
Poor brakes	3	6	4	2	..	12	3	2	2	2	..	6	42
Emergency valves	..	1	..	..	..	..	1	1	1	..	..	..	4
Whistles	1	..	1	1	1	..	..	..	1	..	..	1	6
Air pipes	1	..	..	..	1	..	1	1	..	1	..	..	5
Angle cocks and hoses	..	..	..	..	..	2	1	..	1	..	..	..	4
Line switches	..	..	1	..	1	1	1	1	..	..	..	..	5
A. C. wiring	..	1	..	1	..	2	2	..	2	..	..	..	8
Transformers	..	..	..	..	..	..	..	..	..	..	..	..	..
Control wiring	..	1	..	..	1	1	..	..	1	1	..	..	5
Current relay	..	2	6	..	1	1	1	..	4	..	3	3	21
Line relay	..	..	..	..	..	..	..	..	..	..	..	..	..
Overspeed relay	0	..	..	..	..	..	..	..	..	1	1	2	6
Jumpers and sockets	..	..	..	1	1	..	..	..	..	..	1	..	3
Switch groups	3	..	1	..	..	3	1	..	..	2	1	1	12
Switches	3	1	1	1	4	1	1	..	..	1	3	1	17
Lights	..	..	..	..	..	..	..	..	..	..	1	..	1
Battery lights	..	..	..	..	..	..	..	..	..	..	..	2	2
Motor leads	..	1	1	..	..	..	..	1	..	..	..	..	3
Pantographs	13	14	10	8	9	17	16	4	6	13	14	12	137
Batteries	..	..	1	..	2	3	1	..	2	6	1	4	20
Heaters	..	3	1	2	..	..	..	..	1	1	7	9	24
Motor generators	..	1	1	..	..	..	3	..	..	..	2	1	8
Reversers	2	..	1	..	2	2	1	..	..	2	..	..	10
Motors	..	2	1	3	1	1	..	..	..	1	..	2	11
Blowers	..	2	..	..	..	3	1	..	..	1	2	..	9
Flat wheels	9	14	4	4	4	3	..	..	6	1	6	4	55
Hot journals	..	3	1	2	..	..	3	1	3	5	3	4	25
Hot armature bearings	..	..	..	..	..	..	..	..	..	..	..	..	..
Gears	..	..	..	..	..	..	..	..	..	2	1	..	3
Doors	3	7	1	3	2	..	2	..	6	11	5	9	49
Glass	..	..	2	1	1	1	2	..	4	3	4	..	18
Car seats	..	2	..	2	3	2	1	..	12	3	2	1	28
Trucks	..	..	..	3	1	2	..	..	1	1	1	..	9
Leaky roofs	3	3	5	5	1	..	..	..	..	5	1	2	26
Car uncoupled	..	..	..	..	1	1	..	..	1	1	..	1	5
Shop	..	2	1	1	..	..	..	..	..	1	1	..	6
Motormen	2	1	1	..	..	..	..	2	1	..	..	1	8

These monthly car-defect-report sheets are filled in every day from a trainman's defect slip, which is made out and signed whenever trouble is discovered on any car. This defect slip is reproduced herewith. On the back is a space for remarks by terminal foremen as to the cause of the trouble. After the report is investigated and an explanation of the trouble is written on the back and signed by the terminal foreman, the slip is sent direct to the office of the superintendent of equipment for entry in the monthly car-defect-report sheet. In many cases no trouble is discovered upon inspection, the derangement as reported being only temporary in character or else imaginary on the part of the trainman. In such cases the inspector makes a thorough test under operating conditions and notes the fact on the back of a slip, reporting the car over his signature to be "O. K." Such reports of imaginary defects are not held against trainmen's records. Instead, the men are encouraged to report everything, no matter how minor in character it may be. The reports for which no actual defect was found by the inspectors are not entered in the defect record for obvious reasons, although slips covering the report are sent to the office of the superintendent of equipment in the regular manner.

NEW YORK, WESTCHESTER & BOSTON RAILWAY
This Copy to Inspection Shop Foreman
REPORT OF DEFECTS TO CAR NO..........................

Date....................191 Line.......................
........A. M. ....P. M.
Length of detention................mins. Train No..............
Place of trouble...
Motorman.................................No.............
Conductor................................No.............

CAR-BODY TROUBLES	CONTROL TROUBLES
Bad-order door..................	.Circuit breaker..................
Broken glass....................	.Circuit breaker reset.
Ventilator......................	.Switch group.....................
Bell............................	.Controller.......................
Bell cord.......................	.Reverser.........................
Light switches..................	.Motor cut-out....................
Markers.........................	.Current limit relay..............
Heaters.........................	.Potential relay..................
Diaphragm.......................	.Resistance grids.................
Safety chains...................	.Jumpers..........................
Buffing device..................	.Receptacles......................
Drawbar.........................	.Blower motor.....................
Headlight.......................	.Motor generator..................
Car seats.......................	.Storage battery switches.........
Car floor dirty.................	.Would not notch up...............
Lights..........................	AIR BRAKE TROUBLES
Pantograph trolley..............	.Brakes do not release quickly at times..........
MOTOR TROUBLES	Brakes release on lap.............
Motor bearings..................	.Brakes do not stop train quickly enough..........
Motors hot......................	
Gears...........................	.Motorman's valve stiff...........
	Feed valve........................
TRUCK TROUBLES	Governor does not cut out.........
Motor truck.....................	.Compressor not working...........
Trailing truck..................	.Electric brake...................
Flat wheel......................	.Brake pipe.......................
Hot box.........................	.Reservoir pipe hose..............
Broken brake rigging............	.Brake pipe hose..................
....	.Air whistle......................

DEAD CAR..

REMARKS

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Westchester Equipment—Defect Report Filled Out by Trainmen

MISCELLANEOUS COSTS AND REPLACEMENTS

In Table IV, showing replacement of small parts during the year, the heavy replacements of lamps of all kinds, especially during the first part of the year, were due to changing the standard, as a 23-watt lamp was adopted for use throughout the cars after extended experiments had been made with three other kinds of lamps. As mentioned before, the cost of lamp replacements is omitted from the general maintenance record as given in Table I, but if desired the total cost for lamps may be determined from Table IV and added to the total costs.

TABLE IV—REPLACEMENTS OF SMALL PARTS IN 1913, NEW YORK, WESTCHESTER & BOSTON RAILWAY

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Motor generator auto-starter	...	1	...	1	..	1	1	..	..	..	3	2	9
Controller fingers	...	...	5	...	..	1	..	..	..	..	2	1	9
Switch group contact tips	...	...	...	...	..	32	56	60	41	24	24	18	255
Reverser fingers	6	...	...	...	..	..	..	..	..	..	..	...	6
Resistance grids	6	...	...	...	..	..	..	..	..	..	..	...	6
Unit switches	2	1	...	...	..	..	..	..	..	..	..	...	3
Canopy switches	...	...	4	...	..	..	..	..	..	..	..	...	4
Canvas blower connections	...	...	5	6	6	1	..	2	..	..	2	..	22
Roller side bearings	1	2	3	...	1	1	5	1	1	1	1	2	19
Air-brake hose	...	...	...	1	12	20	..	..	..	..	..	...	33
Line-switch contacts	1	...	...	2	..	..	..	..	..	..	..	...	3
Motor-brush holders	...	2	...	...	2	..	..	..	..	..	..	4	8
Heater coils	...	...	1	...	..	..	..	..	..	4	2	1	8
Journal brasses	...	...	...	...	..	..	4	..	..	5	..	...	9
Pantograph insulators	2	1	...	...	..	..	..	..	5	1	..	...	9
Battery lamps	400	250	150	115	25	25	..	..	..	26	37	33	1061
Gage lamps	24	36	12	6	2		9	..	..	1	0	...	90
Car lamps	221	248	100	91	..	50	60	25	89	38	69	111	1102
Motor armature bearings	...	...	...	...	..	..	..	..	..	1	..	1	2
Motor axle bearings	...	...	...	...	..	..	..	..	..	..	..	...	....

The replacements of switch-group contact tips, which are shown to begin in June, are accounted for by the fact that, according to the standard time basis which has been established for renewing them, all cars are due to have this work done at the present time. The work will, of course, continue until all contacts are overhauled.

Table No. V gives the number of replacements and the mileage of brakeshoes, pantograph shoes and main motor brushes. The cost of labor and material for brakeshoes is given in Table I. The weight of a new brakeshoe is approximately 40 lb., while the weight of the scrap averages 14 lb. This gives a net ratio of useful metal to the total weight of metal purchased amounting to 65 per cent. The pantograph shoes are worth about 20 cents each, including the cost of labor and material employed in their manufacture at the company's shop. The cost of pantographs given in Table I covers, in addition to the cost of the shoes, the cost of work on pantograph frames, insulators, pressure cylinders and springs. The figures given for motor brushes, as shown in Table V, apply only to brushes for the main propulsion motors. These cost about 8 cents each for material only, there being six poles and twenty-four brushes to each motor.

TABLE V—REPLACEMENTS AND MILEAGE OF BRAKE AND PANTOGRAPH SHOES AND MAIN MOTOR BRUSHES, NEW YORK, WESTCHESTER & BOSTON RAILWAY

	—BRAKE SHOES—		PANTOGRAPH SHOES		—MOTOR BRUSHES—	
	Number Used	Miles per Shoe	Number Used	Miles per Shoe	Number Used	Miles per Brush
January..	219	5,988	130	840	285	18,384
February	123	9,627	94	1049	774	6,096
March...	116	12,205	112	1046	738	7,624
April....	124	11,160	104	1109	980	5,651
May.....	156	9,957	96	1320	400	15,214
June.....	90	12,224	93	1357	200	30,308
July	124	12,558	89	1425	100	60,864
August...	95	15,552	66	1866	100	59,088
September	86	17,011	50	2379	350	16,308
October...	150	10,054	46	2667	475	12,384
November	85	16,917	66	1775	350	16,068
December	129	11,644	75	1669	500	12,017
Average	124	12,075	85	1542	437	21,667

Table No. VI includes miscellaneous costs and records, as shown. The cost of lubrication given in this table covers the cost of material only. The labor is shown under the heading "Oilers" in Table I. Car cleaning is expressed on a basis of cost per car per month, two general cleanings being given to each car during that period of time. This work includes interior washing and disinfecting. In addition all cars are dry-swept and dusted every day, the windows being dry-cleaned with whiting. Windows are washed only after rainstorms.

TABLE VI—MISCELLANEOUS COSTS AND RECORDS, NEW YORK, WESTCHESTER & BOSTON RAILWAY

1913	Lubrication Material per 1000 Car Miles	Total Shop Payrolls	Car Cleaning, Cost per Car per Month	Kw-hr. per Car Mile	Watt-hr. per Ton Mile	Number of Shopmen	Pantographs Broken
January.......	$0.21	$2338.89	$6.48	5.60	93.3	26	4
February......	0.20	2229.47	4.91	6.00	100.0	29	8
March.........	0.26	2687.07	5.42	5.30	88.3	29	9
April.........	0.25	2216.68	5.02	4.76	79.3	21	8
May...........	0.21	2267.47	5.02	4.55	75.9	21	6
June..........	0.26	2003.59	6.17	4.61	76.8	22	10
July..........	0.18	2139.41	6.69	4.65	77.5	22	8
August........	0.16	2112.55	6.74	4.58	76.3	22	7
September.....	0.16	1985.08	6.63	4.48	74.5	21	4
October.......	0.22	2035.26	6.65	4.54	75.6	20	3
November.....	0.17	1849.96	6.74	4.91	81.6	20	4
December.....	0.23	2076.91	6.94	5.34	89.0	20	6
Average.....	$0.21	$2161.86	$6.11	4.94	82.3	23	6

The figures for kilowatt-hours per car mile and watt-hours per ton mile are obtained from measurements at the car by means of the wattmeters permanently mounted thereon. The figures include the power used for lighting, heating and for auxiliaries as well as for the main propulsion motors.

MILEAGE BETWEEN INSPECTIONS AND OVERHAULING

The cars are inspected on a mileage basis, the minimum being 1200 miles and the maximum 1800 miles. These limits are adhered to very closely. All cars, it should be said, are tested thoroughly after every inspection, and at these times all parts needing attention are repaired and all necessary replacements are made, so that the cars are maintained in perfect condition at all times. The overhauling periods are therefore established only for heavy apparatus which does not readily get out of order but which must be gone over at intervals to avoid failures and progressive deterioration.

An overhauling period of one year has been established for the main propulsion motors. At these overhaulings the commutators are turned and slotted, the armatures and fields are inspected and tested and the bearings and brush holders are readjusted. One-year intervals have also been established as overhauling periods for trucks, switch groups, pantographs, reversers, line switches, and air-compressor governors. The air compressor is overhauled at one-and-one-half-year intervals, the brake valve at six-month intervals and the control valve and feed valve of the brake system at three-month intervals. Painting and varnishing are done once each year. This short period is due, as explained in a previous article, to the rust which falls upon the car roof and slides from the steel overhead wire and thus tends to cause streaks upon the car after each rainstorm.

ELECTROLYSIS TESTS IN SPRINGFIELD

In the ELECTRIC RAILWAY JOURNAL for Jan. 31, 1914, an abstract was published of a set of suggestions by the United States Bureau of Standards for electrolysis mitigation in Springfield, Ohio. Since that time the proposed installation of insulated negative feeders has been made together with additions that were considered necessary to make a complete arrangement. Recently a series of tests was made upon the new system, and the report upon this has been issued in Springfield by the committee of investigation, which included representatives of the National Bureau of Standards, the city of Springfield and the telephone, telegraph and gas companies in the city.

The system actually installed included insulated return feeders for the Ohio Electric Railway as well as for the Springfield Railway Company, the former company now having installed negative copper amounting to 33 per cent of its positive copper, and the latter company 35 per cent. The conditions were very favorable to a system of insulated negative feeders owing to the fact that the substations of the two companies were at opposite sides of the city so that by interconnecting the tracks it has been possible to interchange current on the negative sides to a very considerable degree, thus aiding in securing low potential differences.

The negative feeders were designed to reduce the potential gradient in all parts of the track system to a mean value not exceeding 0.5 volt per 1000 ft. under net average schedule traffic. This corresponds to approximately 0.8 volt per 1000 ft. averaged during the hour of peak load. The test data show that this condition has been substantially realized.

The report states that the present conditions existing in Springfield correspond to those prevailing in cities in Great Britain and Germany where experience has shown that there is substantial freedom from injury by electrolysis. The regulations in effect in Great Britain as stated by the report limit the maximum over-all voltage drop in any city to 7 volts, the maximum being defined as a mean value between the highest momentary peak and the average for the hour of maximum load. In Springfield the tests showed that the highest value obtained exceeded the British limit by only 2 volts, and in the majority of cases the over-all voltage readings were considerably lower. The limiting value prescribed in Germany prevents the over-all voltage within city limits from exceeding 2.5 volts during average schedule traffic. In Springfield only 19 per cent of the readings were above this.

With regard to potential gradient measurements the largest average value in Springfield for any one hour was 0.98 volt per 1000 ft. This, however, was due to defects of track which could be repaired. The average of all the values obtained throughout the city was 0.23 volt per 1000 ft. The German regulations prescribe for suburban lines a gradient limit of 0.3 volt per 1000 ft. of track during average scheduled traffic. In Springfield the average of all peak load gradients is found to be 0.35 volt for the hour and 0.64 volt for the highest ten-minute period.

The over-all voltage prescribed by law in Lorain, Findlay, Galion, Fremont and Canton, Ohio, is limited to 7 volts between any two points on the non-insulated portion of the track return during the ten minutes showing the highest value, and the potential gradient for the corresponding period is limited to 1 volt per 1000 ft. The values of over-all voltages and potential gradients existing in Springfield are considerably below these limits, except in isolated cases where there is bad rail bonding.

From the results obtained the authors of the report state that they are convinced that the insulated return-feeder system combined with proper maintenance of track bonding is the best means of dealing with the electrolysis problem in all cases where it is not practicable to insulate the tracks from the ground.

The report makes strenuous objection to the use of pipe drainage under any circumstances for the city of Springfield, but instead recommends that the insulated return-feeder system should be supplemented by a certain proportion of insulating joints in the water pipes and gas pipes. With regard to lead cable sheaths of the telephone and telegraph companies, however, it says that it would not be commercially practicable to extend the insulated return-feeder system so that they could be safeguarded against electrolytic action. It is therefore cheaper to apply a limited amount of drainage protection to the cables, which, being continuous conductors, can be protected in this way. The problem of draining cables differs in many respects from that of draining pipes, particularly in that cables are continuous conductors and the difficulties arising from high resistance joints are not encountered. Great care, however, should be exercised not to overdrain the cables, as such overdrainage may involve danger of electrolytic action in neighboring structures.

The report presents definite recommendations which are briefly as follows:

(1) The insulated return feeders now installed should be made permanent, subject to necessary extensions.

(2) No insulated negative feeders are necessary on the interurban lines in the city at the present time, on account of the light loads.

(3) All electric railway tracks within the city limits should be so constructed and maintained that no rail joint will exceed the resistance of 8 ft. of rail.

(4) All tracks within city limits should be inspected once each year.

(5) No metallic connections between water or gas pipes and the railway return circuit should be permitted.

The Best Trolley Wire

The Writer Shows Why Current-Carrying Conditions, Limits of Wear, Salvage Values and Other Factors Should Be Considered in Selecting a Standard Trolley Wire

RY G. H. M'KELWAY, ENGINEER OF DISTRIBUTION BROOKLYN RAPID TRANSIT SYSTEM

A short time ago my office was invaded by an enthusiastic and persistent salesman of a large wire company who, immediately after his entrance, announced that he had come in to sell me 10 miles of trolley wire. The fact that the company with which I am connected was not then buying any of its trolley wire from his company did not shake his confidence in the least, but seemed rather to increase his ardor, as he stated that he loved a good fair fight.

He knew that wire similar to that now furnished by his company had been tried out by us several years before and that there had been no repeat order for it. Assuming, therefore, that I had already learned of the high quality of the wire made by his company from the previous experience, he did not enlarge at length upon its advantages over other makes of wire in so far as its strength, toughness or conductivity was concerned, but he tried to convince me of the desirability of using it principally because of its lower first cost as compared with other wire of the same size and similar qualities. This, perhaps, was due to my statement that I did not doubt that the wire in question was a very good one, but that I had never been able to see that it was as economical in the long run, all things being considered, as the one that we were using.

At last, becoming convinced that general statements as to the economy of the wire were futile and that I must be "shown" by means of figures that could be applied to specific cases, he left, but in a week or two he was back with a typewritten statement which gave the results that might be expected on the lines of my company.

The figures were conservative and in all but one point seemed to agree closely with what might be expected from the conditions under which we operate. Even the figures to which exception was taken could easily have been duplicated on many systems, but here it was our experience that it was safer and more economical to use others. The different conditions required by our service did not seem to be so important as greatly to change the salesman's figures, and he was greatly surprised and disappointed to find that the results, in dollars and cents, were entirely altered, and that instead of his wire showing a saving of approximately $175 per mile over what we were using, the revised figures indicated that we would lose about $15 for the same unit of length.

As a seemingly slight and relatively unimportant change in but one of several conditions had entirely altered the results of the calculations and caused an apparently better wire to fall below our standard in desirability, it might be well for the engineers of other lines to look more carefully into this matter to see if they are using the kind of wire best suited to their purposes when both service and price, the latter including maintenance, scrap value and first cost, are considered.

NEED FOR MATHEMATICAL STUDIES

It is impossible to know what wire will be the most efficient in any special case without making some kind of a calculation, yet how seldom is any calculation made! The usual way is to buy the wire that has been used with success before by the same road or about which the engineer has heard such reports from other roads as would make him believe that it will be the best for his road. Even if the first cost of the two different makes varies considerably, an attempt is seldom made to go into the matter carefully to see which would be the more economical in the long run. Almost invariably the choice is made either because one wire is cheaper than the other in first cost or because the life of one is expected to be longer than that of the other.

No attempt is made to balance the additional cost of one wire against the shorter life of the other and also to take into account the freedom from breaks or other causes of trouble and delay, as well as the salvage value of the wire when it has become so badly worn as to necessitate removal. Yet, as has been shown in the example given above, there may be a difference of $100 or $200 per mile of line and even much more. Carelessness in choosing the right kind of wire may often make very decided differences in the maintenance cost per mile per annum.

EFFECT OF CURRENT-CARRYING CONDITIONS

The trolley wires ordinarily used are of copper, steel, copper and steel or of a bronze composition, and it is between these that a choice must be made. While copper is the most used and can be shown to be the best for many lines, yet it is very likely that it is employed in more cases than it should be, as the only point where it can show any advantage over the other wires is that it has greater conductivity than any of them and less first cost than some of them. This high conductivity is important where there are no feeders and where all of the current has to be carried by the trolley wire, but it is not nearly so important where heavy feeders are in multiple and all but a small proportion of the current is carried by them, because then the voltage drop and wattage loss in the trolley wire are very small.

Therefore, hard-drawn copper will usually be the best material on light lines where there is little likelihood that more than three or four cars will take current at the same time, so that the average current will be too small for feeders, although fluctuating between wide limits. On the other hand, copper will seldom be found to be equal to some of the other wires of greater strength, although of less conductivity on heavy lines where the average current consists of perhaps 1000 amp or even more and where it is necessary to run feeder in multiple with the trolley wire. The same reasoning, to even a greater extent, will apply to lightly loaded but very long lines where much feeder has to be run to keep up the voltage and the current density in both the trolley wire and feeders is low. Between these limits there is much debatable ground where each case must be worked out separately and where the conditions may vary enough, owing to the fluctuation in the price of copper, to make it desirable to install at some times one kind of wire and at other times another kind.

COSTS AND SCRAP VALUES OF DIFFERENT KINDS OF WIRES

In order to show how the cost of the wire may differ at different times and also as a help to anyone who may care to work out the costs of trolley wires of different materials for his road, Tables I, II and III are given, showing respectively the price of copper, bronze, copper-clad steel and plain steel wire, of sizes from No. 0 to No. 0000, and at varying prices per pound. While copper and bronze weigh the same per foot, yet there is a difference between the weights of copper, steel and copper-clad steel. For that reason different tables are given of the costs per mile at varying prices per pound of the wire.

TABLE I—PRICE PER MILE OF COPPER AND BRONZE WIRE

Cts. per lb.	No. 0	No. 00	No. 000	No. 0000
13	$219.31	$276.51	$348.66	$439.66
13½	227.74	287.14	362.07	456.57
14	236.18	297.78	375.48	473.48
14½	244.61	308.41	388.89	490.39
15	253.05	319.05	402.30	507.30
15½	261.48	329.68	415.71	524.21
16	269.92	340.32	429.12	541.12
16½	278.35	350.95	442.53	558.03
17	286.79	361.59	455.94	591.85
17½	295.22	372.22	469.35	591.85
18	343.66	382.86	482.76	608.76
18½	312.09	393.49	496.17	625.67
19	320.53	404.13	509.58	642.58
19½	328.97	414.76	522.99	659.49
20	337.40	425.40	536.40	676.40
20½	345.84	436.03	549.81	693.31
21	354.27	446.67	563.22	710.22
21½	362.71	457.30	576.63	727.13
22	371.14	467.94	590.04	744.04
22½	379.58	478.57	603.45	616.86
23	388.01	489.84	616.86	777.86
23½	396.45	499.84	630.27	794.77
24	404.88	510.48	643.68	811.68
24½	413.32	521.11	657.09	828.59
25	421.75	531.75	670.50	845.50
Weight per mile, lb.	1607	2127	2682	3382

TABLE II—PRICE PER MILE OF COPPER-CLAD WIRE

Cts. per lb.	No. 0	No. 00	No. 000	No. 0000
13	$204.49	$257.40	$323.96	$408.46
13½	212.35	367.30	336.42	424.17
14	220.22	277.20	348.88	439.88
14½	228.08	287.10	361.34	455.59
15	235.95	297.00	373.80	471.30
15½	243.81	306.90	386.26	487.01
16	251.68	316.80	398.72	502.72
16½	259.54	326.70	411.18	518.43
17	267.41	336.60	423.64	534.14
17½	275.27	346.50	436.10	549.85
18	283.14	356.40	448.56	565.56
18½	291.00	366.30	461.02	581.27
19	298.87	376.20	473.48	596.98
19½	306.73	386.10	485.94	612.69
20	314.60	396.00	498.40	628.40
20½	322.46	405.90	510.86	644.11
21	330.33	415.80	523.32	659.82
21½	338.19	425.70	535.78	675.53
22	346.06	435.60	548.24	691.24
Weight per mile, lb.	1573	1980	2492	3142

TABLE III—PRICE PER MILE OF STEEL TROLLEY WIRE

Cts. per lb.	No. 0	No. 00	No. 000	No. 0000
4	$59.12	$74.80	$93.92	$118.24
4¼	62.81	79.47	99.79	125.63
4½	66.51	84.15	105.66	133.02
4¾	70.20	88.82	111.53	140.41
5	73.90	93.50	117.40	147.80
5¼	77.59	98.17	123.27	155.19
5½	81.29	102.85	129.14	162.58
5¾	84.98	107.52	135.01	169.97
6	88.68	112.20	140.88	177.36
6¼	92.37	116.87	146.75	184.75
6½	96.07	121.55	152.62	192.14
6¾	99.76	126.22	158.49	199.53
7	103.46	130.90	164.36	206.92
7¼	107.15	135.57	170.23	214.31
7½	110.85	140.25	176.10	221.70
7¾	114.54	144.92	181.97	229.09
8	118.24	149.60	187.84	236.48
8¼	121.93	154.27	193.71	243.87
8½	125.63	158.95	199.58	251.26
8¾	129.32	163.62	205.45	258.65
9	133.02	168.30	211.32	266.04
Weight per mile, lb.	1478	1870	2348	2956

First, let us consider the purchase price of the wire. Some figures obtained by the writer a few months ago will show the relative values of the different types at that time. They were as follows:

Copper	16¼ cents per lb.
Bronze	17¾ to 20 cents per lb.
Copper-clad	15⅞ cents per lb.
Steel	6¾ cents per lb.

At the same time the scrap values of the metals were quoted as:

Copper	13¼ cents per lb.
Bronze	13¼ cents per lb.
Copper-clad	3½ cents per lb.
Steel	1/3 cents per lb.

From a comparison of these two statements of cost it will be seen that while copper is one of the highest priced of the metals, yet its scrap value is so high that the amount of its value lost in service—that is, the difference between the first cost and the scrap value—is the least of all, while the copper-clad wire is greatly handicapped in its race with the other materials on account of its low salvage value.

RELATIVE LIFE OF DIFFERENT KINDS OF WIRE

So far as the relative life of the different wires is concerned, there will be found to be great difference of opinion. Each grade mentioned in the list is made by at least two firms, and although the composition of the metal or metals entering into the wire is the same for all of the firms making that type, the methods of manufacture are often different in some particulars, and even different reels of the same grade of wire made by the same company often vary considerably among themselves. Add to this the different conditions under which the wire is used—light or heavy service, up or down grade, on curves or straight line, over good or bad track—and it will not seem at all strange that all engineers do not agree in their ideas as to the life that can be expected from each kind. However, as some definite life must be assigned to each kind if they are to be compared with each other, it might be said that the engineers with whom I have talked appear to agree, on the average, that, with the exception of copper, the lives of the materials are about equal and the life of hard-drawn copper is approximately one-half of that of any of the others under similar conditions of service. The wire designated by the letter "A" has not been manufactured long enough to show what it will do in the matter of standing up under service, but, judging from the results of tests upon it, it would seem to have a life about midway between the bronze and copper wire, or one and one-half times the latter.

CURRENT-CARRYING CAPACITIES

In order to appreciate the difference that will be made by the different amounts of current that will be wasted in the wire, the resistances of the various kinds must be given as the loss varies directly as the resistance. Compared to Mathiessen's standard the conductivity of the wires is about as follows:

Hard-drawn copper	.95
"A"	.85
Bronze	.45
Copper-clad	.40
Steel	.10

Before comparing directly the cost per annum of the different wires, one other point is to be considered, namely, the average amount of current carried by the trolley wire. To use the average current is not quite correct, as what should be known is the average current that will occasion the same amount of loss in the line per year as the square root of the mean squares of the current taken at short intervals. Where the load fluctuates little the average current will be very close to the correct amount, but where the line shuts down entirely during several hours of the night or where the rush-hour peaks are high the square root of the mean squares should be taken. It will be found that on most lines the engineer, unless he has had considerable experience in such work, will over-estimate the current in the wire, as he will think principally of the load during the heavier hours of the heaviest seasons of the year and will be surprised to find how much nights, Sundays and light seasons will reduce the current in the wire from the amount which he supposed was a fair average for it. Very often he will think that because during rush hours in the winter, perhaps, the current amounts to 200 amp on the trolley wire, one-half of that, or 100 amp, would be a good average. Looking further, he will find that 100 amp is the average load carried during the day only, and that shutting down at night and light loads on Sundays and holidays will make 50 amp a better average for the winter, while the saving due to the cutting out of the heaters and the use of light, open cars will still further reduce the current during the rest of the year so that it will not average for the entire year more than 35 amp.

In attempting to valuate the current lost in the trolley wire, much difference of opinion will be found as to the charge per kilowatt-hour that should be made. This difference of opinion is only natural, as with some companies the cost of energy will be much higher than with others. Energy bought from a steam generating station will cost more than energy obtained from a water-power plant, especially if the latter is lightly loaded. In that case the additional energy will cost almost nothing, as no fuel, labor or capital would be required.

COSTS OF DIFFERENT KINDS OF WIRE IN PLACE

In addition to the cost of the wire itself, there must be added to make up the cost of the material in place the cost of installation, but this will not differ materially for the different types of wire. The copper will not be so stiff as any of the other materials and therefore will be a little more easily handled, but the difference in ease of handling will not be great enough to make any appreciable difference in the cost of installation. The latter will probably average $60 a mile, the amount of special work on the line making a great difference in the cost.

Therefore, taking No. 00 wire, which is standard with a great many companies, especially for city work, the first cost of the various kinds in place would be as follows:

	Copper	"A"	Bronze at 17¾ Cents	Bronze at 20 Cents	C-C	Steel
Cost of wire.	$340.32	$425.40	$377.54	$425.40	$316.80	$250.90
Installation...	60.00	60.00	60.00	60.00	60.00	60.00
	$400.32	$485.40	$437.54	$485.40	$376.80	$310.90

If the investigation should stop here, it can easily be seen that the steel wire would be thought to be the most desirable and the copper-clad next, but let us see what the net cost of the wire will be when the value of the salvage after the wire has been taken down is deducted from the first cost. Suppose that one-quarter of the wire has been worn away so that the weight of the scrap is only three-quarters of that of the new wire. Even that much salvage will seem to be a great deal to many engineers, and there is no doubt that much wire is left up in the air until its weight is far less. However, for important lines where the delay caused by a broken trolley wire is a serious matter, to say nothing of the chances of accident claims due to persons being struck by or frightened at the fallen wire, it will not be safe to have the average wear more than that given above, although at certain points the trolley wire may be much below the average in section. The net cost of the wire would then be:

	Copper	"A"	Bronze at 17¾ Cents	Bronze at 20 Cents	C-C	Steel
First cost...	$400.32	$485.40	$437.54	$485.40	$376.80	$310.90
Salvage	211.20	211.20	211.20	211.20	51.83	4.67
	$189.12	$274.20	$226.34	$274.20	$324.97	$306.23

EFFECT OF DEDUCTIONS FOR SALVAGE AND LENGTH OF USEFUL LIFE

A comparison of the figures obtained by subtracting the salvage value of the wire from the first cost will correct many mistaken ideas concerning the cheapness of some kinds of wire. Copper, previously one of the expensive materials, now shows up as the cheapest instead of steel or copper-clad, the two latter now being at the foot of the list instead of the head. If the wire is permitted to stay up in the air until 50 per cent of it is worn away, the salvage will be only two-thirds of the amount given in the previous table and the results will be:

Copper	$259.52	"A"	$344.60
Bronze at 17¾ cents...	292.74	Bronze at 20 cents.....	344.60
C-C	342.25	Steel	307.79

While copper is still the lowest when net prices are considered, the copper-clad steel and the plain steel have much bettered their positions.

But even the two tables do not show all that should be taken into account, because of the difference in the length of life of the wires under the same service. To get the proper relation the fixed cost per year of interest and depreciation should be estimated for each of the wires. Then, supposing the life to be ten years for the best wearing and five years for copper, with the trolley wire worn down to 75 per cent of its section, the results for each year would be:

	Copper	"A"	Bronze at 17¾ Cents	Bronze at 20 Cents	C-C	Steel
Depreciation.	$37.82	$36.56	$22.23	$27.42	$32.50	$30.62
Interest, 5 per cent	9.46	13.71	11.11	13.71	16.25	15.31
	$47.28	$50.27	$33.34	$41.13	$48.75	$45.93

An examination of these figures will show another series of upsets. Copper is no longer the lowest-priced material, but the bronze wire has taken that place, while those wires composed either wholly or partly of steel have again risen to being the highest in price. If the wire is kept in service until one-half of it is worn away, the yearly cost will be:

Copper	$64.88	"A"	$63.18
Bronze at 17¾ cents....	43.91	Bronze at 20 cents.......	51.69
C-C	51.33	Steel	46.17

These figures show copper to be highest in price and the bronze to be lowest, but with steel not far away.

EFFECT OF ENERGY LOSSES IN THE LINE

There is still one other variable to be taken into account, namely, the value of the energy lost in the line. This will be the hardest of any of the values to determine because of the difficulty in estimating the average current in the wire, its value in cents per kilowatt-hour, and whether all that appears to be wasted in the line really is wasted or merely takes the place of current which, with a higher voltage on the wire, would be wasted in the car resistances because the motormen would then run for a longer part of the time with resistance in series with the motors.

In spite of this trouble of ascertaining the amount of energy lost, an inspection of the following table will show that, even if the cost per kilowatt-hour is only a fraction of a cent, a high line loss will throw out the results calculated so far and without taking account of this point. The average current density in the trolley wire can best be taken as one-half of that measured at the point where it first feeds into the line, as from that point it will decrease to zero at the other end of the section.

LOSS OF POWER PER MILE PER YEAR IN KILOWATT HOURS

	Copper	"A"	Bronze at 17¾ Cents	Bronze at 20 Cents	C-C	Steel
100 amp......	9,480	11,250	20,000	20,000	22,500	90,000
50 amp......	2.370	2,812	5,000	5,000	5,620	22,500
20 amp......	379	450	800	800	900	3,600
10 amp......	95	112	200	200	225	900

The average current in this table is that at the feeding-in point so that the calculations are made with one-half of that amount distributed over the wire.

While these figures make the showing of the low-conductivity wires very bad in comparison with that of copper, yet it must be remembered that the amount of current in the wire will be much less, if there is feeder in multiple with it, when the trolley wire is of low conductivity than when its resistance is less, because in the former case a greater proportion will be carried by the feeder. While this will reduce the loss in the trolley wire and also to some extent that in the whole distribution system over what might be expected, yet there will be an increased loss in the feeder in consequence of the greater proportional load which it carries.

CONCLUSION

The life of wire upon which these estimates were based—five years for copper and ten years for most of the other materials—would probably go with a current density of from 20 amp to 50 amp in the trolley wire, so that those figures would be the most likely to be taken by anyone looking into the case for an ordinary example. Therefore, the steel wires would be very expensive for such service if they were made of the same size as those of the other materials. This trouble, however, might be avoided by enlarging the section of the wire, which would not only decrease its resistance but would increase its life. This will give anyone of a mathematical turn of mind a further chance to investigate the matter as regards his own line. However, it was the intention of the writer merely to point out the conditions which might modify the choice of the wire and to let each engineer figure out what one would be the best for him to use.

On many systems it will be found that while one wire will prove the cheapest for the greater number of the lines, it will not be so for all of them. Several wires might be found, all with one or more sizes, each of which would prove to be the best for some particular line. Owing to the amount of stock that would have to be carried both in the storerooms and by the emergency crews it will not be found advisable to have more than two or three sizes and kinds of wire as a greater variety will cause confusion and expense.

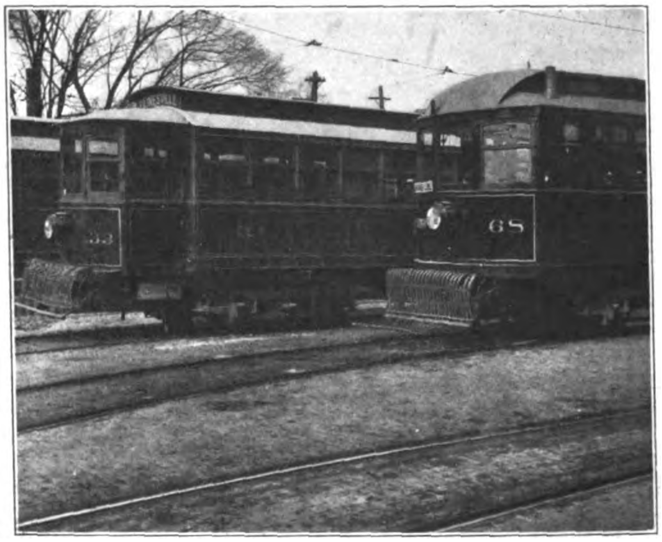
Therefore, it is best to choose that wire which appears to be the most economical for the system as a whole and to make that wire the standard. There will then be no need for the crews, when making repairs, to run in one size or type of wire in a line which was first run with another wire. At the same time the engineer should look well into the subject before choosing his standard because great economies are to be gained by the choice of the proper one.

At the recent annual meeting of the Lancaster & Yorkshire Railway, England, the chairman said the estimate of capital expenditure for the ensuing year was $3,335,025, including $608,750 for a new power station about to be erected at Clifton Junction. It is proposed to electrify the existing lines from Manchester, through Crumpsall, to Bury, and there is little doubt, judging from experience in the Liverpool district, that the additional traffic will well justify the expenditure. Referring to the electric power and light account, the chairman said that the small cost of generating electricity showed the wisdom of the company in generating its own power. Included in the statistical report are figures showing that generation and distribution costs amounted to $174,195, and that $48,700 was provided for renewals. The high-tension energy generated and supplied is classified thus: traction, 28,719,591 kw-hr.; power, 1,576,484 kw-hr., and lighting, 1,753,679 kw-hr.

REMODELING SIXTEEN YEAR-OLD CARS AND OTHER MAINTENANCE FEATURES OF THE CLEVELAND, PAINESVILLE & EASTERN RAILROAD

Along with the radical changes in the power generating and transmission system of the Cleveland, Painesville & Eastern Railroad, as described in the ELECTRIC RAILWAY JOURNAL of July 19, 1913, has come a corresponding improvement in the condition of the rolling stock and many original features have been introduced into the shop practice. The largest single job has been the making over of the old interurban cars, which have been giving excellent service for sixteen years or more. These cars are of substantial construction, weighing about 25 tons equipped, and as reconstructed they operate like new ones.

The first step in the reconstruction was to strip the cars of all trim, ceiling and sash. The old-fashioned beading was planed off everywhere, leaving smooth, chamfered surfaces in its place, and all trim was entirely refinished. The most conspicuous change was in the vestibule. One of the accompanying halftones indicates the difference in style of the yearly and present periods of car construction. The older type of vestibule appears to be a separate feature added to the body, being narrower and lower; the newer form, with Pullman roof, is an integral part of the car. Not only is the appearance thus improved but the windage resistance at high speed is reduced.

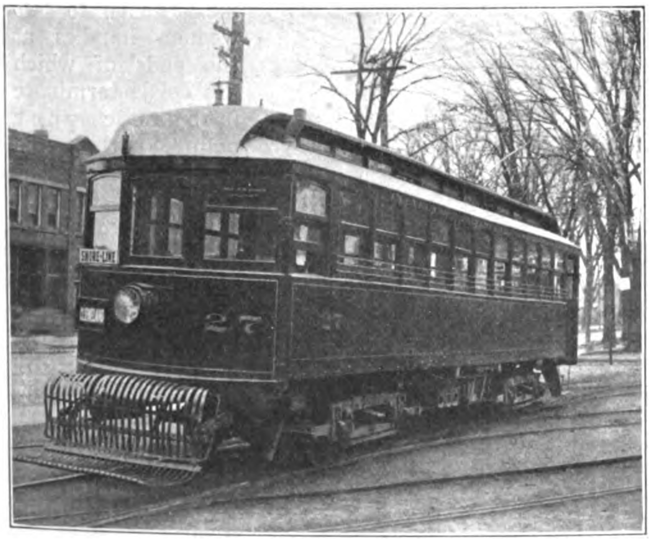


Cleveland, Painesville & Eastern Railroad—Contrast of New and Old Vestibule

Another illustration shows a Brill-27 truck re-equipped with inside-hung brakes. More than one-half of the truck equipments have been thus remodeled and the rest will be completed shortly. The change has been made to secure more even wear of brakeshoes, better braking effect and quicker release. Greater life of brakeshoes is also obtained by this arrangement. In changing the construction, the outside rigging was removed and four bent-steel plates were bolted in the side frames and transoms as shown. The brake hangers are carried under these plates from bearings attached to them by four bolts each. The brake levers slide in slots cut in the plates. Short angles are bolted to the plates to form guides for the bolsters. The motor suspension bars hang in stirrups formed of U-shaped pieces of steel bolted to the inside edges of the plates. The large nut shown at the rear of the plate in the foreground in the illustration is on the bolt by which the motor-suspension stirrup is secured to the plate. The fixed points for the levers are furnished by brackets bolted to the plates but not shown in the illustrations. The floating ends of the levers are joined by cross-bars, at the centers of which the tension rods are connected. The release springs are attached to the ends of these bars by means of brackets. In the illustration an express car is seen in the background equipped with a truck with the older outside-hung brake rigging. The third engraving gives an excellent idea of the appearance of the complete remodeled car.

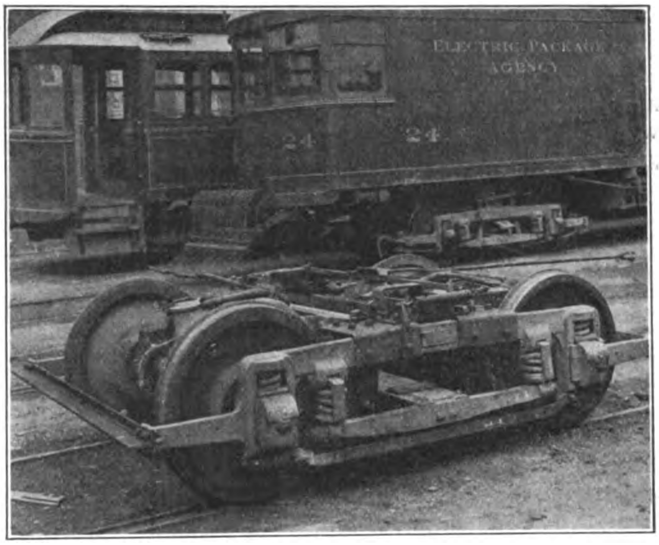
SHOP PRACTICES

One of the shop features is a babbitting machine, original with J. G. Swain, the former superintendent. It consists of a steel mold with a movable steel core, operated by means of a 10-in. air-brake cylinder and plunger. Admission of air draws the core downward and out of the babbitt, leaving a smooth wearing surface. The oil-fired melting pot and machine are compactly mounted on a steel frame so that little space is needed. The machine is provided with an assortment of cores of standard diameters. All commutators are slotted, motor shafts are restored by the use of journal sleeves, which are made from rough tubing 3/8 in. thick. When turned down they are 3/16 in. thick and are allowed to wear to 3/32 in. before replacing. The cars are equipped with GE motors which have strap field windings on brass spools. It has been found difficult to keep the winding permanently tight in the spools and as a result the insulation has chafed very much. A successful expedient devised to overcome this trouble consists in sawing the spools in two in the middle in the plane of the coils. The coils can then be wound and thoroughly insulated and the two parts of the spool shoved into them and clamped tightly in place. Since this plan has been in operation field-coil troubles have practically disappeared. The split spools are used on all motors of this type and a good stock of coils and spools is kept for emergency use.



Cleveland, Painesville & Eastern Railroad—Remodeled Standard Interurban Car

A simple but effective seat-sparing device is a brass foot rail on the exposed edges of the front-seat cushions. These cushions make natural and tempting foot rests for passengers who are riding on the facing seats. As most passengers object to riding backward the front seats are filled last so that the cushions are almost always available as foot rests. A brass tube, mounted on simple brackets at the ends and middle, protects the corner of the cushion and supplies the supposed need for a foot rest.



Cleveland, Painesville & Eastern Railroad—Remodeled Truck

The important work hereinbefore described was begun by Mr. Swain and his associate, Mr. Wood, before their change to the Northern Ohio Traction Company, and it is being continued by the present master mechanic, Ed. Hengst.

RESULTS OF SYSTEMATIC PROVISION FOR PROMOTION ON THE PENNSYLVANIA RAILROAD

Records just compiled of careers of the 170 ranking officers of the Pennsylvania Railroad System give striking evidence of the policy the company pursues in training men, and of the opportunities open to men in the service. Of the 170 officers, 163, among whom should be mentioned the president of the company, started at the bottom. This census of Pennsylvania officers now in active service shows that J. B. Hutchinson, assistant to the vice-president in charge of real estate, purchases and insurance, Pennsylvania Railroad; A. L. Langdon, traffic manager of the Long Island Railroad; E. T. Postlethwaite, assistant to the president of the Pennsylvania Railroad, and E. A. Dawson, manager of the Star Union Line, have worked for the railroad more than fifty years. Each of the five vice-presidents of the Pennsylvania Lines West of Pittsburgh, who have just been elected, has been in the service of the railroad more than forty years. Every one of them began at the bottom of the railroad ladder. J. J. Turner, first vice-president, began work for the Pennsylvania as a ticket sorter; E. B. Taylor, second vice-president, started as a clerk; D. T. McCabe, third vice-president, as clerk; G. L. Peck, fourth vice-president, and A. M. Schoyer, resident vice-president at Chicago, began with the company as messengers.

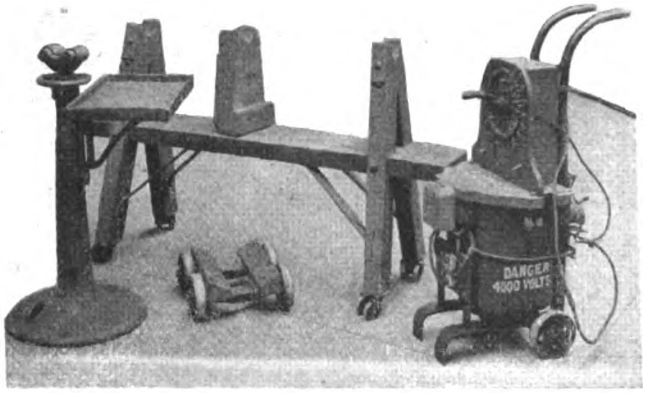
Twenty-two of the company's officers have been in the company's service between forty and fifty years; fifty-seven between thirty and forty years, and fifty-nine between twenty and thirty years. Thirty of these 170 officers are between sixty and seventy years old, sixty-one between fifty and sixty years, sixty-two between forty and fifty, and seventeen between thirty and forty years of age.

The above record is of special interest in view of the criticism to which railway managements have recently been subjected.

Shop Practices at Milwaukee

In the Various Repair Departments of The Milwaukee Electric Railway & Light Company a Number of Quick Methods of Doing Work Have Been Introduced with Marked Success in Reducing Costs

The following series of descriptions of shop kinks and jigs in the shops of The Milwaukee Electric Railway & Light Company are published on account of their general interest as well as for the fact that they may offer suggestions for economies in other electric railway shops.



Milwaukee Shop Kinks—Armature Repair and Test Outfit

PRESS FOR REMOVING BEARINGS

Solid bearings are not removed from the end housings of motor frames on the truck repair-room floor but are brought into the armature room by way of the electric freight elevators. Here they are removed from the housing by an air press especially designed for this purpose. This consists of a 10-in. x 12-in. brass cylinder suspended on a 66-lb. T-rail, which in turn is held in position on a bar-iron frame. The brake cylinder is held rigidly in the vertical position by a section of T-rail bolted to the bar-iron frame and to the cylinder. The supporting frame is attached to two I-beams which form the side frames of a four-wheel truck. The brake cylinder air piping is supplied with a section of hose so that it may be coupled into the shop compressed-air system where 90-lb. pressure is available. Air is either admitted or released to the brake cylinder by way of a valve conveniently located in the air-pipe connection.

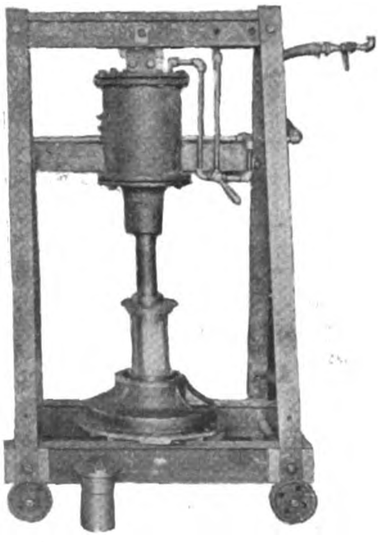
The method followed in removing an armature bearing from the housing is as follows: The housing is mounted on two sections of rail set across the I-beam frame beneath the brake-cylinder plunger. The plunger is fitted with a ram, which is held firmly in position by dovetailed connection. This ram is set on the bearing, and as air is admitted to the cylinder the bearing is pressed from the housing. To replace the bearing in the housing, the ram is removed, and a flat plate similarly held in position on the plunger head by a dovetailed connection replaces it. The rails are removed from beneath the bearing housing, which has been reversed in position and allowed to rest on the I-beam truck frame. After the bearing has been accurately set in position on the housing, the plunger is lowered by the admission of air into the cylinder until it comes in contact with the bearing. Then full air pressure is applied to force the bearing into the housing. A view of this air press for removing solid bearings from the housings is shown in one of the illustrations.

ARMATURE DOLLIES AND HORSES

To facilitate the handling of armatures about the armature repair room, as well as from the repair shop floor to the armature room gallery, wooden armature horses and dollies have been provided. As shown in the accompanying cut, both the dolly and the portable armature horse are substantially built of wood, the dolly being provided with four ordinary truck wheels and a wooden saddle and the horse being provided with a double 3-in. caster under each leg. Each portable horse is provided with extra wooden bearing blocks so that armatures smaller than those from standard railway motors may be set in them and transported about the shop. The shelf between the two legs of this portable horse is provided as a place for the workmen to lay tools. In the winding process the usual cast-iron bracket with a double-roller bearing is employed. Each standard is fitted with a pivoted bracket supporting a wooden tray and the armature shaft bearings may be adjusted vertically by a hand wheel and screw attachment.

POTENTIAL TEST SET

The armature testing outfit embraces short-circuit test sets for armatures and field coils, and an armature potential tester. The latter equipment is somewhat different from that found in other street railway shops and embodies a number of features which make it worthy of special attention. Essentially, it consists of an auto-transformer made from an ordinary pole transformer mounted on a simple truck. This transformer is arranged by way of tap connections and paralleling switches so that the voltage may be stepped up from 125 to 4000 volts in 125-volt steps. This potential test equipment is connected with the 125-volt or 250-volt, sixty-cycle shop-lighting and power circuits, and the actual testing is done by two 30-ft. flexible cord connections to two wooden handles at the ends of which the cords terminate in bare copper points. As a rule each complete armature is put under a 1250-volt a.c. potential test lasting one minute. To indicate to the operator that the test set is operating satisfactorily, a small pilot light set is mounted on the front of the transformer and a small circuit-breaker is installed on the back. This test set, the armature dolly and portable horse, as well as the standard used in winding armatures, are shown in one of the illustrations on this page.



Milwaukee Shop Kinks—Air Press for Removing Solid Bearings

FIELD-COIL DIPPING TANK

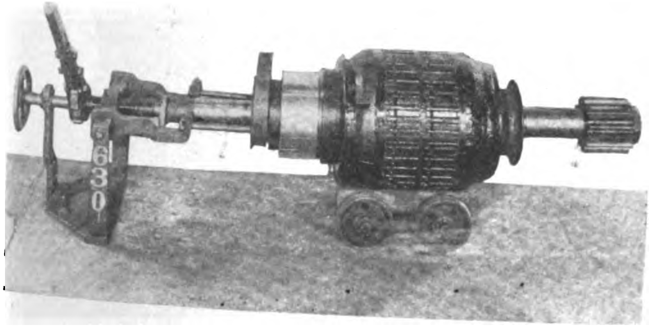
All the armature coils used in repair work are wound by girls in a special inclosed section of the armature repair department. In connection with field work a homemade field-coil dipping tank has been devised to increase the output and at the same time prolong the life of the insulating compound. This dipping tank is made of galvanized iron 3 ft. in diameter and 3 ft. deep. The lid of the tank is attached to an air hoist which raises and lowers the dipping rack into the fluid. This wooden rack is supported on four strap-iron hangers, and is of sufficient size and strength to permit dipping twelve GE-70 field coils at one time. In charging the dipping tank, the slatted platform of the rack is raised even with the top of the dipping tank and the coils set in position. Air is then released from the air hoist, which lowers the rack to the bottom of the tank and at the same time sets the tank lid in position. All coils are left in the insulating compound about one hour, during which time the lid is securely clamped in position with thumb-screw locks. After the coils have been dipped the rack is raised above the liquid but not high enough to raise the lid, and in this position the coils are allowed to drain for three hours before being placed in the baking oven. In conjunction with this field-coil dipping tank, an ordinary block and fall has been conveniently attached to the roof beams so that the very large coils may be raised from a truck and swung onto the coil dipping rack.

ARMATURE STRIPPING ROOM

To remove the dust and dirt which always accompanies the process of stripping old armature cores of defective coils, the armature repair department has found it more economical as well as more satisfactory to do this work in a room devoted solely to this purpose. When armatures come into the repair shop they are lifted to the portable horses, run into this stripping room where all defective coils are removed, after which the armatures are wheeled into the repair department where all repairs necessary are completed.

RATCHET COLLAR PULLER

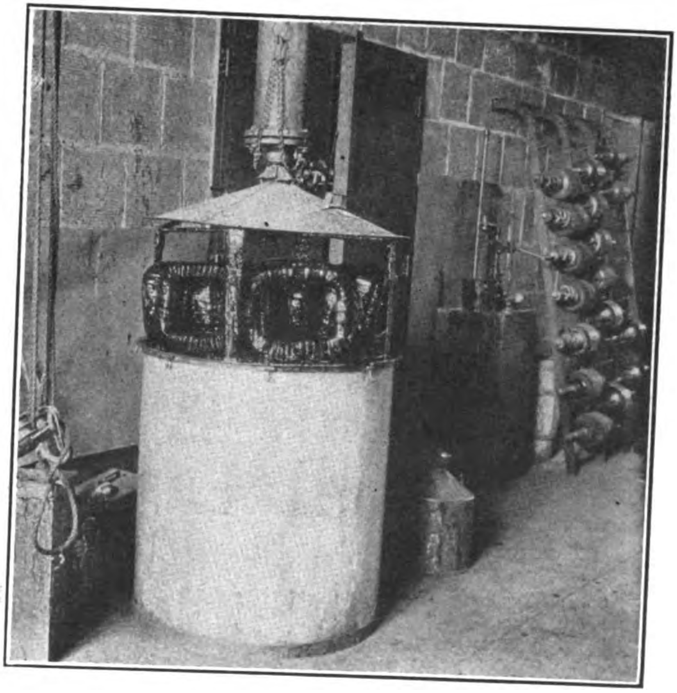
With certain classes of defective armatures it is necessary to remove the collar which adjoins the commutator segments. Under ordinary conditions this is a difficult task, but the armature department of the Milwaukee company has facilitated this work by building a home-made ratchet collar puller. This consists of a half-moon shaped forging which is slipped over the inside of the collar. Two ¾-in. bolts are passed through this forging, and the heads of these bolts are dropped into two slots provided on the puller frame. When the yoke is in position the slack is taken up with a hand wheel set between the head of the puller and the end of the armature shaft. The removing pressure is brought to bear on the armature shaft by advancing the screw with an ordinary hand ratchet and lever. This device is shown in one of the illustrations.



Milwaukee Shop Kinks—Ratchet Collar Puller

NOVEL PINION PULLER

By the use of the ratchet and lever principle in connection with the collar puller in the electrical department, a novel pinion puller has been provided for removing pinions from the armature shaft. This consists essentially of a steel-lipped casting which fits over the pinion, the lips engaging with the pinion teeth. The slack is taken up between the armature shaft and the plunger of the pinion puller by a quick take-up hand wheel, after which the ratchet and lever are brought into play. When considerable pressure has been brought to bear on the end of the armature shaft, a hammer blow struck on a striking block at the exposed end of the pinion puller loosens the pinion. A view of this pinion puller is shown in one of the illustrations on the following page.

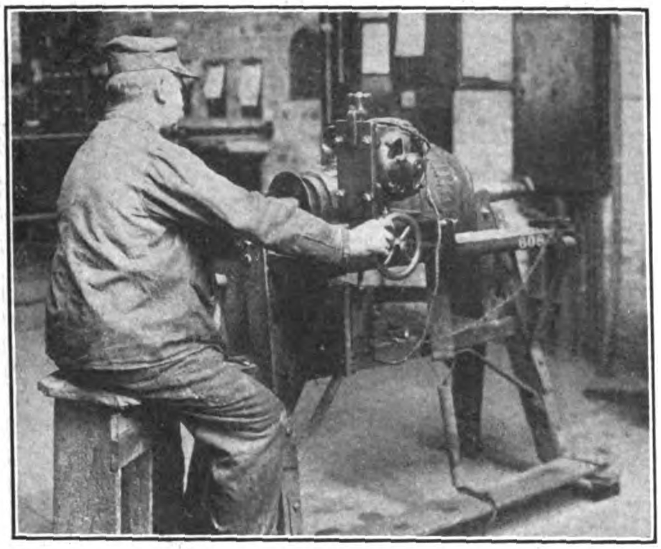

Milwaukee Shop Kinks—Field-Coil Dipping Tank

SIMPLE COMMUTATOR SLOTTER

Like a great many other street railway companies in this country, the Milwaukee railway's armature repair department has designed and built a commutator slotter which has given very satisfactory service. The principal part of this slotting machine consists of a ¼-hp motor which operates at 1800 r.p.m. and is fitted with an extended armature shaft. The slotting saw is applied to the end of the shaft and is held firmly in position by a nut. The motor, in turn, is mounted on a bed which is reciprocated by a hand wheel and a twin pinion mechanism engaging in a rack attached to the underside of the bed. This complete slotting tool is mounted on one of the portable armature horses and may be shifted to any point in the shop. Energy is supplied to the motor by way of a long flexible cord and plug which may be connected into the shop power circuits.

TROLLEY-WHEEL GRINDING ATTACHMENT

All trolley wheels used on the cars of the Milwaukee Railway are manufactured of a very hard and tough bell metal in the company's own brass foundry. Until recently the work of smoothing the trolley wheel groove has been done with an ordinary round file which limited the work of one man to about fifty wheels per day. This added greatly to the manufacturing cost of the trolley wheels, and consequently it was desired to increase the output and at the same time reduce this cost of manufacture. This was accomplished by providing a countershaft attachment to the tool rest of one of the small engine lathes. A carbonite wheel, having the same contour as the trolley wheel groove, is keyed to an extension on one side. The grinding tool is forced into the groove by way of a hand lever and ratchet which already formed a part of the tool rest. This device has increased the output approximately 200 wheels per day. The extreme hardness of the trolley wheel metal, however, makes it necessary to renew the 10-in. grinding wheel after finishing each 1000 trolley wheels. A view of this lathe attachment for grinding trolley wheels is shown in one of the illustrations.



Milwaukee Shop Kinks—Commutator Slotting Machine

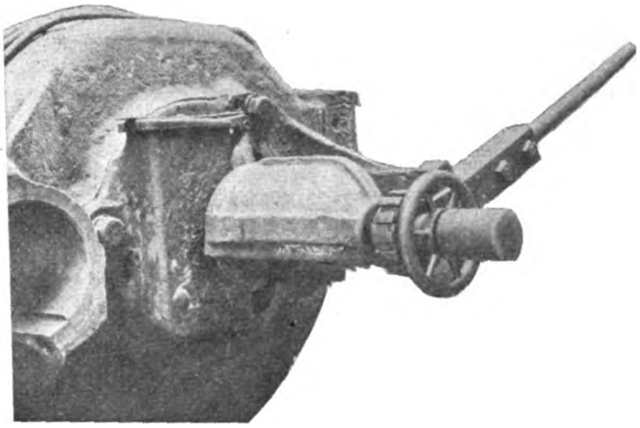
SPECIAL AXLE STRAIGHTENER

Wheel routine in the Milwaukee Railway repair shop is as follows: As wheels are brought in from the truck repair department, they are run through the special axle-straightening machine, where the axles are inspected and straightened if necessary, after which they are passed on to the wheel lathe for truing the wheel treads and flanges. In case of new wheels, after they have been pressed on the axle in the wheel press, they too pass through the axle straightener to verify the axle before going into service.

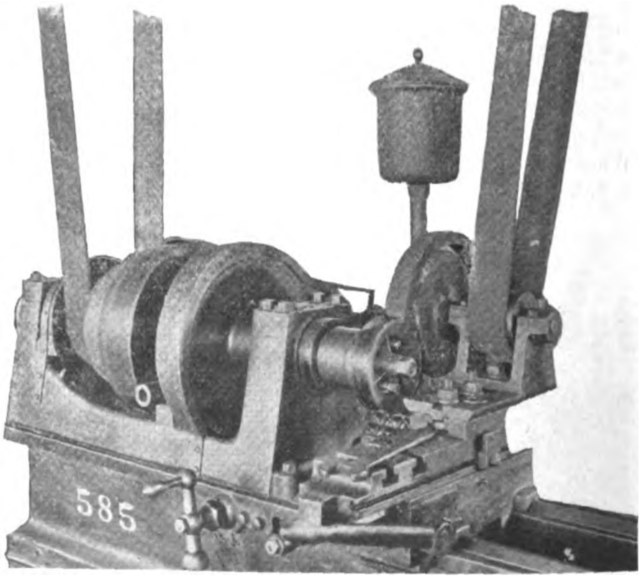
The axle straightener is a special tool built by a local manufacturer. It consists of two pairs of I-beams, one acting as a support for the axle-straightener plunger and the other as the bearing for the wedges and inclined planes which support the axle during the straightening process. The axle-straightener plunger is mounted on a trolley swung from the lower flanges of the I-beams and is connected through a universal-jointed pipe to the oil pump mounted on the top of the upper supporting beams. Swung between these upper I-beams and near each end is a hand-wheel, with screw and chain attachment arranged for raising and lowering the car wheels to the revolving centers of the machine. These centers are arranged with sufficient swing to take the largest sized wheel and are provided with a special spring support so that they will adapt themselves to any deflection during the straightening process. After the car wheels have been centered and the bent portion located by starting the rotating motor installed beside the machine, the axle is supported by a system of wedges. Then the position of the straightening plunger is shifted so that, when the necessary pressure is applied, it will spring the axle true. This machine has a pressure capacity of 30 tons, consequently most axles may be straightened cold. A view of this special axle-straightening machine is shown in one of the illustrations.

OVERHAULING MOTORS

To obtain a largely increased motor efficiency from old GE-70 motors and at the same time reduce the cost of maintaining them, all motors of this particular type are being overhauled. The process necessary to accomplish this includes, first, truing on a planer the frame seal between the halves of the motor housing and then boring out the ends for the motor casing to receive new cast-steel armature-bearing housings. A change also was made in the manner of holding the bearings in place in the housings. Heretofore this was done by two dowel pins at the bearing ends, but much trouble was experienced in pressing the bearings into the housings and at the same time keeping these pins in line with the holes. In the overhauled motors these bearings were secured in place by rolled-steel keys. The GE-70 axle bearings were also standardized with the GE-80 bearings by boring out the motor-axle bearing housing to the proper diameter to receive a GE-80 bearing. All worn bolt holes also have been retapped to the next larger size. The work of overhauling the GE-74 motors is now practically complete, and it has been found that at a reasonable cost for overhauling, the efficiency of the motors has been increased considerably.



Milwaukee Shop Kinks—Ratchet Pinion Puller



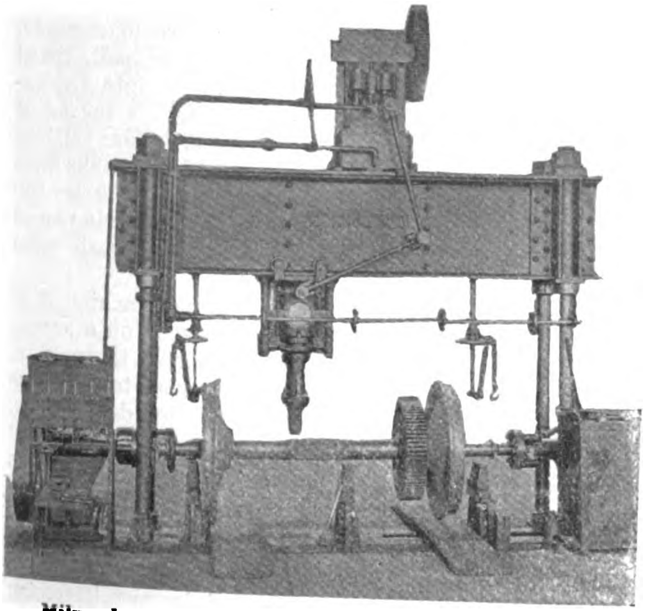
Milwaukee Shop Kinks—Trolley Wheel Grinding Attachment

OVERHAULING AIR COMPRESSORS

At each 45,000-mile general overhauling the air compressors and air equipment are removed from the car and the machine is completely dismantled. All oil is removed, the valves reground, the armatures thoroughly tested in the armature repair department, and, in fact, all parts thoroughly cleaned before reassembling and testing. Each compressor is tested for fifteen minutes at 100-lb. pressure before it is returned to service. The heads of the triple valves are rigged up in connection with an engineer's valve so that the emergency valves may be tested for leaks. This testing equipment is connected with an ordinary pressure gage to indicate leaks. A rack is also provided in this air-testing equipment for testing motorman's valves under 100-lb. pressure after the valve seats have been carefully ground and made ready for service.

MOTOR-TESTING MACHINE

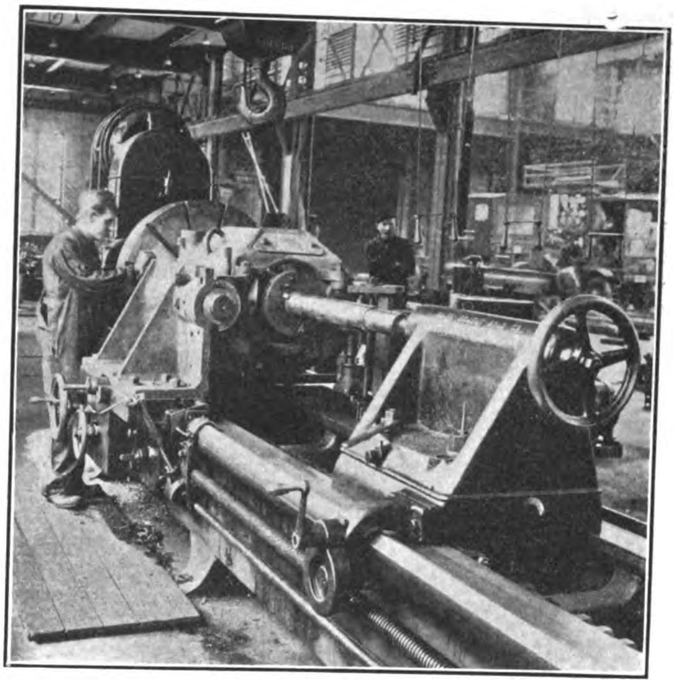
A motor-testing machine equipment has recently been added to the truck repair department of The Milwaukee Electric Railway & Light Company. The principle of this machine consists simply of the old device of bucking two motors, one operating as a generator and the other as a motor. The armature shafts are connected through a flexible coupling after the motors have been lined up and clamped into position on the testing bed. The motor leads are connected by flexible cords and plugs to a switchboard, which is so arranged that either test unit may be run as a motor or a generator by throwing a switch. The generator is loaded through a bank of resistance coils installed in the coil-baking oven on the gallery overhead. The heat from these coils is used in heating the baking oven, steam heat being used as an auxiliary at times. The load on the generator is controlled at will by a system of double-throw single-pole switches. At the same time all parts of each motor are thoroughly inspected to insure good condition before it is placed in service. All motors, both new and old, are put through this load test before they are installed on the trucks. The test operation is carried on by a storeroom attendant, whose quarters are convenient to the testing equipment. This man has been carefully instructed as to the manner of testing and inspecting, and he fills out the form report for each motor inspected.



Milwaukee Shop Kinks—Special Axle Straightener

BOLSTER STANDARDIZATION

As a part of the general overhauling of cars on the 45,000-mile inspection, all bolsters are being standardized as to the height of the center and side bearings, as well as the gage of the car body. Standardizing gages for this purpose have been made of ¼-in. steel plates and designed to check the gage and the relative heights of the center and side bearings. These standardizing gages are made in two forms, one for the truck bolster and another for the body bolster. During the overhauling process all bolsters are being equipped with special pocket and castings. These castings serve as chafing plates and foundations for the side bearings and also contain the spring pockets for the end bolster springs.



Milwaukee Shop Kinks—Jigs Used in Boring Motor Housings

REHABILITATING 6-IN. AXLES

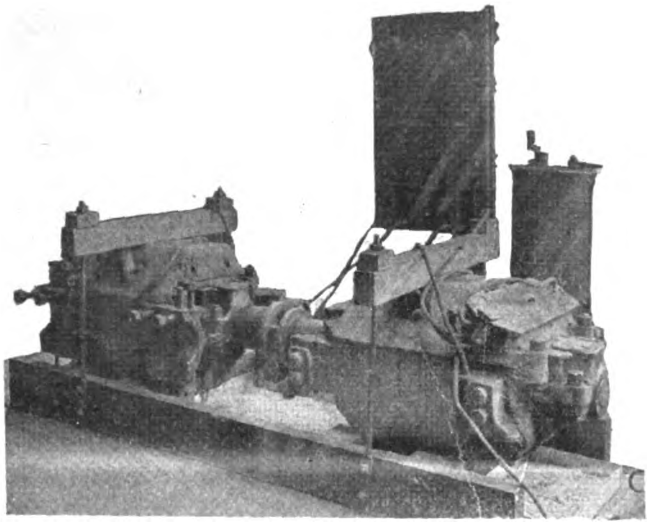
At the close of the 45,000-mile inspection period, when all cars receive a general overhauling, the 6-in. axles have been found to have worn considerably at the motor-axle bearings. In order to rehabilitate these axles for further service when the wear is shown to be in excess of 1/16 in. under size, they are turned down to 5⅞-in. diameter at the point where the motor axle bearing is applied. The bearing mandrels are changed and the axle bearings reduced in diameter to fit the new axle—all of which results in a first-class job, and at the same time no apparent weakening has developed in the axles so repaired.

DRUM SANDER OF LARGE SIZE

It has been found to be very economical when old cars are overhauled and new cars are constructed to install a 49-in. triple-drum sander. In this machine each drum gives a different gradation of sanding and is equipped with individual motor drive so that all three or any one of the sander drums may be operated at one time. This machine is used for sanding sashes and doors and, in fact, any large panel work which will pass over the 49-in. drums. It has been found especially adapted for sanding all sashes and doors, and these are put through the machine with the glass in place. Either before or after these old sashes are put through the machine, a little hand work is necessary in the panels and around the moldings. This, however, is only a small part of the hand work which would be required without the machine. The parts are then ready for finishing.

BURNING-OFF TORCH

In the paint shop it was found that considerable time was being consumed in the process of burning off paint on cars undergoing general repainting. This work was being done with an ordinary hand blow-torch, which before a car could be completed had to be replenished with gasoline several times, thus delaying the work. To eliminate this waste of time, the equipment engineering department has designed and provided a simple torch which gives a constant flame. Essentially, this torch consists of an ordinary wrought-iron pipe mixer made up in the shop, with two hose connections, one to the illuminating gas-pipe lines and the other to the compressed-air piping system, and of sufficient length to burn off an entire car. Valves at the mixer on the air line and the gas line permit the mixture to be regulated to obtain the hottest possible flame. The time of burning off cars has recently been reduced considerably and the saving is attributed to the adoption of this torch.



Milwaukee Shop Kinks—The Motor Test Set

ELECTROPLATING

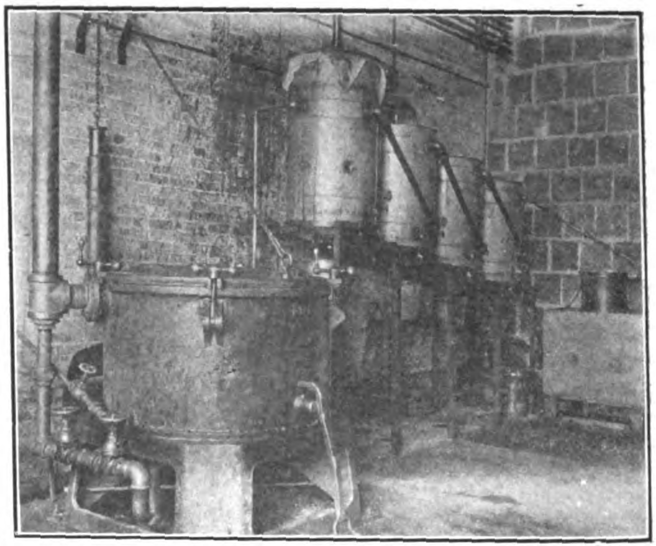
Recently the Milwaukee Railway company has found it practical as well as economical to add an electroplating and dipping department to its repair shop. An unused portion of the balcony over the machine shop has been partitioned off for this purpose, and two men, namely, a plater and a helper, have been able to handle all work of this character without difficulty. The present equipment is sufficient to electroplate all the hardware from two city cars in a nine-hour day. All brass trimmings and fittings are removed from cars brought in for the general overhauling at 45,000-mile intervals. The material receives a railway statuary-bronze finish. After this work has been done, it is anticipated that parts not subject to wear will never have to be removed from the car again, and all worn parts may be lacquered in place.

Essentially, the process necessary to produce this finish is as follows: First, all fittings are submerged for about one and one-half hours in a potash solution to remove old lacquer and grease. From this tank the fittings are given to a polisher who carefully wire-scratches and brushes them until they are thoroughly clean. Following this operation, they are immersed in a copper electroplating tank for fifteen minutes. In order to give all fittings uniform finish, as the quality of brass on different types of cars varies widely in color, they are copper-struck. The final stage of the electroplating process includes scouring with a hand brush and pumice stone to give the desired shade for the statuary-bronze finish. The parts are then dipped into a lacquer tank and hung up to drip.

It is sometimes necessary to do other kinds of plating called for by inter-department orders, some of which originate in the power and lighting department of this company. The equipment necessary to do this work includes tanks and dripping racks; the most expensive part, however, is a small motor-generator set, which delivers 150 amp at 5 volts or 6 voltts, as is required in the electroplating process.

OIL AND WASTE RECLAIMING

All waste collected in the truck repair department as well as the outlying car stations is deposited in special retainers, and from time to time is delivered to the oil and waste reclaiming department which is inclosed in a separate room on the truck repair department floor. Each carhouse, as well as the truck repair department, is credited with the gross weight of waste received, after which it is carefully sorted and bad or badly caked waste is scrapped. That remaining is put into a cylindrical oil and waste saving machine, where the oil is abstracted. This oil in turn is run through four settling tanks and a special filter. The first and third tanks have steam coils to accelerate the settling process. After the oil has passed through the fourth tank it is again placed in a retainer and used only for saturating waste used in packing journal boxes.



Milwaukee Shop Kinks—Oil and Waste Reclaiming Outfit

When the waste is removed from the machine it is held and sorted further, and finally placed on a screen over steam-heated coils, where it is dried thoroughly. All cotton and wool waste is kept in separate retainers for delivery to the oil and waste reclaiming department. The cotton waste is used for wiping, and it is reclaimed by washing it in a sal-soda solution, after which it is found to be better and cleaner than when purchased new.

The *Daily Consular and Trade Reports* contains a notice that proposals are requested by the Direccion General de Obras Publicas, Ministerio de Fomento, Madrid, Spain, for the concession and construction of an electric tramway in Madrid. The American consul at Madrid states that the estimated cost of this tramway is $22,935, and its rolling stock must include at least two electric cars. Work must be commenced within one month from the date of award and finished within three months from the same date. Proposals should be submitted through a resident agent before April 22.

Supplementary Report on Swiss Electrification

This Is an Abstract of the Report Which Resulted in the First Appropriation for Electrifying the St. Gothard Line—The Selection of the System of Propulsion Is Held in Abeyance

Following the report of the Swiss Electrification Commission, of which an abstract with map was published in the ELECTRIC RAILWAY JOURNAL for March 7, 1914, a supplementary report was made under date of Aug. 23, 1913, to the Administrative Council of the Federal State Railways by Chairman Dinkelmann as representative of the railways department. It is pointed out in the introduction that, technically speaking, electrification can no longer be considered a risk and that the lack of coal deposits in Switzerland and the abundance of hydraulic power make electrification peculiarly attractive. While the amount of capital required to electrify the Federal Railways could not be raised at one time, it was well to plan now for the acquirement of the water-powers so that the necessary energy would be available under favorable conditions when wanted for railroading.

The report then explains why the Erstfeld-Bellinzona section of the St. Gothard line is a favorable one for the first electrification on account of its heavy traffic and profile conditions. Further, the choice of this section will not require an extraordinary outlay of capital while its length is ample for trial purposes. The installation, however, will be based on the eventual electrification of the entire line, or that from Chiasso to Lucerne. The energy requirements quoted by the Electrification Commission were none too high, as the increase in traffic due to electrification would probably be greater than estimated. Again, the Electrification Commission had laid more stress on the reduction in operating cost than on the technical advantages of electrification, but these advantages would be sufficient to justify the change even if it did not produce a direct saving in cost per ton mile. In general, it was apparent that if the traffic on the Federal State Railways continued to increase it would prove profitable to electrify a large number of sections. Water-power concessions of ample capacity for electrification had already been acquired as part of the franchise properties of the original St. Gothard Railway.

CHOICE OF ERSTFELD-BELLINZONA SECTION

Table I shows the extent and physical conditions on the Erstfeld-Bellinzona line. Local traffic on this line is so small that the management does not recommend motor-car service until such time, at least, as the electrification can be extended to Lucerne. Only locomotives can be considered, and most of these should be adapted for hauling any kind of train. As a rule, express trains should have one locomotive and freight trains two, one acting as pusher. These machines must be capable of exerting at least the present permissible maximum drawbar pull of 10,000 kg, but, if desired by the connecting foreign railways, the locomotives of a through express train should be capable of exerting a drawbar pull of 12,500 kg. In this event ten-car trains would be possible in place of eight. As for freight trains, it is necessary to retain the present standard of permissible tractive effort. However, as one locomotive would not always suffice to handle up a grade the load which it could draw on the level, a locomotive must be used at each end of some trains.

TABLE I.—PHYSICAL CONDITIONS OF LINES TO BE ELECTRIFIED FIRST

Sections	Length of Sect. in km.	Length of Tunnels in Percentage of Length of Section.	Per Cent of Maximum Grade on Given Lengths.
Erstfeld-Goeschenen	28.88	25.0	2.6 on 10.41 km 2.5 on 7.85 km
Goeschenen-Airolo	15.74	95.0	0.6
Airolo-Biasca	45.58	18.0	2.7 on 3.25 km 2.6 on 11.36 km 2.5 on 7.94 km
Biasca-Bellinzona	19.10	1.4	0.8
Erstfeld-Bellinzona	109.30	28.0	2.5 to 2.7 on 40.81 km
Bellinzona-Chiasso	55.28	10.0	2.6 to 3.89 km 2.5 on 3.90 km
Lucerne-Erstfeld	60.52	15.0	1.0
Other parts of Fifth District, including Pino (frontier)-Luino	64.68	7.7	1.0
Fifth District complete, including Pino-Luino	289.78	16.6	2.5 to 2.7 on 48.60 km

Regeneration possibilities had been carefully studied, but were not considered important. Any reduction which they might effect on station loads depended too much on the timetable and might be affected by unforeseen conditions. Again, an economy in water use at the Ritom power station would be of little practical value, and even then only for three or four months during the year. A possible water saving there of 10 per cent would hardly balance the higher cost of the locomotives. In no sense does the advisability of electric traction on the St. Gothard line depend upon regeneration as a factor.

ESTIMATES OF TRAFFIC

The daily fluctuations in traffic throughout the year on the section under consideration are very great. Thus in 1911 the minimum was 1,680,000 ton km and the maximum 2,282,000 ton km. The power plants, of course, must be capable of handling these variations.

Table II compares the present steam and possible electric speeds on the St. Gothard line. It should be understood that the speeds on down grades are limited by safety regulations and so would not be appreciably increased by electrification.

TABLE II.—SPEED COMPARISON, ELECTRICITY AND STEAM IN KILOMETERS PER HOUR.

	Express		Local		Freight	
	Elec.	Steam.	Elec.	Steam.	Elec.	Steam.
On up grades of						
0 per cent	85	85	70	55	40	35
0.5 per cent	80	80	70	55	40	35
1.0 per cent	75	68	70	55	40	35
1.5 per cent	68	55	61	50	38	28
2.0 per cent	58	46	51	40	33	23
2.6 per cent	50	40	42.5	31	27.5	19
On down grades of						
0 per cent	85	85	70	60	40	35
0.5 per cent	85	85	70	60	40	35
1.0 per cent	80	80	70	60	40	35
1.5 per cent	70	70	70	60	38	35
2.0 per cent	65	65	65	53	33	30
2.6 per cent	60	60	60	45	27.5	27.5

It is calculated that if electric traction had been used in 1911 the maximum requirements would have been 210 per cent of the average requirements. This ratio was used as a basis for estimating future needs. The traffic of 1918 is estimated as 35 per cent greater than that of 1911. Based upon the average daily output for 1911 at the drivers of 4850 hp this would mean in 1918, 4850 × 1.35, or 6550 hp. By proper arrangement of the timetable the additional trains can be scheduled so as to improve the load factor, and it is believed that the power station capacity in 1918 would not have to be more than 19,000 hp. The ratio between the maximum and average loads would then be 19,000 ÷ 6550, or 2.86. In the ten years following, namely, up to 1928, an additional increase of 35 per cent in traffic is assumed. The probable average output at the drivers would then be 6550 × 1.35, or 8250 hp, and the maximum load would be 21,000 hp. The ratio between the maximum and average would then be 21,000 ÷ 8250, or 2.55, compared with 2.86 in 1918 and 3.1 in 1911. The power requirements for the rest of the lines in the Fifth District is estimated at 13 per cent less than for the Erstfeld-Bellinzona line. Hence in 1928 an average of 5050 hp and a maximum of 16,000 hp would be required. As the peaks are not simultaneous, it is thought that a power station capacity of 32,000 hp will be required in the first case and of 35,000 hp in the second case.

It is assumed that by 1928 the entire St. Gothard line will be electrified. If the traffic is 70 per cent greater than in 1911, the average output of the turbines would have to be 26,000 hp and the maximum about 60,000 hp.

The power station sites are on opposite watersheds of the St. Gothard line, namely, a station at Amsteg on the north and one at Ritom on the south. Fortunately the high-water conditions for the two stations occur at different seasons. These stations would suffice for a long time for the Fifth District without building a third station, which would make a grand total of 70,000 hp during twenty-four hours, or enough for many of the eastern, central and northern lines of Switzerland.

CHOICE OF SYSTEM

The Electrification Commission had recommended single-phase operation at 10,000 volts to 15,000 volts, fifteen cycles, not because this system was the best for any one condition but because it was the most flexible for Swiss railroad electrification as a whole. In commenting on this decision, Mr. Dinkelmann's report takes up the three systems as follows:

The d.c. system is the oldest and best tried, but it is universally agreed that high tensions are needed for supplying energy to heavy trains from an overhead wire. The necessary current could be obtained with a 1000-volt third-rail, but the management considered such a proposition speculative and so did not take it into serious consideration. On the other hand, a 3000-volt d.c. overhead line would have to be very heavy to handle the loads on the St. Gothard line; nor would it be possible to use a high d.c. voltage without sacrificing some of the good weight and speed-regulating qualities of the d.c. motor. Further, with a high-tension d.c. line it would be very difficult or practically impossible to use direct-connected accumulators.

The adoption of the single-phase system as recommended by the Electrification Commission has been assumed in making up the costs hereinafter given. This was done because it is now clear that single-phase motors of the desired capacity can be built and that the single-phase locomotive has all the speed flexibility of the steam locomotive.

The three-phase system has, in point of age, an advantage over single-phase. It is characterized by the simplicity of its traction motors, but this advantage is inseparable from the very narrow speed limitations. The three-phase locomotive may be superior for certain conditions, but where a great variety of profiles obtain the running speeds would often be too high or too low for economy. Thus the Simplon locomotives, 1906 model, are limited to the approximate speeds of 35 km and 70 km an hour, while the 1907 model has four speeds, namely, 26, 35, 52 and 70 km an hour. No intermediate speeds with full tractive effort are possible. Not even a light Simplon train exceeds 70 km an hour, and if one standard speed was raised all the others would increase also. The continuous use in three-phase equipment of a maximum speed which is actually required for short periods only would in one case mean an increase of one-third in the amount of the energy requirements.

The rigid limitations of three-phase equipment appear in another way. Thus the 1906 type of the Simplon locomotives can be coupled to those of the 1907 type only for the common speeds of 35 km and 70 km an hour. The Giovi locomotives, which operate at 45 km and 22.5 km an hour, could not be worked economically with the Simplon machines. In general, the three-phase system does not give the desired flexibility in speed. Further, lost time could be made up only on down grades by sacrificing regeneration, the very quality for which three-phase is most highly praised.

If single-phase is adopted for the Erstfeld-Bellinzona line, it would be possible with little extra cost to use a potential of 15,000 volts in some sections and one of 7500 volts in tunnels. However, the experiences with 15,000-volt suspension in the Loetschberg tunnel will serve to settle the need for two voltages.

Despite the foregoing remarks, the management does not definitely recommend the immediate adoption of single-phase as this matter can be settled after the hydroelectric development is fairly well advanced.

STATIONS AND TRANSMISSION

The Amsteg and Ritom stations would be fitted with 7500-volt to 8000-volt, 8000-hp single-phase generators, driven by Pelton wheels and connected to the line either direct or through step-up transformers. The transmission potential would be 60,000 volts. The first feeding-in points would be at the two power stations and at the Biasca substation. Up to say 1918, a 7500-volt trolley would be used, and then it could be raised to 15,000 volts with the establishment of substations at Goeschenen, Lavorgo and Bellinzona. The transmission system would be in duplicate and each line would be proportioned to carry the quantities of energy demanded by all railways in the Fifth District. All substations would be tied in with each other and to the transmission system to minimize interruptions.

SUBSTATIONS AND CATENARY LINE

The Amsteg and Piotta substations will be located close to the Amsteg and Ritom plants. The Amsteg substation would contain an initial equipment of three 3500-kva transformers. Biasca and Piotta would have four such transformers. Goeschenen and Lavorgo would be equipped like Amsteg, while the installation at Bellinzona would depend upon developments. The contact line would be of catenary type with transverse bridges on open sections. In the tunnels the overhead structure would be carried from supports fixed in the arched roof. Suitable precautions would be taken to localize mechanical failures. The rails would be bonded for the return current.

LOCOMOTIVES

Generally speaking, the use of larger capacity electric locomotives will make it possible for two such locomotives to do the work of three steam locomotives. One class of electric locomotives would be designed for a drawbar pull of 12,500 kg and a maximum speed of 90 km an hour. This type would be used primarily for through passenger service, but it would also be available for other operation. A second class of locomotives would be designed for lighter miscellaneous service. The design of locomotives for freight service exclusively is in abeyance. Electric operation of the Bellinzona-Airolo section would demand twenty-six to thirty locomotives, and of the Erstfeld-Bellinzona section thirty-six to forty-two, or even more, according to the increase in the number of trains following electrification.

Among the special costs would be that of ten car-heating outfits for use on through trains, besides 290,000 francs for placing all weak-current circuits underground and augmenting the telephone service and for the modification or construction of car maintenance plants. The reinforcement of certain bridges is not considered in the costs pending knowledge as to the weights of the future locomotives and trains, etc.

COSTS

In presenting the cost estimates the management points out that many of the items are necessarily tied in with the electrification of the Fifth District as a whole rather than with the particular sections to be electrified first. This is especially true of the water-power developments. The costs, also, cannot be compared directly with those of the Electrification Commission as they do not cover exactly the same items. The new figures are higher, because the commission calculated that only three plants would be required for the Fifth District, whereas the new calculations call for two for the Erstfeld-Bellinzona line alone. The new contact line costs are somewhat higher; the transmission cables have been extended and devices have been added to insure protection against all possibility of accident. Further, it is believed advisable to give up the commission plan of running more but lighter (320-ton) trains, as the increased business will demand trains of present (420 to 500 metric tons) or heavier weight at higher speeds. The request for an appropriation covers all items except locomotives. A special appropriation will be requested when the locomotive designs are settled. The replaced steam locomotives will be transferred to other lines.

TECHNICAL RESULTS EXPECTED FROM ELECTRIFICATION

One result of electrification would be faster trains. Thus express train No. 58, which now requires 132 minutes from Erstfeld to Bellinzona, would make the trip in 114 minutes, a saving of eighteen minutes, or 13 per cent. Again the headway would be improved by the reduction in time required by trains to pass through the St. Gothard tunnel. Passenger trains which now traverse the tunnel in seventeen minutes would do so in fourteen minutes, and freight trains would cut down their time from thirty to twenty-three minutes.

In 1911 the steam locomotives of the Erstfeld-Bellinzona section ran 3,712,000 km. Electric locomotives of 10,000 kg to 12,500 kg drawbar pull to perform the same work in ton-kilometers would have to run only 2,950,000 km, a saving of 21.2 per cent in mileage. Assuming a 35 per cent increase in travel by 1918, steam locomotives would have to run nearly 5,000,000 km, compared with 3,950,000 km by electric locomotives. In 1911 the actual cost per steam locomotive km on the Erstfeld-Bellinzona line was 1.27 francs. This figure included interest, maintenance and depreciation of locomotives, depreciation on track, coal, stores and labor. On the assumption that steam should be used during 1918 and that there was no increase in the cost of coal, steam traction during that year would cost 5,000,000 × 1.27 francs, or 6,350,000 francs. But the estimated cost for electric power per locomotive kilometer, exclusive of energy but inclusive of all of the charges mentioned above, is 0.73 franc, so that, on a basis of 3,950,000 electric locomotive km, the cost for electric operation for these charges would be 2,883,500 francs.

The annual cost of producing energy and supplying it to the locomotives is made up of the following items:

	Francs.
Interest on 37,000,000 francs	1,480,000
Amortization of capital and payments to depreciation fund	554,300
Water rights and various charges	331,400
Labor and material	281,700
Maintenance and repairs	457,000
Total	3,104,400

The cost of train heating is placed at about 100,000 francs. The annual expenses for electric traction would therefore be 6,087,900 francs, apportioned as shown in the figures given below.

TABLE III.—SUMMARIZED COSTS OF ELECTRIFICATION.

	Chargeable to Construction.		Chargeable to Operation.		Total
	Francs.	Francs.	Francs.	Francs.	Francs.
I. A. Cost of organization and administration		1,000,000			1,000,000
B. Interest on capital during construction		2,100,000			2,100,000
C. Condemnation costs		430,000			430,000
D. 1. Roadway	10,000		10,000		
2. Track	170,000				
3. Shops and buildings	1,580,000		290,000		
4. Telegraphs, signals, etc.	1,700,000				
5. a. Contact lines	4,770,000				
b. Substations	1,540,000				
c. Transmission lines	5,500,000				
d. Hydroelectric station	16,700,000				
Total of I. D.		31,970,000		300,000	32,270,000
II. Cars, including heating equipment		400,000			400,000
III. Miscellaneous furnishings		650,000			650,000
Contingencies		1,000,000		650,000	1,650,000
Total		37,550,000		950,000	38,500,000

Expenses up to end of 1912 (not included in the request for an appropriation):

	Francs.	Francs.	Francs.
General costs account of construction	93,399.43		93,399.43
Engineering	85,822.80		85,822.80
Water rights	577,909.80	596,000	1,173,909.80
Total	757,132.03	596,000	1,353,132.03
Amortization for discarded equipment			290,000,00

	Francs.
Electric traction exclusive of energy	2,883,500
Energy	3,104,400
Heating	100,000
Total	6,087,900

This is an approximate saving of 260,000 francs a year in comparison with steam. The superiority to steam will increase with the growth of traffic and with extensions of those lines much of whose basic expenses are comprised in the present electrification. Furthermore, the cost of locomotive fuel is likely to increase while the rising wage rate will affect steam operation more than electric operation.

REQUEST FOR APPROPRIATION

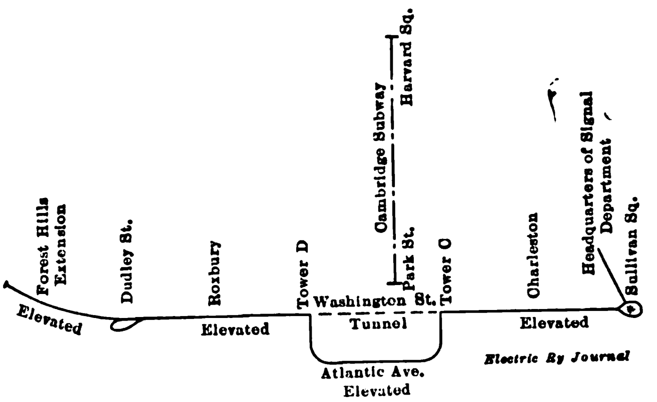
In view of the foregoing an appropriation of 38,500,000 francs plus 290,000 francs for the amortization of the scrapped steam equipment was requested for the electrification of the Erstfeld-Bellinzona line. This proposition was approved by the board of directors on Oct. 31, 1913.

For the Usui-Tage mountain railway in Japan, which was formerly operated by steam, twelve direct-current gear-and-pinion locomotives have now been provided. The power plant contains three 1000-kw turbo-generators producing three-phase energy at 6600 volts and fifty cycles. The third-rail system is used.

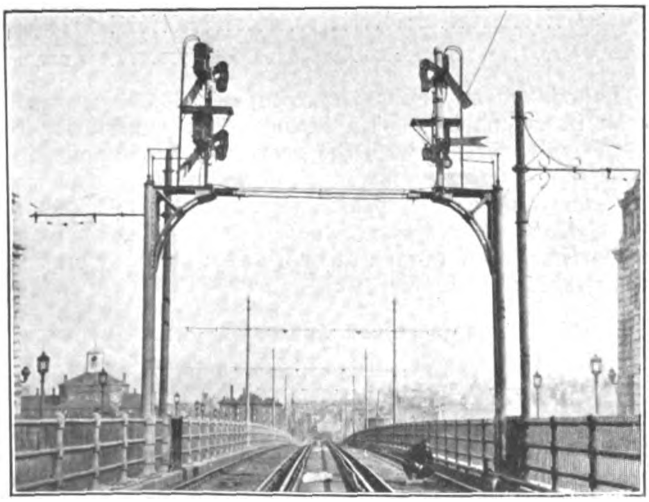
Signal Maintenance on the Boston Elevated

Details of Methods Used in Inspecting and Repairing Signal Apparatus on 27 Miles of Subway and Elevated Track Are Given—In January, 1914, There Were but Eight Trouble Reports for More than 2,000,000 Operations

The rapid transit lines of the Boston Elevated Railway comprise about 27 miles of main-line track, and include the elevated lines completed in 1901, the Washington Street tunnel, the Forest Hills elevated extension and the Cambridge subway. All train movements on these lines have been controlled by block and interlocking signals from the beginning of service, and at present about 250 signals are in use, all being of the Union Switch & Signal Company's manufacture and of the electro-pneumatic type. The signals in the Cambridge subway are operated by alternating current, forty-five blocks being in service, while those in the Washington Street tunnel and on the elevated lines are of the direct-current type. In the former case, the double-rail return is used, and energy is supplied to the local transformers of the system from 550-volt mains, the feed to the track circuits being 10 volts maximum. The mains supplying the direct-current signals are operated at 110 volts with a single rail return, the pressure drop across the track relays ranging from 15 volts to 20 volts. The Cambridge subway and the other rapid transit lines do not interchange equipment, but all are operated under the direction of a superintendent of rapid transit lines.


Forest Hills Extension
Dudley St.
Roxbury
Tower D
Cambridge Subway
Harvard Sq.
Park St.
Tower C
Charleston
Headquarters of Signal Department
Sullivan Sq.
Washington St.
Tunnel
Elevated
Elevated
Elevated
Atlantic Ave. Elevated
Electric Ry Journal

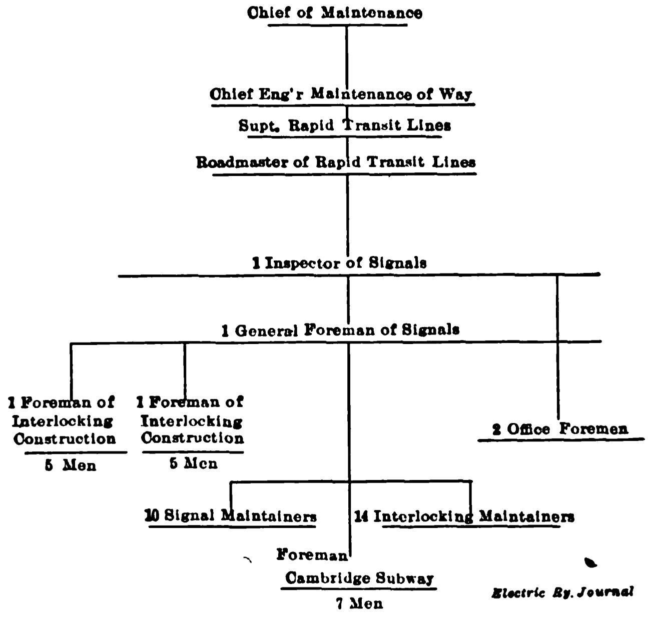
Boston Elevated Signal Maintenance—Diagram of Rapid Transit Lines



Boston Elevated Signal Maintenance—Signal Bridge, Cambridge Subway Line

ORGANIZATION OF SIGNAL MAINTENANCE WORK

The maintenance of signals and interlocking and all new construction in connection with either is handled by the company's department of maintenance and way, headed by a chief engineer responsible to the chief of maintenance. Reporting to the former through the superintendent of rapid transit lines is a roadmaster of rapid transit lines, and to the last-named official the head of the signal department reports, with the title of inspector of signals. As shown in the accompanying diagram, the inspector of signals is assisted in executive duties by a general foreman of signals, under whom are a foreman of interlocking construction, a foreman of electrical construction, ten signal maintainers, fourteen interlocking maintainers and a Cambridge subway foreman, under whom are seven men, four being assigned to interlocking and three to signals. Under the foreman of interlocking construction are five constructors and helpers, and under the foreman of electrical construction are also five constructors and helpers. There are two classes of interlocking maintainers, the first class being responsible for both electrical and mechanical interlocking apparatus, and working from 5.30 a. m. to 3 p. m., the second class having no responsibilities in relation to electric interlocking maintenance, but otherwise having the duties of the first class, their working hours being from 3 p. m. to 12.30 a. m. Train service on the rapid transit lines extends roughly from 5:30 a. m. to 12.30 a. m. daily. There are also two office foremen who report to the general foreman or the inspector of signals, and who have general charge of all signals and interlocking forces in the absence of both.

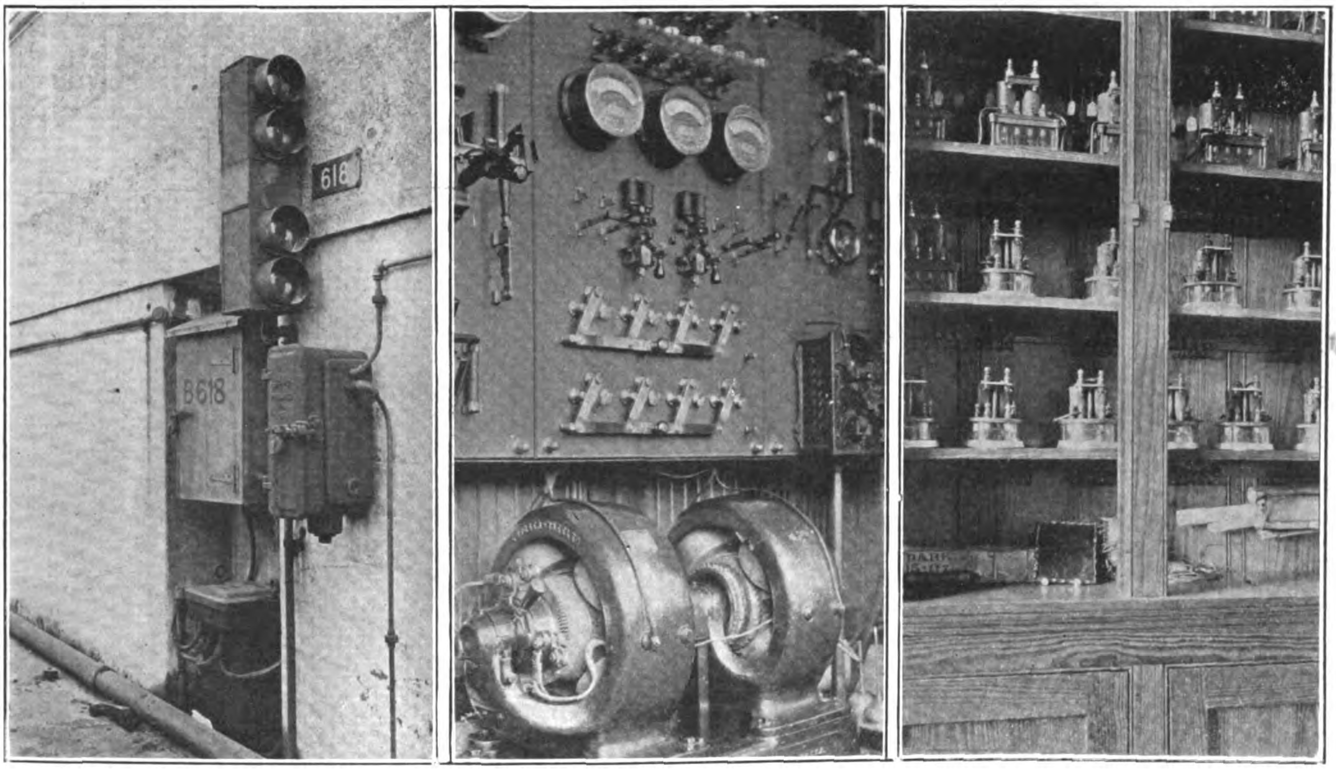

Chief of Maintenance
Chief Eng'r Maintenance of Way
Supt. Rapid Transit Lines
Roadmaster of Rapid Transit Lines
1 Inspector of Signals
1 General Foreman of Signals
1 Foreman of Interlocking Construction
5 Men
1 Foreman of Interlocking Construction
5 Men
2 Office Foremen
10 Signal Maintainers
14 Interlocking Maintainers
Foreman Cambridge Subway
7 Men
Electric Ry. Journal

Boston Elevated Signal Maintenance—Organization Chart

A schematic diagram of the rapid transit lines is shown herewith. The track layout requires the use of eleven interlocking towers, which are in general operated in three daily tricks, as follows: First trick, 12 midnight to 9 a. m.; second trick, 9 a. m. to 6 p. m.; third trick, 3 p. m. to 12 midnight. An overlap is thus provided to care for the afternoon rush-hour conditions. Monthly shifts in tricks are made in regular rotation by signal maintainers. Men on the first trick work in connection with night construction and repair crews and are required to understand both electrical and mechanical apparatus. Towermen are directly responsible to the train dispatcher, whose headquarters are at Sullivan Square, the general office of the superintendent of rapid transit lines. The signal blocks on the system vary from a maximum of 2020 ft. to a minimum of about 600 ft., with an average length of 1100 ft. The signal department normally employs about forty men aside from the foreman and inspector.

DUTIES OF SIGNAL MAINTAINERS

The work of signal maintainers on the elevated structure is similar to that in the subway and tunnel lines, with the exception that in the latter installations all signal indications are rendered by lamps, both lamps and semaphores being required on the elevated lines. Compressed air controlled by electrically operated valves and supplied at a pressure of 90 lb. per square inch is used in the operation of semaphore arms and switches throughout the system. Single maintainers on the elevated lines and in the Washington Street tunnel work in three daily shifts, viz., 12 midnight to 9 a. m., 9 a. m. to 6 p. m. and 3 p. m. to 12 midnight. Those in the Cambridge subway work from 12 midnight to 9 a. m., from 6 a. m. to 3 p. m., and from 3 p. m. to midnight. The following outline of the distribution of maintenance work on signal equipment in the Cambridge subway illustrates the character of the duties required:



Boston Elevated Signal Maintenance—Block Signal with Relay Box, Transformers, etc.—Motor-Generator Set for Signal Service—Repeaters and Relays in Signal Tower

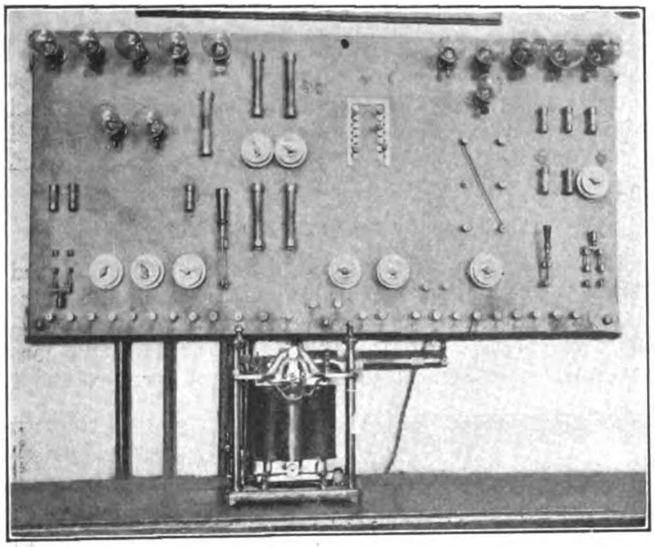
First trick, midnight-9 a. m.—Inspect all lamps in subway inverts, Eliot Square shop and yard, with necessary replacements. Look after cleaning of all electric lighting switchboards (sixty-three in number). See that automatic throw-over switches supplying emergency subway lighting current are working properly. Inspect pumps at five pump chambers between Harvard Square and Kendall Square, inclusive. Test cross-over track switches at Kendall and Quincy Squares. Answer emergency calls for light or signal trouble.

Second trick, 6 a. m. to 3 p. m.—Inspect and keep oiled all signal apparatus between Harvard Square and Park Street, covering twenty-four straight electric signals, three electro-pneumatics on bridge and twenty-seven automatic stops. Inspect pumps in chambers daily and answer emergency calls.

Third trick, 3 p. m. to midnight.—Inspect daily and keep cleaned and oiled all pumping apparatus. Inspect and clean ejectors at Harvard, Central and Kendall Square. Answer light and signal emergency calls. All maintainers keep tower P, at Harvard Square, informed as to whereabouts.

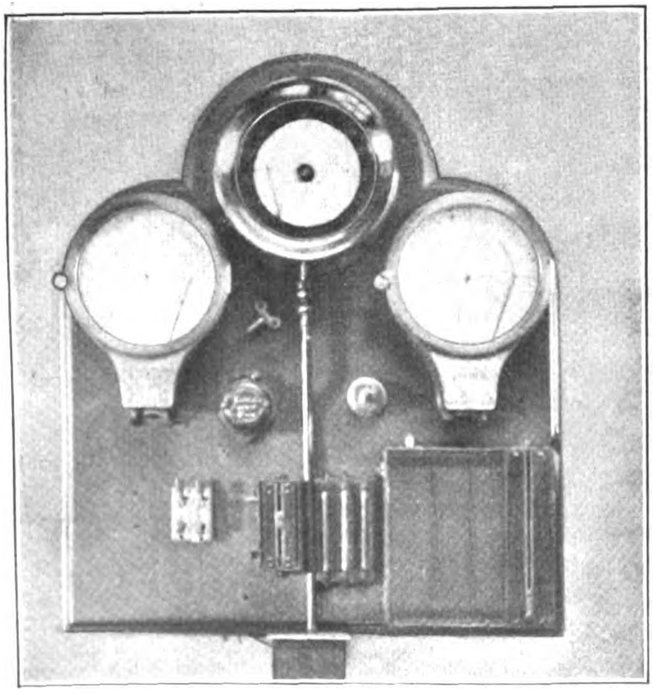
DETAILS OF MAINTENANCE WORK

The maintenance work includes the inspection and oiling of ten pumps, including switchboards and automatic starters controlled by floats, replacement of workout foot valves, repairing burned-out or defective connections, rheostats, lamps, fuses, etc. There are about 4000 incandescent lamps in the Cambridge subway and its stations. In general, signal maintainers are expected to note any defects in track or roadbed when on duty, and on the elevated lines the mechanical adjustment of semaphore mechanism receives a good deal of attention. Light parts are renewed by maintainers. In renewing resistance tubes, improving contacts, etc., the signal circuit within the case is easily killed by pulling an inclosed fuse. In general, relay adjustments are made at the office of the inspector of signals by an office foreman, who specializes in this delicate work. In the Cambridge subway a maintainer often receives from fifteen to twenty calls daily to replace burned-out lamps, fuses or other light repairs. The inspection of motor-generator sets in towers which furnish current at 110 volts to the signal mains is handled by signal maintainers, storage batteries being kept in condition by interlocking maintainers. Maintainers are promoted from construction crews, the senior construction man being utilized as a spare maintainer. He thus has experience in the work prior to becoming full-fledged maintainer. Before attaining this rank the candidate is required to pass an oral and written examination given by the inspector of signals, the written portion dealing mainly with the making and interpretation of signal or interlocking wiring diagrams.



Boston Elevated Signal Maintenance—Signal Test for Maintenance Work, Signal Inspector's Office

On maintenance work each man is allotted a regular section of the line, although on occasion the force is concentrated at points requiring special attention. Exclusive of the Cambridge subway, the rapid transit lines are divided into two approximately equal geographical sections, three maintainers making their headquarters for trouble calls at Tower C and three at Tower D. Signal maintenance in the Washington Street tunnel is divided between two men, each of whom cares for some additional outside signal work on the elevated structure. Shifts of maintainers overlap in the afternoon rush hours.

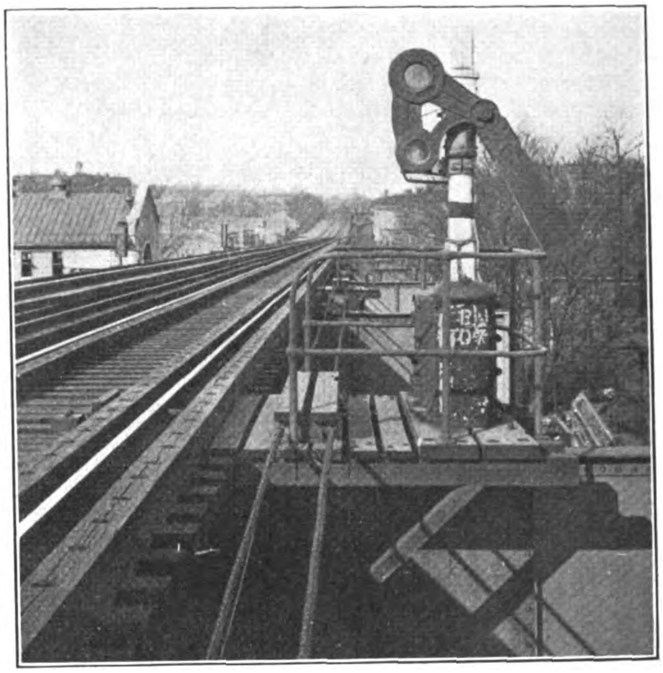


Boston Elevated Signal Maintenance—Recording Air Gage and Voltmeter, Office of Signal Inspector

RECORDS AND REPORTS

Each signal department employee is provided with a 4-in. by 8-in. pocket-book of blueprints containing the standard symbols of the Railway Signal Association, lists of standard terminal strips, wiring diagrams of all signal, track and supply circuits of typical arrangement on the system, wiring of detector and interlocking machines, surface car signals and track switches, track layouts at important junctions, car clearance diagrams, speed tables, heater wiring, telephone circuits and platform clearances, with an explanation of pneumatic valve operation and other data bearing directly upon the work of the department. Reports of signal troubles are transmitted to the train dispatcher by telephone or telegraph and are at once turned over to the signal maintainers and then to the signal inspector's office.

Each maintainer upon completing a repair job or upon adjusting any operating trouble reports to the office on a 4-in. by 6-in. slip recording the nature of the trouble, the time required to attend to it, etc., retaining a yellow carbon copy for reference. From the reports of maintainers a 3-in. by 5-in. day card is made up, giving the signal number and the cause of trouble reported, and from the day cards a monthly report to the roadmaster is compiled, showing in summary form the date of occurrence of each trouble, the kind of trouble experienced and an analysis of the month's operations. The monthly report for January, 1914, shows thirty-two trouble calls in 2,086,597 total operations of automatic and interlocking signals and switches, there being 50,577 operations per block or automatic signal troubles and 65,206 operations per total number of trouble calls. In this record a loss of power is considered as a trouble report, even though the signal system may not in any way be responsible. Twelve reported trouble calls were found to be without foundation, and in the month there were but eight trouble reports for apparatus in more than 2,000,000 operations.



Boston Elevated Signal Maintenance—Typical Automatic Block Signal

The repair shop work of the department is handled at the George Street yard, where facilities for bench and machine tool work are available in association with other work performed by the department of maintenance of way. Surface line signals are maintained by the department of wires and conduits. Adjoining the office of the inspector of signals is a schoolroom for car-service employees, a feature of whose equipment is a model track circuit operated by a miniature elevated car. In the main office of the signal department extra relays are kept ready for immediate use and a repair and test bench is installed with a 2-ft. x 4-ft. slate switchboard at which all forms of electrical energy used by the department are available, including direct and alternating current at various pressures, typical track circuit connections, etc. A small lathe, belt-driven by a fan motor, is available for coil winding and the office is equipped with recording instruments showing on twenty-four-hour charts the variations in third-rail voltage, air pressure and signal main potential. The department stockroom is combined with that of the maintenance of way department at the George Street yard.

CHICAGO MEETING OF SIGNAL COMMITTEE

The joint committee on block signals of the Engineering and Transportation & Traffic associations met at Chicago on March 17. The representatives of the committees in attendance were J. M. Waldron, New York; Gaylord Thompson, Trenton, N. J.; C. H. Morrison, New Haven, Conn.; John Leisenring, Peoria, Ill.; H. A. Nicholl, Anderson, Ind.; J. W. Brown, Newark, N. J.; L. H. Palmer, New York; F. W. Coen, Sandusky, Ohio; Chester P. Wilson, Indianapolis, and W. C. Smith, Boston, representing the railway members of the committees. The representatives of the manufacturers present were S. M. Day, General Railway Signal Company; H. W. Griffin, Union Switch & Signal Company; Carl P. Nachod, Nachod Signal Company, Ind., and Charles N. Wood, of Boston. L. E. Gould, of the ELECTRIC RAILWAY JOURNAL, acted as secretary of the meeting.

Chairman Waldron called upon J. W. Brown for a report from the joint sub-committee on rules and definitions. Mr. Brown said that his committee had spent the previous day in a thorough discussion of necessary revisions and additions for the existing block-signal rules in order to make them include methods of operation with trolley-contact signals. Definitions for such terms as "neutral indications" were then discussed generally by the whole committee, after which the chair instructed each attendant at the meeting to co-operate with Mr. Brown in determining the best definition for this and for such other terms as "registering signal," "permissive block," "absolute block," etc. It was the belief of the sub-committee that a foundation or skeleton for a complete set of block-signal rules should first be prepared and that the future work of the sub-committee should then be directed toward filling in and making each rule or definition satisfactory to the entire field.

It was decided that the existing steam railroad rules and definitions should be followed wherever possible. The committee also instructed its sub-committee to work with the Railway Signal Association in obtaining uniform definitions for semaphore, clear indication, caution indication, switch indicator, etc., and a new rule defining the location of signals with respect to the established direction of traffic was tentatively prepared. C. L. Henry, president Indianapolis & Cincinnati Traction Company, was quoted as offering to supply copies of his signal rules which were used for the operation of trains under the Simmen signal system.

The possibility of a more general use of light signals for day and night indications was then discussed by several members of the committee. Mr. Morrison pointed out several features, as shown by tests made at New Haven, in which existing types of light signals using 15-watt lamps gave indications that were entirely distinct at 1500 ft. These signals had 8-in. lenses. He mentioned a new type of light signal with a 10-in. lens which in daytime could be read at 3500 ft., and summarized the New Haven tests by saying that the developments of light signaling were interesting and encouraging.

H. A. Nicholl spoke regarding the twenty-nine blocks of light signals which protected 50 miles of track on the lines of the Union Traction Company of Indiana. These signals had 8-in. lenses and 40-watt lamps and could be read at 3500 ft. The indications were clear and satisfactory both day and night. There had been but one false clear indication by the signals during a period lasting for more than a year, and he was not even sure that this should be charged against the signals. No phantom indication had been given by reflection from headlights, and recent sleet storms had not affected the continuity of signal operation. He thought that so far as operation and cost of installation were concerned the light signal was the equal of the semaphore.

John Leisenring pointed out that the Illinois Traction System was largely equipped with semaphore signals, but also had some light signals. He thought that the light signal could be read for a greater number of hours out of the average day than could the semaphore.

Chester P. Wilson then briefly described the block-signal installation on one line of the Interstate Public Service Company in Indiana. The system included semaphores at sidings and light signals for intermediates. The intermediates shortened the block to about 60 per cent of the distance between sidings. There had been no trouble at all with the light signals except for the burning out of a few lamps owing to excessive voltage, and this was the result of the use of a voltmeter that was in bad order.

Mr. Leisenring spoke of the value of semaphores in showing the public that traffic was being protected, and he pointed out that the back lights on semaphores at night helped the crews get long trains in the clear. Mr. Griffin spoke about the legibility of light signals, saying that with 8-in. lenses a layman could easily read them at 2000 ft. and a motorman at 2500 ft. His company had installed some light signals with 5-in. lenses for speeds as high as 45 m.p.h. Mr. Day recommended 8-in. lenses and spoke also of the remarkable freedom of light signals from lightning troubles, as shown by results in Indiana. Gaylord Thompson said that his road, between Trenton and Princeton, N. J., was protected with Nachod signals having 5-in. lenses, and that these were entirely satisfactory for slow-speed service.

Just before the close of the session the committee agreed tentatively to recommend as good practice the use of 8⅜-in. lenses for high speed and 5⅜-in. lenses for medium speed.

The committee then adjourned subject to call of the chairman for another meeting which will be held in May or June.

Construction of electric tramways in Parana, Argentina, has been commenced and it is expected that the work will be finished about the middle of 1916. As soon as the electrification of the Santa Fe tramways is completed, it is probable that electric tramways will be laid in Esperanza, the oldest colony in the Province of Santa Fe, and to-day one of the principal cities of the country.

Convention of the American Railway Engineering Association

Reports of Committees Formed the Basis of Profitable Discussion on Roadway, Ties, Rails, Ballast, Track Structures and Other Features of Railway Work Affecting Electric as Well as Steam Railway Operators and Constructors—Abstracts of Important Reports Are Given in This Issue

The fifteenth annual convention of the American Railway Engineering Association was held in Chicago March 17 to 21. The National Railway Appliance Association gave a comprehensive exhibit in the Coliseum and the First Regiment Armory. Abstracts of the papers and reports of special interest to electric railway men follow.

TRACK

The report of the committee on track contains an interesting study of speeds on curves and the relation between speeds of trains and the lead curves and switch angles of turnouts. As a part of this study the committee presented tables and diagrams showing the results of its study of speeds of trains on curves. The committee also drew the following conclusions on the relation of speed and unbalanced elevation for curvature:

The comfort of a passenger on a train which passes over a curve or through a turnout at high speed is not dependent on the height of the center of gravity of the engine which draws his train, or of the car in which he is riding, nor is it dependent on the point where the resultant of forces intersects the plane of the track. But it is much affected by the condition of the track in the matter of surface and line, and the disturbed equilibrium of the passenger is due to centrifugal force uncompensated by the cant of the track.

The relation of speed to the condition of the track cannot be reduced to formulas, tabulated or shown on a diagram, but the relation of equilibrium to speed can very readily be shown. There are nearly as many opinions as there are individuals as to what constitutes a comfortable speed on curves. By tabulating speeds which will produce a certain fixed degree of disturbance of equilibrium one can at least furnish a basis for comparison between speed and comfortable riding.

Another point of interest in this report is the result of an experiment in extending the duties of the section foreman to include simple work commonly handled by men of the bridge and building, water service, telegraph and signal departments. He is at all times on one section of limited mileage and can attend to any such work with the minimum delay and expense, as compared with sending a man from one of the other departments from the division headquarters. This plan has been tried to a limited extent with the consolidation of the track and carpentry, telegraph and water-service work, principally, however, on the smaller lines. The combination of track and signal departments has been most thoroughly tried and has made the most progress.

In view of the limited extent to which this plan has been followed, no definite conclusion can be drawn at this time, and the entire subject is still in the experimental stage. At the same time, this method would appear to offer possibilities for economy in maintenance and deserves careful consideration by railway officers not only in combining the maintenance of the track and signals, but more particularly the combination with light carpentry and similar work. An incidental advantage, which should not be lost sight of, is the possibility of attracting a better class of men for the signal, bridge and other departments because of the increased salary paid for the enlarged duties.

BALLAST

The committee presented standard ballast sections from the principal railroads of Canada, the United States and Mexico. In all nearly eighty cross-section drawings were given. By superimposing the sections of the different roads, for both single track and double track, the committee was able to produce composite drawings of ballast sections. On the basis of these it recommended certain standard sections. Certain fairly definite conclusions had been reached by studying one point at a time as follows: In class A, stone ballast section, the top ballast should consist of broken stone, and where economical, there should be a sub-ballast of fine material, such as cinders, gravel or granulated slag. The depth of the ballast should be 24 in. and on curves the depth of 24 in. should be continued under the low rail. Where top and sub-ballast is used, the thickness of the top or coarser ballast should be 12 in. and the thickness of the sub-ballast or finer material, 12 in. The slope of the ballast on the side should be two to one and the upper corners should be rounded off to a 4-ft. radius. The top of the ballast should slope with a grade of $\frac{1}{2}$ in. to 1 ft. from a point in the center of the track at the top of the tie to the intersection with a 4-ft. radius above mentioned, to avoid interference with track circuits. The top of the sub-grade should not be level but should be raised to provide drainage.

The committee recommended further that foul ballast should be cleaned with ballast forks or screens, that the space between tracks should be cleaned to a depth of 6 in. or more below the bottoms of the tie, that the berm should be cleaned to the bottom of the ballast, preferably not less than 12 in., that cross ditches should not be under rail joints, and that a statement should be made indicating that in the report of the committee on ballast for 1914 tests are reported which indicate that stone ballasts can be cleaned by use of screens for approximately one-half the cost of cleaning with forks.

In an appendix a report on cleaning stone ballast by means of screens, by W. I. Trench, division engineer of the B. & O. Railroad, is given. In another is a set of drawings of a collapsible screen for use in cleaning ballast.

TIES

The report covered a study of the effect of the design of the tie plates and spikes on the durability of ties; a continuation of the study of stresses to which cross-ties are subjected and a determination of the sizes required; a study of economy of labor and material effected through the use of treated ties as compared with untreated, and the compiling of further information as to the use of metal, composite and concrete ties.

On the basis of data furnished by railroads on the matter of plates and spikes the following important conclusions were drawn: Plates with deep ribs or claws cut the ties so as to admit moisture and decay. The deep ribs or claws are not necessary to hold the plates in position and are undesirable. Flat plates used with cut spikes become loose and the looseness results in mechanical wear of the tie. They are satisfactory, however, when used with screw spikes. Plates with cross ribs not over 3/16 in. deep or other independent fastenings that will hold them to the tie do not seriously damage the latter and at the same time do not become loose and cause mechanical wear when used with ordinary cut spikes. The width of the tie plate is an element to determine the mechanical wear of the tie. When plates less than 7 in. wide are used with softwood ties, they cut into the wood sufficiently in some cases to determine the life of the tie. The plate should be of sufficient thickness to avoid cupping on either side of the rail. This thickness depends on the projection beyond the rail, the amount of traffic, the kind of tie and the rate of deterioration from rust, etc. Screw spikes prolong the life of the tie over that obtained with cut spikes. Where treated ties are used all boring should preferably be done previous to treatment. Ordinary driven, cut spikes, by breaking down the structure of the wood for an inch or so around the spikes, facilitate decay at that point where greatest strength of the tie is required. In the case of treated ties, this introduction of decay below the treatment may defeat the purpose of treatment. The breaking down of the structure of the wood with the use of cut spikes is, to a considerable extent, avoided where the spike is driven in a bored hole. Spikes so driven have at least the same holding power as spikes driven without boring. Where spike holes are to be bored and cut spikes used the diamond-pointed cut spike is preferable because of the greater ease with which it follows the hole. Appended to the report were a number of tables and photographs showing the comparative holding powers of different forms of spikes and illustrating the effect of the design of track spikes and tie plates on the durability of ties.

On the subject of treating ties the statement was made that the ever-increasing demand for tie timber and the ever-decreasing supply have created the necessity for treating timber not suitable for ties in its natural state. The economy in labor resulting from the use of treated as compared with untreated ties depends largely on the cost and frequency of tie renewals and therefore on the comparative life of the tie. Economy of both labor and material in cost per tie per annum was therefore presented in the report. Reports showed that the service life of ties depends on many conditions, many of them variable ones. Further, American railways have used treated ties such a short time that available data on the length of life as compared with that of untreated ties are not at all reliable.

The report gave numerous tables of data with comments thereon. The general principle is laid down that the increased cost of the treated tie is justified when the annual cost of its maintenance in track does not exceed the annual charge of the untreated tie. The increased life of the treated tie naturally decreases the number of annual renewals, resulting in decreased labor charge and disturbance of track and ballast. This item of decreased track disturbance has a value estimated by some as high as one-fourth the total cost of surfacing. The determination of this factor is so much involved, however, that it may be properly accounted as an undetermined credit to the use of the treated tie. The increased initial cost of the treated tie over the untreated one raises the question of interest charges on the additional expenditure for the period of its life in track; the ultimate economy of the treated tie used must cover this interest feature. The attempts to assign monetary values have resulted in questionable accuracy, but the results from a comparative standpoint have a workable value.

Tabulated results of ninety answers from railroads representing 230,000 miles as to the comparative cost and life of treated and untreated cross ties indicate that the average life of untreated ties is 7.78 years and the average cost $0.761; the average life of treated ties is 13.85 years and the average cost $1.031. The average cost of removing an old tie and installing a new one is about $0.23. There is an undetermined factor of cost incidental to tie changing due to the disturbance of the ballast and consequently of the surface of the track. Whatever this cost may prove to be, it is an inverse ratio to the life of the tie, and therefore least in the tie of longest life. There is need for further investigation of this subject.

The committee's investigations up to the present as to the comparative costs of labor and material involved in the use of treated and untreated ties favor the tie treated with preservatives of such quantity and quality as to preserve the wood fiber against decay to the limit of mechanical wear. In favor of the use of treated ties are the following points: the rapid and alarming disappearance of the available supply of timber suitable for use as untreated ties; the possibility of using available supplies of cheaper and so-called inferior timbers when chemically treated; the decrease in cost over a term of years of total tie renewals, owing to reduced cost of necessary renewals, and of reduced cost of labor of surfacing, tamping and replacing ties, fastenings and ballast resulting therefrom. There is a growing realization of the desirability of adzing and boring ties before treating and of obtaining more perfect drainage by boring spike holes clear through the ties. The committee believes that it is feasible with the formulas and facts presented in the report for any intending user of cross-ties to calculate the comparative cost of treated and untreated ties in any particular case.

In regard to the use of metal, composite and concrete ties, the committee compiled information from a large number of railroads and arranged this alphabetically under the names of the roads. The compilation showed very active experimenting with the use of metal and concrete ties. The committee evidently does not consider the data sufficient for the drawing of any general conclusions. As the report states the committee is building up a history of cross-ties that will be good for future reference and is reporting only on those ties that have been put in the tracks and used by some steam or electric railroad.

WOOD PRESERVATION

The report of the committee on wood preservation contains some interesting conclusions on the use of refined coal tar in creosote oil and on the question of methods of accurately determining the absorption of creosote oil. In an appendix the committee presented a paper by Dr. Hermann von Schrenk and Alfred L. Kammerer on the use of refined coal tar in the creosoting industry. They state that since 1908 approximately 24,500,000 ties have been treated with a combination of 80 per cent creosote oil and 20 per cent refined coal tar. Practically all paving blocks since 1907 have been treated with such a combination. The total amount of creosote oil used in the United States in 1912 was 83,666,490 gal. During 1912 it is estimated that 12,500,000 gal. of coal-tar-creosote combination were used for the treatment of ties and about 14,000,000 gal. for paving blocks, or a total of 26,150,000 for both, or about 31 per cent of all the oil used. Adding to this similar oil used at plants from which no figures are available, a conservative estimate indicates that about

40 per cent of all the creosote oil used in 1912 was a coal-tar-creosote combination.

Coal tar is one of the by-products obtained from the destructive distillation of coal, either at retort gas works or at by-product coke-oven plants. Gas-house tar usually has a high percentage of free carbon, coke-oven tar a low percentage of free carbon, and both tars when redistilled yield creosote oil.

Coal tar was added to creosote oil in large quantities in the early days of creosoting and is still added to creosote oil in England to give a black color to creosoted wood. The addition of a small amount of coal tar to creosote oil reduces the amount of evaporation which takes place. The combination remains in wood longer than the same creosote oil without the coal tar addition.

Experience of many years has shown that the high-boiling constituents of creosote oil are the most effective in preserving wood. Coal tar is largely composed of high-boiling compounds. The presumption, therefore, is that by adding a small amount of coal tar to creosote oil the antiseptic value of the mixture is not reduced but may be enhanced.

One of the most important considerations, however, is that if the coal tar is used anywhere, it should be mixed with the creosote oil under the immediate direction of the railroad company and with its full knowledge. The practice which has come about in various quarters of selling creosote oil mixed with coal tar as a No. 1 specification oil should be stopped, and the caution is added that the greatest care should be taken, where timber is treated with creosote, where a No. 1 specification is called for, that the specification for such oil be rigidly enforced.

RAILS

The committee reported that failures in the bases of rails having a comparatively thick base have been few and some railroads using rails of the thin-base type have recently increased the fillet between the web and the base to secure additional material at that point. Work on this subject will be continued.

During the year reports have been made on a number of special investigations principally by M. H. Wickhorst, engineer of tests. These reports dealt with manufacturing processes and the causes and defects of seams in rails. Of particular interest is an elaborate investigation on the influence of aluminum and silicon on Bessemer ingots and rails. Aluminum was added in the mold up to 10 oz. per ton with and without silicon. The general conclusion was favorable to the use of aluminum.

The sub-committee on rail joints recommended standard drilling for six-hole and four-hole angle bars in the belief that the sentiment which caused the withdrawal of the recommendations of the committee on tracks, adopted in 1904, was based on prejudice and had no substantial foundation.

The subject of stresses to which rails are subjected in service had been referred to a special sub-committee which reported that no material benefit is to be gained by further mathematical investigation of the question unless accompanied by actual tests of the service conditions. It was suggested that a combination be formed of the rail committee with the roadway, track and ballast committee, for conducting such tests jointly with the tests proposed by the last-named committee, through the proposed joint committee from the A. S. C. E. and A. R. E. A.

As a result of the discussion between the rail committee and members of the manufacturers' committee as to some parts of the specifications for carbon steel rails, certain changes were suggested and a complete copy of the specifications as revised is appended to the report.

WOODEN BRIDGES AND TRESTLES

The committee report on wooden bridges and trestles recommended that the report at the last annual meeting on the use of guard rails be amended to read as follows:

"It is recommended as good practice in the installation of guard rails to extend them beyond the ends of the bridges for such distance as is required by local conditions, but that this distance in any case be not less than 50 ft.; that guard rails be fully spiked to every tie and spliced at every joint; that the guard rails be some form of metal section, and that the ends be beveled, bent down or otherwise protected against direct impact with moving parts of equipment.

"It is also recommended as good practice to use inner guard rails on all open-floor and on the outside tracks of all solid-floor bridges and similar structures longer than 20 ft. in main-line tracks and on similar bridges and structures in branch-line tracks on which the speed of trains is 20 m.p.h. or more."

IRON AND STEEL STRUCTURES

Appendix A in the report on iron and steel structures regarding methods of protecting against corrosion was of considerable interest. An abstract of the information contained regarding pigments is as follows:

Pigments may, in respect to their action upon steel in water, be divided into three classes, each of which merges into the next by easy steps, so that the line of demarcation is difficult to ascertain. These classes are the "inhibitive," the "neutral" (inerts or indeterminate) and the "stimulative." The "inhibitive" pigments retard rust, the "stimulative" hasten the corrosion, while the "inerts" are an intermediate class which apparently leave the material in much the same condition as it was originally.

Pigments may further be divided according to their ability to exclude and to shed moisture. A pigment may exclude the moisture and still be of such a surface character as to allow it to stand upon the surface until it evaporates or is absorbed, or a pigment may have such surface characteristics that the moisture will run off. A "shedding" pigment may be a greater absorber of moisture than an "excluder" and still be a superior protection, according to the conditions of location.

Pigments may have different coefficients of expansion and "drying" and different moduli of elasticity. In cases where great differences obtain in any or all of these properties, the surface may "alligator" or crack. The liability of some of the best "inhibitors" to crack or alligator is so great as to preclude their use in many cases. The chemical processes by which the pigments are prepared exert a marked influence in the action of the pigment on the metal.

The consideration of the conditions of exposure are also important in the selection of a pigment. The chemical composition of the pigment may be affected by either heat, light, moisture or gases, so that it would fail, whereas if one or more of these deteriorating influences was absent good service would be obtained.

The vehicle is as important as the base. While the vehicle may, on account of porosity or other features, be objectionable, yet the addition of the pigment will, by reason of the filling of the voids, produce a sucessful protective coating. Investigators have concluded that the size of the pigment particles is important, and that the law of minimum voids holds true in the preparation of protective coatings as well as in concrete. Therefore, either various proportions of the same pigment, which have different degrees of fineness, or the mixing of pigments of different degrees of fineness, would seem to be advisable. The spreading value of a pigment is an important consideration, secondary, of course, to its protective action, but still influencing it. Too high a spreading quality causes films of paint too thin to withstand the actions of the deteriorating influences.

Investigators appear to have come to the conclusion that bituminous coatings protect metal better than any other, but that the action of sunlight readily destroys their life, and hence their value, and that, therefore, they are practically of no value as a protective agent where subjected to the action of light.

From the preceding it appears that: (1) Priming coats should always be inhibitors, whether or not they are excluders or shedders. (2) Finishing coats should be excluders or shedders, shedders, preferably, whether or not they are inhibitors, neutrals or stimulators. (3) Care must be taken to consider the deteriorating influence and determine the chemical requirements of the pigment accordingly. (4) In cases where a pigment appears in more than one class, care should be taken to determine its process of manufacture before using it as a priming coat. (5) That the best results will probably be obtained by using an "inhibitive" and "excluder" or "shedder" pigment for both priming and finishing coats. The following table, due to Cushman, summarizes the matter.

CLASSIFICATION OF PIGMENTS

Inhibitors	Indeterminates	Stimulators
Zinc and lead chromate	White lead (quick process, basic carbonate)	Lampblack
Zinc oxide	Sublimed white lead (basic sulphate)	Precipitated barium sulphate (blanc fixé)
Zinc chromate	Sublimed blue lead	Ochre
Zinc and barium chromate	Lithopone	Bright red oxide
Zinc lead white	Orange mineral (American red lead)	Carbon black
Prussian blue (inhibitive)	Litharge	Graphite No. 2
Chrome green (blue tone)	Venetian red	Barium sulphate (barytes)
White lead (Dutch process)	Prince's metallic brown	Graphite No. 1
Ultramarine blue	Calcium carbonate (whiting)	Prussian blue (stimulative)
Willow charcoal	Calcium carbonate (precipitated)	Linseed oil
	Calcium sulphate	
	China clay	
	Asbestine	
	American vermilion	
	Medium chrome yellow	

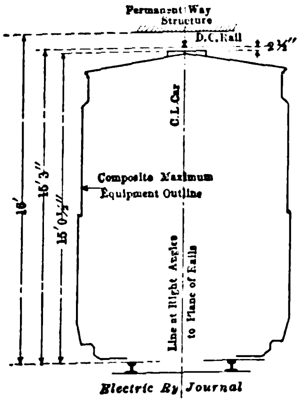
From this it is seen that the carbon and graphite paints should not be used as primers, that the zinc and zinc lead pigments are good primers, while the lead basis may belong to either class, according to their method of manufacture.

This report also contains a bibliography of articles and committee reports contained in the proceedings of the American Society for Testing Materials referring to preservative coatings for iron and steel. Other subjects dealt with at length in this committee's report include concrete incasements, column tests and secondary stresses.

REPORT OF THE COMMITTEE ON ELECTRICITY

The work of this committee was divided among six sub-committees as follows: committees on clearances, transmission lines and crossings, insulation, maintenance organizations, electrolysis and relation to track structures.

The sub-committee on clearances presented data from a large number of railroads showing present practice as to third-rail and overhead clearances. These were arranged in tabular form. A set of diagrams appended to the report showed suggested overhead clearances for permanent way structures and working conductors. Four of these diagrams were taken from the report prepared by the committee on electrical workings of the American Railway Association, and the statement was made that these are also being considered by a sub-committee of the American Electric Railway Association. These diagrams were reproduced in the issue of the ELECTRIC RAILWAY JOURNAL for May 24, 1913, page 935. A fifth diagram, showing recommended under clearance for overhead d.c. rail, was prepared by the sub-committee, based on the minimum under clearance of structures permitted by the New York State Public Service Commission. Reference was made in the report to the statement in the report for 1912 that information was not then sufficient to make recommendations of clearance for automatic stops. At a joint meeting held during the past year, attended by representatives of several associations, it was decided that the present state of development of automatic train stops or speed regulation devices is in an experimental stage, and since no such device has as yet been generally adopted by steam railroads, the joint committee should give no further consideration at this time to the location of such devices on the track structure and should so report back to the various associations. The joint committee recommended also to the clearance committees of the various associations that further study be made of the equipment clearance line shown on the third-rail clearance diagram adopted by the American Railway Engineering Association at its meeting of March, 1912. Following the meeting of the joint committee the sub-committee collected data on equipment clearance lines of various railroads and recommended a slight modification in the above-mentioned third-rail clearance diagram to provide for automatic stops or other structures of a similar nature. This study is to be continued.



A. R. E. A. Reports—Overhead D. C. Clearance Diagram

The other sub-committees reported simply progress on their work, the report of the sub-committee on electrolysis containing a report of the meeting on May 27, as published on page 1025 of the issue of this paper for June 7, 1913.

REPORT OF SIGNAL COMMITTEE

Because of the growing importance of the track circuit as a controlling agency for all signal appliances, the committee on signals and interlocking presented reports of various tests showing the conductivity of creosote and creosote-treated ties; also the effect of ballast and bonding conditions. The electrical resistances of smoothly hewn 7-in. x 9-in. x 8-ft. ties were investigated. These ties had been in the weather for approximately six months but had not been placed in the track. The pores seemed to be filled with creosote, but this was not oozing out as sometimes is the case in warm weather. Tests were conducted in the laboratory of the engineer of tests, Topeka, the air being warm and dry in all cases. In the tests 5-in. spikes were driven 4½ in. into ties at various distances apart and resistance readings were taken. Copper and brass plates were tried for cross-sectional measurements but without success, as the contact resistance formed too great a proportion of the total. Spikes also were driven part way into opposite faces and resistance readings taken.

The resistance with spikes 12 in. apart measured 12,000 ohms, spikes 4 ft. 8½ in. apart measured 42,000 ohms, and cross resistance between spikes 99,000 ohms. With spikes 12 in. apart the resistance measured 4200 ohms and with spikes 36 in. apart it measured 10,000 ohms. With the tie wet and with salt solution on its upper surface, the resistance with spikes 12 in. apart measured 54 ohms and with spikes 36 in. apart it measured 200 ohms.

In another test two sections of 90-lb. Santa Fé rail were firmly spiked at standard-gage distance, two spikes being used for each section. Each portion of rail was drilled, and No. 8 B.W.G. size copper bond wire was bonded thereto. Resistance readings were taken, first, with tie dry; second, after water had been poured over it, and, third, after a solution of 2 lb. of common salt in water had been poured over upper surface of each tie and around rail bases. An attempt to read resistance between rail and copper plate placed under the tie was not successful on account of high contact resistance. With one tie the resistance between rails was 13,000 ohms, but after about 1 gal. of water had been poured over its upper surface and the rails the resistance between rails was 12,000 ohms. After more water had been poured over the tie the resistance between rails was 11,000 ohms. After the salt water had been poured over the tie the resistance between rails was 1075 ohms.

The results obtained in this experiment indicated that dry creosoted ties in themselves did not possess very high conductance, nor was their conductance increased to any great extent by the addition of a slight percentage of moisture. The amount of water poured on in this test might be assumed as equivalent to a shower on ties in well-drained track. It was impracticable to reproduce conditions experienced in some locations, where the ties might be submerged for hours or days.

The addition of the salt solution brought forth such a great reduction in resistance as to brand this substance as a great detriment to successful track circuit maintenance. While it was assumed that 2 lb. of salt per tie represented an extreme case, yet the accumulation of brine from refrigerator cars year after year might mean that the residue remaining in the tie would eventually approach the amount used in this test. The cross-grain measurements tended to prove that the resistance was less with the grain than along the year rings or radial lines.

There were approximately 3200 cross ties per mile of single track. If all of these possessed the same resistance as the creosote mixture used in treating and there was leakage of current between rails through no other path, the resultant leakage resistance per mile of track would be 58.7 ohms or 310 ohms per 1000 ft. From the data obtained the following leakage resistances were calculated, it being assumed that all leakage was due to ties alone: Dry, 4.07 ohms per mile or 21.5 ohms per 1000 ft.; wet, 3.44 ohms per mile or 18.2 ohms per 1000 ft.; salt solution, 0.336 ohm per mile or 1.77 ohms per 1000 ft. A measurement of resistance of a man's body, between his hands (moist), was made and found to be 19,000 ohms. Between points on his arms where skin was thin the resistance was taken and found to be 10,000 ohms.

SIGNS, FENCES AND CROSSINGS

A sub-committee made a study of the proper qualities of fence wire, but was unable to secure any data of value. Another sub-committee investigated the relative values of concrete, metal and wood for signs and signals. A long table showing the results was presented. A digest of the law and the rulings of the public utilities commissions relating to the erection and maintenance of crossing signs was given as well as one on the law relating to trespassing on railroads and private property. Drawings of typical crossing and trespass signs were included in the report. An appendix to the report contained abstracts from statutes in regard to trespassing.

BUILDINGS

The report of this committee summarizes some of the important points to be considered in selecting a roofing as follows:

(1) Chance of leaks, due to character of construction.

(2) Probable life, including chance of damage by the elements and by wear from other causes.

(3) Fire-resisting value.

(4) Cost of maintenance.

(5) First cost.

The information collected on shop floors by the building committee was of special interest because it is applicable to street and interurban railway shops. This report says that the essential requirement of a shop floor is a good hard-wearing surface that is level, smooth, easy on the feet, easy to truck loads over and capable of carrying heavy loads. The advantages and disadvantages of the different typical types are as follows:

Cinder or gravel floor is a type in general use and is the one best adapted for blacksmith shops and foundries. It is often used where an inexpensive floor is required or where on account of a heavy fill inside of foundation walls a more expensive floor would fail on account of settlement.

Plank floor on cinder or gravel is often found desirable where a heavy fill inside of foundation walls is required, where settlement may occur, and where other types of floors would not answer on account of the volume of trucking required or on account of the necessity of gathering and saving scrap material, as in a machine shop. It consists of planking spiked to sleepers resting on the filled material between the foundation walls.

Wood block floors have the advantage that they can be easily repaired, are easy to work and truck on and do not damage falling tools. They need a concrete base to distribute heavy loads which may bear on a few blocks only. Asphalt block floors are sometimes used to advantage, as the blocks come ready to be laid, and they can be laid like wood blocks or like brick.

A concrete floor makes a cheap and fairly permanent floor. It is easy to truck over, is easily cleaned, is sanitary and has the advantage that no special foundations have to be provided, except for the heavier types of machinery. Light machinery is simply bolted to the floor. Industrial tracks may be cheaply installed in the floor with the head of the rail flush with the top surface. This floor, however, damages falling tools, it is hard to work on and becomes worn in spots. Sometimes granite screenings are used instead of torpedo sand to give additional wearing life. Ordinary concrete floors are porous and constant wear results in granulation and abrasion, starting holes which rapidly increase in size and gradually make the floors useless. Heavy wear, trucking and constant hard usage also make them wear unevenly.

Concrete floors may also be laid with special finish designed to be more lasting than the usual concrete floor. There are several special materials on the market that are used for the top finish which give good results. These generally consist of some mineral powder mixed with other substances. When applied the particles of this powder expand, filling the porous places in the concrete and give a surface of flint-like hardness, making a dustproof, wear-resisting and waterproof floor. One advantage is that this topping can be applied after the base is set without materially hurting its efficiency. These special top dressings may also be used to advantage in patching old damaged concrete floors without renewing them.

An asphalt floor is considered to be an ideal floor for shops, if properly laid, with the correct materials and mixtures. Many floors of this character are in service and in fair condition after having been laid twenty-five years. They are easy to walk on and truck over and become more dense and durable as traffic increases. They do not grind away material under truck traffic, they do not easily wear uneven, do not easily crack or disintegrate, are noiseless and dustless, and can be kept clean with broom or mop, or by flushing with a hose. They are sanitary, waterproof and fireproof, and are easily repaired.

A brick floor with a concrete base is easily repaired, easily cleaned, sanitary and fairly cheap, but it is hard to truck over, hard for men to work on and hard on falling tools. The filling, concrete base and 1-in. sand cushion are placed in the same manner as for a wood-block floor.

In the report are given numerous drawings of floor cross-sections with dimensions.

RECORDS AND ACCOUNTS

In view of the fact that the Interstate Commerce Commission has prescribed the use, as far as they are applicable, of the conventional signs or symbols of the American Railway Engineering Association on the maps and profiles required by the commission, the committee on records and accounts has carefully revised those now in the manual and submitted the revision of the symbols for approval. Tables of these symbols showing the old as well as the newly recommended symbols were given.

One item of the work laid out for the committee was the recommendation of feasible and useful subdivisions of Interstate Commerce Commission classification Account No. 6, dealing with roadway and track. The commission does not specify as to the number of subdivisions in this account, provided the account is charged with all elements of expense that the classification indicates should be charged to it. The committee recommended ten subdivisions of this account as follows: track maintenance, applying track material, cutting weeds and general cleaning, ditching and bank widening, changing grades and alignment, flood damage, bank protection, filling, other care of roadway and track, and work-train service.

COPPER STATISTICS FOR 1913 AND PROSPECTS FOR 1914

The production of copper in the United States during 1913 was 612,000 tons, of which 200,000 tons are credited to Arizona and 140,000 to Montana. Michigan and Utah contributed more than 75,000 tons each. Domestic delivery for the same period came to 349,000 tons and export delivery to 395,000 tons. While a considerable proportion of the copper mined here is exported, the United States imports also a large quantity of copper, amounting in 1913 to 180,000 tons. Since 1860 copper prices have varied from 55 cents in 1864 to 9 cents in 1894, and the average price for the last thirty years has been 18.84½. In 1913 the average price for lake copper was 15.70, for electrolytic 15.52, for casting 15.33 and for standard 15.07. Judging from the behavior during the past year and from the present outlook, it seems likely that the average price of copper for the year 1914 will not be much above the thirty-year average of 18.84½ cents which has already been given.

QUARTERLY MEETING OF RAILWAY SIGNAL ASSOCIATION

The quarterly meeting of the Railway Signal Association was held in Chicago on March 16, 1914, and was devoted largely to the approval of various standards and forms of specifications being prepared by standing committees. The report on signaling practice included some interesting tests upon the use of creosote in treating cross-ties. The results obtained in electrical tests indicated that dry creosoted ties in themselves possess a high resistance and that this resistance is not decreased to any great extent by the addition of a slight percentage of moisture. The addition, however, of a salt solution brought about a great reduction in resistance, so much so that it was found to be a great detriment to successful track circuit maintenance. This condition was one which might be expected, from the accumulation of brine drippings from refrigerator cars year after year. Electrical measurements across the grain of the tie tended to show that the resistance was less with the grain than along the annular rings of radial lines. As a result of this test it was calculated that the leakage resistance per mile of track, under normal conditions, would be 58.7 ohms or 310 ohms per 1000 ft., the resistance being inversely proportional to the length of track.

Signal requirements of electric railways, including the rules adopted by the American Electric Railway Association, were submitted by a special committee composed of J. M. Waldron, chairman, R. C. Johnson, John Leisenring and C. H. Morrison. In presenting this report Chairman Waldron stated that it was the purpose of the committee to bring the peculiar requirements and conditions of electric railway signaling to the attention of the signal association, and he called special attention to the extensive use of light signals by electric lines. He reported that a special committee hoped to present the result of experience with this type of signal in its next report to the association.

Upon the question of approval of this committee's report the question arose as to whether it should be accepted as information only, or whether it should be discussed in detail at this time so that it could be approved by the association. In this discussion it was brought out that it would be well to accept the report as information at this time, but in view of the possible steam road electrifications, as well as those already electrified, such modifications as are necessary to this report should be made so that both steam and electric railroad signaling would be uniform. At the close of the discussion the report was accepted as information, and the board of direction was instructed to bring about a scheme which would meet with the approval of the American Electric Railway Association, as well as the Railway Signal Association for making such modifications as are necessary.

ENERGY FIGURES IN COLUMBUS

In the article on the use of the double-deck car in Columbus published in the last issue of this paper a typographical error occurred in the table on page 582 in the line referring to the cost of energy for the different types of cars. These figures should have been stated to be cents per car mile and not cents per kw-hour.

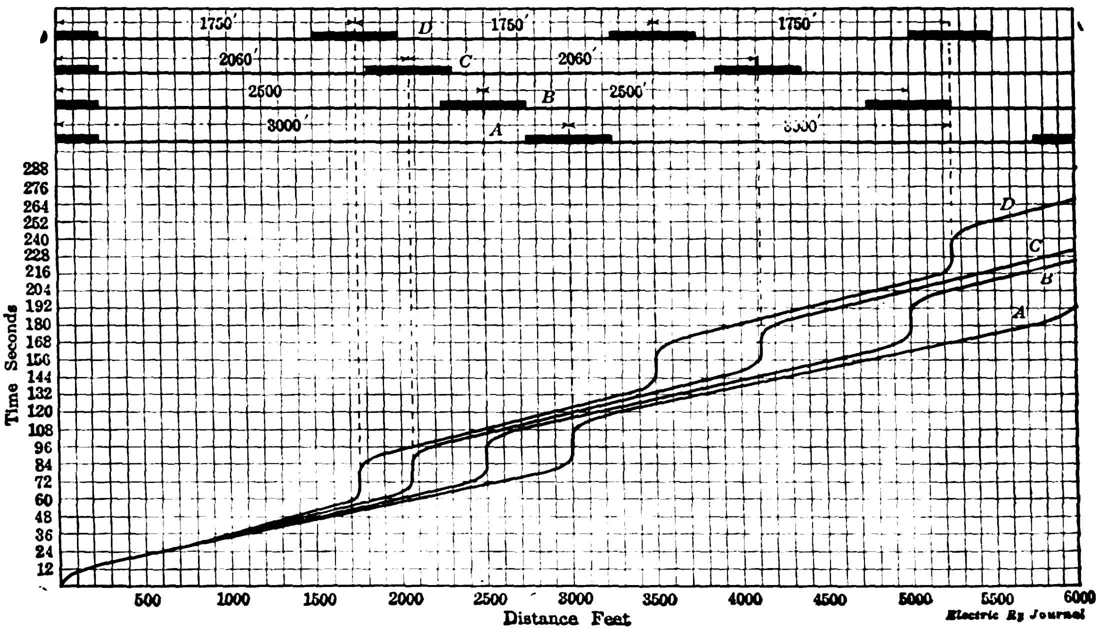
As amended, these figures, all in cents per car mile are: double-deck car, 1.602; single motor car, 1.144; two motor cars with multiple unit control, 2.288; single-ended two-car trains, both motor cars, 2.038; one motor car, one trailer, stepless, 1.976.

EFFECT OF STATION SPACING ON SCHEDULES

BY C. W. SQUIER, E. E.

Public-spirited citizens and organizations frequently recommend more stops on local electric railways without full consideration of the effects of such on schedule speeds.

In studying the operating conditions of different lines with a view of obtaining the highest schedule speed possible, I have found to what extent stops prevent rapid transit. Fast operation of express trains is not obtained by a high maximum speed so much as by the time saved in eliminating stops. A certain distance is necessary for a train to reach maximum speed. The greater the distance between stops the longer that maximum speed may be maintained. and the shorter will be the resulting running time between terminals. A short distance between stops is one of the great difficulties under which electric railways operate.



Curves Showing the Effect of Different Spacing of Stations on the Time Required to Travel a Certain Distance—Station Stop, 15 Seconds

TABLE SHOWING RELATION BETWEEN LENGTHS OF RUN, SPEED, NUMBER OF TRAINS REQUIRED TO MAKE SCHEDULE, ETC.

Run No.	Feet Between Stops	Schedule Speed M.p.h.	Time Necessary to Travel 7 Miles	Time Necessary to Walk Half the Increased Distance Over Run No. 1	Time Saved in Traveling 7 Miles with Increased Distance Over Run No. 1	No. Trains Required to Maintain 5 Minutes Headway with 10 Miles Length Line	Layover Period
1	1750	15.1	27 min. 48 sec.	....	....	17	5 min. 33 sec.
2	2060	16.3	25 min. 40 sec.	..... 31 sec.	1 min. 37 sec.	16	6 min. 40 sec.
3	2500	17.9	23 min. 24 sec.	1 min. 15 sec.	3 min. 9 sec.	15	8 min. 28 sec.
4	3000	19.5	21 min. 33 sec.	2 min. 10 sec.	4 min. 5 sec.	14	8 min. 54 sec.

The following comparison of operating conditions on three elevated lines which have the same equipment and service requirements is made from actual tests. It will serve as an example of the relation between running time and distance between stops:

Average Distance Between Stops, Ft.	Schedule Speed, M.p.h.
1859	13.5
1926	13.7
1972	13.8

A comparison of these figures shows how the schedule speed drops off as the distance between stops decreases. The line with the greatest distance between stops, 1972 ft., has a schedule speed of 0.3 m.p.h. greater than the line with 1859 ft., or there is an increase of 0.3 m.p.h. for an increase of but 113 ft. between stops.

To follow the comparison further, I have drawn the four distance-time curves shown in the accompanying diagram. These are plotted with the same operating characteristics so that the resulting running time is comparable with the distances between stops, which have been taken as 1750 ft., 2060 ft., 2500 ft. and 3000 ft. respectively. The results are also tabulated above.

If we assume that with any increase in the distance between stops a passenger will have to walk one-half this increased distance, and if we add this time to the time taken by the train, we find that a person traveling 7 miles will save 1 minute 37 seconds when the distance between stops is increased from 1750 ft. to 2060 ft., 3 minutes 9 seconds when the distance between stops is 2500 ft., and 4 minutes 5 seconds when the distance between stops is 3000 ft.

A further betterment of the service will be brought about by the decreased headway and increased number of passenger seats which would result from this greater distance between stops. With a line 10 miles long and stations spaced 1750 ft. apart, seventeen trains would be required to maintain a 5-minute headway. With the distance between stops increased to 3000 ft. the same number of trains would be able to maintain a 4-minute headway. Thus the time between trains and the consequent delay occasioned by waiting for them is reduced one minute. This saving will offset some of the extra time taken to walk the increased distance.

This decreased time between trains will give three more trains per hour passing any point on the line. If we assume that each train is capable of seating 500 passengers, then by increasing the distance between stops we would provide 1500 more passenger seats per hour and thus add to the comfort of travel.

So far I have referred only to such points as might be of advantage to the traveling public. The operating company would also be benefited by an increased distance between stops. Energy consumption would decrease as the total number of stops would be less, and the rheostatic losses during acceleration would be proportional to the number of stops. Finally, for the same service the same headway could be maintained with fewer cars. This would mean less capital invested and lower maintenance costs.

COMMITTEE MEETINGS A. E. R. A.

A meeting of the passenger traffic committee of the Transportation & Traffic Association was held jn Cleveland on March 17. Those in attendance were E. E. Soules, Peoria, chairman; C. R. Gowen, Syracuse; E. R. Kelsey, Toledo, and E. B. Burritt, secretary of the association. At the meeting the committee developed a line of procedure and decided to include a consideration of motor buses.

The meeting of the 1914 convention location committee was held in New York, March 14. No definite decision was reached. The committee will hold another meeting in New York, March 27.

The joint sub-committee made up of the rules committee of the Transportation & Traffic Association and the block signal committee of that association and of the Engineering Association met in Chicago March 16. Those in attendance were L. H. Palmer, New York; C. P. Wilson, Indianapolis; F. W. Coen, Sandusky, and J. W. Brown, Newark. The instructions of this committee were to develop standard rules for a signal system other than track circuit systems. The members also discussed signal rules and definitions. The committee had before it the rules disseminated by several trolley contact signal manufacturers including the following: United States Electric Signal Company, Boston; Nachod Signal Company, Inc., New York; Electric Railway Signal Company, represented by Charles N. Wood Company, Boston; Automatic Signal Company, Cleveland. With these rules and definitions and those of several roads the committee considered the ways and means for obtaining uniformity. After the rules have been revised and new rules and definitions have been decided upon the joint sub-commission will present them to the block signal committee and to the signal manufacturers for confirmation.

CENSUS REPORT ON ELECTRIC RAILWAYS

The remaining preliminary figures for the forthcoming five-year report on the electric railways of the United States have been given out by the Bureau of the Census, Department of Commerce. Statistics for various individual states have previously been given in the issues of the ELECTRIC RAILWAY JOURNAL of Jan. 10, 1914, Jan. 17, 1914, and Feb. 7, 1914. Statistics for the fourteen remaining states have now been issued by the Bureau of the Census and many be secured from Washington.

The statistics given in the accompanying table are a summary of all the individual state reports for the years ended Dec. 31 in 1912 and 1907 and June 30 in 1902. The totals include electric light plants operated in connection with the electric railways and not separable therefrom but do not include reports of mixed steam and electric railways or railways under construction during the census year which had not begun operations. There has been inserted in the table as prepared by the government a column showing the per cent of increase for the various items from 1907 to 1912 in order that there may be a basis for comparing the development of electric railways during the first and second five years of the decade.

The figures as presented for the continental United States show general gains for the decade 1902-1912. The number of operating companies increased from 817 in 1902 to 975 in 1912, or 19 per cent. There were 41,065 miles of track in 1912 as compared with 22,577 in 1902, or an increase of 82 per cent. The persons employed numbered 282,461 in 1912 as compared with 140,769 in 1902, or an increase of 101 per cent. The revenue passengers carried in 1912 numbered 9,545,554,667 as compared with 4,774,211,904 in 1902, or an increase of 100 per cent. The gross income in 1912 amounted to $585,930,517 as compared with $250,504,627 in 1902, or an increase of 134 per cent. The operating expenses amounted to $332,896,356 in 1912 as compared with $142,312,597 in 1912, or an increase of 134 per cent. The total horse-power of the power plants was 3,665,051 in 1912 as compared with 1,349,211 in 1902, or an increase of 172 per cent. The horse-power of the waterwheels increased from 49,153 in 1902 to 471,307 in 1912, or 859 per cent. The output of stations increased 168 per cent, rising to 6,952,699,008 kw-hr. in 1912 from 2,161,484,397 in 1902. The current purchased in 1912 amounted to 2,967,318,781 kw-hr., the figures for 1902 not being available.

OPERATING AND FINANCIAL STATISTICS FOR ELECTRIC RAILWAYS IN THE UNITED STATES

	1912	1907	1902	Per Cent of Increase 1902-1912	Per Cent of Increase 1907-1912
Number of companies.	1,260	1,236	987	27.7	1.9
Operating	975	945	817	19.3	3.2
Lessor	285	291	170	67.6	—2.0
Miles of line.........	30,437	25,547	16,645	82.9	19.1
Miles of single track[2].	41,064	34,381	22,576	81.9	19.4
Cars, number	94,016	83,641	66,784	40.8	12.4
Passenger	76,162	70,016	60,290	26.3	8.7
All other	17,854	13,625	6,494	174.9	31.0
Electric locomotives..	277	117	3	...	...
Persons employed....	282,461	[3]221,429	[3]140,769	100.7	28.5
Salaried employees.	23,271	11,700	7,128	226.5	98.9
Wage earners	[4]259,190	209,729	133,641	.93.9	23.6
Power:					
Horse-power, total (in thousands).	3,665	2,476	1,349	171.6	47.9
Steam and gas engines (including turbines)—					
Number	2,312	2,552	2,351	—1.7	—9.4
Horse-power (in thousands)...	3,193	2,384	1,300	145.7	33.9
Waterwheels—					
Number	383	228	159	140.9	24.1
Horse-power	471,307	91,961	49,153	858.9	412.5
Capacity of dynamos, kw (in thousands)	2,508	1,723	898	179.2	45.6
Output of stations, kw-hr. (in millions)	6,052	4,759	2,261	167.6	27.2
Current purchased, kw-hr. (in millions)	2,967	([5])	([5])	...	...
Passengers carried (in millions)	12,135	9,533	5,836	107.9	37.7
Revenue (in millions)	9,545	7,441	4,774	99.9	28.2
Transfer (in millions)	2,423	1,995	1,062	128.1	21.5
Free (in millions)..	165	96	([5])	...	72.2
Car mileage (passenger, express, freight, etc.) (in millions).	1,921	1,617	1,144	67.9	18.8
Income statement:					
Gross income (in thousands)	$585,930	[3]$429,744	[3]$250,504	133.9	36.6
Operating revenues (in thousands)...	$567,511	$418,187	$247,553	129.2	35.9
Transportation revenues (in thousands)	$520,184	$390,276	$235,997	120.4	33.3
Non-transportation revenues[6] (in thousands)	$47,326	$27,911	$11,556	309.5	69.5
Income from other sources (in thousands)	$18,418	$11,556	$2,950	524.2	59.4
Operating expenses (in thousands)...	$332,896	$251,309	$142,312	133.9	32.5
Gross income less operating expenses (in thousands)...	$253,034	$178,435	$108,192	133.9	41.2
Deductions from income (taxes and fixed charges) (in thousands)	$191,123	$138,094	$77,595	146.3	38.3
Net income (in thousands)	$61,910	$40,340	$30,596	102.3	53.4
Dividends (operating companies) (in thousands)	$51,650	$26,454	$15,882	225.2	95.2
Surplus (in thousands)	$10,260	$13,885	$14,714	—30.3	—26.0

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[1] A minus sign (—) denotes decrease.

[2] Includes track lying outside the United States, namely, 1912, 31.91 miles; 1907, 27.52 miles, and 1902, 4.20 miles, and exclusive of track not operated.

[3] For 939 companies in 1907 and for 797 companies in 1902.

[4] Number employed Sept. 16, 1912.

[5] Figures not available.

[6] Income from sale of current included: In 1912, $36,500,030; in 1907, $20,093,302; and in 1902, $7,703,574.

TRIBUTES TO GEORGE WESTINGHOUSE

In the current issue of the *Electrical World* appears a series of tributes of appreciation from a number of men who knew Mr. Westinghouse most intimately. Below are given extracts selected from these which serve to present a composite picture of his predominant characteristics.

William Stanley telegraphed that Mr. Westinghouse possessed three salient characteristics, "a strong, vigorous purpose, a wonderful grasp of the opportunities of life and a high courage that overcame all obstacles."

Nikola Tesla gave his impressions of Mr. Westinghouse at the time of their first meeting in 1888. "Then," said Mr. Tesla, "his tremendous potential energy had only in part taken form, but even to a superficial observer the latent force was manifest. A rare example of health and strength, like a lion in the forest he breathed deep and with delight the smoky air of his factories. His bearing was perfect, but he was a fierce adversary when aroused, a giant when confronted with difficulties which seemed unsurmountable."

E. M. Herr wrote that "great as was Mr. Westinghouse as an inventor, to those closely associated with him he was even more remarkable for his splendid courage, quickness of perception and far-seeing and accurate judgment of future needs and tendencies in the world's progress. These characteristics made him always an optimist. He was always open-minded and quick to see the good in the work of other inventors. In dealing with others he was eminently fair and liberal, but independent and courageous in his own work, never hesitating to assume the entire responsibility for anything he undertook, impatient of interference and rarely accepting or adopting suggestions from his engineers or associates. His kindly courtesy and consideration for all endeared him to his employees and inspired in them a spirit of great loyalty and affection for their chief."

Peter Cooper Hewitt sums up Mr. Westinghouse's characteristic qualities as "an appreciation of nature's forces and a love of mankind." "As the problems involved in nature's secrets unfolded themselves before him he strained every effort to turn their use to the benefit of mankind. He appreciated the enormous danger to humanity that accompanies the harnessing of vast forces and by his foresight and skill prevented disasters which might conceivably have been of enormous extent."

W. M. McFarland said that "one could not be with Mr. Westinghouse and know him without feeling that he was in the presence of one of the world's great and wonderful personalities. This was not because of any peculiarity of manner, for he was singularly unaffected and simple in his dealings with everybody and one of the most approachable of men. The mental qualities which brought about the success of his wonderful career were numerous and diversified. Imagination, organization, executive ability, foresight, courage, tenacity of purpose and cheerfulness were the great qualities that were all his." From personal association and knowledge of his history Mr. McFarland placed tenactity of purpose first, and then courage and foresight. No man ever inspired his subordinates and associates with more affectionate admiration and respect.

Charles A. Terry placed as prominent among the qualities which distinguished Mr. Westinghouse from other great inventors "his powerful intellect, his tremendous will power, his indomitable courage, all different manifestations of his strong personality. His quick insight into the verities of any problem enabled him to arrive rapidly at conclusions, and when convinced of the justice and feasibility of the end to be attained and satisfied as to the course to pursue he trained the full force of his will upon its accomplishment. Back of his persistence and courage was a far-sighted apprehension of not merely the possibilities but the certainties of future scientific and industrial development."

Calvin W. Rice was impressed by the expression of Mr. Westinghouse's character in his home life in which his tremendous capacity for work and power of concentration were manifested. "He followed with precision his program for the day but was so gentle and gracious withal that one yielded as a matter of course to his plans. He was always most considerate of the welfare of his family and his guests. He had the gentleness of strength under complete control."

L. B. Stillwell analyzes Mr. Westinghouse's qualities as "intellectual vigor, dauntless courage and tireless energy. From the start his influence upon the young men associated with him was extraordinary. His lieutenants inevitably partook of his own buoyant hopefulness and his determination to find the solution of the many problems encountered in his development work. He never preached, save by example, but his preaching was remarkably effective."

The following has been received by this paper from N. W. Storer, general engineer of the electric railway department of the Westinghouse Electric & Manufacturing Company, stating the relation of Mr. Westinghouse to the development of electric traction:

"In all the railway world there is no name that comes so near being a household word as that of Westinghouse. It is eminently fitting and proper, therefore, that railway people should, in noting the passing of this great inventor and captain of industry, consider what his life meant to the business of transportation.

"While the field of activity covered by Mr. Westinghouse was remarkable for its breadth, there is no doubt that his greatest interest lay in railroading. From the time his great brain conceived the idea of the air brake and foresaw its possibilities, he was always thinking out new plans for increasing the capacity, efficiency, reliability and safety of our railroads. The air brake and the automatic block signal system have always been popularly considered as safety appliances, but these words do not in any sense express the meaning and value of these inventions to mankind. Not only have they made all railway traffic safer and more reliable, but they have doubled, tripled, quadrupled—increased the capacity of railroads beyond the wildest dreams of fifty years ago.

"When Mr. Westinghouse decided to enter the electric railway field his influence was immediately felt, and from that day to the present his high ideal has always spurred on the engineers of his company to the best that was in them. With them, under his leadership, it has never been a question of simply meeting contract specifications, but of furnishing apparatus that would do the work better, if possible, than it had ever been done before.

"Quick as Mr. Westinghouse was at developing ideas of his own, he was equally quick to appreciate the inventions of other men, and to see in them possibilities far beyond the conceptions of the original inventors. Notable examples of this are found in his purchase of the Goulard & Gibbs transformer patents and the rights to the Parsons patents on steam turbines. While these inventions apply to electric railway work only indirectly, their development has greatly extended its field. His work in the application of the principles so successfully established by the Air Brake Company and the Union Switch & Signal Company led Mr.

Westinghouse to the development of the now well-known electro-pneumatic system of remote control for railway motors. As showing still further his far-seeing mind, we need only instance his letter to the New York papers concerning the necessity for guarding against danger from fire in the subway which was then under construction. The wisdom of this was shown by the almost immediate trend of all designs toward fireproof construction for railway cars.

"His purchase of the three-phase railway patents of von Kando, his development of the single-phase system, and the steady improvement of direct-current apparatus of both low and high voltage to its present state of perfection, all point to his breadth of view and his desire to get the best out of every system and apply the proper system in each place. At the same time he has always emphasized the necessity for an early standardization of systems to permit the maximum interchangeability of equipments.

"In a brief sketch of this kind it is impossible to more than mention a few of the more important achievements, but I think that all will agree that the railway world owes probably as much to George Westinghouse as to any other man who ever lived."

WESTERN SOCIETY OF ENGINEERS DISCUSSES PUBLIC-UTILITY REGULATION

Public-utility regulation was discussed at the meeting of the Western Society of Engineers, of Chicago, on March 16, 1914. The subject of a reasonable charge for public-utility service, which was the theme of an instructive paper read by Dean M. E. Cooley, of the University of Michigan, at the annual meeting of the society and summarized in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, page 124, was discussed in three papers presented at this time.

The first paper was read by Andrew Cooke, Chicago, who considered public-utility regulation from the investor's point of view. Mr. Cooke spoke particularly of railroad investments, taxation, competition and rate regulation. He thought that where surplus earnings were reinvested in the property they should not be capitalized for rate-making purposes. He urged the safeguarding of railroad investments so that the interest paid for the necessary capital could be reduced. He closed by stating that government control seemed to be essential to this end.

Samuel O. Dunn, editor of the *Railway Age Gazette*, read a paper on public-utility valuation from the railway point of view. Mr. Dunn said that the fair present value of railroad properties is, in essence, the value which would be paid to owners under condemnation proceedings. He also discussed the general valuation of the railway properties about to be made by the Interstate Commerce Commission. In relation to the valuation of the land belonging to railways, he said that it should be included at its full present fair value. Constitutionally speaking, the so-called "unearned increment" in the value of land used for railway property cannot be confiscated any more than that for land used for any other purpose. Mr. Dunn agreed with Mr. Cooke about excluding from the valuation surplus earnings invested in business. Depreciation value should be figured in accordance with the existing potential service of the thing being valued. The speaker argued vigorously for a fair allowance for going value and concluded by saying that he felt very confident that when the government valuation of the railways of the United States is made it will result in an advance in rates rather than in a reduction. The railways of the country, therefore, could look with equanimity on the government's gigantic plan of valuing all the railway properties.

Harold Almert, a consulting engineer, was the third speaker. He discussed public-utility regulation from the points of view of the public and the engineer. The public's interest was in securing an adequate service at reasonable rates. The machinery of the public-utility commission had been created to accomplish this purpose. Mr. Almert said that the engineer who had had training in law and accounting as well as engineering training and experience was the man best qualified to get at the real facts in the broad questions of public-utility regulation. The helpful engineer must be nothing less than a publicist, and on him should rest, and no doubt in time would rest, the greatest responsibility in relation to these questions which is to devolve upon any class of American citizens.

John W. Alvord, past-president of the society, was called upon to open the discussion. He remarked that about $1,000,000,000 worth of property would be appraised annually in the next five to eight years. The fundamental principles of appraisal work rested in the law and in such questions as the definitions of property, value, etc. In this work the law should be regarded as the foundation, engineering judgment as the superstructure, and the work of the economist and business man as giving the finishing touches to the edifice. Mr. Alvord gave an amusing illustration of the manner in which the highly trained staff of a public-utility commission might go about the valuing of a horse. The staff would probably determine carefully the value of the iron in the shoes, the glue in the hoofs, the worth of the hide, etc. But they would be valuing a dead horse. Going utilities are to be compared to live horses, and the speaker pointed out the wide variation of valuation of going concerns—a variation often difficult to define by formula and method. But for the most part the commissions were doing their work with great care and great patience.

William B. Jackson, consulting engineer, said that what the utility earned was not so important to the citizens as what it did with its earnings.

James E. Quan, chairman of the Illinois Public Utilities Commission, was called on, but retired in favor of Walter A. Shaw, the engineering member of the commission. Mr. Shaw spoke briefly, assuring his hearers that the Illinois commission believed that the utilities were entitled to fair rates on a fair valuation.

L. E. Cooley, consulting engineer and brother of Dean Cooley, said that if he had his way the utility would be financed with only one security. This one security would bear only a minimum rate of interest until the utility was a going concern and other issues of the security would be put out during the early years to cover possible losses. When the utility was on its feet and a prosperous going concern, the security would then receive a fair return, all over that to be turned into a surplus fund to provide for amortization or improvement to the property.

A. C. King, deputy commissioner of gas and electricity of Chicago, spoke briefly and was followed by Prof. Morgan Brooks, of the University of Illinois, who dwelt particularly on quality of service rather than reduction of rates.

The ELECTRIC RAILWAY JOURNAL has opened a permanent Pacific Coast office in Room 502, Rialto Building, San Francisco, Cal. The editorial work will be in charge of N. A. Bowers, who has been news correspondent for this paper for the past year in the Northwest with headquarters at Vancouver and previous to that time was connected with the *Engineering Record*.

COMMUNICATIONS

MR. WILSON DISCUSSES THE TENTATIVE SYSTEM OF ACCOUNTS

AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION—COMMITTEE ON A STANDARD CLASSIFICATION OF ACCOUNTS

BOSTON, MASS., March 13, 1914.

To the Editors:

It is hoped that Accounting Series Circular No. 41, which has just been sent out by the Interstate Commerce Commission to all electric carriers, will prove to be acceptable to them. A great deal of time has been spent upon these classifications both by the representatives of the Interstate Commerce Commission and the members of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association.

For several years there have been in use as standard practice classifications covering operating expense accounts, operating revenue accounts and road and equipment accounts. These have proved fairly satisfactory, but numerous questions have, of course, arisen as to the application of the accounts, and an endeavor has been made to word the new text so as to cover all of these matters. To provide for a complete system of accounting there have now been prepared classifications to cover income accounts, to cover profit and loss accounts and to cover general balance sheet or ledger accounts. Great care has been used to make these as complete as possible, and it is sincerely hoped that they will meet with the approval of all interested parties, whether company officials or others interested financially or otherwise in the railway properties.

The new classification covering operating expenses has been so changed that there are now ninety-nine accounts under six general headings where there were formerly eighty-eight accounts under five general headings, the additional general heading being that of "Power Account."

Under this general heading there has now been placed in addition to the items formerly coming under the sub-head of "Power" (which formerly came under the general heading of "Conducting Transportation") items previously chargeable to Account 22, "Transmission System," and Account 25, "Buildings and Structures," Divisions (a) "Power Plant" and (b) "Substations and Storage Battery Plants," formerly under the general heading of "Maintenance of Way and Structures," and Accounts 30, "Power Plant Equipment," and 31, "Substation Equipment," formerly under the general heading of "Maintenance of Equipment." It also includes that portion of Account 48, "Superintendence of Transportation," which included the salaries and other expenses of the superintendent of power. It is thought that the combination of all of these accounts under this new general heading will be found very advantageous when comparisons have to be made between different properties where the conditions governing the generation or purchase of power on these properties differ.

Under each of the general headings of "Way and Structures," "Equipment" and "Power" there have been added accounts entitled "Equalization." These accounts have been provided for use by such companies as may wish to distribute some of their operating expenses over a period of months rather than to include the total expenditure in the month when the work was actually done. By debiting or crediting these accounts one may see at a glance the actual expenditures that have been made during the month and yet distribute the expenditures over a longer period. It is provided, however, that this account must be cleared annually unless there is some good reason why a portion of the expenditure should be carried over.

Under the general heading of "Equipment" there has been added a new account numbered 40, "Equipment Retired," which has nine sub-accounts covering the different classes of equipment. This account was set up in order that the other maintenance accounts might show only the sums actually expended for maintaining the equipment still in use by the company and not include additional sums to cover the value of equipment which was no longer used by the company.

Under the general heading of "Traffic," a new account numbered 78, "Parks, Resorts and Attractions," has been added to cover such items as have been incurred primarily for the purpose of inducing travel.

Under the general heading "General and Miscellaneous" there has been added a new account, No. 87, "Valuation Expenses," to cover any expenditures to which a carrier may be put in complying with federal or state requirements in order to ascertain the value of the property under the control of the reporting company. There has also been added a new account, No. 88, "Amortization of Franchises," to which account shall be charged each month the proper proportionate expense of acquiring such franchises.

All officials interested should carefully consider the general instructions on pages 11, 12 and 13.

No new ruling has been made covering depreciation, the old provision that the company need not set up such an account unless compelled by state regulations so to do being still in force.

The operating revenue accounts remain practically the same. Account No. 103, "Parlor, Sleeping, Dining and Special Car Revenue," has been amplified, the old text having said nothing about sleeping and dining car expenses and receipts. Provision is now made for the charging of cost of supplies to this account and crediting thereto the receipts from the sales of these supplies.

The road and equipment accounts have received considerable attention. In the old steam railroad classification there was a separate schedule covering additions, betterments and replacements. Definite instructions relative to these accounts had never been promulgated for the use of electric carriers, and these carriers have always been allowed to make charges to the road and equipment accounts for work of this nature. I now understand that the steam railroads have decided it is better to have only one classification for property accounts rather than two and have done away with their separate text for additions, betterments and replacements and, in the future, are to include them in the regular road and equipment accounts.

The general instructions preceding the schedule of the road and equipment accounts, taken in connection with the text of the accounts, covers very comprehensively the treatment of all of the property accounts, and with these explanations it seems as though there should be no excuse for not properly classifying and taking care of all property items.

Three new accounts have been added entitled "Organization," "Unlimited Franchises" and "Limited Franchises." Items of this kind were previously included in the old Account No. 44, "Miscellaneous."

Attention is particularly called to Account No. 546, "Interest During Construction," which takes the place of the old Account No. 41, "Interest." The new account allows a more liberal treatment of this important item than in the old classification, inasmuch as it permits a proportion of the discount on funded debt issued for construction or additions and betterments purposes to be charged to this account.

It is to be regretted that these tentative schedules could not be put into the hands of those interested at an earlier date and more time be allowed to offer criticisms and suggestions. But this was found to be impracticable as it is the desire of the Interstate Commerce Commission to put all these schedules into effect with the year commencing July 1, 1914, and in order that this may be done it will be necessary to get the schedules into the hands of the printer at the earliest possible date. A meeting of the representatives of the Interstate Commerce Commission and the members of the committee on a standard classification of accounts has been called to be held in Washington on March 25 to consider criticisms and suggestions.

H. L. WILSON, Chairman.

PLATFORM ACCIDENTS IN MOSCOW

MOSCOW, RUSSIA, Feb. 27, 1914.

To the Editors:

I have just read with interest the article in your issue of Feb. 17 upon "The 'Safety First' Signs in Portland." I might state in this connection that on each motor and trail car of the Moscow Municipal Tramways is painted the following statement: "Boarding and alighting when car is running are forbidden." There is also a regulation of the Moscow Municipal Council forbidding the practice, and the violators of the law may be arrested. In spite of this fact passengers enter and leave the cars as they please. The number of the tramway fatalities is increasing from year to year and the percentage of the serious accidents is also increasing. A summary of the accidents to passengers for the year 1911 (the last year for which statistics are available) is shown in the following table:

TABLE SHOWING ACCIDENTS TO PASSENGERS, MOSCOW TRAMWAYS, 1911

	From Boarding and Alighting	Total
Fatalities	5	6
Serious injuries	107	132
Slight injuries	2520	2855
Total	2632	2993

As will be seen, the percentage of boarding and alighting accidents to the total was 88.

There were 265 car collisions, resulting in injuries to forty-three passengers. These figures are included in the table printed above.

The number of vehicles struck by cars was 1973.

The length of line is 56.8 miles, not including several horse lines.

The number of passengers carried was 209,000,000 and the car mileage was 23,500,000.

Some center-entrance motor cars have been run from the beginning of the municipal operation and some of a new type have recently been put in service, but neither type is particularly popular with the Moscow public.

M. SHEREMETEWSKY, Mechanical Engineer.

REPORT OF THE BOSTON JOINT COMMISSION

The report of the Massachusetts Public Service Commission and the Boston Transit Commission, acting jointly in its investigation of street railway service in Boston, was made public this week. A summary of the testimony at the hearings conducted during this investigation has been published in previous issues of this paper. The conclusion reached is "That to some public authority be committed a thorough and fundamental consideration of the whole metropolitan transportation problem, involving all street car systems which serve the metropolitan district and such railroad systems, or such parts thereof, as may be properly included within the same investigation, and involving not only a consideration of questions of fares and service, but also questions of the charter rights and property rights of the parties and the relations between the various companies concerned as well as the relation of the transportation system as a whole to the municipalties constituting the metropolitan district."

In discussing the subject the report says that the general cause of complaint has been the crowded condition of the cars and irregularity of service, especially during rush hours. The hearings developed the fact that the seats furnished by the Boston Elevated Railway and the Bay State Street Railway Companies, the two companies under investigation, equaled the number of passengers carried but that the difficulty experienced could not be met if additional cars were furnished because on many existing lines the facilities were being utilized to their full capacity. The report also refers to the rapid extension, especially during recent years, of the ride possible for a single fare, and the requirements upon the Boston Elevated Railway to make still further expenditures.

Referring particularly to this company the report says that in 1888 the capital invested per $1 of gross earnings on the Boston Elevated was $2.38. In 1913 it had risen to $6.22. Conversely the number of revenue passengers carried for each $1 invested has shown a great reduction. In 1888 for each dollar of investment 8.37 revenue passengers were carried, while in 1913 only 3.09 revenue passengers were carried. The number of free transfer passengers had increased from about 11,000,000 in 1893 to upward of 18,000,000 in 1913. These statistics show that the investment obligations of the Boston Elevated Railway have been increasing much faster than earnings, and the committee asks the question: "How far can the company profitably carry passengers for a 5-cent fare?" Statistics seem to warrant the inference that the limit of a profitable ride is 4¼ miles.

Continuing, the report says that the fundamental difficulty in attempting to deal in any flexible manner with inequalities and injustices in the present situation is the rigid provision in the Boston Elevated charter which guarantees the right to charge a fare of 5 cents for any passage in one direction on its lines and imposes upon the company the obligation of carrying passengers for a fare of not more than 5 cents. The question before the commissions was also complicated by the fact that lines which some complainants desired the Boston Elevated to assume belong to another corporation—the Bay State Street Railway. If it should be found desirable that the Boston Elevated's service should be extended beyond present limits it might be found that the only practicable method of providing these facilities was through an amendment of the company's charter which would relieve it from some of its present obligations.

For this reason the joint commission recommends the thorough consideration of the subject already mentioned, a consideration which might involve certain changes in the charters of the companies concerned and possibly their consolidation or combination.

The recently opened $6,000,000 power plant of the United Electric Light & Power Company, of New York City, has caused annoyance to neighbors by reason of excessive noise. Professor Sabine, of Harvard University, has worked out a plan on the principle of the Maxim silencer for reducing the roar, the air being drawn through a well provided with deadening partitions.

Equipment and Its Maintenance

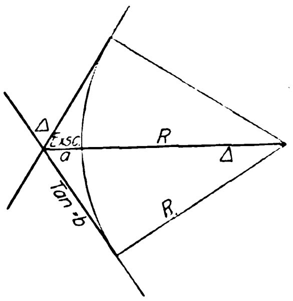
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

A SURVEYOR'S SHORT CUT

BY M. BERNARD, ASSISTANT ENGINEER IN WAY AND STRUCTURE DEPARTMENT, BROOKLYN RAPID TRANSIT SYSTEM

It often happens that it becomes necessary to know both the radius and the Δ angle of a curve of which only the tangent and exsecant are known. The simple method shown in the accompanying drawing has been devised by the writer.



Finding Radius and Δ Angle

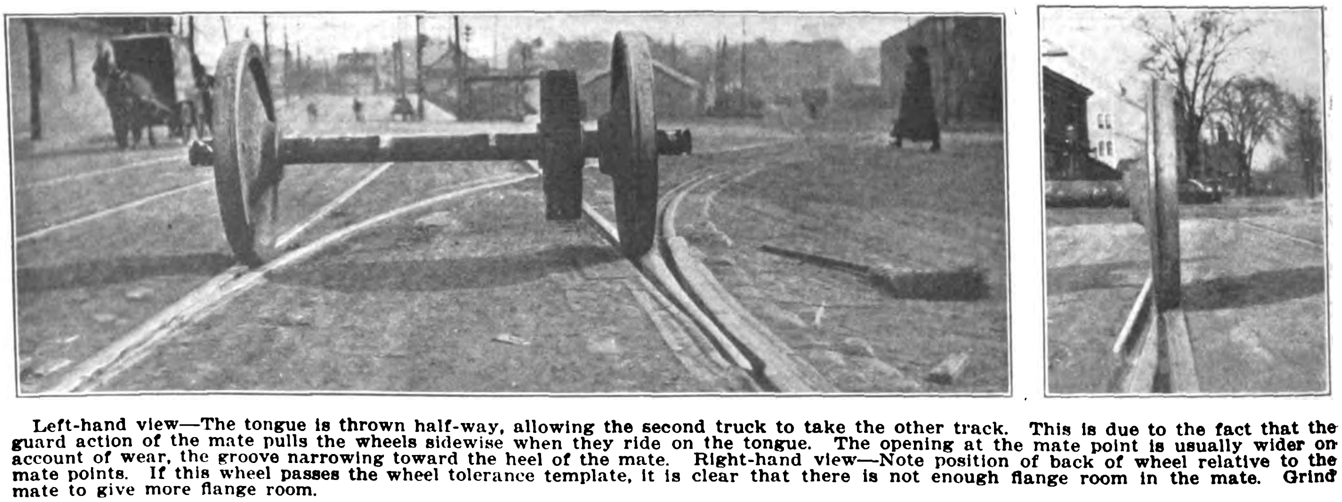
In this figure let R equal the unknown radius, Δ equal the unknown central angle, a equal the known exsecant and b equal the known tangent. Then $(R+a)^2 = R^2 + b^2$. On solving this equation, $R = \frac{b^2 - a^2}{2a}$; substituting value of a and b gives R. With radius and tangent known, the central angle can easily be found.

DERAILMENTS AT FACING POINT SWITCHES

BY "CONTRIBUTOR"

The maintenance of way department of the Connecticut Company is investigating the cause of derailments at facing point switches. From a track standpoint, it finds that usually one of three different things occurs:

First—The movement of the switch tongue between the trucks causes the rear truck to take the other track.



Left-hand view—The tongue is thrown half-way, allowing the second truck to take the other track. This is due to the fact that the guard action of the mate pulls the wheels sidewise when they ride on the tongue. The opening at the mate point is usually wider on account of wear, the groove narrowing toward the heel of the mate. Right-hand view—Note position of back of wheel relative to the mate points. If this wheel passes the wheel tolerance template, it is clear that there is not enough flange room in the mate. Grind mate to give more flange room.

The Correction of Switch Troubles by the Connecticut Company

Second—Wheels mount over the tongue.

Third—Wheels mount over the mate point.

A close study of the cause of tongue movement between trucks shows some rather interesting results. While this action is usually reported as a loose switch tongue, it is rarely caused by the looseness of the tongue. The first fact considered when cars split switches is that the wheels are riding on the tongue, and the conclusion is that the real cause is inadequate flange room in the mate. When a pair of wheels enter into a switch riding on the tongue and attempt to pass the mate point the back of the flange rubs hard on the mate point. Now, as soon as guard action begins, the gage line of the wheel which stands away from the gage line of the mate in some cases will ride up and over the mate, thus derailing the car; or if the wheel keeps the groove, the guard action in the mate pulls both wheels sidewise and so pulls the tongue with them, thereby opening the switch and allowing the second truck to take the other track. We are endeavoring to meet this condition by designing new special work with wider flange room in the mates, while our old mates are ground out sufficiently to prevent this kind of trouble.

The cause for the mounting of wheels over the tongue may be either that the tongue is too blunt so that steel wheels more or less worn will ride over the point and leave the rails, or insufficient flange room in the switch piece. The latter trouble usually occurs in old special work which was designed for smaller wheels than are being operated over it now. The trouble with blunt tongues can easily be avoided by the use of a grinder. Insufficient flange room in a switch piece is more serious and calls for replacement with a new piece.

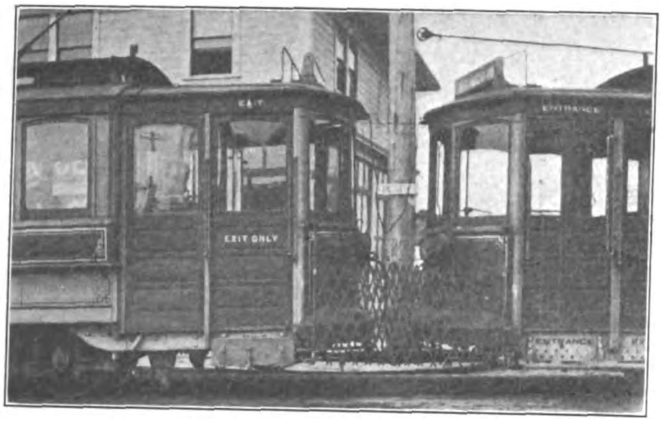
The cause for the mounting of wheels over the mate point is faulty equipment, wide gage or insufficient flange room in the mate. This occurs more often than is generally believed. All switch pieces must be set to neat gage when installed. In fact, great care must be exercised to see that this part of the special work is kept to good gage even though the rest of the layout may be laid to the ¼-in.-wide gage now used by some makers of special work.

From the car maintenance end, it is important to keep a standard distance back to back of the wheels.

SAFETY INTER-CAR GATE AND STREET SEMAPHORE AT PORTLAND, ORE.

BY B. F. BOYNTON, CLAIM AGENT PORTLAND RAILWAY, LIGHT & POWER COMPANY

As shown in one of the accompanying illustrations, the Portland Railway, Light & Power Company has recently equipped all of its two-car trains with a collapsible gate which avoids accidents where people attempt to board the front car and fall between the two cars. As the train rounds a curve the gate closes up on one side and opens out on the other side. We are more than satisfied that this device will prevent many serious accidents. The view of the train connection also shows that we use a lamp over the exit step at the front platform as an aid to alighting passengers.



Safety Gates of Collapsible Type Between Vestibules of Two-Car Train, Portland

The other view shows a new signal that we are installing at dangerous street crossings. We call this the "wigwag" signal. It is painted red for easy observation in the daytime, while a red disk light in the middle makes it prominent at night. It is also fitted with a bell. When a car approaches a point within 1000 ft. of a protected crossing, the signal, which is painted "Look out! Stop!" begins to move backward and forward, the light burns and the bell rings. We got the idea of this signal from the Pacific Electric Railway, Los Angeles, Cal., and we think it is one of the best devices now available for the satisfactory protection of dangerous crossings.

LOOK OUT STOP
ERS GROCERS

"Wigwag" Signal to Give Visible and Audible Warnings at Perilous Street Intersections

A CAR CLEANER FORMULA AND A HOME-MADE VARNISH REMOVER

BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT ROCKFORD & INTERURBAN RAILWAY

The following formula has been found a very efficient and economical one for a car cleaner:

Dissolve 15 lb. of green-oil soap in 15 gal. of boiling water, add 30 gal. of mineral lard oil and 15 gal. of floated silica. Mix thoroughly. Always stir well before using. Apply with sponge and where necessary with a brush. Wipe perfectly dry with clean waste or cheesecloth.

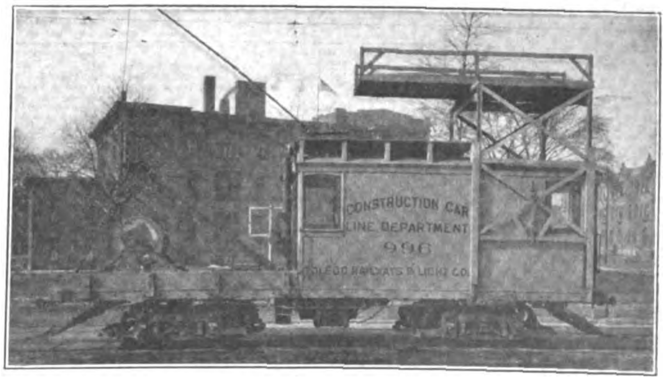
This formula was adopted by one of the large steam railroads after it had tried various cleaners on the market. It can be made for about 40 cents a gallon and is absolutely harmless to the finest varnish. In fact, it is beneficial to the varnish because it prevents checking. To obtain the best results the oil soap should be purchased from the Monahan Antiseptic Company, Chicago, and the lard oil from the Union Petroleum Company, Philadelphia, Pa., as by test these proved to give the best results.

Judging from our experience, the writer believes that other electric railways which use much varnish remover will find the application of the following formula to prove exceptionally efficient and economical: 1 gal. acetone, 1 gal. benzol and ½ lb. paraffin. These materials can be compounded at a cost of from 70 cents to 75 cents per gallon, as against $1.50 to $2 for most of the varnish removers on the market.

DERRICK LINE CAR WITH MOTORED TOWER, PUSH-BUTTON SIGNALS AND BREAKER LIFT CUT-OUT

An unusually effective line car, embodying both a derrick and a motor-operated tower, has been constructed by the Toledo (Ohio) Railways & Light Company after careful investigation of the good features embodied in the types used on other electric railways.

The Toledo line construction car includes a wooden underframe and floor, 30 ft. long x 8 ft. wide over all, 17 ft. of which is occupied by a cab and the remaining 13 ft. by a derrick and trolley wire reel jack. Doors at each end of this cab and on one side of the car floor permit poles to be transported by leaving both doors open. This allows poles longer than the car body to be handled, and as many as seven have been carried at one time.



Toledo Derrick Tower Car—View Showing Platform Raised and Addition of Derrick

As noted, the cab is 17 ft. long x 8 ft. wide, with an over-all interior height of 7 ft. 7 in. One side of the body is furnished with a telephone, a first-aid cabinet and a workbench equipped with a large vise and with drawers for tools. The wall space on the opposite side is occupied by large hooks on which the usual tackle and chains of a line car equipment are hung. The control equipment in the cab is arranged for double-end operation, each end being fitted with a controller and a motorman's air-brake valve.

While the design of the tower proper is not unusual, since it is of the ordinary Trenton type with a lifting range of 5 ft. 7 in., it is motor-operated by means of a worm gear and steel cables. One excellent feature is that the tower-operating motor is under the control of the motorman, who shifts its position as directed by a push button and bell signal operated by the man on the tower. Again, a good safety feature is that the lift of the raising mechanism is limited by equipping the mechanism with an automatic circuit-breaker which trips when the tower reaches its upper or lower limit. The tower platform is of the revolving type, reinforced by an over-truss rod. It is 14 ft. long x 8 ft. wide, thus permitting a lineman to work on the trolley wire over a parallel track when it has been revolved so that its length is at right angles to the car.

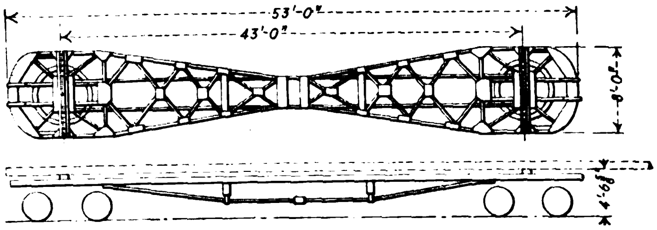
Toledo Derrick Tower Car—Interior View

This car body is mounted on Brill trucks equipped with two GE-57 motors and air brakes. Heat is provided in the cab by four electric car heaters. The derrick, which is also an unusual feature in cars designed for this purpose, is hand-operated by a two-handle winch. It was designed to lift 3 tons. The winch merely raises and lowers the boom, the load being elevated by means of a differential chain hoist swung from the outer end of the boom. The addition of the derrick to this car has materially increased its utility. Not only is it adaptable for loading poles and wire onto the car floor, but in emergencies it can be used for almost any purpase for which its capacity is fitted.

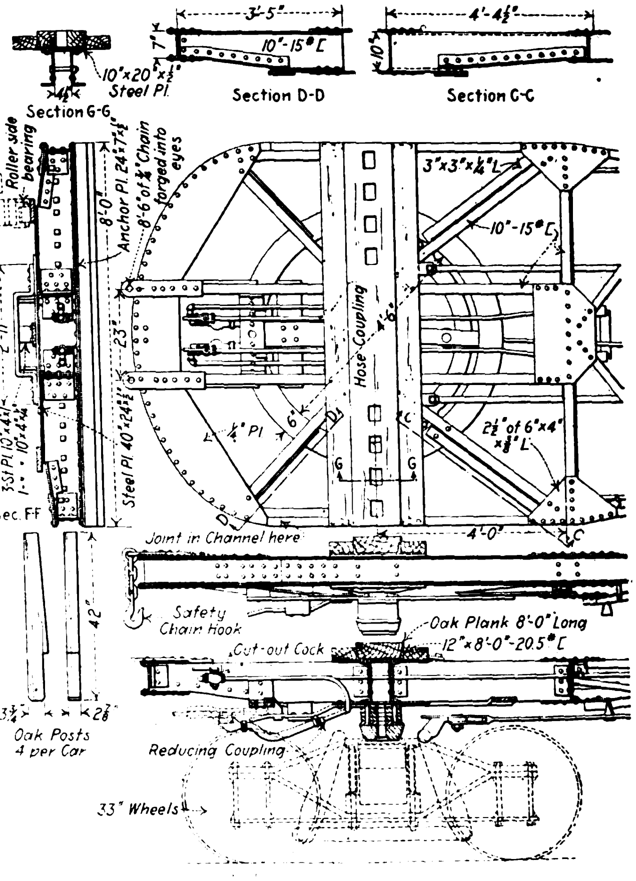
In service this car has proved very satisfactory in emergency repair and new construction work. It has been found, however, that about 10 ft. additional length in the car body would prove very advantageous, and that it would be desirable to increase the carrying capacity by equipping the car with heavier trucks and more powerful motors. These additional changes, it is believed, would make the car more adaptable for all conditions, although as it now stands it appears to embody more good features than any hitherto built by other electric railway companies. This car was designed by J. W. Sharp, general line foreman of the Toledo Railways & Light Company, assisted by L. L. Smith, designer, and constructed by C. A. Brown, master mechanic of the company.

A 25-TON RAIL CAR

The mechanical department of the Brooklyn Rapid Transit system has recently designed and built two structural steel rail-carrying cars of the unique hour-glass form shown in the accompanying drawings. The former rail cars consisted of the usual chained double truck, but this design has been superseded for the sake of greater safety and efficiency. As shown on the general plan, the trusses which constitute the framework are greatly narrowed toward the center so that the car, which is 53 ft. over all, will be able more readily to clear any poles, special work, etc., when carrying rails 60 ft. long. In general, this truss performs the work of a standard reach pole. The intermediate framing simply ties the structure together, as the load is taken by the bolsters. Perhaps the most interesting feature of the design is the use of a riveted circular side bearing of 5-ft. diameter which enables the truck to swing through an angle of 90. deg.



Plan and Elevation of Rail-Carrying Car, Showing Taper Toward Center



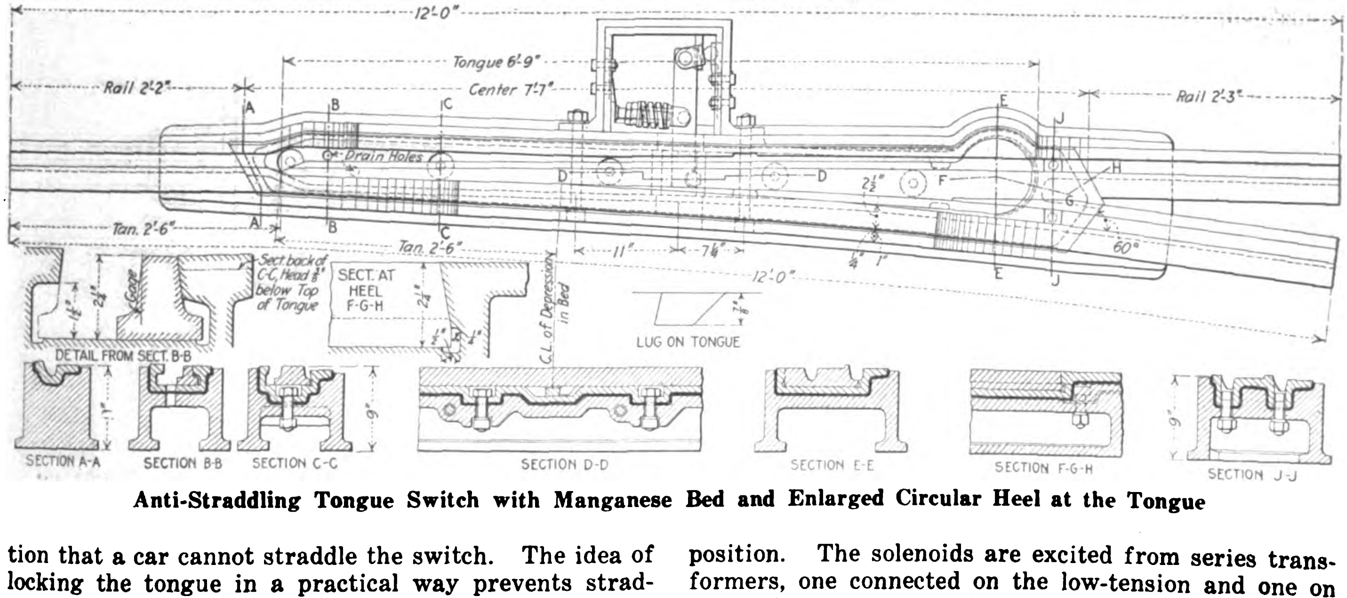
Detail of Rail-Carrying Car, Showing Circular Side Bearing

The car is built for trailer service. Its equipment includes semi-automatic air brakes, Peacock geared brakes and a safety chain in addition to the drawbar. As the swing of the trucks does not permit the use of a center lever, side-hung brake rigging with radius-bar operation is used. The car structure alone weighs 5000 lb., and with trucks and equipment complete, 20,000 lb. The maximum load of rail is 25 tons. The rails are carried on wooden platforms, provided with stake pockets as indicated. Section GG of the detail drawing shows the location of the shelf which has been provided for getting a purchase under the loaded rails with a crowbar to move them to the unloading skid. The rails will be lowered to the ground by means of structural skids, and the speed of lowering will be controlled by block and tackle mechanism, including hooks or other grappling devices for making connection to the rails on the skid.

IMPROVED ANTI-STRADDLING TONGUE SWITCH

The constant tendency on almost every electric railway to increase the size and weight of cars and the amount of service over a given piece of track has led the New York Switch & Crossing Company, Hoboken, N. J., to improve still further its well-known anti-straddling tongue switch. The anti-straddling device was first brought out by this company in 1905, and it has proved ever since to be one of the most meritorious features of its special work. The design illustrated embodies several important improvements to meet the present heavy day service.

The switch bed is manganese steel for the entire length of the tongue. The manganese tongue is heavily reinforced with an enlarged circular heel. It is absolutely pinless not only in name but in fact. There is no bolt, lug or other projection at the heel, and the bearing efficiency at this vital point is 100 per cent. The large end of the tongue cannot be driven down, as it rests on a perfectly level foundation of manganese steel. The wear between the tongue and the bed is therefore minimized. The spring mechanism in the switch box performs three functions. It holds the tongue back at the heel, down on its bed and locks it always in such a position that a car cannot straddle the switch. The idea of locking the tongue in a practical way prevents straddling and is an excellent example of the application of the "safety first" idea to track work.



Anti-Straddling Tongue Switch with Manganese Bed and Enlarged Circular Heel at the Tongue

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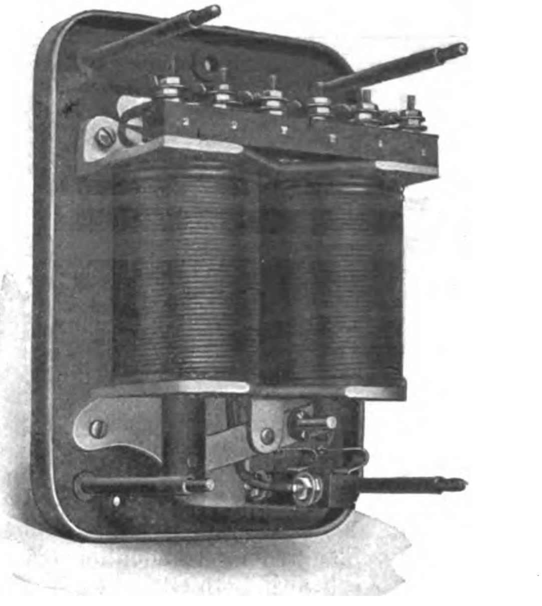
A recent report of the City Chamberlain of New York has recommended to the New York street cleaning department the method of snow cleaning used in Ottawa. He says that there an arrangement has been made with the street railway company to clean not only its roadway but the street surface for a distance of 14 ft. from the tracks. The work is done by an electric snowplow.

REVERSE-POWER RELAY

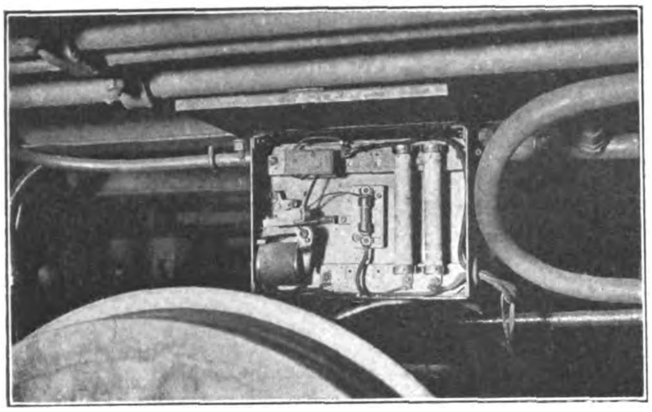
In the accounts given in this and preceding issues of the ELECTRIC RAILWAY JOURNAL of the progress in underground power distribution for electric railways the element most prominent has been the reverse-power relay. The lack of such a device until quite recently has made necessary the use of separate lines for individual rotary converters. Relays of this kind are desirable also between transformers connected in parallel in a bank. The Condit Electrical & Manufacturing Company, Boston, Mass., has recently brought out a relay for the latter purpose. The underlying principle is this: Two solenoids act on plungers connected to opposite ends of a lever which normally rests in one position. The solenoids are excited from series transformers, one connected on the low-tension and one on the high-tension side of a transformer. The connections are such that, under normal conditions, the pull of the two solenoids is balanced. If a short-circuit occurs between either series transformer and the main transformer, or in the main transformer, power flows into the short circuit from both sides and disturbs the balance in the relay. One solenoid overpowers the other and closes a switch carried by the connecting lever and operates the tripping coils on the circuit-breakers in the transformer circuit.



Relay with Cover Removed

OPERATING EXPERIENCES WITH AND IMPROVEMENT OF COASTING-TIME RECORDERS

The coasting-time recorder of the Railway Improvement Company, New York, was first placed in service in 1908 on the lines of the Interborough Rapid Transit Company. Since then its ability to cut down energy consumption and brakeshoe wear, aside from incidental savings, has resulted in its adoption on a large number of other railways, both city and interurban.



Installation Under Car of Relay Used in Connection with Coasting-Time Recorder

Although the coasting-time recorder "made good" from the start, its application to a wide variety of operating conditions showed that, like other human devices, it was subject to improvements in the light of greater experience. These improvements, as made, range from an entirely different scheme of clock operation to such minor matters as making the mechanism dustproof and more accessible. The following record of these changes shows how large a share the operator may have in helping the manufacturer perfect his product.

The one serious drawback of the original recorder was the possibility that a shrewd, unscrupulous motorman could make the machine record coasting time while the car or train was at a standstill. The reason for this lay in the fact that the circuits which controlled the starting and stopping of the clock movement were so interlocked with the master controller and air brakes that the recorder would continue to operate on line current as long as the brakes were not applied. Thus, by refraining from applying the brakes, the motorman could coast to a standstill at a station or in a blockade and keep the clock running by permitting only enough energy to pass through the controller for that purpose. If he overran his stop, he could simply reverse his controller to go back to it. In either case the coasting record was falsified. A similar trick was discovered on a surface line. On approaching the terminal, the motorman would permit his car to run to a friction stop, but as he did not apply the brakes, the trolley current still kept the recorder in operation.

The clock and its connections are now so arranged that the current can reach the controlling magnet on the clock movement only when the traction motors are running as generators, and this generated voltage during coasting furnishes energy for the clock magnet. The electric relay is so arranged that when the controller is "on" no current can possibly get through to the clock magnet from the traction motors. When the brakes are applied the clock circuit is opened. Consequently, a motorman must have the car moving without power or brakes on in order to get current into the magnet that operates the clock. It is therefore impossible for a motorman to coast to a standstill and obtain a fictitious record because the energy which operates the clock magnet ceases just when the motor stops.

On a straight-air-brake car the relay is installed at any convenient place, but where hand brakes are used exclusively the relay is installed under the car. A common method of installing the relay is shown below.

Another merit of the new scheme is that the clocks' operation does not require any line current, which is an economy of some importance on systems where hundreds of clocks are in use.

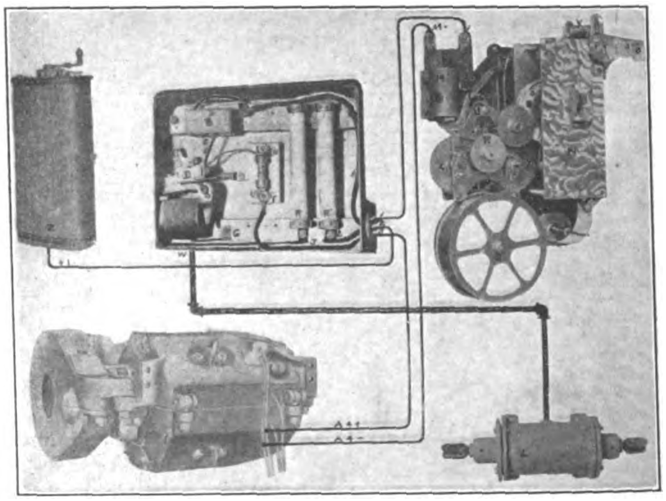
SPITTING
ON THE FLOOR, PLATFORMS
OR OTHER PARTS OF THIS CAR
IS UNLAWFUL.
OFFENDERS ARE LIABLE TO ARREST.
By Order of the Board of Health.

Recorder Reversed and Used as Health Sign

IMPROVEMENTS IN RECORD STRIPS AND CASES

The original form of tape record showed only the motorman's number and his coasting time. It was found that motormen would retain bad records until they could hand them in with the excuse that the record had been spoiled by some blockade. The new form of record shows not only the motorman's number but also that of the car on which the record was made. A motorman will not dare to hold this record back because other men might turn in records with the same car number at the same time. A most valuable by-product of the car number record is that the coasting efficiency of the cars themselves may now be compared. In fact, several companies keep coasting records on both the mechanical and human bases, so that they can now detect inferior running equipment as well as inferior men by the same means.

The tape on which the record is made was originally of one shade, white, throughout. Now the last 20 ft. are usually tinted pink so that when that shade appears the operating department can insert a new reel at once. Under the old scheme it was necessary for a man to inspect each recorder every day to care for replacements.



Connection of Coasting-Time Recorder and Its Relay with Motor Control and Air-Brake Equipment

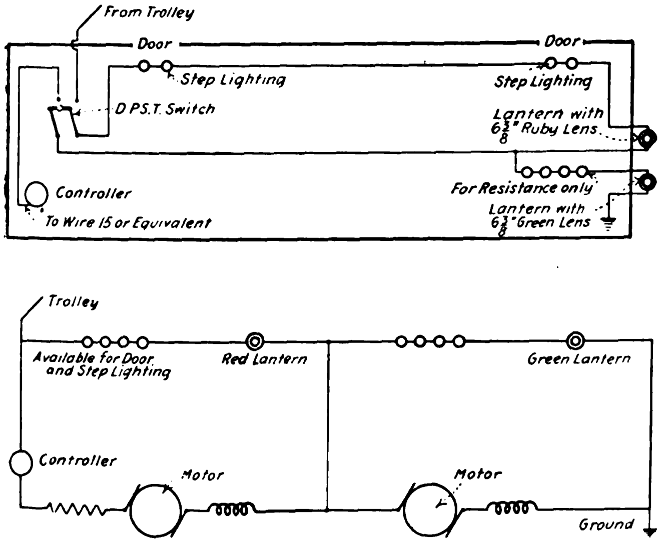
On a large railway like that of the Third Avenue Railway System, which operates several groups of lines under various conditions, differently colored tapes are used so that the record of lines in each group can be recognized at once. Again, in a city where more than one railway system is operated with coasting recorders, it is desirable to make the type used on the recording tape in different styles to prevent the possible exchange of records among the motormen of the different companies.

Wooden cases were used in the first recorders, but at the request of the Pennsylvania Railroad, which operates steel cars on its Long Island division, the recorders were furnished with steel cases to match. The British Columbia Electric Railway found, however, that these steel cases were not entirely dustproof under its operating conditions. It therefore installed weather stripping for the edgings and furnished the keyhole with a spring shutter which blocks the hole when the key is withdrawn.

The very latest improvement made in connection with this recorder is one suggested by the Third Avenue Railway. In the ordinary arrangement both the keyhole and the paper outlet are at the top of the recorder case. This location was rather inconvenient for most motormen. Greater accessibility was secured by reversing a balance weight in the armature so that the clock could be installed upside down. This brought the keyhole 8 in. lower than before; furthermore, the paper outlet was placed at the side instead of at the front of the case. These changes left the upper part of the clock free to be painted with a spitting sign by means of the "decalcomanie" system of cold transfer painting which is similar in principle to the transfer picture books so popular with children.

ELECTRIC TAIL LIGHT AND INDICATING TRAIN SIGNALS

A simple system to enable the motorman of a following car to distinguish the movements of the car ahead is the electric tail light and indicating signal equipment of the Nichols-Lintern Company, Cleveland, Ohio.



Diagrams of Signal Wiring for Single-End Car and of Its Relation to the Motor Circuit

The material consists of one or two lanterns, as the case may be, with safety fuses, switch, resistance units (lamps) and the necessary wire. Typical wiring plans showing the relation of this equipment to the other apparatus are presented in the accompanying cuts.

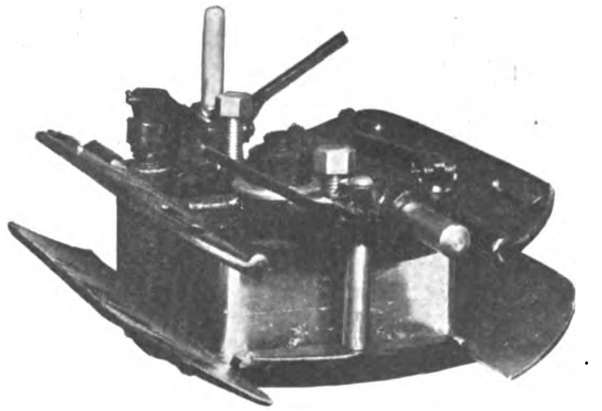
The Lintern signal is entirely automatic in operation. Its cardinal principle is that the character of the signal displayed depends upon the use of the different voltage combinations available on a car. The tail lamps are used in this way as speed indicators by the display of the red light alone at full voltage with the controller "off," of the red and green lights together at half voltage and of the green light alone at full speed with the controller "on."

The system, however, is not confined to the foregoing operations. For instance, the "power-on" signals can be displayed on full voltage at all positions except "off." Some operators prefer this modification as one desirable for lines with close headways. The "power-on" signal can also be operated in the daytime, and it is possible to use the "power-on" signal and the indicating tail light alone or together. As indicated in the diagrams some of the resistance lamps which are used in series with these signals may be used to serve other purposes, as for step lighting. With tail-light signals like these the motorman behind can follow the car ahead with increased safety at the least expenditure in power, braking and personal tension.

FORM FOR CURVED FIELD COILS

The accompanying illustration shows a form for winding the curved field coils of Westinghouse 38B, 49, 68 and similar motors as brought out lately by the Comstock Manufacturing Company, Wilkes-Barre, Pa. This form is exceptionally useful in that the coil is wound and formed to proper shape at the same time, so that no pressing is required. Ordinarily this type of coil is wound on a straight or flat form, and afterward it is pressed in its proper shape. The latter operation may injure the insulation and otherwise damage the coil. The Comstock form eliminates the danger of injured insulation and thus avoids a large proportion of short-circuits.

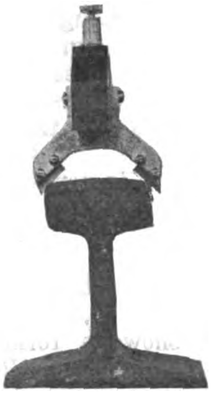
This form is made of bronze, with a parallel parting in the center. It is provided with two backing-off screws which permit the coil to be released after winding. To hold the wire in place while winding from the convex to the concave side of the form, an adjustable guide is provided on both ends. These guides are adjusted at each turn of the wire. Cam levers are used to hold the guides secure at each adjustment. The outer faces of these guides are convex to conform to the proper radius of the coil. Small flat springs are installed at each of the corners to hold the tape while it is being woven into the field and to hold it together after the coil is removed from the form. This manufacturer also makes a complete line of armature and field coil forms, including armature coil-pulling machines, strap coil forms and winding machines for either light or heavy work.



Form for Winding Curved Field Coils of Westinghouse 38B, 49, 68 and Similar Motors

BOND TESTERS WITH SAW-CONTACT BLADES

The Roller-Smith Company, New York, has improved its bond-testing apparatus recently, as shown in the accompanying views. The first illustration shows a section of rail and the new saw-blade contact on the contact bar. It can readily be seen that if the contact bar is moved backward and forward exactly as a saw is used, the contacts will saw right into the rail so that good contact is absolutely certain. Thus the saw blade is a great improvement over the old style where the contacts were dropped on the top of the rail and where there was sometimes difficulty due to the failure to establish proper conductivity. The other illustration shows the contact bar complete, together with the bond tester and the method of using this equipment.

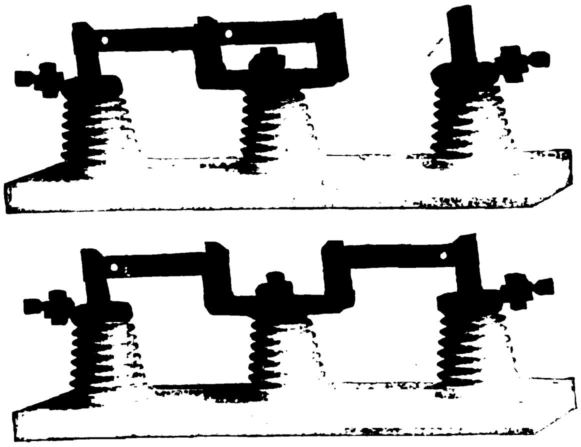


Saw Contact Blade

Making a Test

SELECTOR-TYPE DISCONNECTING SWITCHES

The selector type of disconnecting switch is a transfer switch which does not require the circuit to be interrupted while making a change. It can also be used to connect two independent circuits in parallel. However, it is not designed for opening under load, and therefore no attempt should be made to open it with current on the line. These switches are in effect two single-throw, single-pole disconnecting switches with the hinge jaws connected together and mounted on the same insulator. The hinge jaw is also provided with dummy jaws to hold either blade of the switch in the open position.



Selector Disconnecting Switch, Open and Closed

Two types of these switches are made by the Westinghouse Electric & Manufacturing Company. Type M is intended for wall mounting, the live parts being mounted on porcelain insulators carried on a cast-iron yoke or base. This forms a simple but substantial construction that is neat in appearance and moderate in price. All parts of this switch except the porcelain insulators are finished in black marine. Type D is designed for indoor mounting on marble bases or switchboard panels. It is made for either front or rear connection or for any combination of front and rear connection desired. The copper parts are dipped and lacquered.

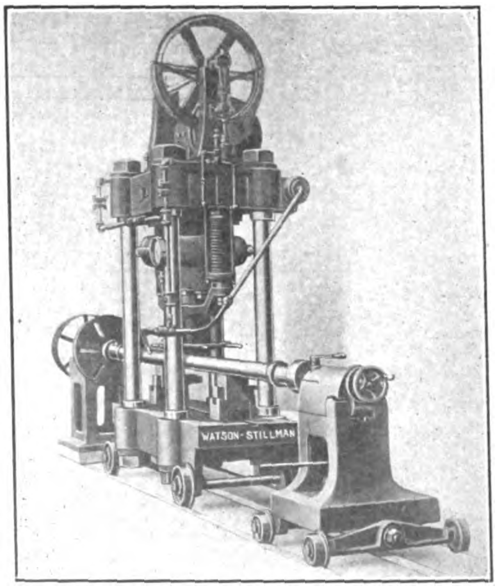
SHAFT STRAIGHTENING WITH A 325-TON HYDRAULIC PRESS

The Watson-Stillman Company, New York, recently produced a hydraulic press that has a capacity of 325 tons. This capacity is sufficient to take the bends out of any steel shaft up to 10 in. diameter, the length being limited only by the extent of the foundation provided. The new tool, as shown, is a motor-driven self-contained unit, requiring no outside air or hydraulic system. It has three independent parts, namely, the headstock, which is stationary, and the press and tailstock, which are on rollers to permit their adjustment to varying lengths of shafts.

The bed rails are flush with the floor so that when not in use the movable parts can be rolled to one side, leaving the floor clear of obstructions. The headstock and tailstock are similar to those of a lathe, except that the centers are hinged to follow the movement of the shaft ends when the bend is made.

The shaft is revolved from the headstock and the "high point" marked. The press is then moved to that point and the bending blocks are adjusted.

The ram has a maximum movement of 2 in., and screwed concentrically into it is a square-threaded adjustment screw which compensates for the different diameters of the shafts and also enables the operator to predetermine the flexure desired. This adjustment eliminates all danger of overbending.



Hydraulic Type Axle Straightener

The entire hydraulic power plant, including a 5-hp motor, pump, reservoir, etc., is mounted on the top platen of the press. The floor space required is 3 ft. 6 in. wide by the length of the shaft plus 6 ft. The total net weight of the press is 19,300 lb.

News of Electric Railways

The Detroit Valuation Report

The principal items in the report fixing the reproduction value of the physical property of the Detroit (Mich.) United Railway in the one-fare zone at $31,028,982, which was submitted to the Municipal Street Railway Commission on March 11, are as follows: straight track construction, $9,668,966; special track work, curves, etc., $1,785,220; cars, $7,736,345; land, $2,989,318; paving, $1,154,720; buildings other than power, $1,943,033; overhead feeder lines, $1,034,838; power stations A and B and power department buildings, $2,583,818.

The appraisal does not include franchise values, material on hand or a number of construction works under way. As noted in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, the company estimates that the reproduction value will be between $36,000,000 and $37,000,000, franchises included, when final. No attempt was made by the company to determine the amount of depreciation from the figures submitted, it being assumed by the company that that work can be best undertaken in connection with the investigation of the engineers to be appointed to represent the city.

The present appraisal is practically $5,000,000 greater than the appraisal submitted to the committee of fifty in 1909. The company explains, in *Electric Railway Service*, its weekly publication, that the increase is due to the construction of several miles of new track, the replacement of many miles of track with new rails and foundation, the purchase of much additional real estate, the erection of new shops and the purchase of several hundred new cars including all the pay-enter cars now in use.

The company has been asked to indicate formally to the Street Railway Commission the selling price of the property. What this price will be when depreciation is allowed is a matter of conjecture at this time. It is not expected that any important action in connection with the appraisal will be taken until such time as the commission appoints its engineers to make an appraisal for the city.

Conferences are being held between the members of the Municipal Railway Commission and F. W. Brooks, general manager of the Detroit United Railway, in regard to the construction of a new cross-town line over a route the details of which have yet to be determined. The line will be practically 2 miles north of the existing east and west cross-town lines and will connect with the proposed Junction line on the east and the Harper line on the west, making an outer belt which would be of great assistance in relieving downtown congestion. Under the low-fare agreement of Aug. 7 the company is supposed to extend the Kercheval line and effect a connection between the Mack and Myrtle lines, but the cross-town line is suggested as an alternative for the extension named in the agreement.

Increase in Stock of Cleveland Company Authorized

The Public Utilities Commission of Ohio has granted permission to the Cleveland (Ohio) Railway to issue $2,141,100 of stock to be sold at not less than par to provide funds to build extensions and make other improvements which have already been noted in the ELECTRIC RAILWAY JOURNAL.

W. R. Hopkins of the Cleveland Underground Rapid Transit Company promises that work on the proposed underground railway will be begun by Jan. 1, 1915. Councilman Stolte had prepared an ordinance for submission to Council, repealing the grants to the company, and he, in company with Assistant City Solicitor Joseph Hostetler, called upon Mr. Hopkins in connection with the matter. Mr. Hopkins told the city officials that $100,000 had been spent upon the plans and investigations. Peter Witt, street railway commissioner, is opposed to the repeal of the grant. He says that underground tracks would relieve the surface lines of much of their long haul and reduce the company's expense. It is probable that the proposed ordinance will be held up until the first of the year in order to give the company an opportunity to carry out the promise made by Mr. Hopkins.

An employee of the Cleveland Railway was arrested on March 12 on the charge of robbing fare boxes. He had been under suspicion for some time and at last was found selling tickets at Superior Avenue and East Fifty-fifth Street. This man had access to the room in which the magazines are kept after being taken from the fare boxes at night.

J. J. Stanley, president of the Cleveland Railway, and Peter Witt have inspected the new double-deck car which is being operated in Columbus. This car was described and illustrated in the ELECTRIC RAILWAY JOURNAL of March 14, 1914.

Strike on Local Terre Haute Lines

The Amalgamated Association called a strike of the city car service men in Terre Haute, Ind., on Saturday night, March 14. Only three men left their cars, but riotous mobs dragged crews from the cars and broke windows. Cars were operated under police protection in the city, but the police would not permit passengers to ride and even compelled passengers on the interurban cars to alight at the city limits. The company operated its cars all day Sunday, with the regular crews, but the authorities still refused to allow the company to carry passengers.

Judge Baker of the Federal Circuit Court sent deputy United States marshals to Terre Haute to serve summonses on the various labor leaders to appear before the Federal Court at Indianapolis on March 16 to show cause why they should not be held in contempt of court. The complaint shows that the strike is in violation of the agreement of Jan. 3, on the hearing in the Federal Court at Indianapolis of the petition of the Fidelity Trust Company for an injunction against certain labor leaders and officials of the Amalgamated Association, who it was charged were attempting, in violation of the company's agreement with its employees, to cause a strike which would imperil the property of the company in Terre Haute. The labor leaders declared they were not responsible for the strike and that it had no official sanction.

On Monday, after the hearing in the Federal Court at Indianapolis, Judge Baker issued an injunction forbidding the employees of the Terre Haute, Indianapolis & Eastern Traction Company who have entered into an agreement for the arbitration of differences from going on strike or quitting work in a body. It also enjoins all the labor leaders mentioned in the complaint, and a number of union employees, from in any way coercing or attempting to induce the employees of the company to strike or quit work. It further enjoins any and all persons from gathering in the streets for the purpose of interfering with the operation of cars.

M. L. Clawson, the labor attorney, stated in defense of the labor men that the signature of the employees to the contract made with the Governor which stipulated that no strikes were to be called had been obtained under duress, and that the company had broken the contract by discharging men because they had joined the union. Judge Baker offered to go to Terre Haute and investigate the matter. He said, however, that even admitting Mr. Clawson's statement that some men were discharged, the contract between the company and the men was broken only in regard to these one or two men, and that it was still in full force and binding on the majority of the employees. Judge Baker contended that a contract such as that made between the company, the employees and Governor Ralston has full force in the eyes of the law and that the labor men are compelled to respect it. On the question of responsibility for violence, Judge Baker said that the labor leaders could be held for the acts of rowdyism of crowds on the streets unless they took affirmative action to discountenance the strike.

There were no further acts of violence on Monday, and Monday evening the city authorities stated that passengers would not be further prevented by the police from riding on the cars in Terre Haute. On Tuesday, March 17, the company resumed operating its full schedule of cars in the city with regular crews.

The Public Service Holding Company

A series of ten lectures is to be delivered before the public utility section of the West Side Branch of the Young Men's Christian Association of New York on successive Monday nights. The public utilities will be dealt with from the standpoint of their relation to the consumer, the State and the investor, and the speakers, as previously announced in the ELECTRIC RAILWAY JOURNAL, will include some of the foremost men in their respective lines of endeavor. The first lecture, which was introductory in its character, dealt with the magnitude of the public utility business. It was delivered on March 9, 1914, by T. Commerford Martin, secretary of the National Electric Light Association and special officer of the United States Census Bureau. Mr. Martin traced the development of the electrical industries from 1877.

The speaker on the evening of March 16 was Francis T. Homer, of Bertron, Griscom & Company, New York, N. Y., bankers. His subject was "The Holding Company." Mr. Homer said that the first notable holding company was the Northern Securities Company. This company was organized to control and dominate two parallel railroads and its purposes were altogether different from the motives which have prompted financiers to organize holding companies in the public utility field. Public utilities were a natural monopoly and separate companies were undesirable. Mr. Homer illustrated this point by referring to two gas companies operating in one community with duplicate plants. The cost of duplication had to be met ultimately by the consumer. A public utility was obligated to provide good service whether or not requirements as to service were written into the franchise or operating grants. Unfortunately holding companies which controlled interests in fields of business where restraint was harmful, were not differentiated from the class of holding companies dealing in lines where the accumulated power thus secured could not be used except for good, instead of evil. Such were the holding companies that have been becoming more and more popular and effective in meeting the requirements of public service corporations. So far from holding companies in this line of activity endeavoring to become interested in competitive situations and thereby restrain competitive activity, the purpose of the holding company was to acquire interests in companies widely distributed, serving different communities and localities, so that, through the joint control and management, the aggregate result would show not isolated conditions of prosperity or depression, but the more stable average incident to serving widely separated communities.

Mr. Homer said that the arguments most frequently advanced against the holding companies were that they were likely to be over-capitalized; that investors were likely to be misled by holding company financial statements; that holding companies acquired only the majority of stock in the separate companies and worked to the detriment of the minority holders, and that the owning company was out of touch with local spirit. The charge of over-capitalization was not well founded. In the case of holding companies the various issues of bonds and the preferred stock were placed with the public while the bankers or organizers accepted the common stock or prospects as their share in participating in the merger. The holding company must of necessity be capitalized conservatively or the failure to earn a return on the preferred stock or the bonds would result automatically in the organizers of the company losing their control over the property. Even under the adverse conditions of 1913 only one large holding company became involved in financial difficulties. This company embarked in irrigation projects—a work beyond its province.

In regard to the likelihood of people being misled by holding company financial statements, Mr. Homer said that complete statements of the stocks and bonds owned by holding companies were more frequent in their reports than were summaries of the properties of the railroads in their reports. In regard to holding companies acquiring only a majority of stock of the companies which they desired to take over, Mr. Homer said that an effort was usually made by the holding company promoter to acquire all of the stock of the companies to be taken over, but that holders of stock in the companies to be taken over frequently demanded an excessive price for their stock. In regard to the officers of the holding companies being out of touch with local spirit in towns in which their subsidiaries operated, Mr. Homer said that the reverse was a fact. The officers of public service holding companies realized that it was essential to have local men interested in the subsidiaries and that such local men could not afford to remain directors if the property was mismanaged because the reflection would be directly on them.

He summarized the advantages of the public service holding company as those that result from combined operation, purchasing and financing. In the holding company operating competition was comparative. The results obtained by resident managers of subsidiary companies were compared not with one or two other companies, but with many other similar companies, depending on the size of the holding company and the number of its subsidiaries. Nowhere else was there the same chance for advancement for men as with a holding company. The officers and directors were experts and made the business their lifework. On the other hand, in independently operated companies, particularly in cities of moderate size, the principal officers of the utilities were usually interested in them merely as an incident to some other business. Comparisons of service and management of two cities of the same size in one of which a holding company operated and in the other an independent company showed that the service and management in the city in which the holding company operated were better than in the city in which the independent company operated.

The speaker said that the engineers connected with holding companies planned for standardization and were necessarily familiar with conditions which confronted the separate local companies and were better fitted on that account to make recommendations than were outside consulting experts even if the independent company could afford to hire the best engineering talent. In the case of the floods in Ohio and Indiana last year, the subsidiary companies of the holding companies had experts at their service at once, whereas the independent companies had to compete for competent help in a market already depleted. The same advantages of organization obtained as regards the legal end. Management organizations had similar advantages to the public service holding companies except as regards finances and the marketing of securities. The large issues of the securities of the holding companies necessarily commanded broad markets. Mr. Homer closed his remarks with references to the relative increases in population of cities and in the gross receipts of public utility companies. He estimated that between $500,000,000 and $600,000,000 a year would be needed by the public utilities for each of the next five years to meet natural growth.

Government Ownership of Telephone Lines

In the annual report of the American Telephone & Telegraph Company for the year ended Dec. 31, 1913, Theodore N. Vail, president of the company, discusses very definitely the general subject of government ownership. In summing up the attitude of his company toward this subject, Mr. Vail says in part:

"Our opposition to government operation and ownership is prompted because of our interest in the upbuilding and preservation of a great public utility. The efficient operation of every utility is necessary to the public and efficient, progressive or permanent service cannot be rendered by companies not making a fair profit. No government-owned telephone system in the world is giving as cheap and efficient service as the American public is getting from its telephone companies. We do not believe that similar service furnished by our government would be an exception."

Mr. Vail raises the question whether government operation should be maintained out of its own revenue or whether the properties should be operated at a charge on the general revenue at the cost of the whole public for the benefit of a part. There may be some things which should be made free and convenient for the whole public, even at the expense of the public revenue, but the telephone and telegraph are not among them.

Mr. Vail continued in part as follows:

"A thorough study of all available reports and official information on the operation of government owned and operated telephones and telegraphs shows that the combined telegraphs and telephones are without exception operated at a deficit. These deficits are not the result of a definite policy to give a cheap service to individuals at the cost of all, but are due to errors in management, such as underestimates of values and cost of new construction, disregard of maintenance and depreciation and particularly of obsolescence, impossible theories of operation, and a mistaken policy founded on promises, prophecies and assertions exactly the same in character as those now being used to bring about government ownership in this country. There are no sound reasons given for real advantages promised for government ownership and operation which do not apply to or cannot be secured by government regulation."

Progress with New Haven Segregation Negotiations

It is understood that at the conference in Washington on March 14, 1914, between the representatives of the federal Department of Justice and the officers of the New York, New Haven & Hartford Railroad the latter agreed that the electric railways in Connecticut should be placed in the hands of trustees. The conference was to be resumed on March 21. There is no foundation for the statements made unofficially following the conference on March 14 that new demands have been made on the company by the department. In this connection Attorney-General McReynolds authorized the following statement:

"Several newspapers have published statements to the effect that in the pending negotiations between the Department of Justice and the New Haven Railroad the government is making new demands upon the New Haven company not covered by the general agreement reached on Jan. 10, 1914; that it is demanding that the New Haven part with its holdings in dock and wharf properties at New Haven, Providence, Fall River and other Sound and river ports in New England, and that the department is attempting in the pending negotiations to recede from the general understanding that the Interstate Commerce Commission shall pass upon the right of the New Haven to retain its Sound lines. There is no foundation for these statements and this intimation."

Administration Holding Company Bill Made Public

On March 17, 1914, Judge Henry D. Clayton, chairman of the House committee on the judiciary, made public the text of the administration bill relating to holding companies. The bill provides that it shall be unlawful for any corporation engaged in interstate or foreign commerce to acquire directly or indirectly the whole or any part of the stock of another corporation also engaged in interstate and foreign commerce where the effect of such acquisition would be to eliminate or lessen the competition existing between the two companies or to create a monopoly of trade in any community. The bill exempts from its provisions corporations that purchase stock solely for investment and do not use the same by voting to diminish existing competition. It is stated furthermore that nothing in the act shall be taken to prevent a corporation from causing the formation of subsidiary corporations for the actual carrying on of its lawful business or from owning and holding all or any part of the stock of the subsidiary corporations when the effect of the formation is not to eliminate or lessen pre-existing competition.

The House committee on interstate and foreign commerce has prepared a bill which will be incorporated in the antitrust program of the administration in place of the Sims bill, which provides for the regulation of railroad capitalization. This newer bill provides that every dollar borrowed, paid, earned and spent shall be accounted for to the Interstate Commerce Commission and that the commission may regularly make public the facts procured from the companies. It contains a provision which greatly extends the powers of the commission in regard to its right to prescribe what information annual railroad reports should contain, particularly with reference to the issuance of new securities. The only part of the measure that has been criticised by any members of the committee is the paragraph which makes the publicity discretionary with the commission, some of the members insisting that it should be mandatory. The bill was prepared with the assistance of Interstate Commerce Commissioner B. H. Meyer.

Public Service Commission Upheld

The Court of Appeals of New York handed down a decision on March 17, 1914, sustaining the appeal of the Public Service Commission of the Second District of New York, in the matter of the joint application of the Westchester Street Railroad and the New York, New Haven & Hartford Railroad. The Westchester company was organized to take over the property of the Tarrytown, White Plains & Mamaroneck Railway sold at public auction in foreclosure of a mortgage. The New York, New Haven & Hartford Railroad owned 247 out of 300 bonds of $1,000 each against the Tarrytown Company and it purchased the principal part of the property, paying therefor $912,023. Application was made by the Westchester company and the New Haven company for a stock issue to that amount, but the commission found the value of the property to be only $434,067 and limited the stock issue to that sum. The Westchester and the New Haven companies took the matter before the Appellate Division upon a writ of certiorari, and the Appellate Division annulled the order of the commission and directed it to sanction the issue of the full amount of stock prayed for. The Court of Appeals has reversed the Appellate Division, holding that under the circumstances of the case the amount paid for the property was not controlling upon the commission, and sent the matter back for further hearing, giving all parties the right to introduce further evidence as to value.

Northampton Arbitration Hearing

The arbitration board sitting in the Northampton (Mass.) Street Railway wage increase controversy began its hearings on March 15 in the Superior Court room in Northampton. The full board was present. Martin J. Hennessey, Springfield, Mass., represented the employees; T. G. Spaulding, Northampton, represented the company, and City Solicitor Thomas McDonald, Chicopee, Mass., was the third member. E. L. Shaw appeared as counsel for the company, with L. D. Pellissier, general manager, and H. J. Campbell, cashier. J. H. Reardon, Worcester, Mass., represented the Amalgamated Association. The employees' case was first considered. It was stated that the men desire a wage scale of $2.50 per day for motormen and conductors for the first six months' service, $2.75 for the second six months, and $3 thereafter, other employees to be granted an increase of 10 per cent.

Testimony was chiefly confined to evidence regarding the increased cost of living in the last few years, the contention being that a family of five could not be supported adequately in Northampton on less than $963 a year. Mr. Spaulding pointed out that the men are living on less than this wage at present. Comparisons of wages in other occupations were submitted, those selected having shorter hours and higher pay than work on the company's lines. Under the present schedule of wages, first-year men are paid 21 cents an hour, with increases to 26 cents beyond the fifth year. The average earnings of forty-nine men have been $2.40 a day or $876 for 365 days' work. With one day off a week the average earnings are $751.20. The present compensation is as follows for different groups of men: Twenty-two men receive $2.60 per day; three receive $2.45; five $2.40; six $2.30; one $2.25; twelve $2.10. From Jan. 1 to Feb. 12 last the average fares collected by a conductor were $25.33 a day. The gross revenue of the company increased 20 per cent between 1909 and 1913; the passengers per car-mile increased 17.35 per cent, and the net operating revenue increased by $51,452 between 1909 and 1913. Detailed testimony was also presented bearing upon the duties of conductors and motormen and the contention was made that the maximum rate of pay should be reached in one year instead of in six. It was brought out by the company that those supporting the plan to have the wage schedule work up to the maximum in one year knew of no other company which paid its highest wage at the end of twelve months.

Cedar Rapids & Iowa City Railway Opens Extension

The Cedar Rapids & Iowa City Railway, which operates between Cedar Rapids and Iowa City, Ia., has completed an extension of some 15 miles to Mt. Vernon, northeast of Cedar Rapids. A special excursion train consisting of four cars was run over the line on March 11.

The road from Cedar Rapids to Iowa City has been in operation since September, 1904. This portion is some 30 miles in length. The road now connects two college towns with Cedar Rapids, which has a population of about 35,000. Iowa City, the home of the State University of Iowa, is a town of 10,000 inhabitants. At the other end of the line is Mt. Vernon with a population of 1500, and an additional student population of 600 or 700 attending Cornell College. The resultant student passenger traffic is very large.

The new line parallels the double-track main line of the Chicago & Northwestern Railroad from Cedar Rapids to Mt. Vernon, but the interurban has the shorter route by 1 mile. The station of Bertram and the proposed new towns of Trachta, Gardendale, Palisades and Cornell are between Cedar Rapids and Mt. Vernon. The sites are platted for most of these places. When all adjustments are made, hourly service will be established from Mt. Vernon through Iowa City. A shuttle service is now operated between Cedar Rapids and Mt. Vernon. The line is to be extended from Mt. Vernon to Lisbon, Ia., 2 miles. There is a bridge 500 ft. long over Big Creek. The station in Vernon is in the center of the city.

Progress on the Line Between Kalamazoo and Grand Rapids

All the grading on the new line of the Michigan & Chicago Railway has been completed from Kalamazoo, Mich., to the junction of the Grand Rapids, Holland & Lake Michigan Railway near Grand Rapids. The exact location of the carhouses and the shops in Grand Rapids has not yet been made public. Towers for carrying the high-tension wire have been placed along the route and the third-rail equipment is being distributed. The work of completing the tracklaying will be taken up before April 1, weather permitting. The electrification of the Allegan & Battle Creek line, crossing the main line at Montieth, is under way. It is intended to connect the Kalamazoo-Grand Rapids line with the lines via Flint, Saginaw and Bay City. The Michigan & Chicago Railway will probably arrange with the Michigan United Traction Company, operating from Kalamazoo to Jackson and Lansing, for linking these lines. The Michigan State Railway Commission has under consideration the application of the Michigan & Chicago Railway for permission to issue $1,000,000 of bonds and $1,000,000 of stock to take over the Saginaw & Flint Railway. The contracts which have been placed with the General Electric Company by the Michigan & Chicago Railway for equipment call for twenty four-motor, 2400-volt car equipments, thirteen 500-kw motor-generator sets, eight 500-kw rotary converters and one 7500-kw turbine and switchboard equipment.

Municipal Ownership Vote in Menasha.—The Common Council of Menasha, Wis., has passed a resolution to submit the question of purchasing the property of the Wisconsin Traction, Light, Heat & Power Company in Menasha to a vote of the people at the spring election.

Utility Commission Recommended for Cincinnati.—A public utilities commission, composed of three members appointed by the Mayor, with almost autocratic powers, has been recommended by the committee on public utilities and franchises to the Cincinnati charter revision commission.

Hearing on Uniform Accounts in Missouri.—April 15 has been set as the date for a hearing at Jefferson City, Mo., where a system of uniform accounting will be discussed by the Missouri State Public Utilities Commission and representatives of utilities, both municipally and privately owned.

Railway Company Awarded Power Contract.—The contract for furnishing current for the operation of the railway systems in the central portion of Dayton, Ohio, was awarded to the Dayton City Railway on March 12. It covers a period of ten years and involves an aggregate of $300,000. The plan was evolved through a desire to eliminate the network of wires at the street crossings in the central portion of the city.

Estimate of Cost of Municipal Line Between Pasadena and Los Angeles.—D. J. MacPherson, the engineer who was engaged by the city to make a preliminary survey of the proposed municipal railway between Pasadena and Los Angeles, Cal., via the Arroyo Seco Canyon, has submitted the results of his survey to the board of city commissioners. According to Mr. MacPherson it will cost $2,089,164 to build and equip a new line between the two cities. The length of the line will be about 10 miles.

Decision in Arizona Extension Case.—The Phoenix (Ariz.) Street Railway was ordered some time ago by the State Corporation Commission to double-track a portion of its line extending ten blocks and connect with another portion in the business section already having a double track. The company applied for an injunction to prevent the commission from enforcing the order. The United States District Court has refused to grant the injunction and has declared that the order was not an unreasonable one.

English Municipal Trading Undertakings.—United States Consul Halstead, at Birmingham, Eng., has prepared a report concerning the results of municipal operation of public utilities in English cities. It covers the street cars, gas and electric lighting, water, markets, etc., and shows the profits and losses, rates levied for all the different purposes, etc., in the cities of England and Wales. The report was transmitted by the Department of Commerce to Congress, and has been printed as House Document No. 710.

New Pittsburgh Subway Ordinance Drawn.—A new ordinance authorizing the construction of a subway system in Pittsburgh, Pa., was submitted to the members of Council for their inspection at the meeting of the committees on March 11, 1914. The measure was drawn by Assistant City Solicitor C. K. Robinson and it was expected that it would be introduced at the meeting of the Council on March 17. The bill is in blank as to the route of the subway, and also as to the name of the company to which the grant is to be made.

Price of Union Street Line, San Francisco, Fixed.—The price to be paid for the Union Street line, San Francisco, Cal., which the city purchased from the Presidio & Ferries Railroad, has been fixed at $312,322 by City Engineer O'Shaughnessy, of San Francisco, and T. C. Mullen, the company's representative. The company received $50,000 of the amount when the agreement to purchase was made, leaving $262,332 due, with an additional allowance of $3,483 for interest at 5 per cent for ninety-seven days from Dec. 10, 1913, when the road was taken over for operation by the city.

Resolutions of Railway Business Association.—At a meeting of the executive committee of the Railway Business Association held in Chicago on March 18, 1914, resolutions on the death of Mr. Westinghouse were unanimously adopted. The resolutions referred to Mr. Westinghouse's invention of the air brake which "accelerated immeasurably the growth of the country and its transportation system." It also referred to his achievements in other fields. Resolutions were also adopted on the death of E. L. Adreon, who had been an executive member of the association since its organization.

Provisions of Interstate Trade Commission Bill Decided Upon.—The bill providing for the creation of an Interstate Trade Commission was agreed to by democrats and republicans of the House committee on interstate commerce on March 16, 1914, and favorably reported to the House. The measure, which would create a new commission to take over the powers and duties of the present Bureau of Corporations, has been submitted to the full committee by the subcommittee which framed it, made up of democrats and republicans, of which Representative Covington, of Maryland, was chairman.

Report Regarding Increase in Fares on Toronto Civic Lines.—Commissioner of Works Harris of Toronto, Ont., reports the deficit of the Toronto Civic Railway Lines for 1913 to be $84,712. In consequence, the advisability of increasing the fare has come before the transportation committee of the Board of Control and rates of fare have been suggested by members, varying from 5 cents and six tickets for a quarter to three tickets for 10 cents and ten tickets for a quarter. It has finally been decided to have Mr. Harris report on the receipts likely to accrue from the operation of the civic lines at 3-cent, 4-cent and 5-cent fares, respectively.

Amortizing Excess Capitalization.—At the suggestion of the Public Service Commission for the First District of New York the Brooklyn Borough Gas Company has voluntarily agreed to write off $428,428 of its excess capitalization. It proposes to charge off at once $178,428 and to amortize the remaining $250,000 by setting aside each year a special fund equal to 5 cents for each 1000 cu. ft. of gas sold during the year. In a rate case conducted by the commission, it was found that the company's capitalization was in excess of the fair value of its property, and Commissioner Milo R. Maltbie, who conducted the rate case, suggested to the company the advisability of revising its balance sheet for this purpose.

Decision in Dallas Fare Case.—On March 4, 1914, the Texas State Supreme Court declined to grant the application of the city of Dallas for a writ of error to review the decision rendered by the Court of Civil Appeals of the Fifth District on June 14, 1913, in favor of the Dallas Electric Corporation. As noted in the ELECTRIC RAILWAY JOURNAL of June 28, 1913, page 1173, the decision of the Fifth District Court was an affirmation of a decision by Judge Foree of the Fourteenth District Court, who granted an injunction restraining the enforcement of the initiative ordinance passed at the special election on April 2, 1913, providing for the sale of seven tickets for 25 cents and for 3-cent fares where passengers had to stand.

Bids Opened for New York Subway Section Contract.—During the week ended March 14, 1914, the Public Service Commission for the First District of New York opened bids for the construction of Section No. 6-A of Routes No. 4 and 38, the new Seventh Avenue subway in Manhattan. The lowest bidder was the Oscar Daniels Company at $305,261. The Rapid Transit Subway Construction Company, which is owned by the Interborough Rapid Transit Company, was the third lowest bidder at $498,038. The chief difference in the bids was for the item of protecting the existing subway and the safety of the passengers and other persons therein, for which the Daniels Company bid $12,000 and the Rapid Transit Subway Construction Company $135,000. The commission has received a letter from the Interborough Rapid Transit Company asking to be heard before the commission awards the contract.

Employees Petition Commission.—The Public Service Commission of the Second District of New York has been petitioned by the secretary of the joint conference board of the Amalgamated Association in regard to the complaints of representatives of eleven cities of the State in relation to improvements in the operation and equipment of cars. A conference with this board was held by the commission on Jan. 20, 1913, at which various matters connected with the comfort and safety of street railway employees throughout the State were discussed. The number of employees represented in the joint conference board, parties to these complaints or requests, totals 6000. The improvements which they desire are as follows: the vestibuling of all closed cars on conductor's end, a vestibule or storm front to be placed on all open summer cars, all cars to be equipped with sand boxes and sand levers placed uniformly on all cars, uniformity in the placing of fender plunger and motormen's gong plunger on all cars, air brakes to be placed on all double-truck cars, elimination of the running board on all open summer cars, stools to be permitted for the use of motormen, seats for conductors on pay-as-you-enter cars, a place to be provided on interurban cars for conductors' signal lamps when not being used, block system on all interurban lines, a uniform headlight for city cars.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CANADA

It is understood that the Canadian government intends to introduce a special bill in the Canadian Parliament dealing with the subject of the control of the capitalization and bond issue of railway companies, instead of incorporating this in the new consolidation of the railway act. Hitherto it has been the practice to include in each act of incorporation a special provision dealing with the capitalization and bond issue of that particular railway.

MASSACHUSETTS

The Boston Transit Commission sent a special report to the Legislature this week answering inquiries of Representative McInerney regarding the personnel and work of the board. The commission held 121 meetings in 1913, averaging three hours in length. Much of the work is done outside the meetings, including views of subway construction, conferences with the Boston Elevated Railway, with public officials, contractors and others. Chairman Swain contends that a board of five members meets the varied demands more efficiently than the suggested commission of three. The committee on street railways has reported leave to withdraw the bill prohibiting the placing of boxes or other obstruction on the running boards of open cars. The committee on railroads has reported leave to withdraw the bill authorizing the employment of auditors to be at the service of petitioners to the Public Service Commission in certain cases, and has reported adversely on the bill establishing a commission on a tunnel to connect railroad systems entering Boston.

NEW YORK

Governor Glynn signed the workmen's compensation bill on March 16, 1914, and sent to the Senate nominations for four of the five places on the commission to administer the law. The constitutionality of the workmen's compensation act passed last December had been questioned, so, at Governor Glynn's request, the present Legislature re-enacted it, with one change—the Assembly amended the bill by providing that not more than three of the commissioners should be of one political party.

The policy of having the State develop its own water-power resources instead of leaving that work to private enterprise is recommended strongly in the report of the Velte legislative committee submitted to the Legislature on March 12. This committee, appointed a year ago to investigate the present diversion and potentialties of the Niagara River water-power resources, does not commit itself to any particular development scheme, but commends on broad lines the Velte bills now pending, which embody the State-developing plan recommended by Governor Glynn.

It is understood that the Assembly ways and means committee has decided to disregard the resolution providing for an investigation of the Public Service Commission of the First District.

The following bills have been introduced in the Senate: To amend the labor law in relation to sanitation in mercantile establishments; to amend the rapid transit act of 1891 with reference to securing work and materials, with reference to security, with reference to contracts for limited amounts, and with reference to the acquisition of property; to amend the public service commissions law in relation to the issue of stocks by railroads and street railroads; to amend the laws in relation to the completion and operation of certain street service railroads; to amend the railroad law in relation to heating cars propelled by gasoline or oil engines; to amend the railroad law in relation to consolidated corporations; to amend the railroad law in relation to the minimum number of employees to be employed in the operation of street service railroads; to amend the public service commissions law in relation to the interchange of transfers between certain railroads in cities of the first class.

The following bills have been introduced in the Assembly: To amend the public service commissions law in relation to the suspension of orders of the commission and power of the commission to suspend rate schedules; to amend the railroad law in relation to rates of fare on certain railroads; to amend the penal law in relation to advertising for laborers during strikes or lockouts; to amend the public service commissions law in relation to the free transportation by common carriers of mail carriers in uniform; to amend the railroad law in relation to consolidated corporation; to amend the railroad law to provide for the transfer of property when the existence of a railroad corporation ceases.

Financial and Corporate

Stock and Money Markets

March 18, 1914.

In the early trading on the New York Stock Exchange to-day a strong tone prevailed with upturns helped materially by moderate buying for foreign account. The market was extremely sensitive to aggressive action either way and fluctuated within narrow margins except in a few issues. The volume of business was light and the final tone was steady. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¾ @ 3¼ per cent; four months, 3 @ 3¼ per cent; six months, 3¼ @ 3½ per cent.

In the Philadelphia market to-day dealings were light. Interest centered locally in the transit stocks.

In the Boston market to-day Boston & Maine was the feature. In the early trading this issue gained five points, but later reacted two points. The general list was higher to-day than it was yesterday.

The volume of trading on the Chicago Exchange was extremely small to-day. The bulk of the bond transactions was in the Metropolitan West Side Elevated 4's.

Trading was fairly active in Baltimore to-day in a broad market, but the volume of transactions was small. The bond transactions totaled $71,000, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 11	Mar. 18
American Brake Shoe & Foundry (com.)	93	91½
American Brake Shoe & Foundry (pref.)	141½	140
American Cities Company (com.)	36	36
American Cities Company (pref.)	61½	64
American Light & Traction Company (com.)	365	365
American Light & Traction Company (pref.)	107	107
American Railways Company	38	•38
Aurora, Elgin & Chicago Railroad (com.)	38	35
Aurora, Elgin & Chicago Railroad (pref.)	79½	77¼
Boston Elevated Railway	82	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	60
Boston & Worcester Electric Companies (com.)	•6¼	•6¼
Boston & Worcester Electric Companies (pref.)	39	38
Brooklyn Rapid Transit Company	92⅝	92
Capital Traction Company, Washington	109½	108
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	92	91
Chicago Railways, ptcptg., ctf. 2	31	30¾
Chicago Railways, ptcptg., ctf. 3	6½	6½
Chicago Railways, ptcptg., ctf. 4	3	3
Cincinnati Street Railway	105	105
Cleveland Railway	104	103½
Cleveland, Southwestern & Columbus Ry. (com.)	4	4
Cleveland, Southwestern & Columbus Ry. (pref.)	23	23
Columbus Railway & Light Company	20½	13
Columbus Railway (com.)	62	53
Columbus Railway (pref.)	81	79½
Denver & Northwestern Railway	71	71
Detroit United Railway	85	a85
General Electric Company	148	147⅛
Georgia Railway & Electric Company (com.)	120	121
Georgia Railway & Electric Company (pref.)	87	87
Interborough-Metropolitan Company (com.)	14⅝	14⅝
Interborough-Metropolitan Company (pref.)	59¾	60
International Traction Company (com.)	30	•30
International Traction Company (pref.)	a85	•85
Kansas City Railway & Light Company (com.)	10	10
Kansas City Railway & Light Company (pref.)	25	25
Lake Shore Electric Railway (com.)	5½	•5½
Lake Shore Electric Railway (1st pref.)	85	•85
Lake Shore Electric Railway (2d pref.)	22	•22
Manhattan Railway	131	129
Massachusetts Electric Companies (com.)	11	11
Massachusetts Electric Companies (pref.)	62	61
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25¼	25¼
North American Company	76	76⅛
Northern Ohio Traction & Light Co. (com.)	63	70
Northern Ohio Traction & Light Co. (pref.)	98¼	98¼
Philadelphia Company, Pittsburgh (com.)	42¼	42
Philadelphia Company, Pittsburgh (pref.)	42¼	42
Philadelphia Rapid Transit Company	18¼	18¼
Portland Railway, Light & Power Company	54	54
Public Service Corporation	112	111
Third Avenue Railway, New York	44¼	43¾
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	75	75
Twin City Rapid Transit Co., Min'apolis (com.)	105¾	105¾
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	80	80
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	27	26½
United Rys. Inv. Company (com.)	20	18
United Rys. Inv. Company (pref.)	43¾	42½
Virginia Railway & Power Company (com.)	53	53
Virginia Railway & Power Company (pref.)	96	95
Washington Ry. & Electric Company (com.)	87⅝	87
Washington Ry. & Electric Company (pref.)	87	86¾
West End Street Railway, Boston (com.)	72	73
West End Street Railway, Boston (pref.)	94	93¼
Westinghouse Elec. & Mfg. Company	73	76¾
Westinghouse Elec. & Mfg. Co. (1st pref.)	116½	118

• Last sale. a Asked.

ANNUAL REPORTS

Atlantic Shore Railway

The statement of income, profit and loss of the Atlantic Shore Railway, Sanford, Maine, for the fiscal year ended Dec. 31, 1913, follows:

Operating revenue:	
Freight revenue	$35,023
Passenger revenue	307,885
Other revenue from transportation	19,834
Other operating revenue	8,738
Total operating revenue	$371,480
Operating expenses	$283,221
Net earnings	$88,259
Miscellaneous income	2,434
Gross income	$90,693
Deductions from income:	
Coupon interest	$94,225
Miscellaneous interest	57
Taxes	7,223
Profit and loss adjusting entries	147
Total	$101,652
Deficit for year	$10,958

The total revenue mileage operated by the company in 1913 was 1,344,707, as compared to 1,341,032 in 1912. The total car hours in 1913 were 117,511, in 1912 116,218; and the total passengers carried in 1913, 5,010,342, in 1912 4,892,371. Other comparative statistics are as follows:

	1913	1912
Average fare revenue passengers	.0794	.0788
Average fare, all passengers (including transfer passengers)	.0614	.0608
Gross earnings per car mile	.2761	.2688
Gross earnings per car hour	3.160	3.101
Operating expenses per car mile	.2106	.20
Operating expenses and taxes per car mile	.2159	.205
Operating expenses per car hour	2.41	2.314
Operating expenses per cent of gross earnings	76.24	74.61
Average number of employees, including officials	180	180

Toronto Railway

A statement of earnings of the Toronto (Ont.) Railway for the year ended Dec. 31, 1913, as compiled from information contained in the annual report, follows:

Gross earnings	$6,049,019
Operating expenses	3,123,308
Net earnings	$2,925,711
Deductions from income:	
Bond interest	$195,807
Payments to city:	
Percentage on earnings	939,991
Pavement charges and taxes	156,100
Total	$1,291,898
Surplus	$1,633,813
Balance from previous year	3,694,757
Total	$5,328,570
Dividends—2 per cent on paid-up capital	879,958
Surplus—carried forward	$4,448,612

A discrepancy is noticed between the figures for bond interest and for pavement and tax expenses as given in two places in the report. In the income account the interest on bonds is given as $195,807, and the pavement and tax expenses as $156,100, a total of $351,907. In the running report to the stockholders, however, it is stated that deductions from net earnings were made for bond interest to the extent of $188,807; for pavement expenses, $91,466, and for taxes, $58,251, a total of $338,524. Between these totals there is a discrepancy of $13,383. No explanation is offered regarding this inconsistency between the two sections of the report. The income account itself, or income statement, as it would properly be called, is deficient in that the operating and maintenance charges, interest on bonds, percentage on earnings, pavement expenses and taxes are all placed in one group as deductions from gross earnings, instead of being grouped as above to show net earnings from operation.

The gross passenger earnings of the company amounted to $5,980,695, as compared with $5,367,502 for 1912, an increase of $613,193. The operating ratio was 52.2 per cent. The payments made to Toronto in 1913, when compared with the payments made during the previous year, show an increase of $147,659.

William Mackenzie, president of the company, says in part:

"The third drawing of the company's currency and sterling bonds, under the terms of the mortgage deed dated Sept. 1, 1892, took place on June 27, 1913. There has been drawn to date a total of $562,512.

"The expenditure on capital account throughout the year amounted to the sum of $1,064,858. In addition to various extensions and improvements to certain of the company's shops, carhouses, etc., several buildings were erected.

"The Toronto & York Radial Railway reports very satisfactory increases, the gross earnings amounting to $584,491, compared with $492,923 for the previous year, an increase of 18.5 per cent."

Reorganization Plan of the American Water Works & Guarantee Company

The reorganization plan announced for the American Water Works & Guarantee Company, Pittsburgh, Pa., provides for the formation of a new company, to be known as the American Water Works & Electric Company, to take over the assets of the old corporation with the exception of cash, stock, notes and floating indebtedness of four subsidiary irrigation properties. The new company will have $10,000,000 of 7 per cent cumulative first preferred stock, of which $5,000,000 will be issued at once; $20,000,000 of 6 per cent participating preferred stock, of which $10,000,000 will be issued at once; $10,000,000 of common stock, of which $7,000,000 will be issued at present, and $20,000,000 of collateral trust 5 per cent twenty-year bonds, of which $6,250,000 will be issued now and $3,700,000 will be available as collateral. Of the collateral trust bonds to be issued at once, $5,733,300 are to be reserved for exchange, par for par, against the first mortgage bonds of the California-Idaho Company and $516,700 are to be used to pay indebtedness of subsidiary companies. The amount of the bonds reserved as collateral is to cover the indebtedness of subsidiary companies to bank creditors. Various banks holding paper of the subsidiaries indorsed and rediscounted by the company are to give an extension of paper covering in all six years.

The plan of reorganization has been approved by the bank creditors' committee, by the protective committee of the four irrigation companies, by the bondholders' protective committee of the California-Idaho Company, by other creditors and the receivers. More than 80 per cent of both classes of stock has been deposited with the stockholders' protective committee. Stockholders have already provided $4,500,000 in cash throughout an underwriting syndicate, which has agreed to take all securities not subscribed for by the present stockholders.

All stock of the new company, except directors' qualifying shares, for the period of five years from the reorganization is to be vested in five voting trustees to be chosen by the reorganization committee. This committee may appoint one or more of its own members as voting trustees. Each depositor of the preferred stock of the old company will be entitled, upon subscription and the payment of $35 per share, to receive $40 par value in first preferred stock and $100 par value in participating preferred stock of the new company. Each depositor of preferred stock who does not make such subscription and payment will be entitled to receive for each share of old preferred stock $50 par value in participating preferred stock on payment of an assessment of $5 on each share of old stock. Common stockholders will be entitled to receive $10 par value of first preferred stock and $70 par value of new common stock for each share of old stock on subscription and payment of $10. The common stockholders who do not subscribe will be entitled to receive for each share now held $10 par value in new common stock upon payment of an assessment of 50 cents a share.

Under the approved plan the four irrigation companies, the Twin Falls-North Side Land & Water Company, Twin Falls-Salmon River Land & Water Company, Twin Falls-Oakley Land & Water Company and the Sacramento Valley Irrigation Company, are to be turned over to a protective committee representing the bonds of the company and $1,000,000 is to be paid for the release of the guarantee of the irrigation companies' bonds. This money is to be used for the development of the irrigation companies' property, the equity in which will ultimately be divided 51 per cent to the bondholders and 49 per cent to the new company.

Babylon (N. Y.) Railroad.—In an order entered on March 17, 1914, Justice Chatfield, in the United States District Court, dismissed Ralph J. Hawkins as receiver of the Babylon Railroad. The court said: "The receiver in this case has done wonderfully well and has bettered the road by making it a usable property."

Carolina Power & Light Company, Raleigh, N. C.—The Electric Bond & Share Company, New York, N. Y., which controls the Carolina Power & Light Company, has recently issued a 43-page illustrated booklet, describing the properties and finances of this latter company and its subsidiaries. The Carolina Power & Light Company is a consolidation of the Raleigh Electric Company, the Central Carolina Power Company and the Consumers' Light & Power Company, and it controls the Yadkin River Power Company and the Asheville Power & Light Company.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—A certificate was recently filed by the Cincinnati, Dayton & Toledo Traction Company, reducing its capital stock from $5,250,000 to $2,250,000, to consist of $250,000 of preferred and $2,000,000 of common.

Cleveland (Ohio) Railway.—The Cleveland Railway has received permission from the Public Utilities Commission of Ohio to issue $2,141,000 of stock to be sold at not less than par to provide funds for extensions and improvements under the conditions noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, page 488.

Columbus Railway, Power & Light Company, Columbus, Ohio.—An initial dividend of 1½ per cent has been declared on the preferred stock, series A, of the Columbus Railway, Power & Light Company, payable on April 1, 1914, to holders of record of March 15.

Des Moines & Central Iowa Electric Company, Des Moines, Iowa.—Bodell & Company, Providence, R. I., are offering at par and interest the entire present issue of $1,150,000 of 6 per cent sinking fund gold bonds, series A, of the Des Moines & Central Iowa Electric Company. These bonds are dated Sept. 1, 1913, and due Sept. 1, 1937, but subject to call at 105 and interest. This company controls the Iowa subsidiary properties of the Illinois Traction Company, including the street railway in Oskaloosa. The bonds are guaranteed as to principal, interest and sinking fund by the indorsement of the Illinois Traction Company.

El Paso (Tex.) Electric Company.—The stockholders of the El Paso Electric Company on March 9, 1914, voted to authorize an additional $1,000,000 of common stock, the present issue to be $375,000. The proposed basis of the offering will be eight shares of the old stock to one of the new pro rata to the present stockholders, as noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914.

Hudson & Manhattan Railroad, New York, N. Y.—The Hudson & Manhattan Railroad has applied to the Public Service Commission of the First District of New York for authority to issue $154,000 of first lien refunding mortgage bonds. The application is made under the authorized mortgage to the Central Trust Company, New York, N. Y., for $65,000,000, of which $37,035,000 has already been issued. The additional amount is required for extensions and betterments and for refunding purposes.

Indiana Utilities Company, Angola, Ind.—The Indiana Utilities Company has petitioned the Public Service Commission for authority to issue bonds in the sum of $6,000.

Interstate Railways, Camden, N. J.—The directors of the Interstate Railways have decided to refund $42,000 ($6 per bond) to cover the expenses met by the bondholders who deposited their bonds with Edward B. Smith & Company, Philadelphia, Pa., as managers during the reorganization plan that was proposed but not adopted five years ago.

Knoxville Railway & Light Company, Knoxville, Tenn.—The Guaranty Trust Company, New York, N. Y., successor to the Standard Trust Company, which was trustee for an issue of forty-year 5 per cent consolidated gold bonds of the Knoxville Railway & Light Company, announces that it will receive proposals until April 3, 1914, for the sale to it of as many of the bonds as can be purchased for $18,339, at a rate not to exceed 107½ and interest accrued.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has authorized the Manhattan Bridge Three-Cent Line to issue common stock to the amount of $260,000 at par, the proceeds to be used to acquire property and increase facilities. The company at present has outstanding $190,000 of stock.

Monterey Railway, Light & Power Company, Monterey, Mex.—The Monterey Railway, Light & Power Company has been compelled to defer the payment of interest on its securities. The directors of the company have issued a notice that the payment of interest on the $6,000,000 of first mortgage debenture stock will be deferred until such time as financial and political conditions improve in the republic.

New York, Auburn & Lansing Railroad, Ithaca, N. Y.—The property of the New York, Auburn & Lansing Railroad was sold under foreclosure on March 6 to H. W. Fitz, chairman of the bondholders' committee, for $200,000. This was the only bid. A reorganization plan has been submitted to the Public Service Commission for the Second District of New York for approval and the purchase by the bondholders' committee is a step in the furtherance of this plan. The property will probably be turned over to the reorganized company early in April. The New York, Auburn & Lansing Railroad is a steam road, but its Ithaca terminal is operated by electricity.

Pacific Gas & Electric Company, San Francisco, Cal.—N. W. Halsey & Company and Harris, Forbes & Company, New York, N. Y., recently offered at 99½ and interest $5,000,000 of 5 per cent gold notes of the Pacific Gas & Electric Company dated March 25, 1914, and due March 25, 1915, but redeemable at any time at 102 and interest. This issue is subject to the approval of the California Railway Commission.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—Plans are being considered for reorganizing the Petaluma & Santa Rosa Railway as the San Francisco & Northern Railway and extending the line from Santa Rosa north into Healdsburg and Lake County.

Porto Rico Railways, Ltd., Ponce, P. R.—At the annual meeting of the Porto Rico Railways held in Toronto, Ont., on March 11, 1914, Max Aitken retired as president of the company and D. E. Thomson, Toronto, Ont., was elected to succeed him. W. D. Ross, Toronto, Ont., was elected vice-president, to succeed Mr. Thompson. James Ryrie, Toronto, Ont., was elected to the board to succeed J. F. Remnant, London, Eng., who retired. Max Aitken, the former president, remains a member of the board. A short while ago I. Hamilton Benn, London, Eng., and Ramon Vaides, San Juan, Porto Rico, were succeeded as directors by V. M. Drury and F. W. Teele, the latter general manager of the company.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The Missouri Public Service Commission has authorized the St. Joseph Railway, Light, Heat & Power Company, a subsidiary of the Cities Service Company, to issue $162,000 of 5 per cent bonds, the proceeds to be used for extensions and improvements.

Third Avenue Railway, New York, N. Y.—The New York Stock Exchange has authorized to be listed on notice of sale $4,187,000 of additional first refunding mortgage fifty-year 4 per cent bonds of the Third Avenue Railway, making a total of $19,977,000. The proceeds of this issue will be used in part payment for the following securities, which will be deposited under the first refunding mortgage: $734,000 of Belt Line Railway Corporation stock and $1,750,000 of its first mortgage thirty-year 5 per cent gold bonds, and $4,221,000 of New York City Interborough Railway stock and $1,702,000 of its first mortgage 4 per cent sinking fund gold bonds.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The managing committee of the funding trust of the Washington, Baltimore & Annapolis Electric Railroad, composed of George T. Bishop, George R. Sheldon and Frank H. Ginn, which expires by limitation on April 1, 1914, has issued a request to the stockholders for an extension of the agreement to April 1, 1916.

Woodstock, Thames Valley & Ingersoll Electric Railway, Woodstock, Ont.—Justice Kelly heard applications before him for the appointment of a trustee to manage this line and for the appointment of E. B. Stockdale of the Trust & Guarantee Company, Toronto, Ont., as receiver.

Dividends Declared

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Asheville, Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., quarterly, 1½ per cent, preferred.

Bangor Railway & Electric Corporation, Bangor, Me., quarterly, 1¾ per cent, preferred.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbus Railway, Power & Light Company, Columbus, Ohio, 1½ per cent, preferred.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Halifax (N. S.) Electric Railway, quarterly, 2 per cent.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

Philadelphia (Pa.) Traction Company, $2.

Virgina Railway & Power Company, Richmond, Va., 1½ per cent, common.

Washington, Baltimore & Annapolis Electric Railroad, Washington, D. C., quarterly, 1½ per cent, preferred.

West End Street Railway, Boston, Mass., $1.75, common.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.							
1m.,	Feb.,	'14	$382,145	......	......	......	......
1 "	"	'13	368,187	......	......	......	......
8 "	"	'14	3,697,728	......	......	......	......
8 "	"	'13	3,429,906	......	......	......	......
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.							
1m.,	Jan.,	'14	$99,233	*$58,352	$40,881	$27,653	$13,228
1 "	"	'13	95,633	*59,241	36,392	24,399	11,993
12 "	"	'14	1,208,529	*716,738	491,791	301,335	190,456
12 "	"	'13	1,079,302	*645,765	433,537	269,159	164,378
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.							
1m.,	Jan.,	'14	$28,814	*$16,795	$12,020	$10,789	$1,231
1 "	"	'13	28,095	*16,682	11,414	10,471	943
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE							
1m.,	Jan.,	'14	$184,509	*$119,731	$64,778	$63,576	$1,202
1 "	"	'13	172,587	*101,605	70,982	56,733	14,249
12 "	"	'14	2,366,719	*1,330,999	1,035,720	721,117	314,603
12 "	"	'13	2,151,337	*1,218,568	932,769	653,348	279,421
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.							
1m.,	Dec.,	'13	$238,628	*$142,954	$95,674	$46,652	$49,022
1 "	"	'12	228,509	*111,142	117,367	48,019	69,348
12 "	"	'13	2,664,219	*1,567,656	1,096,563	589,134	507,429
12 "	"	'13	2,452,451	*1,353,568	1,098,883	578,471	520,412
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO							
1m.,	Jan.,	'14	$105,489	*$68,480	$37,009	$35,058	$1,951
1 "	"	'13	100,992	*65,287	35,705	34,938	767
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE							
1m.,	Jan.,	'14	$45,299	*$39,359	$5,940	$15,338	†$9,398
1 "	"	'13	44,952	*33,092	11,860	14,476	†2,616
12 "	"	'14	675,901	*433,983	241,918	180,436	61,482
12 "	"	'13	627,124	*389,247	237,877	173,105	64,772
MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.							
1m.,	Jan.,	'14	$78,507	$33,269	$45,237	$25,567	$19,670
1 "	"	'13	68,636	25,030	43,607	24,103	19,504
NORTHERN OHIO TRACTION COMPANY, AKRON, OHIO							
1m.,	Jan.,	'14	$270,961	*$171,291	$99,670	$49,462	$50,208
1 "	"	'13	237,466	*142,250	95,216	44,671	50,545
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY							
1m.,	Feb.,	'14	$1,779,010	$1,096,891	$682,119	$802,233	$120,114
1 "	"	'13	1,775,158	1,104,541	670,617	767,505	96,888
8 "	"	'14	16,025,075	9,434,982	6,590,093	6,401,075	189,018
8 "	"	'13	15,703,350	9,419,447	6,283,903	6,097,427	186,476

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*Includes taxes. †Deficit.

Traffic and Transportation

Report and Recommendations in Regard to Service in Schenectady

The Public Service Commission of the Second District of New York has received a report from Charles R. Barnes, electric railway inspector, concerning his investigation of traffic conditions in Schenectady and vicinity. A copy of the report has been submitted to the Schenectady Railway with a request for an answer as to compliance with the recommendations. The report embodies the following recommendations to the company:

1. That it construct and equip an additional substation with the feeders necessary for the additional power required. That it notify this commission within sixty days when such construction will be commenced.
2. That it cause the first step to be lowered on the twenty-six single-truck open cars and the twenty-five double-truck closed cars classified in this report as being too high.
3. That an automatic track switch be installed at the junction of State and Center Streets.
4. That it increase the service during the morning and evening rush hours on the Van Vranken Avenue, State Street, Rosendale Road, Crane Street, Albany Street, "A"-belt and "B"-belt lines, and report to the commission when it will increase the service on the lines mentioned, how much and in what manner.
5. That it increase the "limited" service on city lines in both directions during the noon hour and report to the commission.
6. That it increase the service to and from the General Electric plant during the morning and evening rush hours by the use of trailers on the different lines.
7. That the operating officials of the company confer with the officers of the American Locomotive Company in reference to increased facilities to and from that plant and report to the commission the action taken by the company.
8. That the present headway of fifteen minutes during the non-rush hours on the Rosendale Road, Van Vranken Avenue, Campbell Street, Crane Street, and Scotia lines be reduced to twelve minutes.
9. That it increase the service on the Ballston division during the morning and evening rush hours by the use of multiple-unit trains when necessary to prevent passengers being obliged to stand on any one run more than two days in the week.
10. That it increase the service on the Schenectady-Albany division during the morning and evening rush hours by the operation of not less than three two-car multiple-unit trains to be run at the times which will accommodate the travel best.
11. That it operate not less than ten trailers on the heavy carrying city lines during the morning and evening rush hours and at such other times as will best accommodate the travel.
12. That it procure eight new closed motor cars and ten trail cars as soon as possible.
13. That it withdraw from service all of the forty single-truck cars and replace them with cars with seating capacity of not less than forty by the purchase of new cars or the reconstruction of the old ones, the withdrawal and replacement to be completed not later than Nov. 1, 1914.
14. That it equip the Albany, Troy and Ballston-Saratoga divisions with modern track circuit-control block signals.

Practically 14 per cent of the passengers traveling on this system are obliged to transfer to reach their destination. This is considered a small percentage of transfers to cash passengers.

The popularity of the "express" service operated on the city lines during the noon hour is shown by the increase in the number of cars run for this purpose, which during the year 1913 was thirteen of the larger type. It was estimated that 1000 persons daily availed themselves of this service to go to their homes at noontime.

On account of the inadequate service as the result of limited track facilities an average of only 323 out of approximately 5000 persons employed in the locomotive works patronize the cars during the evening rush hour.

On the matter of block signals the report states:

"The three suburban lines, Albany, Troy and Ballston-Saratoga, are all double-track. The traffic on each has practically reached the limit of safety. Trains on all of these divisions are run at high speed and at times on short headways. Safety requires that all of them be equipped with a proper block signal system. The company has plans under consideration for the equipment of the Schenectady-Albany division with a modern block signal system."

The report calls attention to the desirability for additional crosstown lines and emphasizes the necessity for the widening of some of the streets in the business portions of the city as previously suggested by the commission. Pending such rearrangement of streets it is suggested that an equivalent to double-tracking Lafayette Street in Schenectady might be obtained by the construction of a track through Barrett and Romeyn Streets between State Street and South Avenue.

The number of passengers carried increased from 16,000,000 in 1907 to 22,000,000 in 1912, or 36.24 per cent. The car miles run decreased 13.58 per cent. During this period there was no change in the number of cars owned by the company or in their seating capacity. The passenger receipts increased from $1,015,000 in 1907 to $1,147,000 in 1912, or 13.01 per cent. The operating expenses increased from $743,000 in 1907 to $772,000 in 1912, or 3.27 per cent.

Summarizing, the report sets forth that proper transportation in Schenectady, present and future, is dependent upon the widening and extending of streets in the business section of the city.

Decision in Indiana Fare Case

During the latter part of January the Public Service Commission of Indiana, following a hearing on a petition from the Commercial Club of Carmel, Ind., ordered the Union Traction Company of Indiana to reduce its rate of fare from Carmel to Indianapolis from 30 cents to 25 cents, and from Carmel to Broad Ripple from 20 cents to 15 cents. The mileage from Indianapolis to Broad Ripple is 8 miles, and from Indianapolis to Carmel, 16 miles. For several years three passenger rates have been in effect between Indianapolis and Broad Ripple. On the local Indianapolis-Broad Ripple cars the fare is 5 cents; on local interurban cars, 10 cents; on limited interurban cars, 15 cents. The reduction in fare, on the commission's order, made the highest rate of fare between Broad Ripple and Indianapolis 10 cents.

A. W. Brady, president of the Union Traction Company, filed with the commission a request for a rehearing on the ground that under the decision of the commission a passenger could ride from Carmel to Broad Ripple on an interurban car for 15 cents, and by then taking the local car into the city for 5 cents would get the benefit of a 20-cent fare from Carmel to Indianapolis; that the Chicago, Indianapolis & Louisville Railroad, a steam railroad, was, under the 2-cent fare law, allowed to charge a 15-cent fare to Broad Ripple and 30-cent fare to Carmel, and that the limited cars of the traction company, giving practically the same service as the steam road, would be compelled to transport passengers to these points for 10 cents and 25 cents respectively. On March 12, 1914, the Public Service Commission affirmed its former decision in the matter, overruling several decisions which had been given previously by the Railroad Commission of Indiana, which was superseded by the Public Service Commission on May 1, 1913. In its decision the commission said:

"It is not a question of whether the 20-cent fare from Carmel to Broad Ripple is excessive. It is unreasonable even though it is not excessive. It is an unjust discrimination that ought to be prohibited. The company attempted to justify the additional charge of 5 cents on the principle that it was entitled to 2 cents a mile between the corporate limits of Carmel and Broad Ripple, and 5 cents for the carriage of an adult passenger through the corporate limits of the municipalities. This position is sustained by a number of decisions heretofore rendered by the Railroad Commission of Indiana. This commission, however, is of the opinion that such decisions are not correct statements of the law and the same are hereby expressly overruled."

The commission, however, ruled that the new rate should apply to local interurban cars; that the 30-cent rate on limited cars should be retained, and that there was no reason why the company should be compelled to perform the same service as the steam road at a lower rate of fare than charged by the steam road.

Complaint Against San Francisco-Oakland Terminal Railways Dismissed

The Railroad Commission of California has dismissed the petition of T. D. Johnston to compel the San Francisco-Oakland Terminal Railways, Oakland, Cal., to inclose all of its cars running on its suburban lines with vestibules. The commission in its decision says in part:

"Defendant operates both a city street car system and an interurban system, and while the complaint includes all of the lines operated by defendant, the testimony was confined to the line operated between Oakland, Emeryville, Albany and Richmond, a line about 12 miles long. The testimony shows that about one-half of the cars operated on this line are entirely inclosed, and the other half have open ends. There was some testimony by patrons of this line that during stormy weather the rain driven by the wind blew in upon passengers where they sat in these open-end cars, and of course if these ends were inclosed there would be protection against this discomfort. On the other hand, there were a large number of witnesses who testified that they preferred the open-end cars, even though at times of bad weather they were subject to slight inconvenience. No employee of the company appeared at the hearing, and there is no way of determining whether or not these employees are suffering discomfort except by hearsay statements made at the hearing.

"It is a question whether in this part of California the entirely closed interurban electric car is the more comfortable and pleasant for passengers, or whether the open-end car, affording as it does opportunity to ride in the air and to enjoy an uninterrupted view of the scenery, is preferable. I think it is obvious that in all parts of California there will be times when the weather conditions will make the open ends of cars somewhat uncomfortable for the traveling public, but considering the comparatively short period of stormy weather each year in this part of California, I think it is open to question whether all cars should be inclosed. The evidence in this case is altogether insufficient to warrant a conclusion that the cars should be inclosed. I therefore recommend that the complaint be dismissed."

Municipal Railway Employees Present Demands

Mayor Rolph of San Francisco, Cal., has transmitted to the Board of Supervisors, without recommendation, the report made to him by T. A. Cashin, superintendent of the Geary Street Municipal Railway, relative to the request of the platform men on the railway for one day off with pay every week, and for other concessions. In his report Mr. Cashin states that with the exception of the Butte (Mont.) Electric Railway, which pays its men, after five years of service, 45 cents an hour for a nine-hour day, and the San Francisco-Oakland Terminal Railways, which has a sliding wage scale of 40 cents an hour for a ten-hour day, there is no other street railway that pays the Municipal Railway's rate of $3 for an eight-hour day.

Mr. Cashin says that any arrangement by which every man shall be kept not more than ten hours on call for his eight hours of work a day would be very expensive. He submits four schemes for complying with the ten-hour demand of the men, the most economical of which will increase the operating cost $90 a day, or $32,850 a year. He points out that the railway will, after July 1, 1915, have to provide $101,000 a year for the bond sinking fund. The expense of giving the 130 platform men on the Geary Street road a day off every week would be $20,280 a year, and if the same privilege were allowed the shopmen and other employees the cost would be $15,015 additional. Concerning the request for uniforms Mr. Cashin says that private companies do not provide uniforms, but that on the Canadian municipal railways the men receive one uniform a year and an overcoat every two years.

Petition for Reduction in Fare in Massachusetts.—A petition has been filed with the Public Service Commission of Massachusetts asking for an order to require the Berkshire Street Railway, Pittsfield, to reduce to 5 cents the fare from Pittsfield to North Adams.

Route Numbers in Oakland.—The city cars of the San Francisco-Oakland Terminal Railways, Oakland, Cal., are to be equipped with route numbers similar to those now in use in San Francisco. The first signs will be put on the sixty new low-step pay-as-you-enter cars along San Pablo and Telegraph Avenues.

Reduction in Fare Under Consideration.—W. C. Fisk, vice-president of the Hudson & Manhattan Railroad, is quoted as authority for the statement that the company has under consideration the suggestion of Mr. MacGovern, the recorder of Hoboken, N. J., that the fare from Jersey City and Hoboken, to Ninth Street and to Christopher Street, New York, be reduced from 7 cents to 5 cents.

Local Fare Increase Approved in Massachusetts.—The Public Service Commission of Massachusetts has approved the establishment of a 6-cent local fare unit on the Providence & Fall River Street Railway and has dismissed the petition of citizens of Swansea and Seekonk for an order to require the company to retain the former 5-cent local fare unit.

Brooklyn Transfer Order Adopted by the Commission.—The order of the Public Service Commission of New York, First District, adopted on March 6, 1914, requires that the transfer plan worked out by it for the surface lines of the Brooklyn Rapid Transit System shall become effective on May 1. The conditions which the order prescribes were referred to in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 610.

Freight Terminal Proposal in Louisville.—A proposal to turn over Main Street, the principal wholesale business thoroughfare of Louisville, Ky., during certain hours of the day to the use of the railroads, and to permit the placing of private switches, to be built for the use of freight cars propelled by electricity, has created considerable interest in that city. The plan was originated by the local leaf tobacco exchange, the members of which realize that Main Street has within recent years lost many business houses requiring trackage, by removal to other locations.

Progress with Uniform Rules for Michigan.—It is regarded as unlikely that the Railroad Commission of Michigan will have an opportunity to pass upon the proposed uniform rules for some little time. The meeting at Detroit on March 18, 1914, resolved itself into a conference of the committee on rules with the managers of the interurban properties in the State at which the draft prepared by the sub-committee was read and objections heard from the managers. The committee will pass upon the objections and the rules will probably then be submitted for action by the Railroad Commission.

Operation of Double-Deck Car at Columbus, Ohio.—The new double-deck car of the Columbus Railway, Power & Light Company, Columbus, Ohio, described in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 582, was operated for the first trial on March 2. S. G. McMeen, president of the company, and a number of the city and county officials made up the party. L. E. Hamilton, an inspector of the company, acted as motorman, and Delbert Scott was the conductor. Mr. McMeen paid the first cash fare and Byron L. Barger, director of public safety, deposited the first ticket fare. The trip was made on the High Street line, on which the car will be operated in regular service.

Increase in Surface Car Service in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has announced that it will increase the service on fifteen of its surface lines, making in all about 400 additional trips, or an average of twenty-six new trips for each of the fifteen routes. The advisability of requiring the company to increase service on twenty other surface lines is under investigation by the Public Service Commission of the First District of New York. On March 19, 1914, the New York Municipal Railway Corporation carried in the Brooklyn papers an advertisement headed "Rapid Transit Progress" reviewing the extent to which it has discharged its contracts under the dual subway contracts.

Personal Mention

Mr. B. F. Meyers has been elected vice-president of the Harrisburg (Pa.) Railways to succeed Mr. Frank B. Musser, who has been elected president of the company.

Mr. D. E. Thomson has been elected president of the Porto Rico Railways, Ltd., Ponce, P. R., to succeed Mr. Max Aitken, who continues as a director of the company.

Mr. W. D. Ross, Toronto, Ont., has been elected vice-president of the Porto Rico Railways, Ltd., Ponce, P. R., to succeed Mr. D. E. Thomson, who has been elected president of the company.

Mr. George R. Sheldon, who has been treasurer of the North American Company, New York, N. Y., has been elected vice-president of the company to succeed Mr. J. D. Mortimer, who has been elected president of the company.

Mr. Frank B. Musser, who has been vice-president and general manager of the Harrisburg (Pa.) Railways, has been elected president of the company, in addition to general manager, to succeed Mr. H. D. Walbridge, New York, N. Y., resigned.

Mr. James S. Harlan has been elected chairman of the Interstate Commerce Commission to succeed Mr. Edgar E. Clark. Mr. Harlan's election is in pursuance of the policy adopted in 1911 to limit the term of office of the chairman to one year, the position to be filled by each commissioner in turn in the order of seniority.

Mr. L. O. Veser, chief engineer of the Mahoning & Shenango Valley Railway Light Company, Youngstown, Ohio, has tendered his resignation, effective April 1. Mr. Veser has been in the service of the company since 1909, previously to which time he was connected with various hydroelectric companies in Western States.

Mr. Peter M. Miller has been appointed assistant treasurer of the Jacksonville (Fla.) Traction Company, vice Mr. Arthur F. Butler, resigned. Mr. Miller has been with Stone & Webster for the last eight years, of which five and one-half years were served with the Savannah Electric Company as chief clerk. He was then transferred to Boston for a short while. Two years ago he was made assistant treasurer of the Key West Electric Company.

Mr. Charles N. Hebner has been appointed secretary of the Illinois Public Utilities Commission to succeed Mr. William Kilpatrick, resigned. Until recently Mr. Hebner was in charge of the assignment of expenditures of the Chicago (Ill.) Railways under Mr. John Z. Murphy, chief engineer. He was born in Chicago in 1876. After completing his education in the public schools Mr. Hebner served in various clerical positions until 1908, when he accepted a position with the Chicago Railways.

Mr. J. H. Larmonth, consulting engineer, Toronto, Ont., has been appointed superintendent of the Edmonton (Alberta) Municipal Railway System. Mr. Larmonth, who is at present in private practice in Toronto, will take up his new duties on April 1, 1914. He succeeds Mr. W. T. Woodroofe, who resigned recently. Mr. Larmonth was formerly with the Peterboro (Ont.) Street Railway. As engineer he supervised the construction of the road and later managed the property for a number of years. He was also general manager of the Electrical Power Company. Mr. Larmonth is a graduate of McGill University.

Mr. J. H. Trimingham has been appointed superintendent of power of the Sherbrooke Railway & Power Company, Sherbrooke, Que. Mr. Trimingham was graduated from the McGill University, Montreal, in 1908 in electrical engineering. He was attached to the electrical staff at the University as a demonstrator from 1908 to 1911. For the following eighteen months he was consulting engineer and superintendent of power of the Bermuda Electric Light, Power & Traction Company, Hamilton, Bermuda. During the latter part of 1913 he was engaged in work for the electrical commission of the city of Montreal.

Mr. James Campbell, who has for some time been president of the North American Company, New York, N. Y., has been elected chairman of the board of directors of the company. Mr. Campbell is also a director of the Utah Utilities Company, the National Bank of Commerce of St. Louis, the Mercantile Trust Company of St. Louis, the Southwestern Telegraph & Telephone Company, and numerous other public utility companies. He was born in Ireland and was brought to America by his parents when he was two years old. He was educated in the public schools at Wheeling, W. Va., and entered business in 1859 when he was eleven years old. During the Civil War he was attached to the staff of Gen. John C. Fremont as a messenger. After the war Mr. Campbell located in New York. He later engaged in engineering work in St. Louis. In 1876 he opened offices as a broker in St. Louis and since then has been prominently identified with the development of public utility properties.

Mr. George H. Binkley, whose appointment as engineer of the maintenance of way department of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was noted in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, was born in Richmond, Ind., and was educated at De Pauw University. Mr. Binkley commenced his engineering work with the Pennsylvania Railroad by which he was employed for five years on location surveys, construction and maintenance work. Subsequently he had charge of grading and field engineering work at the World's Columbian Exposition in Chicago and remained with the exposition for a year after its close to compile final reports to the director of works. He next became connected with the Michigan Southern Railway and the Chicago, Rock Island & Pacific Railroad in track elevation work, preparing subway plans for Chicago streets. After a short connection with the bureau of streets in Chicago, Mr. Binkley entered the employ of the Calumet Electric Street Railway, Chicago, with which he remained five years as chief engineer in charge of construction and maintenance. Later he was appointed chief engineer of the railway department of Kohler Brothers, Chicago, contracting engineers, and for four years served as vice-president and chief engineer of the American Engineering Company, Indianapolis, Ind. For four years prior to becoming connected with the San Francisco-Oakland Terminal Railways Mr. Binkley was with the Arnold Company, Chicago, Ill. He is a member of the Western Society of Engineers and the American Society of Civil Engineers.

Mr. Charles J. Witherwax has been appointed general passenger agent of the Schenectady (N. Y.) Railway, which operates 137 miles of line and 186 motor and thirty-three other cars. The office is a new one with the company, and Mr. Witherwax's jurisdiction will cover the management of Brandywine and Forest Parks, which are owned by the company. He will also look after all special car movements, excursions, chartered car service and will personally investigate all irregularities in service. For the last nine years Mr. Witherwax has been connected with the Schenectady Illuminating Company and the Mohawk Gas Company, and since 1908 has served the companies with marked success as an adjuster. Mr. Witherwax has, of course, a large acquaintance in Schenectady and vicinity and is particularly well fitted for the position to which he has been appointed on account of his wide experience in dealing with the public. Referring to his success in this particular, Henry W. Peck, general manager of the Schenectady Illuminating Company, said: "Mr. Witherwax has been a most valuable man to the company through his familiarity with the different departments of the company's work and especially his natural ability to judge fairly the merits of disputes or complaints on the part of consumers against the company. The company has lost a valuable man and one who has largely helped in bringing about the friendly feeling which exists towards the company."

C. J. Witherwax

Mr. James D. Mortimer, vice-president of the North American Company, New York, N. Y., and president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was elected president of the North American Company on March 19, 1914, to succeed Mr. James Campbell, who has been elected chairman of the board of directors of that company. Mr. Mortimer was born in Elmhurst, Ill., and was educated at the Throop Polytechnic Institute, Pasadena, Cal., and at the University of California, from which he was graduated in 1900. After completing his college course Mr. Mortimer taught for more than a year and then entered the service of the Tacoma Railway & Power Company, Tacoma, Wash. When Stone & Webster, Boston, Mass., took over the property of the Tacoma Railway & Power Company and the Puget Sound Electric Railway in 1903 Mr. Mortimer was retained as engineer. Mr. Mortimer became identified with the development of the property of the Telluride Power Company while Mr. James Campbell, chairman of the North American Company, was president of that company, and later he was elected first vice-president of the North American Company, which controls the railway and light properties in Milwaukee. Mr. Mortimer was also receiver of the Toledo & Chicago Interurban Railway, Kendallville, Ind., now the Fort Wayne & Northwestern Railway. He was elected vice-president and secretary of The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company in February, 1910, and in 1912 was elected president of the companies to succeed Mr. Campbell, who was elected chairman of the board of directors.

J. D. Mortimer

OBITUARY

Alden E. Viles, treasurer of the Boston (Mass.) Suburban Electric Companies and a director of the Lexington & Boston Street Railway, the Middlesex & Boston Street Railway, and the Norumbega Park Company, died on March 15, 1914, at his home in Boston, after an illness of two weeks. Mr. Viles was born in Waltham, Mass., sixty-eight years ago, and aside from his business interests, which included the trusteeship of several large estates, was prominent in art and country club circles. He is survived by his widow, a son and a daughter.

Edward T. Moore, manager of the Dallas (Tex.) Consolidated Electric Street Railway, has outlined to the City Commissioners of Dallas the extensive program of improvements which the company already has under way and the betterments which have been decided upon for the near future. The main betterments of service which the company will make at the cost of $931,282 consist of double tracking the loop at Main, Elm and Lamar Streets, thirty-five new cars for operation east of Trinity and twenty new cars for operation on Oak Cliff lines, double tracking the north part of the North Belt from Ross and Pearl on out beyond State Street and other trackage and shop improvements. The cost of the thirty-five new cars will be $203,000—including the new Oak Cliff equipment the total expenditure in this respect will exceed $300,000. The cost of the loop improvements will be $32,000. A line will be built to the Southern Methodist University at a cost of $43,000. Car shops and paint shops for cars will cost almost $150,000. Some of the other improvements follow with their cost as estimated by Mr. Moore: Garrett, double track and paving, $27,000; concrete pits at barns for cleaning cars, $16,900; San Jacinto, retrack and paving, $26,000; double tracking and paving, Bryan, $92,000; block signal system, $3,200; new fare boxes, $1,000; tracking and paving on Peak from Elm to Ross, $88,000. Many of the improvements mentioned are already under way.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Churchill Southern Railway, Fort Churchill, Man.—The Manitoba Legislature has incorporated this company with power to build a railway to be operated by steam, electricity or any other motive power, from Fort Churchill, southerly to Kettle Rapids, on the line which the Dominion government is building from Pas to Port Nelson, Man., with branch lines to any point in the Province of Manitoba. The company is given authority to develop water powers, and to distribute electric energy for all purposes. The directors are: W. Beech, W. Chambers, T. Wright, C. Atchison, Winnipeg; W. Georgeon, Calgary.

***Batavia (N. Y.) Traction Company.**—Incorporated in New York to succeed to the property of the Buffalo & Williamsville Electric Railway in Batavia. Capital stock, $25,000. Incorporators: Stephen W. Brown, William F. Haitz, Michael H. Keogh, all of Batavia.

Blaine-Lynden Electric Railway, Blaine, Wash.—Application for a charter has been made by this company to build an electric railway between Blaine, Lynden and Bellingham. Capital stock, $250,000. Officers: John J. Pinckney, president; Lester Livingston, secretary, and James A. Willison, treasurer. [E. R. J., Feb. 21, '14.]

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has applied to the Public Utilities Commission for a forty-year franchise for an elevated structure from Sixth Street depot to San Pedro Street.

San Diego, Cal.—The Los Angeles & San Diego Beach Railway has received a franchise from the Council for an electric railway from Arctic Street to La Jolla in San Diego.

Stockton, Cal.—The Stockton Electric Railway has received a franchise from the Council for the extension of the El Dorado Street line to Tuxedo Park.

***Bradentown, Fla.**—M. L. Waggoner and associates have received a franchise from the Council to build an electric railway in Bradentown.

Miami, Fla.—An electric railway franchise in the city of Miami is offered for sale and proposals for construction will be received for thirty days by Mayor John W. Watson, Miami. The conditions under which the proposals will be received are referred to on page 96 of the advertising section of this issue.

Atlanta, Ga.—The Georgia Railway & Power Company has asked the Council for a franchise to extend its College Park line into Alabama Street as far as Broad Street in Atlanta.

Pascagoula, Miss.—The Pascagoula Street Railway & Power Company has asked the Council for a twenty-five-year extension of time on its franchise in Pascagoula.

Red Lodge, Mont.—The Red Lodge Electric Railway has received a franchise from the Council in Red Lodge. The company will ask the Council in Bearcreek for a franchise in Bearcreek. This is part of a plan to build a line to connect Red Lodge, Washoe and Bearcreek. C. C. Bowlen, president. [E. R. J., March 14, '14.]

Dobbs Ferry, N. Y.—At the election at Dobbs Ferry on March 17 the electors declared themselves in favor of the repeal of the Burns law, which prohibits the granting of a franchise for an electric line along the Boston Post Road in the villages along the Hudson.

Madison, Wis.—The Chicago & Wisconsin Valley Railroad has asked the State Railroad Commission for permission to build a line from Madison to Janesville.

Milwaukee, Wis.—The Milwaukee Traction Company has asked the Council for a franchise to build a one-mile line over certain streets in Milwaukee. This line will extend from Green Bay Avenue and the Port Washington Road to Evergreen Park. [E. R. J., May 3, '13.]

TRACK AND ROADWAY

Lethbridge (Alta.) Municipal Tramway.—Plans are being considered to extend this company's line to Hardieville during the year.

Little Rock Railway & Electric Company, Little Rock, Ark.—Work will be begun at once by this company relaying its track on East Markham Street between Main Street and Commerce Street in Little Rock.

***Blythe, Cal.**—An electric railway through the Parker Indian Reservation, the survey for which is now being made, will soon be built. The line will run from Parker, Ariz., to Ehrenberg, with possible extensions into Palo Verde Valley and Cibola Valley.

Marin County Electric Railway, Mill Valley, Cal.—This company has filed an amended application with the Railroad Commission asking for authority to issue $75,000 in stock for the purpose of building an electric railway in Mill Valley. It is proposed to run one branch from the Northwestern Pacific depot, in the center of Mill Valley, along Throckmorton Avenue to a point near the Cascade reservation and to extend a second branch from a point near the Northwestern Pacific depot to the high school between Mill Valley and Sausalito. [E. R. J., Feb. 14, '14.]

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company is asked to consider plans to extend its line into the business center of Oakland.

***San Francisco & Northern Railway, San Francisco, Cal.**—This company is being organized and financed by E. H. Rollins & Company, San Francisco, to succeed the Petaluma & Santa Rosa Railroad and build an electric railway which will afford a direct service between Petaluma and Healdsburg, with a steamer connection at Petaluma for San Francisco.

Georgia Railway & Power Company, Atlanta, Ga.—The Decatur Board of Trade has asked this company to extend its Druid Hills line to Decatur. The line now ends 2 miles from the DeKalb courthouse in Decatur.

Valdosta (Ga.) Street Railway.—Work will be begun at once by this company on the line through the western part of Valdosta.

Alton, Granite & St. Louis Traction Company, Alton Ill.—This company is negotiating for permission to cross the tracks of the Chicago & Alton Railroad and the Chicago, Burlington & Quincy Railroad, so that the electric line may be extended to the site of the proposed asylum east of Alton, Ill.

Kankakee & Urbana Traction Company, Urbana, Ill.—During the year this company plans to build 10 miles of new track between Ludlow and Paxton.

Louisville & Southern Indiana Traction Company, New Albany, Ind.—This company plans the extension of its Jeffersonville lines to Claysburg, a suburb of that town. The board of trustees of Claysburg, which has opposed granting a franchise, is now said to be willing to have the line built.

New Albany & French Lick Valley Traction Company, New Albany, Ind.—Contracts have been awarded by this company for the construction of the line between Greenville and Palmyra. This is part of a plan to build an electric line from New Albany to West Baden Springs and French Lick Springs via Mooreville, Greenville, Palmyra, Hardingsburg and Paoli. John H. Martin, Palmyra, president. [E. R. J., Nov. 22, '13.]

***Tipton, Ind.**—An electric railway will be built between Marion and Tipton, Ind., by E. N. Todd, T. E. Dean and D. G. Dean, Windfall, Ind. Lines from Marion to Hartford City and Logansport, Ind., are also contemplated.

Kansas City, Kaw Valley & Western Electric Railway, Bonner Springs, Kan.—Work will proceed as the result of an agreement reached between this company and the Union Pacific Railway. The electric railway signed a thirty-year lease on the right-of-way, which is claimed by the Union Pacific Railway under old Congressional grants. The Union Pacific Railway by this means protects its rights to the land where similar disputes arise in the future. The injunction secured by the Union Pacific Railway has been dissolved and work on the electric railway will be rushed. J. D. Waters, Bonner Springs, president. [E. R. J., Feb. 14, '14.]

Fort Scott & Pittsburg Railway, Fort Scott, Kan.—Surveys have been completed by this company for its 35-mile line between Fort Scott and Pittsburg, via Garland, Arcadia, Mulberry and Frontenac. It is not yet decided when construction will be begun. A. B. Dickman, Fort Scott, president. [E. R. J., Jan. 3, '14.]

Frontenac, Mulberry & Arcadia Electric Railway, Pittsburg, Kan.—At a stockholders' meeting held at Joplin, Mo., the name of the company was changed from the Frontenac, Mulberry & Arcadia Electric Railway to the Kansas City, Fort Scott, Frontenac & Pittsburg Railway. It was decided to expedite work on the proposed electric line between Frontenac and Fort Scott, Kan. [E. R. J., Feb. 14, '14.]

Louisville & Interurban Railway, Louisville, Ky.—This company is asked to consider plans to extend its Okolona line in Louisville.

Madisonville-Nortonville Light, Power & Traction Company, Madisonville, Ky.—Surveys have been completed by this company for its 11-mile electric railway to connect Madisonville, Victoria, Earlington, Barnsley, Morton's Gap and Nortonville. Contracts for the construction of the line will be awarded during April. [E. R. J., Jan. 10, '14.]

Minnesota Northwestern Electric Railway, Minneapolis, Minn.—Contracts will be awarded by this company on Apr. 1 for grading, track-laying and surfacing the first 20-mile section of its line to connect Thief River Falls, Germantown, North Silverton, Cloverleaf and Goodridge. H. W. Protzeller, general manager. [E. R. J., Nov. 1, '13.]

Twin City Rapid Transit Company, Minneapolis, Minn.—Work will be begun soon by this company on the construction of six extensions and a crosstown line in Minneapolis.

Frontier Electric Railway, Niagara Falls, N. Y.—Plans are being made by this company to begin work at once on its line between Niagara Falls and Buffalo. It is understood that the section between the Buffalo city line and North Tonawanda will be completed first. James S. Simmons, Niagara Falls, vice-president. [E. R. J., Feb. 28, '14.]

Black River Traction Company, Watertown, N. Y.—Plans are being considered by this company to build an extension on Washington Street in Watertown.

Piedmont & Northern Railway, Charlotte, N. C.—Plans are being considered by this company to extend its lines to High Point, Greensboro and Winston-Salem.

Cincinnati, Indiana & Louisville Railway, Cincinnati, Ohio.—Preliminary arrangements are being made by this company to begin work this summer on its 85-mile steam and gasoline-electric railroad to connect Cincinnati, Lawrenceburg, Aurora, Rising Sun, Detroit, Patriot, Vevay and Madison. L. S. Cook, Madison, is interested.

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—This company advises that it has as yet made no definite plans when work will be begun on its 30-mile line to connect Chardon, Hampton, Fontville, Rock Creek and Jefferson, Ohio, and Linesville, Pa. C. H. Felton, 735 Williamson Building, Cleveland, secretary. [E. R. J., Feb. 21, '14.]

Cleveland-Pennsylvania Interurban Railway, Cleveland, Ohio.—Contracts will be awarded and construction will be begun by this company within the next six weeks to build 23 miles of single track and 29 miles of double track between Cleveland and Sharon. A contract for 150,000 ties has been let. The power house will be located at Kinsman and the repair shops at Mesopotamia. It is planned to operate ten gasoline-electric cars. Capital stock, authorized, $50,000, to be increased to $2,000,000. Bonds, authorized, $2,000,000. Officers: E. C. Ashley, Cleveland, president; H. P. Smith, Cleveland, vice-president; John Lindy, Cleveland, treasurer; Harlan Sperry, Middlefield, superintendent, and F. B. Morgan, Cleveland, general manager, purchasing agent and chief engineer. [E. R. J., Feb. 28, '14.]

Goderich, Ont.—At a meeting of the Town Council and Board of Trade on March 11 the importance of the Hydro-Electric Radial Railway was recognized. The whole council, with five members of the Board of Trade, will attend a meeting of municipal representatives to be held shortly to urge the building of a line from Goderich to Exeter and St. Mary's, with a connection to London, Ont.

***London, Ont.**—It is understood that a charter will be applied for, by private interests, to build an electric line from London to Grand Bend to Stratford. It is also said that the ultimate plans include Woodstock, Guelph, Galt, Toronto and St. Catharines. This line would cover much the same territory as some of the lines projected by the municipalities and to be built by the Hydro-Electric Power Commission of Ontario.

Ottawa, Rideau Lakes & Kingston Railway, Ottawa, Ont.—The Ontario Legislature is being asked for an extension of time to build this projected railway from Ottawa to Kingston, Ont. G. L. Dickinson, Ottawa, secretary.

Toronto & Hamilton Railway, Toronto, Ont.—This company, which received its charter in 1903 with a capitalization of $500,000 to build an electric line from Toronto to Hamilton, has had its plans revived. It had power to enter into agreements for running rights or to lease or acquire other electric railways.

Hershey (Pa.) Transit Company.—Plans are being made to soon award contract to build its line between Elizabethtown and Hershey.

Montreal (Que.) Tramways.—Plans for an expenditure of about $2,000,000 during the present year, on improvements of its lines, are being prepared by this company. Among the improvements will be several extensions, double-tracking and the reconstruction with heavier rails of some of its lines in Montreal.

Northwestern Electric Railway, Easley, S. C.—This company advises that it has not yet decided when work will be begun on its line to connect Easley, Augusta, Anderson, Abbeville, McCormick and Edgefield. Capital stock authorized, $1,000,000, with the privilege to increase it to $2,000,000. James E. Leach, Easley, is interested. [E. R. J., Feb. 14, '14.]

Jackson Railway & Light Company, Jackson, Tenn.—Work has been begun grading and track-laying for the 2-mile extension from the present terminus on Main Street in Jackson to the Country Club.

Maryville-Knoxville Railway, Knoxville, Tenn.—Grading has been begun by this company on its line to connect Maryville, Rockford, Little Rock, Vestal and Knoxville. Arrangements have been made to connect this line with that of the Knoxville Railway & Light Company at Vestal. John M. Clark, Barryville, secretary. [E. R. J., Jan. 24, '14.]

Eastern Texas Traction Company, Dallas, Tex.—Work has been begun by this company on its line between Greenville and Dallas. J. W. Crotty, general manager. [E. R. J., Jan. 31, '14.]

Dallas Southwestern Traction Company, Dallas, Tex.—Preliminary plans for the construction of this railway from Dallas to Cleburne and Glen Rose are being made by this company, E. P. Turner, Dallas, president. [E. R. J., March 14, '14.]

Northern Texas Traction Company, Fort Worth, Tex.—Ties and rails are being purchased by this company preparatory to double-tracking its line through Arlington and on to Grand Prairie, when the paving of Abram Street is begun in Arlington.

Utah Light & Railway Company, Salt Lake City, Utah.—Material has been ordered by this company for the construction of 13 miles of electric railway, overhead and track, to cover the 5-mile proposed northern extension to Farmington, the 1-mile extension south on Seventh East Street, and the 5 miles from Holliday to the lower power house at the mouth of Big Cottonwood canyon, leaving the extra amount for sidings and connections.

Blaine-Lynden Electric Railway, Blaine, Wash.—This company, the incorporation of which is noted elsewhere in this issue, is securing the right-of-way for its line to connect Blaine and Lynden. John J. Pinckney, Blaine, president. [E. R. J., Feb. 21, '14.]

Wisconsin Electric Railway, Oshkosh, Wis.—Preliminary surveys are being made by this company for its line between Madison and Oshkosh.

SHOPS AND BUILDINGS

San Francisco-Oakland Terminal Railways, Oakland, Cal.—This company is making plans to build a three-story office at Twenty-second Street and Grove Street in Oakland.

Boston & Worcester Street Railway, Boston, Mass.—Plans are being considered by this company to build a new freight and express depot in Marlboro.

St. John (N. B.) Railway.—Plans for the construction of a new carhouse on Wentworth Street in St. John are being made by this company.

Cleveland (Ohio) Railway.—Plans are being prepared by this company to build stations similar to the one at St. Clair and 129th Street in Cleveland. The stations are to be located at Superior Avenue and East 123d Street, Harvard Avenue and East Forty-sixth Street, and Kinsman Road and East 105th Street, Cleveland. The first two will cost about $50,000 each, and the latter $30,000. They will be two stories high and the construction will be of brick and concrete. Morrow & Cross are the architects.

Montreal (Que.) Tramways.—Along the improvements planned by this company during the present year will be the construction of two new carhouses in Montreal.

POWER HOUSES AND SUBSTATIONS

Alexandria (La.) Electric Railway.—This company has entered into an agreement with the Bayou Rapides Lumber Company, whereby the railway company will move its power plant to the plant of the sawmill company, and the sawmill company is to furnish fuel to run the plant. The old power house in Thorn Street will be used as a carhouse.

Cumberland (Md.) Electric Railway.—Plans are being considered by this company to build a new power plant on a plot of ground of about six acres, just west of Cumberland, recently purchased by this company and the Edison Electric Light Company.

Holyoke (Mass.) Street Railway.—Plans are being made by this company to spend $100,000 for additional equipment for its power plant in Holyoke. Contracts for part of the work have already been awarded. Within a few days, it is expected, the contracts for the remainder of the work will be awarded. The plans call for the installation of a new generator, engine, boilers and automatic stokers for the whole battery of boilers in operation at the plant. The contract for the generator has been awarded to the General Electric Company, and the engine will be furnished by the Rice & Sargeant Engine Company, Providence, R. I. The present plant develops 4000 hp, and the new unit will increase the development to 6000 hp.

Public Service Railway, Newark, N. J.—This company has ordered from the General Electric Company one 1500-kw rotary converter outfit for its Hoboken substation, one 1000-kw rotary converter for its Camden substation, and five 500-kw converters for several other substations. The above orders include accessory transformer and switchboard apparatus, feeder regulators and lighting transformers. Other sundry equipment for forty-four substations has been ordered. This company expects to purchase shortly two 20,000-kw turbo-generators for instalment in the new Newark power station.

Piedmont & Northern Railway, Charlotte, N. C.—This company has placed in operation its new power plant in Burlington.

Porto Rico Railway, Light & Power Company, San Juan, Porto Rico.—This company has recently ordered, through its purchasing agent, the Electrical Engineering & Purchasing Company, New York, N. Y., some power station equipment for its new hydroelectric plant at the Comerio Dam in Porto Rico. This equipment, which will be shipped in about a month, includes one Westinghouse 2000-kva a.c. generator, two 2000-kva three-phase transformers, one 25-kw motor-driven exciter set, one battery-charging generator, one fourteen-panel switchboard and turbine equipment.

Utah Light & Railway Company, Salt Lake City, Utah.—Plans are being made by this company to build a new power house at Farmington. An additional motor-generator will be installed at the Cottonwood plant.

Manufactures and Supplies

ROLLING STOCK

Harrisburg (Pa.) Railways is contemplating the purchase of new cars.

Springfield (Ill.) Traction Company is reported to be considering the purchase of new cars.

Jefferson Traction Company, Punxsutawney, Pa., expects to purchase one combination double-truck car.

Kankakee & Urbana Traction Company, Urbana, Ill., expects to purchase one baggage and freight car.

Corning & Painted Post Street Railway, Corning, N. Y., expects to purchase about four second-hand cars.

Third Avenue Railway, New York, has ordered from The J. G. Brill Company a sample care equipped with Radiax trucks.

Havana Electric Railway, Light & Power Company, Havana, Cuba, is building about fifty passenger cars in its own shops.

Manhattan & Queens Traction Corporation, New York, N. Y., has ordered through MacArthur Brothers, contractors, one sprinkler from The J. G. Brill Company.

Morris County Traction Company, Morristown, N. J., has ordered through W. R. Kershner ten 36-ft. all-steel interurban car bodies from the Cincinnati Car Company.

Montreal (Que.) Tramways is preparing a budget calling for an expenditure of about $2,000,000, part of which amount will be used for the purchase of 100 new double-truck cars.

Wilkes-Barre Railway Company, Wilkes-Barre, Pa., is having plans submitted for ten center-entrance cars, which it expects to purchase within the next week or ten days.

New York, Auburn & Lansing Railroad, Ithaca, N. Y., has ordered two 70-ft. motor cars from the McKeen Motor Car Company, to be operated supplementing the present steam service between Ithaca and Auburn.

Lehigh Valley Transit Company, Allentown, Pa., is completing in its own shops one 50-ft. arched roof special parlor car, which is equipped with a kitchen and a smoking compartment. Automatic ventilators are specified.

Arkansas & Northwestern Railroad, St. Louis, Mo., a steam road, has ordered one storage-battery car from The J. G. Brill Company. Storage-battery equipment will be supplied by the Railway Storage Battery Car Company.

Southern Illinois & St. Louis Railway, Harrisburg, Ill., expects to be in the market in the near future for six 60-ft. motor passenger cars, three 60-ft. trail cars, three 50-ft. motor cars, two 50-ft. express trail cars, two 60-ton locomotives, twenty box cars and twenty flat cars.

Long Island Railroad, New York, N. Y., has ordered two 32-ft. 7-in. double-truck storage battery cars from The J. G. Brill Company for train operation on the New York Bay extension between Valley Stream and Mineola. One car will be straight passenger and one combination passenger and baggage. The cars will be equipped with Railway Storage Battery Car Company storage battery equipments, Westinghouse control and motors and Westinghouse air brakes.

Schenectady (N. Y.) Railway has been recommended by the Public Service Commission of the Second District of New York to add to its equipment as soon as possible eight new closed motor cars and ten large trail cars. The commission has also recommended that the company withdraw from service all of the forty single-truck cars and replace them with cars with a seating capacity of not less than forty by the purchase of new cars or the reconstruction of old ones. The withdrawal and replacement of this equipment is to be completed not later than Nov. 1, 1914.

Utah Light & Railway Company, Salt Lake City, Utah, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 14, 1914, as having ordered twenty-four semi-steel closed cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity..........56
Weight of car body..23,500 lb.
Bolster centers, length, 24 ft. 2 in.
Length of body........36 ft.
Length over vestibule..50 ft.
Width over sills.....8 ft. 4 in.
Width over all......8 ft. 7 in.
Height, rail to sills, 2 ft. 10 9-16 in.
Height, sill to trolley base, 8 ft. 10 11-16 in.
Body ....composite
Interior trim.........cherry
Headlining ....Agasote
Roof.............plain arch
Underframe ....metal
Air brakes.....Westinghouse
Axles...........heat treated
Bumpers..........angle iron
Cables ....Westinghouse
Car trimmings........bronze
Control.......West., 18 cars, K-28-B; 6 cars, HL
Curtain fixtures..Cur. Sup. Co.
Curtain material...Pantasote
Destination signs, Elec. Serv. Sup. Co.
Fenders, Hunter Car Sign Co.
Gongs.........Brill dedenda
Hand brakes.........Dayton
Heaters ....Consol.
Headlights.18 cars, Esterline "Golden Glow"; 6 cars, Gen. Elec. D-15
Motors...West., outside-hung
Registers ....Sterling
Sanders...........ry. design
Sash fixtures..O. M. Edwards
Seats...........Hale & Kil.
Seating material......rattan
Trolley catchers, Trolley Supply Co.
Trolley base..Ohio Brass Co.
Trucks, type..Brill 27, GE 1 and Standard Truck Co. O-50
Ventilators...Ry. Utility Co.
Wheels..........rolled steel
Special devices, etc., Hedley anti-climber, Elec. Serv. Sup. Co.'s automotoneers

TRADE NOTES

Union Switch & Signal Company, Swissvale, Pa., has appointed Sidney G. Johnson as vice-president. Mr. Johnson was formerly general sales manager of the company.

Van Dorn & Dutton Company, Cleveland, Ohio, has opened a district sales office at 50 Church Street, New York, N. Y., in charge of M. P. Fillingham, district sales manager.

Mitsui & Co., Ltd., New York, N. Y., exporters, have recently exported 114 light signals, manufactured by the Union Switch & Signal Company, for installation on the Keihan Electric Railway, Japan.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., will hold a meeting of its directors on March 25 at which consolidation with the Westinghouse Machine Company will be considered.

Pyrene Manufacturing Company, New York, N. Y., has received recent orders for extinguishers from the Morris County Traction Company, Albany Southern Railroad and New York, New Haven & Hartford Railroad.

Siemund Wenzel Electric Welding Company, New York, N. Y., has appointed George Hills as general sales agent, with headquarters at 30 Church Street. Mr. Hills recently resigned as president of the Welding Materials Company, New York, N. Y.

Great Western Smelting & Refining Company, St. Louis, Mo., has appointed J. B. Mendenhall, formerly with the National Lead Company, St. Louis, Mo., to a position in which he will handle a line of metals and materials similar to those he handled in his former position.

Railway Storage Battery Car Company, New York, N. Y., has been organized at 30 Broad Street. The new officers are well known in the railway field and are prepared to take orders for storage battery cars, having been given exclusive license under the Thomas A. Edison patents for the use of Edison batteries for electric car service.

Westinghouse, Church, Kerr & Company, New York, N. Y., have been retained by the Canadian Pacific Railway as engineers to investigate the matter of the proposed electrification of the new double-track, 5½-mile Selkirk Tunnel in British Columbia. The investigations will cover in general the type of system to be installed, the relative economies of steam and water power and the effect of the electrification upon operating conditions.

McGuire-Cummings Manufacturing Company, Chicago, Ill., has elected Calvin T. Biddison as vice-president. Mr. Biddison has been an employee of that company, serving in various positions, for the past twenty-five years, being advanced to the position of vice-president from that of general superintendent of the company. John T. Giblin, who has served in various positions for the past ten years, has been advanced from the position of purchasing agent to that of secretary of the company.

Esterline Company, Indianapolis, Ind., manufacturer of curve drawing instruments, has recently opened the following additional branch offices: F. C. Morton, Walker Bank

Building, Salt Lake City, Utah; G. W. Pieksen, Room D-19, Railway Exchange Building, St. Louis, Mo.; J. S. Black, 908 Hennen Building, New Orleans, La.; W. W. Geisse Company, McKnight Building, Minneapolis, Minn.; General Supplies, Ltd., 122 Eleventh Avenue, West Calgary, Alta.; G. L. Priest, 229 Sherlock Building, Portland, Ore. The above offices are equipped with an expert engineering staff, full set of samples, together with all information necessary for promptly taking care of any questions that may arise in connection with the sale or use of graphic instruments.

Clark Electric & Manufacturing Company, New York, N. Y., has received an order from the Chile Exploration Company, New York, N. Y., for a large quantity of seamless splicing sleeves to be used on the latter company's copper transmission and steel ground lines in South America. Last week, at the New York testing laboratories, a ⅜-in. Siemens-Martin steel cable, twisted into a standard seamless tinned copper splicing sleeve, broke outside of the sleeve before pulling out from it and developed approximately 99 per cent of its ultimate tensile strength. No. 000 stranded copper conductor developed practically its full 100 per cent ultimate tensile strength. Another large shipment of sleeves will be made to the Ebro Irrigation & Power Company in Spain on order from the Pearson Engineering Corporation, New York, in the near future. Recent orders have been received from the Connecticut River Transmission Company, Eastern Pennsylvania Railways Company and American Gas Company for overhead protective clamping sets for use at railroad right-of-way, telephone crossings, etc.

ADVERTISING LITERATURE

National Scale Company, Chicopee Falls, Mass., has issued a folder describing its counting machines and elevating trucks.

Monarch Refillable Fuse Company, Buffalo, N. Y., has issued Bulletin No. 20 describing its ferrule and knife blade contact type refillable fuses.

McGill Manufacturing Company, Valparaiso, Ind., has issued a catalog listing its complete line of lamp guards, portables and other electrical specialties.

Esterline Company, Indianapolis, Ind., has issued a folder containing letters referring to the order for 240 Golden Glow headlights recently placed by the San Antonio Traction Company.

Lamb Railway Service Company, Cincinnati, Ohio, has issued a catalog describing its weed burners and burners for melting snow and ice from railroad switches, interlocking devices and tracks.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a number of advertising sheets describing its ball-bearing mountings for vertical armature shafts of electric motors and for various other kinds of shafts.

National Tube Company, Pittsburgh, Pa., has issued Bulletin No. 11B, describing in a comprehensive and carefully compiled manner the history, characteristics and advantages of its pipe. The superiority of its quality over wrought-iron pipe is shown by illustrations of comparative tests of corrosibility, tensile strength, ductility and bursting pressure.

National Malleable Castings Company, Cleveland, Ohio, has issued Circular No. 51, describing and illustrating a few of the various designs of its rail braces and tie plates. Attention is drawn to the better rust-resisting quality of malleable iron than steel, which is invaluable for track fastenings, both because of the effect of atmospheric conditions and more especially from the brine drippings from refrigerator cars. Circular No. 65 describes safety brake levers. Circular No. 66 describes the safety clevis and pin for uncoupling rods.

Fonger Fender Company, Chicago, Ill., has issued a catalog describing and illustrating its tip-tilting automatic fenders. The fender is so hung on the car that its position may be governed from the platform by the motorman. Gravity with slight assistance swings the fender under the car or projects it within a fraction of a second. On encountering a person a tip-tilting or overturnable shield mounted on the front of the fender automatically and instantly tips backward and overturns to the street, thereby forming a scoop. The result of this operation is to trip up the person struck and land him safely on the fender screen without allowing any part of his body to become wedged beneath the fender.

Link-Belt Company, Chicago, Ill., has issued a link-belt data book No. 125 on silent chain drives. Besides giving complete engineering information on silent chain driving in simple and compact form, the book describes many uses of silent chain for the efficient transmission of power and gives specific reasons and illustrations showing application in a large variety of uses. This chain is a series of links connected by joints which consist of segmental case-hardened bushings and case-hardened steel pins. The chain is as flexible as a leather belt and as positive as a gear. Its rated efficiency is 98.2 per cent on actual test. It will transmit any amount of power quietly. Over 200,000 installations were drawn upon for the information contained in the book, which is the only work of its kind and consists of 112 pages, bound in flexible red cover.

Hunter Illuminated Car Sign Company, Flushing, N. Y., has issued a folder containing illustrations of the instalment of its car signs on one of the 175 New York Railways stepless cars and on a Boston Elevated Railway car, an order for which company is now being executed specifying 12,000 signs on 3000 cars. Other large orders are now being acted on for the Third Avenue Railway, Public Service Railway, Connecticut Company, Philadelphia Rapid Transit Company, International Railway, Pittsburgh Railways, Winnipeg Electric Railway, Bay State Street Railway, Rio Janeiro Tramways, Pernambuco Tramways, United Railways & Electric Company, Virginia Railway & Power Company, Washington Railway & Electric Company, Montreal Tramways, Portland Railway, Light & Power Company, Los Angeles Railway, Chicago City Railway, Chicago Railways, San Francisco Municipal Railway, Detroit United Railway, and Memphis Street Railway.

General Railway Signal Company, Rochester, N. Y., has issued Bulletin No. 106-A, describing its Model 1B lightning arrester. This arrester is the same in principle as the Model 1A arrester, but embodies several improved features in the construction and arrangement of the ground and line plates. Bulletin No. 130 describes EZ motion plate rail clips. This appliance provides a firm and substantial support for the detector bar, eliminating lost motion and reducing wear. There are two types of this rail clip, the web bolt type and hook bolt type. The former is bolted to the web of the rail and the latter to the flange of the rail. Five types of motion plates are furnished to provide for the various conditions of throw. Bulletin No. 115-C describes Model 2A signal with illustrations of the signals in service on several railways. Pamphlet 2019 (pocket size) also describes this signal, with the addition of instructions relative to its installation, maintenance and operation; diagrams showing dimensions and clearances of the high and dwarf signal mechanisms; diagrams showing R. S. A. standard foundations, signal masts, semaphore spectacles, signal blades and torque curves, and a number of typical circuit diagrams for interlocking a.c. and d.c. block signaling.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 45,601, describing its aluminum lightning arresters for alternating-current circuits and choke coils and other connections for use with them. The important features in electrolytic lightning arrester design and embodied first in G-E arresters are as follows: oil as a heat-absorbing and insulating medium, insulating barriers between cone stacks and tank, iron pipe work throughout for horn gap structure, charging contacts, charging resistances, transfer switch for interchanging cone stacks for charging, handwheel for operating transfer switch, steel tanks, rim separators for cones, and grounded tank on very high voltages. Bulletin No. 45,600 describes aluminum lightning arresters for use in connection with railway signal circuits. Bulletin No. 44,590 describes Type ML governor for motor-driven air compressors. The function of this governor is to automatically control the operation of either stationary or railway motor-driven air compressors in order to maintain air pressure in a storage reservoir between predetermined limits. Bulletin No. 47,400 describes Type F, Form K12, oil switches, for use on circuits not exceeding 22,000 volts. Bulletin No. A4200 describes strain insulators and strain clamps suitable for insulating and supporting power house wiring and overhead distributing cables and wires.

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VEHICULAR TRAFFIC AND SERVICE DELAYS

A statement recently compiled by the Rochester lines and published elsewhere in this issue relative to the loss of time and causes of interruption to their service during the past fourteen months is of decided interest as being a concrete representation of a problem that confronts all city electric railways. The statement mentioned shows a loss of almost four days' time owing to wagons and autos breaking down or becoming stalled on the car tracks, this being exclusive of the multitudinous petty delays that occur every day before moving vehicles clear the tracks. Could this lost time be calculated, the total would undoubtedly assume far greater proportions. The problem of avoiding these delays is a serious one all the year round. In the winter months the facility and speed with which the railways open up their snow-covered tracks is in reality a special invitation for vehicles to flock to that part of the street, an opportunity of which they are not slow to take advantage. During the other months, too, the smooth surface of the rails attracts them, and the result is a persistent annoying obstruction to efficient service as well as increased danger of collisions.

REMEDY FOR TRAFFIC OBSTRUCTIONS

One remedy for the obstructions to electric railway service from the use of the track by vehicles is, of course, the installation of a rail which does not encourage vehicle use, like a high T-rail. Another remedial plan is that followed by the Rochester lines, which have made a direct appeal to the teamsters' union of that city to co-operate in minimizing the number of traffic delays. In commenting on this request, the *Labor Herald*, the official paper of the Central Trades and Labor Council in Rochester, says that "one of the most serious hindrances to rapid transit is the thoughtless and, it must be admitted, sometimes malicious blocking of the tracks by automobiles and other vehicles," and it calls attention to the fact that the teamsters and drivers as union men are committed to the rule of co-operation, efficiency and fair dealing as regards not only the carmen's union but also the public. The public is, indeed, the chief sufferer from this outrageous abuse of the streets. It seems the height of absurdity to let the driver of a coal wagon, whose time is worth perhaps $2 a day, delay unnecessarily fifty or a hundred business men in reaching their offices or homes, simply because it is somewhat easier for the coal wagon to run on the tracks rather than on some other part of the street, and it is to be hoped that this fact will be realized by city authorities.

THE A. R. E. A. MEETING

In this issue is printed a digest of the discussion of the committee reports presented last week at the annual convention of the American Railway Engineering Association. These reports contain much that is of value to electric railways. At the same time it should be borne in mind that the track conditions of the steam roads differ in several particulars from those on electric roads so that the conclusions accepted for the former cannot be applied directly to the latter. With the steam roads, for example, the weights to be carried by the track are very great, and this condition is not duplicated to any great extent on electric railways. This great weight per axle is the source of much of the wear on ties and the disturbance of ballast. Any element of track construction, therefore, in which weight of load is the determining factor does not greatly interest electric railway engineers. An example of this is the matter of tie wear, one of the serious problems in steam practice, as disclosed by the reports and discussion at Chicago. Tie wear is insignificant on electric railways. Another difference between the two kinds of practice is in the relation of strength to wearing qualities of rails. The broken rail is the *bête noire* of the steam railway engineer. He must take every precaution to secure rails free from pipes and proof against cracking. Life of the rail from the standpoint of wear is secondary to safety of passengers. The electric railway is not bothered by broken rails. Wearing qualities are everything. Of course, care in manufacture to reduce cooling stresses results in a more uniform rail texture which all appreciate. The steam road engineer, however, goes primarily after safety and gets other benefits incidentally, but a rail might be entirely suitable for interurban electric track which would be out of the question on steam track. Thus when the advisability of using expensive alloying metals comes up for settlement the decision must be reached on different grounds in the two cases. The above citations are made merely to illustrate the fact that, while electric and steam roads have many common interests, the conclusions reached for one are not necessarily binding upon the other. At the same time, each has much to learn from the other, and the increasingly closer relation between the railroad and electric railway engineering associations is evidence that this is appreciated. There is need for two separate organizations, but closer co-operation between them is desirable and should be fostered. This can be done best through individual membership in each association on the part of leading members of the other.

RENEWABLE CENTER OR SOLID-MANGANESE SPECIAL WORK

The use of manganese steel in the manufacture of electric railway special work is so new that until recently no service records were available. Sufficient time has now elapsed, however, since both the renewable center and solid-manganese special work have been in use for some definite conclusions to be drawn as to their ultimate economy and special fitness for different classes of service. There can be no question as to the superior qualities of manganese steel in resisting abrasion as compared with steel manufactured by the ordinary processes. There is, however, considerable question as to the economy of purchasing solid manganese instead of hard-center special work for frogs and crossings where the traffic over one piece produces flange wear and that over another results in a flowing or chipping of the metal under repeated impact blows.

On interurban roads where the equipment is heavy, the traffic is comparatively infrequent and the frogs are subjected to severe tensile strains as well as impact at the intersections of the flangeways, the economy of installing the solid-manganese special work has not been questioned. There seems also reason to believe that the solid manganese is more desirable than renewable center special work for certain other classes of installations, such as at crossings with steam railroads, where the special work is made up of A. S. C. E. rail sections and is subject to severe blows and tensile strains. But in both of these cases, of course, the conditions at each crossing should be considered to determine whether the service is sufficient to warrant the installation of a solid-manganese crossing instead of built-up special work which can be installed at much lower first cost. If the interest on the investment in the solid-manganese crossing exceeds the average annual maintenance charge on the built-up work, there is, of course, no economy in the solid-manganese crossing.

In city service, crossing frogs do not fail so much through severe blows or faulty foundations as from the constant succession of comparatively light impact blows caused by the continuous passage of city cars and the other traffic on the street. Under traffic of this kind there has developed, in some cities, a flowing or a chipping of the manganese steel, and as the life of the part where this wear occurs is no greater with solid manganese than with the renewable manganese-insert special work, and as the latter is considerably less in first cost, economy dictates its employment. On the other hand, with a frog in a wye connection or in a turnout, present indications point to greater life from solid-manganese construction. There are no bolted joints to fail as in built-up work, and the angle of intersection is usually so flat that a uniform flange wear rather than impact wear at one point governs the life of the piece.

To sum up, the following conclusions may be drawn from the information at hand: Where the flange wear governs the life of the piece and is uniform under either heavy or light equipment, the solid manganese is desirable, but where the wear is due largely to impact blows the hard-center construction should be employed. For interurban and steam road service, where A. S. C. E. rail sections are used and there is considerable question about maintaining a perfect bearing on the foundation under crossing frogs, the solid manganese commends itself because it is able to withstand more severe tensile strains than built-up or hard-center special work.

A DECADE'S GROWTH

The statistics of the electric railway industry obtained by the Census Bureau for the year ended June 30, 1912, are becoming available, and the first preliminary summary for the country was published in our issue of last week. These figures give statistics of the number of companies, miles of track, cars, persons employed, power, passengers and car mileage and a consolidated income statement, but do not include any of the balance-sheet figures. For this reason it is impossible yet to know the added investment during the past five and ten years. The table as given out by the Census Bureau contains a column giving the percentage of increase for each item between 1902 and 1912, and a column was added in our issue last week of the percentage of increase between 1907 and 1912 to show what proportion of the growth had occurred during the past five years.

As might have been expected, the table shows that most of the increase in miles of track occurred during the first half of the decade from 1902 to 1912. The passengers carried during that period increased much more rapidly than the car miles did, and in even a greater ratio during the last five years. This was undoubtedly due to a considerable extent to the use of longer cars, and perhaps also to a closer study of schedules on the part of the companies and to better loading conditions. During the decade, also, the transfer passengers increased more rapidly than the revenue passengers, but the column of the 1907-1912 percentages shows that this increase occurred entirely during the first half of the decade and that in the last five years the conditions were reversed. This, in turn, is undoubtedly due to the greater care recently exercised in preventing transfer abuses by the adoption of more scientific transfer systems.

A very interesting coincidence is shown by the increases in gross income, operating expenses and gross income less operating expenses for the decade. The increase in each of these figures from 1902 to 1912, by a singular coincidence, is the same, namely, 133.9 per cent. During the latter half of the decade the figures are respectively 36.6, 32.5 and 41.2. The operating ratios for the three years 1902, 1907 and 1912 were respectively 57, 60 and 58. It is possible that these latter figures reflect to some extent the placing in operation of a number of rapid transit lines, such as the New York subway, the Hudson & Manhattan and the Boston subway, which have low operating ratios but high fixed charges, but the data so far published are too meager to warrant any definite conclusions. The surplus for the two periods shows a decrease of 30.3 and 26 per cent respectively, indicating that most of the decrease in surplus has come during the latter half of the decade.

WHY NOT A TECHNICAL COMMISSION ON ELECTRIFICATION?

In our issue of March 29, 1913, we had occasion to comment on the suggestion brought before the New York Railroad Club by Frank J. Sprague that it was time to form a technical commission for two purposes, first, to decide upon the merits and limitations of each system of electrification, and, second, to devise means of financing which would enable the railroads to electrify with a minimum outlay of their own capital. Another "electrical night" of the club has come and gone, but the project for a technical commission apparently has not advanced one step. The way in which the second part of Mr. Sprague's suggestion would be carried out is a matter for future determination, but certainly no valid objections have yet been offered against an impartial engineering study of the electrification problem.

What one technical commission accomplished is perpetuated in the famous Zossen tests, which yielded many of the fundamental data for the present work of the Prussian and Bavarian State Railways electrifications. What another and similar commission has helped to do is attested by the remarks made by Mr. Huber-Stockar on the last "electrical night" of the Railroad Club, where he discussed the forthcoming electrification of the Erstfeld-Bellinzona section of the Swiss Federal Railways. The Swiss Electrification Commission was formed by the competing electrical manufacturers of Switzerland, by the Federal Railways and by other interests which would be affected in an important way by electrification. As previously reported in these columns, this commission studied the problem from every angle and suggested eventually that the single-phase system at 15,000 volts and fifteen cycles was the one which was best for Switzerland as a whole. While the opinion of the commission was not binding, it is worthy of note that the independent study conducted by the Federal Railways seems to point to the same conclusion except that the management saw no need to make a final decision while the extensive hydroelectric plants were building. In any event electrification is assured and a large sum has already been granted for the prosecution of the work.

It is clear from this experience that technical commissions made up of competing interests can certainly accomplish tangible results, and the history in this country ought not to be different. Even if such a commission did no more than determine questions of fact in regard to present conditions on existing installations, it would perform an important service. But with a strong body of unbiased engineers much more than that ought to be accomplished. Such a commission should be able to use its knowledge of existing conditions to determine the directions in which improvements during the future may be expected. Surely nothing is more discouraging to a steam railroad desirous of electrification than to have electrical engineers disagreeing, not only upon the probable operation of electrical apparatus on a proposed line, but even in regard to its present service on lines already in operation.

MAKING OPPORTUNITIES

Sooner or later the ambitious young technical graduate who has obtained a foothold in electric railway work is likely to feel himself hemmed in by departmental organization, particularly if he is employed by a fair-sized company. The specialization of modern industry has gone as far into transportation as into other fields, and the tendency of men without heavy responsibilities to become largely creatures of routine needs to be resisted. Under such conditions the ability to make opportunities for becoming more than normally useful is of great value. It is a splendid feature of electric railway work that it offers so many chances to the man with constructive imagination to develop along congenial and ultimately profitable lines.

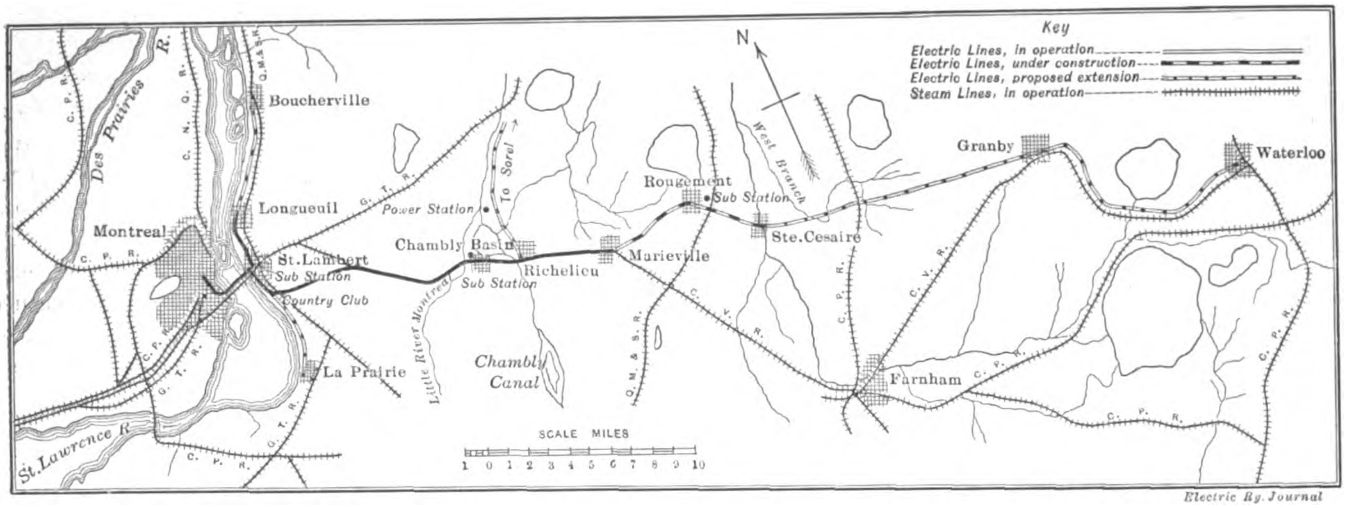
To illustrate by concrete cases, an electrically trained graduate was put at work in the civil enginering department of a city railway company and for some months assisted older men in the calculation of trackwork layouts, in tracing, blueprinting and other jobs that pertain purely to the drawing office. A new system of lines was under construction, including extensive additions to the car service, and as the entire problem was in the hands of the chief civil engineer, the young graduate saw an opportunity to make himself more useful by volunteering to prepare a special study of the car movements, with special diagrammatic analyses never before used in the department, tables of possible schedules and other traffic data. The informal report submitted was welcomed by the chief engineer and led to the compiler's being transferred from the drawing office to the designing room, thus giving him opportunity to do further new work along the lines which he desired and for which his education and tastes peculiarly fitted him. Out of this voluntary work came a closer association with the operating department prior to and following the inauguration of service on the new lines, an increase of nearly 300 per cent. in salary, and experience which led to work of great desirability and association with many of the abler men in the district in which the company operated.

No young man of enthusiasm and willingness to work hard for advancement can tell when such an incidental accomplishment as the ability to use the slide rule rapidly or a cultivated interest in testimony before a public utility board may lead to his selection for new and useful duties under the closer observation of his superiors. It is a good thing to try to become a master of one's work, and the history of all operating companies is filled with the stories, usually unwritten, of men whose advancement was based upon their determination to make themselves useful along lines previously unrealized.

Montreal & Southern Counties Railway

A 600-Volt D.C. Electrification of the Central Vermont Railway South from Montreal, and the First D.C. Catenary Line in Canada

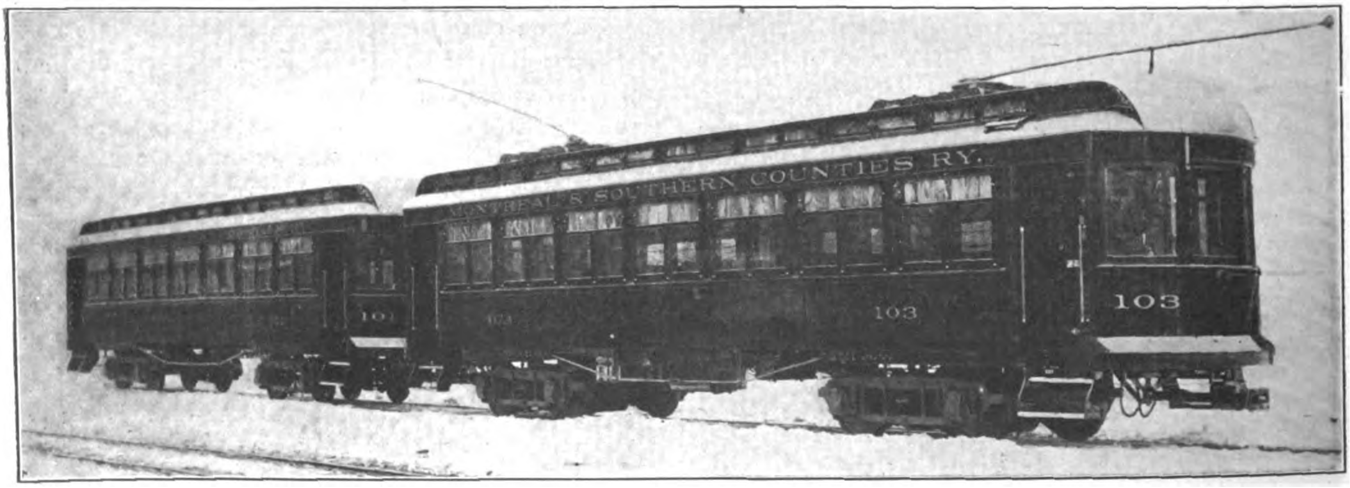
One of the most important electrifications in Canada now partly completed is that of certain parts of the Waterloo branch of the Central Vermont Railway, a subsidiary of the Grand Trunk system. These routes extending south of Montreal are not for heavy freight service but are really to be extensions to a suburban type electric railway. The parent line of the system is a 7-mile section between Montreal, St. Lambert and Longueuil, over the Victoria Jubilee bridge and along the southern bank of the St. Lawrence River, opposite Montreal, and this line and the others hereinafter described are operated under the name of the Montreal & Southern Counties Railway.


Key
Electric Lines, in operation
Electric Lines, under construction
Electric Lines, proposed extension
Steam Lines, in operation
N
Des Prairies R.
C. P. R.
C. N. O. R.
Q. M. & S. R.
Boucherville
Longueuil
Montreal
St.Lambert
Sub Station
Country Club
La Prairie
St.Lawrence R.
G. T. R.
Power Station
To Sorel
Chambly Basin
Richelieu
Sub Station
Little River Montreal
Chambly Canal
Marieville
Rougemont
Sub Station
Ste.Cesaire
West Branch
Granby
Waterloo
Farnham
C. V. R.
SCALE MILES
1 0 1 2 3 4 5 6 7 8 9 10
Electric Ry. Journal

Montreal & Southern Counties Railway—Route and Connections of Road

REASONS FOR CHOOSING 600-VOLT DIRECT CURRENT

When the question of electrifying the steam track arose, the Grand Trunk Railway was very strongly in favor of the single-phase system owing to its satisfactory experience with the single-phase operation of the Sarnia tunnel. It seemed as if the Central Vermont tracks were also suitable for that system, inasmuch as some 30 miles would be electrified, with the possibility of longer extensions later. The final choice, however, was left to the advice of Bion J. Arnold, consulting and constructing engineer. Mr. Arnold had been responsible for the single-phase electrification of the Sarnia tunnel, and he, too, was at first disposed to favor single-phase for the new work. He concluded in favor of 600-volt d.c., however, on a closer examination of the conditions. In the first place, the company had already in service in the vicinity of St. Lambert and Longueuil a 600-volt d.c. system with ten comparatively new eighty-passenger motor and three motor work cars. In the second place, the 7000-ft. Victoria Bridge, the only highway to Montreal, would be up to its allowable maximum loading on the cantilevered roadway with cars not exceeding 65,000 lb. weight. These weight limitations precluded the use of any single-phase cars except with two motors only. On the other hand, the use of direct current made it possible to get maximum adhesion by the use of a four-motor car within the prescribed weight. The third reason was that the company was not certain as to the ultimate extent of its electrification.


MONTREAL & SOUTHERN COUNTIES RY.
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103
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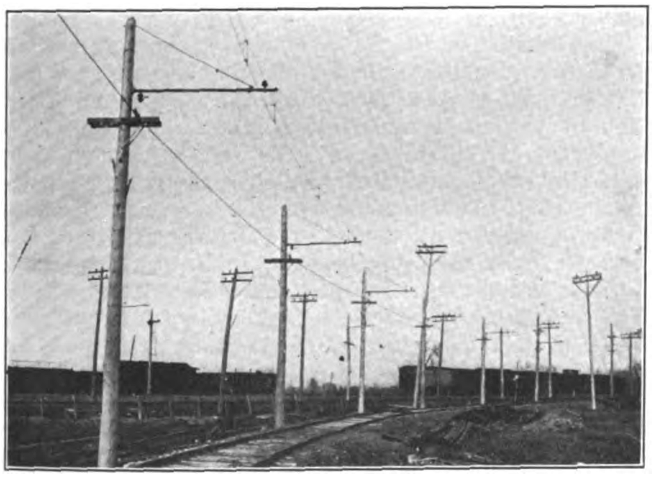
Montreal & Southern Counties Railway—Motor Car and Trailer

It was therefore decided to operate across Victoria Bridge and into Montreal with 600 volts d.c. and to build the Central Vermont extensions with highly insulated catenary construction suitable for eventual operation with either high-tension single-phase or direct current. This decision saved a large amount of money in the initial installation, yet left the company in an advantageous position to change to high-tension operation when conditions regarding the extensions are better known.

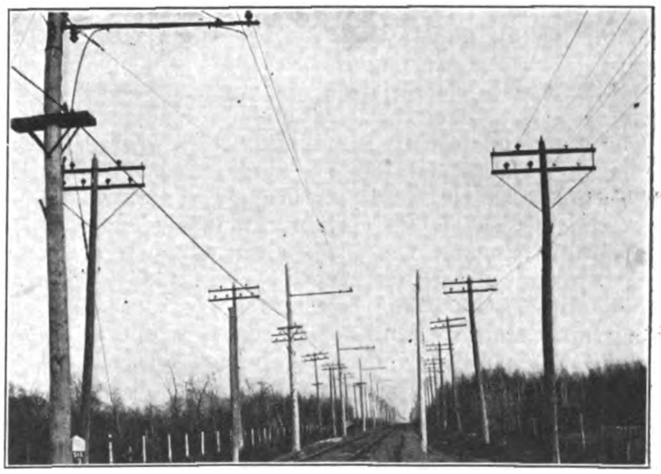
ROUTES

The electric line begins at McGill and Youville Streets, Montreal, and passes to the southern counties over the Victoria Bridge. The steam railroad electrification at present is about 18 miles of main line between St. Lambert and Marieville. An extension of this line is under way for the following 9 miles from Richelieu to St. Césaire, the electrified section of 4.4 miles to Marieville having been opened Sept. 27, 1913. The continuation of the road to Granby will be undertaken this year and will be over a new right-of-way beyond St. Césaire. With the completion of the latter electrification no steam trains will be operated on the electrified sections.

The branches now in operation are the pioneer 7-mile line between St. Lambert and Longueuil, and that between St. Lambert and Country Club, 1 mile. The company contemplates extending the first branch on new right-of-way to Boucherville, 5 miles, while the second branch is to be extended 4 miles to La Prairie during 1914. The charter of the company also gives it the right to build new lines from Richelieu to Sorel and through towns along the southwest shore of the St. Lawrence River. The total number of miles in operation as of Dec. 1, 1913, was thirty-one.



Montreal & Southern Counties Railway—Catenary Work on Curve



Montreal & Southern Counties Railway—Tangent 3 Miles from St. Lambert

TRACK AND LINE

The track is of new 60-lb. or old 56-lb. A.S.C.E. section throughout, except for 80-lb. rail on the lines between Montreal, St. Lambert, Longueuil and Country Club. The standard electrical connections for the old rails are No. 0000 flat ribbon-covered bonds and for new rails No. 0000 cable concealed bonds. The heaviest grade is only 3½ per cent and 550 ft. long at the east approach of the Victoria Bridge, and elsewhere the grades do not exceed 1½ per cent.

The first installation of catenary construction covered 15 miles of track, the hangers and fittings being supplied by the Ohio Brass Company. With few exceptions, the 7/16-in. steel catenary and the No. 0000 grooved copper trolley are carried from wooden poles and T-bar brackets over porcelain insulators. The poles are spaced 110 ft. apart on tangents. The sherardized hangers which are installed at intervals of 14 ft. are of the new type shown in an accompanying cut. This type is designated as C. N. flexible hanger with a three-screw Detroit clamp which is riveted to the ⅛-in. x ¾-in. steel suspension strap. The strap has a 3½-in. x ¾-in. loop to allow vertical movement of the hanger. This loop is snapped over the messenger cable and springs shut automatically to avoid disengagement through accident.

The standard clearance between rail and trolley is 22 ft., and this is increased to 23 ft. at railroad crossings. The bare aluminum d.c. feeders are carried the complete length of the lines. Their conductivity is equivalent to 500,000 circ. mil copper. The feeder lines are carried on malleable-iron composition insulators set on standard oak pins, which in turn are supported by pine cross-arms. Garton-Daniels 625-volt lightning arresters are installed every ten poles in connection with Dossert feeder taps. The private telephone line is transposed every three poles to protect it against inductive effects.

ENERGY SUPPLY

Energy is purchased. All substations are arranged for additional units and in every case the principal machines are of Westinghouse manufacture.

The original line was supplied with power from two engine-driven generators located in the Port St. Charles power house of the Grand Trunk car department. The increase in business on the original and proposed lines necessitated greater capacity in generators, and accordingly a substation situated at St. Lambert was designed not only to supplant the old steam station but to take care of the new interurban business on the electrified track. This substation has three 500-kw, three-phase rotary converters which receive energy via step-down transformers from two 22,000-volt, sixty-three-cycle lines of the Montreal Light, Heat & Power Company.

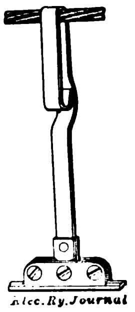
Owing to the fact that the voltage supply at Chambly may vary as much as 12 per cent, the substation at that place has a motor-generator set which is of 400-kw capacity. Normally the St. Lambert and Chambly stations, which are 14 miles apart, are in parallel with a section breaker midway. A third substation is to be located at Rougemont, about 3.5 miles from St. Césaire. This will contain one 300-kw motor generator set to be fed from a new line which will be built from Chambly on the railway's own right-of-way over a separate line for the 4 miles between

Richelieu and Marieville and over the trolley poles from Marieville Junction to Rougemont, 4.7 miles. The combination railway and transmission poles are 40 ft. long, but owing to the difficulty in obtaining this length those on the right-of-way will be 35 ft.

CARS AND CARHOUSE

The first twelve cars of this company are 49 ft. 4 in. long over all and were built at the shops of the Grand Trunk Railway and by the Ottawa Car Company. Ten are passenger with smoking compartment and two are combination baggage and passenger motor cars. They have single-end K control with four Westinghouse 101-B-2 40-hp motors, geared 18:66, placed on Curtis trucks. The cars are also fitted with Westinghouse automatic air brakes. They weigh approximately 54,500 lb. Eight more cars have since been furnished by the Ottawa Car Company. These cars resemble the first type, except that they have steel underframes and carry four Westinghouse 306 interpole motors, double-end, HL control and Tomlinson form 8 air-connecting coupler for train service. Two of these cars are straight passenger, two are combination baggage and passenger, and four are passenger cars with a smoking compartment. The other rolling stock includes two passenger trailers which weigh 36,000 lb., one sweeper-locomotive, equipped with four Westinghouse 306 motors; also two rotary snow plows and one work car with quadruple Westinghouse 101-B-2 motor equipment and one single-truck sweeper.

Montreal & Southern Counties Railway—Substation at Chambly



Catenary Suspension

The Montreal & Southern Counties Railway has placed an order with the National Steel Car Company, Ltd., Hamilton, Ont., for six motor passenger cars and two trailer passenger cars, each 54 ft. 2 in. long over all and 8 ft. 6 in. in width. Each car is to be a combination smoker and passenger car, to seat a total of sixty passengers. The cars are to be of steel underframe construction, Pullman design, the motor cars arranged for single-end operation. The latter will be equipped with Westinghouse interpole No. 306 50-hp motors and non-automatic HL Westinghouse control. Each car will have two toilet rooms and will be heated with Gold electric heaters.

The company also has placed an order with the same car builder for two motor baggage and express cars with over-all dimensions of 49 ft. 4 in. x 8 ft. 6¼ in. These cars will have a steel underframe, wooden superstructure and a plain arch roof. The electrical equipment of each baggage car will be similar to that of the motor passenger cars, except that the baggage cars are to be for double-end operation.

To accommodate the additional cars required by the extensions and increase of local business, the carhouse at St. Lambert has been enlarged from three tracks for eight 50-ft. cars by a 200-ft. x 55-ft. addition, housing four tracks, which makes the total capacity twenty-four cars. A 125-ft. x 30-ft. annex is used as a general office and operating quarters. All heavy repairs, however, are carried on at the St. Charles shops of the Grand Trunk Railroad.

SERVICE AND ENGINEERING

The best headway on this system is the twenty-minute service between Longueuil and Montreal. A two-hour service is given to Richelieu and Marieville, while the stub-line service to St. Lambert and Country Club varies greatly in accordance with traffic conditions.

The line was constructed by the railway company's forces under general direction of W. B. Powell, general manager, according to plans and specifications prepared by B. J. Arnold. All the work was also under the supervision of Mr. Arnold, who was represented in the field by A. T. Hunt, assistant engineer.

STATISTICS OF RAILS AND PIG IRON

The Bureau of Statistics of the American Iron and Steel Institute has issued bulletins containing figures for the total production of all kinds of rails and of pig iron by grades in the United States in 1913. The production of all kinds of rails in 1913 amounted to 3,502,780 tons, against 3,327,915 tons in 1912, an increase of 174,865 tons, or over 5.2 per cent. Included in the total for 1913 are 195,659 tons of girder and high T steel rails for electric and street railways, against 174,004 tons in 1912 and 205,409 tons in 1911. The maximum production of all kinds of rails was reached in 1906, when 3,977,887 tons were rolled, or 475,107 tons more than were produced in 1913.

Of the total production of rails in 1913, 3,303,944 tons were rolled from open-hearth Bessemer and electric steel blooms or billets, against 3,165,939 tons in 1912; 43,793 tons were rolled from new seconds, defective new rails and steel crop ends, against 42,586 tons in 1912, and 155,043 tons were re-rolled from old steel rails or were renewed steel rails, against 119,390 tons in 1912.

Included in the 157,479 tons of rails rolled in 1913 and classified as electric and re-rolled steel are 2436 tons of rails rolled from electric steel and 155,043 tons of renewed rails or rails rolled from old steel rails which the makers were unable to classify as open-hearth or Bessemer. In 1912 there were 3455 tons of rails rolled from electric steel and 119,390 tons rolled from old steel rails or from renewed rails. Twenty-five works in thirteen states rolled or re-rolled rails in 1913, as compared with twenty-four works in twelve states in 1912.

PIG IRON PRODUCTION IN 1912 AND 1913

Grades—Gross Tons	1912	1913	Inc. or Dec.	Per Cent
Bessemer and low-phos.	11,664,015	11,593,385	†70,630	†00.6
Basic	11,417,886	*12,537,746	1,119,860	09.8
Foundry and ferro-sil.	5,073,878	5,219,918	146,045	02.8
Malleable Bessemer	825,643	993,736	168,093	20.3
Forge pig iron	469,183	324,832	†144,351	†30.7
Spiegeleisen	96,346	110,338	13,992	14.5
Ferro-manganese	125,378	119,496	†5,882	†04.6
White and mottled, direct castings, ferro-tit., etc.	54,613	66,850	12,237	22.4
Total	29,726,937	30,966,301	1,239,364	04.1

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*Includes a small quantity of basic pig iron made with charcoal.

†Decrease.

Electrical Night of New York Railroad Club

The Principal Feature of This Meeting Was an Address by Emil Huber-Stockar on Swiss Electrification—Particulars Were Also Given by Other Speakers on American Electrifications

The tenth annual electrical night of the New York Railroad Club was held on Friday, March 20. The principal feature of the evening was an address on "Swiss Electrification" by Emil Huber-Stockar, permanent consulting engineer on electrification Swiss Federal Railways. The speaker was introduced by C. O. Mailloux, president American Institute of Electrical Engineers, New York, as a member of a family which had done notable work in electric transmission and traction. Previous to his connection with the Swiss government, Mr. Huber was manager of the Maschinenfabrik Oerlikon.

MR. HUBER ON SWISS ELECTRIFICATION.

Hr. Huber, in opening his address, reviewed the development of electric traction in Switzerland to date. The first electrification had been made as early as 1894. A three-phase line had been built in 1899. Shortly thereafter an 800-volt d.c. third-rail line had been constructed, and this was followed by the three-phase electrification of the Simplon tunnel. The last large work was the 15,000-volt single-phase electrification of the Lötschberg Railway, which now has thirteen locomotives and three motor cars. Of the 319 km (198 miles) of electrified railways in all Switzerland, 210 km (130 miles) were single-phase, and of the latter mileage 146 km (91 miles) were operated at fifteen cycles. It was apparent that Swiss engineers had enjoyed excellent opportunities for studying the principal systems of electric traction at home. The standard-gage railways of Switzerland amounted to 3400 km (2108 miles), of which 2800 km (1736 miles) were owned by the government.

The saving in operating expenses was not the principal object in the general electrification of the Swiss Railways, because for their conditions the possibilities of steam traction were not exhausted. Still, it might be said that Switzerland was nearer a general electrification than any other country in the world, because it was public policy to bring this about in a country which has no coal and plenty of water-power. The principal benefits to be obtained from electrification were the raising of speeds on grades, the increase of tonnage per train, the elimination of extra and pusher locomotives, and, last but not least, the elimination of smoke in tunnels to encourage travel and reduce track maintenance.

Mr. Huber then gave an abstract of the report made by the board of managers to the board of directors of the Swiss Federal Railways, substantially as published in the ELECTRIC RAILWAY JOURNAL for March 21. He drew special attention to the fact that in Switzerland the greatest hindrance to getting the full benefits of electrification was that the weakness of car couplers usually prohibited a greater drawbar pull than 10,000 kg (22,040 lb.) at the end of the locomotive. For train weights exceeding 300 metric tons it was necessary to have a pusher. For passenger service it would probably be possible to go to higher train weights, owing to the stronger construction of the equipment. He feared that it was too late to go to the draft-rigging practice of America.

Referring to the question of system, Mr. Huber said that the Electrification Commission (see ELECTRIC RAILWAY JOURNAL March 7, 1914) had recommended the single-phase system, although the costs of the three systems were not greatly apart, for the reason that single-phase would give the greatest flexibility in speeds on the Swiss railways as a whole. However, no final decision was essential at this time because further data could be gathered while the power plants were being constructed. If the single-phase system was adopted ultimately, it was quite possible that half-voltage—7500 volts—would be used during the transition period from electricity to steam in order to avoid troubles from the deposit of smoke on the insulators, etc. Regeneration had been carefully studied, but it was of no importance so long as it could not save any water.

REMARKS BY GEORGE GIBBS

William McClellan, chairman of the electric traction committee, New York Railroad Club, then introduced George Gibbs, consulting engineer Pennsylvania Railroad, New York. Mr. Gibbs referred briefly to the Norfolk & Western electrification, the first split-phase locomotive of which had just been tested at Pittsburgh. The electrified section would be ready for experimental runs in the autumn and would be completed in the early winter of 1914. The catenary system would cover 30 miles of route or 90 miles of single track. All of the lines were double-tracked except 4000 ft. of tunnel, which is single track. In this case it was cheaper to increase the capacity of the line by electrification than by double-tracking the tunnel or building a relief line. On the 30-mile section 65,000 tons a day were carried eastbound, and of this tonnage 48,000 tons was revenue business. This tonnage was composed exclusively of coal gathered from mines along the route and so was in addition to through business. The local business amounts to twenty trains a day. The trains started out empty and gradually picked up cars until they had a maximum load of 3250 tons trailing, which was hauled up a 2 per cent grade. With steam operation it was customary to use three Mallet engines, consisting of a head engine, helper and pusher. This combination would be replaced by a front and a rear electric locomotive. Each locomotive was a double unit weighing 130 tons, of which 110 tons was carried on the drivers. The locomotives were carried on six driving wheels with a pair of trailing wheels at each end. Guiding wheels were used because the curvature amounted to fully 42 per cent of the total trackage. The maximum drawbar pull of a half locomotive was 48,000 lb. during acceleration and 38,000 lb. during running. The maximum tractive effort of 62,500 lb. was equivalent to a drawbar pull of 100,000 lb. at the head of the train during acceleration, or five times the figure admissible on the Swiss Railways. Single-phase current at 44,000 volts would be transmitted to the 11,000-volt contact line from a power house containing 9000-kw single-phase generators. On the locomotives a phase converter and transformer are used to transform the current for use in three-phase traction motors.

Mr. Gibbs then discussed the reasons which led the Pennsylvania Railroad to undertake the electrification of the Chestnut Hill and Paoli suburban trackage at Philadelphia. It was important to relieve the congestion at the Broad Street yards and, particularly, one junction where six routes converge. Electrification would improve the capacity of this throat movement by 16 to 20 per cent, enough to relieve the situation for the next five or six years and at less expense than any other method.

The Pennsylvania Railroad was also co-operating with the Westinghouse Electric & Manufacturing Company and the New York, New Haven & Hartford in adapting the mercury rectifier to locomotives. The Pennsylvania Railroad had loaned to the Westinghouse Company a standard steel car which is equipped with four 225-hp motors. A mercury rectifier and transformer had been placed in the baggage compartment for the experimental service. After very promising trials at Pittsburgh for some months, the car was now in experimental service on one of the lines of the New Haven company.

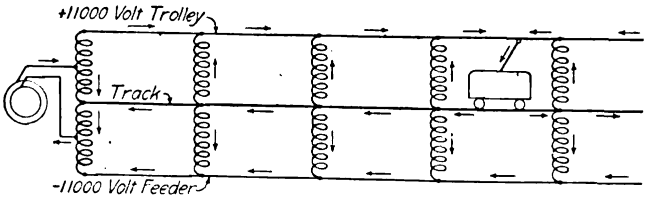
In conclusion, Mr. Gibbs deplored the tendency of electrical manufacturing companies to identify themselves exclusively with some one system of electrification. He complimented the manufacturers highly on the splendid work they had done in developing the apparatus, but he felt that only the user and his consulting engineer could make a decision which would be free from commercial bias. Certainly, the tactics of an engineer-salesman should not be presented in the guise of engineering advice.

REMARKS BY A. H. ARMSTRONG.

A. H. Armstrong, engineer railway department General Electric Company, did not agree with Mr. Gibbs that the engineer of a manufacturer was prejudiced as to systems of electrification. In fact, he said, such an engineer was likely to lean backward in his desire to avoid such a charge. As an example of satisfactory consulting engineering work by manufacturers he mentioned the 2400-volt d.c. electrification of the Butte, Anaconda & Pacific Railway, on which loads of 4000 tons were being hauled.

REMARKS BY W. S. MURRAY

W. S. Murray, consulting engineer New York, New Haven & Hartford Railroad, was the next speaker. He described briefly the new 22,000-volt balanced distribution system which had been installed on the New Haven Railroad to eliminate electromagnetic effects on adjacent telephone and telegraph lines. This was the last straw that had been held up against a.c. traction, and now even that straw was removed. The function of the new distribution system was to break up the cause which created the disturbing lines of force. On the day that the system was changed over he stood in the Cos Cob power house at a telephone receiver connected to the Harlem River yards at New York, 25 miles away. With the original system in use he could not hear distinctly. After the 22,000-volt system had been substituted he could distinguish no difference in the clearness of the telephone transmission during a period of four hours while the load was climbing from zero to 23,000 kva. Under the new system there are 11,000 volts between each wire and ground, a total difference of potential between the two sides of the circuit of 22,000 volts. The rails act as if they formed the neutral conductor of a three-wire system. Auto-transformers are used to transfer the return current from the rail to an aerial circuit connected with the power house.



New Haven Railroad—New Arrangement of Conductors and Auto-Transformers to Eliminate Inductive Interferences

MR. STORER ON NORFOLK & WESTERN LOCOMOTIVES

The last speaker was N. W. Storer, Westinghouse Electric & Manufacturing Company, who described the articulated double-truck locomotives of the Norfolk & Western Railway with the aid of a series of slides. This locomotive has the parallel-rod drive common to steam locomotives, the transmission from each pair of motors being obtained through one jackshaft. The first locomotive had now been on the test track at Pittsburgh for six weeks, and the entire system had operated perfectly. All the weight was spring-supported to the same extent as in steam locomotives. The electrical characteristics of the locomotives were, of course, the same as those of a straight three-phase machine. The Norfolk & Western type was designed for the fixed speeds of 14 m.p.h. and 28 m.p.h. Originally cascade connections were provided to give the further speed of 7 m.p.h., but the railway requested that this be omitted as too low for service.

The phase converter itself was an induction motor with a squirrel-cage winding driven by single-phase current from the transformer, and the other phases were obtained on the plan of the Scott two-phase, three-phase method. This type of machine was particularly desirable for heavy freight service, because it gave the same speeds on down-grades and up-grades. The one-hour rating of each locomotive was 1650 hp at 14 m.p.h. and 2000 hp at 28 m.p.h. It had tractive effort of 45,000 lb. at the lower speed and about 25,000 lb. at the higher speed.

A feature of the motor construction was that the stator and armature could be lifted bodily from the machine and that the armature bearings were carried in the side frames of the locomotives. The motor was of the standard induction type, the rotor having three collector rings on each end. The winding was as solid as an induction motor winding could be. The phase converter had a starting motor to bring it up to speed. The phase converter also drove the fan motors and the compressor. The speed changes from the eight-pole to the four-pole combination were made by means of a commutating switch operated by compressed air.

The dynamometer tests made at Pittsburgh gave very interesting results. The locomotive used weighed 140 tons, which was somewhat heavier, both mechanically and electrically, than calculated. However, the later locomotives would weigh 125 to 130 tons each, as desired. The tractive effort of the first locomotive during acceleration, with a trailing load of 1280 tons, went up to 45,000 lb., and the speed came up very smoothly. A liquid rheostat was used for the latter purpose. It was possible to get a jerk in bringing up the speed, but this was inexcusable. Smooth starting was especially desirable for heavy trains on grades.

Mr. Storer also presented a record of standing tests which, like the other tests, were made on March 9, 1914. Not enough power was available, however, to show what could be done with four motors. With motors Nos. 1 and 2 the tractive effort, dead pull, came up to about 39,000 lb.; with motors Nos. 3 and 4, 43,000 lb. was secured without slipping the wheels. About 112,000 lb. weight was exerted upon the drivers, and the very high coefficient of adhesion of 86,000 lb. tractive effort was secured on the entire locomotive with practically a dead straight pull. He was satisfied that they were going to have a locomotive that would fulfil every detail of the specifications. The rest of the locomotives had now been released and were being built as rapidly as possible.

After a vote of thanks had been tendered to Mr. Huber and the other speakers the meeting was adjourned.

New York Electric Railway Association Convention

At the Nineteenth Quarterly Meeting of the Association, Which Was Held at Lake George, N. Y., on March 21, the Whole Program Was Devoted to the Consideration of "Safety First"—Abstracts of the Papers and an Account of the Proceedings Are Published

The nineteenth quarterly meeting of the New York Electric Railway Association was held at Lake George, N. Y., on March 21. President Hedley welcomed the delegates with a brief opening address and spoke of the value of opposition in throwing light on all sides of any matter under discussion. He advised the delegates to question freely any of the points made in the various papers and then called for the first address scheduled for the meeting.

This was a paper prepared by J. S. Doyle, superintendent of car equipment Interborough Rapid Transit Company, New York. Mr. Doyle was prevented from attending the meeting, owing to an extraordinary press of work which kept him in New York, and his paper, entitled "Practical 'Safety First,'" was read by C. C. Dietz, secretary of the association. An abstract appears on another page of this issue.

In the discussion which followed, W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, pointed out that any of the movements, such as "safety first," which were made the subject of analysis should be followed up in an analytical way. They did not amount to much unless this was done. President Hedley, in answer to a question, stated that some of the low-level, center-entrance cars described in the paper had been in service in New York for about a year and that they had never had a boarding or alighting accident with them.

James P. Barnes, general manager Syracuse & Suburban Railroad, said that in considering a type of center-entrance car for use in the city of Syracuse many difficulties had been encountered. Among these were unpaved streets and places where the cars actually swung over the curb. It would be necessary to make physical changes in some streets before the low-level car could be used. There were two types now under consideration, he said, but the necessity for taking on a new type of car entirely different from the ones already in service involved difficulties. He expected to see a number of interesting compromise types develop in the near future.

Harry A. Bullock, staff assistant to the president Brooklyn Rapid Transit System, presented the next paper entitled "Safety Organization." This appears in abstract elsewhere in this issue. Discussion was postponed until after the other papers which were scheduled for the meeting had been read.

Following this Edward A. Maher, Jr., assistant general manager Third Avenue Railway, New York, presented a paper entitled "Possibilities of the Safety Campaign," which is abstracted elsewhere. During the course of his address Mr. Maher stated that the Third Avenue system had been endeavoring to eliminate boarding and alighting accidents without going to the heavy expense of replacing all of its rolling stock. This had been done by equipping the present pay-as-you-enter cars with disappearing steps and folding doors electrically connected with the controller. This had been accomplished at the rate of two cars a day and at a cost of $310 per car. At the end of six years it was expected that every car on the system would be equipped in this way and that boarding and alighting accidents would be largely eliminated. He said, further, that no boarding or alighting accidents had yet occurred on any of the cars thus equipped, and he believed that this was the longest step that street railway companies could take in the "safety first" movement. With reference to the possibility of passing ordinances to prevent people from crossing streets except at street intersections, he said that such a rule had proved to be most satisfactory in European cities. Opposition was bound to develop when such ordinances were proposed, but if the matter was broached by an organization made up of representatives of the public service corporations and the large concerns having many vehicles on the public highways, the opposition could be overcome. The assistance of the civic organizations should always be obtained. In New York the problem of reducing the number of accidents and the expenses incidental thereto was most serious, as it actually amounted to the question whether a dividend could or could not be paid. There were four ways of reaching the objective point of accident elimination—first, the organization of all who used the public highway; second, the arrangement of conferences upon methods and means for remedying the accidents; third, the education of the public by such means as might be decided to be the best, and, fourth and most important, the development of thought by everyone involved.

Allison J. Van Brunt, director of safety education Public Service Railway, Newark, then presented a paper which is printed in abstract elsewhere in this issue. At the conclusion of this address the whole subject was placed before the delegates for general consideration.

The discussion was opened by Ralph M. Eisenberg, Carbolineum Wood Preserving Company, who called attention to the fact that while the judicious use of signs was wise they should be used only where danger was not evident. If all places where accidents were liable to occur were guarded by signs, the latter would be so numerous that the employees and the public would become accustomed to them and would grow correspondingly careless. The danger sign always compelled attention, but it had to be changed frequently to be interesting or for the warning to be effective. He also suggested that cautions should be printed upon pay envelopes because that was one thing that all employees were certain to read.

William H. Hyland, claim agent Fonda, Johnstown & Gloversville Railroad, continued the discussion with the statement that the railways had become unnecessarily wrought up about teaching the public. With folding doors and steps the passengers on the cars were amply safeguarded, and the only thing left was to teach the motorman that he was responsible for avoiding injury to pedestrians. With regard to educating the public he thought that the use of pictures was good, but believed that written or spoken warnings, continually applied, were better. He did not believe in sending the claim agent into the schoolroom, but thought instead that the teacher should warn the children against the dangers in the street each day before they left the school.

Mr. Bullock thought that it was practical to have safety instruction undertaken by the teacher and made a part of the instruction in the school, but said that in the larger communities it was practically a physical impossibility to get teachers to assume the additional work of teaching safety methods. In that case the only solution was for the railroad company—or, better, the public organizations—to supply the teaching. The character of the instruction was most important, as the education of children was an exceedingly difficult psychological problem. With regard to the suggestion to regulate the movements of pedestrians upon the street, he believed that strong opposition would be encountered at the present time. He was in accordance with this idea, however, and said that in New York the police held power to make such regulations as were necessary for proper regulation of vehicular traffic. The commissioner might be approached on that subject, and in this way a beginning could be made.

Mr. Hyland stated that the present method of going into the public schools with "safety first" propaganda was spasmodic and was to some people objectionable. It lost its value if not continuously repeated. In answer, Mr. Van Brunt stated that when visiting schools within the past two weeks he had asked the school children whether they recollected his previous visits and that about 75 per cent of the children stated that they did so. He therefore felt that the lessons he had given had been of lasting value.

Mr. Barnes remarked in connection with the matter of getting people to cross streets only at the crosswalks that such an effort had been made in Syracuse and had met with excelllent results. The services of the boy scouts had been enlisted for Saturday afternoons, and four boys stationed at each street intersection handed cautionary cards to pedestrians who crossed the street diagonally.

President Hedley, on behalf of the officers of the association, then extended to the four speakers the sincere thanks for the able papers presented. He requested a standing vote of thanks from the delegates as an expression of appreciation, after which the meeting adjourned.

POSSIBILITIES OF THE SAFETY CAMPAIGN

BY EDWARD A. MAHER, JR., ASSISTANT GENERAL MANAGER THIRD AVENUE RAILWAY, NEW YORK

On the surface lines of the Third Avenue Railway in Manhattan and the Bronx, and in the plants and shops operated in connection with them, there has been for the past five years a steady improvement along the lines of the present "safety first" movement. In the shops the moving parts of machinery have been guarded to prevent workingmen from coming into contact with them. On the streets a better rail has been installed. The question of pavement between and alongside the rail has received more systematic attention. The old cars are rapidly giving way to the pay-as-you-enter type with folding doors and disappearing steps. Employees in charge of cars receive instruction touching upon all branches of operation in special schools. At stated intervals lectures are delivered by division attorneys, and there is a persistent effort to raise the standard of platform men by making their employment congenial as well as remunerative.

In brief, this is what has been done along the lines of safety by the Third Avenue system. The company is, however, a long way from the elimination of accidents. During the year ended Dec. 31, 1913, there were 26,981 accidents. These have been classified as follows: boarding, 18.39 per cent; alighting, 20.23 per cent; knock-down, 10.32 per cent; car collision, 9.41 per cent; vehicle collision, 26.68 per cent; employees, 7.49 per cent; miscellaneous, 7.49 per cent. Of these 26,981 accidents, 1801, or 6.67 per cent, occurred to minors, and while the exact figures are not available, it is safe to say that not more than two-thirds occurred to persons under the age of fifteen years. Therefore, only about 4 per cent of the accidents occurred to children.

The boarding and alighting accidents together, amounting to 38.62 per cent of the total number, have received a great deal of thought, as a large percentage can be eliminated when the cars are equipped with folding doors electrically interlocked with the controller. Experience with the cars already equipped justifies this opinion.

The combined knock-down and vehicle-collision accidents represent 37 per cent of the total, and it is probable that a large majority of these are due to the negligence of the persons injured. There seems to be no hope of reaching many of these unless they can be brought to realize that when using the public thoroughfares they were constantly in danger. One step in this direction would be the formation of an organization of which the membership would consist of representatives from all of the large concerns having a number of vehicles in use daily on the public highways. After the formation of such an organization there should be urged upon its members a scheme of additional compensation for drivers based upon efficient handling of vehicular traffic. So long as the employees of these business concerns avoided accident they should, in some part, share in the saving enjoyed by their principals. One of the first things that such an organization should do is to obtain the passage of an ordinance providing that pedestrians might cross the street only at street intersections.

The types of accidents referred to as car collisions and accidents to employees may be combined as next in line of importance. In 1913 these constituted 16.89 per cent of the total. I am free to confess that I do not know any remedy for these classes of accidents. We do not find car collisions limited to inexperienced employees, so they cannot be attributed to lack of training or of knowledge. However, there are two things that may go some way toward eliminating them. First, rigid discipline and the strict enforcement of a rule that a motorman who participates in a car collision shall suffer; second, that the motorman who goes through a year's service without a collision of any kind shall profit thereby. However, there are so many things that enter into this class of accidents that it is a physical impossibility, to my mind, for anyone to map out a method of procedure that would come anyway near eliminating it. If it were possible to have uppermost in the mind of every motorman the constant thought that "in all cases of doubt or uncertainty the safe course must be taken and no risks run," many car collisions would be avoided.

Under the head of miscellaneous accidents were 7.49 per cent of the whole number. These were of various kinds, including interior accidents, tearing of clothes, assaults, and the like, and so far as these are concerned there is no evidence that their number could be substantially reduced.

The number of accidents suffered by children under the age of fifteen has been shown to represent only about 4 per cent of the total number. That even this small number should be eliminated is, of course, desirable, but in the city of New York, where the streets are the children's playground, it seems doubtful that this goal can be actually reached. However, it is incumbent upon us to use every effort within our power to impress upon their minds as well as upon those of adults that continual thought is a necessity to any safety movement.

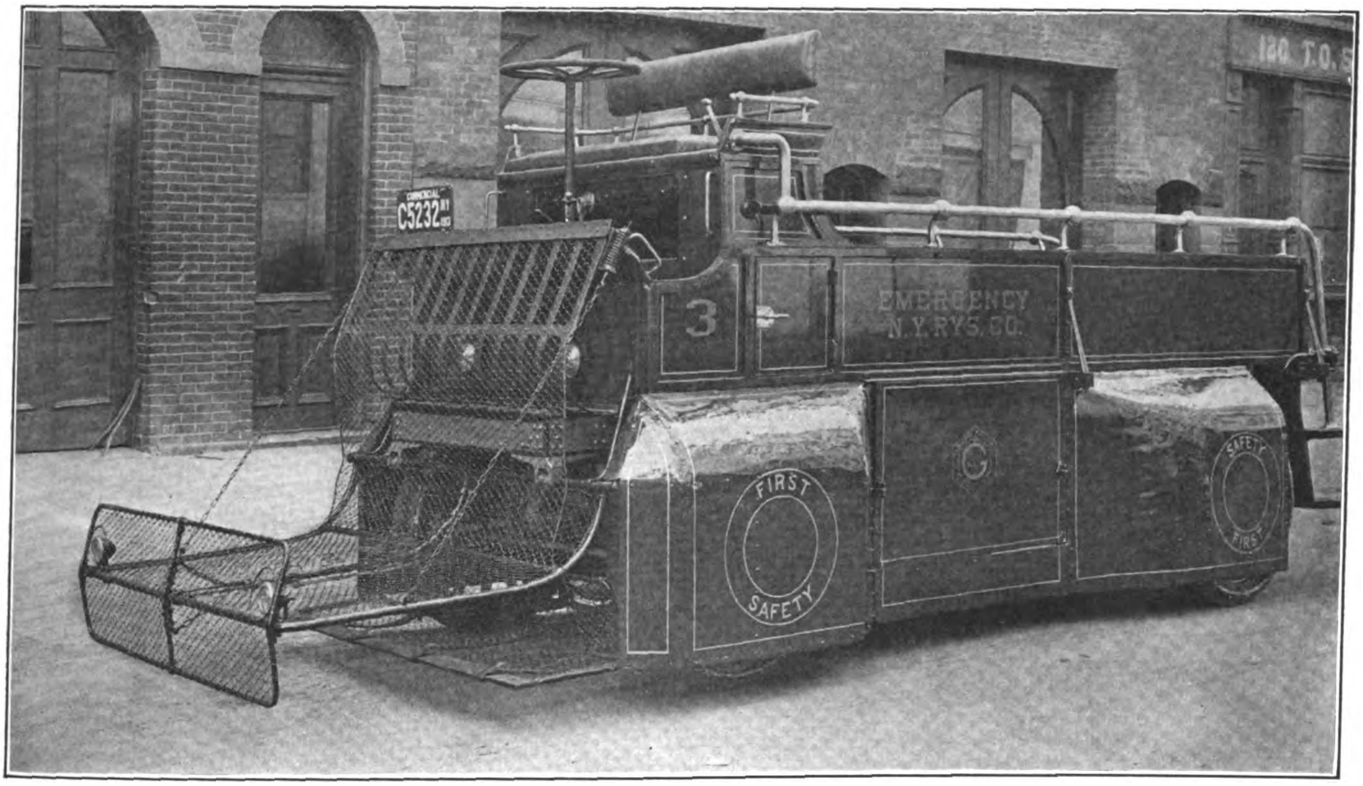
PRACTICAL "SAFETY FIRST"

BY J. S. DOYLE, SUPERINTENDENT OF CAR EQUIPMENT INTERBOROUGH RAPID TRANSIT COMPANY AND NEW YORK RAILWAYS COMPANY

One of the most notable advances in the protection of passengers on electric traction properties in this country has been accomplished through modifying the design of street car equipment.

Boarding and alighting accidents on the ordinary types of street cars have caused more economic loss to our communities than any other single item, and it is gratifying to be able to say that this feature of our big problem has been satisfactorily solved.

When the New York Railways properties were turned over to the Interborough Rapid Transit Company's officers for operation one of the first problems confronting the new management was that of accident prevention, which finally resulted in the creation and development of a continuous low-level center-entrance car.



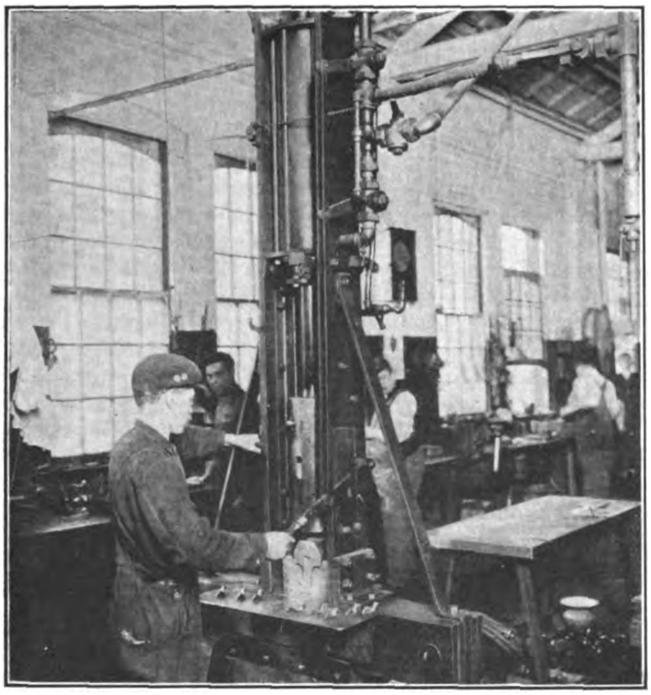
Safety First in New York—Gasoline Emergency Wagon with Fender and Housing for Wheels

It was found that provision had been made for the prevention of premature starting of cars through connecting the door operation with the car-control circuits, thus eliminating the possibility of a car starting with doors open, but nothing had been done to prevent the premature opening of car doors when cars were in motion. This was accomplished by utilizing the motion of motor armatures as an element of car movement to keep the doors stationary while cars were en route. The electromotive force generated by the motor armatures was in this way utilized to interlock and keep the car doors closed until the rotation of the motor armatures stopped, whereupon the doors were again under the control of the conductor. If for any reason the car doors locked in this manner had to be opened while the car was in motion, the conductor was provided with an emergency stopping valve, which, when operated, caused the car to stop, and when the car was stopped, the conductor, of course, was able to open the doors.

The next most important part of the problem was to minimize front-end accidents to street pedestrians. A careful analysis of the situation indicated that, although various types of wheelguards now in use are a very creditable addition to safety, they by no means afford the protection desired. An accidental collision with a standing street pedestrian introduces the possibility first of an injury to the skull or spinal column from impact with the front of the car and a further hazard of the same nature when the pedestrian is thrown to the street pavement. If the person has been fortunate enough to escape these very grave dangers, and a careful analysis of operating conditions indicates that a number are not, the wheelguard then comes into play, and whatever remains of the unfortunate is gathered up by the wheelguard apron.

It is apparent that street pedestrians should not be permitted to come in contact with the solid front of cars, but that the principles involved in the original lifeguard, as usually designed, should be brought into play, and the unfortunate pedestrian should be tripped below the knee line and gathered up in an extending device designed to eliminate the possibility of head or spinal injuries. In addition to this, it was also absolutely necessary that the function of the present-day wheelguard be combined with the extending lifeguard. In other words, all the protection that has been established by years of practice in both these devices—that is, the wheelguard and lifeguard—should be consolidated into one device.

One of the illustrations of the new fender shows the pedestrian in the act of falling upon the lifeguard, the tripping gate having moved to a position to fill the gap between the bottom of the lifeguard and street pavement, which movement also, it should be noted, instantly shuts off the power to the motors and applies the brakes. This further reduces the hazard of accident through stopping the car in half the distance necessary in the case of ordinary cars. When the pedestrian lies prostrate upon the street pavement, a typical wheelguard action occurs, except that the gate operation in this case instantly shuts off the power and



Safety First in New York—Air Hammer with Safety Latch Held Open by Left Hand of Operator

Safety First in New York—Slotter and Planer with Pipe Railing Protectors for Belts

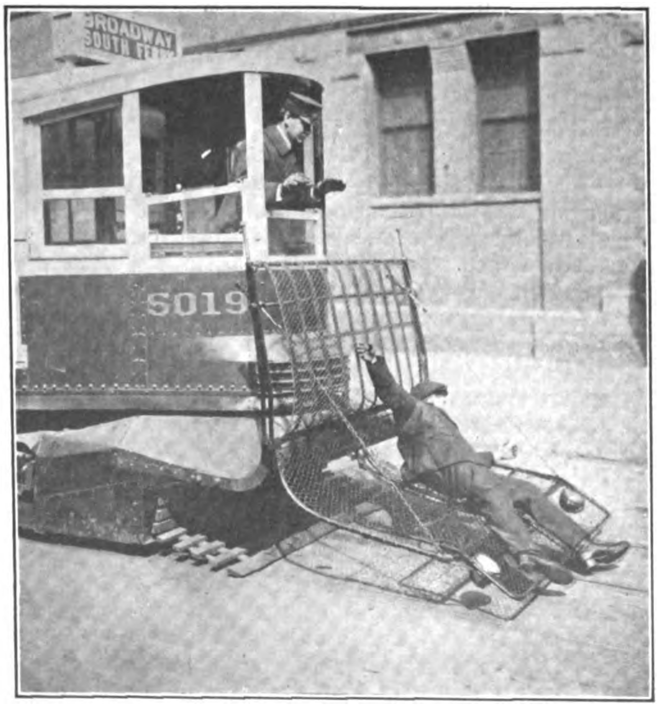
applies the brakes. Another cut shows the function of the life fender gate. This action causes the truck apron to fall on the track in position ready to gather up the body; meanwhile the gate motion has instantly shut off the current and applied the brakes.

The lowering of the car body to within 6 in. of the street pavement also has a value, for accidents of the character in which people are struck by automobiles, cars or wagons and are thrown against the side of cars going in an opposite direction. Such accidents frequently result fatally in the case of the old types of cars because the unfortunate person is thrown beneath the moving wheels, whereas in the case of the low-level car the distance between the car and pavement, 6 in., is too small to permit a person to roll beneath the car body and thus be run over by the car trucks.

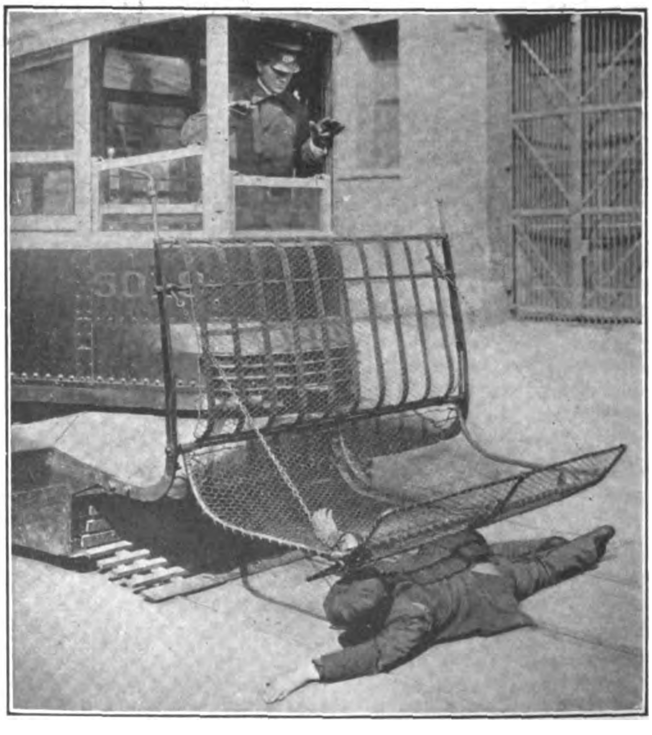
White-enamel grab poles have been installed throughout the interior of the car for the purpose of preventing what are known as "knock-down" accidents, or accidents where passengers are unexpectedly caught off their balance when a car starts or stops and thrown to the floor.

The combined lifeguard and wheelguard is also being tried out on the New York Railways Company's automobile trucks as shown in an illustration.

In addition to the fender, the low-level idea contained in the design of our center-entrance cars was adopted for the automobiles by carrying a sheet-iron



Safety First in New York—Fender Gate Acting with Fender by Raising Pedestrians' Feet from Ground



Safety First in New York—Action of Fender Gate in Dropping Wheelguard cover to within 5 in. or 6 in. of the ground. In highly congested streets, such as those in New York City, the number of fatalities that are caused by people being knocked down or thrown between the wheels of moving vehicles is very large, hence the idea of installing what may be termed a "longitudinal side-wheel guard."

Traffic regulations in New York City prohibit the operation of moving automobiles within a 15-ft. zone of a car unloading passengers, and it is with this particular point in mind that allusion is made to the combined movement of automobiles and street cars. If this statute could be rigidly enforced, a very great saving in the prevention of injury and loss of life would be made.

Cautionary warning signs should be displayed, both within and without cars, and we have tried one of them, but it is an experiment at present. This sign is connected with the center-door operation and extends over the roadway the instant that doors begin to open. It is simple in design, but its adoption is problematical.

What have we done to provide safety for our employees, especially our shop workers? Some of the data exhibited at the recent safety exposition showed the really marvelous results accomplished by the United States Steel Corporation as the product of six years of safety endeavors. A reduction of 43 per cent in accidents to employees was accomplished, and the lives of an army of 9000 were saved.

It is generally conceded that shop safeguards now in vogue among the principal industries and railway organizations will result in a saving of from 30 to 40 per cent in shop accidents. Some of the cuts shown are illustrative of the protective devices used on machines in the shops of the Interborough Rapid Transit Company and the New York Railways Company.

ORGANIZATION FOR A "SAFETY FIRST" CAMPAIGN

BY HARRY A. BULLOCK, STAFF ASSISTANT TO THE PRESIDENT BROOKLYN RAPID TRANSIT SYSTEM

At the outset I wish to state that the Brooklyn Rapid Transit System has not yet adopted within its own working force any specialized safety organization of a general character. We are going slowly in that particular for the reason that we are now operating very efficiently as regards safety. In 1902 damages consumed 6.88 per cent of the gross earnings and legal expense was 1.87 per cent additional. In 1907 damages required 3.86 per cent of the gross earnings, while legal expenses required 1.85 per cent. In 1910 damages had been reduced to 2.66 per cent of the gross, and legal expenses to 1.75. In 1913 damages required but 2.51 per cent and legal expenses but 1.16 per cent, making a total of 3.67 per cent for both damages and legal, the latter item including all legal expenses and not simply those attributable to damages.

This result has been accomplished largely through the care used in the continued instruction of employees in all departments and also by an intelligent study of accidents as they occur. A comprehensive classification forms the basis of continuous study by the train department and by operating, mechanical, electrical and way departments, and this is of the utmost value in checking the results of inspection of track, structures and equipment and also in the instruction of operating employees.

We believe thoroughly in co-operation between departments and we are looking forward to the organization of a central safety committee consisting of the heads of the departments affected and certain of the executive officers. This committee will assume the permanent direction of our various specialized safety activities.

My personal view inclines toward the establishment under such a general committee of two bureaus. One of these should be a bureau of public safety and the other a bureau of safety inspection and investigation which, by the assignment of qualified men from different departments, will conduct a continuous inspection throughout the system similar to that which is maintained in connection with the fire hazard. I also incline to the belief personally that this inspection bureau should have facilities for making special investigations of accidents from the point of view of prevention.

Co-operation seems to be a necessity, and the best method of obtaining it seems to be the organization of a central safety committee as above outlined and the establishment, under such a committee, of the bureau of inspection and investigation with a staff selected by the various department heads who compose the central committee. There should also be a competent supervisor who should be recognized as one of the important officials of the company. In this way, on one hand, we can avoid the difficulty inherent in the isolation of each department's safety activities and, on the other hand, we can steer clear of the perils of creating an outside agency unrelated to the routine operation of the road and more or less likely to clash with those engaged in such routine operation. We have also the proper basis for the study of the problem of public safety, because the bureau of public safety can coordinate with the bureau of inspection and investigation, and this will put the central safety committee in a position to handle the education of the public in a most intelligent manner and without undue tax upon the time of the department heads themselves.

The organization of safety committees among the men themselves should, I believe, be coupled with the central safety organization. Safety committees of the rank and file are unquestionably the most common form of safety organization in all classes of safety campaigns, and their popularity appears justified.

Two reasons underlie this statement. This first is the general recognition that the spirit with which a large force of men undertakes its work depends to a considerable extent upon the participation allowed to them in determining the conditions under which their work is performed, although any attempt at unrestricted application of the idea would probably lead to trouble. However, in the matter of depot discipline we have succeeded, on the Brooklyn Rapid Transit System, in a trial lasting now for a year and a half, in placing the responsibility for the proper conduct of employees in and about one of our club rooms largely upon the shoulders of a house committee elected by the men themselves. The experiment has been an unqualified success.

The second reason is that any central bureau of inspection which may be established can have at best only a limited force. Departmental inspection must necessarily be limited as to time as well as in the number of men engaged in it. However, if by the organization of safety committees the entire working force of the company can be enlisted in the work of inspection, a remarkable continuity and minuteness of inspection can be attained. I do not believe that such inspection, through the encouragement of men to report danger points or danger processes to their safety committee, is a complete substitute for inspection by a central bureau. The safety committee must necessarily have a rotating membership so that many men can get the actual beneficial training resulting from service on such committees. Such committeemen, therefore, cannot be expected to become skilled observers, and many conditions apparent to the trained eye must be likely to escape notice of the safety committee, however efficiently it may be organized.

The bureau of inspection and investigation, as has already been pointed out, does not need more than a limited staff. Indeed, I have been informed by one of the leading safety engineers of the country that such inspection could be efficiently conducted on a system like the Brooklyn Rapid Transit with one man for the mechanical department and one for the department of way and structures. There might also be one man for the electrical department whose observations should include conditions involved by the transmission of current through the streets. These three men would work under a general supervisor who would require a limited stenographic and clerical force.

Underlying this plan of organization one or two principles must, in my judgment, be strictly observed. First, there must be an open-mindedness on the part of superintendents, heads of departments and executive officials with regard to trying out suggestions that involve some little expense. Second, there must be a liberality of expenditure for educational literature. Third, much thought must be given to making safety education interesting and attractive, and I wish to lay emphasis on the use of moving picture lectures among the men and wherever possible among their families. I found no difficulty in Brooklyn in interesting the Vitagraph Company of America in making a safety motion-picture film when we were able to supply a subject that made such films attractive to the general public.

The Vitagraph Company gave us one film free and is preparing, in co-operation with ourselves, the Brooklyn Committee of Public Safety and the Fire Department of New York City, to stage a fire scene on a similar basis. The Vitagraph Company is, of course, reserving the commercial rights to the film. I believe that within a comparatively short time there will be in existence a substantial number of safety films which can be reasonably obtained by any railroad company not in a position to stage pictures itself. For ourselves, we have under consideration the staging of "technical" pictures to be used in depots and in shop instruction. These would hardly interest the public, and we would pay for their cost. But if they are produced we will certainly put any other company desiring to obtain the film in a position to obtain it as nearly free of cost as possible.

The fourth principle underlying the proposed plan of organization is the provision of some special method for stimulating initial activity by the men and for recognizing and continuing merit in safety inspection. There are various proposals based on what is known as "suggestion-award"—the theory under which machinery is set up for recognizing in some substantial way suggestions relative to safety or efficiency in operation. I am inclined to believe that along this line the most practical method of stimulating safety activity among employees will be developed.

I shall not attempt to discuss at length the public safety organization in Brooklyn, as I believe that street railway companies in general are fairly well in touch with what we have done. However, if anyone here is not familiar with the details of this campaign, I will gladly send a file of our public safety literature upon application. I want to say, however, that to conduct effectively a public safety campaign the railway must get the co-operation of a substantial body of representative citizens or else of some representative organization whose activities touch as many phases as possible of the life of the community. Otherwise the company will be suspected of using public facilities to advance its own ends and much of the effectiveness of its work will be lost. In cities where there is a chamber of commerce, or a similar body, in a position to recognize civic issues, the problem is, of course, comparatively simple, always provided that the railway is ready to put up the money for the initial activities.

With such a representative organization it is possible to get into touch directly with the sources of community life, and first of all this brings us to the public schools. I am convinced that there is no place where safety education for the general public can be made more effective. We reach there the most impressionable part of the community and one of the hardest to deal with from the standpoint of safety. We instantly win the sympathy of parents and thus enlist a very substantial proportion of the adult community in the safety movement.

Ultimately I believe that there should be established, in all communities of substantial size, branches of some national organization such as the National Council of Industrial Safety. We have joined this as an individual company, and from it we are deriving great benefit through the weekly distribution of safety material. I am disposed to believe, however, that the start of any safety movement should be local in order to arouse the civic pride of the town and to obtain for any public activities the impetus of official sanction and general public sympathy.

I have one word of caution, however. Public safety and industrial safety have, like all other popular subjects, stimulated the activities of that kind of individual in the community who seeks to attach himself to the industrial structure as a salaried adviser and thus to draw as much money as possible for his advice while contributing as little as possible in actual work. It is sometimes difficult to tell when a company is approached by an institution having a reputable body of trustees whether or not the actual management of its affairs may not be in the hands of some one or more of these professional civic workers. Therefore, all companies, I believe, should scrutinize approaches of this kind with the utmost care and if possible work up the safety propaganda under conditions that will insure a proper expenditure of their money.

THE "SAFETY FIRST" MOVEMENT ON THE PUBLIC SERVICE RAILWAY OF NEW JERSEY

BY ALLISON J. VAN BRUNT, DIRECTOR OF SAFETY EDUCATION PUBLIC SERVICE RAILWAY, NEWARK, N. J.

On the Public Service Railway we endeavor to begin a platform man's career in such a manner that the usual thought that "accidents must happen" will not dwell in his mind. In addition to this preliminary training it is my practice to meet semi-annually practically every man connected with our transportation department and to talk with him about the conditions existing. This intensifies the keen rivalry which exists among our carhouses in the effort to eliminate accidents. The Public Service Railway has not considered it best to use printed matter extensively, as we feel that the personal appeal is the most desirable method of furthering the movement, and in January, 1912, we inaugurated a state-wide educational effort in the public, parochial and private schools to reduce accidents and spread the doctrine of "safety first."

Our method was to have competent lecturers visit the schools after arranging a schedule of dates with the superintendent of instruction. That the lesson has been lasting has been demonstrated by subsequent visits to the same schools, where our lecturers found that more than 80 per cent of the children previously talked to remembered a greater portion of the lessons taught. Our records also prove the efficiency of the method, and since the schools were first visited no child of school age has been injured in the State of New Jersey by contact with a live wire notwithstanding the fact that thousands of live wires were down throughout the State during the blizzard of March 2, and that this resulted in the death of several adults.

We have delivered a large number of lectures at night in social centers, lodge rooms, churches and meeting rooms of drivers' unions and to boy scouts, camp-fire girls and others. Nearly 7000 people have been reached in this way. These lectures have been illustrated by lantern slides and by a film of moving pictures, which has also been exhibited in various moving-picture houses. We have prepared also a card containing warnings and suggestions to wagon drivers, but upon this no reference to our corporation appears. About 230 wagon owners employing 6000 drivers and chauffeurs have signed this card and hung it in their stables. One of our lecturers spent four weeks in the largest department stores in our cities lecturing to the women shoppers and showing lantern slides.

In New Jersey we have a new law which compels the teaching of personal safety to all of the school children. Because of the lack of immediately available funds this law has not as yet been put into effect, but there has been written a text book, in the preparation of which we have participated, and in the near future it will be put in use. At this time our lecturers are revisiting the schools, and in talking to the children this year we have been telling them that the "safety first" thought is so new that necessarily their parents have received no education along this line. We have, therefore, secured promises from the children that, while wearing the safety first button which we furnish, they will set a good example to the older members of their families.

The Public Service Corporation has a well-organized safety committee composed of the heads of its departments with the general claim agent, H. B. Drown, as chairman. To his committee are referred all matters and suggestions relative to the reduction of accidents. If the suggestions are feasible, they are adopted.

I consider that the training of platform men and the inspectors, although it is extremely necessary, will not be of sufficient value to pay for the expenditure unless the general public and the children are also educated. They should be appealed to strongly and frequently. Therefore, in conclusion, I wish to urge upon everyone connected with any claim department to devote a large part of his energy and a fair proportion of his cash allotment to the spreading of the "safety first" movement and to assist in educating the public to think of personal safety.

NEW YORK ELECTRIC RAILWAY ASSOCIATION BANQUET

On the evening of Friday, March 20, the New York Electric Railway Association tendered a banquet to the delegates who had assembled at the Fort William Henry Hotel at Lake George, N. Y., for the quarterly meeting on March 21. After an excellent dinner a number of addresses were made by prominent citizens of central New York, among whom were J. T. Schoolcraft, Mayor of Schenectady; Edward M. Angell, of Glens Falls; James F. Hooker, president Schenectady Board of Trade; P. C. Dugan, general counsel United Traction Company; J. H. Callanan, editor *Schenectady Union-Star*, and J. Edward Singleton, city attorney, Glens Falls. Frank Hedley, president of the New York Electric Railway Association, acted as toastmaster.

Mr. Callanan's exceptional speech was the feature of the evening, and this was made evident by the extraordinarily vigorous applause that followed his address and was later accorded to him at an informal gathering of the delegates after the banquet. He emphasized the need for men of poise in the industrial and political life of the nation, saying that, while the ultra-conservative was required to balance the ultra-radical whose desire for change kept the country from becoming stagnant, there was an unfortunate scarcity at the present time of men who were not aligned with either of the two sides and who could therefore retain an unprejudiced viewpoint of present-day affairs. The entertainment provided during and after the banquet was fully up to the standard set by previous meetings and included two-part song renditions by Messrs. Fasset and Castle.

THE SIXTY-CYCLE ROTARY CONVERTER IN ELECTRIC RAILWAY WORK

In the issue of the ELECTRIC RAILWAY JOURNAL for April 5, 1913, page 618, an account was given of the then new substations in Cleveland, Ohio, in which sixty-cycle rotary converters of 1500-kw capacity each were employed by the Cleveland Railway. At that time these machines were the largest which had been put into commercial operation at a frequency of sixty cycles, and by some engineers the experiment was considered a rather dubious one. These machines have now been in operation for a year with entirely satisfactory results, and their operation and some features of their design were given in a paper before the Cleveland Section of the American Institute of Electrical Engineers on Monday, March 23, by L. P. Crecelius, superintendent of motive power Cleveland Railway.

Mr. Crecelius stated that, in the absence of standard practice in the use of sixty-cycle converters for railway purposes, a very critical consideration was made by the company of the essential details of design. The contract for the converters contained some unusual provisions, which were discussed in the paper. Among the most important of these was the limitation of the current density and of the magnetic flux density. The former was specified not to exceed an average of 3500 amp per square inch based upon d.c. output rating, that is, considering the converter as a generator. Similarly the flux density in the teeth of the armature core was limited to 130,000 maxwells per square inch and that in the core to 65,000 maxwells, based on d.c. output at the rated load. The current density at the brush surface was limited to 45.5 amp per square inch. As the substations are largely located in residence districts, the ventilating ducts and general construction of spiders and fixtures was specified with the object of minimizing all unnecessary noise, such as vibrations, humming and high-pitched windage tones.

Mr. Crecelius said that the introduction of the commutating pole had been very beneficial, especially to converters, as it had afforded the means of increasing the output per pole, had caused a reduction in the number of poles, thus providing a marked improvement in mechanical design of the sixty-cycle converter, and had given more latitude in the width of pole face and spacing of brushes, thereby reducing the disastrous consequences of flash-overs. The commutating pole had made possible good commutation at the higher speeds resulting from the use of fewer poles. One objection to the increase in speed, however, was the resulting noise.

In addition to the noise inherent in all machines, irrespective of speed and not thought especially objectionable. there was windage and brush chatter which increased at a tremendous rate with speed. The operation of several machines, such as those under discussion, in one station without compensation for noise was out of the question, as the sounding of alarms and ringing of tell-tale bells could not be heard. The noise also had a detrimental effect upon the nervous systems of the operators, and was apt to be considered a nuisance in the neighborhood. By far the most objectionable part of the noise was due to high-pitched windage tones, but these had practically been eliminated in the present case by sealing up both ends of the armature and providing a shield behind the commutator leads. The resulting reduction of ventilation required that especially careful consideration be given to the size of the armature conductors.

Mr. Crecelius called particular attention to the increased heating resulting from the use of power factors less than unity. The use of over-excitation of the converters to produce leading wattless current sufficient to overcome the reactance drop not only involved extra heating due to the low power factor at rated load, but this effect was greatly exaggerated at overload. To illustrate this, Mr. Crecelius gave the following figures: Theoretically the ratios between the heating of the winding of a six-phase converter operated as a converter at unity power factor and running as a generator mechanically driven are: average value of all coils, 0.27 to 1; coils tapped to slip rings, 0.418 to 1. When the converters are operated at 0.975 power factor, the values become: average of all coils, 0.313 to 1; coils tapped to slip rings, 0.656 to 1. This means that the average coil has become 15 per cent hotter and the tap coil 57 per cent hotter at the same load. When the converter is overloaded to 150 per cent rating these values are: average of all coils, 2.59 times the heating at 100 per cent load and 100 per cent power factor; tapped coil, 3.63 times the heating at 100 per cent load and 100 per cent power factor. It is evident, therefore, that reactance should be held down to low values when unity power factor is essential in the supply circuit.

The provision in the contract relating to flux density was placed there on account of the company's desire to have considerable generator capacity in the machines to "drive through" short-circuits on the d.c. side. On the Cleveland Railway system short-circuits occur at the ratio of 428 d.c. to five a.c. short-circuits per annum per substation. These short-circuits, which are caused by falling trolley wires, cars opening circuit-breakers, etc., were factors to be reckoned with.

To permit starting from the a.c. side with low reactance in the armatures and the main field poles equipped with proper dampers, it was necessary to interconnect or bridge the dampers between poles to produce a squirrel-cage connection all around the field structure. This bridging of gaps between poles caused the commutating poles to become surrounded by the field damper circuits and seemed objectionable because of the possibility of making this field sluggish to load changes. In the present case, however, no objectionable influence upon the sensitiveness of the commutating pole had been noted. A low-resistance field-damper circuit of pure copper grids had been found superior to other arrangements of open and bridged damper circuits of various resistances which were tried.

Taking up the subject of the effect of commutating poles upon converters at times of hunting, Mr. Crecelius stated that, while the rotary converters in Cleveland were in general operated from turbine-driven generators, with consequent freedom from hunting, on several occasions engine-driven generators had been paralleled with the turbines and the operation of the converters carefully observed. Instantly wild hunting was set up, the pulsations of which agreed in frequency with the speed of the engine, 100 r.p.m., and violent sparking at the brushes at very light load occurred, with flash-overs at about full load. At any stage of the load the operation was absolutely unsatisfactory. By the application of Kapp's formula it was found that the natural period of oscillation of the converters corresponded sufficiently closely with the pulsations of the supply circuit to explain the result. The experiments gave conclusive evidence that commutating poles were objectionable on converters operating on a.c. circuits, subjected to pulsations or to frequent and periodic disturbances. Therefore, reciprocating engines at customary speeds are not suitable for use in connection with 600-volt, sixty-cycle converters.

In the Cleveland converters the efficiency was high because of the liberal use of copper and iron. It was 91.8 per cent at half load, 95 per cent at full load and 95.8 per cent at one-and-one-half load, where it was maximum. As a result the substation efficiency was very high, the ratio of a.c. input to substations to d.c. output at converter terminals over a period of one month being 92 per cent.

In summing up his conclusions as to the features of sixty-cycle synchronous converter application to railway work, the author stated that pulsations in the a.c. supply circuit must be entirely eliminated, the design must include, in addition to the commutating pole, liberal proportions of iron and copper notwithstanding the high speed, and the field dampers must be very low in resistance and bridged to permit of a.c. starting. The advantages accompanying the use of sixty-cycle apparatus include the standardization of frequency, low cost and high efficiency.

DISCUSSION

The comments on Mr. Crecelius's paper centered largely on the matters of hunting and of the reasons for the practicability of constructing high-frequency converters. His statement that wild hunting necessarily accompanies the use of reciprocating engines was questioned. One speaker cited a case where only moderate hunting resulted with light Sunday loads when engines and turbines were operated together. For example, when the load on the reciprocating engines was from 800 kw to 1600 kw and that on the turbines was from 9000 kw to 14,000 kw, current variations were from 2 to 6 per cent. Another speaker stated that hunting may be expected when the natural period of vibration of the system is within the range 70 to 140 per cent of the regular impulses of the prime mover.

The improvements in rotary converter design were stated to be due to the increased surface speed of the armature and the decreased angular speed resulting in greater distances between brushes and in greater leakage whereby the frequency of oscillation was decreased. High commutator speeds had become possible with improved mica and better construction, but very true commutators are required at these high speeds.

High-frequency converters are coming into use rapidly, a statement made by one speaker showing the installation of 67,500 kw of capacity during twenty months, of which more than half was for railway work. The efficacy of the squirrel-cage dampers was pointed out. In one mentioned there was a substation containing a number of converters which had a tendency to hunt. A machine with a squirrel-cage damper was placed in parallel with them and largely eliminated the hunting. The continuous squirrel-cage eliminates "dead-points" and thus facilitates starting.

As a whole the discussion indicated that the sixty-cycle rotary converter is an assured success and that fear of unsatisfactory operation need deter no one from adopting it in any case where good reason exists for so doing.

Annual Banquet of New England Street Railway Club

The Fourteenth Annual Meeting and Banquet—The Speakers Included Mayor Curley, Governor Walsh and W. H. Sawyer—John T. Conway Was Elected President for the Ensuing Year

Six hundred members and guests of the New England Street Railway Club gathered at the Hotel Somerset, Boston, Mass., on the evening of March 26 for the fourteenth annual meeting and banquet of the organization, which was one of the most successful in its history. Long before the dinner hour arrived the corridors and parlors of the hotel were thronged with members and friends renewing acquaintances and interchanging experiences. The annual meeting with the election of officers was held in the afternoon as usual. The banquet hall was tastefully decorated with the national colors, and music was furnished by an orchestra of six pieces and a double male quartet, the entertainment also including legerdemain, impersonations and other vaudeville.

At the head table were seated Governor David I. Walsh of Massachusetts; Chairman Frederick J. McLeod of the Massachusetts Public Service Commission; Mayor James M. Curley of Boston; President C. S. Hawley of the American Electric Railway Manufacturers' Association; President Elton S. Wilde and President-elect John T. Conway of the New England Street Railway Club; President William A. Bancroft, Boston Elevated Railway Company; President H. H. Crapo of the Massachusetts Street Railway Association; W. H. Sawyer, of Ford, Bacon & Davis, New York, and D. F. Sherman, vice-president Rhode Island Company, Providence, R. I. The dinner was enlivened by popular songs, and the menus were of novel design, the successive courses being featured as advertising displays in the racks of a folding pasteboard semi-convertible special car about a foot in length.

In extending a welcome to those present, President Wilde expressed his appreciation of the co-operation of the membership during the past year and introduced President-elect John T. Conway, who predicted the continuance of support and team work during his forthcoming administration and thanked the membership for honoring him with the highest gift within its power. Cornell S. Hawley, president of the A. E. R. Manufacturers' Association, was then presented as the toastmaster of the evening. Voicing the belief that this is the age of the expert, Mr. Hawley called upon Mayor James M. Curley of Boston as an expert in government. Mayor Curley urged the club members to do everything possible to bring the American Electric Railway Association to Boston for its 1914 convention and emphasized the need of New England men's co-operation on behalf of securing uniform labor laws throughout the country. He pointed out that Massachusetts is the only state in the Union whose Legislature is annually elected and criticised the tendency toward excessive lawmaking resulting from yearly sessions.

ADDRESS OF GOVERNOR

Governor Walsh received a most enthusiastic welcome. He extended the greetings of the commonwealth, and announced that in his first ten weeks as Governor he had not received a single complaint regarding the street railways in the State, citing this as ample evidence of the stability and high quality of the service rendered. The speaker expressed sympathetic appreciation of the struggles which electric railway managers are obliged to carry on in order to eke out dividends in the face of constant demands on the part of the public for better service and perfected methods of operation. He pointed out that the people of Massachusetts appreciated this trying problem. He believed that a better understanding was in sight as a result of the agitation of the railroad question. "The public must not go too far in its demands," said the Governor, "and honest management will be upheld by public opinion. The day has passed for reckless and extravagant management, and the best opinion of the State is that you can operate the street railways more efficiently and more in the public interest than the public itself." Closing, he emphasized the efforts of the present Legislature to secure sound laws and urged confidence in the good intentions of its members. The Governor said that he purposed to strengthen the Public Service Commission and urged his hearers to have no fear of regulation by an honest board dealing with honestly managed companies.

ADDRESS OF W. H. SAWYER

William H. Sawyer, of Ford, Bacon & Davis, New York, was the next speaker. After referring to the effect of the electric railway upon the growth of communities, Mr. Sawyer said, in part:

"The expansion of the assessed value of the property in a city depends upon the building up of the territory of the city, and the amount a city can raise for its corporate purposes depends upon the assessed valuation of property. Therefore all of the city's corporate life, its fire and police protection, health, condition of streets and the many comforts of its citizens depend largely upon a constant outlying growth. A city will not expand as it should unless the means of transportation keeps ahead and reaches out into comparatively unpopulated territory. In this way electric railway development has more to do with the building up and expansion of the city than any other element. It is therefore to the best interests of the community not only to obtain from the company the best up-to-date electric railway facilities and service but to continue to extend the lines ahead of rather than to attempt to follow an increase in territory or population which cannot, from the very nature of things, increase without the means or incentive for increasing. The desire of New England to-day is to have the abandoned farms taken up. The telephone and the electric light are minor luxuries compared with the necessity of electric railways, if this back-to-the-land movement is to be accomplished.

"Adding to the direct taxation the indirect taxation in the form of paving, lights, transportation of police and firemen, loss in carrying mails, etc., the average company in that way returns to the public much more than a dollar for every dollar paid to its stockholders, and it should be noted that the public always gets its dollar while the stockholders get theirs, sometimes, may be, perhaps. In view of the importance to the city of this street railway development the city should not permit anything to hinder such an undertaking but should co-operate upon any reasonable basis to enable the company to obtain its capital cheaply and for long periods, which means long-term franchises.

"We all know that the continued development and extension of our electric railway systems is an absolute necessity if our cities and towns are to go forward, advance and prosper. But a large portion of the so-called riding public seems to have entirely lost sight of this really important fact in its almost unquenchable desire to obtain individually more expensive service, or lower fares, or both.

"It is your business as electric railway men to protect your interests, it is the riding public's right to make certain that you deal fairly with them, but above and beyond all that is the big broad civic duty of every member of the community. Until there is a change in attitude the development of electric railway enterprises requiring new money other than that necessary to protect or help protect present investments has practically ceased.

"This has been prophesied before now, but look at the figures. Taking the New England States, we find them some ten years ago with approximately 4000 miles of electric railway track, increasing at that time about 10 per cent a year. The average annual increase in track mileage dropped to approximately 4 per cent for the period 1902 to 1907, dropped to about 2 per cent from 1907 to 1912, and now, for the year 1913, the miles of new track built are absolutely insignificant, amounting to only about 1 per cent—not even keeping up with the increase in population in a portion of the country which merits constant endeavor to increase its population. It is truly appalling when we stop to realize that in neither Vermont nor New Hampshire nor Maine was there one single mile of new extension built in the last year reported by the commissions of those states.

"Much has been written, many an eloquent phrase has been spoken regarding the injustice and unfairness meted out to present investors who made your present systems possible. The sad plight of the widows and orphans has been pathetically told. All true, too true, but affecting only a minor portion of the community, mere platitudes and idle vaporings compared with the solitary, ice-cold fact that electric railway extensions have ceased, and that our communities as a whole will receive no further advantage from the many benefits accruing from new construction.

"It is certainly pertinent that we, as public citizens, vitally interested in the civic welfare of the community, stop, look, listen—whither are we drifting? Let us briefly recapitulate:

"(1) Electric railway extensions are a necessity for the future prosperity and advancement of the New England States.

"(2) The public wants, expects and needs these extensions.

"(3) Practically no new extensions have of late been built or are under serious consideration in the New England States.

"(4) It takes money to build electric railways.

"(5) There is always private money seeking investments where the profit is commensurate with the hazard taken.

"It needs no further diagram for you to see the real solution that must ultimately be arrived at."

THE REST OF THE PROGRAM

A gentlemen with long whiskers at the head table was then introduced as a distinguished tramway expert from Europe who would give his impressions of American electric railways. He made some humorous remarks and concluded by singing "Annie Laurie." During the last verse he removed his disguise and disclosed a well-known entertainer in Boston. During the remainder of the evening there was an attractive vaudeville entertainment.

BUSINESS SESSION

At the annual meeting held during the afternoon the following officers were elected:

President: John T. Conway, Brockton, Mass.

Vice-presidents: L. H. McCray, Kennebunk, Me.; J. Brodie Smith, Manchester, N. H.; Frank C. Wilkinson, St. Albans, Vt.; C. E. Learned, Boston, Mass.; D. F. Sherman, Providence, R. I.; W. P. Bristol, Hartford, Conn.

Secretary: H. A. Faulkner, Boston.

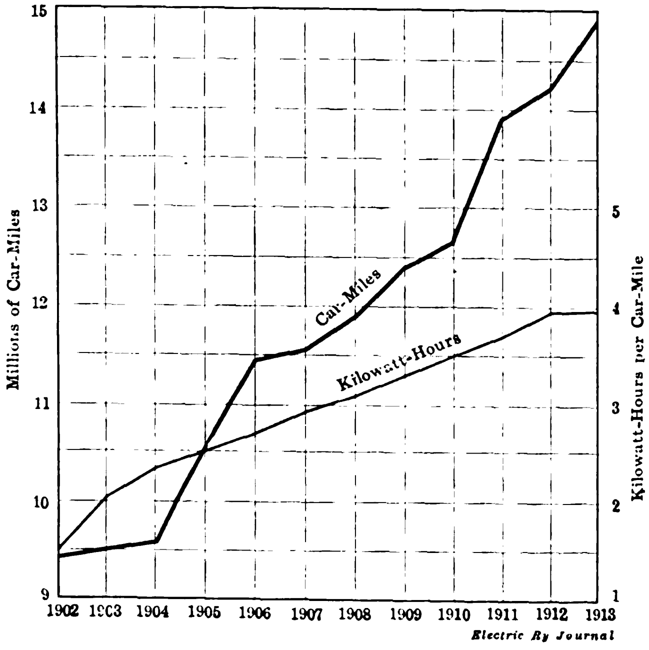
Treasurer: E. P. Shaw, Jr., South Framingham, Mass.

Executive Committee: Elton S. Wilde, New Bedford, Mass.; Harry B. Ivers, Boston; J. T. G. Nichols, Boston; William Pestell, Providence, R. I.; J. E. Dozier, Lynn, Mass.; J. W. Belling, Boston; A. A. Hale, Boston.

Finance Committee: John T. Conway, Brockton, Mass.; H. B. Potter, Boston; Robert E. Hamilton, Boston.

WHY POWER PLANTS MUST BE ENLARGED

In the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 21 a description appeared of the modern generating station which has just been completed by the Louisville Railway Company. Although there were other reasons why a new power plant was needed, some of which were given in the article, the main one was the rapid growth of the power demand on the system. The accompanying diagram has been prepared to show the rate of increase of car mileage during the past ten years and also the rate of increase of the power consumption per car mile.



Louisville Railway—Growth of Power Requirements

From the figure it will be noted that the increase in car mileage has been at practically a uniform rate since 1902 and amounts to about 500,000 per year. During the same period the energy consumption per car mile has more than doubled. This condition is typical of the growth that is going on in electric railway power plants throughout the country.

According to a census report just issued, there were 1562 municipal electric light stations in this country in 1912. This number compares with 1251 in 1907 and 815 in 1902.

Mr. Huber-Stockar Discusses Electrification

This Noted Swiss Engineer Expresses His Admiration for Both the A.C. and D.C. Electrifications Carried Out at New York and Discusses Various Features of Line and Locomotive Design Here and Abroad

Prior to his departure for Switzerland on Tuesday, March 24, Emil Huber-Stockar, president of the Electrotechnical Committee of Switzerland and permanent consulting engineer on electric traction to the board of general managers Swiss Federal Railways, discussed informally with representatives of the ELECTRIC RAILWAY JOURNAL his impressions of electrification in Europe and America.

D.C. AND A.C. SYSTEMS

With regard to a.c. commutator motors in general, Mr. Huber expressed the opinion that many of the difficulties experienced with them were due to the rapid development of the larger-sized motors. D.c. motors had advanced slowly step by step, whereas the a.c. motor had made more abrupt advancements in capacity within a much shorter period. It was really not more difficult to make a good a.c. motor say of 200-hp capacity than a like-sized d.c. motor using 1200 volts at the commutator. For instance, when with the Oerlikon Company some four years ago he had built 1500-volt d.c. equipments for the Bellinzona-Mesocco Railway. Nevertheless, where d.c. motors were used in railway service with a trolley voltage higher than the normal motor brush voltage, as when two motors are permanently connected in series, the speed flexibility of the ordinary series-parallel system was impaired to an appreciable degree.

The third-rail was excellent in its way, said Mr. Huber. Perhaps it could be adapted for 2400-volt service, but he would prefer to let others try it first. Further, if one was compelled for economic reasons to use 5000 volts or more, direct current seemed to be out of the question to-day. High-tension direct current was really more difficult to handle than alternating current in such respects as flashing over and short-circuit currents. In fact, one valuable feature of a.c. was its reactance effect, which tended to throttle excessive currents.

He deplored the war of the systems among engineers. This war now seemed to be more pronounced in America than in Europe. The exaggerated claims and the defamatory reports of the various proponents and opponents had frightened the steam railroad man far more than any mere differences in cost.

Although he believed that for general railway problems the single-phase system was the most adaptable as to flexibility of speed, distance of transmissions and simplicity of contact line, he had nevertheless recommended the extension of the Simplon line on the present three-phase system. He favored this addition partly because it would be needless waste to discard the present equipment and partly because the extension would demonstrate whether the three-phase system was too limited in its range of economic speeds. The conditions in the Simplon tunnel, so far as moisture and heat were concerned, were not favorable, and operation at a line voltage much higher than the present one of 3300 volts might be difficult.

Referring to the Norfolk & Western electrification, he thought that the use of a locomotive with four or eight single-phase series motors would eventually have proved more satisfactory than the split-phase combination with rotating machinery and liquid resistance on the locomotive, notwithstanding the absence of commutators on the motors and the possibility of regeneration. For all that, the combination had been carried out in an admirable way. The a.c. commutator motor really was not so formidable as to justify this complication. If the operator is content with two speeds he was tempted to ask why not go to straight three-phase operation? He realized that the admissible three-phase line voltage was too low for the Norfolk & Western, but this objection could be overcome by more substations.

If at the present time manufacturers were unable to supply sufficiently good single-phase apparatus, certain large electrifications would have to be postponed until they could.

Mr. Huber said that he would carry away a most excellent impression of the operations of all the main-line electrifications in the New York district and of the Hoosac Tunnel as well. He was particularly pleased to see that certain rumors which were going the rounds in Europe about the New Haven single-phase system were in total contradiction to the things that he saw by visits to all parts of this railway. The present splendid maintenance of the New Haven traction equipment was of especial interest to him. As an instance, he mentioned that every one of sixty commutators examined personally was in good condition. Out of a total of 100 locomotives and a number of cars only four locomotives were in the shops for some kind of attention. Indeed, the care-free behavior of the several enginemen that he observed was, in itself, pretty good evidence that their equipment was giving them very little to worry about.

The single-phase operation of the Hoosac tunnel was naturally of the greatest interest to him because of the tunnel conditions on the Swiss railways. Here, too, he found that the locomotives were giving excellent service. Only one machine was not available for service, and even this one was in the shops merely for cleaning. He was told that the insulators in the tunnel were cleansed monthly by rubbing them down with the line "dead," but this seemed an excess of caution.

LOCOMOTIVES

In discussing the mechanical design of the Lötschberg locomotives, which were described in the ELECTRIC RAILWAY JOURNAL for Nov. 15, 1913, Mr. Huber said that the Scotch yoke drive was apparently too rigid for a locomotive with such an elastic frame. As the same design had proved satisfactory on the meter-gage Rhætian locomotives, it would seem that the larger machines on the Lötschberg, Dessau-Bitterfeld and Wiesental lines had reached the critical point where the coupled masses exerted too much momentum on the driving system.

The principal electrical troubles of the Lötschberg locomotives disappeared after the end coils of the transformers had been furnished with better insulation and after the protective condensers had been so installed that they were no longer exposed to the precipitation of moisture upon them. Such mischances as these were not defects of system but natural occurrences in pioneer work. The Lötschberg motors did not heat beyond admissible limits, but some inconvenience had been caused by the commutators for reasons more mechanical than electrical. From the standpoints of acceleration and speed, these motors were perfect.

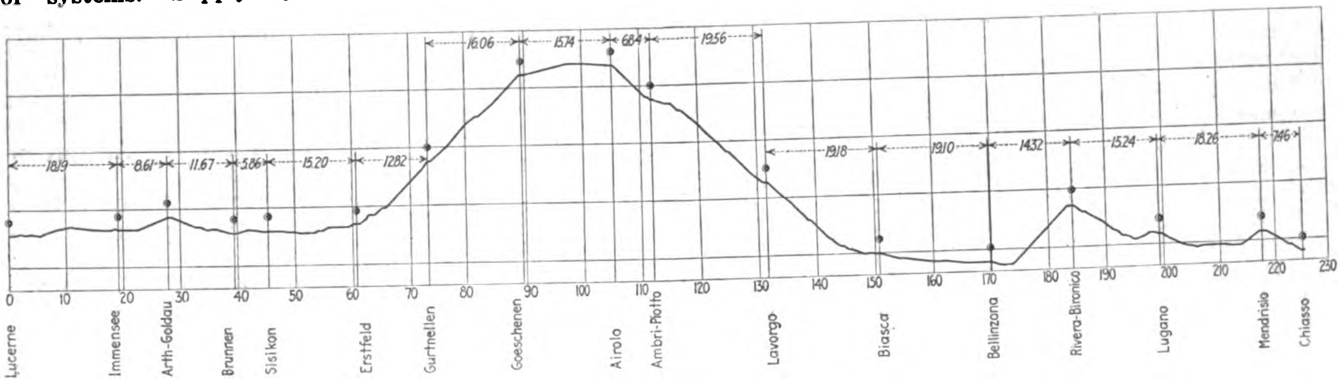
As to locomotive drives generally, there was a tendency toward the geared driving rod. Personally, he believed that the connecting rod was an alien element and that the limits of its use were still to be settled by experience.

For the passenger service of the St. Gothard Railway a double-unit locomotive of 3200 hp, one-hour rating, at 50 km (31 miles) an hour would be used. This performance could hardly be obtained from gearless locomotives with a reasonable number of driving axles. It was proposed to buy a few experimental locomotives of different types as a basis for the final decision.

Returning to the subject of gearless locomotives, he expressed the opinion that this type was most attractive in connection with direct current, provided one had to deal with high speeds on tracks which are level for the greater part.

GENERATING CONDITIONS AND LINE CONSTRUCTION

Mr. Huber, in talking about the power situation in Switzerland, observed that the conditions of hydroelectric generation did not favor the operation of railway, lighting and industrial circuits from single plants or systems. Supply systems there might be tied together for emergency purposes, but not for obtaining a diversity factor. In fact, the railway circuits were low frequency, say fifteen cycles, while lighting and industrial circuits were fifty cycles. Frequency changes were too inefficient and expensive for general installation. In the case of steam plants, it might pay to have a common station, not for the sake of the diversity factor, but for the sake of having a larger and consequently more economical plant. In Switzerland, however, the size of a plant was limited strictly by the water supply, and the interconnection of plants for even the same service was simply an operative precaution or convenience. The same conditions might apply to some hydroelectric developments in the United States.



Profile of St. Gothard Railway Between Chiasso and Lucerne—Distances in Km

An important advantage of the voltage control of the single-phase system from the power station viewpoint was that the starting of trains did not cause such sudden and high peaks as the d.c. and three-phase systems.

Referring to the contact line construction in the Lötschberg tunnel, Mr. Huber said that discharges had occurred only at insulators and these principally in the main tunnel. Troubles in the beginning had been due partly to the erection of the line before the track was laid, thereby causing discrepancies in the relative position of the contact line and the roadbed. However, the principal trouble was that the insulation in certain parts had proved insufficient, notably in the main tunnel where the insulators were fouled by the precipitation of dirty water from the tunnel roof.

Mr. Huber considered a 15,000-volt single-phase contact line practicable for long tunnels, but it was imperative to operate at half voltage, say 7500 volts, during the period of transition from steam to electricity. With steam entirely abolished, he would apply full voltage.

In the tunnels of the St. Gothard Railway no live point of the line would be less than 300 mm (11.8 in.) from ground. This distance was far greater than the minimum clearance in the Lötschberg tunnel. The clearance between any live point on the pantograph and the tunnel vault would be 250 mm (9.8 in.). The contact line would be carried from straight-arm brackets placed toward the axis of the tunnel, and the line would be hung through five or six multiple chain insulators. A chain of insulators of the type proposed had withstood 180,000 volts dry. He did not think that it was satisfactory to use insulators of petticoat or grooved type to obtain the completely independent insulation of the contact lines of each track.

To avoid the unpleasant consequences of a train becoming stalled in the 9½-mile St. Gothard tunnel a feeder wire would be so placed between the trolley lines that an auxiliary current collector could be run under it in emergencies.

The use of steel for contact wire, he said, was almost unknown in Europe. With steel contacts on the collector and running at high speeds, the steel wire appeared to be necessary. An advantage of the steel contact wire was that its elasticity could be used to compensate for dilatation. In Europe brass and, more commonly, aluminum contacts were used in connection with copper trolley wires, the expansion of which must be compensated for by special devices.

He thought that the redistribution scheme of the New York, New Haven & Hartford Railroad, introduced as a protection for weak-current circuits, was a surprisingly clever solution, inasmuch as the increase in the voltage from 11,000 volts to 22,000 volts would possibly save more than the cost of the equipment. He did not believe that the devices for the protection proper would cost $5,000 to $6,000 a mile, as was rumored. He estimated that $2,000 per mile, or $6,000 to $7,000 per substation, would be nearer the truth as only one 2000-kw transformer was used about every 3 miles. However, the New Haven solution was only one of several, and not even the cheapest. So far as experience in Switzerland taught, electromagnetic disturbances were lessened primarily by the use of a low frequency, and they were minimized by the elimination of higher harmonics in generators and motors by means of closed slots or notches set at angles; by installing aerial return wires near the trolley wires and feeders whereby boosting might be used or not; by the removal of weak-current lines to a reasonable distance from the railway line, and by the different known methods of equalizing inductive effects, as by transposition.

In conclusion, Mr. Huber stated that he could not help expressing his admiration for what had been accomplished here in steam railroad electrification. One proof of the satisfaction which these electrifications were giving to their operators was the charming frankness with which access to all parts of the lines and free permission to examine any details had been accorded to him.

PROCEEDINGS OF THE RAILWAY ENGINEERING ASSOCIATION CONVENTION

The committee reports presented at the fifteenth annual convention of the American Railway Engineering Association, held in Chicago on March 17 to 21, were abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for March 21, page 664. The attendance at the convention was the largest in the history of the association. In his presidential address, Edwin F. Wendt, member engineering board Interstate Commerce Commission, after dwelling on the growth of the association, its financial affairs and committee work, took up the question of recent advancements in signals and track, the development of electric traction during the last fifteen years and the valuation of common carriers. In closing his review of steam road electrifications, he stated that "the broad future of railroad electrification is dependent upon its thorough demonstration of great economic advantages over steam. If these are shown, nothing can prevent its ultimate general introduction. If these are not so demonstrated, its limitations as regards introduction will soon be reached."

ACTIONS ON COMMITTEE REPORTS

The report of the committee on rules and organization was adopted after being slightly modified, and the attention of the association was then directed to the report of the committee on signals and interlocking. The association voted to adopt symbols approved by the Railway Signal Association and substitute them for the symbols now shown in the manual. The observations as regards economies in labor and signal maintenance and the rules governing the construction, maintenance and operation of interlocking plants adopted by four Central States were received by the association as information.

The roadway committee's report on unit pressures allowable on roadbeds of different material was received as a progress report, and after considerable discussion as to the advisability of continuing this work it was decided to continue the tests and broaden their scope. This committee's conclusions regarding tunnel construction and ventilation were adopted with minor changes. After considerable discussion regarding the use of inner-guard rails as brought up by the committee on wooden bridges and trestles the committee's conclusions were adopted. The report of the committee on iron and steel structures was accepted as information, the value of the "inhibitive stimulative" theory, however, being questioned. Discussion of other portions of this committee's report was carried over until the Wednesday morning session, when the requirements for protecting traffic at movable bridges were referred back for further consideration, and the bridge clearance diagram was referred to the electricity committee. The report of the track committee was accepted after considerable discussion, after which its chairman presented recommendations for further study. One of these provided for a study of the matter of proper seasons for various kinds of track work and the date of the beginning of the fiscal year when funds are available to do track work. The five clearance diagrams presented by the committee on electricity were adopted. The report of this committee on the question of electrolysis was received as indicating progress and the work of this committee will be continued. The conclusions presented by the wood preservation committee met with considerable opposition with regard to the limiting of the use of coal tar in creosote oil of the second and third grades. After a long discussion in which it was recommended that coal tar should also be used with Grade 1 creosote oil as well as the other two grades, the conclusions of the committee were adopted as presented. The buildings committee report was received and approved for publication in the manual. Statistics of rail failures contained in the report of the committee on rail were received as information, and its conclusions were approved without discussion. The report of the committee on ties brought out considerable information on the merits of screw spikes under varying traffic conditions. The report was received as information.

Two forms of signs, namely, a road-crossing sign and a trespass sign, were recommended by the committee on signs, fences and crossings after a most thorough consideration of standard types and of the laws requiring their installation. The recommended crossing sign plan involved only the form and material and not the wording to be placed upon it. The discussion brought out the fact that several companies were using concrete instead of wooden posts in crossing-sign construction. The type of trespass sign recommended by the committee and adopted by the association does not include the wording shown on the drawings in the committee's report.

Further investigation of the proper depth of ballast, as well as information regarding methods and cost of cleaning stone ballast, was presented by the ballast committee. The latter was received as information, and no action was taken on the proposed ballast sections submitted by this committee. This committee received additional funds to carry on the work of investigating track stresses and will continue its work along that line.

ANNUAL DINNER

At the annual dinner of the American Railway Engineering Association, held in the "gold room" of the Congress Hotel on the evening of March 18, President Wendt acted as toastmaster and the speakers included the Hon. Charles A. Prouty, director division of valuation, Interstate Commerce Commission; the Hon. Charles Marcil, M. P., ex-Speaker of the Canadian House of Commons, and J. M. Schoonmaker, vice-president of the Pittsburgh & Lake Erie Railroad. In Mr. Prouty's remarks he called attention to the fact that within the last fifteen years the price of every article of universal and general consumption, with but one exception, had been advanced, and that exception was transportation by rail. Mr. Marcil's address was regarding the railway problems of Canada, and Mr. Schoonmaker closed with some very complimentary remarks regarding the railroad engineer of to-day. At this dinner it was announced that the following officers of the association were elected for the coming year: President, W. B. Storey, vice-president Atchison, Topeka & Santa Fé Railroad System, Chicago; first vice-president, Robert Trimble, chief engineer maintenance of way northwest system of Pennsylvania Lines West of Pittsburgh, and second vice-president, A. S. Baldwin, chief engineer Illinois Central Railroad, Chicago.

EXHIBITS

Conforming to the usual custom, the National Railway Appliances Association held its annual exhibit in the Coliseum during the week of the American Railway Engineering Association convention. As heretofore, the exhibits included a complete line of materials used in the construction and maintenance of steam and electric railroad track and roadways. At the annual meeting of the appliances association, held on the morning of March 17, Treasurer Reynolds reported a surplus of $8,930, with no liabilities. At the close of this meeting the following officers were elected: President, Norman M. Hench, Carnegie Steel Company; vice-president, T. W. Moore, of the P. & M. Company, and treasurer, C. W. Kelly, of the Kelly-Derby Company.

COMMUNICATIONS

MAINTENANCE AND DEPRECIATION

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., March 23, 1914.

To the Editors:

The editorial on the subject of maintenance and depreciation in your issue of March 21 strikes the right keynote. There has been a great deal of confusion among public service commissions and also among expert accountants as to the theory of depreciation. The old-fashioned idea of depreciation, as it applied to a private manufacturing establishment, involved no nice scientific theories and was comparatively simple in application. The extent to which it was applied depended upon the conservatism and foresight of the business managers. In the case of public service commissions, however, depreciation is not merely a matter of business prudence but is necessarily involved in the large questions of rate making, valuations and taxation.

As I understand the latest attempt to solve this question in scientific accounting, it is that all maintenance and depreciation charges should be shown directly in operating expenses and not concealed by more or less sporadic charges to the profit and loss account. The tendency seems to be to require a uniform charge per month for the maintenance and depreciation, and if this proves to be insufficient at the end of the fiscal year, the charge must be adjusted during the succeeding year to make up for any deficiency. This idea is sound and if generally carried out would reflect accurately the burden of maintenance.

I think that observers of railway reports in the past have been struck with the great variations in maintenance charges as made by different companies operating under more or less similar conditions. The latitude heretofore allowed to railway managers and accountants in this respect has frequently offered an opportunity for great abuses in accounting. In other words, it has frequently been utilized, not necessarily to reduce the maintenance expenditures, but to divert on the books a large portion of such expenditures from operating accounts to capital accounts. Since 1901, when the paper mentioned in your editorial was read by me at a meeting of the Street Railway Accountants' Association, a wave of railroad reform has spread over the country and has produced the new laws and regulatory commissions from which all corporations are now more or less suffering. My own idea has always been that a stricter observation of one of the Ten Commandments would have obviated the necessity for a great deal of radical legislation.

The present confused opinion which your editorial so well reflects ought to be clarified by discussion, and I think that a great public service would result if a consensus of an intelligent and practical opinion could be obtained on the subject.

T. S. WILLIAMS, President.

THE TENTATIVE SYSTEM OF ACCOUNTS

TRI-CITY RAILWAY & LIGHT COMPANIES
DAVENPORT, IA., March 23, 1914.

To the Editors:

I feel that the Interstate Commerce Commission and the committee on a standard classification of accounts of the American Electric Railway Accountants' Association are to be congratulated upon the comprehensive manner in which they have handled the revision of the classification.

I have no suggestions or criticisms to offer.

H. E. WEEKS, Secretary.

PUBLIC SERVICE RAILWAY COMPANY
NEWARK, N. J., March 25, 1914.

To the Editors:

A standard classification of accounts for an industry should keep pace with the growth of the industry and the changes in economic conditions.

The committee that has been working with the representatives of the Interstate Commerce Commission in preparing the latest uniform system of accounts for electric railways has evidently had this in mind. Their joint work has been most thorough and the classification as finally presented to carriers proves once again that electric railways have been working upon a proper basis in the past in so far as their system of accounts is concerned, for the changes that have been made are all logical developments and are not, by any means, revolutionary.

Important additions that have been made since the last classification for electric railways was issued are the classifications of income, profit and loss and general balance sheet accounts. Standardization of these accounts has not heretofore been made and the industry has, no doubt, suffered to some extent because of this lack of standardization. In all work of standardization there must be some give and take, but if accounting officers will study the new system they will find few items indeed to take exception to. The provision for a new general account, "Power," in operating expenses is a decided improvement over the old classification and a great convenience to companies which control both electric railway and electric lighting properties.

Probably the most discussion will surround the treatment of depreciation and amortization in the accounts. Fortunately few accountants nowadays differ upon the question of the desirability of such accounts being provided for, and practically only the question of method of treatment is open for discussion. The system would seem to provide a logical way for the treatment of both depreciation and amortization, though in operating expenses under the head of "Equipment Retired" an account is provided which is unnecessary if the theory as to the treatment of depreciation outlined in the accounts is followed out. This account is evidently provided for the use of companies which are not charging into operating expenses an amount for depreciation and accruing a corresponding reserve. With this account "Equipment Retired" in the classification, it would seem desirable to have similar accounts for other classes of property retired or abandoned in operating expenses under the respective maintenance accounts.

In the general account, "Power," in operating expenses it would seem as if an account "Other Operations Dr." is required. This would also conform with the same accounts under the general accounts "Way and Structures" and "Equipment" in operating expenses. It would seem desirable to provide an additional account under the general account "Power" in both road and equipment and operating expenses for underground transmission conduits, to show the separation of the transmission system between underground and overhead in the same way as shown under the general account "Way and Structures."

The provision of the equalization accounts under "Way and Structures," "Equipment" and "Power" will be a convenience to some companies, but they are optional with the carrier, with the requirement that if carried they should be cleared annually to prevent abuse. Personally I am not in favor of their use.

The balance sheet accounts have evidently been made the subject of considerable study, and their arrangement is such that the information presented in a balance sheet prepared from these accounts, together with the income and profit and loss accounts, which follow accepted practice, should give investors in electric railway properties and the public clear and definite information as to the condition of the property to which they apply. P. S. YOUNG, Comptroller.

THE AMERICAN RAILWAYS COMPANY
PHILADELPHIA, March 25, 1914.

To the Editors:

Replying to your inquiry, I send you herewith copy of the letter which I sent to the Interstate Commerce Commission.

C. L. S. TINGLEY, Second Vice-President.

Mr. Tingley's letter, addressed to Fred W. Sweeney, chief examiner of accounts Interstate Commerce Commission, says:

"Accounts Nos. 30, 'Depreciation of Equipment,' and 40, 'Equipment Retired,' both provide sub-accounts for floating equipment. Account No. 534, under 'Road and Equipment' accounts, also provides for floating equipment, but no appropriate maintenance account is provided therefor.

"Account No. 44 provides for the maintenance of coal pockets and trestles when considered part of the power plant. Account No. 538 provides for coal trestles and pockets when part of the power plant. Account No. 525 provides for the cost of coal pockets and trestles not considered part of the power plant. Now this seems to me to be totally illogical. You are now providing a separate group of accounts to cover the cost of your power plant and a separate group of accounts to cover the maintenance and operation of the power plant so that you may get a unit cost for your power including all the elements thereof. Now we have five power plants where the coal is dumped from cars or elevated from cars and boats into bins adjacent to the power house, where there is a coal trestle which elevates the coal and delivers it to the coal pockets attached to and a part of the power house, so that without question this storage capacity and machinery for handling the coal is physically attached to and connected with and a part of the power house, and maintenance and upkeep will therefore be charged to Account No. 44. We have in another place a coal pocket situated about 40 ft. from the power house, where the coal is dumped from cars into a hopper, elevated into bins and later discharged into charging cars which are wheeled into the power house. This building is not physically connected with the power house and might very readily be considered as belonging in Account No. 525, and the maintenance thereof might very readily be charged to Account No. 24. It would therefore not become part of the cost of the production of power.

"It does seem to me that to be consistent and to secure uniform accounting all coal-storage and coal-handling apparatus used exclusively for company work should be grouped under the power classification, and that where coal for power is handled on or by structures used for revenue purposes the cost should be apportioned so that power would bear its proper proportion of the expense. I know that this question has been passed upon once before, but then the buildings were not segregated into a power group and the logic of the situation was not as forcible as it is now.

"Account No. 203: 'This account shall include amount receivable by the carrier . . . including interest on funded debt, guaranteed dividends on stocks.' Now this seems to be an undue inflation of the income account of the carrier. I have in mind one instance, a piece of road leased for a lump sum plus the interest charges and taxes. Now, one of the provisions of the lease provided for the execution and sale of additional bonds from time to time as the lessee company extended the property. Now, if the accounting company is required to include this bond interest which it never sees in its income account, it is going by so much to inflate its income account, it will be required to pay the federal tax thereon, and it will be taxed on its income therefrom by the state, as will also the lessee, thereby creating double taxation. I cannot assent to the soundness of this proposition from an accounting point of view, and I must most assuredly protest against it from the point of view of taxation.

"Take another example of how it would work. In the State of Ohio, for example, the lessee company would report its gross earnings to the Tax Commission, would be taxed upon them for its franchise tax, and the State Tax Commission would then proceed to value the property irrespective of its fixed charges by capitalizing 37½ per cent of the gross minus 7 per cent for taxes, at the rate of 10 per cent, thereby taxing the property as a whole as a going concern by means of its gross income. The lessor company, being required to display this bond interest in its income account, would again be subjected to the same rule and again be taxed on the value of the property already taxed in the hands of its tenant, from which there would be no escape.

"The same criticism will apply to Account No. 210. I can see no valid reason for including in your income account appropriations for sinking funds or accruals to sinking funds remaining in the hands of the trustee uninvested. They do not accrue to the benefit of the earnings of the company, they are applicable only to the reduction of its indebtedness, are earmarked and absolutely beyond its control. It is not income arising out of the transaction of its business and would be an unwarranted addition to its taxation.

"Account No. 216, and more particularly Note C, would seem to require segregation of taxes, which would not be possible. For example, under the tax laws of the State of Ohio, as stated above, your property is taxed as a whole as a going concern and not upon its physical elements.

"Account No. 224 seems to provide only for the amortization of discount on funded debt, whereas Account No. 311 would seem to contemplate the inclusion of the expenses incident to the creation of the securities based upon the mortgage such as legal fees, printing and engraving and what not. The latter seems to be the more logical proposition and conforms to the practice which our companies follow.

"Account No. 228 is subject to the same criticism as Account No. 210. It seems to contemplate an unwarranted inflation of the income account.

"Account No. 407: I must take serious exception to this account. Cash on deposit with the trustee due on demand upon coupons which have already matured is beyond the control of the company and no longer available as a cash asset. It is an earmarked fund for the liquidation of the matured debt, which the trustee is bound to hold until the obligations are presented, and if they are not presented, to hold indefinitely against their presentation, and it is in no sense an asset of the company. The same is true in a large measure of moneys deposited in a special dividend account to meet dividends which have been declared and are now due and payable. This money represents a debt which is past due and is the property of the persons to whom it is due and for which checks have been issued. It is not a resource upon which the company can draw for its general purposes, and if it should draw upon it the company would commit a grave breach of trust.

"Account No. 411: The note requiring discount for prompt payment of bills to be credited to the accounts charged by the original invoices. I must take exception to this. In my judgment, it is an operation of the treasury department and is no more a credit to the accounts benefited than would the interest on the money required to pay those bills if the treasury department went out and borrowed the money to pay them be a debit. If necessary, show this in a separate income account, but do not require its distribution over a multitude of small accounts, necessitating changes of your unit values in your storeroom and what not.

"Account No. 412: It does not seem to me to be sound accounting or sound finance to take into account dividends which you may assume to have accrued and which have not yet been declared. The same is true of interest on deposits from current balances which can be computed only by the bank, as you are not advised of the dates upon which your checks have been charged to your account.

"Account No. 416 should, I think, also include the expenses as well as the discount.

"Accounts Nos. 435 and 436: When the interest upon a funded debt matures and in accordance with the terms of the bond the company pays the trustee upon the day fixed the amount of said interest, it has discharged its liability, and the liability should not appear upon its balance sheet any more than the cash should appear as an asset upon its balance sheet; and when a funded debt matures and the cash is deposited with the trustee upon the date of maturity the company would be entitled to, and frequently does, demand of the trustee that the mortgage shall be satisfied of record and the lien removed from its property, and it would therefore seem to be an absurdity to continue to carry it as a liability upon its balance sheet. As an illustration, we to-day received a one-thousand-dollar bond out of an issue of $2,500,000 which matured in 1911. The lien has long since been satisfied of record and refunding operations conducted, and it would therefore have been an absurdity, it seems to me, to have continued as a liability an obligation which had already been paid to the representative of the obligee.

"Account No. 447: This account is subject to the same criticism as has been made against Accounts Nos. 210 and 228.

"Account No. 517 would seem to require the structure carrying the tracks of the accounting corporation over a highway to be charged to Account No. 516, but the restoration or creation of the highway to be charged to Account No. 517. This seems to me very much like hair-splitting and would probably result in an arbitrary and estimated division of the cost rather than correct accounting, without due compensation in information obtained.

"Account No. 526: Should not this definition indicate that the wharves, docks, etc., herein charged, but more particularly the coal-handling machinery, are those designed for revenue purposes? For example, I have one wharf equipped with coal-handling apparatus which is never used except to handle coal for the power house, which stands back about 100 ft. from the wharf. The coal-handling apparatus is unquestionably a part of the cost of the power house and its maintenance a part of the cost of the production of power."

APPRENTICE TRAINING ON NEW YORK STATE RAILWAYS

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., March 6, 1914.

To the Editors:

In view of your interest in the success of the experiment described in the issue of the ELECTRIC RAILWAY JOURNAL for March 15, 1913, page 461, you may be pleased to learn that, for the present year, two boys are taking the first year of the apprenticeship course, and two the second, as outlined in your columns a year ago. I find that about 50 per cent of the boys who start the course continue in it to the end. I am able to interest the boys in this work to a greater extent now than heretofore, as we now have a very good trade school in Rochester. The boys taking our apprenticeship course can attend this trade school with no charge for tuition. Under the present law, the State of New York subsidizes industrial or trade schools and Rochester has been quick to take advantage of this and already has a first-class shop school.

Considerable attention is being paid to industrial education in this city, and the Rochester Chamber of Commerce is making a special study of the subject. This work is being carried on by a special committee of which the writer is a member. The work of this committee has consisted mainly in bringing the schools and manufacturers together in such a way as to encourage boys to continue in school for a longer period, and especially so when they can take up trade or vocational work in the schools. The school work of our apprenticeship course will soon be taken care of completely by a special course in the city industrial school. This will undoubtedly be the means of securing permanency for the work.

It might be interesting to you to know that the effect of a few apprenticeship courses in this department has been very pronounced on the older men who are engaged in electrical work. As an instance of this, some time ago I called at one of our outside stations and, in talking with the foreman regarding the boys who were taking the apprenticeship course, was surprised to learn from him that in addition to these two boys every electrician at the station was taking a course in electrical work. The older men who were employed during the daytime became interested in the work of the boys and are now attending night school.

It is thus easily seen that in addition to the benefit derived by the boys who take the apprentice course is the further benefit to the older men who, through the example set by the boys, become interested in obtaining more training and attend the night schools.

G. M. CAMERON, Master Mechanic.

[The plan mentioned by Mr. Cameron was one by which students spent one part of the day at the Mechanics' Institute and one at the railway company's shops. The original article gave some details of the course.—EDS.]

ELECTROLYSIS TESTS IN SPRINGFIELD

Since the publication of the abstract of the report on electrolysis mitigation in Springfield, Ohio, in the issue of the ELECTRIC RAILWAY JOURNAL for March 21, 1914, page 646, a revised copy of the report has been received containing slight changes in the tables. The differences from the figures published in the above issue are few and of minor importance. The revised report shows that 20 per cent instead of 19 per cent of the voltage drops exceeded the limit in Germany of 2.5 volts during average traffic conditions. The average of all peak-load gradients for the hour and for highest ten-minute period were 0.33 volt and 0.63 volt, instead of 0.35 volt and 0.64 volt respectively.

In order to relieve the congestion at the large main station in Hamburg, Germany, a proposal is to be embodied in the next Prussian railway budget for the electrification on the Hamburg-Altona-Blankenese single-phase system of the suburban line to Bergedorf and Friedrichsruhe. The work is likely to be completed in two or three years, and will form an extension of the lines already electrified.

Criticism of Tentative System of Accounts

Suggested Changes in Accounting Series Circular No. 41 Made by Central Electric Railway Accountants' Association in Cleveland, Ohio, March 13, 1914

At the meeting of the Central Electric Railway Accountants' Association held in Cleveland, Ohio, on March 13, 1914, the Accounting Series Circular No. 41, recently issued by the Interstate Commerce Commission and containing a tentative system of accounts for electric railways, was discussed and criticised, and a report was adopted containing suggestions for certain changes to be offered to the commission. This report, published below in full, shows the accounts affected and the alterations and additions suggested. Interpolated matter is printed in italics.

OPERATING EXPENSES

1. Superintendence of Way and Structures:

Omit the words "track foremen," fourth line of the text.

3. Ties:

"This account shall include the cost of cross, switch, bridge and other track ties used in repairing and renewing *main and repair tracks, sidings, spurs, and tracks in tunnels, station yards, shop and other yards; on piers, wharves, track scales, inclines, bridges, trestles and culverts, in carhouses, shops, and storehouses; transfer tables and turntables.*"

5. Rail Fastenings and Joints:

The words "welded joints" are omitted for the reason that it might be construed that labor also was to be included. No change is suggested in the remainder of the text.

11. Cleaning and Sanding track, and

12. Removal of Snow, Ice and Sand:

These accounts should be eliminated from "Way and Structures" and placed under the head of "Conducting Transportation."

15. Bridges, Trestles and Culverts:

Omit the words "and bridge watchman" from the tenth line of the text. It would appear that the services of bridge watchmen would be more in the nature of an operating expense than maintenance.

25½. Way and Structures Retired:

This is a new account which it would seem desirable to include under "Way and Structures," inasmuch as a similar account is shown under the head of "Equipment."

34. Electric Equipment of Cars:

"This account shall include the cost of labor and material used in repairing the electric motive *wiring and* equipment of all passenger, combination, freight, express, mail and service cars." No change is suggested in the rest of the text or in notes A and B.

Note C is added as follows: "Electric motive equipment includes trolley poles, wheels, pantographs, sliding bows, third-rail shoes and so forth."

43½. Superintendence of Power—Maintenance:

The tentative classification includes, under operation, items which are properly maintenance; therefore, it would be desirable to show a new account under the maintenance group—power.

47. Transmission System:

Add to the note: "Tie lines between generating stations and substations shall follow the same rule as other lines."

48½. Power Station Equipment Retired:

This is similar to Account 40 under "Equipment."

50. Superintendence of Power—Operation:

Eliminate the words "maintenance and" in the second and third lines of the text.

60. Power Transferred—Credit:

"This account may be credited and the appropriate operating expense *and road and equipment* accounts charged . . ." No change is suggested in the remainder of the text.

66. Miscellaneous Car Service Expenses:

The second paragraph of text is changed to read: "This account shall include also the cost of secret-service inspection, conductors' books, punches and portable registers; rent of fare registers; repairs and renewals of fare boxes; car-service employees' badges and uniforms; refilling of fire extinguishers in cars; portable signs on cars for guidance of passengers; meals furnished trainmen on rush days; temporary grain doors, and other car-service supplies and expenses." No change is made in the note.

67. Station Employees:

The note is changed to read: "When a station employee is engaged in various duties and his wages can be readily apportioned among the accounts affected, such apportionment should be made."

71. Operation of Signal and Interlocking Apparatus:

The following note is inserted: "When an employee is engaged in various duties and his wages can be readily apportioned among the accounts affected, such apportionment should be made."

72. Operation of Telephone and Telegraph Lines:

Add to Note A: "The cost of telephone service should be charged to the accounts affected when such charge can be readily determined; if such charge cannot be readily determined, Account 86, 'Miscellaneous General Expense,' should be charged."

Eliminate the text of Note B and substitute the following: "When an employee is engaged in various duties and his wages can be readily apportioned among the accounts affected, such apportionment should be made."

75. Other Transportation Expense:

Add the following note: "The cost of repairs to a company's own tracks and equipment necessitated by collisions, derailments, etc., shall be charged to the proper maintenance accounts."

78. Parks, Resorts and Attractions:

"This account shall include the cost of *maintaining and* operating amusement parks, resorts, . . ." No change is made in the remainder of the text or the note.

80. Salaries and Expenses of General Officers:

Eliminate the words "the entire system" in the fifth line, and substitute the words "various departments."

81. Salaries and Expenses of General Office Clerks:

Omit the second paragraph.

Add the following note: "When the salaries of clerks employed in general office can be readily apportioned among the accounts affected, such apportionment should be made."

85. Pensions and Gratuities:

"This account shall include pensions and gratuities paid to retired and incapacitated employees or their heirs, *insurance on employees*, and expenses in connection therewith."

Add the following note: "The cost of liability insurance should be charged to Account 91, 'Injuries and Damages.' "

86. Miscellaneous General Expenses:

Add after the world "telegrams," in line 3, "which cannot be readily apportioned to other accounts." No change is suggested in the remainder of the text.

91. Injuries and Damages:

Add after the word "claims" in line 5 of the first paragraph, "cost of liability insurance."

Add after the word "books" in line 4 of the second paragraph, "cost of appeal bonds."

92. Insurance:

Add an additional note as follows: "Account 85, 'Pensions and Gratuities,' includes benefit insurance; and Account 91, 'Injuries and Damages,' includes liability insurance."

93. Stationery and Printing:

Omit Note A.

94. Store Expenses:

Eliminate from line 4 the word "collecting and."

96 Rent of Tracks and Terminals:

Change to read, "This account shall include payments for rent or use of tracks *and bridges* . . ." No change is made in the rest of the text.

97. Rent of Equipment:

Eliminate this account, as well as Account 116, "Rent of Equipment," and insert two new accounts under "Income"—one for rental paid for equipment and one for amounts received for equipment rented.

98. ————.

This is a new account to be added as set forth in suggestions relative to the road and equipment accounts. (Section 3, Basis of Charges, page 88 of Circular 41.)

There seems to be considerable difference of opinion as to undistributed accounts. A number of those present at the meeting were of the opinion that these items should be distributed directly to the various accounts with the option being given carriers to include them in the present undistributed classification, instead of following the note shown in the tentative classification, which states that "carriers are at liberty to distribute items covered by the following accounts, but all reports to the commission must show the amounts properly charged to the undistributed accounts."

REVENUE ACCOUNTS

No changes are recommended in these accounts.

INCOME ACCOUNTS

209. Income from Unfunded Securities and Accounts:

Add the words "cash discounts," making the last line of the text read, "cash discounts and other analogous items."

Eliminate Note B. The item of cash discount is very similar to interest received on bank balances, and is a financial, rather than an operating item. If note B as shown in the tentative classification were to apply, it would be necessary, in order to be consistent, to charge the interest on notes given in settlement of invoices to the accounts to which the invoices were charged.

210. Income from Sinking and Other Reserve Funds:

This account should not be included among the income accounts. Transactions of the sinking fund are entirely separate matters, and an analysis of that account should reflect all such transactions. The only entry in the surplus account referring to the sinking fund should be for the annual payment, and it would be shown in Account 307, "Appropriations of Surplus to Sinking and Other Reserve Funds."

212½. Rent Received for Equipment:

This new account, in connection with Account 217½, "Rent of Equipment," would take the place of the operating expense account No. 97, "Rent of Equipment," as now shown in the tentative classification.

217½. Rent of Equipment:

This is a new account. See explanation regarding Account 212½.

224. Amortization of Discount on Funded Debt,
228. Appropriations of Income to Sinking and Other Reserve Funds,
229. Dividend Appropriations of Income,
230. Appropriations of Income for Investment in Physical Property,
231. Stock Discount Extinguished Through Income, and
232. Miscellaneous Appropriations of Income:

The above accounts now shown under "Income," which are also included under "Surplus," should be omitted from the income accounts.

PROFIT AND LOSS ACCOUNTS

No changes are recommended in these accounts, although a number of those present at the meeting were in favor of changing the title from "Profit and Loss" to "Surplus" for the reason that "Profit and Loss," in a great many cases, is considered to be synonymous with the term "Income Accounts" as used in the circular, and for the further reason that the word "Surplus" appears in Accounts 307, 308, 309, 310, 311 and 312.

GENERAL BALANCE SHEET ACCOUNTS

407. Cash:

Add the following note to the text of this account: "This account should not include funds deposited with the trustee for the purpose of paying bond interest coupons. All such amounts should be shown in Account 408, 'Special Deposits.' "

408. Special Deposits:

Instead of grouping this account on the general balance sheet under "Working Assets," it would appear that it should be shown under "Deferred Debit Items."

411. Materials and Supplies:

Change the note to read as follows: "Discount allowed for prompt payment of bills for material or supplies shall be credited to Account 209, 'Income from Unfunded Securities and Accounts.' "

412. Interest, Dividends and Rents *Receivable* Accrued:

This account should be shown in the balance sheet under the head "Deferred Debit Items," instead of "Working Assets."

414. Insurance, Rents, *Interest* and Taxes Paid in Advance.

428. Receivers' *Notes and* Certificates.

439. Accrued Taxes *and Insurance*:

This account should also include the amount of insurance accrued, such as liability insurance based on payroll, etc.

ROAD AND EQUIPMENT ACCOUNTS

The last sentence of the second paragraph of Section 3 of General Instructions, Basis of Charges, is changed to read: "If such charge be made, the amount thereof shall be equitably credited to a new account under undistributed accounts."

505. Ballast:

After the word, "delivery," line 3, add the parenthesis (except final distribution).

506. Ties:

After the word "tracks," in line 3, add: "cost of transportation, inspection and handling (except final distribution)."

531. Service Equipment:

Change to read, "Locomotives,"

532. Electric Equipment of Cars:

Change to read, "Service Equipment."

533. Locomotives:
Change to read, "Electric Equipment of Cars."

These changes are recommended so that the accounts above-mentioned may appear in the same order as in the classification for operating expense and road and equipment accounts.

FURTHER RECOMMENDATIONS

It is also recommended that the general balance sheet form should be changed to provide for two groups of accounts under the present head of "Deferred Debit Items," as follows:

Deferred Debit Items { Accrued Accounts
Prepaid Accounts

It is also suggested that it might be advisable to leave blank numbers between the various groups of accounts "Way and Structures," "Equipment," etc. It is suggested that the word "station" be substituted for "plant" in Accounts 45, 48, 51, 55, 538 and 541.

Finally, it is resolved that it is the sense of the association that the fiscal year of electric railways end on Dec. 31, and that the tentative classification go into effect Jan. 1, 1915.

MEETING OF THE PUBLIC SERVICE A. E. R. A. SECTION

The regular monthly meeting of the Public Service Railway Section of the American Electric Railway Association was held at Newark on Thursday evening, March 19, with 184 members and sixty guests in attendance. In accordance with custom, an address was delivered before the presentation of the technical subject of the evening. On this occasion George J. Roberts, first vice-president of the company, spoke on "Duties to One's Self."

INSPECTION OF ROLLING STOCK

The next order of business was a paper by John Hanf, division master mechanic, entitled "Inspecting the Rolling Stock." The paper was read by S. B. Cunningham, executive clerk to the mechanical engineer. Mr. Hanf reviewed the growth in the size of car bodies during the last twenty years from 16-ft. to 18-ft. bodies weighing 6000 lb. to 8000 lb. and costing $600 to $800 complete to the present 32-ft. to 34-ft. city car weighing 50,000 lb. to 54,000 lb. and costing from $6,000 to $7,000 complete. The rolling stock of the southern division, which is in charge of the author, consisted of 161 closed, seventy-three open and thirty-nine miscellaneous service cars, making a total of 273 cars. These cars were operated over 153 miles of broad-gage track. The rest of the Public Service Railway has standard-gage track.

Inspection was on a time basis and most of it was carried out during the daytime. At the office a card system was kept of all cars, and from this record a daily list of cars to be inspected was sent to the foreman. This list gave in detail what was to be done on each car. The list was returned by the foreman at the end of each day for record. Of the assigned cars 12½ per cent were inspected daily. As no inspection was done on Sundays, each car was inspected on an average once every ten days. The journal and motor-bearing waste of 2½ per cent of the cars was repacked daily except Sunday. In addition to the regular ten-day inspection, cars are also examined every night for defective brake or truck parts. The general overhauling of the trucks was carried out about once in twelve months.

Owing to the use of air brakes and heavier cars it had been necessary to change from cast-iron to steel wheels on all of the larger cars. During the past year they have been using a steel wheel with a ⅞-in. flange instead of a ¾-in. flange. It was found that the wheel with the deeper flange was not practicable on their division, especially in the city, because the groove in the rail was not deep enough to accommodate this size flange. This caused the wheel to ride on the flange instead of the tread until the flange was worn down to ¾ in. or less, which was the depth of the rail in a number of places. Under these conditions the deeper, or ⅞-in., flange had a tendency to ride the rail at switches, crossovers, etc. He did not think they should attempt to use for city service a wheel with more than a ¾-in. flange.

Mr. Hanf favored well-painted, clean car bodies because the public judged a company by that feature more than any other. In conclusion, he pointed out the need for giving ample attention to service cars. These cars were usually equipped with old motors and ought to be inspected daily; further, such daily inspection was certainly necessary because the construction cars were often loaded to double their capacity and generally received less care than passenger cars. Snow plows and sweepers were operated by the trainmen only. It was customary on many other roads, he said, to send a shopman out with each plow or sweeper, but he thought it wiser to keep the men at the shop ready for jobs beyond the ability of one man or small gangs. The mechanical department of his (the southern) division also took care of all derailments. This was another argument in favor of keeping the shopmen at the maintenance quarters during a severe snowstorm.

DISCUSSION ON CAR INSPECTION

Mr. Hanf's paper was discussed by D. H. Roszel, who considered the matter from the trackman's standpoint, and W. C. Pierce, supervisor, who presented the viewpoint of the transportation man.

Mr. Roszel noted that Mr. Hanf had referred to the use of the ⅞-in. flange wheel in city service. He would like to see such a standard flange adopted for this type of service, but under present conditions it was not practicable to do so. Two reasons might be given for this. The first was the decreased life of the rail, and the second the pounding of the special work. Many of the old standard rails, such as the 9-in. tram rail and the 7-in. trilby rail, had a flangeway only 1¼ in. deep. With a ⅞-in. flange the permissible wear would be only 4-16 in., while with an 11-16-in. flange the wear would be 7-16 in. Thus the ⅞-in. flange would reduce the life of the rail more than one-third. As they had many miles of this rail in good condition it was inadvisable to adopt this standard for some time to come, as the cost of reconstruction would be prohibitive. The new rail, with a flangeway 1½ in. deep, eliminated this feature. The second reason, namely, pounding of special work, was also very important. The company was compelled to design all of the special work intersections for flange bearing, instead of tread bearing, because of the narrow tread of the wheels; that is to say, the groove at that point was made as deep as the flange was high. Tread bearing would cause the wheel to pound each time it crossed the groove of the intersecting rail, resulting in damage to the track and car and annoyance to the passengers. If they were to design such special work to be used for a ⅞-in. flange, the wheels with the smaller flange would not get the desired bearing, and the result would be the pounding of the point. Therefore, it was not generally advisable to use both 11-16-in. and ⅞-in. flanges on the same line. However, as greater safety demanded ⅞-in. flanges for all high-speed interurban cars, it was necessary occasionally to make an exception.

Other items less known, perhaps, than the flat wheels so obnoxious to the public required careful investigation. One was the necessity of keeping the distance from back to back of wheel outside of a definite minimum. This limit had been placed earlier at 4 ft. 5 13-16 in. for the northern division. This allowed a decrease of only ⅛ in. from the standard distance for new wheels. This figure was not very easily obtained, and as a general thing it was assumed to be correct provided the gage distance was within its limits. However, as a wider range of variation was permitted for the gage width than was possible for this measurement this latter should be tested independently. The necessity of this could be appreciated when one realized that these flanges had to pass through special work where the groove was only 1 9-16-in. wide. This condition fixed definitely the distance between the guards, and if the distance from back to back of wheels was less than this, the wheel was pulled over the top of the guard or special work, causing a derailment.

It was also important to keep the flange thickness within a certain maximum limit. The standard thickness was 1 3-16 in., while according to their investigations 1 4-16-in. was the maximum thickness that could be safely allowed. This figure was based on a truck of 6-ft. wheelbase, operated over a rail with a groove 1 9-16-in. wide. Lately the tendency had been to increase the wheelbase to 7 ft. One could easily realize that, in taking a curve, the flange on a truck with 7-ft. wheelbase would ride at a greater angle to the gage than would a flange on a 6-ft. wheelbase. Therefore it was necessary to be more careful in testing this width as the wheelbase increased. In very sharp curves even this thickness could not be used safely with a wheelbase greater than 6 ft. They had found it advantageous to use the 1 9-16-in. groove because anything larger would not give them the full advantage of the guard and because an increase of the width of the opening at the throat of frogs, mates, etc., would increase the tendency to pound. This measurement had to be made with a special gage. Unless flanges were kept within the limits named (1 3-16 in. to 1 4-16 in.) it would be necessary to change the type of guard rail and special work on many miles of track.

Another item that required measurement was the height of the flanges. If this exceeded the maximum limit, cutting of the rail might result. If it was below the minimum, there would be excessive pounding at all special work like that which occurred when a ¾-in. flange was operated over an intersection designed for a ⅞-in. flange.

There were other things, such as chipped flanges, sharp flanges, soft spots and treads, thickness of rims, etc., which interested the trackman aside from many items in connection with the electrical and braking equipments. However, he had said enough to indicate that many details required the co-operation of the mechanical and way departments to the end that any change in construction by one would not involve a more costly change by the other department.

Mr. Pierce confined his discussion to a statement of the practices on the northern division, stating that it was customary to inspect cars every seventh day. He believed that the stationmaster should be furnished with a list which gave the car number and day of inspection. If it was necessary to operate cars that were due for inspection, they should be put on as trippers. A brake examination should follow three days after the general inspection. Wreckers and sand cars should be inspected just as carefully as passenger cars. Work cars which were under a heavy strain should be inspected every day, and snow plows, sweepers, rotaries, levelers, etc., should receive attention immediately after each storm.

Mr. Hanf's paper was also discussed informally by R. E. Danforth, general manager, and J. E. Quinn and W. R. Ricker, shop foremen.

RESOLUTIONS

L. J. Tynan, of the legal department, then spoke of the great personal and engineering loss which had come to all through the recent death of E. J. Dunne, superintendent of distribution. He presented a resolution of condolence, and on motion the secretary was instructed to send a copy of this resolution to the members of the bereaved family.

The meeting was adjourned at 10:30 p. m., after a vote of appreciation had been extended to the speakers of the evening.

WISCONSIN COMMISSION DISMISSES COMPLAINT AGAINST MILWAUKEE COMPANY

The railroad commission of Wisconsin has issued an order dismissing a complaint of the city of Racine against the Milwaukee Light, Heat & Traction Company. The complaint was filed early in 1913. At that time the company had under construction a number of new cars for use in Racine. Shortly before then it had undertaken to secure certain new franchises in order to extend its lines into outlying territory which had shown rapid development during the previous years. Some of the members of the Common Council sought to impose burdensome franchise restrictions and the company therefore withdrew its application.

In dismissing the complaint the commission sustains the action of the company on every point and makes recommendations with respect to the construction of new tracks in accordance with the company's previous plans and franchise applications.

The order of the commission says in part:

"The city of Racine in its petition alleges in substance that the cars operated by the respondent in Racine are inconvenient and inadequate; that at certain times of the day the cars are overcrowded; that the extension of certain lines is necessary for proper service to the public, and that the sale of six tickets for 25 cents, good at any time when the cars are running, is justified because of the increase of street car traffic in Racine.

"Subsequent to the hearing several new cars were placed in service, satisfying the complaint with reference to the frequency of operation. The company still retains in service a number of remodeled cars. The city attorney in a letter subsequent to the hearing contends that the service will not be satisfactory until these cars are discarded for new cars. The testimony shows that the cars referred to have been used in Racine about ten years, having been operated in Milwaukee previous to that time. During the summer of 1912 they were remodeled at an expense of something over $1,500 per car, and changed to a prepayment type. The old trucks were replaced by others which had been in use for two years in Chicago.

"Members of the commission's engineering staff have investigated the remodeled cars now in use and report that their operation does not result in unreasonable inconvenience to passengers, so long as the cars are maintained in proper repair. They are also of the opinion that the present traffic in Racine can be best handled by comparatively small cars.

"The company has added new cars to its equipment as a result of this complaint, and should continue to do so whenever traffic conditions require it.

"The petitioner asks the commission to require the company to extend its lines as desired by the city. Counsel for the respondent questioned the jurisdiction of the commission to enter such an order. This matter was considered at length in a former decision (City of Merrill v. Merrill Railway & Light Company, 1910, 5 W. R. C. R., 418), in which the following language is used:

" 'The public utilities law has vested in common councils the power to compel extensions and additions to public utility plants when necessary to serve the public requirements. The common council is the proper body to which such authority should be given, if possible, over all public utilities, including street railways. It has the control of streets and is best situated, in the first instance, to determine what extensions and additions are required and where they should be made. Such authority, however, has not been conferred upon the common councils or this commission in respect to street railways, and hence we are without jurisdiction of the subject matter of the petition.'

"No legislation has been enacted subsequent to that decision affecting the question involved, and the position taken must be sustained in the present case."

The chief engineer of the commission and his staff investigated the advisability of the extensions suggested at the hearing, especially with reference to the present needs of the city. Based upon the reports of the engineering staff, the commission recommends, in the interest of better street railway service that the city of Racine grant, without unreasonable encumbrance, and that the company accept certain franchises.

No testimony was introduced with respect to the complaint that the company sells six tickets for 25 cents only for certain portions of the day. It was therefore ordered that the petition be dismissed.

SNOW REMOVAL IN NEW YORK

During February and March of the present year the amount of snow which had to be removed in New York City was greatly in excess of that for any one of the entire previous four years. In the removal of the snow forces of men up to 20,500 were employed. Practically the same force was engaged in snow removal work for the four weeks succeeding the first storm on Feb. 13, 1914.

COST OF SNOW REMOVAL PREVIOUS SEASONS, BOROUGHS OF MANHATTAN, BROOKLYN AND BRONX

Season	Snowfall, In.	Cu. Yd. Removed	Total Cost	Cost per Cu. Yd.
1909-10	30.0	1,873,236	$1,405,873	$0.75
1910-11	24.7	2,628,890	1,475,985	0.56
1911-12	22.7	1,637,593	893,233	0.55
1912-13	11.8	497,757	249,307	0.50
1913-14	34.7	*5,257,562	*2,248,288	0.43

*From Feb. 14 to March 18, inclusive.

The contracts under which snow was removed from the streets of the several boroughs of New York during the past winter were as follows: Borough of Manhattan, Belmont Trucking Company, 56 cents per cubic yard; Bronx Borough, Harold Christiansen, Jr., 42 cents per cubic yard; borough of Brooklyn, Robertson Construction Company, 41.9 cents per cubic yard. The total mileage of streets scheduled for snow removal was 570.5, and of streets not scheduled 695.8. The total area scheduled for snow removal was 20,076,372 sq. yd.

John D. Fetherston, commissioner of street cleaning, states that the cost per cubic yard of snow removed during the present year is below that of former years, owing to the fact that approximately 334,018 cu. yd. were disposed of through the sewers by city forces at greatly decreased cost as compared with contract work. He states that "to have every sewer in town available for the disposal of snow as it falls and to secure a sufficient number of men to keep snow moving into the sewer as it falls appears to be the most feasible scheme for the snow-removal proposition. It has been demonstrated this year that even small-pipe sewers can be used for the removal of snow, and as the maximum rate of snowfall seldom exceeds 1 in. per hour (or approximately 0.1 in. of water per hour) the capacities of the sewers on the whole should not be overcharged by a maximum snowfall. The principal difficulty in snow fighting will be to secure an adequate force of men ready and willing to begin work on the first appearance of snow and to start actually removing the snow not less than one hour after the first flake has fallen, under conditions which indicate that a continued storm may be expected. Mr. Fetherston estimates that for the 570 miles of street scheduled for snow removal a force varying from 20,000 to 40,000 men working continuously for eight hours will put into the sewers an 8-in. snowfall at a cost not to exceed $75,000. In putting the snow into the sewers the manholes are surrounded by wire baskets into which the snow is shoveled and washed into the sewers by means of water from fire hose. To do this work by carts and trucks after the snow has stopped falling would cost between $300,000 and $400,000 if all the snow had to be removed. Mr. Featherston does not advocate giving up the present snow-removal methods, as contracts should still be made for the employment of teams of men to remove snow after the storm is over, in the event that the snow-fighting forces have been unable to cope with the situation.

This matter of snow removal is of particular interest to electric railways where they have to do all or part of the snow removal on streets occupied by tracks. The experience in New York during the past two months should be of value to all responsible for snow disposal.

COMMITTEES OF THE ACCOUNTANTS' ASSOCIATION

Prsident M. W. Glover of the American Electric Railway Accountants' Association has made the following announcement regarding committees:

The committee on prepayment car accounting has been abolished and a joint committee with the Transportation & Traffic Association, entitled transportation-accounting, has been formed. The accounting members of the joint committee are M. R. Boylan, Newark, N. J., co-chairman; C. N. Huggins, Portland, Ore., and G. W. Kalweit, Milwaukee, Wis.

A. L. Linn, Jr., New York, N. Y., has resigned from the committee on overhead charges and A. R. Patterson, Boston, Mass., has been appointed to succeed him.

Mr. Linn has also resigned from the committee cooperating with the United States Bureau of the Census. W. H. Forse, Jr., Anderson, Ind., has been appointed chairman of this committee, and S. C. Stivers, New Orleans, La., has been appointed a member to take the place of Mr. Linn. The other member of this committee is M. R. Boylan, Newark, N. J.

CONFERENCE ON INTERSTATE COMMERCE COMMISSION SYSTEM OF ACCOUNTS

The committee on a standard classification of accounts of the American Electric Railway Accountants' association and representatives of the Interstate Commerce Commission held a meeting in Washington this week for the purpose of going over suggestions and criticisms received in regard to accounting circular No. 41, the tentative system of accounts for electric tramways. All replies to the circular received during the conference were to have consideration in the preparation of the classification for authoritative issue.

No plans have been made for a public hearing and no requests for a hearing in connection with the system of accounts have been received.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

DERAILMENTS AT FACING POINT SWITCHES

BY H. H. GEORGE, ASSISTANT ENGINEER MAINTENANCE OF WAY PUBLIC SERVICE RAILWAY, NEWARK, N. J.

In an article by "Contributor" in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, the following statement was made: "All switch pieces must be set to neat gage when installed. In fact, great care must be exercised to see that this part of the special work is kept to good gage even though the rest of the layout may be laid to the ¼-in.-wide gage now used by some makers of special work."

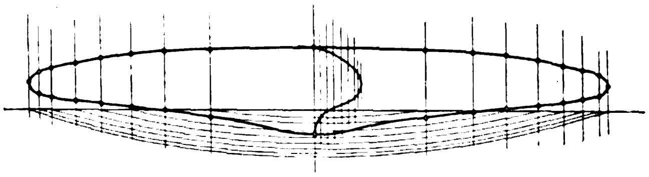


Fig. 1—Preventing Derailments at Switches—Development of Wheel Flange for Determination of Proper Gage of Track on Curves and Required Width of Groove in Guard Rails

The question of car derailments, the determination of the cause and the fixing of the responsibility for the same is one which during the last two years has received much attention on the Public Service Railway property. As a result of the study of this matter, a complete set of rules was formulated, and, after much practical discussion by all departments concerned and many revisions, was adopted as standard. Rules Nos. 3 and 4 of this code read as follows:

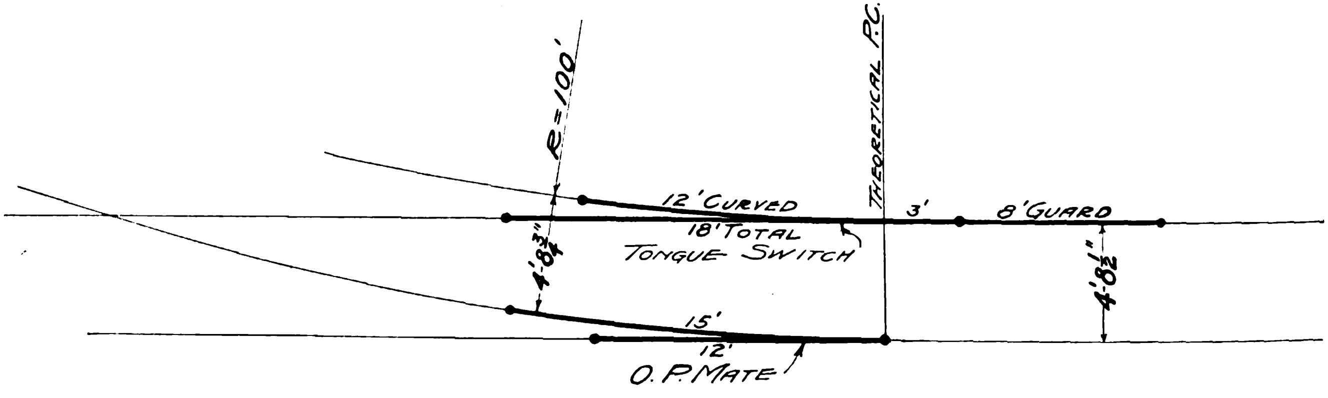


Fig. 2—Preventing Derailments at Switches—Standard Practice of Public Service Railway for Gage of Track in Curves Through Switches

No. 3: "Switches and mates shall be set ¼ in. wide on the curve."

No. 4: "Track on curves of from 40 ft. to 100 ft. inside radius shall be set ¼ in. wide, except where both rails are guarded, in which case the track shall be set and maintained to standard gage. Curves under this radius shall be set slightly full."

In deciding upon these two rules a very careful analysis was made, including the development of the wheel flanges in a plane parallel to the top of the rail and tangent to the gage line of the wheel. This development of our standard flange is shown in Fig. 1. The curve was originally plotted full size and included all four wheels of a truck. As our standard switches have a radius of 100 ft. on the inside rail, this development was placed on a plot of a track of this radius. It was then found that when the track was set to the standard gage the outside flange bore against the rail while the inside flange was ¼ in. away from the guard. Under such conditions, if the gage of the switch pieces was set exact, when the truck "took the switch" the wheels would continue in a straight line until a flange bearing was obtained against the switch tongue. If the gage was exactly 4 ft. 8½ in., the outside wheel flange would then ride the point of the mate; but by setting the gage ¼ in. wide in the curve, the full benefit of the switch tongue as a guard is derived and the foregoing condition is eliminated. It is therefore our practice to specify that the switches and mates be so designed that when the gage for the straight track is set exactly that in the curve will be ¼ in. wide.

The same operation was repeated for curves of different radii and the results were noted. For our guard rail of 1 9/16-in. width of groove it was found that the variations in this dimension for curves of from 40-ft. to 100-ft. radius was so small that ¼ in. was adopted as the standard increase in gage for all curves between these limits. Below 40-ft. radius, which is our standard minimum except in special cases, it was found that the best results were obtained by setting the gage slightly full. The exception to this rule is that shown in Rule No. 4, where both rails are guarded. Fig. 2 shows our practice in setting gage for such curves.

It might also be stated that derailments at facing point switches, caused by trucks "splitting the switch," have been very materially reduced on this property by the installation of a lock box on all facing point switches. The device is simple in construction, positive in action and costs less than $25. The prevention of one derailment will generally more than offset this extra expenditure.

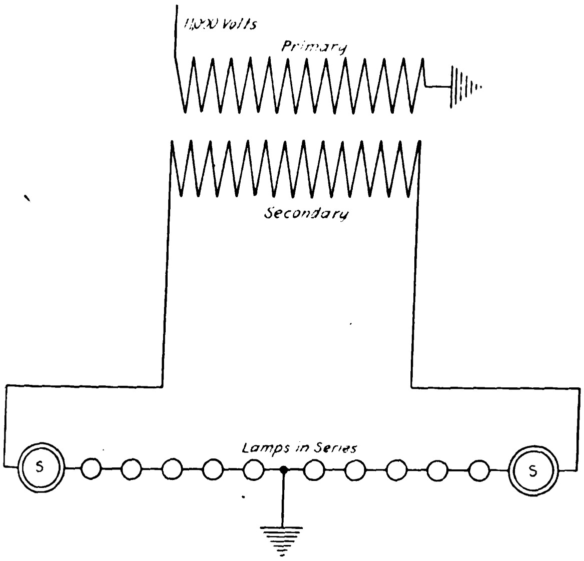
GROUND DETECTORS FOR A. C. ROLLING STOCK

BY A. LONGHURST, FOREMAN OF SHOPS NEW YORK, WESTCHESTER & BOSTON RAILWAY

The electric locomotives of the New York, Westchester & Boston Railway, which are operated by 11,000-volt, twenty-five-cycle alternating current, are equipped with the inexpensive and absolutely reliable ground detectors hereinafter described.

The primary coils of the transformer have a ground return. The secondary is entirely separate and is not grounded. No damage occurs to the secondary winding if only one coil or circuit is grounded, but if a second ground occurs a short-circuit is caused and serious damage is done to the secondary winding. It is therefore essential that a ground on the local circuits should be detected and cleared before the transformer is damaged.

The device in use consists of a bank of ten lamps in series with a ground tap in the center. On each outside leg a switch is installed, and the whole is connected across the secondary winding of the transformer. As the voltage across the secondary is 526 volts, it is necessary to have ten lamps in series as a ground sometimes results from lighting only five lamps with full voltage. These are standard 110-volt lamps.



Ground Detector for Car Transformers

The method of testing is as follows: Each switch is turned on separately and if any of the lamps light it is an indication that there is a ground on either the secondary winding or on one of the local circuits. Then both switches are turned on, and if some of the lamps are brighter than others it again shows there is a ground on the system. If all the lamps light with equal brilliance, it shows that the transformer and local circuits are clear of grounds and also that the bank of lamps is "O. K." A daily test by the motormen insures the fact that a ground is quickly discovered, reported and cleared before any damage is done.

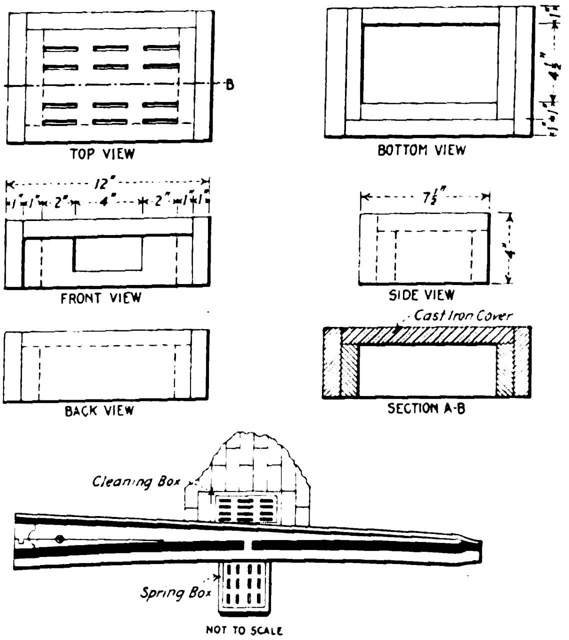
The foregoing system is also used to test for grounds in the local control circuits which are operated by 32 volts direct current. These circuits are not grounded. When only one ground occurs no trouble is experienced, but if a second ground occurs complications arise. A bank of two 32-volt lamps in series with a ground tap in the center is used. While testing, this is connected across the B+ and B— leads from the battery. If there is a ground, only one lamp will light, or one lamp will be brighter than the other. If there are no grounds, the lamps will light with equal brilliance.

MAKING A SWITCH HOLE SELF-CLEANSING

BY "CONTRIBUTOR"

The maintenance of way department of the Connecticut Company is using a small wooden box with a removable iron cover, as shown in the accompanying drawing, for the purpose of permitting the hole in the side of the switch piece to be self-cleaning. This combination is set against the switch, opposite the spring box.

We had experienced some difficulty in operating over certain switches. Upon investigation we discovered that the hole in the side of the switch piece on the side opposite to the spring box had become packed with frozen dirt, crushed stone or other material, so that the tongue could not be thrown all the way over, leaving it in a neutral position. In this case it was necessary to remove the pavement to clean the hole, thus allowing the free end of the tongue connecting-rod to enter into the hole.



Switch and Detail of Cleansing Box

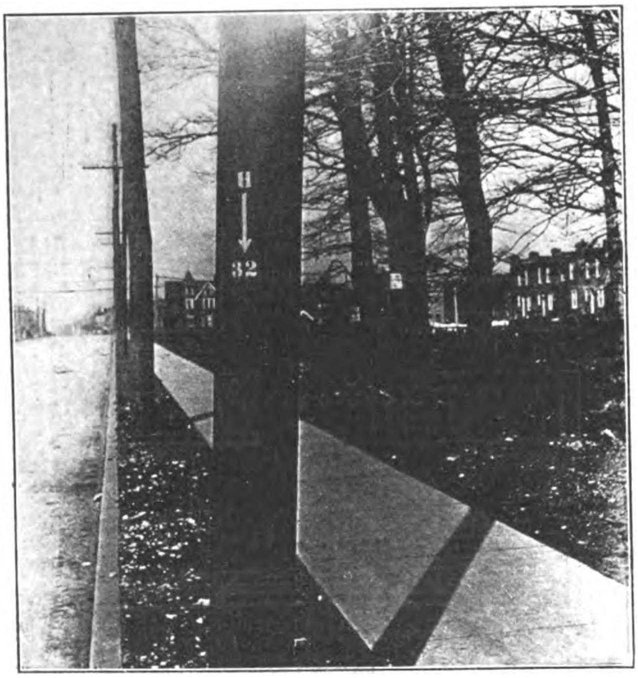
To avoid the removal of expensive pavement and the cost of replacement, a small wooden box was designed to meet these conditions. A "handy man" in the maintenance of way department makes these boxes as required from oak ties which have split while in stores and have thus been rendered unfit for track work. The iron lid or cover is simply an old cast-iron tie plate, 1 in. thick, saved from the scrap pile. The switch repair men remove the lid and clean the box as required.

The Rhode Island Company, Providence, R. I., follows the usual custom of running trippers or double-headers during the rush hours. In running these extra cars one difficulty encountered was that the public would overcrowd the first car, not knowing that there was another car of the same line immediately behind. To secure a more uniform loading of the cars, the company has adopted "Car Following" signs such as are customary on suburban and interurban single-track railways. The signs are made of sheet-iron painted red and bearing in white the words "Car Following." Prospective passengers become well acquainted with the purpose of these signs, and now when they see the dash of a crowded car so marked they are much more likely to wait for the second one.

MARKING LOCATION OF MANHOLES

BY G. H. M'KELWAY, DISTRIBUTION ENGINEER BROOKLYN RAPID TRANSIT SYSTEM

After a heavy snowstorm one of the first duties of the electrical department of a street railway which has underground conduits is to clean the snow off the manhole covers and to scatter salt on them to prevent their freezing so fast that they cannot be raised. This action is necessary not only so that the holes can be entered to inspect the cables and to make whatever repairs may be required but also to prevent the manhole from becoming filled with escaping illuminating or sewer gas. Much more trouble is apt to occur from the accumulations of gas in the holes during cold weather than at any other time, for then the frozen ground offers very little opportunity for the gas to escape through it. The path of least resistance is then into the conduits and through them to the manholes, from which the gas escapes to the open air through either the subsidiary pipes or the holes in the ventilating covers.



Pole Marked to Show Location of Manhole

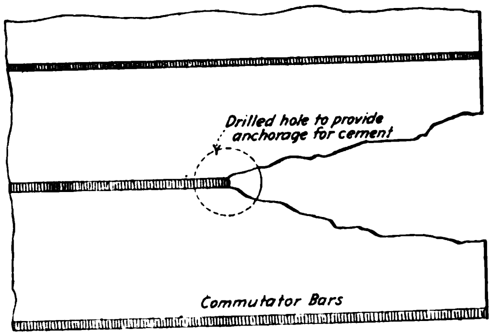
The ventilated type of cover has become almost a necessity in some of the large cities where leaks of gas are common. In New York City all electric corporations are supposed to use that type except in very wet locations where only a tight cover makes it possible to keep the holes clear from water. When the cover is hidden under the snow it is, of course, as poorly ventilated as it would be without any holes in the cover. Hence it is important to remove the snow.

At the same time it is not desirable to do any more shoveling than is necessary to locate the holes easily. In fact, the definite marking of the location of the holes is the best plan, for, however familiar the employees may be with the location of the manholes, they are not always easy to find when other neighboring objects from which the bearings might be taken are also hidden by the snow. Again, in order to clear the holes as quickly as possible, the men composing the gang are often drawn from those employees who are not usually engaged on conduit work and who are naturally unfamiliar with the location of the manholes.

For the guidance of the men it is therefore necessary that some method of marking the location of the holes be arranged. This can be done, and is done with some companies, by sketches in books supplied to the foremen which show the distance in terms of feet from the street intersections, trolley poles, etc. A better plan, however, which avoids all chance of the foreman misunderstanding the sketch or leaving the book behind, is the one adopted by the Coney Island & Brooklyn Railroad.* As shown in the accompanying illustration, this plan consists in marking on the nearest trolley pole first the letter "H" and underneath that the number of feet to the center of the manhole cover together with an arrow pointing in the proper direction. By this means all that the men had to do was to note the location of the arrow, pace off the proper distance and begin digging directly over the manhole cover. While this plan cannot be used when the conduit lines run on streets where there are no poles, yet it can be followed to good advantage in all other cases and with a large saving in time and labor, both important items in the strenuous work of clearing up after a storm.

DENTAL CEMENT TO FILL CAVITIES IN COMMUTATOR BARS

Frank R. Phillips, superintendent of equipment Pittsburgh Railways, has found that the cement used by dentists to fill cavities in teeth makes an excellent filling for the restoration of commutator bars that have been eaten away on account of sparking. An anchorage for the cement is provided by drilling a small hole at the inner end of the "V" which has been eaten out in successive bars. Then the necessary amount of Caulk's "Petroid Cement Improved" is mixed to the consistency of batter to fill the cavity. The cement is applied immediately, and after it has been allowed to dry for thirty minutes it is ready to be filed down flush with the surface of the commutator. This novel application is a proof that the maintenance department of the electric railway may sometimes find helpful equipment in an utterly foreign field.



Dental Cement to Cure a Commutator

A joint meeting of employers and employees was held in Kansas City recently for the purpose of deciding on a definite interpretation of the Kansas workmen's compensation law, which took effect late in 1913. The principal points discussed were whether compensation shall begin immediately after an injury, or two weeks later, and what constitutes permanent partial incapacity. In some industries the workers pay for repairs to tools, etc., and there is some doubt as to whether the law intended that the compensation should be based on gross or net wages.

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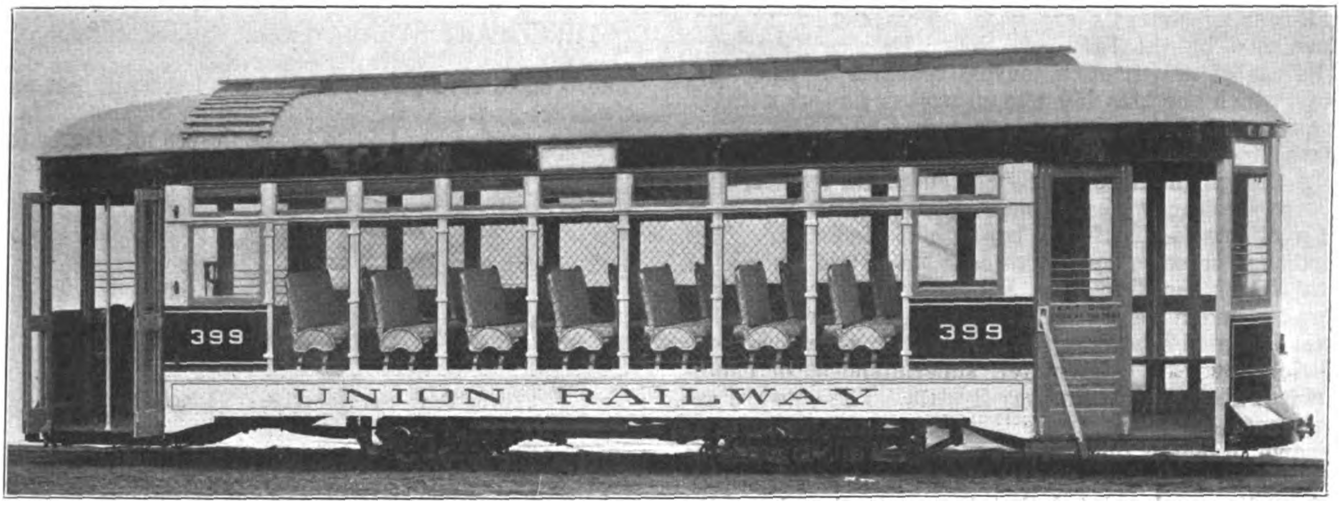
*Recently acquired by the Brooklyn Rapid Transit System.

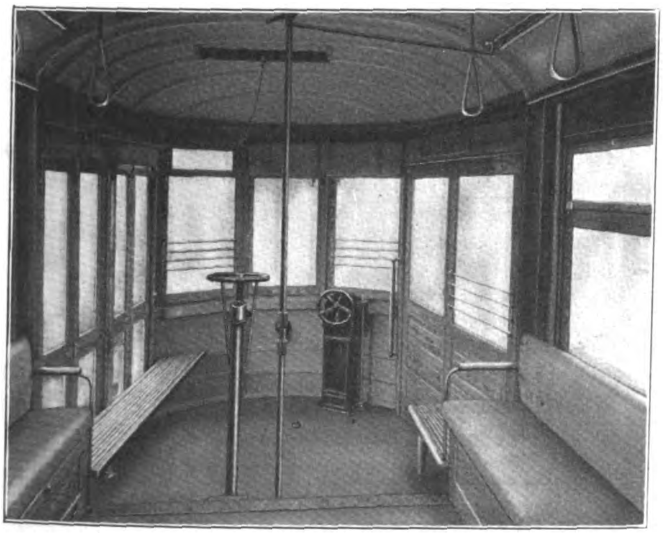
LOW-LEVEL END-ENTRANCE CAR OF THE THIRD AVENUE RAILWAY

The Third Avenue Railway System, New York, has just received from The J. G. Brill Company the remarkable low-level end-entrance car shown in the accompanying illustrations. Although the car is very similar to the standard convertible type of this railway, the height from the pavement to the platform level is only 12 in. and from the platform to the car-body floor 11 in. This solution of the safety step problem was obtained primarily by using a non-parallel axle truck of "Radiax" type of such low level that it could take 24-in. diameter wheels and Jones-Westinghouse "low-floor" motors. A ramp of 3 in. between the line of the corner posts and the center line of each axle is also used.

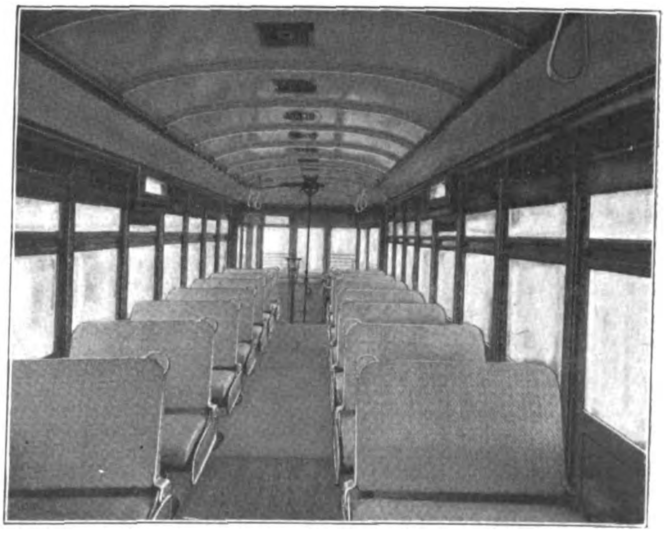


Third Avenue Low-Level Car—View of Car for Union Railway Lines Mounted on Radial-Axle Truck, Showing Stepless Entrance and Other Features

Since the lowest level of this car is at the ends instead of the center, it was necessary to dispense with the usual projecting brake drum and to place the foot gong, which is air-operated, behind the end sill. For the same reason, the wooden platform sub-sills shown on the car illustrated have been replaced by angle irons. The clearance between the pavement and the knee beams is fully 8 in. and between the underside of the platform floor and pavement 11 in. Hence loose paving and other obstructions will not foul the car nor will a person caught by the wheelguard be wedged under the platform.



Third Avenue Low-Level Car—Vestibule Showing Staffless Brake, Platform Seating and Original Cash-Box Stand



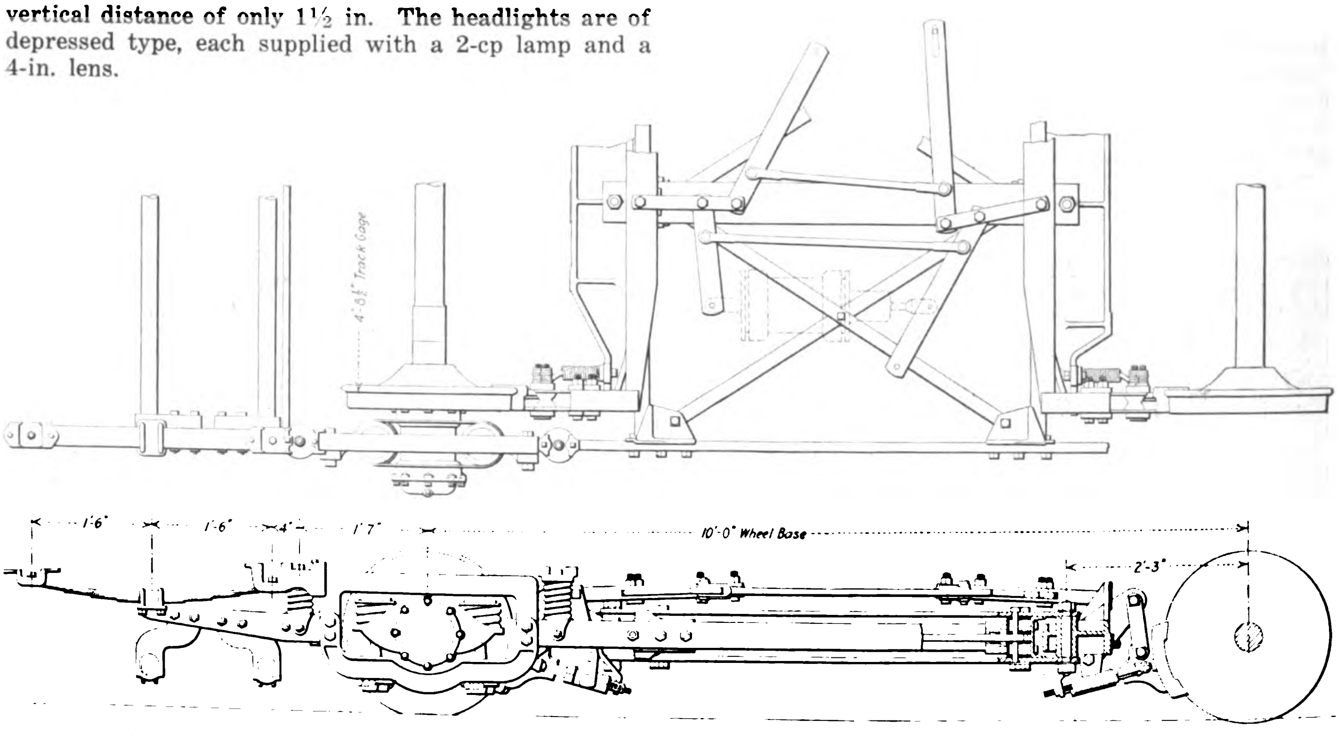
Third Avenue Low-Level Car—Interior, Showing Registers of Exhaust Ventilators and 10-In. Movable Top Sash

The car body in its T-iron framing and general constructional materials is very similar to the single-truck car of this company described in the ELECTRIC RAILWAY JOURNAL for Feb. 14, 1914. Like that car, it has been developed for service on suburban lines where a longer double-truck car would not be justified. The convertible panels also do not extend the full depth of the side but a roof-stored top sash 10 in. deep is provided to give ample extra ventilation on unseasonably warm days. The main difference from the other single-truck car body is that agasote is also used for the dashers, steel having been found too cold; that five more exhaust registers have been installed in the roof and that air inlets operated on the principle of the stove damper have been placed under the seats in such fashion that they open only when the seats are occupied—in other words, the intake of air increases as the number of seated passengers increases.

While the prepayment arrangement is of the Prepayment Car Sales Company's pay-within type, it is planned to use as a cash-box stand the back of a folding seat. This seat, which will be placed on the platform directly in front of the conductor, will be lowered for service only at the motorman's end. Rattan transverse seats and short longitudinal seats are used in the body of the car but slat seats are provided for use along the idle platform doors. In this way a car of 22 ft. 11½ in. body and 34 ft. 11½ in. over-all length seats thirty-seven passengers in the body and eight more on the platforms, a total of forty-five.

Reference has already been made to the low-level "Radiax" truck, the details of which are shown in the accompanying drawing. The center of this truck is reinforced in order to transmit the tractive effort through the transom instead of through the journals as is customary on rigid axle trucks. It will be noted also that ball-bearing journals are used. This equipment was furnished by the Standard Roller Bearing Company. The use of anti-friction journal bearings by this railway, which operates 160 sets on storage battery cars, is good proof that such bearings now give little maintenance trouble.

Although intended chiefly for suburban service, this car will be equipped for conduit plow operation to make it available for use in the borough of Manhattan. The principal traction equipment consists of two 30-hp, No. 328 Westinghouse motors, PK control, National A3 air brakes and a new geared, staffless hand brake which was invented especially for low-level drop-platform conditions by J. S. McWhirter, superintendent of equipment Third Avenue Railway System. The outward appearance of this brake, as installed on the platform, is shown in one of the halftone views. While it would be improper to disclose the details of construction at this time, it may be stated that the mechanism is of the geared type and that the connection under the platform of the brake shaft to the brake chain is made within a vertical distance of only 1½ in. The headlights are of depressed type, each supplied with a 2-cp lamp and a 4-in. lens.



Low-Level, Drop-Platform Car—Part Plan, Elevation and Sections of Non-Parallel Axle Truck Equipped with Ball-Bearing Journals and Wheels of 24-In. Diameter

It is of interest to add that the original plan of the company was to use a double-truck car 42 ft. 2½ in. over all and 30 ft. 2½ in. over the body. The car body would have had a ramp and it would have been carried on low-wheel maximum traction trucks to get a 12-in. step from the pavement. The company is quite likely to use this type whenever more cars are needed on its heavy city lines. Such a car having ten pairs of cross seats instead of seven and the same size corner seats would weigh approximately 28,000 lb. The car described in this article has the following weights: car body, truck and motors, 22,140 lb.; estimated weight plus air brakes, control and other accessories, 24,000 lb., or 533 lb. per seated passenger.

This car was designed and equipped under the direction of Mr. McWhirter. Its principles of construction are in line with the purpose of the management to develop a car which would include the most modern safety and efficiency features and at the same time not be too radical a departure from previous standards.

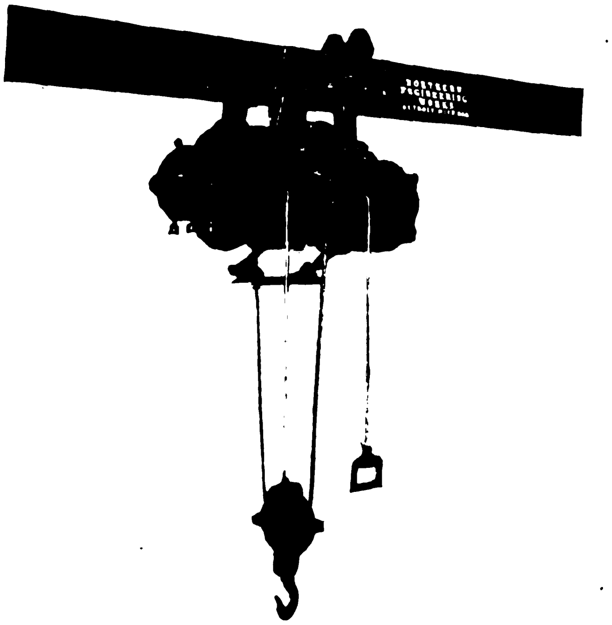
THREE-PART STRAIGHT-LINE SUSPENSION

Three-Part Straight-Line Suspension

The type of straight-line suspension recently put on the market by the T. S. White Company, St. Louis, Mo., represents quite a departure in the design of fixtures to perform this service. As shown in the illustration, this suspension is composed of three parts, namely, a 3¾-in. x 2-in. porcelain body insulator, a malleable iron sherardized yoke for connecting the suspension into the line, and a forged steel sherardized bolt to which the trolley ear is applied. The claims for this new device are that it eliminates the expensive and troublesome insulated bolts now commonly used in straight-line suspensions and that it also provides a better and more economical insulation. On the other hand, it adds no complications to the older types. If anything, it is somewhat simpler and easier to apply. This suspension also has the advantage of the renewable bolt in case the threads are stripped in service, so that it is necessary to renew only this portion instead of the entire suspension.

PORTABLE ELECTRIC HOISTS

The Northern Engineering Works, Detroit, Mich., have recently brought out the type "D" spur-geared electric hoist for portable use and for locations which require the hoist to be suspended by a single hook. This hoist can be easily attached to any overhead trolley or crane and can be readily moved from place to place. It will save much labor where a hand hoist is now used as its speed is many times greater. At the same time, it does not require much more space and uses but little energy. For instance, one 2-ton hoist which lifts about forty times a day, averaging half loads and half lifts, costs only 6 cents a day for power. Where necessary, the hoist can be provided with a variable speed controller, graduating the speed to suit the character of the service. A one-speed reversing switch is used where graduated control is not required.



Portable Electric Hoist

All gears are cut and inclosed completely for internal lubrication. The mechanical disk brake is also inclosed. An automatic limit device stops the hook at the top of the lift. All bearings are bronze-bushed. Since the necessity of portability and compactness somewhat limits the size of the gearing and moving parts, the builders have given particular attention to their strength and durability, using tough material and straight standard cut spur gears instead of planetary or worm or bevel gear combinations. The accompanying table shows the standard sizes of this hoist.

TABLE OF STANDARD SIZES OF ELECTRIC HOIST

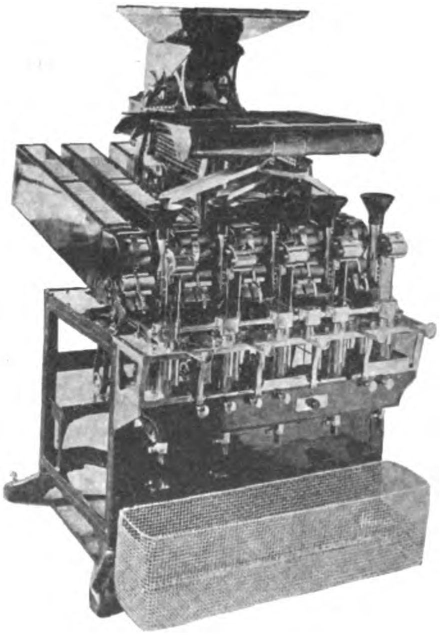
Frame Number	Capacity in Lb.	Horse-Power, Approx.	Maximum Lift of Hook, Ft.	Direct Current Hoist Speed, Ft. per Min.	Alternating Current Hoist Speed, Ft. per Min.
F½	1,000	2	16	25 to 50	25 to 27
F1	2,000	2	16	20 to 50	20 to 22
F2	4,000	2	10	10 to 25	10 to 11
G2	4,000	4	25	20 to 40	18 to 19
G3	6,000	4	25	17 to 40	17 to 18
G5	10,000	4	12	9 to 20	9 to 9½
G6	12,000	4	12	8 to 20	8 to 8½

Standard trolleys can be furnished for either single or double beams for these hoists—free traveling or geared for hand travel.

COIN-HANDLING MACHINE

The Sattley Coin Handling Machine Company, Detroit, Mich., has brought out a machine which, through the time saved in counting coins and the reduced cost of counting, should prove of value to electric railways. This machine makes possible a quick calculation of the receipts of individual conductors or lines and eliminates disputes and discussions in regard to the correct amount of coins turned in by conductors or given them for change. The machine sorts pennies, nickels, dimes, quarters and half dollars, counts them in separate denominations and packages or sacks them as desired. All the coins may be sacked by the machine, all may be packaged, or any combination of these operations may be made as desired. The machine detects and throws out mutilated coins without counting them. Money of different denominations from different parties may be placed in the machine and a count will be registered in dollars and cents, showing accurately the amount of each denomination and the grand total of all denominations.

The coins are first examined for counterfeit matter, slugs, etc., and then placed in a hopper at the top of the machine. From here they are fed down through a hopper spider into five inclined trays which sort them through gravity. A sorting chute runs from each tray to a coin tube with which is connected a counting device. After being counted the coins pass down into a package automatically fed into the package cylinder from the magazine. The open end is closed by a crimping plunger, and the completed package drops into the basket on the next quarter turn of the four package cylinders. The mechanism is so arranged that if it is desired to count only one denomination the four other compartments may be turned out of operation.



Coin-Sorting, Counting and Packing Machine

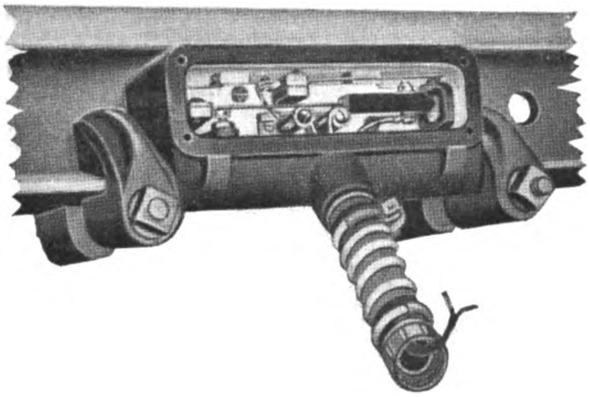
The empty packages that are used in the machine come packed in cartons which are inserted bodily into the package magazines, care being taken that the open ends of the packages come on the proper side. If it is desired to use sacks instead of packages for the money, by a simple device the coins are made to flow automatically into the sacks and stop when a certain amount has been counted. These amounts are 1000 coins in the case of all denominations except quarters, of which 2000 are counted at one time.

The registers on the coin tubes are double. The top register is a sub-totalizer for registering the separate amount of coins in each run and must be set back after each separate count has been recorded. The bottom register is a totalizer for keeping count of the total of all of the separate amounts taken from the sub-totalizer. This has to be set back only after all the separate counts have been taken off.

The capacity of the machine is 800 coins per minute. It is impossible to make a miscount through having a coin go down the wrong coin tube because the counting device becomes automatically locked as soon as the coin of smaller denomination reaches it. Under such conditions the coin may be removed through the ejector slide inserted in the proper funnel. The machine illustrated is run by a Westinghouse motor.

IMPROVED OSCILLATOR OF HIGHWAY CROSSING SIGNAL

The Protective Signal Manufacturing Company, Denver, Col., announces that it has made a further improvement in its oscillator or vibrating contactor. This device is designed to close a control circuit to the crossing signal wherever vibrations in the rail are set up by a passing train. The original oscillator was designed for attachment to the underside of the rail, but the new type C, as illustrated, is attached to the outside web of the rail. It is held in place by clamps, which are installed under the base of the rail, thus obviating all need for drilling through the web.



Oscillator Clamped to Rail

LABORATORY PORTABLE METER

To meet the demand for laboratory instruments, approaching in accuracy the meters of the precision type and suitable particularly for d.c. measurements, the Westinghouse Electric & Manufacturing Company has brought out the type "PL" laboratory portable meters as illustrated. These meters are similar to the type "PL" portable meters, which are adapted to general testing work, except that their extra long scale and strong magnets make them especially suitable for use as semi-portable laboratory meters. They operate on the D'Arsonval principle, namely, a moving coil and permanent magnet, which renders them free from all errors due to residual magnetism.

The new meter, however, has a single air gap through which the moving coil, pivoted at one edge, swings. The single gap permits maximum torque per unit weight for the following reasons:

The magnet will retain a higher permanent strength because the total air gap is relatively narrow and need never be disturbed. The complete movement can be taken out for inspection or repairs without removing any part of the magnetic circuit. Magnets in which the coil surrounds a cylindrical core forming part of the magnetic circuit, as in the usual double-gap movements, are subject to change in field strength if the coil is removed, because the cylindrical core has to be taken out in order to remove the coil.

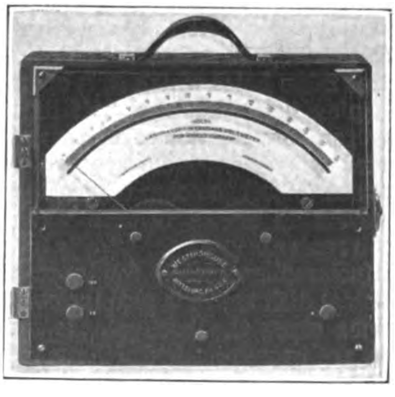
The strength of the magnet can be higher in the single-gap than in the double-gap movement for the magnets of the latter can be only as strong as they would be when the core is out; otherwise they would lose part of their strength the first time the core and coil were removed.

Since the coil when pivoted at one side counterbalances to some extent the weight of the pointer and thus reduces the counter-weight necessary when the coil is pivoted in the middle, as with the double-gap movement, the single-gap movement allows a minimum total weight of movement.

The strong magnets produce a high torque, which, with the light weight of the moving element, gives a high ratio of torque to weight, thus reducing friction errors to a minimum.

The accuracy of these meters is further assured by treating, magnetizing and artificially aging the magnets with their pole pieces complete according to the process originally developed by Madame Curie, the discoverer of radium. Further, the magnets after treating are stored for six months. If they show a decrease in strength after this time they are rejected. The moving coil and pointer are then assembled in the magnetic structure and the manufacture is completed without disturbing the magnetic circuit, an arrangement impossible in the bi-polar D'Arsonval instruments.

The light metal frame on which the moving coil is wound moves through the air-gap of the magnets and makes the reading inherently dead-beat. This important feature enables readings to be taken quickly and prevents violent fluctuations from injuring the pointer or the moving element. The scale, which is 11½ in. long, subtends an arc of 100 deg., giving large open divisions which are of uniform length throughout. The scale has diagonal markings which facilitate accurate readings of fractions of divisions. A mirror which extends the entire length of the scale enables the prevention of parallax in reading.



Standard Laboratory Voltmeter

For use with the millivolt meters, combination laboratory portable shunts are suppled. These combination shunts include three shunts of any desired capacity up to 200 amp mounted in a single box with suitable terminals. These meters are supplied as voltmeters or as millivoltmeters. The millivoltmeters can be used as ammeters in connection with high accuracy.

The Columbus Street Railway & Light Company, Columbus, Ind., recently burned five cars which had been in use in that city for twenty years. The cars were taken out of service not long ago when new rolling stock was secured for the company's lines.

News of Electric Railways

New York, New Haven & Hartford Railroad Segregation Terms

The Department of Justice at Washington announced on March 21, 1914, that an agreement for the dissolution of the New York, New Haven & Hartford Railroad and its subsidiary railroads, electric railways and water transportation lines had been reached. The official announcement as authorized by Attorney-General McReynolds follows:

"The Attorney-General has indicated to the representatives of the New York, New Haven & Hartford Railroad the arrangements which he thinks would result in bringing the affairs of that company into harmony with law. The representatives of the railroad are willing to accept the requirements indicated and to endeavor to put them into effect without delay if approved by the stockholders in a meeting to be called at once. The indicated arrangements, stated in general terms, follow:

"1. The Boston Railroad Holding Company is a Massachusetts corporation, holding a majority of the stock of the Boston & Maine Railroad, and 90 per cent of the former's stock, in turn, is owned by the New Haven Railroad. The charter of the holding company prohibits it from disposing of the Boston & Maine stock. The Legislature of Massachusetts will be asked to remove this prohibition, and, if this is done, the stock of the holding company will be transferred at once to five trustees and, after arrangements have been made to protect the minority stock of the holding company, they shall sell the Boston & Maine stock prior to Jan. 1, 1917.

"2. The stocks of the companies which control the Connecticut and Rhode Island electric railways will be placed in the hands of trustees—five for each State—and shall be sold within five years from July 1, 1914.

"3. The majority stock of the Merchants & Miners' Transportation Company, now held by the New Haven Railroad, will be placed in the hands of three trustees, and shall be sold within three years from July 1, 1914.

"4. The minority stock in the Eastern Steamship Corporation, held by the New Haven Railroad, shall be sold within three years from July 1, 1914, and in the meantime shall be deprived of voting power.

"5. Whether the New Haven Railroad shall be permitted to retain the Sound lines will be submitted to the Interstate Commerce Commission for determination under the provisions of the Panama Canal act.

"6. The Berkshire electric railways shall be sold within five years from July 1, 1914.

"7. A decree embodying the foregoing shall be entered in the United States District Court for the Southern District of New York. The decree shall further provide that upon application of the New Haven Railroad or the trustees and for good cause shown the time within which any of the above-mentioned stocks shall be sold may be extended by the court.

"Trustees satisfactory to all parties have been suggested. Those proposed in connection with the Boston & Maine stock have signified their willingness to serve, and their names are: Marcus P. Knowlton and James L. Doherty, Springfield, Mass.; James L. Richards and Charles P. Hall, Boston, and Frank P. Carpenter, Manchester, N. H. Names of the others will not be made public until acceptance by them is fully assured.

"The essential reason for placing the properties in the hands of trustees is to secure their immediate independent managements.

"The outlines of the proposed decree and trust agreements have been discussed and are understood. Their verbiage remains to be worked out, but no difficulty is anticipated in that respect.

"This statement has the approval of both the Attorney-General and representatives of the railroad."

Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford Railroad, was quoted in part as follows:

"New England needs peace and a chance for constructive work. If that condition could be obtained by an amicable adjustment under which ample time was allowed for the protection of the company's property, the directors felt that such an adjustment would be helpful to New England and to the stockholders of the company. The directors felt that the time allowed, with the right in the courts to extend it upon application of the company or of the liquidators, gave an opportunity for disposing of the various properties to the best advantage possible and with the least disturbance to general business conditions. The financial conditions confronting the company are most difficult, but the proposed adjustment agreement with the government increases the probability of handling the matter successfully, and this very vital question will be taken in hand by the directors at once. The directors felt that the disposition of these properties was a transaction of such importance that the stockholders must pass upon it, to which the department assented. A meeting will be called in the near future for that purpose. Prior to that meeting a statement will be submitted to each stockholder outlining the situation."

The directors of the company met in New York on March 25 and approved the proposed dissolution plan. They will recommend similar action by the stockholders and have set April 21, 1914, as the date on which the dissolution plan will be submitted to the stockholders for their approval.

Apparent Crisis in Toledo Negotiations

The Schreiber ordinance, which requires the Toledo Railways & Light Company, Toledo, Ohio, to operate at a straight 3-cent fare, was scheduled to go into effect on March 27. On the other hand, suit is pending against the company in the United States Court and this may be pushed to the appointment of a receiver.

Henry L. Doherty, of Henry L. Doherty & Company, New York, N. Y., and Thomas H. Tracy, attorney for the firm, spent a portion of the week ended March 21, 1914, in Toledo, in conference with the city officials. At a meeting on the evening of March 19 Mr. Doherty asked that the operation of the Schreiber ordinance be suspended for a certain length of time and that the city appoint an expert street railway man to operate the property as a test. He proposed that such a man take full charge, even to having the books audited, and that the results of his tests be tabulated and the information used as a basis for a new contract. Mr. Doherty explained to the committee that without knowing what will be required in regard to paving, extensions, renewals, etc., it would be difficult to determine upon a rate of fare. With these details known the company could prepare a proposition on the rate of fare and submit it to the city within seven days.

Mr. Doherty said the company would be willing to start with a fare of 3 cents, if provision for a sliding scale was placed in the contract, but that the road could not be operated with profit at a flat rate of 3 cents.

The members of the Council committee on franchises were not disposed to act on any of the suggestions made by Mr. Doherty or his attorney. They insist that the company shall furnish service at a 3-cent fare.

Mr. Doherty made no statement as to what would be done if the ordinance were allowed to go into operation.

City Solicitor Thurstin was instructed to prepare two tentative ordinances to be presented at a meeting of the committee on March 21, in the hope that they may form the basis for negotiations. Mr. Doherty and Mr. Tracy were invited to be present and take part in the deliberations.

On the evening of March 23, 1914, the City Council disregarded the request of Henry L. Doherty for an extension in time of thirty days in which to negotiate a new franchise, and voted to put the 3-cent-fare ordinance into operation on March 27, on which date, it is claimed, all the principal franchises expire. The low-fare ordinance was enacted under the administration of Brand Whitlock.

Mr. Doherty made no statement after the Council acted on March 23, except to say that the company could not operate its property at a profit with a fare of 3 cents.

T. H. Tracy, attorney for the company, said that it would be willing to continue to operate under the agreement in force since July 1, 1912, and also would agree to the city naming an expert to take over the management of the property in the interval pending a settlement on a permanent basis. At present the company is carrying passengers at the rate of six tickets for 25 cents, with a fare of 3 cents and universal transfers between 5.30 a. m. and 7.30 a. m., and 4.30 p. m. and 6.30 p. m.

James Campbell on Depreciation

Under the heading of "General" in the annual report of the North American Company for the fiscal year ended Dec. 31, 1913, James Campbell, formerly president of the company and now chairman of the board, says in discussing the question of depreciation:

"The fact that the subsidiary companies in which your company is interested appropriate large reserves each year for the present maintenance and future preservation of their physical properties should not be without its influence on the value of your equities. Many other public utilities are at present operated under the assumption that a provision for ordinary maintenance is sufficient to arrest depreciation. Examination, however, of the causes leading to the abandonment of various items of physical property shows that in the majority of instances the replacement becomes necessary before the item has been worn out. Maintenance will do little other than permit the realization of the expected life, whereas depreciation is designed to insure the replacement which will increase the useful life of the property.

"The determination of the proper allowances for maintenance and depreciation of properties is not without its difficulties. In fact, it calls for the exercise of conservative judgment and possibly modification from time to time as the necessity therefor develops. The estimates made by regulating commissions in cases involving the regulation of rates are at best crude guesses, and are rarely substantiated by accurate statistical information. That the principle of providing for depreciation is sound appears evident when it is recognized that it is necessary to provide to-day replacements to be made in later years in order that to-day's users of service may bear the cost thereof."

During the year the companies controlled by the North American Company expended $10,528,891, which was charged to capital account, and provided out of earnings reserves for depreciation aggregating $3,401,029, and in addition thereto expended $3,116,082 on maintenance. The proportion of gross revenues expended on maintenance and appropriated for depreciation during the year 1913 by the railways controlled by the company are shown by the following tabulation:

		Per Cent of Gross Revenue	
	Total	Expended for Maintenance	Appropriated for Depreciation
The Milwaukee Electric Railway & Light Company:			
Railway department	22.00	11.16	10.84
Milwaukee Light, Heat & Traction Company:			
Railway department	22.00	19.00	3.00
Wisconsin Gas & Electric Company:			
Railway department	15.00	5.54	9.46
United Railways, St. Louis	24.88	13.32	11.56

Arbitration Board Question Settled in Indiana

The matter of an arbitration board to serve during the three years of the award recently made by the Public Service Commission of Indiana in the matter of grievances of employees of the Indianapolis Traction & Terminal Company was settled on March 16, 1914, when Governor Ralston announced that at his request the Public Service Commission would act as a board of arbitration in the adjustment of any matters, such as the reinstatement of discharged employees, not settled in conferences between the company and its employees' committees. In the award, the commission had provided for an arbitration board of three members to be appointed by the judges of the Federal Court, Indiana Supreme Court and Indiana Appellate Court. The judges declined to appoint such arbiters. The employees, acting under advice of labor leaders, then insisted on a board composed of three members, one selected by the company, one by the employees, and the third member to be chosen by the two thus selected. This form of arbitration board the company refused to accede to on the ground that it could not by virtue of its nature be impartial; that it could not administer oaths, and that it would have no authority to enforce any awards it might make. The labor attorneys stated that they considered the award of the commission as closed and that they would not accept any board appointed by the commission until they knew who the members of the board were.

Upon the announcement that the commission would itself continue to act as a board of arbitration, a committee of employees called on the Governor and protested against this plan. The Governor told them that the commission had consented to act as a board of arbitration upon his request, and that on account of the responsibility of the commission for the safe operation of the street railway properties the plan was a most wise one. The Governor told the committee of employees that the only man who had vilified and abused the commission for its decision was J. J. Thorpe, vice-president of the Amalgamated Association. He informed the members of the committee that they could either agree to the plan of having the Public Service Commission as a permanent board of arbitration or accept the responsibility of declining.

Three Tickets for 10 Cents Suggested in Cleveland

The official labor organ at Cleveland in its issue of March 20, 1914, urges that when an increase in the fare of the Cleveland (Ohio) Railway becomes necessary three tickets be sold for 10 cents instead of making a charge of 1 cent for a transfer. The paper claims that, in making a transfer charge, the burden of the increase falls largely upon the laboring people of the city, whereas under its suggestion all will pay alike. It is estimated that 250,000 persons, or about 40 per cent of the street railway patrons, use transfers daily.

Mayor Baker will consider the suggestion. J. J. Stanley, president of the company, said that three tickets for 10 cents would be much better for the working people, but that the returns to the company would not be so large as under the transfer charge. Figures furnished by the company show that its receipts for February, with a transfer charge, would have been $578,838, while at the rate of three tickets for 10 cents the receipts would have aggregated $568,229.

The City Council enacted legislation recently authorizing the Cleveland Railway to construct what are known as the East Seventy-ninth Street and the East Thirtieth Street crosstown lines. Much opposition has developed to the East Seventy-ninth Street line, which will traverse a private right-of-way for a short distance, and an attempt is being made to secure a referendum vote in regard to the construction of the lines.

Peter Witt, street railway commissioner, reported to the Cleveland Council on March 23, 1914, that the Cleveland Railway contemplated installing motor buses for service in the sparsely settled districts as an experiment. Three buses, to cost $16,251, will be purchased. Each will seat twenty-six people. It has been planned to put the first one in service at the end of the St. Clair Avenue line to operate to the eastern limits of Nottingham. A resolution authorizing the purchase of the buses has been presented to the Council.

W. R. Hopkins of the Cleveland Underground Rapid Transit Company was present at the meeting of the Council on March 23 to report on plans for the proposed subways. Mr. Hopkins said that the lines of the company were planned to take care of both city and interurban cars. He said that financial conditions were improving and that the proposition can be financed. Mr. Hopkins requested that several changes be made in the grant, one of them a higher price for the property in case the city should conclude to take the line over. He also desires the privilege of making a contract with the Cleveland Railway on the long-haul business and authority to bring cars to the surface at certain points.

Municipal Ownership of Public Utilities

The speaker before the finance forum of the West Side Branch of the Young Men's Christian Association of New York, March 23, 1914, was Arthur Williams, of the New York Edison Company, whose subject was "Municipal Ownership of Public Utilities." In opening his address Mr. Williams referred to the misconception of the average non-property-owning citizen who entertained the conviction, consciously or subconsciously, that the enjoyments of the various activities of the municipality in which he lived were paid for largely, if not entirely, by others. There were few enterprises conducted by public officials from which the service could not be obtained more cheaply and efficiently under the methods prevailing under properly conducted private corporations. In other than most exceptional instances men could not be found to administer municipal public service properties properly on account of the accidental character of selection which prevails in the political service of the country. He said that the construction of the Panama Canal and the great reclamation improvements of the West which were often pointed to as indicating the incorrectness of this assertion were not true criteria. The men who so ably conducted these works were free from political control and had years of continuous education and training in the military and naval service in addition to personal qualifications of high executive and administrative order.

Municipal activities of a technical nature failed on account of the absence of continuity of training and practical experience. Public service throttled personal initiative. The elimination of personal interest and incentive took away the most potent stimulus in the rendering of creative and progressive service. For illustration Mr. Williams quoted from a recent work, "Where and Why Public Ownership Has Failed," by Yves Guyot. Even the New York *World*, a paper which could not be said to favor private corporations or to be antagonistic to any of the best interests of labor, concluded an editorial on March 21 as follows: "New York has a written charter, but it is only a matter of form. The real charter of New York is to be found in the decrees of 60,000 and more civil service employees, all organized against their employers, the people of New York. They are the despots of our democracy."

Mr. Williams referred to the failure of the efforts of both Texas and North Carolina to operate steam railroads successfully and to the findings of the investigating committee which inquired into the national transcontinental railway undertaking in Canada. He cited the examples of government ownership of railroads in France and in Germany. In this connection he said: "If Germany with its advanced and highly developed public service can offer in the conduct of its railroads no substantial advantages over private ownership and management, it would be difficult to find justification anywhere, other than as appealing to a political régime seeking to protect itself and perpetuate its existence or to a political party seeking office, for a radical change from our American to these foreign methods."

Referring to municipal failures in general, Mr. Williams said:

"No less than 211 examples of municipal lighting plants exist, each carefully verified, in which municipal ownership or its near equivalent, municipal operation, has been abandoned. This statement is made upon detailed information secured in every case from the mayors, the town clerks or other city officials of each municipality in which the abandonment of public and the substitution of private service has taken place."

The general public was entitled to good service at fair prices and the stock-owning public to a proper degree of protection in its investments. Two recent instances of mismanagement of steam railroad properties offered an example of the fact that the public possessed adequate remedies for the cure of corporate wrongs other than the purchase or investment in and the operation of the various utilities. He referred to the excessive operating costs and the indifferent service of the telephones in Europe which were operated and controlled by municipalities. He also reviewed briefly the movement which resulted in the municipalization of English electric railways and in speaking of Glasgow quoted from the remarks made by James Dalrymple, general manager of the Glasgow Corporation Tramways, in his report to the Council reviewing American practice, an abstract of which was published in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, page 490. Mr. Williams also referred to New York's experiment with a municipal lighting plant and to the municipal ferry. As a result of a comparative study of the municipal lighting plant originated by the officials of the city it was found that the service of the private corporation was more satisfactory and cheaper and after a loss of $108,933, as reported by the experts, the municipal project was abandoned in favor of a private corporation. In regard to the municipal ferries, he asked how the money provided from general taxation for the ferries was of any moral or civic advantage. This investment was now threatened with large depreciation and a greatly increased deficit through the construction of a subway across the Narrows to Staten Island.

In conclusion, Mr. Williams said:

"It is to be greatly hoped that our country, in its national, state and municipal policies, will not adopt European methods, which have been found to be mostly destructive of the best in public and private life, but rather will continue a course in which our great utility industries will be absolutely divorced from politics; that they will continue to give the largest incentive to individual and collective advancement, and that our people may secure at lowest cost the best which science and invention have developed and placed at our service for bettering human conditions."

Chicago Subway Situation

At a recent meeting of the board of election commissioners, the request of the Chicago City Council to eliminate the initial subway proposition from the ballot at the April election was considered. In view of the fact that the Council had notified the board that the necessary enabling ordinance could not be passed in time to make the proposal effective, the board decided to omit the initial subway proposition. The ballot, however, will still contain a proposition in the form of a comprehensive subway ordinance. A strenuous effort is being made by certain newspapers and the Cook County Real Estate Board to defeat this measure. Arrangements have been made to use billboards and moving-picture shows in the campaign against the construction of a subway.

Anniversary of Signing of Dual Subway Contracts

March 19 was the first anniversary of the signing of the dual system subway contracts. At the meeting of the Public Service Commission for the First District of New York on March 18 Chairman Edward E. McCall took occasion to note the work done under those contracts in the first year and expressed himself as gratified at the progress made. He stated that there is now under contract nearly $100,000,000 worth of work on behalf of the city—about two-thirds of the amount which the city will be called upon to do under the dual system agreements. Of this amount more than $27,000,000 worth has been placed under contract during the last year. In addition, the Centre Street loop subway has been placed in operation and the contract let for the reconstruction of the Steinway tunnel for temporary operation.

The Public Service Commission has called for bids for the construction of two more sections of the new subways in New York, one on the Whitehall-Montague Street line in Manhattan, to be operated by the New York Municipal Railway Corporation, and one on the Seventh Avenue line in Manhattan, to be operated by the Interborough Rapid Transit Company. Bids for the former will be opened on April 14 and on the latter on April 17. The section of the Whitehall-Montague Street line runs mainly through Whitehall Street and connects the southern end of the Broadway subway in Manhattan with the proposed tunnel under the East River from Whitehall Street to Montague Street, Brooklyn. The section of the Seventh Avenue line runs from Vesey Street south through Greenwich Street to the Battery, where the Seventh Avenue line will connect with the existing subway.

Plans for Extending New Haven Electrification

The New York, New Haven & Hartford Railroad expects to start preliminary test train operation with electricity between Stamford and Westport, Conn., about April 1, 1914. As soon as this section has been tried out the electric zone will be extended toward Stratford. This will probably be during the latter part of April. Probably by the latter part of May electric operation will be extended to New Haven, thus completing electrification between New York and New Haven, a distance of 73 miles. In this connection W. S. Murray, consulting engineer of the New York, New Haven & Hartford Railroad, in general charge of all electrical engineering and construction, has authorized the following statement:

"The system for electrifying the main line of the New Haven from Stamford to New Haven, which has been under construction for about a year and a half, will in all probability be sufficiently completed so that it may be energized and made use of before the end of May this year. As soon as the current is introduced into the system all regular scheduled trains will be run by electric power. After the entire completion of the electrical equipment is reached, all trains, passenger, freight and switching, will be operated electrically. For the present the change from steam to electricity will not involve any alteration of the timetable, although it is quite possible that later on the electric service will enable a change in the schedule in the addition to it of one or two new trains. Present plans contemplate New Haven as the terminal of the electric system on the east."

Injunction to Prevent Enforcement of Omaha Low-Fare Ordinance

The ordinance requiring the Omaha & Council Bluffs Street Railway, Omaha, Neb., to sell seven tickets for 25 cents, which was passed at the election on March 10, 1914, was initiated by the socialist party in Omaha under the initiative and referendum law. Many of the addresses given by signers of the petition filed with the city clerk were found to be vacant lots, and at other addresses given by signers it was learned that no such party resided there or had resided there. In other cases a number of signatures were all in the same handwriting, and some signers were not even naturalized citizens. Eliminating all of the fraudulent signatures, there was, according to the company's showing, an insufficient number of names to the petition. The city clerk, however, held that, according to his check, the number of signers to the petition was sufficient and the City Commission of Omaha accordingly submitted the question to the voters at the special election on March 10. The company applied for an injunction to prevent the election from being held, but the Circuit Court held that the city clerk was the sole judge of the sufficiency of the petition, and on that ground refused an injunction. The company made no campaign against the measure and the ordinance carried by a vote of only 4709 to 3910. The company is preparing to apply for an injunction to restrain the city from enforcing the ordinance.

Terminal and Viaduct Questions in Kansas City

The Kansas City Terminal Railway asked an injunction in the Circuit Court in Kansas City recently to prevent Mayor Jost and the City Council from passing pending ordinances giving the Metropolitan Street Railway, Kansas City, the right to use the McGee Street and Broadway viaducts over the Belt line until the street railway has paid half the cost of the two crossings. Evidence was heard in the case on March 10, 1914, by Judge Bird. The Terminal company, a steam road, alleges the Metropolitan Street Railway agreed to pay half the cost of all viaducts used by it, with the exception of two. The steam company estimates the cost of the McGee Street viaduct at $174,000 and of the Broadway viaduct at $365,000. On this valuation the terminal railway wishes the Metropolitan company to pay it $269,500. The steam company alleges that the Metropolitan has not secured the consent of a majority of the adjacent property owners on the streets over which the Metropolitan tracks will run. It is charged also that the Mayor and Council refused to compel the street car company to pay its share of the cost of the two viaducts before granting franchises permitting the company to run cars over them.

R. J. Dunham, one of the receivers for the Metropolitan Street Railway, stated in Kansas City on March 9 that the Kealy-Ash plan of routing cars to the new Union Depot was still favored by the receivers. He said:

"The Metropolitan Street Railway will not put cars on either the Broadway or the McGee Street viaducts if such action necessitates its paying half the cost of the structures. The ordinance now pending extending the Broadway line from Fourteenth to Twenty-fourth Street will not be accepted unless the city provides a way for using the Broadway viaduct without requiring the Metropolitan Street Railway to pay half the cost."

The Kansas City Council has passed an ordinance authorizing the Metropolitan Street Railway to lay tracks on Twenty-fourth Street, from Broadway to Main, to supply the west and southwestern sections of the city with street car service to the new Union Depot. The ordinance provides that the tracks are not to be laid until the consent of a majority of property owners is secured. The passage of the ordinance probably means that no tracks will be allowed on the plaza of the new depot. Mayor Jost has ten days in which to sign the measure.

Valuation of Los Angeles Railway

According to the complete report just received of the valuation of the street and interurban railways in Los Angeles, a preliminary résumé of which was published in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, the cost of reproduction new of the system as of Jan. 1, 1913, would mean an investment of approximately $19,800,000. This is an engineer's estimate, based upon a physical inventory, and does not include any allowance for general contractor's profit, for early losses in building up the business or for other "development expenses," such as discount on securities, cost of consolidation or investment in superseded property. The report states that the valuation figure is well within the limit of 10 per cent of any figure which might be arrived at by a more elaborate method of appraisal, but that in case of the purchase of the railways, the figures should be further checked.

It was estimated that the development expenses would amount to more than $5,000,000 for a system of the kind examined, but inasmuch as the original records of the actual cost of developing the lines were not available, no estimate was included. A study was made of the depreciation due to obsolescence, age and inadequacy as of Jan. 1, 1913, and it was estimated that $4,980,000 should be deducted from the figures of the cost to reproduce new in order to show the depreciated value of the physical plant. If the development expenses had been allowed, the cost to reproduce the physical plant would become approximately the actual value of the physical property.

The two most important items in the cost of reproduction were $990,359 for real estate, for power houses, substations and shops, and $1,065,642 for private right-of-way. The system was given the benefit of appreciation in real estate values as determined by contiguous property. Although the original right-of-way was often a strip of land 60 ft. to 80 ft. wide located in advance of street platting, the valuation figure was based on a 30-ft. strip, the remainder of the land having been in many cases donated to the city. No multiplying factor was employed by the valuation board.

On a basis of the earnings for the year from June 30, 1912, to June 30, 1913, the earnings, according to a 10 per cent yearly rate of growth, were estimated at from $7,480,000 in 1914 to $17,737,146 in 1923. The operating ratio was estimated at 74 per cent, including the following amounts: maintenance of way and structures, 12.46 per cent; depreciation of way and structures, 3.83 per cent; maintenance of equipment, 6 per cent; depreciation of equipment, 1.92 per cent; traffic, 0.32 per cent; conducting transportation, 38.51 per cent; general and miscellaneous, 3.21 per cent; injuries and damages, 3.11 per cent, and taxes, 4.54 per cent. The report stated that this record was higher than ordinarily found in the case of an urban system but that it would be difficult to reduce the figures. Some economy in maintenance of both way and equipment might be shown, but the reserve for depreciation should be larger. The return on the investment for interest and dividends is estimated at 7.7 per cent upon the present actual tangible value of the property.

Northampton (Mass.) Arbitration

The representatives of the employees' union on the Northampton (Mass.) Street Railway completed the evidence on behalf of the men at the arbitration hearing on March 23, 1914. The concluding testimony chiefly concerned the working conditions of conductors and motormen, the time required to make out reports of the day's car operations and the absence of compensation for such tasks. The point was brought out in cross-examination that the representatives of the union knew of no company in which the maximum wage is paid at the end of the first year.

E. L. Shaw opened the case for the company. He contended that the best relations exist between the road and its employees; that the management desired to pay the men good wages, but that these should be regulated by the laws of supply and demand. The demands upon the company by the public and by the authorities of the State and municipalities were onerous and must be met.. The speaker advanced the proposition that the cost of living has not increased as much as advocates of higher pay contended, and stated that on Feb. 23 Bradstreet's index number of commodity prices as quoted in the Springfield *Republican* for the month was 8.86 compared with 9.459 a year ago. This was the lowest index number published since Oct. 1, 1911. Mr. Shaw also quoted from a speech made by Secretary Redfield of the Department of Commerce and Industry, at Wheeling, W. Va., about Feb. 23, in which reductions in the cost of living were predicted. The point was also made that the skill required to operate a car and collect fares was not unusual, according to the recent finding of the Indianapolis board of arbitration, which maintained that the work of a motorman was not much more exacting than that of an ordinary laborer. Extended reference was made to the report of the Boston arbitration board. The hearing was continued to March 26.

Measure in Interest of Minority Holders

Senator Kenyon has introduced a bill providing that the government may bring suit in equity on behalf of minority stockholders of public service companies who have been deprived of their rights. The measure would permit either the Interstate Commerce Commission or the Attorney-General to investigate the affairs of a corporation suspected of financial mismanagement, and to bring suit if such mismanagement is discovered. The taking over of a corporation's funds for the benefit of stockholders who have sold their holdings at a loss or who have lost by continued holdings is also authorized, and the measure would give stockholders three years after a decision has been tendered to file their claims.

Proposed Westinghouse Memorial

A plan for a memorial to the late George Westinghouse has been suggested. Among the tentative features are that it take the form of a statue and that this be erected in some open space in Washington, D. C., where Mr. Westinghouse spent some of his later years. A fund of $25,000 or $30,000 will probably be required. This movement will receive the hearty support of members of the engineering and allied professions who owe so much to Mr. Westinghouse's work.

Decision in Wisconsin Paving Case.—According to a decision rendered by the Supreme Court of Wisconsin at Madison on March 17, 1914, not only does a reasonable construction of the franchise of the Southern Wisconsin Railway Company, operating in Madison, require that corporation to pay for the pavement between its tracks and 1 ft. on each side, but that, even if it did not, the Common Council could, by ordinance, make such regulation effective. The company contended that it had to pay only half of the cost.

New Interurban Line Proposed in Ohio.—A contract for the lease of 33 miles of abandoned canal between Lancaster and Nelsonville, Ohio, to James M. Dollison and James Sharp has been approved by Attorney-General Hogan of that State. A company will be organized to build an electric railway on this land. The lines of the Scioto Valley Traction Company connect Columbus and Lancaster and a road is under construction between Nelsonville and Athens. The lease is for twenty-five years and the aggregate rental for the period is $180,000.

Enforcement of Memphis Ordinance Enjoined.—On March 13, 1914, Counsel Francis Fentress granted an injunction restraining the city of Memphis from enforcing an ordinance against the Memphis (Tenn.) Street Railway which was to have gone into effect on March 14. This ordinance provided that the company was to furnish each passenger a minimum of 40 cu. ft. of space, to supply a sufficient number of cars on each line to be run on a "proper and reasonable schedule," to require each car on each separate line to run to the terminus designated on such car after leaving the starting point, to number each car distinctly inside and outside and to place conspicuous signs upon the sides and ends outside, indicating both day and night the route and destination of the cars.

Progress on Boston Subways.—The Boylston Street Subway, at Boston, Mass., has been completed except for a small portion of the Massachusetts Avenue station, the Dartmouth Street lobby of the Copley Square station and the connection with the Tremont Street subway near Park Square. Work is in progress at these points, and interior finish is being applied at the stations. The Boston Elevated Railway, which will operate surface cars through the subway upon its completion, is now installing power and lighting conduit in the subway and tracklaying will begin in the near future. Steady progress is being made in the construction of the Dorchester tunnel at the Boston end and in the building of the East Boston tunnel extension from Scollay Square into the West End.

Jacks on Philadelphia Cars.—The cars of the Philadelphia (Pa.) Rapid Transit Company are all to be equipped with lifting jacks. According to the company, none of the jacks now on the market was found to be sufficiently reliable in emergencies, and the management after many experiments and tests has succeeded in developing a type of jack which has received the indorsement of the coroner and the representatives of the Civic Club. This jack will be submitted to the Public Service Commission, and, when approved, will be installed upon the cars as rapidly as the manufacturers can deliver the necessary quantities. The conductors and motormen will be instructed in the use of the jacks so as to insure the quickest possible action in raising a car in an emergency.

New York Subway Operating Problems Reviewed.—The New York *Evening Post* of March 24, 1914, published in its department "News of the Railroads" an article "Biggest Traffic Problem," in which it gave some of the little known facts in regard to the underground railroad system of the Interborough Rapid Transit Company. Reference was made to the fact that the subway lines are now carrying approximately 1,200,000 passengers daily, whereas the original capacity of the subway was fixed at 600,000. The purposes of the electro-pneumatic brake equipment, the automatic block signal system, the speed-control system and the dispatching system in use in the tunnel under the East River between Manhattan and Brooklyn were all reviewed. The article was concluded with a description of the methods followed by the company in training men for duty in the subway.

Action in Regard to Proposed Providence Subway.—The Board of Aldermen of Providence, R. I., has passed the resolution recommended by the special committee on subways, directing the city solicitor to appear before the General Assembly and apply for legislation for the city to take up the matter of a subway system, in accordance with the draft act prepared by the committee. Sent to the Common Council for action in concurrence, the resolution was adopted after an amendment to the draft act, providing that the commission created by the act should spend no money until authorized by the City Council. Previous to presenting its report to the City Council the subway committee added a clause to the draft act providing that members of the transit commission created should serve without pay. The report of the subway committee, explaining the changes it had made in the act and commenting upon the results of its public hearing, was presented and read in both branches. The plans for the subway were described briefly in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 601.

Utility Board Approves Newark Terminal Grants.—The ordinances authorizing the re-routing of the lines of the Public Service Railway and the provision of terminal facilities in Newark were approved by the Board of Public Utility Commissioners on New Jersey in a report submitted on March 20, 1914. The approval is given subject to the terms of the blanket agreement between the city and the Public Service Railway. The report makes clear that the board does not believe that the carrying out of the provisions of the ordinances in question offers a permanent solution of the traffic problem in Newark and vicinity or even that it will eliminate temporarily the congestion from which the public now suffers. Adequate terminal and looping facilities may improve conditions, but, as expressed by the board, "permanent relief can come only through the creation and use in street railway service of thoroughfares parallel to Broad and to Market Streets through the congested district." In summing up its conclusions the board says: "Careful consideration of all this material leads the board to the conclusion that the several grants made by the ordinances submitted are necessary and proper for the public convenience; that the public interest is thereby properly conserved, and that the ordinances should be approved."

Increase in Pay in Indiana.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has entered into a new working agreement with the trainmen of its interurban lines for a period of three years to March 31, 1917, whereby it increases the rates of pay of the men to the following schedules for the period from April 1, 1914, to Sept. 30, 1915: First year, 22 cents an hour; second year, 24 cents; third year, 25 cents; fourth year, 26 cents; fifth year, 27 cents; sixth year, 28 cents; seventh year, 29 cents; eighth year, 30 cents; ninth year, 31 cents. From Oct. 1, 1915, to March 31, 1917, the rate from the first to ninth years remains the same as above, but for the tenth year's service the rate is increased to 32 cents an hour. The agreement also provides that men shall be paid for actual time consumed on train in deadheading to and from points where they are sent for runs. Men called for a run or held for a run and not used are to be paid a minimum of one hour. If held more than one hour they are to be paid for actual time held. Three hours is to be the minimum time for which any man is to be paid who takes out any run; men who are paid the minimum of three hours for a run are to remain at head of the extra list unless they have had a previous run the same day. Nine hours is to be the minimum time paid for any regular schedule run. No regular schedule run is to be more than twelve hours and fifteen minutes. Regular men who are taken off runs and placed on some extra runs for the day are to be paid not less than the regular pay of the run. The Union Traction Company of Indiana and the Indianapolis, Columbus & Southern Traction Company have also entered into agreements with their interurban trainmen whereby a new scale of wages is effective on April 1, 1914, giving the men the same rates of pay as shown in the agreement of the Terre Haute, Indianapolis & Eastern Traction Company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK

The Public Service Commission for the First District has sent to the Legislature a bill to amend the rapid transit act so as to give the city of New York, through the commission, the power to build rapid transit lines directly through men employed by the city. As the law now stands the commission has the power to lay out routes and let contracts, subject to the approval of the Board of Estimate and Apportionment, but has not the power to do the actual construction work. In case of emergency such a power might become necessary to the completion of parts of the new subway system.

The following measures have been introduced recently in the Assembly: An act making an appropriation for the elimination of certain grade crossings; an act to amend the railroad law in relation to street surface railroads in cities of the first class; an act to amend the railroad law in relation to rates of fare on certain railroads; an act to amend the public service commissions law in relation to the free transportation by common carriers of mail carriers in uniform.

The following measures have been introduced recently in the Senate: An act making an appropriation for the elimination of certain grade crossings; an act to amend the public service commissions law in relation to the free transportation by common carriers of mail carriers in uniform; an act to amend the public service commissions law in relation to the issue of stock by railroads and street railroad corporations; an act to amend the railroad law in relation to the alteration of existing crossings of highways and steam surface railroads; an act to amend the railroad law in relation to street surface railroads in cities of the first class; an act to amend the railroad law in relation to when corporate powers of a railroad corporation shall cease and also to provide for the transfer of property when the existence of a railroad corporation ceases; an act further to provide for the formation and regulation of corporations for the exercise, transaction and conduct of public franchises and business subject to the jurisdiction and supervision of the public service commission, and an act for the further regulation of corporations under the supervision of the Public Service Commission.

RHODE ISLAND

An act requiring street railways in Rhode Island to equip the end of all cars in which the motorman stands with proper heating apparatus has been introduced in the lower branch of the Rhode Island General Assembly. A penalty of $25 for each offence against the provisions of the bill is provided. The act is now pending before the House judiciary committee.

A. E. Potter, president of the Rhode Island Company, Providence, R. I., and other electric railway officials appeared on March 26, 1914, at the hearing before the Rhode Island Senate judiciary committee upon the so-called carmen's bill, which would make it compulsory for men seeking employment as motormen in Rhode Island to have been residents of the State for at least sixty days prior to their employment. Frank W. Tillinghast, attorney for the Rhode Island Company, contended that the bill was unconstitutional. Mr. Potter's remarks at the hearing were few, but the following day he amplified his statement made at the State House. He said:

"In case demands were made upon this company which it did not feel it could grant, the passage of this bill would prevent the company from employing experienced employees from outside the State and interfere seriously with the operation of cars, even though a majority of the employees of the company were not in sympathy with the demands. Many of our most efficient employees are recruited in Massachusetts and Maine, particularly when all the local industries are active. Every year we employ experienced men from other cities who are well recommended. Another reason why the bill should not be passed is that we have lines running into Rhode Island from Massachusetts operated under agreement by men who live in Massachusetts. If this bill became a law and the cars of these lines were off time for any reason, the cars would have to stop at the State line and the passengers would be required to wait until the cars coming in the opposite direction arrived. In regard to the second section of the bill, all men are required to break in practically fifteen days. Some men take a day or two less, while it is necessary for many to take more than fifteen days. It has been stated that a man new to the business is preferable to one who has operated cars in other cities for the reason that a man with experience elsewhere would be inclined to follow the rules of the other companies by which he had been employed rather than those in use on the Providence lines. This is not so. The standard code of rules in use in Providence is practically the same as the code in every other large city, except that a few special orders relate wholly to local operating conditions."

Financial and Corporate

Stock and Money Markets

March 25, 1914.

In the early trading on the New York Stock Exchange to-day the general list was not affected to any material extent by the weakness in the Corn Products and the Panhandle issues, but in the trading in the afternoon the market was extremely dull and at times business was almost at a standstill. Pennsylvania was made the center of an attack late in the afternoon and that issue closed down one point over yesterday. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¾@3 per cent; four months, 3@3¼ per cent; six months, 3¼@4 per cent.

Small dealing characterized the stock market in Philadelphia to-day. Union Traction stock sold off to 44⅛ at the close.

The Boston market was dull to-day with an easier tendency. The local railroads sold off.

The stock transactions in Chicago totaled 1111 shares to-day, well distributed. The bulk of the bond transactions was in Chicago Railways 5s.

The Baltimore market was quite active to-day. The bond transactions totaled $47,300, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 18	Mar. 25
American Brake Shoe & Foundry (com.)	91½	90½
American Brake Shoe & Foundry (pref.)	140	138½
American Cities Company (com.)	36	36
American Cities Company (pref.)	64	65
American Light & Traction Company (com.)	365	365
American Light & Traction Company (pref.)	107	107
American Railways Company	*38	38¼
Aurora, Elgin & Chicago Railroad (com.)	35	42
Aurora, Elgin & Chicago Railroad (pref.)	77¼	77½
Boston Elevated Railway	82	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	60	a63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	38	37
Brooklyn Rapid Transit Company	92	92⅛
Capital Traction Company, Washington	108	107½
Chicago City Railway	170	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	91	91
Chicago Railways, ptcptg., ctf. 2	30¾	30
Chicago Railways, ptcptg., ctf. 3	6½	6
Chicago Railways, ptcptg., ctf. 4	3	2½
Cincinnati Street Railway	105	105
Cleveland Railway	103½	103¾
Cleveland, Southwestern & Columbus Ry. (com.)	4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	23	*23
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	71	71
Detroit United Railway	a85	a80
General Electric Company	147⅛	146¾
Georgia Railway & Electric Company (com.)	121	120½
Georgia Railway & Electric Company (pref.)	87	86¼
Interborough-Metropolitan Company (com.)	14⅝	14¾
Interborough-Metropolitan Company (pref.)	60	60⅛
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	10	10
Kansas City Railway & Light Company (pref.)	25	25
Lake Shore Electric Railway (com.)	*5½	*5½
Lake Shore Electric Railway (1st pref.)	*85	*85
Lake Shore Electric Railway (2d pref.)	*22	*22
Manhattan Railway	129	130
Massachusetts Electric Companies (com.)	11	11
Massachusetts Electric Companies (pref.)	61	61½
Milwaukee Electric Ry. & Light Co. (pref.)	95	*95
Norfolk Railway & Light Company	25¼	25¼
North American Company	76¼	75½
Northern Ohio Traction & Light Co. (com.)	70	70
Northern Ohio Traction & Light Co. (pref.)	98¼	98¼
Philadelphia Company, Pittsburgh (com.)	42	43
Philadelphia Company, Pittsburgh (pref.)	42	42
Philadelphia Rapid Transit Company	18¼	18¼
Portland Railway, Light & Power Company	54	54
Public Service Corporation	111	112
Third Avenue Railway, New York	43¾	43½
Toledo Traction, Light & Power Co. (com.)	20	15
Toledo Traction, Light & Power Co. (pref.)	75	70
Twin City Rapid Transit Co., Min'apolis (com.)	105¾	105
Union Traction Company of Indiana (com.)	11½	*11½
Union Traction Company of Indiana (1st pref.)	80	*80
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore)	26½	27¼
United Rys. Inv. Company (com.)	18	21½
United Rys. Inv. Company (pref.)	42½	47½
Virginia Railway & Power Company (com.)	53	51
Virginia Railway & Power Company (pref.)	95	96
Washington Ry. & Electric Company (com.)	87	89½
Washington Ry. & Electric Company (pref.)	86¾	87
West End Street Railway, Boston (com.)	73	70½
West End Street Railway, Boston (pref.)	93½	89½
Westinghouse Elec. & Mfg. Company	76¾	76
Westinghouse Elec. & Mfg. Co. (1st pref.)	118	118

* Last sale. a Asked.

ANNUAL REPORTS

The North American Company

The statement of income, profit and loss of the North American Company, New York, N. Y., for the fiscal year ended Dec. 31, 1913, according to the twenty-fourth annual report just issued, is as follows, as compared with 1912:

	1913	1912
Interest received and accrued	$476,695	$537,327
Dividends received	1,814,424	1,517,953
Profits and compensation for services	78,623	289,189
Total	$2,369,742	$2,344,469
Salaries, legal expenses, net rentals and all other expenses of administration	$77,514	$76,217
Taxes	26,159	11,654
Interest and commissions paid and accrued	166,968	107,674
Sundry accounts written off and reserves	11,539	17,697
Total	$282,180	$213,242
Net income	$2,087,562	$2,131,227
Dividends paid and accrued during year	1,489,665	1,489,665
Balance carried to undivided profits account	$597,897	$641,562

The statement of income, profit and loss of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., a subsidiary of the North American Company, follows:

Operating revenues	$6,016,916
Operating expenses	$3,167,365
Depreciation (reserve credit)	633,359
Contingencies (reserve credit)	15,043
Taxes (reserve credit)	390,668
Net operating revenues	$1,810,481
Non-operating revenues	45,178
Gross income	$1,855,659
Interest charges	733,322
Net income	$1,122,337
Dividends on preferred stock	270,000
Dividends on common stock	788,000
Surplus	$64,337

The operating revenues of The Milwaukee Electric Railway & Light Company increased 5.9 per cent during 1913. Operating expenses, taxes and reserves increased 7 per cent, gross income 2.3 per cent and net income 2.2 per cent. As between the various departments the operating revenues of the railway department increased 2.12 per cent, and of the light and power and the steam heating departments, 13.65 per cent. The revenues of the railway department reflected the effect of the reduction of fares for passengers ordered by the Railroad Commission of Wisconsin on August 23, 1912, in the case now on appeal to the United States Supreme Court.

During the year there was expended on additions to physical property the sum of $2,377,113. In arriving at the net operating revenues there were deducted for maintenance and depreciation of physical property amounts equal to the following percentages of the operating revenues: railway department, 22 per cent; electric light and power department, 16 per cent, and steam-heating department, 6 per cent. The balances remaining after providing for the maintenance in ordinary operating expenses were carried to the credit of the depreciation reserve.

The progress of the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., during 1913 is shown by the following statement:

Operating revenues	$1,443,250
Operating expenses	$710,982
Depreciation (reserve credit)	76,896
Taxes (reserve credit)	101,027
Net operating revenues	$554,346
Non-operating revenues	721,699
Gross income	$1,276,045
Interest charges	614,677
Balance	$661,368

The operating revenues of The Milwaukee Light, Heat & Traction Company increased 16.6 per cent over those of the year 1912. The operating expenses, taxes and reserves increased 13.7 per cent, and the net income increased 22.7 per cent. During the year 1913 $613,962 was expended on additions to physical property and the company charged off 3 per cent of the operating revenue for depreciation and 19 per cent for maintenance.

The remarks of James Campbell, president of the company, on the subject of depreciation, contained in the report, are referred to at length on page 736 of this issue.

The results of operation of the United Railways Company of St. Louis, St. Louis, Mo., for 1913 were as follows:

Gross earnings:		
Revenue from transportation	$12,612,787	
Revenue from operation other than transportation	89,857	
Total		$12,702,644
Operating expenses (including depreciation)		8,573,617
Surplus over operating expenses		$4,129,027
Taxes		653,674
Income from operation		$3,475,353
Income from other sources		84,349
Gross income from all sources		$3,559,703
Deductions from income:		
Interest on funded debt	$2,651,013	
Interest on notes payable	9,661	2,660,674
Surplus		$899,029

The passenger revenue of the United Railways Company of St. Louis for the year 1913 showed an increase over the year 1912 of $443,292, or 3.67 per cent. Other revenue from transportation increased $12,727. Revenue from operation other than transportation decreased $4,465, and income from other sources increased $19,433. The gross earnings and other income for the year 1913 increased $470,986 over the year 1912, or 3.82 per cent. Total operating expenses (including depreciation) and taxes increased during the year $746,568. The percentage of operating revenue charged off for depreciation during the year amounted to 11.56 and that for maintenance to 13.22.

The total number of passengers carried during the year was 376,425,241. The percentage of revenue passengers using transfers during the year 1913 was 48.69. The car mileage amounted to 42,790,086 car miles. During 1913 there was expended and charged to capital account for added property the sum of $697,066. During the year 1.10 miles of track were added and 0.80 mile was removed.

Washington Water Power Company

The statement of income, profit and loss of the Washington Water Power Company, Spokane, Wash., for the year ended Dec. 31, 1913, follows:

Gross receipts	$2,909,147
Receipts from interest on current balances	5,803
	$2,914,950
Operating expenses, including taxes	1,291,673
	$1,623,277
Interest on bonds, July 1, 1913, and Jan. 1, 1914	$259,219
Premium on $104,000 bonds bought for sinking fund	2,666
Annual credit to amortization fund for discount on first refunding mortgage bonds	8,000
Interest on consumers' deposits, etc	2,975
Depreciation of plant and sinking fund	325,000
Uncollectible accounts, etc	8,572
Total	$606,432
	$1,016,845
Interest at 5 per cent on work under construction	92,346
	$1,109,191
Dividends paid at the rate of 8 per cent per annum; April 1, July 1, Oct. 1, 1913, and Jan. 2, 1914	1,126,552
Deficit for 1913	$17,360
Surplus from 1912	1,136,466
Surplus, Dec. 31, 1913	$1,119,106

The gross earnings for 1913 were $2,914,950 as compared to $3,170,245 in 1912, an apparent decrease of $255,295. This figure is without meaning, however, for prior to 1913 the system of accounts, continued from the time when the electric light and street railway departments were separate corporations, included in the gross earnings and expenses charges for services rendered by one department to the other. The Public Service Commission of Washington, however, prescribed a system of accounts, effective in 1913, abolishing these charges. Hence in 1913 the gross earnings and expenses were each reduced by $353,783. On the old accounting basis the gross earnings for 1913 would be $3,268,734, an increase of 3.1 per cent. On the same basis the operating expenses (including taxes) were $1,645,457 in 1913 as compared to $1,602,353 in 1912, an increase of 2.6 per cent. The gross income from operations increased from $1,567,892 in 1912 to $1,623,277, or 3.5 per cent. The amount applicable to dividends in 1913 was $1,109,191, while the dividends declared were $1,126,552, causing an appropriation from the 1912 surplus of $17,360 as compared with the 1912 deficit of $49,575. The total surplus as of Dec. 31, 1913, was $1,119,106 as compared to $1,136,466 the year previous, a decrease of 1.5 per cent.

The number of passengers carried decreased from 20,726,062 in 1912 to 19,437,009 in 1913; car miles from 3,698,584 in 1912 to 3,650,692 in 1913, and car hours from 432,213 in 1912 to 423,455 in 1913. The total amount of depreciation, which is carried on the balance sheet as a deduction from the original cost of the assets, amounts to $2,411,989 for the past ten years. The sum of $123,599 was expended in 1913 for betterments and extensions. It is stated that no extensions of importance or increases of equipment are now contemplated.

Terre Haute, Indianapolis & Eastern Traction Company

The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has issued a notice to the stockholders of the company that the board of directors has decided to pass the usual quarterly dividend of 1¼ per cent on the preferred stock of the company, due on April 1, 1914. The statement of earnings of the properties controlled by the company follows:

	1913.	1912.
Gross earnings	$6,533,013	$6,432,059
Operating expenses and taxes	3,964,863	3,814,427
Net earnings	$2,568,149	$2,617,631
Rentals and other deductions, subsidiary companies	1,594,732	1,532,672
Interest on divisional bonds of this company	15,000	15,000
Balance	$958,417	$1,069,959
Interest on T. H., I. & E. bonds	325,000	325,000
Balance available for sinking funds and dividends	$633,417	$744,959
Sinking funds, subsidiary companies	150,813	145,730
Sinking fund on divisional bonds of this company	12,500	12,500
Sinking fund on T. H., I. & E. bonds	55,000	55,000
Total sinking fund	*$218,313	*$213,230
Balance	$415,104	$531,729

In addition to the sinking fund as shown in the financial statement there was paid as interest on bonds already held by trustees in sinking fund, which was applied to the purchase of additional bonds by the trustees, the sum of $60,540 in 1913 and $49,255 in 1912, making a total of moneys received for sinking fund accounts by the trustees of $278,853 in 1913 and $262,485 in 1912.

The notice in regard to the suspension of the dividend refers to the losses of the company due to the floods early in 1913, the losses incident to the recent strike of the employees and the expenditure of $300,000 for extensions, improvements and betterments in excess of the returns from securities sold during the year and in addition to the regular maintenance allowance of 18 per cent.

American Light & Traction Company

The statement of earnings of the American Light & Traction Company, New York, N. Y., for the years ended Dec. 31, 1912 and 1913, follows:

	1913	1912
Earnings on stocks of owned companies	$3,751,976	$3,688,867
Miscellaneous earnings	714,257	567,993
Gross earnings	$4,466,233	$4,256,860
Expenses	123,107	117,657
Net earnings	$4,343,126	$4,139,204
Surplus and reserve Dec. 31, 1912	8,689,293	7,835,726
Total surplus earnings	$13,032,419	$11,974,930
Less dividends:		
Cash dividends on preferred stock	$854,172	$854,172
Cash dividends on common stock	1,341,182	1,215,732
Stock dividends on common stock	1,341,183	1,215,733
Total dividends	$3,536,537	$3,285,637
Surplus balance on Dec. 31	$9,495,882	$8,689,293

American Light & Traction Company, New York, N. Y.—The American Light & Traction Company is offering to holders of the $1,968,000 of collateral trust bonds of the Southern Light & Traction Company an exchange for these securities of the first mortgage bonds of the San Antonio Traction Company and the San Antonio Gas & Electric Company, deposited as collateral for the Southern Light & Traction Company bonds. Each holder of a $1,000 bond of Southern Light & Traction Company will receive in exchange a $500 bond of the San Antonio Gas & Electric Company and a $500 bond of the San Antonio Traction Company.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—At the annual meeting on March 18, 1914, of the Charleston Consolidated Railway, Gas & Electric Company, which is operated by the Charleston Railway & Lighting Company, the stockholders voted to increase the common capital stock from $2,500,000 to $3,000,000. The proceeds of this additional issue are to be used to pay for additions and betterments as made from year to year.

Chicago (Ill.) City Railway.—The Chicago City Railway has applied to the Public Utilities Commission of Illinois for authority to issue $3,000,000 of additional first mortgage 5 per cent bonds.

Chicago (Ill.) Elevated Railways.—It is reported that the Chicago Elevated Railways will execute a first and refunding mortgage to provide for the $500,000 of expense being incurred in lengthening platforms on the union loop and the different lines and for the purchase of new cars at a cost of about $1,250,000. Owing to the fact that the $25,000,000 of 5 per cent first mortgage bonds of the Northwestern Elevated Railroad have not been sold to the public, but are held as collateral for the $30,000,000 three-year 5 per cent notes which mature on July 1, it will be possible to arrange with the National City Bank, New York, to withdraw this mortgage and issue in its stead a first and refunding issue covering not only the Northwestern Elevated Railroad but the other properties controlled by the Chicago Elevated Railways.

Chicago (Ill.) Railways.—Application has been made by the Chicago Railways to the Public Utilities Commission of Illinois for permission to issue $4,244,000 of additional first mortgage twenty-year bonds.

City Service Company, New York, N. Y.—The stockholders of the City Service Company are to vote on April 7, 1914, on the question of increasing the authorized capital stock from $50,000,000 ($30,000,000 of 6 per cent preferred stock and $20,000,000 of common stock) to $65,000,000 ($40,000,000 of 6 per cent preferred stock and $25,000,000 of common stock). It is stated that the new stock is for future use and none is to be issued at present. Of the present authorized capitalization $15,718,380 of the common stock and $27,368,426 of the preferred stock have been issued.

Cleveland (Ohio) Interurban Railroad.—On March 16, 1914, the Public Utilities Commission of Ohio authorized the Cleveland Interurban Railroad to issue common capital stock in the amount of $150,000 to be sold for the highest price obtainable but for not less than the par value. The proceeds from the sale of this stock are to be applied on the payment of outstanding obligations now due, amounting to $293,738.

Georgia Light, Power & Railways Company, Macon, Ga.—The London Stock Exchange has listed $981,000 of additional first lien 5 per cent thirty-year gold bonds of the Georgia Light, Power & Railways Company. This makes the total amount listed $3,211,000.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The directors of the New York, New Haven & Hartford Railroad have authorized an issue of $2,490,000 of 5 per cent equipment notes maturing serially in from one to fifteen years. The notes cover some of the new steel passenger cars and electric equipment of the company.

New York State Railways, Rochester, N. Y.—Harris, Forbes & Company, New York, N. Y., and associated houses are offering at 90 and interest to yield more than 5 per cent an additional $5,621,000 of fifty-year first consolidated mortgage 4½ per cent gold bonds of the New York State Railways. These bonds are tax exempt in New York State. The total authorized issue is $50,000,000, of which $12,546,000 are outstanding, including the present issue. The amount of $11,486,000 is reserved to retire divisional bonds and the remainder is applicable to future requirements.

North American Company, New York, N. Y.—The North American Company, at a meeting of its directors held on March 19, 1914, elected the following officers: chairman of the board of directors, James Campbell; president, James D. Mortimer; vice-president and treasurer, George R. Sheldon; assistant to the president, Edwin Gruhl; secretary and assistant treasurer, James F. Fogarty; assistant treasurer, Robert Sealy; assistant secretary, Robert Randall. James F. Fogarty, Edwin Gruhl and William T. Graham have been elected directors during the last year to fill the vacancies.

Omaha & Lincoln Railway & Light Company, Ralston, Neb.—The Omaha & Lincoln Railway & Light Company has filed a mortgage with the Central Trust Company of Illinois, Chicago, Ill., as trustee, to secure an issue of 5 per cent twenty-five year bonds of an authorized amount stated to be $2,250,000. It is reported that the proceeds of the issue are to be devoted largely to extending the company's lines from Omaha to Lincoln.

Pacific Gas & Electric Company, San Francisco, Cal.—Byrne & McDonnell, New York, N. Y., announce that the directors of the Pacific Gas & Electric Company have authorized, subject to the approval of the stockholders, an issue of $12,000,000 of additional preferred stock to be offered to stockholders at 80 on the basis of six shares of the new issue to five of their present holdings. This issue will bring the total outstanding preferred stock of the company up to $22,000,000.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has purchased the property of the Yamhill Electric Company, serving Newberg, Carlton, Dayton and other towns in Yamhill County, Ore., with a total population of about 5000. The Yamhill system has been connected with the high-tension transmission lines of the Portland Railway, Light & Power Company.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The board of directors of the San Francisco-Oakland Terminal Railways, as reorganized on March 3, 1914, includes the following: J. F. Carlson, president of the Central National Bank of Ohio, W. I. Brobeck, W. A. Bissell, F. V. Whipple, J. K. Moffett, W. R. Alberger, and F. W. Frost. The membership on the board has been increased to nine, two places remaining to be filled.

Southern Traction Company of Illinois, East St. Louis, Ill.—Federal Judge Francis M. Wright, Danville, Ill., has authorized an issue of $500,000 of receivers' certificates, par $500 and $1,000, to provide for completing the construction of the Southern Traction Company of Illinois. The appointment of the receivers for this road was noted in the ELECTRIC RAILWAY JOURNAL of March 14, 1914.

Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—The Kentucky Southwestern Electric Railway, Light & Power Company has filed at Paducah, Ky., a trust deed to secure a bond issue of $2,000,000, with the proceeds of which the company's line from Henderson to Hickman, Ky., will be built.

Underground Electric Railways Company, Ltd., London, Eng.—The London Stock Exchange has listed an additional issue of £21,400 of 4½ per cent bonds of the Underground Electric Railways of London, Ltd., due in 1933, par value £100. The total amount now listed is increased to £1,827,400.

Dividends Declared

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Cincinnati, Ohio, quarterly, 1½ per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Houghton County Traction Company, Hancock, Mich., 3 per cent, preferred, 2½ per cent, common.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred; quarterly, one-half of 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 3 per cent, cumulative preferred; quarterly, 1¾ per cent, common.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$18,835	$21,478	$2,644	$660	$3,304
1 "	"	'13	20,087	17,640	2,447	466	1,981

BATON ROUGE (LA.) ELECTRIC COMPANY

1m.,	Jan.,	'14	$15,020	*$10,230	$4,791	$2,105	$2,686
1 "	"	'13	13,427	*8,472	4,955	1,734	3,221
12 "	"	'14	164,722	*104,140	60,582	25,147	35,435
12 "	"	'13	148,647	*90,065	58,582	20,772	37,810

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m.,	Jan.,	'14	$7,333	*$7,261	$72	$1,066	†$994
1 "	"	'13	7,873	*7,190	683	1,091	†408
12 "	"	'14	123,864	*98,799	25,065	13,019	12,046
12 "	"	'13	120,718	*91,184	29,534	12,590	16,944

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m.,	Jan.,	'14	$29,798	*$18,563	$11,235	$6,437	$4,798
1 "	"	'13	31,836	*17,761	14,075	5,823	8,252
12 "	"	'14	378,915	*210,756	168,159	73,527	94,632
12 "	"	'13	363,685	*195,146	168,539	68,292	100,247

GRAND RAPIDS (MICH.) RAILWAY

1m.,	Jan.,	'14	$102,585	*$65,143	$37,442	$13,615	$23,827
1 "	"	'13	104,563	*59,931	44,632	14,736	29,896
12 "	"	'14	1,299,426	*808,819	490,607	165,512	325,095
12 "	"	'13	1,246,432	*711,230	535,202	175,171	360,031

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

1m.,	Feb.,	'14	$40,673	*$26,956	$13,717	$12,542	$1,175
1 "	"	'13	40,667	*25,849	14,818	12,542	2,276
12 "	"	'14	580,201	*351,787	228,414	150,500	77,914
12 "	"	'13	544,091	*322,035	222,056	152,014	70,042

NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.

1m.,	Jan.,	'14	$634,422	$320,594	$313,828	$205,020	$108,808
1 "	"	'13	607,494	309,596	297,898	191,380	106,518

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEXAS

1m.,	Jan.,	'14	$173,094	*$106,248	$66,846	$24,227	$42,618
1 "	"	'13	157,048	*93,973	63,075	24,837	38,238
12 "	"	'14	2,148,246	*1,192,216	956,031	286,310	669,722
12 "	"	'13	1,833,115	*964,820	868,295	270,065	598,230

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Jan.,	'14	$582,610	*$277,286	$305,324	$173,282	$132,042
1 "	"	'13	553,598	*270,209	283,389	153,021	130,368
12 "	"	'14	6,752,754	*3,305,387	3,447,367	2,028,862	1,418,505
12 "	"	'13	6,664,693	*3,326,159	3,338,534	1,777,317	1,561,217

TAMPA (FLA.) ELECTRIC COMPANY

1m.,	Jan.,	'14	$80,158	*$43,855	$36,303	$5,062	$31,241
1 "	"	'13	68,157	*34,738	33,419	4,794	28,625
12 "	"	'14	856,941	*475,616	381,326	56,216	325,310
12 "	"	'13	761,241	*396,920	364,320	53,999	310,321

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*Includes taxes.
†Deficit.

Traffic and Transportation

Passenger Traffic Out of Indianapolis

Statistics which have been made public by E. B. Peck, vice-president of the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company, showing the operation of interurban cars and the passenger traffic in and out of the traction terminal station at Indianapolis, Ind., for the year 1913, bring out the fact that despite interruptions of service caused by the floods in March and April of last year, and as a result of labor difficulties in Indianapolis and vicinity during the fall, there was an increase of approximately 100,000 passengers carried in 1913 as compared with 1912. The following tables show the dates on which the various interurban lines entering Indianapolis commenced operation.

Indianapolis, Columbus & Southern Traction Company	Jan. 1, 1900
Terre Haute, Indianapolis & Eastern Traction Company, Eastern Division	June 17, 1900
Indiana Union Traction, Muncie Division	Jan. 1, 1901
Terre Haute, Indianapolis & Eastern Traction Company, Martinsville Division	Aug. 2, 1902
Terre Haute, Indianapolis & Eastern Traction Company, Brazil Division	Sept. 15, 1902
Indianapolis & Cincinnati Traction Company, Shelbyville Division	Sept. 12, 1902
Terre Haute, Indianapolis & Eastern Traction Company, Northwestern Division	Oct. 9, 1903
Indiana Union Traction, Logansport Division	Dec. 3, 1903
Indianapolis & Cincinnati Traction Company, Rushville Division	July, 1905
Terre Haute, Indianapolis & Eastern Traction Company, Danville Division	Sept. 1, 1906
Indianapolis, Crawfordsville & Western	July 4, 1907
Indianapolis, Newcastle & Toledo	June 29, 1910
Beech Grove Traction Company	March, 1911

The total number of passengers carried since 1900 is as follows: 1900, 377,761; 1901, 955,554; 1902, 1,523,411; 1903, 2,347,936; 1904, 3,274,654; 1905, 3,881,332; 1906, 4,469,982; 1907, 5,032,677; 1908, 4,979,371; 1909, 5,156,906; 1910, 5,736,-272; 1911, 6,279,822; 1912, 6,431,714; 1913, 6,524,366.

The total number of interurban and suburban passengers arriving and departing from the station of the Indianapolis Traction & Terminal Company, Indianapolis, for 1913 and 1912, together with the total passenger cars and the total freight trains, follows:

	1913			1912		
Month	Passengers	Passenger Cars	Freight Trains	Passengers	Passenger Cars	Freight Trains
January	479,855	20,058	2,057	390,261	18,391	1,965
February	448,686	18,434	1,832	375,964	17,298	1,725
March	*411,531	16,442	1,554	439,727	19,540	1,932
April	438,073	16,260	1,503	464,193	19,444	1,969
May	645,432	22,499	2,107	586,930	22,192	2,066
June	672,562	22,683	2,182	629,421	22,478	2,015
July	710,220	24,120	2,302	644,119	23,631	2,092
August	†659,443	23,506	2,058	648,349	23,002	2,139
September	584,804	22,742	2,155	621,341	22,091	2,000
October	555,272	22,053	2,320	563,576	20,473	2,125
November	††381,853	15,962	1,480	520,445	19,736	1,922
December	536,635	22,064	1,951	547,388	20,741	1,946
Totals	6,524,366	246,823	23,501	6,431,714	249,017	23,896
Average per day	17,875	676	64	17,573	680	65

*Flood March 25, 1913. †Interurban strike of Aug. 23, 1913. ††Indianapolis strike of Oct. 31, 1913.

Through limited trains are operated between Indianapolis and the following cities, the number of trains each way daily being shown in the last column:

	Miles	Time	Trains
Fort Wayne, Ind.	136	4 hours 35 minutes	10
Goshen, Ind.	160	5 hours	2
Louisville, Ky.	117	4 hours	6
Dayton, Ohio	110	4 hours 10 minutes	6
Terre Haute, Ind.	72	2 hours 15 minutes	7
Marion, Ind.	72	2 hours 35 minutes	2
Lafayette, Ind.	70	2 hours 10 minutes	10
Richmond, Ind.	70	2 hours 35 minutes	7
Muncie, Ind.	57	1 hour 45 minutes	2
Connersville, Ind.	58	1 hour 30 minutes	6
Greensburg, Ind.	49	1 hour 30 minutes	7

The tables show that during 1913, owing to the interruptions in service on account of the floods and labor troubles, there was a slight decrease in the number of passenger and freight cars operating in and out of the Indianapolis terminals.

It is estimated that while the population of Indianapolis is about 250,000, the actual trading population of the city, due to the interurbans, is approximately 500,000. Of the 6,524,366 passengers handled during 1913, each one is theoretically counted twice, representing a round trip, in estimating the number of people who visit Indianapolis, which brings the actual number of visitors to the city to approximately 3,250,000. The population of Indianapolis according to the United States census of 1900, when the first interurban line was operating into the city, was 169,164; the census of 1910 fixed the population at 233,650, an increase of 38.1 per cent.

Traffic Interruptions of New York State Railways

The New York State Railways, Rochester lines, has compiled in advertisement form an interesting statement concerning the loss of time and causes of interruption to its traffic during the past fourteen months. This statement appeared in the *Labor Herald*, the official paper of the Central Trades and Labor Council of Rochester, as follows:

WHY WE ASK FOR CO-OPERATION

Following is a list of interruptions to service during the past fourteen months:

Date	Interruption
January, 1913	9 hours 56 minutes
February, 1913	4 hours 55 minutes
March, 1913	8 hours 25 minutes
April, 1913	2 hours 41 minutes
May, 1913	4 hours 9 minutes
June, 1913	9 hours 53 minutes
July, 1913	8 hours 46 minutes
August, 1913	4 hours 11 minutes
September, 1913	10 hours 15 minutes
October, 1913	6 hours 29 minutes
November, 1913	4 hours 47 minutes
December, 1913	6 hours 10 minutes
January, 1914	9 hours 22 minutes
February, 1914	3 hours 51 minutes
Total for 14 months	93 hours 50 minutes

These interruptions, *which total almost four days*, were caused by wagons and autos breaking down or becoming stalled in the car tracks.

Every interruption results in twofold inconvenience to our fellow citizens: They cannot reach their destinations on time, nor can they be sure of riding in comfort because of the crowding which invariably follows when cars are bunched.

These are the reasons why we ask drivers of vehicles to co-operate with us in an effort to bring the number of interruptions down to the minimum.

This does not mean that the car tracks should never be used by drivers of vehicles.

We know there are times when drivers cannot reasonably be expected to drive elsewhere.

The motorman, who is himself a driver, knows this, too. He doesn't ring his gong for the purpose of annoying a fellow driver. He rings his gong simply because it's the only way he has of asking you to co-operate with him so he can land his passengers on time.

If drivers of vehicles will use the car tracks only when necessary and will turn out for cars to pass whenever they can do so without risk of damage to their vehicles, we will appreciate their co-operation because it will reduce the number of interruptions and enable us to give the people of Rochester better service.

NEW YORK STATE RAILWAYS
(Rochester Lines).

Results in El Paso Safety Competition

The results obtained by the El Paso (Tex.) Electric Railway in the competition between two equally divided teams of train crews to lessen accidents are regarded as highly satisfactory. While the percentage of decrease for the first two months was small, the company says that this is not a true criterion, as the fundamental consideration was to obtain a report of all accidents, however small or insignificant. The records of the company actually show that for the period of the sixty-day contest few serious accidents came to the attention of the officers. Alves Dixon, superintendent of the safety first division, said:

"Actually totaling the accidents that were recorded for January and February, 1914, the first period of the competition, the decrease as against the accidents recorded for the same period of 1913 was slight. We are anxious, of course, to reduce accidents to the minimum, but we are more anxious to decrease serious accidents and to get the trainmen to report all accidents. Our principal concern was over the unreported accident. In a period of sixty days only two accidents were unreported. They were of little consequence, but they resulted in the defeat of the 'Red' team. The unreported accident is penalized most heavily, and so anxious are the trainmen to avoid being assessed this heavy penalty that they report things that are not really accidents. The unreported accident is the bugbear of the claim department."

The competition will be continued throughout the year without material change. Each day the score is posted at the carhouses showing the relative standing of each team. The inauguration of the contest was referred to in the ELECTRIC RAILWAY JOURNAL of Feb. 28, 1914, page 498.

Hearing on Needham Fares

The Massachusetts Public Service Commission held a hearing at Boston on March 11, 1914, upon the petition of the selectmen of Needham for the establishment of a single fare between Needham and Newton Highlands, on the Middlesex & Boston Street Railway. William G. Moseley, for the petitioners, contended that the company ought to issue a fifty-ride book for $2.50, corresponding to a similar book in use on the company's Needham-Natick line. Emphasis was laid upon the industrial travel between Needham and points on the Needham-Watertown line and counsel urged the establishment of a 5-cent fare at morning and night at least. It was pointed out that 12 cents in fares is collected at present between Needham and Newton Highlands, while passengers holding ticket books can ride from Needham to Natick, 7 miles, for 5 cents per trip.

George M. Cox, general manager of the Middlesex & Boston Street Railway, reviewed the early history of the lines involved. He pointed out that at one time a ride of about 15 miles could be taken for a 5-cent fare between Needham and Union Square, Brighton. In 1908, when the properties of the Boston Suburban Electric Companies were on the verge of a receivership, despite the addition of fare limits, a campaign for 6-cent fares was conducted with success, and to accommodate industrial travel the fare limit on the Needham-Newton Highlands line was set at Elliot and High Streets, Newton Upper Falls, northbound, instead of at the Needham-Newton boundary. Mr. Cox contended that the owners of industrial plants should pay their employees enough to cover their carfare without asking the street railway to accept less than a fair return on its investment. The company paid a 4 per cent dividend in 1913 and had a surplus of $446 without making any charge for depreciation. The Needham-Wellesley line, which is used by Natick passengers, earned only 9.45 cents per car-mile in 1913 and its operating expenses were 19.1 cents. Only 849 passengers were carried in Needham on Jan. 26. Two extra cars were run to carry 155 of these to and from the mills, and the extra cars have to be run empty half of each round trip between Needham and the Auburndale carhouse. The Needham traffic as a whole was carried at a loss, and the company was in no position, particularly in view of the demands of its employees with regard to a wage increase, to reduce its fares. The case was taken under advisement.

"Safety First" Conference in San Francisco

Under the auspices of the Industrial Accident Commission of the State of California, a "safety first" conference was held in San Francisco on March 13, 1914, for the purpose of discussing the effects of the recently enacted workmen's compensation act, as well as other state measures which may be enacted in the future for preventing accidents or adjudicating the loss they occasion. Among the speakers were Governor Johnson, State Senator A. E. Boynton, J. W. Lilienthal, president of the United Railroads, San Francisco, and John A. McGregor, president of the Union Iron Works. Perhaps the most important action taken was the decision to appoint a state commission whose duty it would be to study the cause of accidents in industrial plants, mills, etc., in connection with the means and devices which might be used to prevent such accidents, and also to draft from time to time legislation designed to make it illegal to use certain manufacturing processes without the use of safety appliances of a specified character.

Mr. Lilienthal pointed out that the keynote of future legislation along this line should be prevention and not compensation. He said that he had taken the year 1913 as a basis for rating accidents on the lines of the United Railroads and that he had offered to add to the wages of the platform men the amount by which the total accident cost in 1913 was reduced in succeeding years.

A representative of the Southern Pacific Railroad, in reviewing the "safety first" work on that road, pointed out that all employees were urged to suggest means of lessening the danger in methods and equipment used by the company. Steps were taken to facilitate the handing in of such suggestions and special committees were appointed to pass upon them. Of the many suggestions which were received from employees about 71 per cent were adopted or used. A greater number of accidents was recorded in 1913 than 1912, it was stated, because of the strict enforcement of the rule that every accident, whether trivial or not, be reported. Largely to the "safety first" campaign was accredited the better mortality record in the year just passed, there having been thirty-one more fatalities in 1912 than in 1913.

Mr. McGregor thought that the feature of the new law which gives the employee no compensation for the first two weeks of time lost on account of injury by accident was a wise means of preventing false claims for minor injuries. He referred to the high employer's liability insurance rates and said that part of the $75,000 to $90,000 a year which the Union Iron Works would have to pay in premiums for such policies was used to much better advantage in an endeavor to prevent accidents.

Ira B. Cross, Underwood Building, San Francisco, Cal., is secretary of the Industrial Accident Commission of the State of California.

Signs on the Sides of Kansas City Cars.—The Kansas City Council has passed an ordinance requiring the Metropolitan Street Railway to place the names of lines on the sides of street cars, as well as the front and rear. Many of the company's cars already have the required signs, and the additions will be made to those which have not. The ordinance has been signed by Mayor Jost.

Performance for New York Transportation Men.—H. H. Vreeland, in charge of the welfare department of the Interborough-Metropolitan Company, arranged with the Hippodrome in New York so that the members of the benefit associations of the Interborough and Metropolitan Railways companies could attend the evening performances at the Hippodrome on March 23, 24 and 25, at half price. The privilege was extended to the families of the members. A great many took advantage of this arrangement.

Ventilating the Near-Side Cars in Philadelphia.—The management of the Philadelphia (Pa.) Rapid Transit Company has developed a method of ventilation for its near-side cars based on foreign practice wherein by means of hinging the upper sash of every alternate window in the car any desired supply of fresh air may be admitted without causing a direct draft upon the passengers. The sample cars equipped with this ventilating device have been in experimental operation during the last two months and have been indorsed by the health authorities and the passengers.

Social Feature Added to Kansas City Meetings.—A social feature has been added to the division superintendents' association of the Metropolitan Street Railway, Kansas City. The officers of the company recently decided that more good would result if there were some sort of stimulant added. Accordingly, one of the semi-monthly meetings will be featured in the future by a dinner at a local hotel or restaurant. The division superintendents' association was organized about two years ago to allow the heads of divisions to exchange information and ideas. Twelve superintendents and nine assistants comprise the membership of the association. The meetings are held on the first and third Wednesdays of each month. Heretofore the sessions have been held at the general offices, but, as indicated, one of the meetings each month will take place at a local hotel in the future.

Cuspidors for Motormen.—Finding it impossible to prevent its motormen from chewing tobacco, a street railway in a tobacco-growing section has devoted its recent efforts to minimizing the discomforts and danger to passengers arising from this habit. Hitherto the motormen, practically all of whom chew tobacco, have spit either through the door, where possible, or on the floor of the cab in cars where they do not have access to the exit. The mechanical department of the company has devised a cuspidor, which has been installed in many of the cars and will be put in others as rapidly as possible. The device consists of a funnel-shaped receptacle of cast iron, white enameled, the stem of which runs through the floor of the cab toward the track below. A feature is the lid, added for sanitary reasons. A lug, operated by the motorman's foot, controls the lid. As soon as the pressure of the foot is removed, the lid readjusts itself over the cuspidor. The spittoons are flushed by dashing water into them.

Employees' Magazine in San Francisco.—*The United Railroads Magazine*, the first issue of which will appear this month, will be a publication devoted to the interests of all employees of the United Railroads, San Francisco, Cal. The first issue is to have eight pages and the subject heads or departments under which the contents will be arranged include "Safety First"; "Commendable Records," where mention will be made of long service terms and especially creditable work; "Contributions," which will be open to stories, poems, suggestions or complaints from the men, and "Trolley Sparks," which will be devoted to personal notes and announcements of social events. The magazine will carry no advertising, and the expense of publication will be borne by the company. Although it will be distributed among employees gratis, they will be depended upon, it is announced, to furnish the major portion of the matter published so that the magazine may be representative of all ranks and departments. The publication will be edited by Noble Hamilton, assistant to J. W. Lilienthal, the president of the company.

Organizing to Meet the Emergency of the Snowstorm.—In the article which was published in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, page 552, reviewing the work of the electric railways in the East in the recent severe storm, mention was made of the excellent record made by the Philadelphia (Pa.) Rapid Transit Company in keeping its lines open. It will be recalled that the Philadelphia papers were unstinted in their praise of the officers and the men for the service which they performed at the time of the storm. According to Co-operative Bulletin No. 26, issued by the Stotesbury management of the Philadelphia Rapid Transit Company under date of March 21, 1914, the first steps toward meeting the emergency of the storm were taken in July and August, 1913, when numerous conferences were held at the headquarters of the company attended by all of the operating officials, at which equipment and other matters of importance were considered in detail and the most careful preparation made for snow fighting during the winter. Subsequent conferences with the officials of the way, electric and rolling stock departments served still further to amalgamate the various interests into a compact, efficient, snow-fighting unit.

Denver Safety League.—At a recent meeting held in the auditorium of the Denver (Col.) City Tramway building a safety league was organized, which will embrace every official and employee of the company. The purpose of the league is to engage in and promote the work of accident prevention, with a view to safeguarding the company's employees and also the general public against injury arising from any act or failure to act on the part of the company, its employees, or any of its agencies. It is proposed to make the central safety committee a general clearing house for the prevention of accidents and for the correction of all unsafe conditions or improper methods out of which accidents might arise. The regular monthly meeting of the Denver City Tramway Section of the American Electric Railway Association was held on Feb. 19, 1914. Charles B. Wells, superintendent of transportation of the company, presented a paper, "A Safety Millennium." One of the suggestions which was made during the discussion was that the companies in several cities unite on the subject of moving pictures and illustrate in one city at a time all of the pictures which are collected. It was pointed out that this would reduce the cost materially and greatly increase the efficiency of the campaign.

Personal Mention

Mr. William B. McKinley, president of the Illinois Traction System, Peoria, Ill., and formerly a member of Congress, has announced himself as a candidate for election to Congress as a Republican from the Nineteenth district in Illinois.

Mr. Howard W. Irwin has been appointed investigating engineer of the Bay State Street Railway, with headquarters in Boston. He will report directly to Mr. C. F. Bancroft, superintendent of motive power and machinery, and will continue to have general charge of the work of the instruction department, but will relinquish his duties as assistant superintendent of equipment.

Mr. Emil Huber-Stockar, president of the electrotechnical committee of Switzerland and permanent consulting engineer on electric traction to the board of general managers of the Federal Railways of Switzerland, sailed for home on the *Kronprinzessin Cecilie*, on March 24, 1914. Mr. Huber-Stockar devoted all of his stay to a study of the steam railroad electrifications at New York and also to the Hoosac tunnel. His impressions in regard to American practice are presented elsewhere in this issue.

Mr. F. Herbert Snow, hitherto chief engineer of the Pennsylvania State Department of Health, has been appointed chief engineer of the Pennsylvania Public Service Commission and will organize a bureau of engineering. Mr. Snow is a graduate of Harvard University and Massachusetts Institute of Technology, and was a member of the firm of Snow & Barbour, Boston and New York. He was in general engineering practice from 1890 to 1905, and was engaged in work connected with the abolition of grade crossings in Boston.

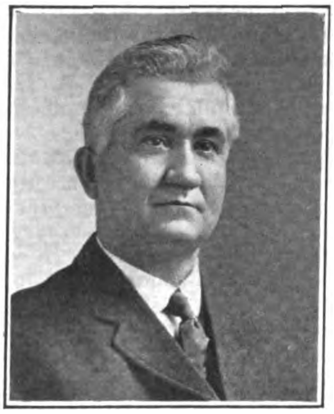
Mr. Thomas Beauchamp, formerly foreman with the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., has been appointed superintendent of shops of the Yonkers (N. Y.) Railroad. Mr. Beauchamp was previously with the United Railways & Electric Company, Baltimore, Md., for ten years as foreman, but resigned from that company to take a similar position with the Cincinnati (Ohio) Traction Company. He resigned from the Cincinnati Traction Company to become connected with the Coney Island & Brooklyn Railroad, by which he has been employed for five years.

Mr. Louis C. Fritch has been appointed assistant to the president of the Canadian Northern Railway. Mr. Fritch was born on Aug. 11, 1868, at Springfield, Ill., and was educated at the University of Cincinnati, where he studied both civil engineering and law. He entered railroad service in 1884 and in 1904 went to the Illinois Central with the title of assistant to the general manager. In 1906 he was made assistant to the president, and in 1909, as consulting engineer for the company, he made a special study of the electrification of the Chicago terminals. He is a member of the committees on rail and electricity of the American Railway Engineering Association. He is also a member of the American Society of Civil Engineers and other technical societies.

Mr. P. J. Kearny has been appointed electrical engineer of the New York, New Haven & Hartford Railroad, New Haven, Conn., reporting to Mr. W. S. Murray, consulting engineer, with duties as assigned. Mr. Kearny was graduated from the Massachusetts Institute of Technology in mechanical engineering in 1903. In 1904 he did post-graduate work in electrical engineering at that institute. He next served as an engineering apprentice with the Westinghouse Electric & Manufacturing Company. In 1906 he was appointed assistant to the electrical engineer of the New York, New Haven & Hartford Railroad, and in 1910 was appointed engineer of electric traction by the New York, New Haven & Hartford Railroad on the New York, Westchester & Boston Railway electrification. Since 1913 he has been with the firm of McHenry & Murray, engineers, New Haven, Conn., acting as consultants to the New York, New Haven & Hartford Railroad.

Mr. C. M. Clark, of E. W. Clark & Company, Philadelphia, Pa., chairman of the board of directors of the Portland Railway, Light & Power Company, Portland, Ore., was the guest at a luncheon of railway and steamship officials held on March 17, 1914, at the Multnomah Hotel, Portland. Mr. Clark spoke about public relations and said that it was the duty of the employees of all public service companies to preach and live up to the "public-be-pleased" policy of the companies. Mr. Franklin T. Griffith, president of the Portland Railway, Light & Power Company, acted as chairman. Other speakers were Mr. R. A. Leiter, attorney for the Portland Railway, Light & Power Company; Mr. A. C. Spencer, general attorney for the Oregon-Washington Railway & Navigation Company; Mr. W. P. Bartlett, chief dispatcher for the Oregon Water Power lines, and Mr. G. C. Fields, superintendent of interurban transportation of the Portland Railway, Light & Power Company.

Mr. Ray W. Reynolds, general manager of the Springfield (Mass.) Street Railway, had a complimentary dinner tendered to him recently at the Highland Hotel, Springfield, by the employees of the Hartford & Springfield Street Railway, of which he was formerly general manager. Mr. Reynolds was presented with a diamond ring by his former associates as a token of esteem. Those present at the dinner in addition to Mr. Reynolds were Mr. Joseph S. Goodwin, superintendent of the Hartford & Springfield Street Railway; Mr. Frederick M. Dubois, master mechanic, representing the carhouse employees; Mr. John E. Thompson, chief engineer, representing employees of the power station; Mr. John F. Hannon, chief dispatcher, representing the transportation department; Mr. James Furey, roadmaster, representing the track and roads department; Mr. Robert H. Frew, superintendent of overhead lines, representing the linemen; Mr. Frank Seward, cashier and chief clerk, representing the accounting department, and Mr. Robert F. Kelly, Mr. Frank W. Lovejoy and Mr. Edward O'Donnell, representing trainmen.



J. T. Conway

Mr. John T. Conway, who was elected president of the New England Street Railway Club at the fourteenth annual meeting on March 26, 1914, is one of the most widely known operating men in New England. He was born in 1860 at Stonington, Conn., and after spending his boyhood on the farm entered the Mystic Valley Institute at Mystic, Conn., in 1879. In 1881 he joined the staff of the Singer Sewing Machine Company at Meriden, Conn., and later attended East Greenwich Academy. Mr. Conway's street railway career began in 1885, when he entered the service of the Brockton (Mass.) Street Railway as a horse-car conductor. He was appointed carhouse foreman at Brockton in 1890 and division master in 1891. In 1900 he was made assistant superintendent of the Brockton lines of the Old Colony Street Railway and with the development of the southern lines of the Bay State Railway he became superintendent of Division 1, South, his jurisdiction embracing the lines centering in Brockton, Quincy and Hyde Park and covering about 300 miles of track. Mr. Conway is an Odd Fellow and a Knight Templar and is a member of the Boston City Club, the boards of trade of Brockton and Quincy, Mass., and other organizations.

Mr. William B. Storey, Jr., for the last year first vice-president of the American Railway Engineering Association, was elected president for the coming year at the recent convention in Chicago. Mr. Storey was born on Nov. 17, 1857, at San Francisco, was graduated from the University of California in 1881, and entered the employ of the Central Pacific Railway as rodman. When the Southern Pacific Company took over the Central Pacific he remained in the service, and when he left in 1893 he had advanced through the rank of leveler and transitman to that of assistant engineer, in charge first of location and afterward of construction and reconstruction. During part of 1894 and 1895 he was assistant engineer with the federal Débris Commission. In the latter year he entered the service of the San Francisco & San Joaquin Valley Railroad as engineer, later becoming also general superintendent. Upon the completion of that road in 1900 it was purchased by the Atchison, Topeka & Santa Fé, and Mr. Storey was taken to Topeka as chief engineer in charge of both maintenance and engineering. In 1906 he was made chief engineer of the entire Santa Fé system, in charge of construction, at the same time acting as consulting engineer on maintenance. Two years later he was made vice-president in charge of construction, and at the close of 1910 his jurisdiction was extended over operation. Mr. Storey is a charter member of the American Railway Engineering Association. He is also a member of the American Society of Civil Engineers, the American Society for Testing Materials, the Western Society of Engineers and the Technical Society of the Pacific Coast.

OBITUARY

W. A. Dutton, one of the founders of the Van Dorn & Dutton Company, Cleveland, Ohio, which was organized more than twenty years ago, died in St. Augustine, Fla., on March 21, 1914. Mr. Dutton was actively connected with the Van Dorn & Dutton Company from the time of its formation until his retirement about four years ago from the position of secretary and treasurer of the company. Prior to his connection with the Van Dorn & Dutton Company Mr. Dutton was secretary and superintendent of the St. Clair Street line in Cleveland. Following his retirement from the Van Dorn & Dutton Company Mr. Dutton took up his residence in St. Augustine. He recently returned North and underwent an operation at the Lakeside Hospital, Cleveland, and returned to the South about six weeks ago apparently greatly improved. His death followed a second operation performed at St. Augustine on March 14. Mr. Dutton was sixty years of age and is survived by his widow and one daughter.

James Sheldon Cummins, one of the original partners of H. M. Byllesby & Company, Chicago, Ill., and continuously and closely associated with the firm for many years, died in Chicago on March 25, 1914. Mr. Cummins was the senior member of the law firm of Cummins, Stearns & Milkewitch and vice-president, director and senior counsel of H. M. Byllesby & Company. He was also a director and officer in a number of public utility companies. He was born on March 22, 1857, in Upper Province Township, Delaware County, Pa., and was educated at Swarthmore College. He was admitted to the Pennsylvania bar in 1882 and practised law at Media, Pa., where he was married in February, 1889, to Alice Charlotte Byllesby, the daughter of Rev. DeWitt Clinton Byllesby. In 1891 Mr. Cummins was appointed counsel for the Thomson-Houston Electric Company in Chicago and continued with that company until it was consolidated with the General Electric Company in 1893, after which date he served the latter company in a similar capacity.

H. C. Patterson, formerly mechanical and electrical engineer of the Illinois Traction System, Peoria, Ill., and recently engaged in consulting engineer work, died at his home in Decatur, Ill., on March 13, 1914. Mr. Patterson had been actively engaged in the mechanical, electrical and hydraulic engineering work since 1880, at which time he became connected with the engineering department of the New York Edison Company. In 1882 he was sent to Europe by the Edison interests to assist in constructing the first lighting stations there. In 1883 he became connected with the sales department of the Brush Electric Company, Cleveland, Ohio, and in 1885 entered the employ of the engineering department of the Thomson-Houston Company, Boston, where he organized the engineering department and subsequently was appointed chief engineer of the company. When the Thomson-Houston Company was succeeded by the General Electric Company, Mr. Patterson continued with that company and engaged in the construction and design of more than seventy-five railway and lighting plants. About 1895 Mr. Patterson was appointed receiver of the Consolidated Lighting Company, Dover, N. H. From 1896 to 1902 he was manager of the municipal lighting and water plant of Austin, Tex., and from 1902 to 1909 he engaged in consulting engineering work with offices in Boston. In 1909 Mr. Patterson was appointed mechanical and electrical engineer of the Illinois Traction system, which position he held for two years, resigning to engage in consulting engineering work.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mississippi Electric Railway, Columbus, Miss.**—Incorporated in Mississippi to build an electric railway. Capital stock, $5,000,000. Incorporators: Charles F. Sherrod, F. W. Crosby, G. T. Banks, and others.

***Carbon & Stillwater Electric Railway, Red Lodge, Mont.**—Incorporated in Montana to build a 40-mile interurban electric railway between Red Lodge and Columbus. Capital stock, $750,000. Incorporators: William Larkin, Red Lodge; James Herington, Stillwater; W. H. Reber, Absarokee; O. O. Anderson, West Rosebud; L. C. Piper, East Rosebud; C. W. Selleck, Roscoe; John Shaw, Luther; Thomas Hogan, A. N. Whittington, E. D. Draper and Marcus McKay.

FRANCHISES

Birmingham, Ala.—The Birmingham, Ensley & Bessemer Electric Railway has received a franchise from the Council in Birmingham.

Santa Clara, Cal.—The Peninsula Railway, San José, has asked the Council for a three months' extension of time on its franchise on Saratoga Avenue in Santa Clara.

Jacksonville, Fla.—Following a protest from property owners of South Jacksonville, the City Council has passed an amendment to the franchise changing the route of the proposed new line from Myrtle Avenue to Hendricks Avenue. The original franchise was granted to Thomas R. Osmond, representing the Jacksonville & St. Augustine Public Service Corporation. [E. R. J., Jan. 3, '14.]

Atlanta, Ga.—The Georgia Railway & Power Company has received a franchise from the Council in Atlanta to build a loop for its College Park line in Alabama Street, and also to extend its tracks into Butler Street for its suburban express station. The franchise for the Alabama Street extension was granted for an indeterminate period, and the Butler Street franchise was made a part of the Gilmer Street franchise, which is for a period of thirty-nine years.

East St. Louis, Ill.—The receivers of the Southern Traction Company, an interurban line which it is planned will extend from St. Louis into southern Illinois, will accept a modification of the fifty-year loop franchise. The company has a permit to enter St. Louis over the municipal bridge and a fifty-year franchise for a downtown loop.

Keokuk, Ia.—The Keokuk Electric Railway has received a franchise to extend its lines in Keokuk along McKinley Avenue to the baseball park, a distance of 1 mile.

Pascagoula, Miss.—The Pascagoula Street Railway has received a twenty-five-year extension of time on its franchise in Pascagoula.

Kansas City, Mo.—Among the ordinances passed by the Council that will go to Mayor Jost at once for his approval are the two authorizing the Metropolitan Street Railway to lay tracks in Broadway from Fourteenth Street to Southwest Boulevard and in Twenty-fourth Street, from Broadway to Main Street, to provide street car facilities to the new union passenger station from the west and southwest sections of Kansas City.

Cleveland, Ohio.—The Lake Shore Electric Railway has asked the Council for an extension of time on its franchise in Cleveland and for an extension of its lines to the Public Square.

Dayton, Ohio.—The Dayton & Troy Electric Railway has asked the Council for an extension of twenty years on its franchise in Dayton. In its new application the company agrees to pave within its tracks if it obtains the extension asked.

Sharon, Ohio.—The Valley Street Railway, Lemoyne, Pa., has asked the Council for a franchise for an extension over the East Hill in Sharon.

Sarnia, Ont.—The Sarnia Street Railway has asked the Council for a franchise to extend its lines in Sarnia.

New Hope, Pa.—The Bucks County Electric Railway has asked the Council for a franchise for an extension on North Main Street in New Hope.

TRACK AND ROADWAY

Northwest Arkansas Railway, Bentonville, Ark.—Plans are being made by this company to finance the interurban line to connect Bentonville and Rogers. The company has leased the branch line of the St. Louis-San Francisco Railroad from Rogers to Grove, Okla. C. E. McClure, president.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to extend its line from Pomona into the Chino district and into Corona, where it will complete a loop which will include San Bernardino, Riverside, Corona, Chino, Pomona, Ontario and towns west. It is stated that the Chino extension is under consideration, as is also a direct line between Ontario and Pomona. Work has been begun by the company on the construction of new cement bridges on its line between Arlington and Corona. This company has placed in operation its new Riverside-Bloomington-Rialto extension.

San Diego (Cal.) Electric Railway.—All sections of track construction, additions of equipment and general improvements on this company's lines in San Diego and in Balboa Park will cost about $1,500,000 and will be completed within a year. New work just begun is the re-railing and ballasting of the Fifth Street line. Grading has been begun in Balboa Park for the new park line. In connection with the new park line a loop encircling thirty-six blocks of the business district will be constructed. This will be double-track and 114-lb. rails will be used. The Adams Avenue line from Mission Cliff Park to Kensington Park bridge will be double-tracked.

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has awarded a contract to H. S. Tittle for the concrete poles for the Van Ness Avenue line and the contract for furnishing underground conduit materials was awarded to Pierson, Roeding & Company.

***San Francisco, Cal.**—Plans are being considered for the private construction of an electric railway to Hunter's Point to connect with the projected Potrero extension of the Municipal Railway and to be operated by the syndicate of capitalists. It is planned to build a line about 1½ miles long from Hunter's Point to the Twenty-fifth Street terminal of the municipal line, and to turn the line over to the city for operation as a part of the Municipal Railway. It will run principally over a private right-of-way. Among those interested are A. Schilling, H. T. McCloskey, C. O. Miller, F. W. Van Sicklen and F. Morgan.

Groton & Stonington Street Railroad, New London, Conn.—Plans for the improvements of this company's lines include the expenditure of $50,000. New ties will be laid all the way from Groton to Westerly. There are also contemplated improvements in reducing several of the sharper curves along the route.

St. John's Electric Company, St. Augustine, Fla.—This company is asked to consider plans to extend its line north from its present terminus at the north end of the city.

Alton, Granite & St. Louis Traction Company, Alton, Ill.—Engineers of this company and the Chicago & Alton Railroad are making plans to build an electric railway under the Chicago & Alton Railroad tracks at Upper Alton. Each company will bear part of the expense, which will be about $70,000. The crossing will permit the extension of the traction company to the new asylum.

Southern Illinois & St. Louis Railway Company, Chicago, Ill.—W. H. Schott, president of this company, announces that financial arrangements for the construction of this new line have been made through the F. R. McMullin & Company, Chicago. This new line is an extension of the Southern Illinois Railway & Power Company's line between Eldorado and Carrier Mills in Saline County, Ill. The extension will include approximately 60 miles connecting Harrisburg, Johnson City, Marion, Benton, Herrin and West Frankfort. Franchises have been secured by this new company in all the cities mentioned, and the contract for grading the first 25-mile section out of Harrisburg has been let to M. C. Connors & Company, Chicago. [E. R. J., March 7, '14.]

Indianapolis & Frankfort Railroad, Indianapolis, Ind.—This company states that its proposed 55-mile line between Indianapolis and Frankfort will not be operated as an electric railway. J. J. Turner, president, Philadelphia, Pa.

Tri-City Railway, Davenport, Ia.—To spend $20,000 in rebuilding the old Rockingham line from the Davenport Locomotive Works to Elsie Avenue, a distance of 1 mile, is planned by this company. The improvements will consist of paving the track and laying new rails where it is required. The construction of the new line to Bettendorf will begin about the middle of April. The rails for this extension will be ordered at once.

Keokuk (Ia.) Electric Company.—An extension of its McKinley Avenue line through Rand Park and out to the new baseball park in Keokuk is being planned by this company.

Kansas City, Kaw Valley & Western Electric Railway, Bonner Springs, Kan.—Appraisers for this railway filed their report with the Wyandotte County officials recently, completing the right-of-way work on the line between Kansas City, Mo., and Bonner Springs, Kan. The line will enter Kansas City, Kan., over the right-of-way of the Kansas City, Mexico & Oriental Railway, later connecting with the Metropolitan Street Railway's tracks at Central Avenue. It will gain entrance to Kansas City, Mo., over the Metropolitan's tracks.

***Garden City, Kan.**—Officials of the United States Sugar & Land Company have announced that the company will build an interurban electric line to connect its numerous irrigated ranches. The company is installing a large electric power plant.

Anthony & Northern Railway, Hutchinson, Kan.—Plans are being made by this company to extend its line from the present terminus north of Pratt to Larned. This is part of a plan to build a line from Anthony northwest to Pratt, Larned, Lacrosse, Hays City, Stockton and Smith Center to Hastings, Neb. R. A. Cox, Hutchinson, is interested. [E. R. J., Dec. 21, '13.]

***Hutchinson, Kan.**—Plans are being considered to build an electric railway from Hutchinson through the Arkansas Valley, via Kingsley and Larned, to Dodge City. Among those who are interested in the project are Levi S. Smith, Larned; E. E. Frizell and the Hutchinson Commercial Club, Hutchinson.

Frontenac, Mulberry & Arcadia Electric Railway, Pittsburg, Kan.—More than $20,000 in stock has been subscribed to build this 15-mile electric railway to connect Frontenac, Mulberry, Arcadia and Pittsburg. J. S. Patton, Pittsburg, president. [E. R. J., Feb. 14, '14.]

Topeka (Kan.) Railway.—This company has been asked to co-operate with the municipal authorities in a plan for parking the space between the street-car tracks on several thoroughfares. The plan was outlined recently by C. M. Robinson, city expert, and approved by the commercial club and other organizations. The proposed improvements, except on Kansas Avenue, the chief business street, will be made when it is necessary to repave the thoroughfares, according to the plans. Among the streets included in the plans are Harrison, Van Buren, Topeka Avenue, Quincy, Monroe and others.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—Surveys have been completed by this company for its line between Paducah and Henderson, Ky. Surveys have also been completed for a line to Cairo and another line to Hickman, Ky. The company intends to enter into an agreement with the officers of the Illinois Traction System to build a bridge over the Mississippi River at Cairo. E. F. Wheaton, general maanger. [E. R. J., Feb. 3, '12.]

Bay State Street Railway, Boston, Mass.—Final plans for the general track work during the year have been shown to the Council by this company. These plans include a number of propositions, among which are the double-tracking of Chestnut Street from Essex Street to Wenuchus Square and on Chatham Street from Essex Street to Maple Street in Boston.

Worcester (Mass.) Consolidated Street Railway.—This company is asked to consider plans to extend its Clinton & Fitchburg tracks in Lincoln Street across the lake at the old Lincoln Street bridge and construct a new line in North Quinsigamond Avenue, on the east shore of the lake, that would join the present line at the Causeway.

Michigan & Chicago Railway, Lansing, Mich.—The State Railroad Commission has authorized this company to change its name to the Michigan Railway Company. The company plans to build an electric line which will eventually circle the State. [E. R. J., Dec. 13, '14.]

Helena, Mo.—Preliminary surveys are being made to build an electric line from St. Joseph to Pattonsburg. J. H. Kimmet, Helena, is interested. [E. R. J., Jan. 31, '14.]

Big Horn Canyon Irrigation & Power Company, Billings, Mont.—Arrangements are being made by this company to begin work soon on its electric railway from Custer on the Northern Pacific Railway to Hardin. Power will be generated by a dam in Big Horn Canyon. It will also furnish power for lighting purposes. Capital stock authorized, $5,000,000. Capital stock issued, $500,000. Officers: J. J. Harris, Hardin, president; A. Becker, Hardin, vice-president; Edward Lawlor, Hardin, secretary and treasurer, and B. C. Lillis, Billlings, general manager and chief engineer. [E. R. J., March 7, '14.]

Omaha & Lincoln Railway & Light Company, Lincoln, Neb.—Plans are being made by this company to extend its lines beyond Papillion and into Lincoln.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—During the next two weeks this company will award contracts to relay some of its tracks and have some special work done on its lines in Elmira.

Kingston (N. Y.) Consolidated Railroad.—This company has awarded a contract to Fred T. Ley & Company, Kingston, to reconstruct 2500 ft. of track in Kingston.

Third Avenue Railway, New York, N. Y.—Work has been begun by this company for the extension of the elevated railway to White Plains Avenue and 241st Street in New York City.

Durham (N. C.) Traction Company.—This company is asked to consider plans to extend its lines in Durham from the present terminus on Mangum Street to the Eno River.

Northern Ohio Traction & Light Company, Akron, Ohio.—Plans are being considered by this company and the Stark County Commissioners to build a broad paved highway between Canton and Massillon, a distance of 8 miles, and to operate a ten-minute street-car schedule over the road.

Cleveland, Alliance & Mahoning Valley Railway, Cleveland, Ohio.—A contract has been awarded by this company to Elmer Morgan for grading the line between Leavittsburg and Newton Falls. [E. R. J., Feb. 14, '14.]

Cleveland (Ohio) Railway.—This company will be enabled to make contemplated extensions and improvements as the result of the approval by the State Public Utilities Commission of a stock issue of $2,141,100. Among the principal extensions contemplated are for a cross-town line in East Eighty-second Street, Broad Avenue and East Seventy-ninth Street, and for a cross-town line in East Thirtieth Street from St. Clair Avenue to Woodland Avenue in Cleveland.

Tri-State Traction Company, Steubenville, Ohio.—Plans are being made by this company to begin work soon on its 17-mile extension south from Warsaw.

Choctaw Railway & Light Company, McAlester, Okla.—This company has decided to extend its Second Ward line in McAlester to connect with the McAlester Country Club, a distance of 1 mile.

***Fort William, Ont.**—The owners of property lying along Victoria Avenue West and the western boundary of Fort William have offered to build an electric railway in that section and turn it over to the city complete, provided the city will give some specified service over the branch.

Guelph, Ont.—The City Council of Guelph has passed a resolution which will be presented to the Hydro-Electric Commission asking for an investigation into the cost of equipment and operation of a line from Guelph to Orangeville via Hillsburg and Erin.

Ottawa, Ont.—The government is considering a subsidy to the Ottawa & St. Lawrence Railway for a line passing the rifle ranges. Work is to begin this spring.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—This company is asked to consider plans to double-track Bedford Street within the village limits of Sandwich.

Conestoga Traction Company, Lancaster, Pa.—Plans are being made by this company to extend its lines in Lancaster.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—During the year this company plans to build 6 miles of new track between Ellwood and Beaver Valley.

Hull (Que.) Electric Railway.—The following extensions are proposed by this company: double-tracking Laurier Avenue, Youville to Reboul Street and Reboul Street to Brewery Creek; also the construction of a branch line to Notre Dame Cemetery in Hull.

Valleyfield (Que.) Waterpower Company.—This company, which has been incorporated under the Quebec companies act, is applying to the Canadian Parliament for authority to build the following railways, to be operated by electricity: From Salabery to Valleyfield southwesterly across the counties of Beauharnois and Huntingdon, along Lake St. Francis to the provincial boundary; from the same starting point southwesterly across the counties of Beauharnois, Chateauguay and Huntingdon to the international boundary, and from the same starting point northeasterly, crossing the St. Lawrence River and across the counties of Soulanges and Vaudreuil, to the Lake of Two Mountains. [E. R. J., Dec. 6, '13.]

***Big Rock, Tenn.**—A plan to connect the towns of Big Rock, Weaver's Store, Lafayette, New Providence and Clarksville, Tenn., by an electric interurban line is being considered by the citizens in that section. Mayor Martin of Big Rock is interested.

Memphis (Tenn.) Street Railway.—Representatives of this company, with city officials and representatives of the Southern Railway, have signed a contract for the immediate construction of a reinforced concrete overhead bridge at the Madison Avenue crossing of the Southern Railway.

Texas Traction Company, Dallas, Tex.—Extensive improvements are being made by this company to its local lines in Denison. New poles are being placed and the tracks have been overhauled. Between Denison and Sherman new ties are being placed and the roadbed improved.

Southwestern Traction Company, Temple, Tex.—Plans are being made by this company to extend its lines from Temple to Waco and from Temple to Austin.

Seattle, Wash.—The city engineering department, the office of the superintendent of public utilities, Councilman Erickson and the city utilities committee of the City Council are working on the proposed extensions and enlargement of municipally owned and operated lines in Seattle. The engineering department is working out the most feasible routes and the office of the superintendent of public utilities and the Council committees are framing an ordinance that will permit of the sale of sufficient bonds to begin actual construction. As proposed, the first extension will begin at Third Avenue and Stewart Street and extend to the Latona bridge, where four lines will branch out into different portions of the city.

Tacoma, Wash.—A contract between the city of Tacoma and the Puget Sound Traction, Light & Power Company for the operation of a municipally owned electric line to the tideflats has been signed by Mayor Seymour and L. H. Bean, for the company. The city will issue bonds to the amount of $25,000 for the construction of the new line. Work cannot be begun until the bonds are sold. [E. R. J., Jan. 31, '14.]

Baraboo, Devil's Lake & Western Railway, Madison, Wis.—Preliminary arrangements are being made by this company to build its electric line to connect Cashton, Ontario, Baraboo, Portage, Plain and Kilbourn. It is planned to purchase power. Capital stock authorized, $100,000. Officers: T. F. Risley, Baraboo, president; F. J. Effinger, Baraboo, vice-president; George W. Brunschweiler, secretary, and William E. Rowlands, Baraboo, treasurer. [E. R. J., March 7, '14.]

Janesville & Madison Traction Company, Madison, Wis.—Preliminary arrangements are being made by this company to begin work this summer on its 36-mile line to connect Janesville, Indian Ford, Edgerton, Albion, Stoughton and Madison. The company plans to do its own work. Its repair shops will be at East Madison and it will operate four cars. Officers: G. Pickhardt, Madison, president, general manager and purchasing agent; William Peper, Madison, vice-president; Frank W. Weston, Madison, secretary; C. B. Antill, Janesville, Wis., superintendent. [E. R. J., March 7, '14.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has purchased 20 acres in the industrial district of El Segundo for the purpose of constructing storage yards. Plans are being made to begin work at once on its new depot in El Segundo.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—This company has made known its plan to establish its permanent office building at Twenty-second and Grove Streets in Oakland. The present depot is to be moved to some convenient spot near by. Work will begin on the new structure immediately.

San Diego (Cal.) Electric Railway.—Work has been begun by this company on its new carhouse on Adams Avenue in San Diego. The structure is of concrete and brick construction and will have a capacity of 125 cars. The cost is estimated to be about $125,000.

Rock Island Southern Railroad, Monmouth, Ill.—This company has moved its general office from Monmouth to Rock Island.

Illinois Traction System, Peoria, Ill.—Work will be begun at once by this company on its seven-story office building on the site of the old National Hotel in Peoria. The cost is estimated to be about $350,000.

Metropolitan Street Railway, Kansas City, Mo.—The formal opening of the new division headquarters at Ninth and Brighton Streets will be held by this company about April 1. The new structure, two stories in height, represents an expenditure of $10,000.

Brooklyn (N. Y.) Rapid Transit Company.—This company is asked to consider plans to build a new passenger station on the Myrtle Avenue elevated line at Cumberland Street, Brooklyn.

Springfield (Ohio) Railway.—Plans have been completed by this company for its new carhouses and repair shops to be built at Clifton Street and East Street in Springfield. The buildings will be of steel frame with concrete foundation, 9-in. exterior walls and concrete roof.

POWER HOUSES AND SUBSTATIONS

San Diego (Cal.) Electric Railway.—Improvements are being planned by this company at the power plant at Broadway and Arctic Street. These improvements include new boilers, boiler-feed pumps, salt-water circulating pumps and an extension of the salt-water circulating system to the foot of E Street.

Kansas City, Kaw Valley & Western Electric Railway, Bonner Springs, Kan.—This company has closed an agreement whereby it will receive power from the municipal light plant at Kansas City, Kan. The electric line will spend $25,000 in making necessary installations of transformers. The railway will pay about $1,000 a year for power.

Public Service Railway, Newark, N. J.—This company expects to add a new 3000-hp unit to its Marion power station, which will include boiler and generator equipment.

Guelph (Ont.) Radial Railway.—Bids are being received by this company for alterations to its power house in Guelph.

Tennessee Railway, Light & Power Company, Memphis, Tenn.—E. W. Clark & Company, Philadelphia, managers of the Tennessee Railway, Light & Power Company, announce that the Tennessee Power Company, the principal generating subsidiary, has begun delivery of current from its development No. 2 on the Ocoee River to the plant of the Aluminum Company at Maryville, Tenn., a distance of 63 miles. The contract calls for about 20,000 hp annually and the minimum annual return will be $225,000.

Charlottesville & Albemarle Railway, Charlottesville, Va.—During the next four months this company will award contracts to build a new substation in Charlottesville. It will purchase a new rotary converter with a capacity of 200 kw or 250 kw.

Manufactures and Supplies

ROLLING STOCK

Waterbury & Milldale Tramway, Waterbury, Conn., expects to purchase two cars.

Washington-Virginia Railway, Washington, D. C., has ordered five cars from the Southern Car Company.

Homestead & Mifflin Street Railway, Homestead, Pa., expects to purchase during the next few weeks one closed car.

Waupaca Electric Light & Railway Company, Waupaca, Wis., expects to purchase from two to ten coal cars, side-dump.

Dayton, Covington & Piqua Traction Company, West Milton, Ohio, expects to purchase two passenger trailers for interurban service.

Birmingham, Ensley & Bessemer Electric Railway, Birmingham, Ala., is reported as expecting to purchase eight pay-as-you-enter cars.

Memphis (Tenn.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as having issued specifications for twenty-five cars, has ordered twenty-five motor cars and ten trailers from The J. G. Brill Company.

Jefferson Traction Company, Punxsutawney, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, as expecting to purchase one combination double-truck car, has purchased one double-truck combination passenger and baggage interurban car from the G. C. Kuhlman Car Company and two single-truck city cars from The J. G. Brill Company.

Electric Short Line Railway, Minneapolis, Minn., noted in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, as expecting to purchase several gasoline-electric cars, has appropriated $268,000 for rolling-stock equipment, and has placed orders for four all-steel 73-ft. General Electric gasoline-electric cars and two 80-ton engines for construction work, costing $120,000; fourteen 60-ft. trailers, $10,000, and twenty-eight 40-ft. flat cars, $38,000.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, as having ordered six interurban cars from the Preston Car & Coach Company, has specified the following details for these cars:

Seating capacity	66
Weight of car body,	37,000 lb.
Bolster centers	33 ft.
Length of body	46 ft.
Over vestibule	56 ft. 6 in.
Width over all	9 ft. 1½ in.
Body	combination
Underframe	steel
Air brakes	West.
Axles	Jones & Laughlin
Bumpers	anti-climber
Control	Gen. Elec.—Type M
Couplers,	Ohio Brass automatic
Curtain material	Pantasote
Destination signs,	Elec, Serv. Sup. Co.
Gongs,	Elec. Serv. Sup. Co.
Hand brakes	Ackley
Heaters	Peter Smith
Headlights	Crouse-Hinds
Motors	G.E.-233
Registers	International
Trucks	Taylor
Ventilators	Automatic
Wheels	steel-tired

TRADE NOTES

Norma Company of America, New York, N. Y., maker of ball, roller, thrust and combination bearings, announces the removal of its offices, on April 11, from 20-24 Vesey Street to 1790 Broadway.

Allen Bradley, Milwaukee, Wis., announces the removal of its Chicago representative, Frank L. Gohl, from his old quarters at 540 Commercial National Bank Building to 307 Webster Building, 327 La Salle Street, Chicago, Ill.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., at a meeting on March 25, 1914, elected James N. Wallace, president of the Central Trust Company, New York, N. Y., and H. H. Westinghouse directors of the company to succeed Thomas W. Lamont and George Westinghouse.

Weston Electrical Instrument Company, Newark, N. J., has appointed Edwin Wortham, sales agent for the Bristol Company, as district representative of the Weston Electrical Instrument Company for the states of Virginia, West Virginia and North Carolina, with offices at Suite 38, Allison Building, Richmond, Va.

Niles Car & Manufacturing Company, Cleveland, Ohio, has appointed J. A. Hanna, for several years sales manager at the general sales office, 312 Electric Building, Cleveland, Ohio, as vice-president also. Mr. Hanna in April will move his office to the Niles Car Works, Niles, Ohio, in order to be in closer touch with the work.

Henry R. Kent & Company, New York, N. Y., is the title of a new firm of engineers which has opened offices at 141 Broadway. The members of the firm are Henry R. Kent and Carl M. Vail, both for a long time connected with Westinghouse, Church, Kerr & Company. The firm will do a general engineering business.

W. W. Cole, New York, N. Y., consulting engineer, formerly with Day & Zimmerman, engineers, Philadelphia, Pa., has opened an office at 43 Exchange Place, New York, N. Y., for the practice of a general consulting engineering business, including investigation and reports of public utilities, industrial companies and advising in regard to reorganization and economic operation of railroads. Mr. Cole's first work was in the position of constructing engineer for George H. Norman, of Boston, and the New England Construction Company. Subsequently Mr. Cole became connected with the Toledo, St. Louis & Kansas City Railroad as constructing engineer. Later he became superintendent of the electrical installation of the Allston division of the West End Street Railway, Boston, Mass. After completing this work Mr. Cole became manager of the Utica (N. Y.) Belt Line. From Utica he went to Elmira and constructed the West Side Railroad. He became vice-president of the Utica Water, Light & Railroad Company. In 1908 Mr. Cole was appointed general manager of the public utilities department of Dodge & Day, engineers, Philadelphia, Pa. His next position was as general manager of the Citizens' Traction Company, Oil City, Pa. A short while ago Mr. Cole became connected with Day & Zimmerman and his time was divided largely between the New York and Philadelphia offices of this company.

Union Switch & Signal Company, Swissvale, Pa., at a meeting of its directors on March 18 elected H. G. Prout president, succeeding the late George Westinghouse. Mr. Prout graduated from the University of Michigan in 1871. In 1873 he served as major of engineers and later colonel of the general staff in the army of the Khedive of Egypt. He commanded an expedition in the Soudan and was governor of the Provinces of the Equator. After this service he became editor of the *Railroad Gazette*, which position he held for sixteen years. In 1903 he was appointed vice-president and general manager, acting in this capacity until his recent appointment as president. This company lately has received a contract for the installation of 70 miles of automatic block signaling on the Kansas City, Clay County & St. Joseph Railroad. The territory to be signaled is single track, with twenty-five sidings, extending from Kansas City to St. Joseph, and Kansas City to Excelsior Springs. A total of fifty one-arm Style B semaphores will be employed at sidings, and fifty one-way Model 13 light signals intermediate to the sidings. The T. D. B. system of signaling, similar to that installed on the Chicago, Lake Shore & South Bend Railway; the Chicago, South Bend & Northern Indiana Railway; the Indianapolis, Columbus & Southern Traction Company; the Ohio Electric Railway; the Louisville & Northern Railroad, and the Scranton & Binghamton Railway, as described in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, will be used. Alternating current at 2200 volts, 25 cycles, will be transmitted throughout the signaled territory and stepped down to 110 volts for operating the various units and feeding the track circuit transformers. A new feature to be undertaken in this work is the lighting of all switch stands and stations from the a.c. signaling mains.

ADVERTISING LITERATURE

S. K. F. Ball Bearing Company, New York, N. Y., has issued a catalog describing its ball bearings for railway lighting generators.

Allen-Bradley Company, Milwaukee, Wis., has issued Bulletin No. 541 describing its Type H resistance starting switch for a.c. induction motors. Graphite compression resistance is used.

S. Freeman & Sons Manufacturing Company, Racine, Wis., has issued a catalog describing and illustrating its high-power steam boilers of the horizontal return tubular, Scotch marine, internally fired and water-tube type.

Allgemeine Elektricitäts Gesellschaft, Berlin, Germany, has issued a series of catalogs describing its meter factory, the construction of its meters, rheostats, starting controllers and electrically driven clocks.

H. W. Johns-Manville Company, New York, N. Y., prints in the *J-M Power Expert* for March, 1914, an illustration of a new 192-ft. steel stack, lined with 2-in. vitribestos, recently built for a power station of the Toledo Railway & Light Company.

G. A. Wood Preserver Company, St. Louis, Mo., has issued a circular containing two testimonial letters from Edward F. Tyler, general superintendent Greenville Traction Company. In 1905 three barrels of wood preserver were used for treating ties on this railway. Five years later, in 1910, the ties were found to be in perfect state of preservation. A re-examination about a month ago showed the nine-year-old treated ties to be in apparently as good condition as when inspected in 1905.

H. M. Byllesby & Company, Chicago, Ill., have issued circular cards illustrating hydroelectric developments at Taylor's Falls, Rapidan, Coon Rapids and Cannon Falls, owned by the Consumers' Power Company, which in turn is controlled by H. M. Byllesby & Company. The Coon Rapids development on the Mississippi River is planned for completion in 1914. The dam was finished Jan. 7. It will have an initial installation of 10,500 electrical hp in five units, operating under an average 17½-ft. head. The ultimate capacity is 15,000 hp. Power derived will be used in Minneapolis and St. Paul. The entire structure has a total length of 2070 ft., with a solid concrete spillway dam 1000 ft. long, to be surmounted by 28 Tainter gates, each 33 ft. long and 8 ft. high.

NEW PUBLICATIONS

Les Surtensions. (Maintenance of High-Grade Tension Lines.) By I. Van Dam. Paper, 268 pages. Librairie Gauthier-Villars, Paris. 12.5 francs ($2.50).

This book is devoted exclusively to problems which arise in the operation of high-tension lines and describes the construction and utility of the various protective devices used in connection with them. The author calls attention to the remarkable progress made in high-tension transmission in America and states that his countrymen are now proposing a 120,000-volt line to transmit electrical energy to Paris from falls on the upper Rhone. Among the topics considered in this book are corona phenomena, high-tension insulators, self-induction and capacity of aerial and underground lines, resonance, causes of line disturbances, forms of conductors, factors of safety, specifications, etc. Lightning protection receives extended treatment.

Die Eisenbahn-Technik der Gegenwart-Fahrzeuge für Elektrische Eisenbahnen. (Electric Rolling Stock.) By E. C. Zehme, Berlin, 235 pages, illustrated. C. W. Kreidel, Wiesbaden, Germany. Paper, 10 marks ($2.50).

This volume is the fourth in a series being prepared by experts to cover the entire field of railroading. The present one is Section E of the fourth volume and deals with electric railway rolling stock. Dr. Zehme did not confine himself to European practices in this work, as he has included many descriptions of designs and constructions followed in the United States and, particularly, in heavier multiple-unit and locomotive work. The book itself describes the theory of design and construction of direct-current and alternating-current traction motors and their systems of control. This is followed by a description of other devices, such as current collectors, resistances, transformers, compressors, lighting and heating equipment, etc. The second division of the volume takes up the mechanical features of rolling stock, such as truck and body. An unusual but extremely interesting section is the discussion on the conditions which fix the capacity and size of the various electrical features of the car. The last section is devoted to descriptions of cars built for various classes of service, such as the underground lines of London and New York, and to features of electric locomotive design.

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ARBITRATION VERSUS STRIKES

From the report just issued by the Amalgamated Association it appears that in the six months ending with December last there were eleven strikes and lockouts, involving 1723 members of the association. In the same period there were fifteen arbitrations of disputes in which 23,000 members were interested. Aside from the obvious conclusion to be drawn from these figures as to the extent that arbitration has superseded strikes, the comment of the association's officers thereon is of interest. "A study of the arbitration cases," the report says, "points to the fact that arbitration, as a general proposition, effects a compromise with results about evenly divided, although the record of arbitration cases for the six months rather favors the employing companies. But arbitration is known to be supported by public opinion, and it would be suicidal for this association, the members of which are engaged in public utility employment, to refuse arbitration in any cases where a fair method of arbitration is possible." The report states that the association now has 188 written agreements with electric railway companies.

THE "MOVIES" FOR ELECTRIC RAILWAYS

The increasing use of the moving-picture film in electric railway educational and safety work shows the alertness and wisdom of managers in utilizing a popular agency for doing a much-needed work. It is a trite saying, but one worthy of constant application, that the surest entrance to the intelligence is through the "eye-gate." The moving picture provides the vehicle for conveying vivid impressions by way of this entrance. Let us note the following salient facts. The moving-picture film is expensive, but the apparatus for projecting the pictures is comparatively cheap. The needs of one railway company are akin to those of another, and a picture which teaches a safety or other lesson in one place can do the same thing in another. The moving-picture theaters use films in circuits, thereby cutting down the expense of exhibitions and preventing the accumulation of unusable films. Why is there not a suggestion here for our business also? A central agency could have scenes "staged" and films printed for circulation at nominal cost among subscribers. The money now being spent by individual companies for films is probably nearly enough to finance the proposition. Why not get together now before any money has been wasted through duplication of initial expense? The office of the American Electric Railway Association would be the natural and most efficient clearing house for this work, and a special committee of men already active in this line could take the initiative and plan the campaign.

WHY ADHERE TO THE MONITOR-DECK ROOF?

In this age of crass materialism it might perhaps seem unnecessary to decry any efforts made toward the perpetuation of artistic effect and inherent grace of outline. Nevertheless we feel constrained to side with the open advocates of the exclusive use of arched roofs for street cars even though this course may be fraught with danger to higher ideals. That the monitor-deck roof has held its own in the affections of many street railway men during the past few years is evidence that all are not devoid of the desire for beauty in car design. At least this is the reason given, in nine cases out of ten, for the retention on new cars, notwithstanding its greater cost and weight, of the monitor roof, the estimates varying from $50 and 200 lb. to $100 and 500 lb. per car—to say nothing of its cost of maintenance. In the tenth instance the reason given by a railway for adhering to the monitor-deck roof will be the supposititious lack of ventilation in arched-roof cars, but as it will often be found on the same railway that the cars are provided with ventilators in the monitor and that the deck sashes are fixed in place, this reason can hardly be taken very seriously. As a matter of fact, there was every reason for the monitor-deck roof in the days before the development of the ventilator. Now, when there are many thoroughly practical ventilating devices on the market, the reason for its existence has become limited to the fact that its appearance, through habit, is less offensive than that of the plain arch. To adhere to it on such grounds is no more logical than to condemn the small wheel for city cars because it looks insignificant.

THE SMALL WHEEL COMING INTO ITS OWN

It is encouraging to find the small car wheel growing rapidly in favor, for there is available in car design hardly any better means for economy than its use. Its practicability has been demonstrated beyond a doubt, and its sponsor, P. N. Jones of the Pittsburgh Railways, is even now extending its use to high-speed service on one of the company's interurban lines. The saving in weight with small wheels and trucks and with motors to suit, approximates 2500 lb. per car over the lightest kind of two-motor equipment, and if the assumption is accepted that unnecessary weight on cars costs 5 cents per pound per year this would practically pay the interest charges on the investment for the new features of the equipment. Under the new conditions the old question as to the relative advantages of a 32-in. rolled-steel wheel with a light rim that is not turned, and of the 34-in. wheel that is turned three or more times, loses much of its interest. Indeed, the greatest advantage of the 22-in. or 24-in. wheel, as we have pointed out before, is due to the fact that it permits a reduction in the height of car floor to the point where it can be reached with two easy steps. The indirect result of this is that passenger movement is accelerated, accidents are reduced and complaints are lessened, so that the benefits, when summarized, extend far beyond the immediate savings that can be directly computed. The "baby" motors necessitated by the small wheels have long since passed out of the experimental stage as they are no longer the product of but one manufacturer and hundreds of them are in successful operation. In the light of these facts it is not surprising that the progressive properties are taking advantage of the opportunity for economy which has become available, at least for all new cars.

TOLEDO FIGHT BECOMES A FARCE A situation at Toledo which might easily have become very serious has been turned into a farce by the good judgment displayed by the company in dealing with the fare complication. An attempt of the city to impose a flat 3-cent fare on the company upon the expiration of franchises on March 27 was met by an announcement that this was not in accord with the agreement and would be disregarded. It was also definitely announced that passengers tendering 3-cent fares in other than the "workingmen's hours," for which this fare now prevails with the consent of the company, would be carried free. The novel idea of free car rides naturally attracted much public attention. The records of the company show that each day a majority of the riders have paid the regular fares. Only a minority have taken advantage of the situation. The proportion of the total riders who traveled free under the offer of the company has decreased materially. This is a clear indication that the people of Toledo are not in sympathy with the effort of the politicians to force a settlement without regard for the decencies of fair play. The policies of the company in handling the delicate situation created by the crisis of expired franchises were at once masterful and conservative. They could not provoke conflict. They were notice to the effect that if conflict came it would have to be precipitated by the opposing side. No one can find any sane ground for a quarrel with a company that offers free rides to passengers who will not pay its regular rates of fare. The position of the company is that it has a legal and a moral right to certain agreed rates of fare. It tries by argument and persuasion, through meetings, newspaper advertisements, posters in the cars, as well as through its conductors, to lead people to accept its point of view. If the people will not do so, they are the guests of the company for the ride. It is a notable experiment that is being made in Toledo. We do not recollect an instance of a similar one. In making it Mr. Doherty plainly and frankly counted on the sense of justice that he believed would prevail when the people understood the facts. He has shown that the 3-cent fare is not adequate in Toledo. If the long-standing, discreditable franchise imbroglio in Toledo is settled on lines that are fair to each interest concerned such a result will undoubtedly help the industrial reputation of the city. It is greatly to be hoped that a fair settlement will be the final outcome of the extraordinary events of the last week.

FARE INEQUALITIES AT BOSTON

The report of the Boston joint commission on electric railway transportation, which was briefly abstracted in a recent issue, is an attempt to bring at least some relief to an admittedly difficult problem. Could the Boston transportation system be designed *de novo* the work would be fairly simple. But it is an entirely different matter to outline now a course which will be fair to all of the interests involved. Perhaps the most interesting feature of the report is the recognition by the board that inequalities in fares are inevitable in such a community as Greater Boston under the conditions of its past development and the present distribution of service. At the hearings before the board strong demands were made by many suburban communities for a 5-cent fare to and from the heart of Boston proper, and many inequalities were pointed out in relation to fares and distances from the business district. It was shown that in some cases suburbs located closer to the center of Boston than others are unable to purchase as much transportation for a nickel as the latter, and in the particular instance of Hyde Park, a newly added ward of Boston, a 10-cent through fare is in force through the joint occupancy of the extreme southern portion of the city by the Boston Elevated and Bay State Street Railways. Residents of Chelsea, on the north side of the city, were also aggrieved because of their inability to journey beyond the center of Boston after the payment of a single 5-cent fare, whereas the residents of Newton Corner, Watertown and other suburbs are literally unrestricted in their ability to travel over practically all portions of the Boston Elevated system for a single fare. Here again, the existence of two companies in the same metropolitan district creates inequalities.

The commission points out that while it may seem theoretically that every passenger should be able to ride an equal distance for the same fare, no matter where the ride begins, there is no practicable way of bringing about such an ideal arrangement. No system has ever been put in operation which will accomplish this result. Even the zone system fails to do it, as it provides merely that the fare from any point within a given zone to any point in another zone shall be the same. On the Hungarian steam railroads, for example, the first zone is 15 miles wide and the second 9 miles, and a passenger pays the same fare for traveling 1 mile that he does for 15, or the same for traveling 15¼ or 24 miles. The inequalities in the Boston district are not arbitrary but are the result of a natural development in the course of which all communities have benefited, though some more than others. Some of the existing disparities are the result of physical and topographical conditions which cannot be eliminated and which can be offset only at enormous cost.

In some cases present difficulties are due to the lack of foresight of residents of suburban communities twenty-five years ago, when the street railways serving the central portion of the Boston district were consolidated into the West End Company. Thus, the Lynn & Boston Railroad was not included in this consolidation, largely on account of opposition from representatives of Chelsea and Revere, who feared that the consolidation would result in a monopoly and in an increase of fares between those places and Boston. It is largely because of this opposition that these communities find themselves to-day in the position of complainants. The consolidation actually resulted in a comprehensive and unified car service for Boston and most of its suburbs, with the establishment of many through lines, reduction of fares, establishment of an enormous transfer system and many other service improvements. The average length of a half round trip has increased from 3.62 miles in 1889 to 4.28 miles in 1913 between the center of Boston and suburban points. Where trips are made over the two systems, however, it has been impossible for the public to realize all the benefits of unification, and this situation was the source of most of the specific complaints which were heard by the board.

Under the terms of its charter the Boston Elevated Railway cannot be required to charge less than a 5-cent fare for a continuous ride in one general direction between any two points on its system, and this stands in the way of the establishment of low joint through rates shared by the Bay State company and necessarily leads to the payment of two fares in many municipalities served in part by each company. The fundamental difficulty of avoiding the payment of two fares on inter-system journeys has been emphasized in numerous decisions by the Massachusetts Railroad Commission, and it seems clear that nothing short of a comprehensive rearrangement and articulation of all the steam and electric lines serving Greater Boston can eliminate the principal fare inequalities and apparent discriminations brought out at the hearings. Perhaps no portion of the board's report is of greater interest than its refusal to recommend that the Boston Elevated Railway lease the lines of the Bay State company in Hyde Park in order to yield a 5-cent fare to that portion of Boston proper. The residents of that ward contended that a lease should be consummated along the lines established some years ago in West Roxbury. But the commission points out that the distance involved is greater than that asked for by any of the other communities in appearance; that the single-city-single-fare principle often recognized by the railroad commission has never been regarded as an inflexible rule; that it has with one exception been confined to the lines of a single company; that in numerous instances acceptance has been refused to the plan where the length of ride involved (10 miles to the center of Boston in the Hyde Park case) was unreasonable because of the financial condition of the company controlling; and that if the appeal should be granted, the extension of the precedent to a dozen other suburban communities would probably result in financial disaster to the Boston Elevated Railway and would arrest street railway development in the metropolitan district.

THE DEMAND FOR SUBWAYS

One of the characteristic developments of the last few years in city transportation has been the demand on the part of a great many cities for subway systems. Undoubtedly this has been due in large part to the great success from a transportation and financial standpoint of the New York subway. Many prominent citizens from other places after visiting New York have returned home enthusiastic over subway operation and impressed with the belief that the local railway system in their own town should provide rapid transit by subway within the center of the city and under important traffic arteries. The plan naturally appeals to the civic authorities and to the citizens who do not realize that the profitable nature of the New York subway is due entirely to the great density of population and the peculiar topography of the city which compels a great deal of long distance riding, and that in most cities with a distributed population the construction and operation of a subway system as a purely commercial enterprise is financially impracticable. The fact is, that subway service is a luxury which only the very largest cities can afford, and even in New York the last subway contracts are being subsidized by the city, which practically guarantees the railway companies against loss from their operation.

There is no doubt that in a great many cases a city can afford to subsidize a rapid transit system and more than make up indirectly for the direct loss from the construction of the line. We believe in the economic value to any city of the best kind of transportation which the circumstances warrant. It contributes not only to the material welfare of the citizens because of the saving of time effected, but it also adds to the growth and wealth of the community because of increased real estate values. The cost of this improvement, however, should be borne directly by those who profit by it. We believe it is also the duty of the local railway company which possesses the monopoly of transportation within any city, and hence will be one of the beneficiaries by its growth, to do all that it reasonably can to co-operate in establishing such a transportation system.

One of the cities which is now facing the question of subways is Philadelphia. A comprehensive system has been planned under expert advice, the future traffic up to 1930 has been estimated with more care than has probably ever been devoted to a similar problem, and negotiations are now under way with the Philadelphia Rapid Transit Company as to the conditions under which it will consent to operate this system. So far, the ideas of the city authorities and the railway company as to the proper form of contract seem to be far apart, but perhaps this is only natural in the early history of the undertaking. A contract of this kind is necessarily subject to bargaining. But we trust for the interests of the city that the negotiations will not be as long drawn out as in New York. Each side is dependent on the other, and if both company and city are willing to recognize the part which the other can play in effecting this improvement a conclusion ought not to be long delayed.

The experience of the past indicates that the company is ready to do its part in supplying the public with good transportation. During the past few years, or under the present Stotesbury management, it has provided 1580 new cars, two new carhouses with a capacity of 669 cars, and 28,000 additional horse-power, and has raised the maximum wages of its men 7 cents an hour. It is easy to understand that it should desire now to go slow in assuming additional obligations in view of the fact that it has never paid a dividend on its present paid-up capital of $30,000,000, and for the eight months ending March 1, 1914, had a surplus of only $189,017.

CLAIM BUREAUS

In 1910, at the urgent recommendation of the Claims Association, the American Electric Railway Association made an arrangement with the Hooper-Holmes Information Bureau to become a clearing house of the association for information about accident claims and for the use of the files of that bureau. This action was the result of a number of years of discussion as to the best method for generally indexing accident claims on electric railways, and the arrangement thus completed was expected to fulfil the need which had long been felt for a central exchange of this kind. There have been continuous complaints, however, that the railway companies have neglected to utilize the opportunities thus afforded or to co-operate with the bureau. These complaints have been heard not only at meetings of the Claims Association but at meetings of other associations. Even as long ago as November, 1912, Mr. Tichenor at a Central Electric Railway convention called attention to the fact that during a recent year of the 350 companies authorized to receive the benefits of the national bureau only sixty companies reported to it and of that number six did two-thirds of all the reporting.

The subject is again called to the attention of railway companies by a letter published in this issue from President Weh of the Claims Association. It is difficult to understand the reasons for the refusal of the companies to avail themselves of a plan which the assotion is financially supporting. No man engaged in a large mercantile business on a credit basis would attempt to conduct his affairs without his Dun or Bradstreet, yet this is practically what the electric railway companies are trying to do in their claims department unless they use this bureau. The Hooper-Holmes organization is essentially a credit organization of the claimants in the field, but, unlike the Dun or Bradstreet companies, it has necessarily to depend very largely upon its subscribers for the information to complete its credit records. If these reports are not forthcoming, the whole system falls to ground. If the managements realized the importance of this matter as thoroughly as do the claim agents, we do not believe that there would be further cause for complaint.

ENERGY AND TIME ANALYSES IN RAILWAY OPERATION

Some strange anomalies present themselves to the student of electric railway economics. One of these is that every railway carefully meters the energy that goes from the power and substation to each feeder section, but very few keep any account of how much is used on the passenger cars or in the carhouse, shop, track and service car operations. Another anomaly is that the motorman and conductor who are the salesmen of the railway's only commodity, transportation, are at liberty to hurt the sales by hurrying over one section of their route, dawdling over another and perhaps even failing to visit some traffic territory at all. This is a practice which has been found to occur on several suburban lines and is brought about by the crew turning the car back without orders before it reaches the end of the line.

The absurdity of having no check upon the use of electrical energy by the different crews will be clear from a parallel with any gas company's practice. Like the railway the gas company knows how much illuminant (kw-hours) it produces and how much is lost through leakage in the pipes (drop in feeder and line circuits) between the tanks (power and substations) and the consumer (car). Here the parallel ends, for the gas company has a meter at the ultimate points of use whereas the railway has none. Of course, it will be urged that the relation of the gas company to the consumer and of the railway to the motorman are not the same. But wherein do they differ in principle? To be sure, the user of gas has to pay for it, for no gas company would think of offering him a flat monthly rate based simply upon the number of his burners. Both parties naturally find it preferable to deal only with exact quantities. On the other hand, the motorman does not pay for the energy that he takes from the line, and he is free to be even more prodigal with it than a gas user who has a flat rate.

The possibility of charging a motorman with the energy used on his car would seem chimerical were it not for the fact that London taxi operators actually do pay for their own gasoline. However, the essential point is that every car should be equipped with a device which will make the motorman as careful with electric fuel as the taxi operator is with liquid fuel. This is not only a question of saving energy but of eliminating the inefficient man and the antiquated, uneconomical car. The particular type of car meter to be used is of far less importance than recognition of the fact that the present practice of confining energy measurements to powerhouses, substations and feeders is utterly inadequate. Furthermore, large quantities of unmetered energy may be taken from the line for such purposes as track and shop welding, machine tool operation and pit lighting. One must have a great deal of optimism to believe that those who take energy in this way will concern themselves deeply about its economical use or the bad effect which it may have on line voltage. It is not flattering to the clear-sightedness of American operators that they should not see this point until they have to pay so many dollars per month for power purchased from local central or hydroelectric stations. In this respect they have a great deal to learn from the operators of European electric railways who are frequently obliged to purchase all of their electrical energy from the local municipal plant. The result is that a kw-hour is treated like money that has to be paid out to the other fellow and not like a coin that is transferred from one pocket to another.

The second absurdity to which attention has been directed is that so little exact knowledge is obtained about the movements of the crews while on their runs. This is especially true of suburban and interurban lines with long headways where the inspectors are too few to catch all disobedience of orders. In such cases all that may be known with certainty about a crew is the time that it left the operating station. The management does not know whether the car made all stops necessary to pick up the traffic and whether it maintained the proper running speed and car spacing. Yet here, too, simple means are available to record the goings and comings of the men on the cars just as readily as of the men in the shop. On one large foreign city system, for example, time points are fixed for certain intersections throughout each route, and every lapse from the schedule is liable to be checked by inspectors at these points. Several American railways have improved on the time-point idea by using printing clocks in which the motorman and conductor insert some standard form of time card. By shifting these registering clocks to different points occasionally and averaging the better readings, a railway could obtain a wonderfully exact running card for all divisions so analyzed. Here again, the application of exact methods to what has hitherto seemed a quite intangible part of the railway business will first weed out the negligent platform man and then point the way to the preparation of better time tables and the better utilization of the car mileage.

THE CONTAGION OF AMBITION AND CO-OPERATIVE EDUCATION

A letter from the master mechanic of the New York State Railways printed last week calls attention to a factor in educational work which is sometimes overlooked. Some young men in his employ have been allowed to spend part of the day in school, working during the rest of the time in the shops on the so-called co-operative plan. He makes the significant statement that these men are having a beneficial, stimulating influence on their companions, who are taking to studying out of hours. Few in number as are the co-operative students, the germ of ambition which is stimulating them has infected their associates. What could not be forced on the larger mass of employees has reached them by contagion. The efforts of the management, therefore, have been supplemented and reinforced. If ambition is contagious in this way, there is much hope for the future of the industry and the individual.

The plan used in Rochester is to have the boys spend a part of each day, under pay, at a local school and part at the shops. This scheme differs from the Cincinnati plan, regarding which a letter was printed in the issue for March 14, and in which for administrative reasons, a greater frequency of alternation between shop and school was considered desirable. The success of both plans, however—and they have been successful—has depended not so much on the methods followed as upon the spirit in which they have been applied. The success, as it appears to us, has resulted for several reasons. Technical education has been made possible to boys to whom it would otherwise have been out of reach. Many of another class who had the means for further schooling would have been overschooled had they not had this opportunity to see the relation of shop and school and to allow the law of attraction to help them in choosing a career. Those who needed and could profit by more mental training have been prevented from becoming bookish by their contact with shop conditions. Finally, all co-operative students realize that there is more to success in life than can be learned from teachers and books, that they must learn to get along with all sorts and conditions of men.

Our present system of education tends to over-train some boys who would have been more useful, and therefore happier, if they had been "switched off" into industry earlier. Many parents, particularly those who had not themselves many educational privileges, look on education for their sons as a relief from the necessity for toil. How often is heard the expression: "I hope my son will not have to work as hard as I have!" Their sons are therefore put through elaborate training, in college in many cases, only to be a disappointment to the parents. Education is a success only as it makes its recipient more useful. The co-operative plan appeals to us as tending to impress this fact.

Electric railway men interested in the development of their employees are inclined to wonder why the efforts made by the apprentice-training and educational committees of the American Electric Railway Engineering Association, the American Electric Railway Association and other technical societies do not accomplish more. Elaborate plans are prepared and a great deal of discussion takes place, yet nothing seems to result. There are at least two reasons for this as far as the railway associations are concerned. In the first place, these committees have no salesmen in the field to bring their propositions to the attention of the responsible officers of the member companies. Second, this training movement must proceed from within the company organization, beginning with men of conviction and personality, and all that outside influence can do is to inform and suggest. We do not, however, believe that the work of these committees is a failure. Rather, the results are indirect in keeping in circulation the training spirit, even if the plans are not adopted wholesale.

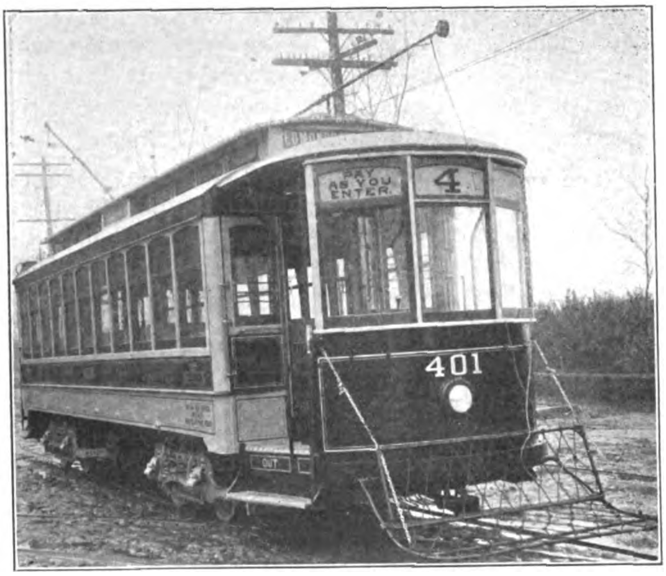
Sixty Recent Cars for Baltimore

These Cars Differ from Preceding Baltimore Types in the Use of More Steel in the Underframe, Cast-Steel Instead of Built-Up Iron-Plate Bolsters, Tungsten Lighting, Etc.—Route Number Signs Have Also Been Introduced for General Application

During December, 1913, the United Railways & Electric Company, of Baltimore, placed in service upon the Edmonson Avenue line the third consignment of sixty prepayment semi-convertible cars received from The J. G. Brill Company to replace open and closed cars. The general dimensions of the new car are as follows: length of platform, 5 ft. 8½ in.; length over corner posts, 30 ft. 8 in.; length over all, 43 ft. 9 in.; maximum width, 8 ft. 5 in. The exterior of the car is similar in design to the large number of pay-as-you-enter cars now in operation in Baltimore, but the new type has a few important improvements over its predecessor.

DOORS, SEATS AND GENERAL FINISH

The entrance to the car proper is gained by a pair of sliding doors which give a 26½-in. opening. On the extreme left is a single-door with 23½-in. opening, which swings inward for emergency exit. This door has door stops at the top and bottom which hold the door open when necessary, particularly during the hot summer months. The regular car-body exit is formed by the double sliding doors on the right at the front end.



Baltimore Car—View Showing Route Number Sign

The seating of the car is an arrangement of four longitudinal seats extending the length of the first two windows at each corner, the rest of the car being furnished with fourteen transverse reversible spring rattan seats 36 in. wide. The aisle space between these transverse seats is 21¾ in. The longitudinal seats at the two diagonal corners by the swinging doors have a portion arranged to fold downward to permit the opening inward of the swinging doors. The total seating capacity of the car is forty-two passengers, twenty-eight on the transverse seats and fourteen on the longitudinal seats. The use of pressed-steel pedestals, wall and aisle plates in the Hale & Kilburn transverse seats represents a saving of approximately 25 lb. per seat over seats of similar dimensions made up with malleable-iron castings.

The ceilings are covered with agasote, which has been sanded smooth and, after being painted light-buff color, has a ½-in. aluminum black-edged stripe. The interior finish is natural cherry. The interior moldings are very plain so as to require the least work in keeping the car clean.

CAR FRAMING

The wooden sills are 2¾ in. by 6⅞ in. The steel sill plate measures 5/16 in. x 16½ in. The sill plate by means of a drop-forged corner iron is held by rivets to the end sill, which is a 10-in. channel. The center knees are securely riveted to the end sill by means of a ⅜-in. gusset plate, thus forming a very substantial and stiff underframe. A further change has been made in the pair of stringers running from the intermediate crossing through the bolster to the 10-in. channel at the end sill. Instead of these stringers, which were formerly of wood covered with a heavy angle iron, a pair of 3-in., 5.5-lb. I-beams are used. These are securely riveted by means of angles and Z-shaped plates to the 10-in. channel and gusset plate near the platform. Where the I-beam stringers meet the intermediate crossing fastening is made with angles riveted to the I-beams and then bolted to the crossing. The floor boards are all hollow back to reduce the weight.

The car-body bolster, instead of being built up of iron plates and cast-iron spools, which are not only difficult to construct but liable to entail heavy maintenance expense, is now made of cast steel in one piece. This bolster was designed by the United Railways & Electric Company to carry a specified center-plate load and with a large factor of safety. Holes in the bolster admit air pipes, I-beam stringers and hand-brake pull rods.

Like the previous cars of this type, the platform supports are made of light channel irons.

SANDERS, BRAKE RIGGING, BRAKES, TRUCKS, ETC.

The car is equipped with four sand boxes of the "Dumpit" type, two of which are placed beneath platforms and two in the corner of the car under the longitudinal seat. The sand boxes at each end are operated simultaneously by means of a hand lever connected to a rocker shaft. The hand-brake rigging is a system of chain sheaves which avoids an elaborate system of levers and produces excellent hand-brake rigging with a slight saving in weight. The car body complete with foundation brake rigging, etc., weighs approximately 16,350 lb. The air brakes are the Westinghouse Traction Brake Company's SM-3 equipment in connection with a type F automatic slack adjuster. This use of slack adjusters has made it feasible to change from daily to weekly inspections. Both the "G" governor and the "DIF" compressor have a number of small details introduced in their construction, as required by the railway company's specifications. One important feature is the method of suspension. Instead of using a pair of cradle-type brackets, three brackets are bolted to the compressor near the top, two on one side and one on the side opposite. These in turn fit into supports bolted to the car underframing, thereby securing three-point suspension. The motorman's valve has a special guard of home manufacture to prevent grease getting on the clothing of passengers while standing on the rear platform. The brake cylinder is 10 in. in diameter. The total weight of the air brake equipment, including all of the pipes and fittings, is about 1300 lb.

The cars are mounted on a pair of Brill 27 GE-1 trucks. The Symington journal boxes are of a type specially designed for the railway, using its standard check plates and bearings. The back of the box is fitted with an M. C. B. wooden dust guard. The journal-box lids are of malleable iron. The axles are Cambria heat-treated steel 4½ in. in diameter with 4.885-in. gear seats and 4-in. journals. Solid gears are used and are pressed on with from 45 tons minimum to 60 tons maximum pressure. The wheels are cast iron 33 in. in diameter. The brakeshoes have the separable heads and steel backs of the American Electric Railway Association's standard design. The truck brake rigging is the United Railways & Electric Company's standard slide brake. The approximate weight of the two trucks is 12,700 lb.

ELECTRICAL EQUIPMENT AND LIGHTING

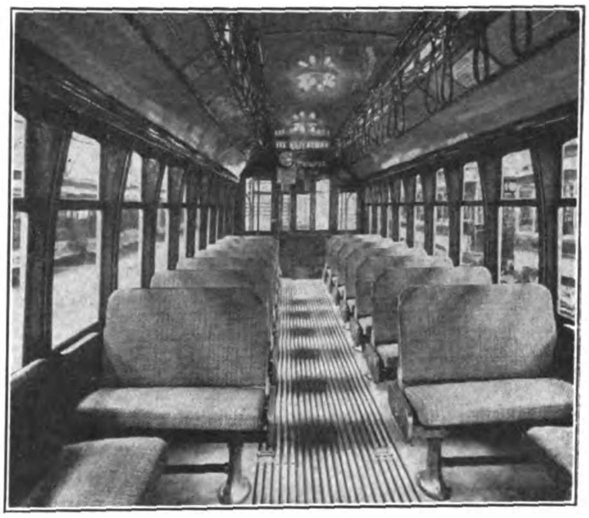
The electrical equipment consists of four 246-B motors operated by two K-35 G-2 controllers. These motors have some special features required by the railway's specifications, the most prominent of which are the field coil terminals, brush-holder design and an improved method of lubrication for the axle bearings. The controllers also include some special features, the most important being the rearrangement of the controller connections to prevent excessive burning of controller fingers and segments. At the base of each controller finger is a casting fitted with set screws which comprises the terminal. The resistance as furnished consists of two boxes, one containing twenty-eight grids and the other eighteen grids. Fifteen-tooth special-grade hardened pinions made by the Tool Steel Gear & Pinion Company were used in connection with hardened sixty-nine-tooth solid gears made by the same company. The gear cases are of malleable iron. Two standard GE circuit breakers altered to meet the specifications of the railway are a part of this equipment. There are also one GE form A aluminum-cell lightning arrester and one choke coil.

The cables within the car are placed in a transite-lined cable box running the length of the car. The leads of the cables running to the controller, motor, resistance and ground are placed in conduit, extending below the platform or floor of the car. The complete electrical equipment including conduit and fittings weighs approximately 11,850 lb.

The car-wiring schemes used in Baltimore were described in the ELECTRIC RAILWAY JOURNAL for April 8, 1911. The present cars are wired in much the same manner, except that the 12½-cp lamps have been replaced by 23-watt tungsten lamps. Wires are run in conduit for the heaters, although at the present writing no heaters are installed. At each intermediate post a pearl push-button is supplied in connection with a Faraday monitor buzzer at each end of the car for passengers' signals. This circuit is operated by a Patterson battery set model B-R-3 (three cells in series). This battery set, which is inclosed in a metal box and placed under one of the longitudinal seats, is kept locked at all times to prevent the stealing of the cells. All wires which form the lighting circuit are placed in grooved moldings. Each platform has two lights on the transverse center of the hood, arranged to burn simultaneously with the front headlight. As a result of a tungsten lamp test which was conducted recently on a number of cars, the new cars are being equipped throughout with the General Electric Company's 23-watt, 110-volt Mazda lamp. There are twenty-four lamps in each car, twenty of which are burning at any one time.

FARE REGISTRATION, ETC.

Each car is supplied with one International Cash Register Company's automatic coin-counting fare box of a type designed for Baltimore. The registration of fares is supplemented with two International R-7 registers. A register rod, which passes through the car, communicates by a small rod at either end with one of the registers; the standard practice of the railway company is to use the forward register. The fare box is carried upon a sliding railing, so that when the car is reversed the railing can be raised up out of the way and the fare box carried to the other platform.



Baltimore Car—View of Interior Showing Tungsten Lamps

The installation of the complete electrical and air-brake equipment was made at the shops of the United Railways & Electric Company. As promptly as the cars were received from the builder they were turned out fully equipped at the rate of two a day. The complete car weighs, without passenger load, 42,200 lb. The new car weighs 1004 lb. per seated passenger.

The complete specifications, covering all details in connection with the car body, trucks, electrical and air-brake equipments, were prepared under the direction of A. T. Clark, superintendent of rolling stock and shops, subject to the approval of William A. House, president.

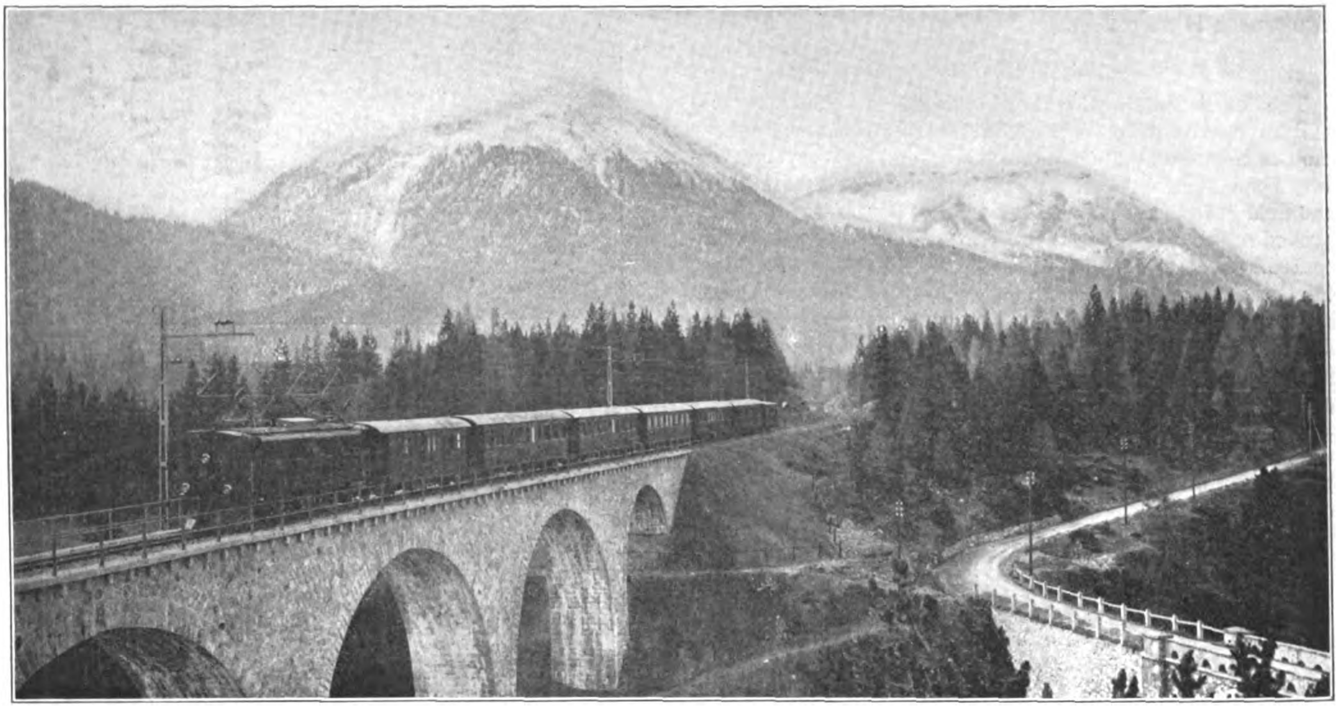
SOUTH AMERICAN SECTION OF WORLD TRADE DIRECTORY

A complete revision and detailed classification of the names of South American importers and merchants, made by the American consular officers in co-operation with the Bureau of Foreign and Domestic Commerce, has been published as a section of a new edition of the World Trade Directory. The lists have been brought up to date and are presented in uniform style, with a finding index. A new feature is the listing, so far as the information could be obtained, of the American and other foreign agents of South American importing firms and of the names of the parent firms of branch houses located in various South American cities. The directory does not aim to include the names of South American exporters, nor are the names of manufacturers given, except those who are, or seem likely to become, purchasers of American materials or merchandise. The publication is a directory of South American buyers for use by exporters and manufacturers in the United States. The directory is in octavo form, bound in buckram, and is sold at $1 a copy, to cover partially the cost of printing. Those desiring one or more copies of the directory should apply to the Bureau of Foreign and Domestic Commerce for the necessary order blank.

Single-Phase for the Rhaetian Railway

The Rhaetian Railway Is One of the Most Important Narrow-Gage Lines in Switzerland and Part of It Has Recently Been Electrified. A Novel Feature of the Locomotive Described in This Article Is That the Rotors and Stators of the Motors Are Fed at Different Voltages

The Rhaetian Railway, which operates a network comprising about 186 miles of meter-gage (39.37-in.) track in the canton of Grisons, Switzerland, is being changed from steam to electric traction. The first lines to be electrified are those of the Engadine, a valley which rises at St. Moritz and Pontresina to 5870 ft. above the sea level. The electrified lines, which are single-phase at sixteen and two-thirds cycles and 10,000 volts to 11,000 volts, begin at the towns named and end at Schuls, in the Lower Engadine, at an altitude of about 3940 ft. Their total length is 39 miles and their maximum grade is 2½ per cent.



Rhaetian Railway—Locomotive Hauling Train over Viaduct on a Bracket Catenary Section

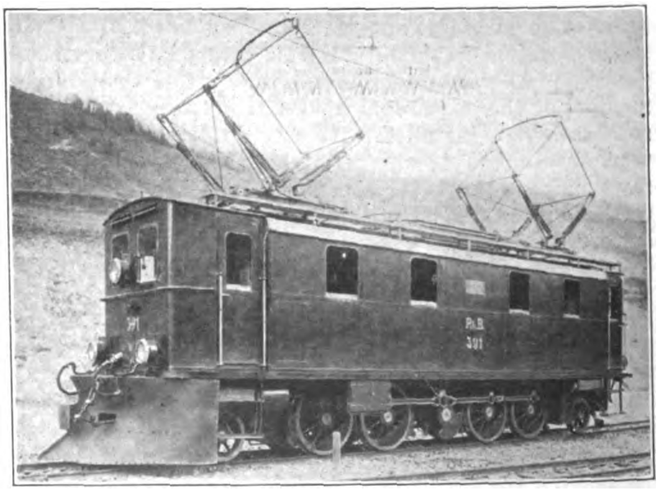
The trains are hauled by locomotives, one of which has been supplied by the Allgemeine Elektricitäts-Gesellschaft, Berlin, Germany, as hereinafter described. The mechanical part was built by the Schweizerische Lokomotiv und Maschinenfabrik, Winterthur, Switzerland. A preliminary description of this machine appeared in the ELECTRIC RAILWAY JOURNAL, page 273, Jan. 31, 1914.

The locomotive, which is destined for both passenger and freight service, must be able to haul in continuous service trains having a total weight of 200 metric tons maximum. The maximum tractive effort at the circumference of the driving wheels has been fixed at 19,030 lb. As the admissible axle pressure is only 11 tons, it was necessary to provide the locomotive with four coupled axles and two running axles. The maximum speed is 27.9 m.p.h. The locomotive has two motors of an hourly rating of 350 hp each. Both motors have pinions on each side which mesh into a common gear. This shaft is connected by inclined connecting rods to a jackshaft between the second and third of the coupled axles. The teeth of the two pinions of each motor are cut obliquely in opposite directions to equalize stresses.

The locomotive possesses a closed body, divided into the apparatus room and two cabs for the engineer. The electrical equipment is composed of the motors, the transformer, the control system, the current collectors and the auxiliary apparatus.

MOTORS AND TRANSFORMERS

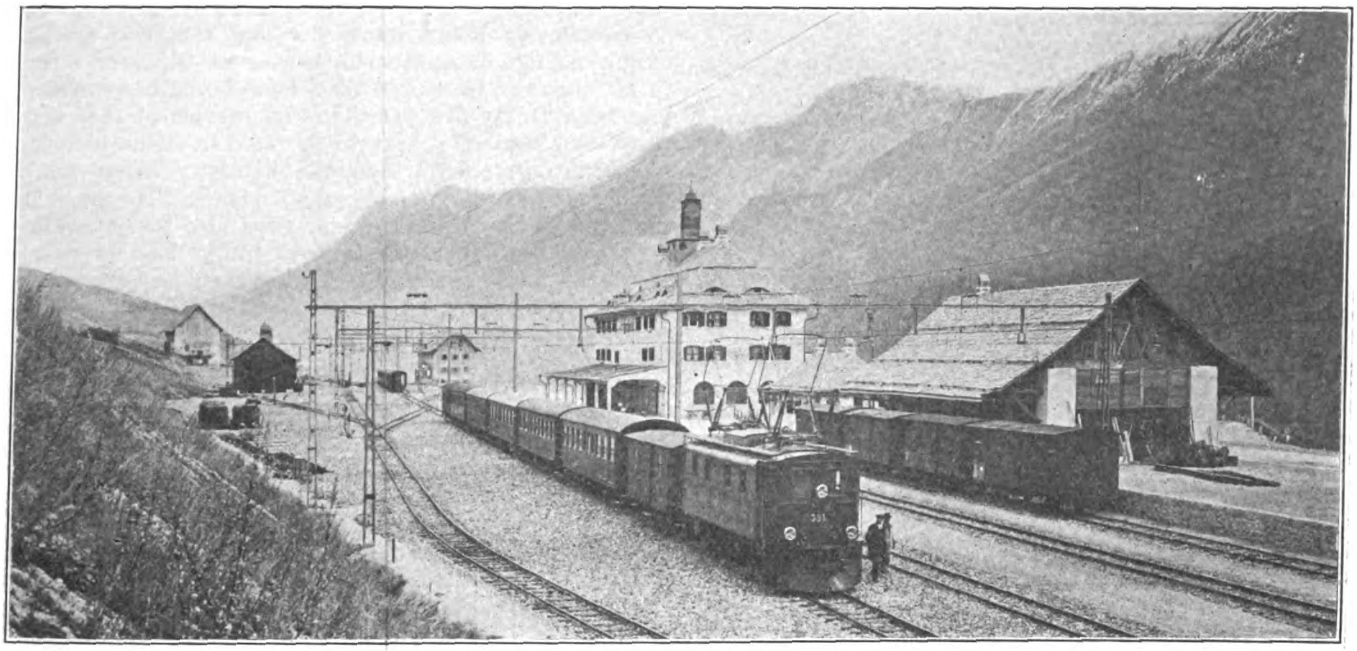
These motors are designed to start as repulsion machines with short-circuited commutators. After the rotor has reached a certain speed, the short-circuit is opened and the motors continue to run. The independent feed of the rotor and the stator windings at different pressures is secured by means of an auto-transformer. The latter is permanently connected in



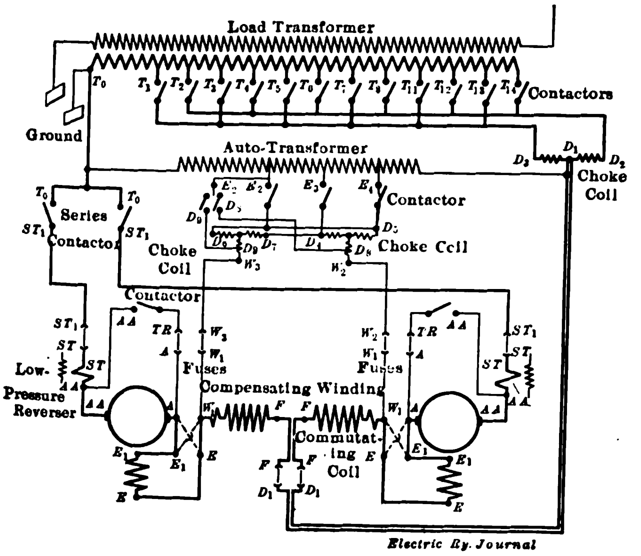
Rhaetian Railway—Single-Phase Locomotive of 700 HP.

shunt with the entire winding of the motor. The ratio between the pressures supplied to the rotor and stator respectively is regulated by the engineer in accordance with the speed as shown by the speed indicator. The locomotive can be driven also by one motor alone should the other be damaged. For this purpose each motor can be easily disconnected without any possibility that self-excitation will follow because of the idle rotation.

The main transformer, combined with the auxiliary transformers and the choke coils, is submerged in oil. The oil casing has copper ribs which permit most efficient cooling. The oil switch has four contacts. The two contacts which close the circuit before the others are connected in series with an ohmic resistance to protect the transformer from rushes of current at the instant when the oil switch is closed. The switch can be operated from either cab by direct mechanical or indirect electropneumatic transmission. The switch opens automatically on overloads. For purposes of inspection the oil casing can be lowered by a winch.



Rhaetian Railway—Light Steel Catenary Bridges at Schuls-Tarasp Station



Electric Ry. Journal

Rhaetian Railway—Control Diagram of Single-Phase Locomotive

CONTROL

The control is effected by electromagnetic contactors, the coils of which are fed with single-phase current at 300 volts. The accompanying diagram of connections shows the different functions of these contactors. The twelve contactors used for the "power-control" connect the terminals D_2 and D_3 of a choke coil with taps T_1 to T_{14} of the load transformer. Tap D_1 of the choke coil feeds the motors at pressures lying between any two adjacent steps, T_1, T_2, T_2, T_3, etc., the contactors of which have just been closed. To vary the motor voltage, these contactors are opened and closed alternately. Interruption of the current is avoided because at least one contactor is always closed. A second kind of contactor is used to vary the voltage ratio between the rotor and stator. For this purpose, taps E_2 to E_4 of the auto-transformer are connected with W_2 and W_3 of the motors. Two further contactors are used for short-circuiting the rotors during the starting period. The two reversers which control the direction of running are also operated with 300 volts alternating current. Finally, two "series" contactors T_0 and *St* are used, first, to get a double interruption of the motor circuit and, second, as a safety precaution against incorrect operation and involuntary starting.

The contactors are operated from the controllers in the cabs. These controllers resemble the usual car controllers. They consist of a main cylinder for the control of the "power" contactors and an auxiliary cylinder for the control of the reverser, the voltage regulation and the short-circuiting of the rotors. The two cylinders are locked against each other in the usual way, so that a change of the direction of running can be effected only when the circuit has been opened.

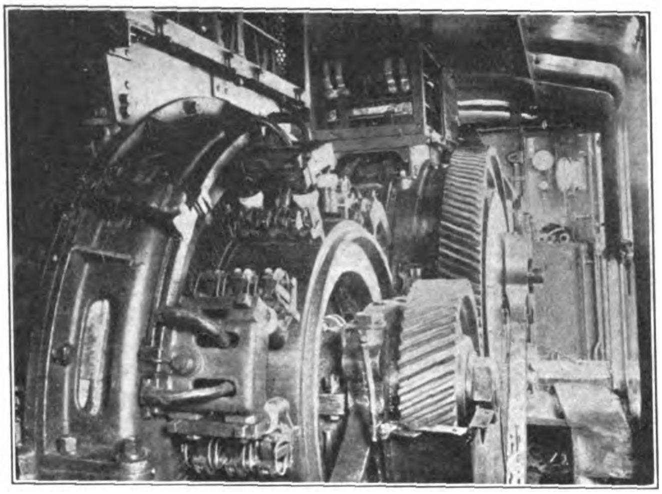
All contactors are provided with auxiliary contacts so that wrong connections will not be made, say when a contactor remains in the "on" position when it should be "off," in which case the transformer or other apparatus could be damaged. The reversers also possess auxiliary contacts which allow the "series" contactors to close only when both reversers are set for the same direction of running. Finally, the "series" contactors include auxiliary contacts to avoid starting the locomotive when the controller has been left on one of its operating positions instead of the zero position.

CURRENT COLLECTION, BRAKES, ETC.

Current is collected from the overhead line by means of two pantographs with aluminum bows. These collectors are designed for a height of the contact wire varying between 13.6 ft. and 20.7 ft. and operate with compressed air. One motor-compressor produces the air pressure for this purpose as well as for the electro-pneumatic control of the oil switch, the signal whistles and the sander.

The locomotive is equipped with the Hardy vacuum brake. A special controller in each cab is used to operate an electrically driven vacuum pump, which produces the necessary vacuum for the operation of the brake. In the braking position the controller operates an air slide valve mechanically. The locomotive is lighted by direct current produced by a converter group the shaft of which also carries a fan ventilator for the ventilation of the apparatus room. The d.c. generator of the group works in parallel with a battery and is controlled by an automatic regulator to avoid overloading of the battery.

The high-tension apparatus is inclosed in a compartment the doors of which are so interlocked pneumatically with the current collectors that they can be opened only when the collectors are lowered.



Rhaetian Railway—Interior of Locomotive with the Gear Drive Exposed

Reports received by the Allgemeine company up to March 1 showed that this locomotive had then run about 18,600 miles in trial and regular service without developing any appreciable defects. The average wear of the brushes was about 1 mm per 10,000 km (approximately 0.064 in. per 10,000 miles). No contacts have required replacement. At the severe trial runs the locomotive complied with all the specified conditions. A train of a total weight of 180 tons attained an average acceleration of 0.557 m.p.h.p.s. on a 2 per cent grade.

A FOREIGN VIEW OF AMERICAN ELECTRIFICATION

Philip Dawson, electrical engineer of the London, Brighton & South Coast Railway, gave an illustrated talk before the employees of that company at London Bridge Station, London, on Wednesday, March 11. This lecture was based on a recently completed six months' tour of inspection of American and European electrifications.

Mr. Dawson said that so far as the electrification of main-line railways was concerned progress in Europe had been quite as rapid as in America, as shown by the fact that at present there were in Europe more than 2000 miles of electrified main-line single track over which some 300 electric locomotives were operated, figures practically as high as any to be found in the United States. This, of course, did not take into consideration the interurban development of the United States. Although the extent of railway electrification was practically the same in Europe and in America, there was a great difference in that far longer stretches of individual lines were electrified in America. Thus the New York, New Haven & Hartford Railroad had electrified nearly 600 miles out of New York. The two freight yards at the Harlem River terminal, New York, were of particular interest to him. These yards have 60 miles of electrified track and in the month of November, 1913, they handled 65,000 freight cars, or about 1,250,000 tons. The work in these yards was of an excessively heavy character and consisted chiefly of unloading flat-bottomed barges or lighters. The chief inspector in charge of the yard told him that he had been thirty-five years in the service of the company, and that if it was to go back to steam haulage he would quit, as he found electricity safer, more speedy and more reliable than steam. The freight manager of the Harlem River yard also told him that in one case when it was necessary to go back to steam for a few days on account of alterations twice as many steam locomotives were required to do the same amount of work. One electric switching locomotive had worked continuously for twenty-four hours a day for forty-six days, working with three shifts of men.

The maintenance of American steam locomotives varied according to types and cost from 10 cents to 20 cents per locomotive mile, whereas the electric locomotives throughout America varied in maintenance cost from 3 cents to 5 cents per locomotive mile. G. W. Wilden, mechanical superintendent of the New Haven system, had informed him that as an average for general railway work, such as that of the New Haven system, six to seven electric locomotives would do the work of ten steam locomotives and that the maintenance costs were about half of those of steam.

Mr. Dawson then described the work done by the Pennsylvania Railroad at New York and on Long Island. He observed further that for the single-phase system to be used in the Philadelphia suburban electrification 90 miles of single track would be electrified and that 120 motor cars were on order. After brief references to the Baltimore & Ohio, Hoosac and Michigan Central tunnel electrifications, Mr. Dawson discussed the Sarnia tunnel of the Grand Trunk system. The electrification of this tunnel had given very satisfactory results. For steam, the cost per car handled had amounted to 27 cents, whereas the cost electrically was little more than 16 cents. The total number of passenger and freight cars handled in one year with six electric locomotives was 320,000, or about 12,500,000 tons. This electrification amounted to 12 miles of single track.

Mr. Dawson also visited the Butte, Anaconda & Pacific Railway, which, he said, Americans called the "biggest little railway in the world.'" The standard trains weighed 2400 tons and were hauled up 1 per cent grades. Mr. Galloway, the general manager, informed him that the electric locomotives handled 25 per cent more weight at 50 per cent higher speed and saved 25 per cent in operating expenses as compared with the steam locomotives used hitherto. The speaker also referred to the Spokane Inland Railway and the electrified lines of the Southern Pacific system at Oakland.

In conclusion, Mr. Dawson mentioned the electrification work accomplished or under way on the Continent. The two largest installations of the Prussian State Railways were that between Leipsic and Magdeburg, a distance of 100 miles, and that between Lauban and Königszelt, 81 miles of route in the mountain district of Silesia. The total track mileage electrified by the Prussian State Railways, including the suburban system at Hamburg, amounted to nearly 400 miles, over which 120 motor cars and 100 electric locomotives were operated. As to France, the Midi Railway was to electrify about 550 miles of the track on which seventy-three electric locomotives and fifty-four motor cars were to be used. In Italy, he was informed at Genoa by the chief engineer of the Italian State Railways, that the three-phase locomotives did three times the mileage of steam locomotives at no greater cost. Two of these locomotives, one in front and one behind, handled 380-ton trains at 27 m.p.h. on grades of more than 3 per cent. The financial results of electrification have been so satisfactory that the Italian government now had in contemplation the electrification of nearly 1500 miles more.

At the end of the lecture Mr. Dawson answered a number of questions put to him by his auditors.

JOINT NATIONAL COMMITTEE ON ELECTROLYSIS

The second regular meeting of the joint national committee on electrolysis was held in the rooms of the American Institute of Electrical Engineers in New York on Feb. 25, 1914. The minutes of the meeting have just been made available by the committee. The meeting was attended by B. J. Arnold, temporary chairman; Calvert Townley, E. B. Katté, H. S. Warren, D. W. Roper, F. N. Waterman, A. F. Ganz, W. J. Broder, A. S. Richey, Philip Torchio, L. L. Elden, Forest Towle and Paul Winsor. This joint committee was formed at the suggestion of the American Institute of Electrical Engineers at the instance of Calvert Townley. In the issue of the ELECTRIC RAILWAY JOURNAL for May 24, 1913, page 934, an announcement was made of the preliminary plan, which included representation by all interests involved. The purpose of the formation of the committee was to agree upon some basic principles or method of procedure to be followed in the case of electrolytic disputes.

An account of the first meeting of the committee, on May 27, was published on page 1025 of the issue of this paper for June 7, 1913. At this meeting several interests were not represented, and it was decided to effect only a temporary organization until the co-operation of all could be secured. R. D. Mershon, who was at that time president of the American Institute of Electrical Engineers, called the meeting to order, and B. J. Arnold was elected temporary chairman. A preliminary organization was effected and this was made permanent at the meeting held recently.

In order that the work of the committee could be laid out and a definite plan of action decided upon, the following appointments to a committee on plan and scope were made: Calvert Townley, chairman, representing the American Electric Railway Association; E. B. Katté, representing the American Railway Engineering Association; H. S. Warren, representing the American Telegraph & Telephone Company; D. W. Roper, representing the National Electric Light Association; F. N. Waterman, representing the American Institute of Electrical Engineers; A. F. Ganz, representing the American Gas Institute, and W. J. Broder, representing the Natural Gas Association of America.

At the request of the chairman, Mr. Townley gave the following outline of the general scope of the committee for the benefit of those represented who had been recently appointed:

"Electrolytic controversies have in the past given rise to unnecessary and acrimonious disputes and not infrequently have resulted in litigation between the corporations concerned. The usual procedure in disputes of this kind has been for each side to employ one or more electrical experts, who generally disagree as to the cause of the trouble and the remedies therefor. The dispute sometimes gets into the newspapers, occasioning unpleasant notoriety and resulting in more or less drastic action by the city government concerned. Much of this could be avoided if a body such as this committee could be created which would consider broadly the questions covered by the controversy, without attempting to pass upon the questions at issue, the members to report back to their respective organizations so that in time the committee would become recognized as a neutral body whose decisions would be authoritative, just as is the standards committee of the American Institute of Electrical Engineers in connection with matters of definition and standardization. With that end in view the Institute initiated the movement to organize a national body to consider the general subject and agree upon any basic principles or methods of procedure to be followed in the case of electrolytic disputes. Now that the organization of such a body has been accomplished, it remains for the committee to determine what lines of action to take."

Mr. Townley then said that in correspondence with different people he had found that the purpose of the committee was frequently misunderstood, the impression prevailing in some quarters that it was to act as an arbitration board in controversies, telling what ought to be done and thereby taking the places of executives or of the court.

The third meeting of the joint committee was held in the rooms of the American Electric Railway Association on Feb. 26, 1914. It was announced that the Bureau of Standards would be officially represented in the committee by Dr. E. B. Rosa, and he was appointed secretary of the joint committee and a member of the committee on plan and scope.

The committee on plan and scope presented a preliminary report resulting in the adoption of the following resolution: "Resolved, that the chairman be authorized to appoint committees as informally recommended by the plan and scope committee to collect information as outlined in the report and that the committee on plan and scope be continued and requested to report further at the next meeting of the joint committee."

As at present constituted the joint national committee on electrolysis consists of the following representatives of their respective organizations: American Electric Railway Association—R. P. Stevens, A. S. Richey, Calvert Townley; American Railway Engineering Association—E. B. Katté, D. J. Brumley, W. I. Trench; National Electric Light Association—Philip Torchio, L. L. Elden, D. W. Roper; American Telephone & Telegraph Company—H. S. Warren, F. L. Rhodes, A. P. Boeri; American Institute of Electrical Engineers—B. J. Arnold (chairman), F. N. Waterman; National Bureau of Standards—E. B. Rosa; Natural Gas Association—B. C. Olyphant, Forest Towle; American Gas Institute—A. F. Ganz, J. A. Gould, Jacob D. von Maur.

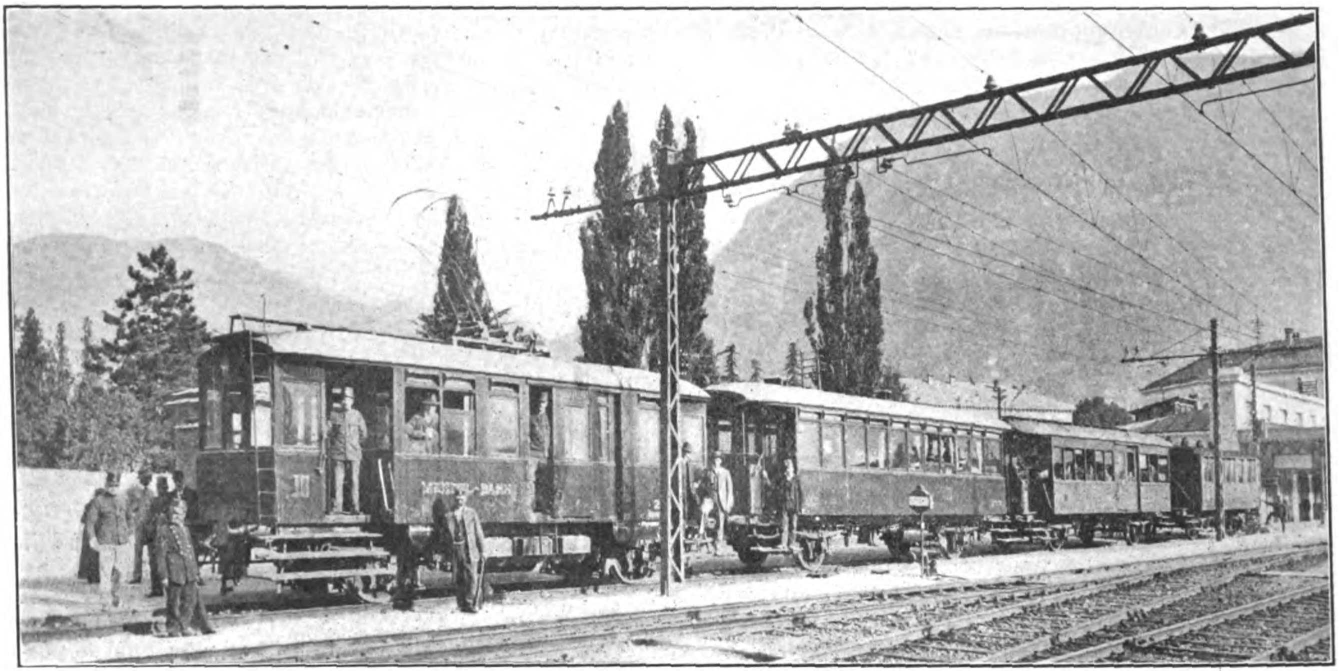
Before the adjournment of the third meeting, Chairman Arnold announced the appointment of the following committees: On principles and definitions—Messrs. Rosa (chairman), Brumley, Stevens and Boeri; on methods and analyses of surveys—Messrs. von Maur (chairman), Olyphant, Elden, Rhodes and Winsor; on foreign practice—Messrs. Torchio (chairman), Towle, French, Townley and Gould; on domestic practice—Messrs. Waterman (chairman), Broder, Ganz, Roper, Richey, Katté and Warren.

The 1200-Volt D.C. Ueberetsch Railway

This Is a Standard Gage Railway in the Southern Tyrol Near Bozen, and Is the First Austrian Railway to Be Equipped with Straight 1200-Volt D.C. Motors—Part of the Line Was Changed from 650 Volts and Part Was Changed from Steam

BY WILLIAM C. GYAROS, ELECTRICAL ENGINEER, BUDAPEST, HUNGARY

The Ueberetsch Railway connects the town of Bozen with the lower end of the fine cable railway of the Mendel ridge, which within one sweep of 1.4 miles overcomes a difference in elevation of more than 2600 ft. to reach the Mendel Pass at a height of 4500 ft. above sea level. The magnificent panoramic view afforded from this height, commanding the Dolomitic Alps, renders the Ueberetsch Railway one of the most important tourist routes in the neighborhood. The Ueberetsch region of southern Tyrol is also famous for its excellent red wine. The total length of the Ueberetsch Railway is 10.7 miles. The line is of standard gage and single track throughout. It uses 52-lb. rails on the upper sections, and 69-lb. rails on the 2.8-mile section operated jointly with the Bozen-Meran Railway. The Mendelbahn* or end section has a maximum grade of 6.2 per cent with an average of 5.8 per cent, while the middle or Ueberetsch section has a 3 per cent grade for 3½ miles.



Ueberetsch Railway—Passenger Train Under Catenary Bridge Construction at Bozen

The daily time table contains from nine to ten mixed passenger and freight trains and from one to two freight trains. The train weight varies from 35 to 52 metric tons for the mixed trains and from 50 to 80 tons for the freight trains, motor car included. The maximum speed of the trains amounts to about 28 m.p.h. on the jointly-operated section with 1 per cent grade, to between 14 m.p.h. and 22 m.p.h. on the Ueberetsch line proper, and to between 10 m.p.h. to 13 m.p.h. on the Mendelbahn section. The sharpest curve is about 400 ft. radius.

OLD AND NEW ELECTRIFICATIONS

The Mendelbahn section was electrified in 1904, but with 650 volts only. Immediately after the opening of this section, plans were proposed for the electrification of the complete line, but for several years no decision was reached because electrification did not show the desired economies. However, in the year 1910, the Austrian Ganz Electric Company, Ltd., Vienna, made a satisfactory tender based on the use of 1200 volts direct current, including the change of the Mendelbahn section to the higher voltage. At that time 1200 volts was a record in both Austria and Hungary, and it still holds

Ueberetsch Railway—Combined Substation and Residence at Etschwerke the record in the former country. The height of the voltage is of particular importance because the motors are wound for the whole line potential instead of being used two in series.

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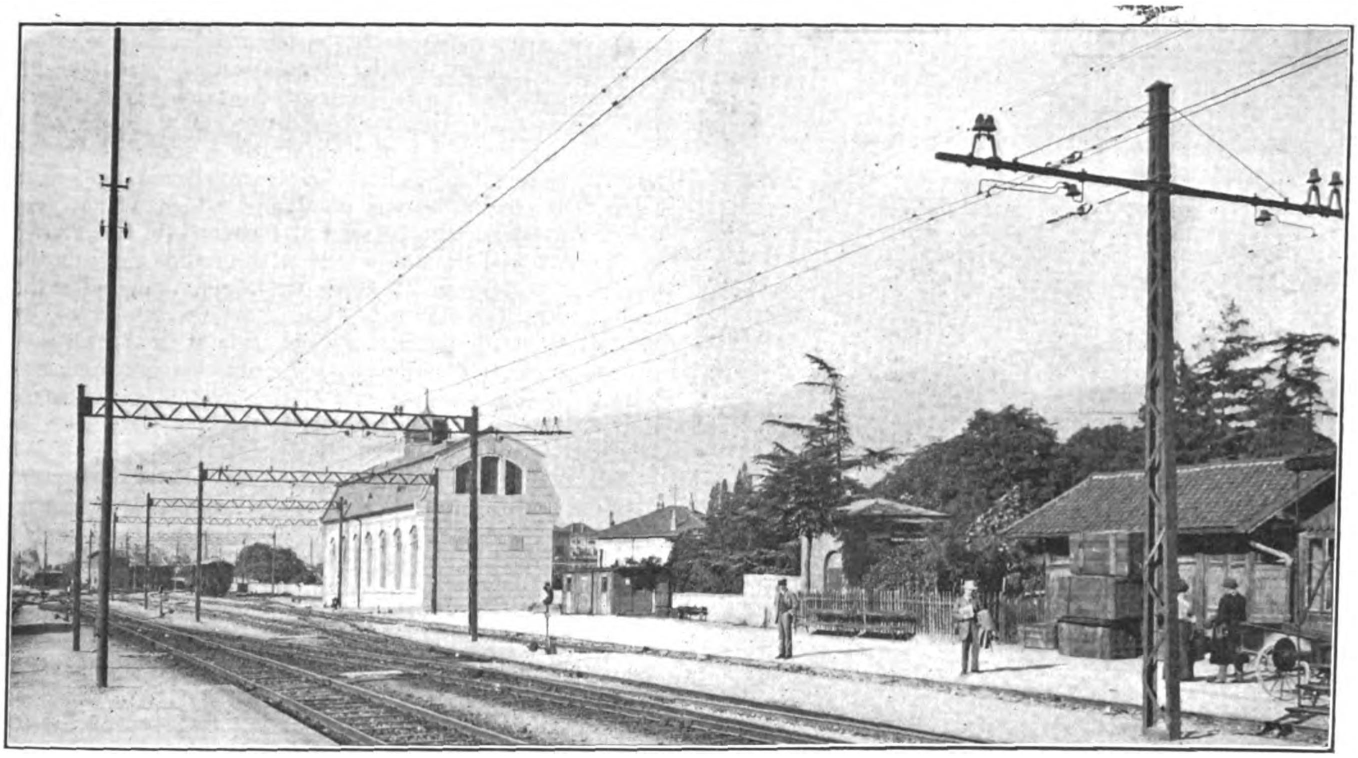
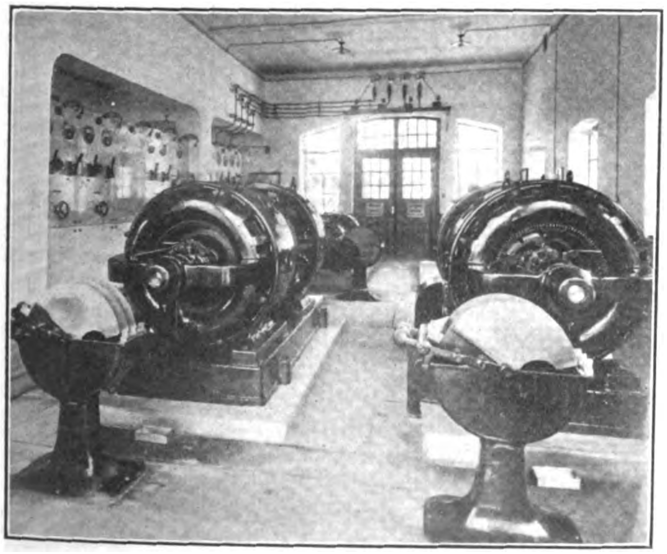
*The Mendelbahn was described in the STREET RAILWAY JOURNAL for April 2, 1904.

The 1200-volt direct current is produced in the substation at Eppan, which lies pretty nearly at the center of the whole line. Energy is derived from the transformer substation of the Etschwerke, a local hydroelectric plant. The Etschwerke transformer substation furnishes three-phase power at 10,000 volts and forty-six cycles over a cable about 3000 ft. long to the Eppan substation. The latter, by means of four separate feeders, supplies 1200 volts direct current to four sections of the railway.



Ueberetsch Railway—Lattice Pole and Bridge Catenary Suspension at Bozen



Ueberetsch Railway—Interior of Substation at Etschwerke

SUBSTATION

The handsome substation shown contains the ground floor, the machine room, transformer room, stores, repair shop and one-half of the storage battery, while the other half of the battery and living apartments are located on the upper floor. The high-tension apparatus and the connections of the 10,000-volt transmission cable terminals are in the basement underneath the transformer room.

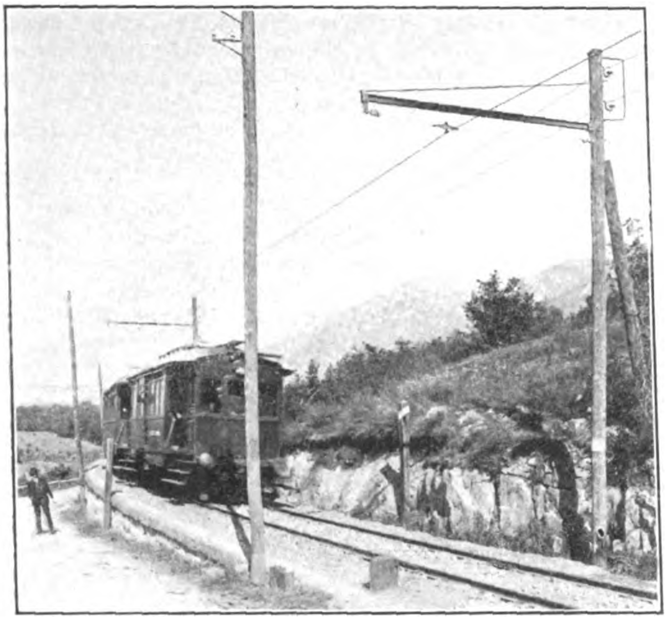
The 10,000-volt high-tension switching apparatus is located within fireproof compartments. The oil switches are operated by means of chain drives from the switchboard in the machine room above. The oil switches have automatic break with time-limit action for overload, the respective low-voltage relays being situated on the front of the switchboard panel above, together with red and green signal lamps which show the position of the switches.

The high-tension three-phase current is taken from the basement to the transformer room through high-tension cables. Two transformers of 220 kva each are provided, one for each motor-generator set, to step down the tension from 10,000 (or 20,000) to 500 volts. The low-voltage three-phase power is carried to the machine room by means of bare copper wires carried on porcelain insulators.

The machine room contains two motor-generator sets, one of which serves as a spare, and an automatic reversible battery booster. The motor of the motor-generators is of the induction type and is directly coupled to a 1200-volt commutating-pole d.c. generator of 140-kw output at 900 r.p.m. Each set has three ring-lubricated bearings, the coupling between the motor and generator being rigid. The booster is of the Pirani type and consists of a 500-volt three-phase induction motor and a double-commutator generator built for a normal output of 260 amp at 120 volts and 1340 r.p.m. The two commutators work in parallel for boosting the battery for line work, and in series for battery charging.

The switchboard has eleven panels of white marble and is provided with insulated platforms in front and behind. The iron framing of the switchboard carries all apparatus and measuring instruments for both 500-volt three-phase and 1200 volt d.c. energy. The switchboard contains only the handles of the chain drives for the oil switches, and the low-tension measuring and signaling apparatus. The 500-volt and 1200-volt apparatus are arranged behind the panels, and only their grounded handles project on the front. The 1200-volt measuring instruments are protected against contact by grounded covers.

The 500-volt switches for the three-phase induction motors are of the oil-immersed type. The 1200-volt switches for the generators, battery and feeders are of the air-break magnetic blow-out type. These switches have a single break and solid contacts, and are built like motor-car contactors. There is an automatic circuit-breaker and a negative switch for each generator, and a circuit-breaker and a hand-break switch for the battery and for each feeder.



Ueberetsch Railway—Bracket Construction Along Highway

The switchboard also carries all exciter rheostats, and two four-pole commutating switches for the reversible booster. The totalizing panel contains an ammeter for the total outgoing current and an integrating wattmeter for the total line power. The substation apparatus is completed by four lightning arresters with respective choke coil and ground resistance, one set for each outgoing feeder; these are located on a frame above the entrance door.

The storage battery consists of 577 Tudor cells for a one-hour discharge capacity of 259 amp-hours. That half of the battery which is on the higher potential is provided with better insulation throughout, beside which a wooden lattice fence fastened to insulators is installed to protect the attendants from shocks which they might receive if they touched simultaneously the wall and any live part of the cells. A knife switch is inserted in the conductor which connects the battery halves, and by means of this the halves may be separated and the battery potential halved for any work on the battery, thus decreasing still further the danger of shocks to the attendants.

LINE CONSTRUCTION

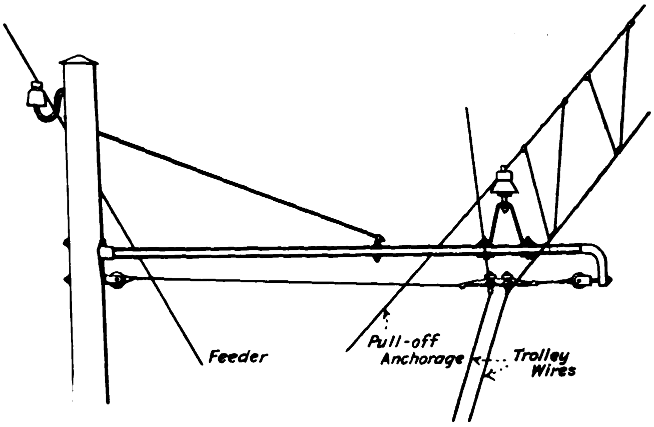
The trolley line consists of an 80 mm^2 (about 160,000 circ. mils) grooved hard-drawn copper wire, with the exception of the Mendelbahn section, on which the existing double trolley of two circular wires of 50 mm^2 (about 100,000 circ. mils) and of the Kaltern station, where the 100,000 circ. mil overhead wires were kept unaltered.

The suspension of the trolley wires on the Mendelbahn section had been of the span-wire type, on bracket poles of wood. The suspension was not changed, but the insulation was increased by the introduction of a special insulating pin in the hanger insulator and of powerful porcelain strain insulators at the ends of the span wire. The same method of suspension and of insulation was used on the middle section, with the sole difference that the type of bracket shown was adopted. Substantially the same suspension is used in the tunnels and in the stations.

On the jointly operated section the authorities demanded a catenary suspension for the trolley wire and the Fischer-Jellinek system was adopted. This system has been used successfully on other similar railways, among others on the Budapest Local Railways. It is a catenary suspension with automatic trolley tension regulation.[*] The tension regulation is secured by weights attached to the ends of the trolley wire which are conveniently sectionalized every 3000 ft. to 4000 ft. The novel means for obtaining a movable trolley wire in connection with a rigidly supported messenger cable consists in the use of clamps which do not grip the trolley wire tightly, but fit loosely into the groove of the wire and thus allow the wire to slide through the clamp. To prevent it from traveling along with the trolley wire, the clamp is hung from the messenger by two wires running up obliquely from it in the form of the letter V, instead of using only one perpendicular wire. In this way the suspension system secures free play to the trolley wire without the auxiliary messenger wires used in other systems.

Bracket poles of wood are used on this section except at Bozen station, where it has been found more convenient to use steel lattice girders, which span several tracks. Steel poles are used at pull-off points.

The messenger is a seven-strand steel cable of 34.5 mm^2 (70,000 circ. mils) section, mounted on a double petticoat clock-shape porcelain insulator, which carries an upper petticoat of tin as a protection against mechanical injuries. A second insulation is provided by a "stabilite" bushing around the lower end of the insulator pin. On each bracket a steadying arm is applied to hold the trolley wire in line above the track, which is insulated by the same kind of insulator as the messenger.



Ueberetsch Railway—Bracket Pole with Both Span and Catenary at Transition Point

The feeder wires are carried on the same poles as the trolley wire, on separate double petticoat porcelain insulators. Copper wires of 50 mm^2 (about 100,000 circ. mils) section are used, and connected in multiple, where required.

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[*] See Electric Railway Journal, June 1, 1912, page 911.

The trolley line is divided into four parts by suitable section insulators. The four stations of Bozen, Eppan, Kaltern and St. Anton and a few sidings are also separated from the main line by section insulators. The separate sections are fed over sectionalized switches. At least one lightning arrester is installed in each section. The tracks are bonded by protected copper rail bonds of about 170,000 circ. mils section; cross bonds of a similar section are used every 330 ft., as well as bridging wires at switch points, to insure continuity of the track circuit.

ROLLING STOCK

The rolling stock consists at present of four passenger motor cars and a number of passenger trailers. During the vintage season extra freight is handled with borrowed steam equipment. The motor cars serve for freight trains as well as for passenger trains, and have a service weight of 17.5 metric tons, without load. They have two radial axles instead of trucks, and 1000-mm (about 40-in.) wheels. There are twenty seats in two compartments per motor car, beside standing accommodation for fifteen persons and for a baggage compartment. The over-all length of the motor cars is about 9.50 m (31 ft.).

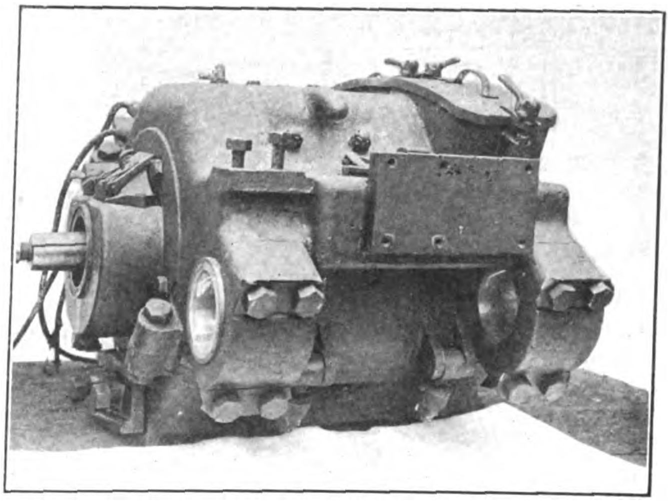
The electric equipment consists of two 85-hp motors, geared 1:4.5, built for an average of 1100 volts and running at 560 r.p.m. at the hour rating. The motors are wound for the full line potential, and until recently they held the record for brush voltage in Austria-Hungary. They have been surpassed very recently by motors for the Tátra Railways, furnished by the Budapest Ganz Electric Company, which are wound for the full line voltage of from 1650 to 1700 volts.

The motors have commutating poles and diagonally split cases but no artificial ventilation. The bearings are in circular shields which are large enough to allow the armatures to be rolled on the floor without coming into contact with it. The armature bearings are of the ring-lubricated type and have satisfied all expectations. The axle bearings have drop feed lubrication, as it would have been very difficult to apply the ring construction to them.

The multiple unit control employed is based on the series-parallel system. It consists of eleven electromagnetic contactors, a reversing switch, two master-controllers and a couple of converters with accessories to furnish the low voltage auxiliary current for the control system. Furthermore, the apparatus includes an automatic circuit breaking relay, one safety fuse box, a motor cut-out switch, the starting resistances, a lightning arrester and a pair of bow collectors. The eleven contactors and the reverser are located underneath the car underframe. The contacts of the contactors are of solid copper, making contact with a slight rubbing motion. The actuating solenoid and the blow-out coil are on the back. The reverser is a contact drum revolving between two rows of contact fingers under the action of two solenoids, one for each running direction. The contactors and the reversing switch are controlled from the master controllers placed on the platforms.

The master controller consists of two cylinders, one for reversing, the other for the series-parallel control. The operation of this master controller shows some interesting points. The main cylinder, namely, that for the series-parallel points, is connected to a strong coil spring, which tends to bring it back to its initial position. The main handle, instead of being applied directly to the shaft of the main cylinder, actuates a ratchet mechanism, by which the main cylinder can be moved forward by one point every time the main handle is swung forward through an angle of about 30 deg. Thus the full series of starting points is accomplished by ten pairs of forward and backward swingings of the main handle. This ratchet action achieves the same end as the various controller regulators inasmuch as the motorman is prevented from making excessively rapid starts. In the running position, the handle rests against a slightly raised stop in the top of the controller, so that the weight of the motorman's hand suffices to hold it there. For switching off the current the motorman has only to release the handle, when it will be swung backward by a spring which exceeds the resistance of the stop previously mentioned, thus freeing the ratchet mechanism and allowing the main cylinder to return to its initial position. In this way, the arrangement embodies also the features of the "dead man's handle."

The circuit-breaking relay is a solenoid inserted into the main circuit. Above a certain maximum current value this relay will open a contact and interrupt the control current. A voltage coil upon the same magnet core is placed under current in the "out" position of the relay and fixes the relay there until the master controller is brought back into its initial position. The safety fuse box has a horn air gap combined with a powerful magnetic blow-out action. The motor cut-out switch is a contact drum between two rows of contact fingers and needs no further description. The control current converter is a small machine of about 500 watts output with two independent armature windings and two commutators, one for 600 volts and the other for 100 volts. The field is excited from the 600-volt side. A permanent resistance is inserted in series with the armature, as it is essential that the converter may be cut in instantaneously. Two of these converters are connected in series across the line potential; they are combined with a separate cut-out switch, by which one of the two may be thrown out of circuit in case of failure and replaced by a conveniently connected resistance in such a way that operation might be continued with the remaining converter.



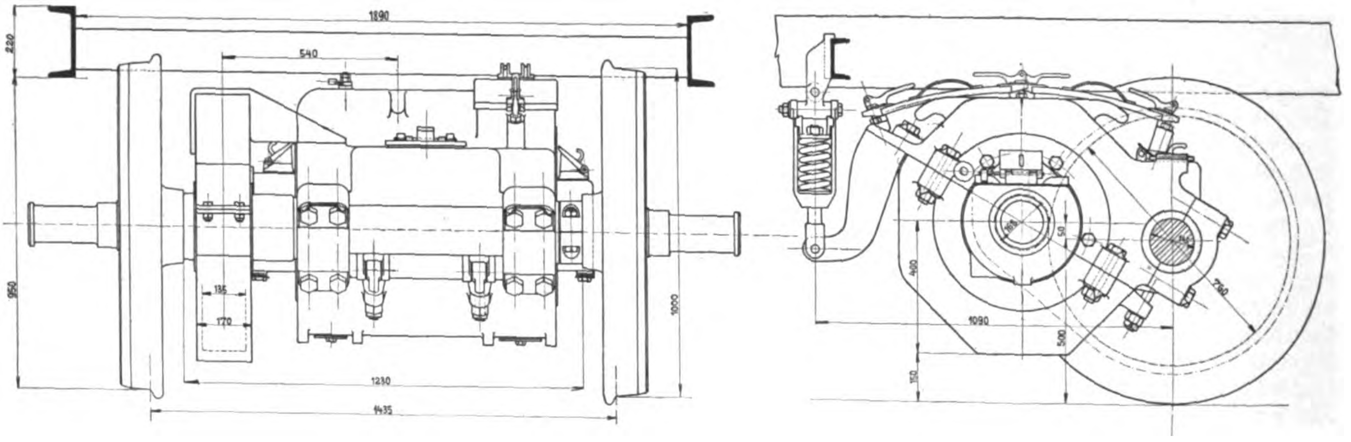
Ueberetsch Railway—1200-Volt D.C. Motor

The lightning arrester is located on the roof. It consists of a horn air gap with magnetic blow-out combined with a carborundum grounding resistance. The two current collecting devices are of the well-known Siemens type and have aluminum sliding contact bows. Two are used to secure a safe sparkless contact at a comparatively light trolley pressure. A common hemp trolley cord is used, and no special insulator is used with it as that was found unnecessary at the line voltage employed.

The electric lighting of each motor car consists of ten 25 cp, 120-volt lamps connected in series, of which four (in pairs) are used in the headlights, two on the platforms, the rest inside. The lampholders as well as the lamp sockets are of special construction to enable them to stand the full line pressure appearing at the lamp terminals in case of lamp failure. The lamp socket is entirely enclosed in an insulating cover. The heating is done by "Electra" type heaters, of which three of 600 watts each are used in series in one circuit. The main fuse for the lighting and heating circuits is applied on the roof of the car and consists of a fuse strip strung across a horn gap; porcelain-incased plug fuses are used for the separate circuits.

The motor cars are equipped with automatic vacuum brakes and eight brake shoes. The air pump is driven by a high-tension d. c. series-motor; motor and brake are controlled by a combined controller and brake valve. Besides the vacuum brake a very powerful hand brake is provided because of the heavy grades on the system. For signals a signal bell and a signal horn may be used; the latter is actuated by the exhaust of the air pump.

The trailers are similar to the motor cars but are of greater length, relatively lighter construction and have open platforms. They generally contain fifty seats, of which twenty are first-class and thirty are third-class. The lighting and heating are similar to that of the motor cars, with the chief difference that twice the number of heaters is used in accordance with the greater cubic capacity of the trailers.



Ueberetsch Railway—85-Hp, 1200-Volt D.C. Motor for Standard Gage (Dimensions in Millimeters)

MAINTENANCE AND OPERATION

The main car storage and repair shop is at Kaltern station, and is capable of holding five cars. The tools are driven by one 15-h.p. 1200-volt commutating pole d. c. shunt motor at 1200 r.p.m., fed from the trolley line. A plain storage shed for two cars exists at Bozen. The operation of the railway during two and one-half years of 1200-volt service has been most satisfactory. Of particular importance is the very small wear on the motor brushes and commutators, as well as on the ring-lubricated bearings. The success of this first 1200-volt railway in Austria promises well for further developments in this direction, and it is to be expected that high-tension d. c. railway construction will make further progress as soon as the present economic depression is over.

DIFFICULTIES OF CONDUIT OPERATION IN NEW YORK

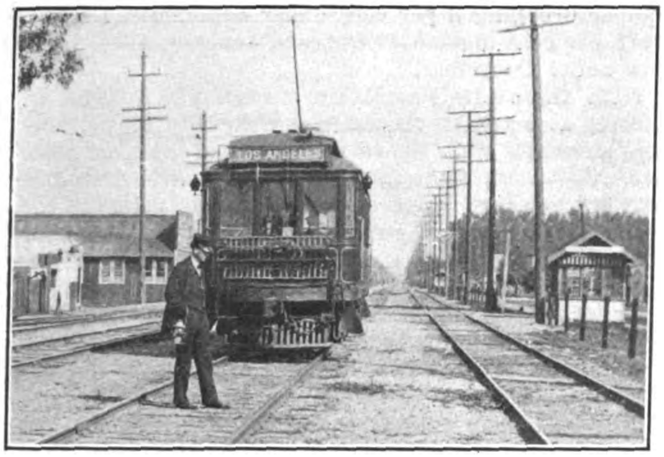
Although visitors to New York see the cars operating regularly on the conduit system, few, even among electric railway men, realize the additional care and expense required to keep the underground conduit railway in operating condition. The initial high cost of conduit is not its only objection. The conduit must be constantly cleaned, as all sorts of objects fall through the slot in spite of the fact that the slot is only 7/8 in. wide.

According to T. F. Mullaney, chief engineer Third Avenue Railway, broken automobile chains cause a great deal of trouble on the lines of that company when they find lodgment in the conduit. The first intimation of trouble from such a cause is a short circuit or ground on the system, when one of these chains comes in contact with the conductor rail or with the plow of a car. But automobile chains are not the only metal objects which pass from the street into the conduit to cause trouble to the railway operator. Iron hoops from barrels, baby carriages, etc., pieces of wire, bolts, horse shoes, mud, snow and débris of every kind seem to be attracted to this place. Recently on the Amsterdam Avenue line of the Third Avenue company a car came to a sudden stop, and it was found that a 3/4 in. steel cable 28 ft. long had in some way slipped through the opening in the street and had become entangled in the plow of the car. Some time ago on the Third Avenue line quite a few steel rods fell from a passing truck into the conduit, and these became entangled with cars as they passed, with resulting short circuits.

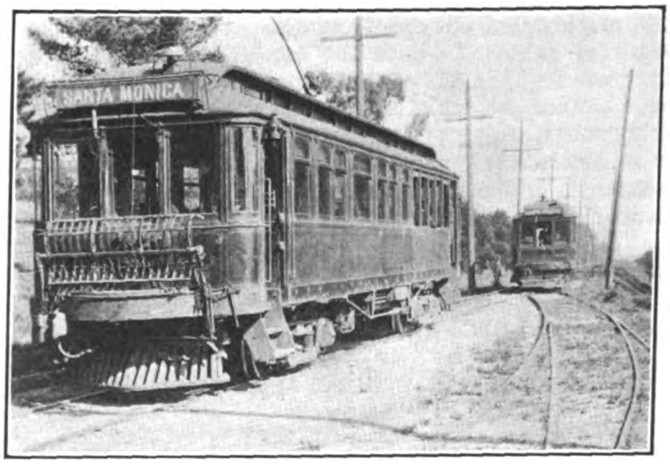
Snow causes a great deal of trouble because of its tendency to drift and fill the conduit. This snow has to be removed by pushing it to manholes by car scrapers and is then shoveled out. These manholes are from 100 ft. to 200 ft. apart and are large enough to receive considerable quantities of snow. During a heavy snowstorm a large force of men has to be engaged on this work constantly, as the manholes must be kept clean. The trouble of cleaning the conduit of snow is enhanced because the manholes are necessarily between or close to the tracks, and it is no easy task for the men to raise the covers and remove the packed snow in a street congested by traffic.

Mischievous persons, particularly boys, also cause serious trouble by attaching a small piece of metal to a string and lowering it through the slot and across the conductor rails, thus causing a short circuit and in some cases tying up the line.

It is no easy matter to locate a ground or short circuit on a system of this kind, as the only way it can be done is practically to examine all insulators, cars, etc. For example, the company finds that a car plow, on a section on which there may be fifty cars, has become short-circuited. There is no way of determining which car causes the trouble except by examination, and the defective plow may be on the last one of the fifty cars examined.



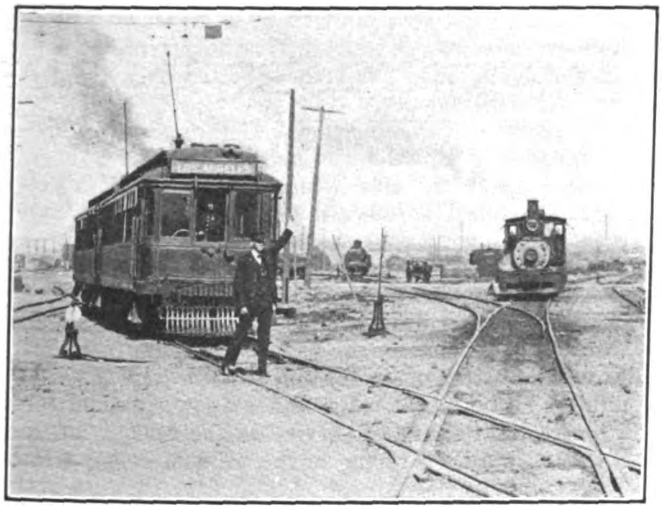
Pacific Electric Motion Pictures—Improper Protection of Passenger Train, by Night



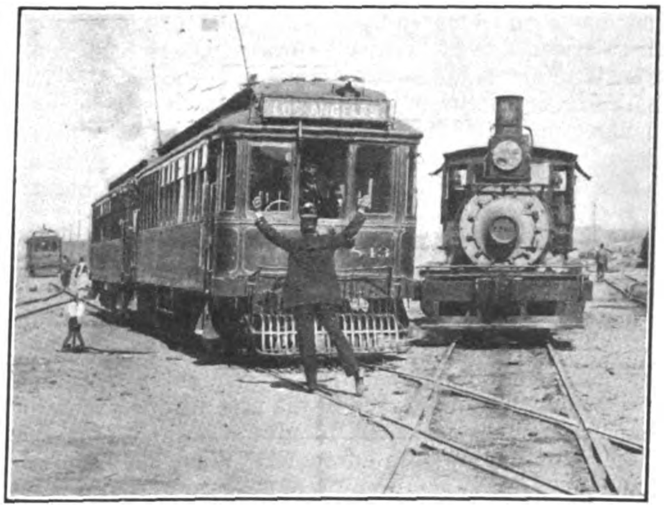
Pacific Electric Motion Pictures—Proper Position of Conductor with Superior Train Entering Siding

MOTION PICTURES ON PACIFIC ELECTRIC RAILWAY

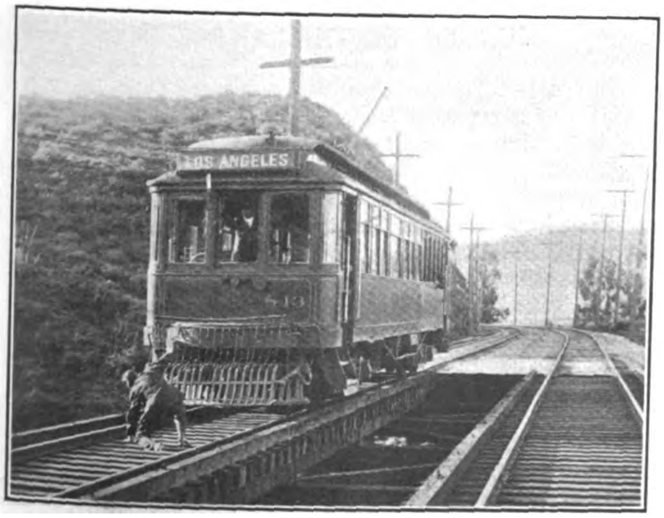
In the issue of the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 578, an account of the practice of the Pacific Electric Railway in the use of motion-picture films for instruction in rules was given. The accompanying illustrations have been selected by the general manager, J. McMillan, from this company's collection to show the general style of the pictures. While it is impossible by means of stationary pictures even to suggest motion, these illustrations indicate the general style followed. The careless inspection of the steam railroad track at an intersection to detect the approach of a train, and the consequence of such careless-



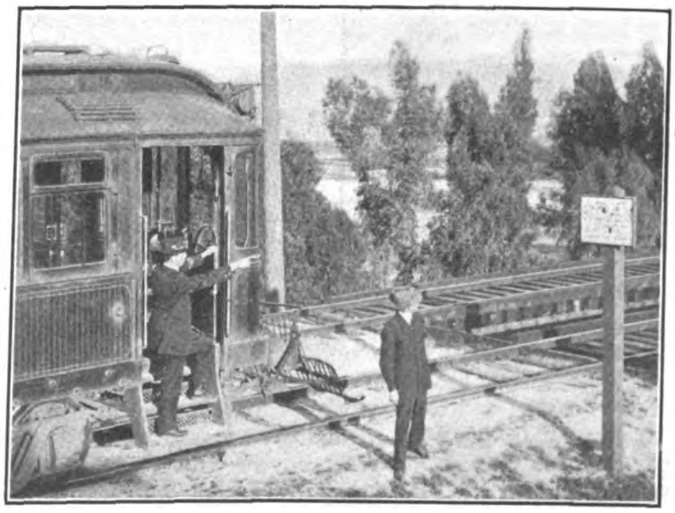
Pacific Electric Motion Pictures—Careless Flagging at Railroad Crossing



Pacific Electric Motion Pictures—Result of Careless Flagging at Crossing



Pacific Electric Motion Pictures—Car Rounding Curve at High Speed Not Under Control, Strikes Trespasser on Narrow Bridge



Pacific Electric Motion Pictures—Car After Rounding Curve Under Control, Stops Before Reaching Bridge and Motorman Calls Attention of Trespasser to Sign ness are brought out clearly by the pictures. So is the result of failure to have the car under control in a place where, as in the case of a narrow bridge, a pedestrian cannot get out of the way of an approaching car. Courteous warning of a pedestrian who has unwittingly or otherwise broken the rule about trespassing on the company's property is recommended pictorially. The company finds that suggestions can be made to the men in this way which would "go in at one ear and out of the other" if given orally.

DO LOW FARES INCREASE RIDING?

BY IRWIN FULLERTON, GENERAL AUDITOR DETROIT UNITED RAILWAY

For many years city street railway operators in the United States have been informed that a reduction in the rate of fare would not be detrimental to their interests because the increased riding would offset the reduction in the rate, or, in other words, that if the 5-cent fares were reduced to 3 cents there would be so much more riding on the cars that the gap in the gross receipts caused by the 2-cent reduction in fare would be closed. It is sufficient to say that the avenues through which this really marvelous theory of economics has been propounded have not been street railway operators or expert investigators. In the main, this argument has been advanced by organizations or individuals whose knowledge of electric railway matters has been, to treat it kindly, academic rather than practical. The absurdity of the premise as a general proposition will be apparent because if it was followed to its logical conclusion a 2-cent fare should be much more desirable than a 3-cent rate, and a 1-cent fare would be better than either.

Within the last six months the Detroit United Railway has had opportunity to observe the effect of a lower rate of fare upon the riding habit. Since Aug. 15, 1913, under a temporary day-to-day agreement with the city, a seven-for-a-quarter rate has prevailed as the principal fare factor, as compared with a straight 5-cent fare previously. The difference in the rate will be generally acknowledged as sufficient to give a fair test of the theories of the low-fare advocates. What has been the result?

The following table shows the percentages of increase in passengers carried during the last thirteen months over the same months a year ago. The change in fare occurred on Aug. 15, 1913.

TABLE SHOWING PERCENTAGES OF INCREASE IN PASSENGERS CARRIED OVER THE CORRESPONDING MONTHS OF THE PREVIOUS YEAR. DETROIT UNITED RAILWAY

With 5-Cent Fare		With Seven for a Quarter Tickets	
Month	Per Cent Increase	Month	Per Cent Increase
January	20.53	†August	16.03
February	16.89	September	19.42
March	20.41	October	16.41
April	17.41	November	14.65
May	18.15	December	13.39
June	15.17	January, 1914	12.38
*July	9.53		

It will be observed that in both January and March of 1913 the percentage of increase was greater than in September, the month which shows the largest percentage of increase in passengers of all since the low-fare agreement has been effective. The average increase for the last four months of 1913 under the lower fare was 15.91 per cent, as against an increase of 19.34 per cent for the first quarter and 16.87 per cent for the second quarter of 1913 under the 5-cent rate. It will also be observed that there has been a steady decrease in the percentage of increased passengers carried in each succeeding month since the low-fare arrangement, October dropping 3 per cent under September, December 3 per cent under October, and January, 1914, 1 per cent under December.

With these statistics it is exceedingly difficult, in Detroit at least, to reconcile the theories of the low-fare advocates with the results obtained in actual practice. As a matter of fact, the conclusion is inevitable that the average rider on city railways uses the car because he wants to get to some particular place for business or pleasure. If there is any percentage of the public which uses the street car for pleasure-riding purposes or travels simply for the ride, it is imperceptible. If there has been any increase in the short-distance riders because of the lower rate, it certainly is not distinguishable.

It would seem evident that there are factors which affect the riding habit much more than the rate of fare. Industrial conditions and rapid or retarded growth in population should probably be regarded as the most important of these other factors.

There is a phase of the lower-fare more-riders theory which has been either overlooked or disregarded by its advocates, yet it is a phase which has a very important bearing upon the finances of a street railway. If it were true that increased riding followed fare reduction, it is unquestionable that increased transportation facilities must follow, with a consequent increase in cost of operation, and if the gap in receipts between two rates of fare could be equalized by a larger patronage at the lower fare, there must still be taken into account the larger drain upon the treasury caused by the cost of the increased service.

Whether it is really beneficial to the public to have lower fares is a broad question with plenty of arguments on both sides. But it must be recognized that if fares are reduced to such a point as to give a bare margin over operating expenses, street railway companies will not be able to provide the service which they could supply under more favorable fare conditions. Sometimes cheap rides are not economical for the public, and it is reasonable to believe that the individual rider will be better off in the end if he forgoes the small saving which he might make under a lower rate of fare and places the quality of service as the first consideration in his mind. So long as the product of the street railway company has a fixed price and its expenses work on a sliding scale with the trend continually upward, it is a mathematical certainty that the public cannot receive more than it pays for.

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*July, 1912, was Cadillaqua month and traffic was above normal.

†Fifteen days in August were under 5-cent fares.

JUSTICE FOR THE RAILROADS

"Starve the Railroads and We Starve Ourselves" is the title of a recently issued reprint from an article by Frank A. Munsey in the April, 1914, issue of *Munsey's Magazine*. The railroads, Mr. Munsey points out, were built by private capital and are owned by private capital, yet they have little of the inherent freedom of private property. The amazing development of railroads has necessitated the establishment of government control. The exercise of this control, however, has frightfully crippled and maimed the entire railroad business of the country, producing a condition picturesquely characterized by the author as a "blue funk," manifesting itself by business depression and industrial starvation. Reestablishment of business can only be brought about, Mr. Munsey believes, by the impetus of advancing railroads freight and passenger rates that will enable them to do business at a rational and fair profit. Then, and not until then, will the confidence of investors be restored, money will flow into railway securities, railroads will begin buying again, and the country electrified into industrial action again.

Fare Dispute in Toledo

Complications Over the Termination of Franchises Threaten to Become Serious, but Tension Is Relieved by Announcement of the Determination of the Company to Carry Passengers Free if They Will Not Pay Its Established Rates of Fare

The franchise complications in Toledo reached a crisis on March 27. With the close of that day some of the principal railway franchises of the Toledo Railways & Light Company, covering parts of the trackage within the city of Toledo, expired. Since Jan. 8, 1912, under a temporary arrangement with the authorities who represented the city at that time, the company has been giving a fare rate of 3 cents between 5:30 and 7:30 a. m. and 4:30 and 6:30 p. m., and six tickets for 25 cents at all other times. It held that under the agreement with the city officials, this arrangement for rates of fare was to be maintained until a satisfactory settlement of the entire franchise question could be made. However, the City Council passed the so-called Schreiber ordinance, providing that after expiration of the franchises of the company on March 27 the rate of fare should be 3 cents flat. This ordinance was passed before the expiration of the old franchises of the company and with the provision that it should become effective at their termination.

Officials of the company have been in frequent consultation with the city authorities in regard to the terms of a new franchise but no settlement has been reached. The present officials of the city government are not those who held office at the time the temporary fare arrangement of 1912 was made, nor are they the same as those who were responsible for the passage of the Schreiber ordinance providing that the rate of fare should be 3 cents upon expiration of the old franchises on March 27. The present city officials, however, were elected on 3-cent fare platforms and have argued for that point without regard to the other questions involved.

Apparently both sides were lined up for some kind of a conflict directly after the time of expiration of the franchises at midnight on March 27. No one knew what would take place. In order to place the matter in the court for settlement, the company had made application to John M. Killits, judge of the United States District Court, then sitting at Cleveland, for an injunction against enforcement of the ordinance. The application for an injunction was argued before Judge Killits by attorneys for the company and for the city on March 26. City Solicitor Thurstin argued that the Federal Court had no jurisdiction in the case and that the Common Pleas Court of Lucas County obtained prior jurisdiction when the suit to enforce collection of $250 a day rental for the use of streets upon which franchises had expired was filed by Mr. Schreiber, formerly the city solicitor. During the course of his argument Mr. Thurstin deprecated the report that there might be violence and said that it was the intent of citizens who would attend a Municipal Ownership League meeting to be held on the night of March 27 and who would board the cars at midnight, to offer 3-cent fares, but that they would test the matter later in peaceful manner if the company refused to accept.

Mr. Tracy, attorney for the company, called attention to a published statement of Councilman John Mulholland that he intended to insist upon riding for 3 cents in spite of possible court orders.

In postponing the final hearing on the application for a temporary injunction until March 28, Judge Killits then said that if a conflict took place before his decision in the case was announced he would place the property in the hands of a United States marshal. In accordance with this announcement Judge Killits directed United States Marshal Lapp of Cleveland to go to Toledo so as to prevent possible rioting after midnight, March 27, when the ordinance was supposed to become effective. There were two deputy United States marshals in Toledo and it was stated in the papers that an unlimited number of special deputies would be sworn in if necessary. The statement of Judge Killits was in part as follows:

STATEMENT OF JUDGE KILLITS

"Anticipating, naturally, that the present situation might confront the court at the last moment, some study of the law pertinent thereto has been had, and, assuming that the franchises expire with Friday, as the city contends, we find these principles to control, and on them we expect to act:

"1. The city thereafter has the right to impose reasonable terms for the day use of the streets, and may express those terms in rates of fares, exactions of rentals, provisions for service, conditions of improvement, any and all, as it chooses. If these terms are reasonable and the company attempts thereafter to use the streets, it must be held to have accepted them. Its use of the streets cannot be held to be an acceptance of unreasonable conditions.

"2. The company (although when using the streets without a franchise it is of the nature of a trespasser) may continue to operate its cars without the city's consent, because running street cars is in the line of use for which highways are provided, and because its kind of public service is that necessary to a large and populous community. The so-called Schreiber ordinance in its grant of a day-by-day right to use the streets after March 27, in that respect gave the company no new right.

"3. The company can only operate after expiration of its franchises at the city's sufferance, and its right to do so ends abruptly when the city acts through a new franchise or by imposing reasonable terms for a continued day-by-day use, or by other means at the city's command.

"4. Such use without the city's consent is under the burden of reasonably compensating the public for occupying the streets, either in connection of fare, or payment of rental, or both, as city and company may thereafter agree upon, or as judicially determined, if a contest is forced.

"5. The company may absolutely discontinue operation when the franchises expire, in which case it is entitled to a reasonable time to salvage its property.

"6. This court, in this case, has the jurisdiction to enjoin the enforcement of any ordinance for the use of the streets which is in any substantial degree confiscatory, and, until it is established that terms of an ordinance arbitrarily arrived at are reasonable and not substantially confiscatory, this court may halt its operation pending inquiry.

"It follows that no right exists anywhere to compel the company to run its cars upon any terms as to rate of fare or other conditions which are merely arbitrarily ordained, until it is decided that such arbitrary conditions are reasonable. This court could not take over the business of the company through a receiver and establish an arbitrary rate of fare, or refuse to halt, until inquiry is had, the operation of an ordinance in which an arbitrarily determined rate of fare is fixed, without involving the court in an unlawful confiscation of property if it should develop that the rate of fare failed to bring revenue enough to provide the service the community ought to have, pay proper wages and other necessary expenses of operation, and leave a balance equal to a fair return upon the reasonable value of the investment employed—and the courts are practically unanimous that a fair return should be 6 per cent. This company's right to protection from confiscation is precisely that of an individual owner of property.

HENRY L. DOHERTY WILL SPEAK
AT MEMORIAL HALL TO-NIGHT.

Toledo Fare Dispute—Advertisement of Mass Meeting

"Whether or not 3-cent fare or the alternative of $250 per day street rental, in case the company declines to accept the 3-cent rate, are respectively, reasonable conditions, is very largely a matter of speculation with most of us. A considerable amount of arbitrary deduction controls our judgments. It may be, however, that the city has data and facts upon which its action in passing the ordinance of last November was based, and which sustain the terms which the company complains to be unreasonable. The Supreme Court of the United States, in the Detroit and Cleveland cases, in which facts legally similar to those involved were passed upon, leaves this court no power to deny the company injunctional relief until we know that it is not asked to carry an unconscionable burden.

"The opportunity now presents itself to fairly work out the question. The company is not protected by a franchise against the city, so that it may be compelled to be fair to the public. The city likewise cannot annoy the company beyond the annoyance incident to the end of franchise rights, which disturbance was a likelihood which the company accepted in taking the expired franchises; it knew that its definite rights would come to an end. Surely, what every honest citizen wants is the best service at the lowest cost for fare consistent with a fair return to the investor upon every dollar honestly invested, and there is but one way to solve the problem.

"If it is desired to continue operation through a receivership, the court will appoint two receivers, one to be suggested by the company and one by the city. They will be given equal authority, and steps will be taken so to co-ordinate details as to prevent opportunity to fairly say that an equal show is not afforded both parties.

"The good sense of the community surely will not tolerate disorder. If this hope is shown to be baseless, we will put the operation of cars in the hands of the marshal of this court for a few days."

On his return to Toledo from Cleveland, Judge Killits commented on the fact that he had received anonymous letters. He said: "If there is any person for whom a public officer trying to do his duty has more contempt than another, it is the coward who writes him anonymous letters. It is only a coward who would do such a thing." He said that he was tired of receiving anonymous letters.

LOSSES UNDER THE ORDINANCE

President Frank R. Coates of the Toledo Railways & Light Company sent a formal announcement to Mayor Keller of Toledo on March 26 that the company would disregard the Schreiber ordinance.

Mr. Coates filed an affidavit in the federal court giving figures in support of the motion for the temporary injunction. He said that if the company had operated under the Schreiber ordinance during 1913, it would have lost $203,171.

The statement filed by Mr. Coates showed that in the year 1913 the totals of the various cash and ticket fares and the percentage of the totals in each case were as follows: 5-cent cash fares, 10,375,092, or 21.67 per cent; 3-cent cash fares, 1,412,391, or 2.95 per cent; 1-cent children's cash fares, 1,000,643, or 2.09 per cent; tickets at the rate of six for 25 cents, 22,310,996, or 46.6 per cent; 3-cent ticket fares, 12,778,552, or 26.69 per cent. The total number of revenue passengers was 47,877,673. The total number of transfer passengers was 13,173,914, or 27.5 per cent of the revenue passengers. There were 634,581 employees' and special tickets, making a total of all passengers of 61,686,168. The average revenue per passenger was 3.05 cents. The average revenue per pay passenger was 3.93 cents.

Applying the straight 3-cent fare plan to the actual results for the year 1913 the number of 3-cent fare passengers would have been 46,872,242, or 97.9 per cent of the total. The number of 1-cent passengers would have been 1,005,431, or 2.1 per cent of the total. The average revenue per passenger would have been 2.3 cents. The average revenue per pay passenger would have been 2.96 cents.

The cost of the operation of the cars during 1913 was 2.65 cents per revenue passenger carried. This amount was divided by Mr. Coates as follows: Operation, 1.73 cents; maintenance, at the rate of 6 cents per car mile, 0.75 cent; taxes, 0.17 cent. This calculation does not include interest or dividend charges on capital investment or anything for sinking fund, or any payment of rental for use of the streets. It does not include any credit for the amount received from the interurban lines for operation on city tracks.

Mr. Coates also declared that operation was conducted economically last year and that because of the constant rise in the cost of labor and materials it is likely to be more expensive in the future.

Carl H. Keller, the Mayor, issued a proclamation on March 27, stating that the Schreiber ordinance passed on Nov. 24, 1913, would become effective after midnight on March 27, making the prevailing rate of fare 3 cents with universal transfers. He expressed the firm opinion that the ordinance was entirely effective to require the company to accept this rate of fare and that he was sustained in his judgment by the present City Council.

Whatever merit there might be in the contention of the company, Mayor Keller declared that he had the utmost confidence that the people of Toledo would be fully protected and their rights preserved by the city solicitor and his department. The Mayor also said:

MAYOR COUNSELS AGAINST DISORDER

"I dislike very much to have this controversy between the company and the people find its way into the courts for the reason that court procedure is too often interminable, so that the people become impatient with its delays.

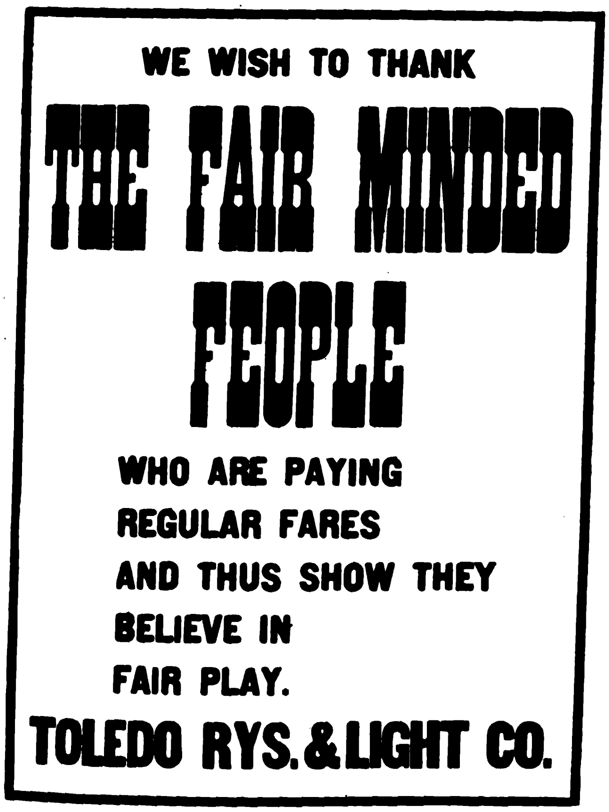
"I sincerely hope that the citizens of our city will proceed in the enforcement of this ordinance in a peaceful and orderly manner, and that they will at all times remember that the city's legal department is at their service.

"My own attitude in the matter will be this: Shortly after midnight to-night I shall enter upon a Summit and Broadway car and proffer the conductor in charge of the car 3 cents in currency. Upon his refusal to accept my proffer of a 3-cent fare I shall communicate this fact to the City Solicitor, who assures me that on Saturday morning he will ask for an injunction compelling the company to accept a 3-cent fare.

"I again urge upon the citizens to employ only peaceable means to accomplish the enforcement of this ordinance.

"The fight for a 3-cent fare is not merely a local one. The eyes of the entire nation are centered upon this city in this struggle, and what is accomplished here to bring about lower fares for the citizens of Toledo will go forth as an example to other cities of the United States. I trust that nothing may be done to reflect upon the fair name of our city."

The city police were kept on duty after midnight on March 27 in readiness to meet trouble if any was started.



WE WISH TO THANK
THE FAIR MINDED
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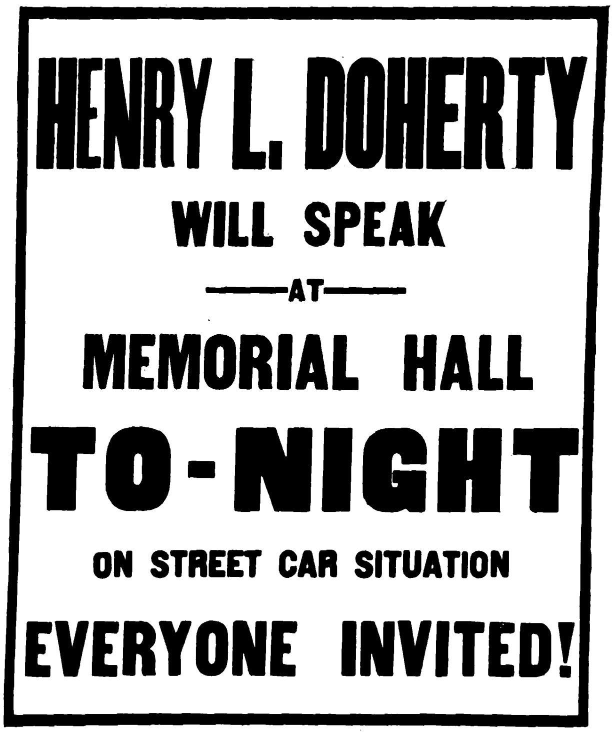
AND THUS SHOW THEY
BELIEVE IN
FAIR PLAY.
TOLEDO RYS. & LIGHT CO.

Toledo Fare Dispute—Poster Issued by Company

A meeting of the Municipal Ownership League was held at Memorial Hall on the evening of March 27. John Mulholland, Councilman-at-Large, presided. Henry L. Doherty, chairman of the Board of Directors of the company, and President Coates were in the audience.

After several speakers had been heard, Mr. Doherty rose and said, "My name is Doherty and if the audience stands for fair play I would like to be heard."

Chairman Mulholland announced that the regular program had been arranged and that he would not allow it to be stampeded for anyone not on the program. Many people in the audience wanted to hear Mr. Doherty and repeatedly called out his name, but the chairman declined to give him an opportunity to be heard. Mr. Doherty listened to the discussion and made no further attempt to get a hearing.



HENRY L. DOHERTY
WILL SPEAK
—AT—
MEMORIAL HALL
TO-NIGHT
ON STREET CAR SITUATION
EVERYONE INVITED!

Toledo Fare Dispute—Poster Advertising Mass Meeting

MR. DOHERTY PAYS THE MAYOR'S FARE

One of the most amusing of the events that happened after midnight arose from the Mayor's public announcement, given above, that he would tender a 3-cent fare for a ride. Mayor Keller left his office in the City Hall directly after midnight. He was accompanied by the chief of police and a number of other city officials. They took automobiles for several blocks. They did not know that Mr. Doherty had been waiting for them to appear and was following them in another automobile. When the Mayor and his party stopped and boarded a car Mr. Doherty was there. He gave a dollar bill to the conductor and said to the Mayor and his friends, "You gentlemen are my guests for this evening."

Then the Mayor made another attempt. He and his party started off in their automobiles and Mr. Doherty followed closely in his machine. Stopping another car, the Mayor boarded the platform. Mr. Doherty also appeared, and offered another dollar, insisting that the Mayor and his friends be his guests on that car.

The spirit in which this incident was carried out undoubtedly did a good deal to relieve the tension of the situation.

Later the Mayor found an opportunity to ride without the presence of Mr. Doherty. The fare of 3 cents which he tendered was not accepted and he rode free. After his experience, the Mayor was quoted as saying that he was glad that there was no trouble and that the people were not unfriendly to the present management of the company but that they were disgusted with the way the company had dealt with them in years past.

MR. DOHERTY HIRES A HALL WHEN HE WANTS TO TALK

About 10 o'clock on the morning of March 28, Mr. Doherty concluded that he would rent Memorial Hall, where he had been refused an opportunity to speak on the previous evening, and would discuss the issue publicly. Although the time of notice was very short, advertisements were published in the newspaper, posters were prepared and a band was hired to advertise the meeting. The band rode around the city in a car of the company. The car was decorated with banners on the sides calling attention to the meeting. The advertisement said: "Every citizen is invited to Memorial Hall to-night. Henry L. Doherty talks on the street car situation. Everyone interested in the future growth and prosperity of Toledo and in a square deal for all is invited. Eight o'clock. Come early." The hall was crowded.

Mr. Doherty discussed the issue at length. He said that the franchise and the 3-cent fare question had been an excellent political issue. He said that he did not believe in municipal ownership, but that if the majority of the people did, he wanted them to have it. If the people insisted on municipal ownership the company was willing that the city should begin then the condemnation of its property for the purpose of taking it over. If the city was not in a position to buy then, the company was willing to take a franchise with a municipal ownership provision permitting it to buy when it could. Mr. Doherty declared that the company was willing to try a 3-cent fare if it was assured of something better provided this rate did not pay. He said that Toledo wanted good transportation, and that it could not get it on a 3-cent fare basis. Mr. Doherty also offered to let the city put an expert in charge of the railway operations at the expense of the company to determine what rate of fare should prevail.

When the hearing was begun before Judge Killits in Toledo on March 28, to the surprise of the city officials, Carl Nau of Nau, Swearingen & Rusk, public accountants, of Cleveland, appeared as a witness. Mr. Nau was actively connected with the Johnson element in Cleveland when the franchise situation in that city was under negotiation. He has also represented the city of Cleveland in subsequent proceedings in regard to the present railway ordinance in that city. During an early stage of the negotiations in Toledo the city wanted to have Mr. Nau make an investigation and report on the operations of the Toledo Railways & Light Company as a basis for a franchise settlement. The city, however, did not have the money to pay for this report and the expense was met by the company, although it was understood that the work was done for the city. Mr. Nau testified that the gross receipts for 1912 were $1,895,317, of which $1,738,145 was obtained from local passengers. The balance was received from interurban roads for use of the track and from miscellaneous sources. If the same number of passengers had been riding on the fare schedule provided in the Schreiber ordinance receipts from local car passengers would have been $1,292,035. Receipts from other sources would have brought the total to $1,449,207. Operating expenses, Mr. Nau said, were $1,463,181, indicating a deficit of $13,974. This would have been increased by $95,906 for taxes and $91,250 for rent. If the rental of $250 a day provided in a rental ordinance should be added, Mr. Nau testified that the total cost of operating the system would have been 2.97 cents per revenue passenger without any allowance for a return on the investment.

Rathbun Fuller, counsel for the company, amended the cross bill for the company so that it should state that the ground for attacking the ordinance was that the provisions are in conflict with the federal constitution and therefore confiscatory.

The decision of Judge Killits on the plea for an injunction was rendered on March 30. Judge Killits said in part:

DECISION OF JUDGE KILLITS

"That the company may run its cars day by day without the city's consent and charge fare because its service is a public necessity; it may charge a rate that will pay its expenses of operation, including proper maintenance charges, and a fair return for the use of its investment.

"If these ordinances are unreasonable exactions, they are as if they never had been passed by the Council and the company is not affected by their presence on the ordinance books. It may continue to operate its cars until the city ejects it, without reference to them. They are not self-enforcing. We could give the company no safeguard by an order of injunction which is at all necessary to it if these ordinances are unreasonable, for it may ignore them with impunity up to the entry of an order respecting them made by a court whose power the city solicitor may invoke under the ordinances themselves, and when that order is entered the company will be in precisely the same position it would be in if this court should undertake to pass upon the force and effect of the ordinances.

"All we can see the complainant or the company could hope to gain by an order from this court enjoining the city solicitor from fulfilling the duty imposed upon him by the ordinances would be the moral effect of a judgment that the ordinances were unreasonable. While an early solution of this contention is highly desirable we cannot agree that that fact is a sufficient ground for injunctional relief.

"We notice last the insistence that an injunction is necessary to prevent multiplicity of suits and the conclusion that might ensue because of the popular belief that a right exists to ride for 3-cent fares. We have given this question considerable attention and are unable to see how such a situation could be met by any order that this court might make. Its order would be against the representatives of the city only, and could not run against individual citizens, unless the court should completely take into its possession the street railroad system.

"Our order, therefore, would have but moral force, if any, against those disposed to take advantage of the ordinance on their individual accounts, and would not reach the dignity of a prevention. The fear also takes no account of the obvious duty of the peace officers of the city to protect the company in its rights until the ordinance which it questions is tested and determined.

"The section of the Schreiber ordinance which says 'and the continuing by said company of the operation of its cars on lines covered by said franchises expiring March 27, 1914, shall be deemed an acceptance of this ordinance and all the terms thereof,' is so much waste of verbiage.

"It must be borne in mind that the Council is dealing with a corporation engaged in providing a paramount necessity to the city, and the city's power is not to impose any terms, but reasonable terms, upon a use by the company of the public streets for transportation purposes.

"What the people of the city on Saturday needed and had to have if the city was to continue its prosperity and its people enjoy the conveniences to which they are entitled, was the transportation they had on Friday. While it is Council's function to suggest terms, it is likewise the company's right to question their reasonableness, anr that right cannot be denied it.

"The Council imposes terms in the interest of the public; the company likewise serves the public, and the insistence that the company shall lose its right to question the reasonableness of the conditions imposed upon it in the assumed interest of the public, because it serves the public, is intolerable.

"All the company needed to do to avoid this much of the ordinance, it did months ago when it notified the city in writing that the ordinance was not and would not be accepted."

INTERPRETATION OF THE DECISION

Mr. Doherty sent a letter to the City Council giving the company's interpretation of the decision of Judge Killits, saying in part:

"1. The Toledo Railways & Light Company, by operating its cars after March 27, 1914, does not thereby accept the terms of that ordinance.

"2. The Schreiber ordinance will not go into effect until a court of competent jurisdiction has declared that 3-cent fares and $250 a day rental for the use of the streets are reasonable.

"3. That the city has the right to order the Toledo Railways & Light Company to cease operation of its street cars at any time upon the streets of the city.

"4. The Toledo Railways & Light Company has the right at any time to cease the operation of its street cars upon the streets of Toledo.

"5. That it is the duty of the city authorities to see that the company, so long as it operates its cars upon the streets of the city with the consent of the city, shall be protected and assisted in the performance of its duties.

"With these propositions before us, it seems to us of vital importance that the company be permitted to receive the rates of fare which prevailed prior to March 27, 1914.

"Our experience is demonstrating that the citizens of Toledo, as they come to understand the situation, are willing to continue to pay the above rates of fare.

"The number of passengers insisting on riding at a 3-cent rate, and who were consequently carried free on Monday, were fewer than those on Saturday, and we have every reason to believe that the people will be entirely satisfied to allow our present rates of fare to continue until a franchise agreement is reached.

"We assure you that we will make no appeal for protection at present, for we have been given an excellent demonstration of the fact that the Toledo public is inclined to be fair and we believe that simply by moral effort practically all of the people of Toledo will gladly pay this fare, and thus avoid unnecessary annoyance. In this matter as in all others the company wants to do everything it can to deserve and earn public good will."

The company also advertised its letter in the daily papers and said:

"We now ask that the fair-minded people of Toledo not refuse to pay the rate of fare admitted to be legal prior to March 27. We also request that those who want to be fair and have ridden on our cars free without legal or moral right reimburse the company. Many have already done this without request on our part. We wish to settle this controversy without litigation and delay and will do all in our power to bring about this conclusion and if given the opportunity we will provide for Toledo the best transportation system in the country."

INSTRUCTIONS TO THE MEN

One of the most notable features of the situation has been the loyal conduct of the trainmen. Simple instructions were given to the men. They were signed "By order of President F. R. Coates" by J. M. Enright, manager of railways, and read as follows:

"Accept nothing but the regular cash or ticket fares. Use every peaceable means to collect this fare, but in no case are you to resort to violence or force.

"Do not, under any circumstances, eject passengers forcibly from the cars or use harsh language in arguing with passengers.

"Do not, under any circumstances, accept a 3-cent fare, except during regular 3-cent hours. If necessary, carry any objecting passenger for nothing in order to maintain your regular schedule.

"Keep a careful count of those who refuse to pay the regular fare."

Although the company did not make definite public announcement of its plans, it had them all made and was ready to meet the issue on carefully prepared grounds. Trainmen were instructed with care as to the general policy of the company to accept regular rates of fare and to refuse 3-cent tenders, but were left pretty much to the exercise of their own judgment in individual cases. The result of the warnings of city officials against violence, the presence of an unusual number of city police on the streets, the cautionary words of Judge Killits and the presence of United States marshals combined to keep the crowd which was out in the hours after midnight of March 27 from causing trouble. Of course an unusually large number of people were out to see what was going on but at no point was there any effort to start disorder. As the plans of the company were not generally known except to those who discovered them when boarding the cars, the number who rode free between midnight and the regular beginning of rush-hour traffic on Saturday morning was small. On account of the Saturday half-holiday the number was greater on Saturday. The newspapers really urged the people to ride free. The headlines of one leading paper on the afternoon of March 28 said: "Thousands of men tender 3-cent fares and get free rides. Workers declare they will take families for Sunday joy rides over the entire street railway system." These articles caused many to take advantage of the chance for a free ride on Sunday. Since then the free travel has been lighter each day. On Saturday, March 28 out of a total of 202,744 revenue passengers 10.9 per cent did not pay fares.

WORK OF TRAINMEN

Different men from the offices of the company have spent time on the cars talking and advising with the conductors in the performance of their duties. In the main, however, the conductors have had to be guided by their own good judgment. In the great bulk of cases where passengers have refused to tender anything but a 3-cent fare, the conductors have used arguments in order to get them, if possible, to pay the regular rate. In thousands of cases the arguments presented by the conductors have been effective in inducing passengers to pay present fares. Accounts of many humorous cases have been published in the newspapers. The conductors have not hesitated to use the argument that they were personally interested in the success of the policy of the company. Many people have told conductors that it would make no difference to the employees of the company if fares were not paid. Conductors have contradicted this and have done their best to demonstrate that the company could not continue to pay wages unless it continued to receive fares. Several cases of dispute which ended in physical encounters have been reported, but the number of these cases has been very small.

There is no question but that the number of passengers who ride free would be very materially reduced if some means could be adopted of restricting the traffic to the usual riders. Toledo is not so large a city but that the patrons are fairly well known to the conductors with whom they travel. Many conductors have reported that a number of those who ride free are people who have made a practice of walking before. The hoodlums of the city, who have nothing to occupy their time, make up a material proportion of those who ride free. These are, of course, not regular riders and it would not be fair to judge the sentiment of the people of Toledo by the number of men and boys of this type who indulge in the free-riding habit. A number of cases are reported where employers have expressed the hope to the men in their establishments that they would not take advantage of the unfortunate position of the company to avoid the payment of the regular rate of fare.

The closest possible measure of co-operation has been developed between the officials and the employees in all departments of the company. This has been helped by meetings at which the situation has been discussed fully by various officials. It has resulted in giving the employees of all ranks a thorough understanding of the attitude of the company. Meetings of the representatives of the new business department, who come in constant contact with the public, and of the conductors and motormen have been held throughout the present week. Some of these meetings have been addressed by the following: Henry L. Doherty, Frank R. Coates, J. M. Enright and E. R. Kelsey, manager of the publicity department; George Williams, manager of the new business department of the Doherty Operating Company, and Frederic Nicholas, ELECTRIC RAILWAY JOURNAL.

Trainmen have been urged to collect the fares if they could induce passengers to pay. In one case a conductor had among the passengers one woman who declined to pay anything but a 3-cent fare and one man who became abusive in argument. When the man had finished his denunciation of the conductor he walked into the car. The woman thereupon arose and handed the conductor a 5-cent piece, saying that she was more ashamed of the man than she was of herself and wanted to pay his fare. Another conductor reported that a man boarded the car with a little child and tendered 3 cents. When this was refused the man and the little child went into the car and the conductor heard the child say: "He didn't taken them, papa; give them back to me so I can put them in my bank." In other cases a man accompanied by another person would hold out six cents in his hand and the conductor would take 5 cents and ask for another fare. In several reported cases of this kind the passenger threw the odd cent at the conductor.

Mr. Doherty and President Coates have literally worked night and day to bring order out of the chaotic situation into which matters were tending. They have not been alone in their efforts. Other officials of the company have worked in similar ways. Many of the employees in various positions have done the same. The solicitors in the new business department have rendered excellent service.

Mr. Doherty has been making his headquarters in Toledo since the situation became acute. He has discussed the questions frankly with anyone and has declared that he wanted to make the facts public.

As matters stand now, the tentative draft of a franchise has been considered by officials of the company and the city. Various clauses have been discussed with the idea that an agreement might be reached readily on all questions except the rate of fare. Mr. Doherty told a committee of the City Council that when it had completed the franchise without a reference to the rate of fare and would say that the document represented the best terms possible, he would state the lowest rate of fare that could be furnished.

In the meanwhile public opinion is more aroused than ever before. It is not aroused, however, in the same way that has been characteristic of proceedings in Toledo previously. Notwithstanding the expressed advice of city officials displayed prominently in the daily newspapers, fewer people each day ride free. A letter from a prominent manufacturer was published in one of the daily papers stating that the company must have a square deal. One of the leading papers remarked editorially on March 20: "You must admire the man who, when he wants to talk, hires a hall."

OPINIONS OF OFFICIALS

President Coates made the following statement to the ELECTRIC RAILWAY JOURNAL: "The outlook is good. The percentage of people who travel free is lessening each day. Our trainmen have co-operated with us in every way to protect the interests of the company. Naturally we felt somewhat uncertain about the outcome of our experiment until we could see that the results were not going to be discouraging. We feel certain now that we followed the right course. The public as a whole does not want to take unfair advantage of the difficulty of the company. The large majority of the people want to pay their fares. By the course they have followed they show that they do not approve of the attitude of the city authorities in trying to impose a low rate of fare which is inadequate."

Mr. Doherty said in discussing the situation, that, before he became interested in the Toledo company he had been told that Toledo was a hotbed of radicalism. He had found that there was a radical element in the city, but it was not the controlling element by any means. The majority of the people had shown that they wanted to deal fairly with the company.

ELECTRIC RAILWAYS OF AUSTRIA

The statistics for the year 1913 covering the electric railways of Austria, Bosnia and Herzegovina show a total of seventy-three d.c. lines, of which twenty-five operate at 750 volts or more, and six single-phase lines. Twenty-four of the railways are operated on standard gage and fifty-five on narrow gage. The length of the d.c. lines is 1166 km (723 miles) and of the a.c. lines 242.7 km (150 miles), a total of 1408.7 km (973 miles). During the past year the increase in the number of d.c. lines was twelve and of the single-phase lines three. The increase in the length of d.c. lines was 148.1 km (92 miles) and of single-phase lines 171.8 km (106 miles). These statistics do not include the electric railways of Hungary.

J. M. McElroy, manager Manchester (Eng.) Corporation Tramways, is preparing a report on the proposed construction of a subway line in this city, based upon investigations which he has carried out into methods adopted in other cities. The report will probably contain a suggestion for a mile and a quarter subway, which would cost at least $1,461,000 and might run up to $2,435,000. Including the cost of dealing with sewers and street widening, it is estimated that the total cost would exceed $3,500,000.

COMMUNICATIONS

THE INTERSTATE COMMERCE COMMISSION ACCOUNTS

THE CLEVELAND RAILWAY COMPANY
CLEVELAND, OHIO, March 25, 1914.

To the Editors:

The tentative classification is progressive, and seems to me to be almost complete. Those who have prepared it deserve the thanks of every electric railway company.

H. J. DAVIES, Secretary.

ILLINOIS TRACTION SYSTEM
CHAMPAIGN, ILL., April 1, 1914.

To the Editors:

Replying to your inquiry in reference to the tentative classification of accounts, I have not had time to examine these in detail, but have had one or two of my men go over them, and they seem to report favorably. So far as I can see, the change will make quite an improvement. D. S. BRAMBLE, General Auditor.

AMERICAN CITIES COMPANY
NEW ORLEANS, LA., March 27, 1914.

To the Editors:

I have just received a copy of the tentative classification of accounts promulgated by the Interstate Commerce Commission and am sorry that I have not the time at present to go into it thoroughly. However, there is one thing which I have had in mind for some time and that is, I would favor a division of maintenance of cars and maintenance of electric equipment of cars into a number of accounts. My experience has been that the amount expended upon maintenance of cars and electric equipment is equal to, if not in excess of, the amount expended upon track and roadway and electric line.

The classification as promulgated provides for eight or nine accounts for the distribution of maintenance of track and roadway and four accounts for the maintenance of distribution system, whereas only one account is allowed for the maintenance of cars and for the maintenance of electric equipment. S. C. STIVERS,
Assistant Treasurer and Assistant Secretary.

THE COLUMBUS, DELAWARE & MARION RAILWAY
COLUMBUS, OHIO, March 27, 1914.

To the Editors:

During all the years in which I have been engaged in public service accounting, I have realized the need of a uniform system of accounting which would be so flexible and simple that it would permit the best possible information with the least possible expense to the carrier.

It may be truthfully said that the accountants themselves blazed the trail for the present order of things in the accounting field of the electric railroads. We have gone about our work individually and collectively, without hope of reward or fear of punishment, believing that the best interests of our properties would be conserved when we had accomplished the purpose for which we are responsible. If the criticisms and suggestions of the Central Electric Railway Accountants' Association are taken into consideration in the classification now proposed, I believe the system will more completely meet the requirements of the carriers.

One suggestion, well thought of by the Accountants' Association, is that of changing the fiscal year to Dec. 31. I believe this change in date would work to our direct benefit in closing our books. The system now under consideration by the Interstate Commerce Commission for interstate carriers is more nearly complete than any heretofore adopted, and when it is thoroughly understood it will be highly appreciated, I am sure. After its adoption, the intrastate commissions should immediately adopt the same system in order that we may have one uniform system for all carriers.

A. F. ELKINS, Auditor.

JOPLIN & PITTSBURG RAILWAY
KANSAS CITY, MO., March 30, 1914.

To the Editors:

It seems to me that the Interstate Commerce Commission in conjunction with the committee of the American Electric Railway Accountants' Association, has handled the revision of the system of accounts for electric railways so judiciously and in such a comprehensive and satisfactory manner that it is entitled to a vote of thanks from the companies and the investing public, who will be benefited by certain changes made in the classification of the operating and maintenance accounts. The extension of standardization to also cover income, profit and loss and general balance sheet accounts, and any slight alterations that might be suggested do not appear important enough to be worth while.

Fortunately the changes effected by the tentative plan are not sufficiently radical to prevent a fair comparison between statements issued under the new rules and those of previous years.

The new provision for the segregation of power accounts I think is admirable and should prove especially desirable in cases where companies operate lighting and power properties in addition to electric railways. Apparently the committee was mindful of this class of companies throughout its deliberations.

The introduction of an account for amortization of franchises will probably call forth adverse criticism, justly, I think, if it is the intention that the apportionments for elapsed years of a limited franchise shall all be crowded into the remaining years of its life. This would work an unnecessary hardship upon many companies whose franchises are of long standing, particularly where there is no reason to question their renewal. Instead of being mandatory, the use of this account should, in my opinion, be optional with the companies, as is the case with depreciation accounts.

E. S. BIGELOW, Auditor.

RUSH-HOUR FALLACIES

MILLVILLE, N. J., March 31, 1914.

To the Editors:

I was very much interested in the editorial on "Rush-Hour Fallacies" in the March 21 number of the ELECTRIC RAILWAY JOURNAL, for my experience in different cities seems to show that a good many of the managers do work more for the rush-hour traffic than they do for the traffic before or after rush hours. To illustrate, I might recount my experience acquired when I lived in the suburbs of a large city a few years ago.

At first I used the steam train in going back and forth from my business because I could get a comfortable seat and have a chance to read the paper. Later I thought it would be advantageous to live within the 5-cent limit and use the street cars, so I moved to a point nearer to my place of business. I had been told that the cars ran frequently morning and evening, on a two and three-minute schedule. I found this to be true during the rush-hour periods. I had also expected that I would be able to take my wife into the city to the theater in the evening, but after one or two experiences I had to give this plan up, and if I had anything to do in the evening I did not attempt to come home for dinner. I did not expect to get a seat during the rush-hour, but when I returned to the city at 7:30 p.m. I certainly did expect to get a seat, or, at least, not to be crowded worse than when I traveled during the rush hour. But as soon as the traffic in the evening began to slacken, say at about 7 o'clock, the management pulled off all the cars it possibly could, leaving all the people who were traveling for pleasure at that time to be crowded worse than during the rush hours. Again, on our local line, the headway was cut down to fifteen minutes, with the result that if a person lost the 7:30 p.m. car, he might as well give up attempting to go into the city. In consequence, the railroad lost many fares. This policy may be economy of operation, but it does not tempt the patronage of people who are traveling for pleasure.

I took up with the superintendent the matter of increased facilities, or at least of keeping on with the more frequent service for a little longer period in the evening, but he did not seem to think it would amount to anything and let the matter go. I am certainly glad to see that some companies are up to date enough to try to build up their traffic in the manner that you have described. CHARLES H. BIGELOW.

COMMISSIONS ON ELECTRIFICATION

BOSTON, MASS., March 31, 1914.

To the Editors:

The writer has followed with great interest the controversy reported in your columns between the exponents of different kinds of electrification. The situation is strongly reminiscent of a meeting of a spelling reform association which I once attended, in which the only serious difficulty seemed to be that each of the members was possessed of the only easy and practical scheme for phonetic spelling. There is some question whether a commission on electrification would be any more efficient in standardizing a definite method than the spelling reform association has been in bringing about its long desired uniformity. Mr. Sprague's plan is an attractive one, for it might lead not only to a definite technical plan of procedure but to a financial program which might obviate the very serious difficulty now found by the railroads in financing electrification or anything else. But I venture to submit that the present frame of mind of the advocates of the various systems in this country, as detailed in the articles which have been published from time to time in your excellent journal, is not such as augurs well for a harmonious report unless from a carefully packed commission. The differences of opinion seem too radical and too irreconcilable. In fact, one may go through the list of engineers prominently associated with railway work and arrange them into respective groups as reliably attached to their several opinions as the leaders of party politics in a doubtful state. If it were attempted to form a commission such as that suggested, it is greatly to be feared that the real work would be done in caucus rather than in committee, and once the committee was finally announced its conclusions could be defined without much risk of ruining one's reputation as a prophet. In short, while unquestionably the time is coming when such a commission could do extremely useful work, it is yet more distant than the friends of electrification could wish.

And the second proposition is very similar. Any means of financing electrification for the railroads with a minimum outlay of their own capital practically implies the financing of the change by those otherwise interested in the electrification, and while this may come, and come in a perfectly legitimate way, it should be preceded by more harmony regarding methods and apparatus than has yet been evident. The ends suggested by Mr. Sprague are eminently worthy ones, and in the fulness of time they may be brought about. But up to the present there is very little in the temper of the discussions before our technical societies to suggest harmony or a judicial decision in the very near future. BARRETT LEE.

INDEX BUREAU

AMERICAN ELECTRIC RAILWAY CLAIMS ASSOCIATION
CLEVELAND, OHIO, March 28, 1914.

To the Editors:

The ELECTRIC RAILWAY JOURNAL has, for so many years, championed all that is best in the street railway industry and fostered every movement likely to benefit the industry that I am taking the liberty of enlisting its good services in behalf of a project of vital importance to every street railway in the country and one that is dear to me personally as president of the Claims Association.

You are doubtless familiar with the Hooper-Holmes Index Bureau, a clearing house for personal injury claims, and with the good work it is doing in the street railway field. I assume also that you know of the arrangement under which the American Association contributes $500 per annum to the bureau to secure its services for member companies at slight cost (5 cents per inquiry). It now appears, and I imagine the fact will be as surprising to you as it was to me, that despite this low rate fully 95 per cent of the member companies are not availing themselves of the service, and in failing to report their cases are limiting the service the bureau can give to those who are patronizing it.

Many claim men are apparently forgetful of the advantages of the bureau save when suspicions are aroused by an occasional case. The success of the bureau obviously depends upon real co-operation. The fewer names reported, the less likelihood of return. It further appears that a continuation of this lack of interest will probably lead to the cancellation of the association's subscription and the valuable service of this bureau will be allowed to go by default. This I would very much regret, as I believe the Claims Association has, in this bureau, its greatest opportunity for perfecting a national index bureau, the desire of claim agents for years. The bureau has now in its files some three million names, which it is increasing yearly at the rate of better than 300,000, in spite of the limited support it is receiving from our association.

To pass up this opportunity of availing ourselves of this mass of data would be a calamity. If the service of the bureau, as most of the companies wrongfully assume, were only to run down the accident faker, I, too, should willingly see it thrown into the discard, for the accident faker is now rapidly becoming extinct. But the bureau has and does a real dollar-saving service in preventing personal injury claimants from cashing in more than once on any injury. The detection of one such fraud saves a sum greater than the total cost of a year's entire reports.

I am so sure of the merits of this service and so anxious that all member companies of the association realize them, that I am venturing to ask you to investigate the situation, and if consistent with the facts to speak editorially on the subject. I shall be glad to furnish you any data or information you may desire.

W. F. WEH, President.

The Soria Railway, a line not quite 90 miles long, in the province of Soria in Spain, is conducting an energetic campaign of education to improve agricultural conditions along its line. Many of the railway stations have been provided with little agricultural museums where the farmers and others interested may obtain all kinds of useful information.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

EQUIPMENT DEFECTS—TROLLEY POLES

BY C. W. SQUIER, E. E.

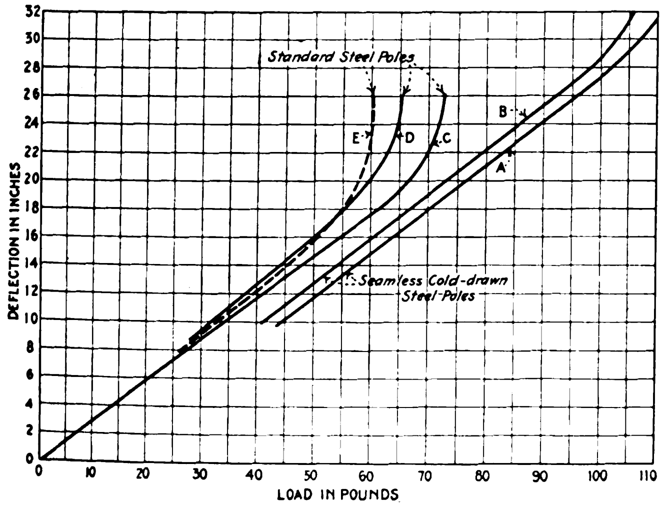
In the ELECTRIC RAILWAY JOURNAL for March 7 the writer discussed some of the troubles experienced with trolley wheels and harps. In this article trolley poles will be considered in like manner.

Poles are made in several different ways. Some are of cold-drawn steel and seamless in construction, while others are rolled up from steel and butt-welded together. The upper end of the pole must be elastic enough to absorb shocks and inequalities in the wire, and it is made as light as is consistent with the strength required. The lightness and flexibility of the pole have much to do with the maintenance of and the life obtained from the trolley wheels.

Poles which give trouble are usually bent, broken or pulled out of their sockets.

POLES BENT, BROKEN OR PULLED OUT

When trolley wheels leave the wire violently the pole becomes bent or broken on striking the overhead construction. Poles also become bent if the tension springs on the base close all the way before the pole is down, because it is then necessary to bend the pole itself in order to get the pole under its retaining hook. The pressure required to bring the pole down under the hook may be great enough to force the pole to take a permanent set.



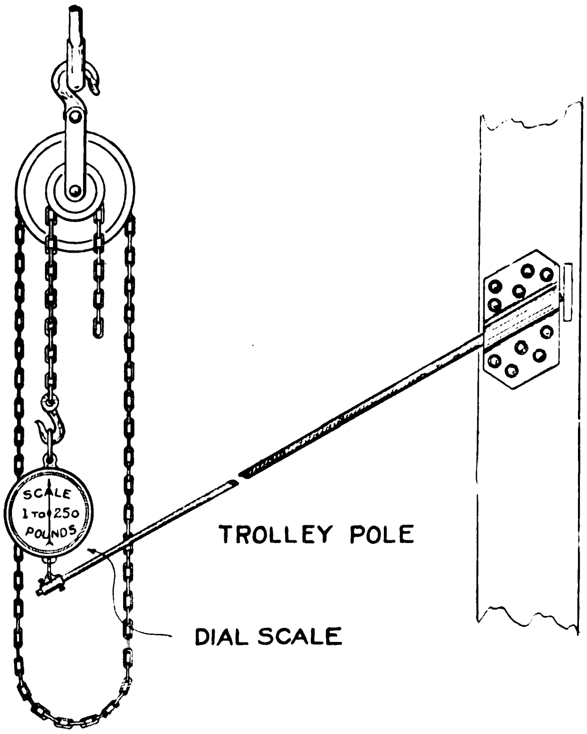
Curves Showing Deflection for Trolley Poles with Different Loads at Free Ends

A pole made of tough material like high-carbon steel or reinforced in some manner is less liable to take a permanent set but it is more liable to break and cause accidents. Most roads prefer to have a pole bend rather than break, but the poles should be stiff enough to avoid excessive trouble from bends. Poles should be straightened cold, as any metal becomes softer after it has been reheated. They should also be straightened between wooden supports, for if straightened between metal supports they are liable to be nicked or kinked.

The usual cause for the pulling out of a pole is that the pole clamp and fork have become worn excessively or that the nuts and bolts in the pole clamp have worked loose. All such nuts should have lock washers and be properly tightened after a new pole is installed. It may be advisable to provide the bolts with cotter keys if the nuts continue to work loose. The clamps and forks should be inspected for wear each time a new pole is installed.

UNIFORMITY OF MATERIAL

Operating companies do not have the time or the apparatus necessary to test poles before placing them in service to see if their quality is uniform or the same as lots previously received. If roads desire to make such a test, however, the arrangement illustrated in an accompanying drawing shows a simple method that could be applied to a few poles taken from each shipment and that would give all the information necessary for a comparison of uniformity.



Testing Trolley-Pole Tubing by Means of a Weight and Chain Hoist

All the apparatus required is a trolley pole clamp, a chain hoist and a spring balance which should register a maximum of at least 100-lb. or 150-lb. pull. The standard trolley-pole clamp should be mounted in such a location that when a pole is installed in the clamp the free end will come under a hoist. Hook one end of the spring balance to the pole and the other to the hoist. Then take readings of the height of the pole from the floor and the pounds tension corresponding to the different heights. This will give the pull in pounds necessary to produce any deflection. By plotting these values curves of the form reproduced will be obtained. The curves shown are for two cold-drawn steel poles and two standard steel poles. As indicated by the bend in the curves, the deflection is proportional to the load up to the point where the pole starts to take a permanent set. The cold-drawn steel poles, as shown in curves "A" and "B," took a slight permanent set with a 105-lb. load, and the standard steel poles shown by curves "C" and "D" did so with a 60-lb. load. The dotted curve "E" is made from a test on the same pole as was used for curve "C" after this pole had been straightened cold, and this last curve demonstrates how much easier it is to distort a pole if it has ever been bent before.

EQUIPMENT AND STORES ECONOMIES ON THE THIRD AVENUE RAILWAY SYSTEM

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY, NEW YORK

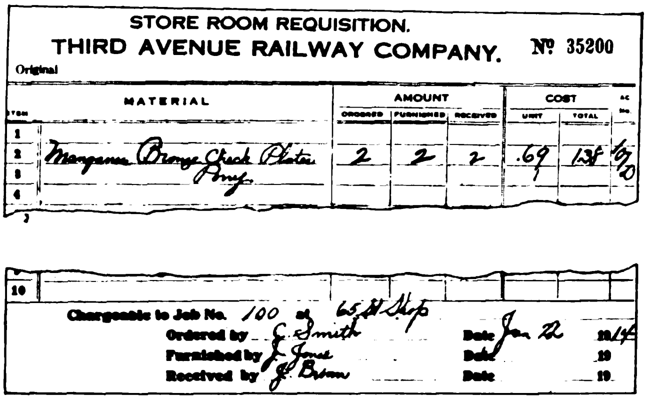
The maintenance costs of the equipment department of the Third Avenue Railway for the past three years show a slight increase over the two years preceding 1913, owing to the fact that in the early part of that year President F. W. Whitridge authorized an increase of 1 cent per hour to all employees of the company. If this increase had not been made, the costs per car mile would have continued downward. In view of the latter fact, it may be interesting to mention a few of the equipment department practices which are in vogue at our Sixty-fifth Street shops.

The saving in the manufacture of controller segments is a good example of piecework economies. New segments cost from $11 to $13 per 100, while we make them at a piecework price of 75 cents per 100. As we made more than 11,000 segments during the past year, the saving on this item alone was approximately $1,000. Again, a new controller finger costs about 9 cents and has a scrap value of only 3 cents. We collect the worn fingers from the carhouses, regrind them at a cost of 1 cent each and then send them out for additional service. Thus we double the amount of wear and still receive the scrap value. As 22,000 fingers were reground during the past year, it is clear that quite a saving was attained even on this trifling item. Our Hampden grinder* for cast-iron pony wheels saved us about $4,000 during the past year. The electric welding plant, which we built up largely of home-made materials, has reclaimed thousands of dollars' worth of gear cases, motor frames, axles, armature shafts, truck sides and other parts from the scrap pile.

Low maintenance costs also follow from the means used to secure the maximum amount of service from the brakeshoes and lubricants supplied to the various carhouses. Each carhouse foreman is required to forward to the office of the superintendent of equipment a monthly report which shows the amounts of the different types of brakeshoes and lubricants which were on hand at the beginning of the month, the amounts received later, the amounts used and the amounts on hand at the end of the month. These figures are recalculated to a mileage basis, and the statistics comparing all carhouses are sent to each foreman. Due allowance is made, of course, for differences in equipment and service. This practice and the standardization of shoes and shoe-heads have reduced lubrication and brakeshoe costs 33 per cent during the past year.

STORES PRACTICES AND ACCOUNTING

The monthly reports from the foremen are also of value in preventing an undue stocking of material. All material for the equipment department is delivered to the general storeroom and charged to the material and supplies account. When material of any kind is required by this department a storeroom requisition of the type illustrated is made out in triplicate. This requisition always shows the account number to be charged. One copy is retained by the foreman who receives the material, and two copies go to the general storekeeper, who enters the cost of the material on the duplicate copy. The storekeeper forwards all duplicates at the end of each day to the distribution clerk of the equipment department. The distribution clerk then posts the proper charges to the various account numbers and, to catch possible errors, checks the amounts as charged by the storekeeper. This distribution is tabulated at the end of each month and forwarded to the accounting department, which then deducts whatever credits may be due, such as scrap, and sends a statement to the equipment department. This manner of accounting has been found very satisfactory because it keeps the equipment department adequately informed about the amounts which are being charged for maintenance.



STORE ROOM REQUISITION.
THIRD AVENUE RAILWAY COMPANY. № 35200
Original

ITEM	MATERIAL	AMOUNT ORDERED	AMOUNT FURNISHED	AMOUNT RECEIVED	COST UNIT	COST TOTAL	AC. NO.
1							
2	Manganese Bronze Check Plates Pony	2	2	2	.69	1.38	107D
3							
4							
10							

Chargeable to Job No. 100 at 65 St Shop
Ordered by C. Smith Date Jan 22 1914
Furnished by J. Jones Date 19
Received by J. Brown Date 19

Specimen of Storeroom Requisition

Particular attention is paid to having the proper account numbers appear on the time cards which go to the distribution clerk. To guard against any irregularities, an itemized list of the various account numbers is supplied to every foreman, outlining the different classes of work embraced. These cards are taken up each morning by the checker, who sees that the proper charges are made and that all piecework quantities are checked. This checker is necessary because most mechanics are more intent on doing their work than paying attention to account numbers. Our account numbers are subdivided to observe the costs of the individual items. For instance, "Repairs to Passenger Cars," Account No. 107, is subdivided as follows:

107A—Repairs to car bodies.
107B—Painting.
107C—Fenders.
107D—Trucks.
107E—Driver wheels.
107EE—Pony wheels.
107F—Hand brakes.
107G—Air brakes (Allis-Chalmers).
107H—Air brakes (National).
107I—Changing equipment from box to open cars and vice versa.
107J—Heaters and lights.
107K—Fare boxes, etc.

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*See ELECTRIC RAILWAY JOURNAL, page 886, May 25, 1912.

The same method is pursued with all the following account numbers, such as:

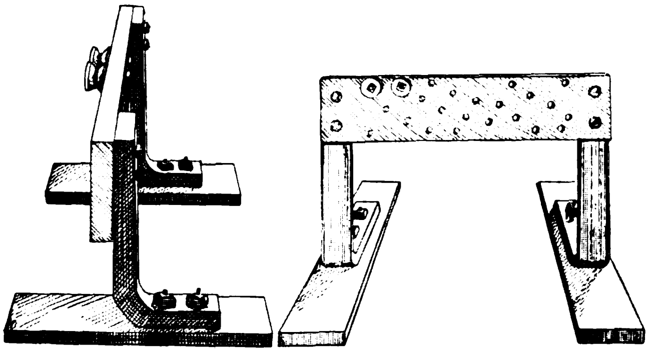
109—Repairs to service cars.
110—Repairs to electrical equipment of all cars.
111—Repairs to shop tools and machinery.
112—Shop expenses.
113—Vehicles.

We include service vehicle maintenance cost as part of the equipment department maintenance, although many other railways do not. In 1913 this item alone amounted to nearly $16,500, or about $0.00056 per car mile.

PIPE BENDER AND POLE STRAIGHTENER

BY JOHN DUNCAN, MASTER MECHANIC FORT DODGE, DES MOINES & SOUTHERN RAILROAD

The operating department of the Fort Dodge, Des Moines & Southern Railroad uses for pipe bending and trolley pole straightening the simple and inexpensive means shown in the accompanying sketch. The contrivance is made from one piece of 1-in. x 10-in. iron, 4 ft. long, into which numerous holes are bored in order to get any angle that is wanted. The bar is mounted on two right-angle irons, the yoke thus formed being bolted to a pair of 2-in. x 6-in. planks, so that the equipment can be shifted to any part of the floor. The sketch also shows a pair of bolted spools used in connection with pipe jobs.



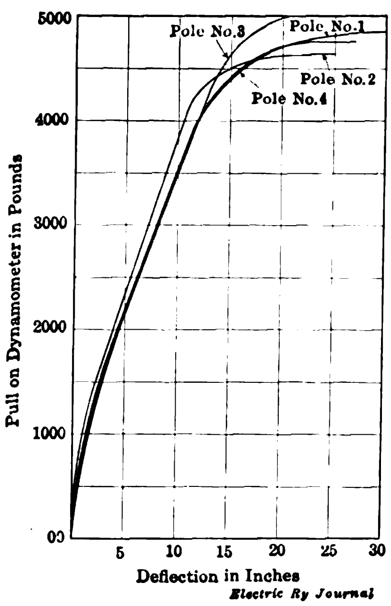
Outfit for Pipe Bending and Pole Straightening

CONCRETE POLE TESTS IN SYRACUSE

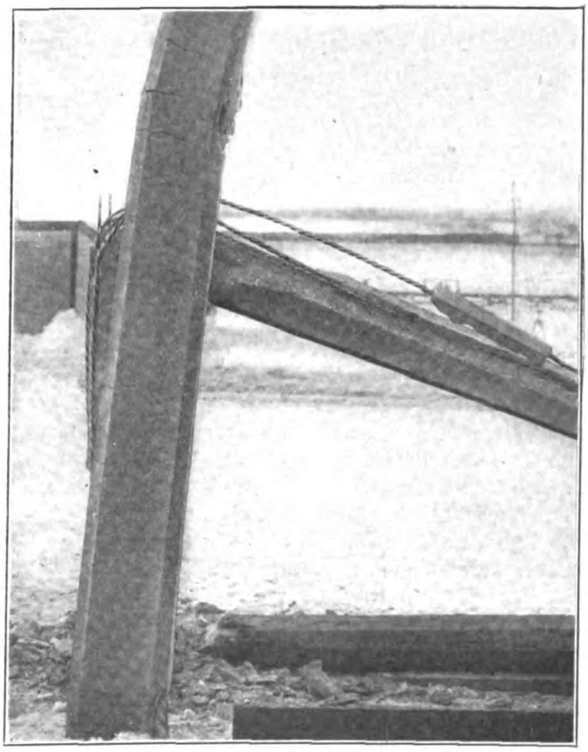
The New York State Railways, Utica-Syracuse Line, have some 1400 reinforced concrete poles in use on their various city and interurban lines. The first of these poles were manufactured in 1910, and since then the method of manufacture has been developed so that the poles have been adopted as the standard throughout for certain lines where there is heavy traffic. The method of constructing the poles and the details of the pole yard were given in the issue of the ELECTRIC RAILWAY JOURNAL for March 15, 1913, page 502. The standard pole for double-track city construction, either span or bracket, is of 7-in. top and 13-in. butt and is 30 ft. long. The standard interurban pole is of 7-in. top, 14-in. butt and is 35 ft. long. An 8-in. top, 14-in. butt, 30-ft. pole is constructed for heavy city work and corners, and an 8-in. top, 17-in. butt, 45-ft. pole is also manufactured for heavy-feeder line work. The standard 30-ft. pole weighs approximately 3200 lb. and costs complete, including all material and labor, maintenance of plant, etc., $12.03 at the yard. This pole is designed to take the place of the steel tubular pole, which costs approximately $35.

RESULTS OF RECENT TESTS

On March 12, 1914, a very satisfactory test of some of the poles was made at Syracuse. Four poles were tested. The purpose of the test was to determine not only the stress-strain diagram for the poles but also the best method of placing the reinforcing rods.



Stress-Strain Diagrams of Concrete Poles



Concrete Pole No. 3, Failing under a 5000-Lb. Pull—Broken Pole in Rear

The poles were 7-in., 30-ft. poles made of concrete of a mixture of one part cement, two parts sand and two parts of stone. The reinforcement for pole No. 1 consisted of four ⅝-in. twisted rods 29½ ft. long placed in the corners and four ½-in. x 23-ft. rods, four ½-in. x 16-ft. rods and four ½-in. x 8-ft. rods evenly spaced along the sides. The same construction was used in pole No. 4. Pole No. 2 was constructed the same as the standard pole with the exception that three of the center rods on each of the two sides were placed back of the rods on a compression and tension side. Pole No. 3 was constructed the same as the standard pole with the exception that a web reinforcement of No. 8 steel wire was wound around the various reinforcing rods at intervals of 5 in. throughout the length of the pole. All of the poles were aged from four to four and a half months.

Poles No. 2 and 3 were tested simply to determine whether or not the bunching of reinforcement on the tension and compression sides, or the installation of web reinforcement, would produce enough greater strength or stiffness over the standard method of construction to warrant the expense of the additional reinforcement, or the inconvenience produced by the necessity of placing poles like No. 2 with a bunched reinforcement in such a position that the tension and compression sides would always be perpendicular to the direction of the stress.

For testing purposes the poles were set 6 ft. in the ground with a rake of 9 in., and a 2-ft. ring of concrete, 1 ft. thick, was placed at the ground line and also at the butt. Wooden poles were placed on the ground between the butts of two of the concrete poles so as to maintain the base of the latter in position. In the tests the poles did not move in the ground more than 1/16 in.

A 7/16-in. steel cable was connected by means of an eye-bolt through the pole under test at a point 21 ft. above the ground line, and a 5000-lb. dynamometer was placed in the cable close to the pole. The cable was passed through a sheave at the same distance from the ground on the pole opposite the one under test. The pull was applied by means of a set of tackle blocks in increments of approximately 200 lb. up to failure. Deflection from the vertical was measured at the point of attachment of the cable by means of a surveyor's transit.

The accompanying curves show the results of the test and bring out the fact that the changes from the standard method of construction involved in bunching the rods are not justified by the resulting slight increased strength of the poles.

The tests described were carried out under the direction of Henry G. Throop, superintendent of lines and buildings New York State Railways.

CORRECTING DERAILMENT TROUBLE FROM MAXIMUM TRACTION TRUCKS

BY R. P. WILLIAMS

A switch may unjustly acquire a bad name for derailments on account of its location, while the derailments may be wrongly ascribed to the type of their construction. When derailments are taken as a matter of course there is a tendency to refrain from an investigation which might cure the trouble.

When a switch is placed in a curve more or less trouble is always expected because it has no tangent at the point end. Of course, no engineer would place a switch in this way if he could avoid it, for no switch can be considered safe if its entrance has no tangent at least one wheelbase long. We have a switch without a tangent ahead, and when we renewed it last we determined that nothing other than its unfavorable location should be left in it to invite derailments. The tongue was ground to a safe bevel, and the mate side guard was ground so that the inner edges of the wheel flange would not bind. We were proud of the completed switch. Judge of our surprise a month later when we were told that derailments were frequent. "Of course," said the transportation inspector, "the derailments are not serious because we always have a man stationed at the spot." It was then decided that the trouble was due to the manganese tongue because it was so much harder than the steel wheels, as indicated by the fine shavings lying about. A forged tongue was installed, and instructions were issued that every derailment be reported. The change from a manganese to a forged tongue did reduce the derailments about 50 per cent, but they were still too frequent for safety. After the forged tongue was worn to what we considered perfect shape, we took the original manganese tongue, ground it carefully to the same shape and put it back in the switch. After a time the derailments began again in spite of the change.

Now that we were satisfied that the switch itself was perfect, we turned our attention to the trucks that were operated over it. Seven repeaters were noted. In each case we found that the trouble was due to such truck defects as these: narrow-gage wheels, heavy side bearings and excessive length of compression bolts. The principal trouble, however, was lack of grease. Heroic measures were taken to cure the last-named defect by detailing men to grease every side bearing whenever the track had been freely sanded after a storm. The result was that derailments at this point were eliminated entirely and the switch lost its bad reputation.

In another instance derailments at a certain new right-hand switch were numerous. This switch had a manganese tongue, and the guard side was too straight. We gave it the proper bevel, with the result that no further derailments occurred except with maximum traction trucks. One offending truck was put over the pit and tested for flange, gage and side-bearing trouble. The only defect found, however, was a slight creeping wear in the forward pony wheel. After this defect was removed the car was tried again but did not show improvement. We then learned that this type of truck was constructed to throw 70 per cent of the car weight on the drivers and 30 per cent on the ponies, and that the trucks were used with the pony wheels leading.

When the test car was returned to the shop the trucks were examined again. This time we found that there was no weight on the right forward pony wheel, and that five-eighths of the compression had been exerted on the left forward pony before the right forward wheel had received any. The records showed that this truck had been derailed at almost every right-hand switch on the line. The cause was therefore readily removed by going over the adjustments of the truck to insure the equal distribution of weight on both pony wheels.

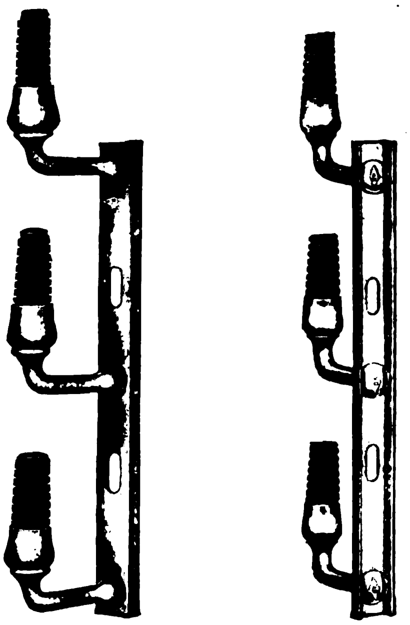
The moral of this experience is that we must examine every side of the case before we say this or that is the fault. The maximum traction truck had acquired an unsavory reputation and was condemned as a class. In fact, derailments were taken so much as a matter of course that motormen took no special pains to avoid them. Now, if derailments occur at any point throughout the system, we examine the truck as well as the special work.

MAINE ELECTRIC RAILWAY STATISTICS

According to the fifty-fifth annual report of the Board of Railroad Commissioners of Maine, there were fourteen electric railroads and one horse railroad in the State on June 30, 1913. The total mileage of street railways was 485.09 miles, there being no increase during the year ending on the above date. The number of employees, including general officers, was 1825 as against 1840 in the year previous. The gross assets of the several electric railways were $32,733,851, and the gross liabilities, including capital stock, $31,949,708, these amounts being increases of $4,878,462 and $4,420,002 for the previous year. The aggregate capital stock amounted to $14,378,968, an increase of $126,800. The total amount of dividends declared during the year was $324,395, an increase of $95,917. Seven of the companies paid dividends varying from 3 per cent to 7 per cent and eight paid no dividends at all.

HOT-RIVETED BRACKETS WITH IMPREGNATED COBS

The impregnated locust or oak cobs used in the construction of the brackets illustrated herewith are slowly forced into the cold-drawn steel shells under a pressure of several tons. A desirable wood thimble is thus secured without the danger of splitting the cobs. The wall plates are made of pressed-steel and open-hearth channels and the brackets of hot-forged open-hearth steel. The brackets are riveted hot with electrically operated riveters. No metal portion of the bracket touches the insulator. These brackets are the product of the Barnes & Kobert Manufacturing Company, New Haven, Conn.



Front and Rear Views of Electric Riveted Brackets

TESTS OF TITANIUM RAILS

The fifth bulletin covering rail reports made by the Titanium Alloy Manufacturing Company has just been issued. This contains detailed results of chemical analyses and physical tests upon a number of rails, titanium-treated and untreated. The bulletin adds to the tests reported previously results from six sections of open-hearth rails rolled during the summer of 1913 for a southern railroad system. Sulphur prints, etched sections and micro-photographs of etched and unetched steel are included in the report, as in the case of previous bulletins. These are remarkably illuminating illustrations of the actual structure of the steel which entered into the different rails.

From the results of all of the tests given in the bulletin it was indicated that the treated rails in general were stronger, and, except in the case of one rail, were less ductile than the untreated specimens, although this is possibly due to the fact that the treated rails were higher in carbon at head and flange than were the untreated rails. In view of the greater average strength and hardness of the treated rails they might have been expected to show lower impact resistance, but the results obtained from them in the endurance tests appear to be about equal to those obtained from the untreated rails.

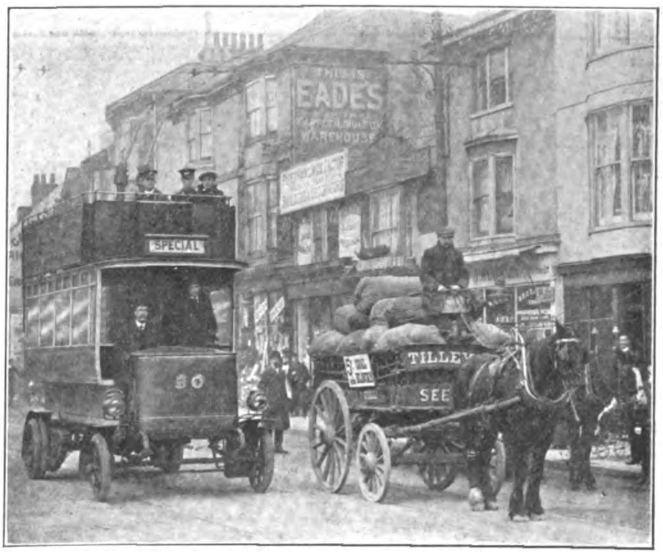
The tests and photographs show the difference between segregated rails with hard centers and other rails with soft centers. The latter gave more uniform results in the vibratory endurance tests and this indicated a greater degree of safety when in use in the track. It was found that, in the treated rails, there existed a pink slag of unknown character, although the latter was not found segregated in dangerous, weakening streaks. Since two of the three untreated rail specimens were badly segregated and none of the three treated rails showed any such indication, the tendency of ferro-carbon-titanium in preventing this harmful condition was believed by the manufacturing company to be well demonstrated.

DOUBLE-DECK TRACKLESS TROLLEY BUS ON TRIAL AT BRIGHTON, ENGLAND

The R. E. T. Construction Company, Limited, London, England, recently loaned to the Brighton Corporation Tramways the first double-deck trackless trolley bus ever built. As shown in the accompanying illustration, this bus is being used in experimental service on a wood-paved street in the famous pleasure resort named. The route is 2100 ft. long and is on a thoroughfare in the center of the town where the flexibility of the trackless trolley bus can best be determined.

The vehicle has a 13-ft. wheelbase and is equipped with two 20-hp completely inclosed commutating-pole motors. Two types of brakes are provided, the hand brake acting on the shaft, and an external expanding brake on each of the back wheels. The apparatus controlled by the motorman is compactly arranged on the front platform. The steering gear is immediately in front of the motorman and the controller is in a convenient position on his left-hand side, while all the other controlling parts are within easy arm's reach. The two trolley bases, one being needed for the return circuit, are situated at the back of the bus. The present bus accommodates thirty-eight passengers, but this vehicle by no means represents the limit of capacity in double-deck buses.

In one of the tests at Brighton the bus was successfully zigzagged across the whole width of the roadway. At present no provision has been made for turning the vehicle at the terminals, but even under the present conditions the motorman is able to turn the vehicle in ten seconds.

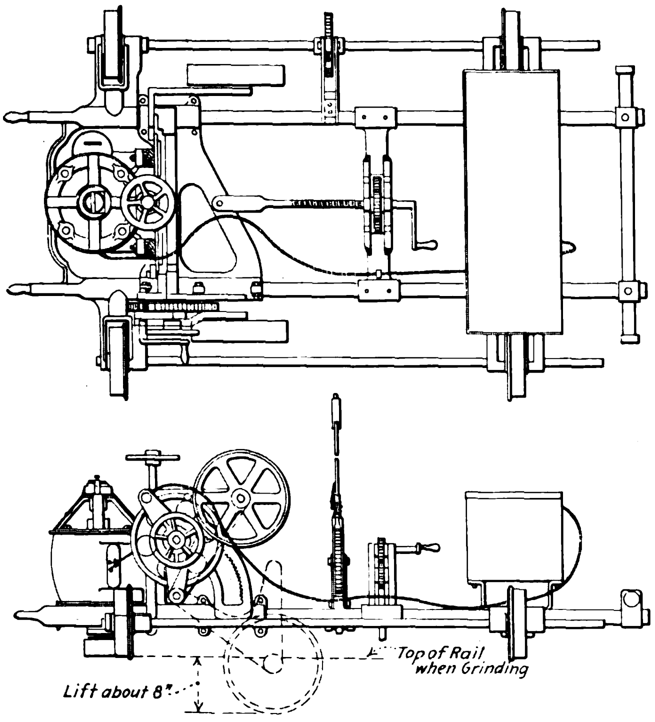


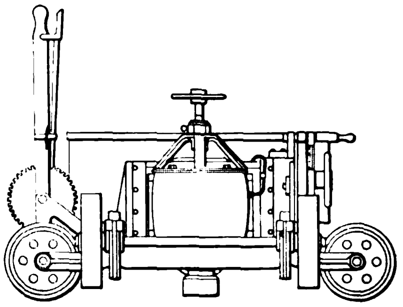
Double-Deck Trackless Trolley Bus Making a Turn-out on a Brighton Street to Pass a Truck

Easy acceleration, almost completely silent running, smoothness of motion, absence of skidding, flexibility of movement and lack of disagreeable odors are the chief advantages asserted for this system in comparison with gasoline buses.

PORTABLE TRACK GRINDER WITH CUP WHEEL

An important auxiliary of the electric joint-welding process of the Indianapolis Switch & Frog Company, Springfield, Ohio, is its improved portable track grinder for producing a smooth finish after the steel or manganese has been added. Among the distinctive features of the machine illustrated are light weight (1500 lb.), freedom from chattering and avoidance of dips or irregular spots even in the hands of inexperienced men. As to the first feature, the weight is so balanced through the carrier wheels that the carriage can be swung around and easily taken from the track by two men in ten seconds. The use of a cup wheel of emery or other abrasive material is perhaps the most characteristic feature. This wheel is driven by vertical motor of 3 hp to 5 hp, and as it is adapted for wet grinding it can cut very rapidly without burning. The carriage is oscillated or propelled by means of a ratchet lever placed in the center. The normal arrangement of the machine will take care of all surface work. However, for grinding down in grooves or for roughing surface work, the motor is thrown from the vertical to an inclined position to permit the attachment of a flexible shaft and ordinary-shaped wheel. This grinder can also be used for the attachment of drills or reamers.





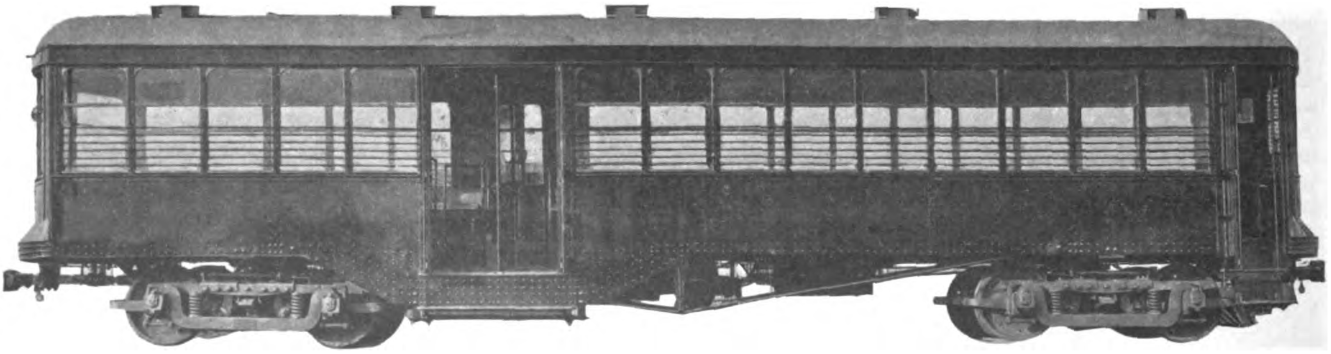
Elevations and Plan of Rail Grinder

SIDE-ENTRANCE CARS AT BIRMINGHAM

Within the past year the Birmingham (Ala.), Ensley & Bessemer Railroad purchased from the Southern Car Company, High Point, N. C., five side-entrance cars of the type shown in the accompanying illustrations. In these cars the side-entrance principle has been adapted to permit separate compartments for colored and white passengers. Colored passengers enter and leave at the left-hand side of the dividing rail while the white passengers use the other side of the rail. As the white compartment is larger, it is also furnished with a front exit. A sliding step is used at the main opening, but a folding step was required at the front to avoid fouling the front truck during swiveling. All doors are hinged and are clear-glazed. The successive steps from the ground to the car floor are 13 in., 14 in. and 10 in. plus a ramp of 3 in. up to the bolster line. As the cars are operated single-ended, the devil-strip side has no doors other than one which is used by the conductor to adjust the trolley pole.

The cars are 47 ft. long over the bumpers and 8 ft. 7 in. wide over all. The side sills are composed of 6-in. x 6-in. x ⅜-in. angles running the entire length of the car. To these angles a 3/16-in. x 32-in. steel plate is riveted to form the side sheathing, a stiff plate girder being obtained by riveting 2-in. x 1½-in. x ¼-in. angle irons to the sides. At the main side opening for passengers the side sill angle is reinforced by ½-in. x 12-in. steel plate bent to shape and extending about 4 ft. on each side of the opening. The side sill angles of the plate girder are further strengthened by an under truss securely fastened to the angle and forming truss posts about 4 ft. in front of the center-door opening. The cross-sills at the main side opening and other smaller floor members are 6-in., 10½-lb. channels. A conduit for cables and pipe was formed by riveting a 5/16-in. x 12-in. plate on top of the center channel structures and a ½-in. x 4-in. plate on the bottom of the center channels at each crossing.

The posts are of white ash or oak. The roof has both white oak and steel carlins, the latter being placed at each side post. The interior finish is of cherry and the ceiling is agasote. The arch roof is supplied with ten Garland ventilators. The car seats fifty-eight.



One-Way Side-Entrance Car for Birmingham, Ensley & Bessemer Railroad

A NEW LIGHT-WEIGHT PRESSED-STEEL TRANSFORMER CASE

A radically different type of transformer case for distributing transformers has lately been placed on the market by the Pittsburgh Transformer Company after several years of development and testing. This new case is of pressed-steel, blue-annealed planished plate, and naturally it is much lighter than the ordinary cast-iron cases.

Transformers are really a tonnage material when considering the handling expense, the lightest and smallest size weighing at least 100 lb., and the medium and larger sizes weighing up to 3000 lb. each, for the pole-type sizes. The handling of a distributing transformer is necessarily done by the line-crew with "hand-power" and "man-power," which is higher in cost than "horse-power." The saving in the cost of freight is, of course, in proportion to the reduction in weight and averages 30 per cent. While it is difficult to get accurate central station costs for the handling of such heavy material as transformers, fairly close estimates show that on 10,000 lb. of transformers shipped 500 miles, the freight, cartage, loading, unloading, warehousing, installing, etc., costs about $110. Thus, a 30 per cent decrease in weight saves $33. The appreciable weight reduction also permits larger transformers to be mounted on poles with the same pole-strain safety factor, or permits the use of smaller poles for given transformer sizes.

Transformer Made with Pressed-Steel Case to Secure Economy in Weight and Shipping Cost

It is asserted, furthermore, that the new pressed-steel case is also much stronger than cast iron, so that it will stand up even better to the everyday wear and tear, rough handling in transit and the accidental bumps and jars which may happen when a transformer is dropped from a pole or wagon. Thus it is reported that in laboratory tests, thirteen blows with a sledge hammer failed to show any injury, except slight indentation of the pressed steel, whereas, two blows of the sledge applied to an ordinary cast-iron case cracked the cast-iron case with the first blow and completely shattered it with the second blow.

Finally, unless the common cast-iron case is carefully japanned it will leak oil, due to seepage through the porous cast iron, and where the cast iron is imperfect or thin, hot transformer oil will seep through the metal and drip. Pressed steel, due to its density and non-porous structure, eliminates the possibility of oil seepage.

1200-VOLT HIGH-SPEED PASSENGER LOCOMOTIVES OF THE OAKLAND, ANTIOCH & EASTERN RAILWAY

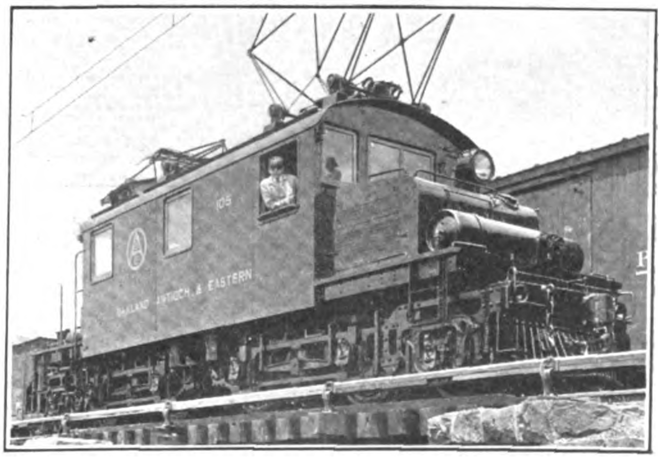
Business has increased so rapidly since the opening of the Oakland, Antioch & Eastern Railway that in order to cope with the heavy through-passenger traffic between San Francisco and Sacramento it has been necessary to place in operation two 62-ton d.c. locomotives for hauling passenger trail cars. Each locomotive when operating at, say, 56 m.p.h. is capable of hauling a train of five steel passenger trail cars, weighing 37.5 tons each, on a level tangent track at 1100 volts. With only three of these cars, one of these locomotives under the same track conditions is able to attain a balancing speed of about 60 m.p.h.

MECHANICAL PARTS

The mechanical parts were built by the Baldwin Locomotive Works, Philadelphia, Pa. There are two articulated trucks each having six wheels, four of which are drivers, making a total of eight drivers per locomotive. Each group of wheels consisting of two pairs of driving wheels and one two-wheeled radial truck has an independent frame. These two truck frames are connected together with an articulation link. The cab is mounted on a separate frame which is supported on the truck frames by eight spring-loaded friction plates, no draw bar pull being transmitted through the cab. The cab center pins carry no weight and are used simply to maintain the position of the cab with respect to the trucks.

The truck side frames are steel castings of the steam locomotive type, 3½ in. wide, with their centers 76 in. apart transversely. These frames have renewable wearing gibs on the pedestals. The two-wheeled trucks under the ends of the locomotive are of the modified Rushton type with radius bars, and are equalized with the driven wheels. In each group of wheels the equalization is continuous on both sides of the locomotive.

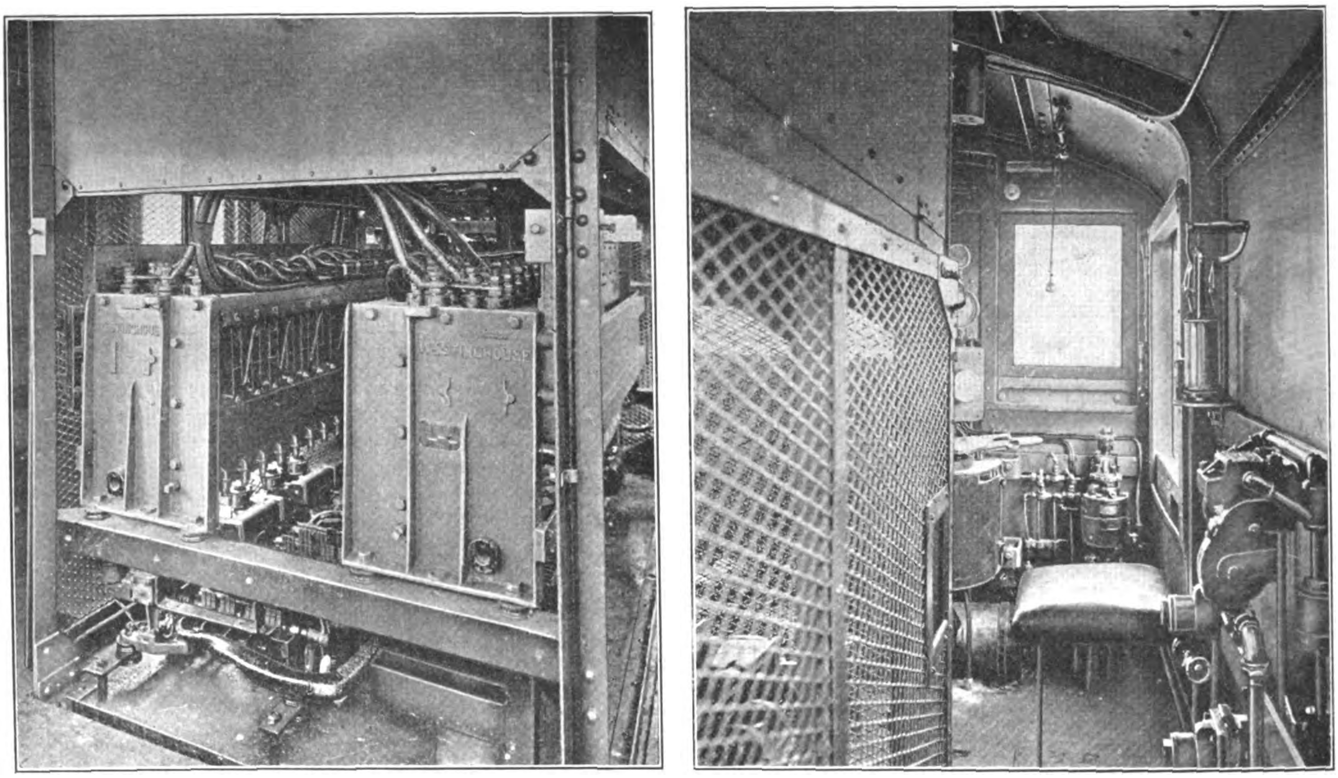
The truck frames are braced transversely at each end and also at two intermediate points. The cross-ties at the inner ends of the frames have radial faces which bear against each other. These cross-ties are provided with spring buffers placed 38 in. apart. In negotiating curves the inside buffers are compressed, thus tending to restore the alignment of the frames after the curve has been transversed. These buffers, being in contact at all times, also help to promote steady riding when passing over rough tracks.



1200-Volt D.C. High-Speed Passenger Locomotive of the Oakland, Antioch & Eastern Railway

The cab underframe is a built-up structure composed of channels, plates and angles. The longitudinal sills are four in number and they consist of 8-in. channels which have a length of 33 ft. 11¼ in. The width over the outside channels is 8 ft. 10 in. This structure is spring supported at eight points, four on each truck frame. The center pins which hold the cab frame in alignment with the trucks are 14 ft. 8½ in. apart. One of these pins is allowed a limited amount of longitudinal movement in the center plate on the cab frame to compensate for the varying distance between truck centers when the locomotive is traversing curves and to relieve the cab frame from buffing shocks. The cab is arranged for double-end operation. The automatic couplers have radial drawbars with centering springs. The principal dimensions of these locomotives are presented in an accompanying table.

ELECTRICAL EQUIPMENT



Interior Views Showing Contactor and Cab Equipment Layout of 1200-Volt D.C. Locomotive

The control for the traction motors is of the Westinghouse unit switch field type (HLF), similar to the type HL except that the field control takes care of the extra field tap of the motors. The control equipment is mounted in a grounded expanded metal cage which protects the apparatus and yet allows it to be accessible for maintenance and inspection.

It will be noted that the reversers or series parallel switches are placed next to the floor, the switch groups and line switches directly over them, and the resistors directly over the switch groups under the roof. The grid resistors are mounted in the main cab over the switch groups and are enclosed in a steel cabinet open at the bottom and provided with hinged doors on each side so as to secure easy access. Ventilators are provided in the roof over the resistance cabinet. Forced ventilation is supplied by blowers mounted on the extended shaft of the dynamotors. The air-brake distributing valve is conveniently located inside the cab where it will be kept sufficiently warm to prevent freezing.

The control apparatus of each locomotive consists in general of the following: Two master controllers, two switch groups, two change-over switches, two control resistors, one series-parallel switch, two reversers, one main switch, one main fuse and box, one set of train line connectors and one set of grid resistors.

Each locomotive is propelled by four Westinghouse No. 308-D-7 250-hp motors. These motors are of the commutating-pole box frame type arranged for field control.

LOCOMOTIVE DATA

Gage	4 ft. 8½ in.
Wheelbase, rigid	7 ft. 4 in.
Wheelbase, total	31 ft. 0 in.
Driving wheels, diameter, outside	42 in.
Driving wheels, diameter, center	37 in.
Driving journals	5 in. x 9 in.
Truck wheels, diameter	30 in.
Truck journals	4½ in. x 8 in.
Width over all	10 ft.
Height to top of cab	12 ft.
Length center to center of coupler knuckles	39 ft.
Weight on driving wheels	86,000 lb.
Weight, total engine	124,000 lb.

Two dynamotors are mounted on each locomotive. These operate the compressor and blowers and supply the required amount of 600-volt direct current for lighting the passenger cars, the locomotive, headlight and for operating the control. Each compressor has a capacity of 35 cu. ft. of free air per minute.

The air brakes, built by the Westinghouse Air Brake Company, are of the type EL especially designed for electric locomotive service. Each locomotive is also equipped with a hand brake for holding the locomotive when stored.

The "near side" stop is attacked in a petition of residents of Independence, Mo., in which city officials were asked to take up with the Metropolitan Street Railway, Kansas City, Mo., which operates in Independence, the question of changing to "far side" stops. The request, however, was due to local conditions. Parkways between the curbing and pavements are said to have been damaged by persons boarding cars under the "near stop" conditions. Where far stops are observed, the passenger is in line with the entrance to the car from the sidewalk crossing and thus need not cross the parkway.

LONDON LETTER

(From Our Regular Correspondent)

The annual dinner of the Tramways & Light Railways Association was held in March. Viscount Chilston, the newly-elected president of the association, presided. Harry England, vice-chairman of the association, proposed the toast of "Our Guests," among whom were included representatives of the tramway officials of the Board of Trade and of the Municipal Tramways Association. He stated that the Municipal Tramways Association and the Tramways & Light Railways Association now worked together and that the feeling that existed between the associations some years ago had entirely disappeared. The toast was responded to by Alderman H. Linsley, president of the Municipal Tramways Association, who stated that it was diplomatic to invite representatives of the Board of Trade, as that was the one department with which they all ought to be on good terms. Alderman Rodgers, Newcastle, also responded to the toast, and extended a hearty welcome to the members of the association, which is to hold its next meeting in Newcastle. The toast of "The Tramways & Light Railways Association" was proposed by J. M. Henderson, who pointed out that there were 286 tramway systems, either company or municipally owned, with 2626 miles of track, the capital amounting to £80,000,000 and the gross annual receipts to £15,000,000. In replying to the toast the chairman spoke of the useful work that both associations had performed in the Houses of Parliament. He expressed disappointment, however, at the recent decision of the House of Lords on the rating question. He stated that they had a warm corner in their hearts for the Board of Trade, and thanked the Postmaster-General for his work in regard to the question of guard wires. He concluded by expressing the hope that the relations of the associations with all the government departments would continue to be of the same friendly character. Arthur Stanley proposed the health of the chairman. This concluded the proceedings, outside of the excellent musical entertainment which had been provided.

The total number of bills deposited in Parliament for the session of 1914 relating to railways, tramways, railless electric traction, etc., and the supply of electricity, gas and water, is 112, as compared with ninety-four of the session of 1913, while the total amount of money proposed to be raised is £19,666,170, as compared with £21,148,410 in 1913, a decrease of £1,482,240.

The Stalybridge, Hyde, Mossley and Dukinfield tramways committee has decided to abolish halfpenny fares on its tramway system except for children entitled to half fares. In the future children between the ages of three and fourteen are to be allowed to travel at half fare. Heretofore the provision in regard to children riding for half fare has applied to those between the age of three and twelve years.

In his speech at the meeting of the Bristol Tramways George White made it clear that the company means to oppose the Bristol Corporation bill for the purchase of the tramways. The chairman referred to the rapid and remarkable development of the motor bus traffic and the charabanc services. The motor bus services are to be further augmented in response to the popular demand, and the summer services of the long distance charabancs are evidently to be increased in the near future.

The Hove Town Council, in reply to a communication from the Brighton authorities, has passed a resolution expressing the opinion that it would be to the best interests of the two towns to test the overrunning system of railless traction. Until this had been done the Council could not agree to arbitration. Having adopted the under-running system, Brighton favors the appointment of an arbitrator to determine what system should be adopted for the authorized through routes. The representatives of Brighton have pointed out that the overrunning system is unsuited to the conditions there, owing to the necessity of crossing certain tramway tracks.

The examiners of private bills have received official intimation of the withdrawal of the bill under which Parliament was asked to incorporate a company to construct an electric railway under the River Tyne between Tynemouth and South Shields.

The Liverpool tramways committee has decided to equip the tramway system with automatic point controllers, such as the one in operation opposite the Town Hall. Vacancies will be found in the carhouses for the boys now engaged as point attendants. The controller which is to be installed will be of the Collins type.

The London County Council is seeking the support of the local authorities to an increase in the speed of the tramcars, and after this has been obtained will approach the Board of Trade for consent. A speed of 16 m.p.h. is permitted on a few routes, and the Council is anxious to have the 12 m.p.h. routes scheduled for the higher speed. The borough councils, however, do not appear to be willing to acquiesce to the proposal.

The report of the Underground Electric Railways, Ltd., London, shows a satisfactory increase, but it is interesting chiefly for facts which it gives in regard to the company's construction work. The work which has been in progress at the Charing Cross station of the Metropolitan District Railway is almost finished, and the new escalators are already in service connecting this railway with the Bakerloo tube which passes underneath. The escalators connecting with the Hampstead tube, which has been extended from the vicinity of the Strand by means of a loop underneath Charing Cross station, will be in service soon. Flying junctions have been constructed at Earl's Court, which will greatly facilitate train movement at that point. The extension of the Bakerloo tube from Edgeware Road to Paddington was opened in December, 1913, and the traffic is developing satisfactorily. Escalators are being installed on this line at Oxford Circus and Baker Street stations. The construction of the Queen's Park extension of the Bakerloo Railway, by means of which access will be had to the main line of the London & North Western Railway when trains will run from the whole tube system of London as far north as Watford, is also well under way and should be completed this year. Work has also been commenced on the extension of the Central London Railway from Wood Lane to connect with the Ealing and Shepherd's Bush line of the Great Western Railway. The City & South London Railway, also controlled by the Underground company, shows a slight falling off in the receipts, but after the tunnels of this railway have been enlarged, so as to allow intercommunication of rolling stock, it is expected that the traffic will increase.

The Metropolitan Railway is bettering its service to Harrow, and is preparing to extend to Richmond. The London & North Western Railway refers in its annual report to the electrification to Watford in conjunction with the Bakerloo Railway, and also in conjunction with the North London Railway which will bring the electrified lines into Broad Street station in the city. Nearly £2,500,000 will be spent by the London & North Western Railway during 1914, of which the new power station at Stonebridge Park will absorb more than £500,000. The London, Brighton & South Coast Railway reports excellent results due to its policy of electrification of its suburban lines. This company is pushing on with the electrification of the suburban services and hopes to complete the section from Balham through Streatham Common, Norbury and West Croydon to Wallington by the end of this year. Other sections will then be taken in hand as quickly as possible, and it is hoped that the complete electrification of the company's suburban lines will be finished within a period of four years.

The Midland Railway reports that it is now widening the line on certain portions of its route between London and Tilbury in preparation for electrification. The company is asking for power to issue £1,000,000 of new capital. The London & South Western Railway is engaged in the work of electrifying the Thames Valley branches and the necessary main lines connecting the suburban area with its huge new station at Waterloo.

The board of trade of Swansea has, after considerable agitation, consented to the construction by the Corporation of the Mount Pleasant Light Railway. The new line will have one of the steepest grades in England.

A. C. S.

News of Electric Railways

Rapid Transit Developments in Philadelphia

On March 25 the Philadelphia Rapid Transit Company submitted to the special committee on rapid transit of Philadelphia a plan under which the company would agree to operate the additional rapid transit lines proposed in a report recently issued by the city. These include (1) an elevated railway to Frankford to be built by the Rapid Transit Company and operated as an extension to the Market Street Elevated service; (2) a tube under the Delaware River to be built by interests holding that franchise, this line to be leased to the Rapid Transit Company and operated as an extension to the Market Street Elevated service with an additional fare of 3 cents therefor; and (3) additional subway and elevated lines, including the Broad Street subway and the Chestnut Street subway-Darby elevated, to be built by the city and operated by the company with free transfers between the surface lines.

In this connection the company pointed out that at present it is making a charge of 3 cents for transfers between surface cars (or exchanges, as they are called at Philadelphia) at a great many points and that this rate of fare is protected by the contract between the company and the city, dated July 1, 1907. An analysis of the receipts of the company shows that it is absolutely dependent upon the revenue from this exchange charge.

The sum produced by this extra 3-cent charge for exchange tickets during the last three fiscal years was as follows: 1911, $739,296; 1912, $774,764; 1913, $794,264; and the same rate of increase (4 per cent) gives the figures: 1914, $826,034; 1915, $859,075; 1916, $893,438. The company says that if it puts a free transfer system in operation, as has been advocated by the Council, it should be compensated for the elimination of the returns from the 3-cent exchange ticket and suggests as a means by which this could be accomplished that it should be relieved of (1) the annual payment in lieu of repaving streets, at present about $500,000; (2) the annual payment to the city for tax on dividends of certain of the underlying companies, now approximating $115,000; and (3) the annual payment into the sinking fund under the contract of July 1, 1907, at present $120,000. The total of these various items amounts to the sum of $735,000.

As the problem for the fiscal year, 1915, is to compensate for a loss of $859,000, there would still remain a deficit of $124,000 which the Rapid Transit Company would be obliged to overcome by economy in operation and by rerouting and combining certain lines to meet the new conditions arising from the enlargement of the transfer privilege. The company would, in this event, resume payments into the sinking fund in 1924, upon a basis which, if the contract were extended for an additional period of seven years, would produce the sum of $30,000,000, with which the city could purchase the capital stock of the Rapid Transit Company at the termination of the contract. In the same statement it also outlines the other conditions under which it will agree to operate the rapid transit lines which have been proposed for construction.

A. Merritt Taylor, transit director of the city, opposed the proposition made to the city by the Rapid Transit Company and has summarized the main points of difference between the city and the company in the following comparative table:

P. R. T. PROPOSITION		TENTATIVE SUGGESTIONS OF THE DEPARTMENT OF CITY TRANSIT	
COMPANY'S INVESTMENT—ESTIMATED COST		COMPANY'S INVESTMENT—ESTIMATED COST	
Frankford elevated, structure	$6,510,000	Frankford elevated, structure	$6,510,000
Frankford elevated, equipment	2,402,000	Frankford elevated, equipment	2,402,000
		Broad Street subway, equipment..	7,393,000
		Chestnut - Darby, equipment	2,045,300
Total	$8,912,000	Total	$18,350,300
(Company to secure lease of Camden tube, costing $6,000,000 in 5 per cent bonds, and ownership thereof to be vested in P. R. T.)		(Company to secure lease of Camden tube, costing $6,000,000 in 5 per cent bonds, and ownership thereof to be vested in P. R. T.)	
CITY'S INVESTMENT		CITY'S INVESTMENT	
Broad Street subway, structure..	$34,682,000	Broad Street subway, structure...	$34,682,000
Broad Street subway, equipment..	7,393,000		
Chestnut subway-Darby elevated, structure (note)	12,810,000	Chestnut subway-Darby elevated, structure (note)	12,810,000
Chestnut subway-Darby elevated, equipment (note)	2,045,300		
Total	$56,930,300	Total	$47,492,000

NOTE: P. R. T. takes the position that Market Street elevated line has insufficient reserve capacity to justify the temporary operation of the Darby elevated service through Market Street, and positively refuses to make the necessary arrangement therefor. If this be final, the Darby elevated cannot be built until traffic conditions justify the building of the Chestnut Street subway.

METHOD OF OPERATION	METHOD OF OPERATION
Company to operate all city-built and city-equipped lines on the following basis:	Company to operate all city-built lines on the following basis:
1. From net earnings deduct:	1. From net earnings deduct:
(a) No company investment in equipment under this plan.	(a) Interest on company's investment therein at 6 per cent, cumulative.
(b) Preferential payment for decrease in company's net income of year prior to operation of city-built line, viz.: year ending June 30, 1918.	(b) For the first five years of operation of each city-built line, but not thereafter, a preferential payment to equal the net decrease, if any, in the net income of the company derived from all its surface lines and its rapid transit lines below the actual net income for year to June 30, 1914, which decrease is caused solely by the diversion of traffic by such city-built lines. Amount of this preferential payment, or payments, not to exceed $500,000 in any one year. In case of disagreement as to amount of preferential payment, question to be arbitrated by one representative each of city, company and public service commission, whose findings shall be subject to review and final decision by the public service commission.
(c) Interest and sinking fund on city's investment, cumulative.	(c) Interest and sinking fund on city's investment, cumulative.
2. Divide balance of surplus earnings between city and company (half and half).	2. Divide balance of surplus earnings between city and company in proportion to their relative investment in all new rapid transit lines.
3. Outside of delivery district free transfers with all surface lines at points of intersection at stations, and also with other rapid transit lines; division of fare to be 2½ cents to city and 2½ cents to company.	3. Free transfers between all surface lines and new rapid transit lines (Camden excepted) at points of intersection at stations, division of fare to be 3 cents to city and 2 cents to company; and also with other rapid transit lines, division of fare to be 2½ cents to city and 2½ cents to company; such free transfers to be regulated to such extent only as may be necessary to protect the interests of the public.
4. When city builds Chestnut subway - Darby elevated line, company to operate it with Frankford elevated line as a through line on above basis, company to be allowed 6 per cent return on its investment in Frankford line.	4. When the city builds Chestnut subway-Darby elevated line, company to operate it with Frankford elevated line as a through line on above basis, and the earnings on Frankford-Chestnut-Darby Line to be divided on above basis.
	5. City to have right to require company to operate on above basis additional rapid transit lines or extensions which the city may from time to time build and equip.
	6. The profit from Camden tube, at 3-cent fare, the 2 cent payment to surface lines for transfers and preferential payment to compensate for surface losses.

	7. City to have right to require company to extend its existing surface system from time to time as the Public Service Commission may determine to be necessary for public convenience.
	8. 1907 contract to be extended for seven years. In future division of earnings provided under contract, city to receive during last seven years of extended contract and thereafter (if property is not purchased at expiration of extended term) all surplus earnings over 6 per cent on par value of P. R. T. stock.
Note:—City to be permitted to capitalize its interest and sinking fund accruals to end of first year of operation. Company to be permitted to capitalize its interest accruals to end of first year of operation. Such accruals as are capitalized shall not be taken out of earnings.	Note:—City to be permitted to capitalize its interest and sinking fund accruals to end of first year of operation. Company to be permitted to capitalize its interest accruals to end of first year of operation. Such accruals as are capitalized shall not be taken out of earnings.
Universal Transfers.	Universal Transfers.
Beginning Oct. 1, 1914, company to discontinue 3-cent exchange tickets and establish outside of central delivery district universal free transfers between surface lines and between surface and rapid transit lines. To compensate company for annual loss of revenue from exchange tickets, which amounted to $803,108 for year to June 30, 1913, city to amend 1907 contract as follows: 1. Extend expiration of contract for seven years from 1957 to 1964. 2. City to waive annual payments in lieu of repairs of paving and license fees, amounting to upward of $500,000 per year, and also tax on dividends of subsidiary companies of about $116,000 per year. 3. Present sinking fund payments of $120,000 per annum to be suspended for next ten years and thereafter to be so graded as to extinguish par value of company's stock in remaining forty years.	The above plan suggested by the department would eliminate over one-half of the exchange tickets automatically in a manner which would impose no undue burden on the P. R. T. Company or on the city. The remainder thereof should also be eliminated in a manner to be agreed upon and universal transfers should be secured to all.

Letters of E. T. Stotesbury and T. E. Mitten to the board of directors of the Philadelphia Rapid Transit Company, in which they agreed a new and broader financial plan should be adopted by the company to meet the new situation caused by negotiations with the city, have been made public by the company. These letters were read and considered at the meeting of the board on March 25, prior to the meeting of the company and city representatives at which Mr. Taylor objected to the terms proposed by the company. The letter from Mr. Stotesbury was accompanied by a letter from Mr. Mitten to him. Mr. Stotesbury pointed out that the city's elevated and subway development plans necessitated the company's co-operation, or, in the absence of that, of meeting such active competition as would follow the construction and operation of such additional lines. He observed that even though expected earnings materialized the possibility of competition would make it impossible to sell new securities based solely upon the company's credit.

Mr. Mitten, in his letter to Mr. Stotesbury, submitted the following tables of the earnings of the company during the Stotesbury management, as compared with the year immediately preceding that management:

Year ended June 30:	1914	1913	1912	1911
Estimate:	(12 months)			
Gross earnings....	$23,525,000	$22,625,000	$21,750,000	$20,900,000
Operation	14,682,000	14,140,625	13,593,750	13,062,500
	$8,843,000	$8,484,375	$8,156,250	$7,837,500
Fixed charges.....	8,843,000	8,768,000	8,573,000	8,489,500
*Deficit	....	*$283,625	*$416,750	*$652,000
Actual	(8 months)			
Gross earnings ...	$16,025,074	$23,927,179	$22,700,692	$21,529,469
Operation	9,434,982	14,205,755	13,948,831	13,149,060
	$6,590,092	$9,721,424	$8,751,861	$8,380,409
Fixed charges	6,401,075	9,211,841	8,902,350	8,795,969
Surplus—*Deficit	$189,017	$509,583	*$150,489	*$415,560

Increase in gross earnings—Estimated, 4 per cent per annum; actual, 4.5 per cent. Operating ratio—Estimated 62.5 per cent gross; actual, 60.2 per cent.

Continuing, Mr. Mitten said:

"The surplus earnings for the eight months ending Feb. 28, 1914, amount to $189,017, as against $186,476 for the same period of the previous fiscal year. Presuming that the results for the full year ended June 30, 1914, be not less than for the preceding fiscal year, there will then have been a net surplus of approximately $500,000 during the four years, as against an estimated total deficit of $1,352,375.

"The capital expenditures follow:

Total capital expenditures three years to June 30, 1914.		$14,000,000
As the original plan of financing was enlarged by the authorization of two car trust agreements, the certificates outstanding thereunder are for the purpose of this comparison, here deducted..................		5,888,000
		$8,112,000
This net total of capital expenditures being covered by 1912 5 per cent bonds provided therefor, as follows:		
Issued and outstanding......................	$5,028,000	
In treasury	972,000	
Available for use during year commencing March 1, 1914..........................	2,000,000	$8,000,000

"There then remain $2,000,000 of the 1912 5 per cent bonds available for the capital expenditures during the two years ending June 30, 1916. It would have been recommended that at least the major portion of this amount should be expended during the next fiscal year ending June 30, 1915, this in order that the beneficial effect from the total authorized expenditures be so much sooner realized by the public."

Bids for Subway Construction in New York

The Public Service Commission for the First District of New York has opened bids for the construction of the section of the Eastern Parkway subway, Brooklyn, known as Section No. 1-A of Route No. 12, in Flatbush Avenue between St. Marks Avenue and the Prospect Park Plaza. For the greater part of the distance the structure will be a six-track subway. Four tracks are to be used by the Interborough Rapid Transit Company for the Eastern Parkway subway, and the other two tracks will be used by the New York Municipal Railway Corporation to connect the Fourth Avenue subway with the Brighton Beach Railroad. According to unofficial figures the lowest bidder for the construction of this section was the Cranford Company, Brooklyn, at a total of $2,225,520. The next lowest bidder was the Litchfield Construction Company, at $2,330,000, and the third was the Mason & Hanger Company at $2,498,000. The contract was subsequently awarded by the commission to the Cranford Company.

Mr. McKinley's Welcome Home

William B. McKinley, president of the Illinois Traction System, who returned to his home in Champaign, Ill., on March 25, 1914, after a seven-months' tour around the world, was accorded a reception by the citizens of Champaign-Urbana and the students of the University of Illinois upon his arrival in his home community. Mr. McKinley's private car was run over the Illinois Traction System to Danville to meet him. Dinner was served on the return journey. The car reached Urbana at 6.40 p. m., and at the courthouse square in Urbana a reception was held and the guest made a brief address. The special car then proceeded to the campus of the University of Illinois, about 1 mile to the west, and Mr. McKinley and his party alighted from the private car and with the University band leading a line of march was formed to the University Armory. Here David Kinley, vice-president of the university and professor of economics, presided. The mayors of both cities, the presidents of the commercial organizations, representatives of various student organizations, the president of the University Young Men's Christian Association, a representative of the Urbana high school and a number of other speakers welcomed Mr. McKinley. The McKinley party then entered automobiles and were driven to the McKinley home in Champaign. The closing part of the program was held from the front porch of the McKinley home in the presence of 3000 people who assembled on the lawn.

As Mr. McKinley landed at New York he was handed a silver tube containing an invitation signed by about 400 citizens of Decatur asking that he come to their city. Mr. McKinley and his party accordingly proceeded to Decatur on the evening of March 26. The reception at the Decatur Club was almost as large and enthusiastic as was the one in Champaign-Urbana.

The London County Council Tramways

The report of the London (England) County Council issued recently contains an elaborate review of the tramway undertakings of the Council. A table was published showing the position of the tramways in London during the year ended June 30, 1889, a few months after the Council came into being. The total length of route line at that time was 129⅛ miles, the total paid-up capital £3,478,126, the working expenditures £722,983, the net receipts £213,533 and the number of passengers, 169,120,000.

The following table shows the progress made with the electrification and extension of the system:

Year	Electric (in Operation) at End of Year, Route Miles	*Horse (Including Lines in Process of Reconstruction) at End of Year, Route Miles	Approximate Total, Route Miles	Remarks
1902-3	Some lines undergoing reconstruction	88⅝	88⅝	
1903-4	19¼	69⅜	88⅝	First electric tramways opened for public traffic on May 15, 1903.
1904-5	26⅝	68¾	95⅜	
1905-6	30⅜	73⅝	104	Includes ⅜ mile in Archway Road worked by Metropolitan Electric Tramways.
1906-7	58⅞	57⅞	116¾	
1907-8	68⅝	51¾	120⅜	
1908-9	85¾	42⅜	128⅛	Includes ⅜ mile in Archway Road worked by Metropolitan Electric Tramways, and ⅜ mile in Leabridge Road worked by Leyton Urban District Council.
1909-10	116¼	19¼	135⅜	Includes 2 miles in Archway Road and Harrow Road worked by Metropolitan Electric Tramways and ⅜ mile in Leabridge Road worked by Leyton Urban District Council.
1910-11	127⅝	16⅝	144¼	Includes 3¼ miles in Archway Road and Harrow Road worked by Metropolitan Electric Tramways.
1911-12	132⅝	13⅝	146¼	Do.
1912-13	138¾	9½	148¼	Do.

The rolling stock in each year from and including 1903 was as follows:

	Electric Cars	Horse Cars
1902-3	—	517
1903-4	306	290
1904-5	401	227
1905-6	414	216
1906-7	671	723
1907-8	965	621
1908-9	1170	516
1909-10	1326	127
1910-11	1551	107
1911-12	1584	96
1912-13	1676	74

The following table shows the number of passengers and the total receipts for the last eleven years:

	Passengers	Total Receipts £
1902-3	109,615,496	444,698
1903-4	133,139,085	536,239
1904-5	164,818,560	682,095
1905-6	183,512,421	782,210
1906-7	314,227,090	1,414,604
1907-8	372,515,754	1,663,031
1908-9	412,913,811	1,847,451
1909-10	451,439,216	2,023,004
1910-11	504,715,300	2,232,818
1911-12	533,440,235	2,356,181
1912-13	512,652,700	2,251,729

The cost of reconstructing the tramways for electric traction is charged to capital account and, in accordance with the usual practice, repayment is spread, as regards lands and buildings, over sixty years, and as regards permanent way, cars, machinery and other short-lived items, over twenty-five years. In 1908 the Council decided that provision at the rate of 2-3d. a car mile would be sufficient, but that the adequacy of the provision should be reconsidered in five years' time. At the same time the Council, as an additional precaution, decided that for five years from April 1, 1908, any surplus after providing for renewals at the rate of 2-3d. a car mile should be set aside for general contingencies. The title of the "renewals reserve fund" was altered to "renewals fund" and the new temporary fund was named the "general reserve fund." The amounts credited to these funds in each year since 1907-8 are as follows:

	Renewals Fund	General Reserve Fund
1907-8	£51,329	£34,634
1908-9	107,570	—
1909-10	132,231	59,878
1910-11	129,229	103,198
1911-12	138,152	84,551
1912-13	497	—

The number of car miles run in recent years on the Council's tramways at workmen's fares, and the number of passengers on these cars follow:

Year	Car Miles	Number of Passengers
1906-7	2,200,090	19,528,799
1907-8	3,408,985	27,977,412
1908-9	3,948,168	32,083,034
1909-10	4,450,142	36,354,226
1910-11	5,169,237	42,380,597
1911-12	5,439,026	47,571,105
1912-13	5,822,713	49,695,801

Electrification References at British Railway Meetings

Generally speaking, it may be stated that at the annual meetings of British railway companies this year the chairmen have given more particulars to the public than usual and the trend of their remarks has been in favor of electrification. This undoubtedly has been brought about by the successful electrification scheme of the underground railways of London, and by the severe competition of motor omnibuses, electric tramways and tube railways. The experience of the Brighton Railway has also helped to show the other railways what may be expected from electrification of suburban lines, and there now remain only a very few railways with terminals in London which have no electrification scheme in hand. One of these is the Great Eastern Railway, which recently appointed H. W. Thornton, late of the Long Island Railroad, as its general manager. An electrification scheme will probably be evolved there.

Some of the railways which do not reach London are also busy with electrical schemes, and the Northeastern Railway in its annual report refers to the electrification of the mineral lines between the Shildon and Newport sidings, a distance of 18 miles. The cost of this work, including the provision of ten locomotives, is estimated at £150,000. The first of the locomotives is almost finished, and the work of equipping the lines is well in hand. It is expected that the system will be ready for operation by electricity by the end of the year. The Lancashire & Yorkshire Railway is engaged with the electrification of its line from Manchester to Bury, on the same system precisely as on the electric railway between Liverpool and Southport. Meantime, the high-tension electrified line in the vicinity of Bury is attracting attention, and though no formal description of it is yet available it is understood that the results have been satisfactory.

With regard to the electrification scheme which the London & Southwestern Railway has in hand, it is interesting to note that it has been decided to remodel the existing railway carriages for electric operation. The regular electric train will be composed of two motor cars and a trailer. Six-coach trains will be run during the rush hours. The leading motor coaches will terminate in a pointed end for the purpose of diminishing wind resistance.

The York Corporation is confronted with a difficult problem in endeavoring to provide adequate tramway services without destroying the features of this historic town. The intra-mural streets, with few exceptions, are narrow and congested, but they contain many fine examples of medieval domestic architecture. The existing tramway system pierces the walls only once. It is now proposed to extend the system from near the center of the city to the Hull Road district, a thickly populated area on the northeastern side of York lying outside the walls. The proposed new route will pass along Walmgate to Walmgate Bar, the only gate in the city to retain its barbican, but the old gateway will not be interfered with, as a single line will pass through an arch at the side of the bar, built many years ago under a street improvement scheme.

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*The northern tramways, about 48 miles in length, were worked by the North Metropolitan Tramways under lease up to April 1, 1906.

H. M. Byllesby on Depreciation

In the recent annual report of the Northern States Power Company, H. M. Byllesby, president of the company, gives the following interesting discussion concerning the manner of appropriating amounts out of the earnings of public utilities for depreciation:

"All of the properties of the company have been fully maintained to 100 per cent efficiency. The cost of this maintenance has been charged to operation. Beyond this no arbitrary charge has been made out of current earnings to represent any accruing depreciation which has not become evident, except in certain particular instances amounting to the sum of $67,861. The question of an allowance for accruing depreciation beyond the full maintenance of the property is one which is under discussion at the present time and upon which the most divergent views are expressed by operating officials. On the one hand, it is contended that beyond maintenance to 100 per cent efficiency no further arbitrary depreciation should be charged. On the other hand, it is contended that in addition to the full maintenance a certain definite allowance for accruing depreciation should be made. The amounts so to be allowed, whether based on percentages of gross income or percentages of depreciable value of the property, vary from the smallest amounts to amounts which are far beyond the possibilities of any property to sustain with present rates.

"In the meantime, no distribution has been made on the common stock of the Northern States Power Company since its formation. The earnings which have accrued on the operating statements as applicable to that purpose have been reinvested in the plant and extensions to the service. This policy will be continued until such time as a more definite program as to depreciation has been generally adopted by public service companies similarly situated or until, by the establishment of public utility commissions in the states wherein the company operates, more definite rules on this subject are laid down for the guidance of the officers. Then the officers will put into effect in this property a working plan for the definite providing of accrued depreciation beyond the full maintenance which the properties always have.

"Certain of the real estate holdings of the company have increased pronouncedly from the general appreciation in values in their vicinity. These appreciations in value should be taken into account in any consideration of the more or less academic question of accruing depreciation where properties have been fully maintained."

Increase in Wages in Danville.—The Danville Street Railway & Light Company, Danville, Ill., has granted an increase in pay to the street railway employees. All three-year men will receive $2.30 a day; two-year men, $2.20 a day and one-year men, $2.10 a day. The increase amounts to 10 cents a day.

New Oregon Road Placed in Operation.—The line of the Southern Oregon Electric Railway in Medford, Ore., was placed in operation on March 20, 1914. C. G. Bullis, the manager of the company, has announced that work will be begun this month on the construction of a 2-mile extension through Medford to Siskiyou Heights.

Third Arbitrator for Middlesex & Boston.—George L. Mayberry, Waltham, Mass., has been selected as the third member of the special arbitration board which will sit in the wage dispute between the Middlesex & Boston Street Railway and the local branch of the Amalgamated Association. An increase of from 6 cents to 7 cents an hour is sought by the men.

Appeal of Montreal Tramways Dismissed.—The Court of King's Bench, Montreal, has dismissed an appeal of the Montreal Tramways from the decision of the Quebec Public Utilities Commission ordering it to give details of the working of the company. The contention of the company was that the commission had no jurisdiction, but the court held that the commission had ample powers.

Reported Electrification of Steam Line Between Warren and Youngsville.—The statement was made in Buffalo a few days ago that the Dunkirk, Allegheny Valley & Pittsburgh Railway, which is controlled by the Lake Shore & Michigan Southern Railway, will be electrified between Warren, Pa., and Youngsville, a distance of 9 miles. That this work will be carried out in the near future is unlikely as no provision for it has been made in the current expenditures of the company.

Abandonment of Car Building Plans for New Orleans.—The New Orleans Railway & Light Company, New Orleans, La., has abandoned the plan which it has had under consideration for some time to build all its own cars and will shortly place an order for fifty new cars. Until recently the company built eight or ten cars a year at its own shops. When the need of new cars became apparent recently, J. S. Pevear, vice-president of the company, had a number of plans prepared and submitted them to W. B. Thompson, head of the department of public utilities of the city, with the end in view of adopting a type of construction which would be satisfactory to the officials of the city.

Presentation of Toronto Purchase Agreement Postponed.—Mayor Hocken of Toronto, Ont., explained to the City Council on March 23, 1914, the absence of the agreement for the purchase of the property of the Toronto Railway and the Toronto Electric Light Company by the city. The agreement was to have been presented on that day. He said that in spite of the efforts of the Board of Control and the Corporation Counsel it was impossible to complete the agreement in time for the meeting. The work was progressing satisfactorily, although the power contract was very intricate. The Mayor said that the Corporation Counsel had informed him that with the settlement of the power contract and the conditions governing the entrance of radial electric railways the agreement could be completed within forty-eight hours.

Special Public Utilities Number.—The New York *Evening Post* published on Monday, March 30, 1914, its first public utilities supplement and announced that it will inaugurate the policy of giving regularly greater recognition than hitherto "to the industries and investment activities which have come to be included under the general title of public utilities." The supplement was divided into two sections of fourteen pages each and contained many signed articles on different phases of public utility work. Among the contributors to the supplement who are well known in the electric railway field were James E. Sague of the Public Service Commission for the Second District of New York; Alexander C. Humphreys, president of Stevens Institute; Paul Leake of the American Public Utilities Company; F. W. Stevens, formerly chairman of the Public Service Commission of the Second District of New York; Francis T. Homer of Bertron, Griscom Company; C. Loomis Allen of Allen & Peck, Inc.; Francis T. Blossom of Sanderson & Porter; Edwin Gruhl, assistant to the president of the North American Company; George Williams of Henry L. Doherty & Company; Arthur Williams of the New York Edison Company; Stephen L. Coles of the Society for Electrical Development, Inc., and Henry G. Bradlee of Stone & Webster.

Spread of Workmen's Compensation Legislation.—The rapidity with which compensation laws are superseding employers' liability laws as a method of dealing with the results of industrial accidents is indicated in bulletin No. 126 of the Bureau of Labor Statistics entitled "Workmen's Compensation Laws of the United States and Foreign Countries." This bulletin recounts the activities of the twenty-eight commissions appointed in this country to consider the subject, in so far as reports were made, and reproduces the text of the laws of the twenty-three States which have enacted such legislation, besides the federal statute, the executive order relative to the canal zone, and the railway employees' bill that was before the Sixty-second Congress. Accounts of the operations of the laws and of their construction by the courts are also given. The laws of their respective States have been declared constitutional by the courts of last resort in Massachusetts, New Jersey; Ohio, Washington and Wisconsin, though in Montana and New York the opposite result was reached; in Montana because of the presence of an unessential feature of the law that permitted double liability, while in New York the principle of the law was held to be in conflict with the constitution of the State. The constitution was amended last year and a law enacted to express the will of the people.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS.

The committee on street railways has recommended that the petition for the consolidation of the Connecticut Valley Street Railway and the Northern Massachusetts Street Railway be referred to the next Legislature. The committee has sent in adverse reports upon the bill extending the jurisdiction of laws relating to street railways to trackless trolley companies; upon the Niland bills providing for the purchase of the Boston Elevated Railway by the State, and upon the bill prohibiting the operation of elevated or street cars in which the payment of fare is required before the passenger enters the main body of the car. The committee on metropolitan affairs has reported no legislation necessary on the special reports of the Boston Transit Commission regarding the removal of the elevated structure on Washington and Main Streets and the construction of a station at Bennett Street, in the Washington Street tunnel. Several bills to prohibit the overcrowding of street cars are now before the committee on street railways. Among the bills favoring public ownership is an American Federation of Labor measure calling for the purchase by the State of all the street and electric railways within the commonwealth.

NEW YORK

The Legislature adjourned on March 28, 1914. Failure of the two branches to agree upon financial legislation has made it necessary for Governor Glynn to call an extraordinary session. In the closing hours the Governor sent to the Senate for confirmation the names of William Temple Emmett and Frank Irvine for appointment to the Public Service Commission of the Second District and of George M. Schulz for appointment to the Public Service Commission for the First District. These nominations were all confirmed. Assemblyman Simpson's bill to amend Greater New York's charter authorizing the comptroller of the city of New York to issue corporate stock notes in anticipation of tax collections to cover expenditures for public improvements which are to be apportioned among the budgets for ensuing years, was passed by both Houses and sent to the Governor. The Sullivan bill calling for two men to act as crew on every street car operated in the State was lost in the Assembly by a vote of sixty-three to sixty-two.

PROGRAM OF ASSOCIATION MEETING

Association of Railway Telegraph Superintendents

The annual convention of the Association of Railway Telegraph Superintendents will be held at New Orleans, La., on May 19, 1914. M. H. Clapp, superintendent of telegraph of the Northern Pacific Railway, St. Paul, Minn., who is chairman of the topics committee of the association, has announced the following program of papers for the meeting:

Paper, "The Fitting of Applicants for Telegraph and Telephone Service on Railroads," by J. B. Sheldon, superintendent of telegraph of the Union Pacific Railroad, Omaha.

Paper, "The Organization for Clearing Storm Troubles, Including the Providing of the Necessary Material, Poles and Wires on Railroad Right of Way," by J. C. Hubbard, general supervisor of lines of the Western Union Telegraph Company, New York.

Paper, "The Organization of Gangs, Including Plans for Boarding the Men," by M. B. Wyrick, division plant superintendent of the Western Union Telegraph Company, Dallas.

Paper, "Unit Costs of Railroad Pole Line Construction, How Obtained and How Used," by V. T. Kissinger, superintendent of telegraph of the Chicago, Burlington & Quincy Railway, Chicago, Ill.

Paper, "The Use of the Printing Telegraph on Railroads," by Archibald Wray, assistant superintendent of telegraph of the Chicago, Rock Island & Pacific Railway, Chicago, Ill.

Paper, "The Transposition of Wires for Railroad Telephone, Physical and Phantom Circuits," by C. A. Robinson, of the engineering department of the American Telephone & Telegraph Company, New York.

Paper, "Maintenance of Telegraph and Telephone Equipment," by M. B. Overly, engineer telephone department of the Cleveland, Chicago, Cincinnati & St. Louis Railway, Indianapolis, Ind.

Financial and Corporate

Stock and Money Markets

April 1, 1914.

In the initial dealings on the New York Stock Exchange to-day there was moderate buying of international stocks, but the advances made in the early trading were lost in a gradual recession later in the day. The Gould railroad group was the most prominent feature in the afternoon trading. Toward the close the tone of the market improved and a number of issues made fractional advances. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 3 @ 3¼ per cent; six months, 3 @ 3¼ per cent.

The local issues were not in demand to-day. Philadelphia Rapid Transit was offered at 17¼. The bond transactions totaled $28,100, par value.

In Chicago the stock market to-day was narrow and the volume of sales small. The demand for bonds was good.

The market to-day in Boston was extremely dull and irregular. Small sales were recorded of Boston Elevated, Massachusetts Electrics and West End Street Railway.

The sales of stocks in Baltimore to-day totaled only 807 shares. The sales of bonds totaled $50,000, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Mar. 25	Apr. 1
American Brake Shoe & Foundry (com.)	90½	88½
American Brake Shoe & Foundry (pref.)	138½	139
American Cities Company (com.)	36	36
American Cities Company (pref.)	65	63½
American Light & Traction Company (com.)	365	367
American Light & Traction Company (pref.)	107	107
American Railways Company	38¼	38
Aurora, Elgin & Chicago Railroad (com.)	42	42
Aurora, Elgin & Chicago Railroad (pref.)	77½	78
Boston Elevated Railway	82	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	a63	63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company	92¼	92⅜
Capital Traction Company, Washington	107½	101¼
Chicago City Railway	170	a170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	91	90
Chicago Railways, ptcptg., ctf. 2	30	30
Chicago Railways, ptcptg., ctf. 3	6	6
Chicago Railways, ptcptg., ctf. 4	2½	2½
Cincinnati Street Railway	105	105
Cleveland Railway	103¾	104½
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*23	*23
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53½
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	71	71
Detroit United Railway	a80	a80
General Electric Company	146¾	147
Georgia Railway & Electric Company (com.)	120½	121
Georgia Railway & Electric Company (pref.)	86¼	85¾
Interborough-Metropolitan Company (com.)	14¾	15⅛
Interborough-Metropolitan Company (pref.)	60⅛	60⅜
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	10	*10
Kansas City Railway & Light Company (pref.)	25	*25
Lake Shore Electric Railway (com.)	*5½	*5½
Lake Shore Electric Railway (1st pref.)	*85	*85
Lake Shore Electric Railway (2d pref.)	*22	*22
Manhattan Railway	130	130
Massachusetts Electric Companies (com.)	11	11
Massachusetts Electric Companies (pref.)	61½	61½
Milwaukee Electric Ry. & Light Co. (pref.)	*95	*95
Norfolk Railway & Light Company	25¼	25¼
North American Company	75½	78½
Northern Ohio Traction & Light Co. (com.)	70	70
Northern Ohio Traction & Light Co. (pref.)	98¼	101
Philadelphia Company, Pittsburgh (com.)	43	42½
Philadelphia Company, Pittsburgh (pref.)	42	40
Philadelphia Rapid Transit Company	18¼	17½
Portland Railway, Light & Power Company	54	*54
Public Service Corporation	112	112
Third Avenue Railway, New York	43½	43½
Toledo Traction, Light & Power Co. (com.)	15	a20
Toledo Traction, Light & Power Co. (pref.)	70	a70
Twin City Rapid Transit Co., Min'apolis (com.)	105	104⅝
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*80	*80
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	27¼	27
United Rys. Inv. Company (com.)	21½	20
United Rys. Inv. Company (pref.)	47½	48
Virginia Railway & Power Company (com.)	51	50
Virginia Railway & Power Company (pref.)	96	96
Washington Ry. & Electric Company (com.)	89½	87⅝
Washington Ry. & Electric Company (pref.)	87	87
West End Street Railway, Boston (com.)	70½	71
West End Street Railway, Boston (pref.)	89½	92
Westinghouse Elec. & Mfg. Company	76	75
Westinghouse Elec. & Mfg. Co. (1st pref.)	118	119

* Last sale. a Asked.

ANNUAL REPORTS

Federal Light & Traction Company

The consolidated statement of income, profit and loss of the Federal Light & Traction Company, New York, N. Y., and its subsidiaries (excluding depreciation) follows:

	1913	1912
Gross earnings	$2,329,164	$2,167,507
Operating expenses and taxes	1,389,032	1,253,155
Net earnings from operation	$940,132	$914,352
Federal Light & Traction Company	36,640	22,447
Total income	$903,492	$936,799
Interest charges	531,821	442,827
Central Arkansas Railway & Light Corporation dividend	63,000	63,000
Federal Light & Traction Company dividend	150,000	150,000
Discount on bonds	40,716	73,895
Surplus	$117,955	$207,077

Intercompany earnings, expenses and interest charges, as well as the operations of the Deming Ice & Electric Company, are not included in the above statement. The central Arkansas Railway & Light Corporation was not incorporated until 1913, but to make the figures for 1912 and 1913 comparable the amount of $63,000 paid for dividends in 1913 is also deducted from the 1912 earnings in the statement.

The gross earnings for 1913 showed an increase of 7.5 per cent over 1912, but the operating expenses and taxes increased 10.8 per cent during the year, so that the net earnings from operation increased only 2.8 per cent. The increase in operating expenses and taxes was mostly owing to a 42 per cent increase in the taxes during 1913. The total income decreased 3.5 per cent during 1913; interest increased 20.9 per cent; surplus decreased 43.3 per cent.

The report states that the earnings for 1913 were less than anticipated, principally for the following reasons: (1) the conflagration at Hot Springs, Ark., on Sept. 5, 1913, resulting in a loss of the generating station, the discontinuance of service for several weeks and the inauguration of emergency service with increased operating expenses; (2) the decrease in earnings of the Tucson Gas, Electric Light & Power Company under the new rate schedules prescribed by the Arizona Corporation Commission effected Sept. 1, 1913, from which the company feels justified in expecting relief; (3) the extraordinary expenditures in connection with rate cases before the Arizona and Missouri commissions, and (4) the large increase in taxes.

Cleveland, Painesville & Eastern Railroad

The statement of income, profit and loss of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, for the year ended Dec. 31, 1913, as compared with the preceding year, follows:

	1913	1912
Earnings:		
Passenger revenue	$312,980	$300,413
Special car revenue	5,079	5,657
Mail revenue	250	250
Express revenue	35,736	35,302
Milk revenue	11,292	10,584
Station and car privileges	1,149	1,049
Telephone and telegraph service	557	663
Rent of tracks and terminals	6,295	6,172
Rent of equipment	11,886	11,475
Rent of buildings	1,725	1,468
Power	17,947	10,011
Miscellaneous	21,027	19,144
Total	$425,923	$402,188
Expenses:		
Maintenance of way and structures	$40,927	$37,827
Maintenance of equipment	20,669	21,631
Traffic expenses	1,771	1,294
Conducting transportation	100,479	99,938
General	45,889	44,536
Total	$209,735	$205,226
Net earnings	$216,188	$196,962
Interest and taxes	152,246	138,787
Surplus	$63,942	$58,175

The operating ratio of the company was 49.24 per cent in 1913 as compared to 51.02 per cent in 1912, a decrease of 1.78 per cent. The number of car miles decreased from 931,328 to 928,108. The income per car mile was 45.89 cents in 1913, as compared to 43.18 cents in 1912, and the operating expenses per car mile in 1913 were 22.50 cents in 1913 as compared with 22.03 in 1912, leaving net earnings per car mile of 23.39 cents in 1913 as compared with 21.15 cents in 1912. The number of passengers carried increased from 2,609,117 in 1912 to 2,736,106 in 1913, but the earnings per passenger dropped from 11.51 cents in 1912 to 11.43 cents in 1913.

E. W. Moore, president of the company, says in part: "Lighting lines were constructed in Richmond and extensions were made to existing lines. During the year a new Worthington feed water pump was installed in the Painesville power plant and a new 300-kw rotary converter with transformers was installed at Willoughby.

"Two open cars, formerly used for summer traffic, were entirely rebuilt, placed on heavy Baldwin trucks, with Westinghouse 75-hp motors and two other cars were enlarged and remodeled. During the year twenty-two cars were overhauled and repainted.

"During the year property was purchased for $12,000 in Painesville, on which a modern building will be erected at some future time for a waiting room, ticket office, storeroom and an electric package office."

Chicago City Railway

The statement of income, profit and loss of the Chicago (Ill.) City Railway for the year ended Jan. 31, 1914, follows:

Passenger receipts (Southern Street Railway included)	$11,289,037
Receipts from other sources	446,406
Gross earnings	$11,735,443
Operating expenses, taxes and renewals of combined systems; interest on capital investment of Chicago City Railway and net earnings of Southern Street Railway	9,931,721
Net earnings	$1,803,722
City's proportion (55 per cent as per ordinance)	992,047
Company's proportion (45 per cent as per ordinance)	$811,675
Interest on capital	2,305,150
Income from operation	$3,116,825
Other income, net	220,799
Total income	$3,337,624
Interest on bonds outstanding	1,409,548
Net income	$1,928,076
Regular dividend—10 per cent	1,800,000
Surplus	$128,076

In order to avoid any confusion on the subject, it may be well to explain that the item of $2,305,150 for interest on capital, added in the above statement to obtain the income from operation, represents an amount that was included in the operating expenses, thereby reducing the amount of net earnings to be divided between the city and the company. This amount is 5 per cent on the yearly valuation summarized from certificates of rehabilitation expenditures received monthly from the board of supervising engineers. After the deduction from gross earnings through operating expenses, the city allows this figure to be put back in the statement together with other income, in this way showing the total net available for interest and dividends.

During 1913 the gross earnings of the company increased 9.56 per cent over the figures of the previous year, this increase being mostly due to the 9.3 per cent increase in the passenger receipts during the year. The total expenses, however, increased 9.65 per cent, which gave a comparatively less increase of 8.03 per cent in the net earnings. The increase of 10.4 per cent in the interest on capital was more than offset by the decrease of 25.2 per cent in other income, giving an increase of 6.7 per cent in total income for the period. Interest on bonds increased 19.2 per cent, so that the net income increase was reduced to 0.92 per cent. After the declaration of four quarterly dividends of 2½ per cent as in 1912 the surplus for 1913 showed a decrease of 12.3 per cent, as compared with the previous year.

The report states that sufficient reserves having been set aside under the provisions of the 1907 ordinance to provide for the maintenance and renewal of the property, it was decided by the board of directors to distribute from earnings an extra dividend of one-half of 1 per cent upon the capital stock. Hence the balance in the surplus account at the close of the fiscal year was $40,334.

During the year the company built 14.24 miles of single track. The total mileage of single track now owned is 306.31 miles.

Further Details of American Water Works & Guarantee Company Reorganization

The stockholders of the American Water Works & Guarantee Company, Pittsburgh, Pa., recently received from the protective committee two circulars giving additional details of the reorganization plan as noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, and stating that H. Hobart Porter of Sanderson & Porter, New York, would accept the presidency of the reorganized company, to be known as the American Water Works & Electric Company.

The first circular contains an interesting discussion of the situation that confronted the protective committee at the time it was appointed. After stating that the company, which was organized in 1891, had for many years conducted a successful business in the ownership and operation of water power plants and also had a controlling interest in the West Penn Traction properties, the value and earning power of which had been demonstrated, the circular continues as follows:

"The company had, however, during a period of some six years prior to the receivership, engaged in irrigation projects in the far West to an extent and in a manner disproportionate to its resources. It was liable as a guarantor upon approximately $20,000,000 in mortgage bonds of such irrigation companies, all of them maturing serially year by year. It had been anticipated that the heavy requirements for principal and interest upon these obligations and for the operation and development of the irrigation properties would be met by deferred payments by settlers upon the lands. The payments collected, however, fell far short of these requirements and the deficiency had reached large proportions. The company had thus invested in these projects, in addition to the outstanding bonds, upwards of $10,000,000, represented by the floating debt of the irrigation companies held by the American Water Works & Guarantee Company. In addition thereto, the American Water Works & Guarantee Company had endorsed and rediscounted with third parties large amounts of paper of those companies for the payment of which it was liable. Not only had the American Water Works & Guarantee Company invested in the properties substantially all the cash received from the sale of its entire issue of preferred stock, but it had used in these enterprises funds which could otherwise have been applied to the current needs of its profitable public service properties, with the result that at the time of the receivership each of its subsidiary companies was stripped of working capital and was indebted to banking institutions upon notes which the American Water Works & Guarantee Company had endorsed to the total net amount of approximately $3,050,000. In addition to these entanglements, the American Water Works & Guarantee Company had pledged as collateral to its guarantee of the California-Idaho irrigation bonds, the major portion in value of its assets."

By the terms of the reorganization plan, the California-Idaho bondholders are to exchange their present bonds for new 5 per cent twenty-year collateral trust bonds of the reorganized company, par for par against present holdings. The holders of the other four irrigation issues, aggregating $14,097,800 in principal amount, are to be paid $1,000,000 for the release of their guarantee. The bondholders will receive 51 per cent interest in the equities remaining in these properties after the payment of principal and interest on their bonds, the new company receiving 49 per cent interest therein. Under the reorganization plan there have been no changes in the capitalization of the subsidiary companies. All of the assets will be taken over by the new company, but there will be no guarantee by the new company on any subsidiary issues, all the guarantees of the old company being cancelled and released.

Bank creditors, whose paper to the amount of $3,050,000 has matured, have agreed to accept for a portion of that paper twenty-year 5 per cent collateral trust bonds of the reorganized company at 87½, the remainder being renewed and extended over a total period of six years.

According to the second circular, the reorganized company expects to raise $4,500,000 through its present stockholders by subscriptions to new stock and by assessments on stockholders who do not subscribe. All assessments must be paid in full on or before April 27, 1914, and in case of default, present stockholders will forfeit all interest in the reorganization. Subscriptions to new stock may be paid in full on or before April 27, 1914, or in instalments ending Oct. 27, 1914, and any stockholders failing to subscribe or pay the first instalment of their subscriptions on or before April 27, 1914, will forfeit all interest in the reorganization.

The circular also states that the committee has caused an underwriting syndicate to be formed, which has underwritten the $4,500,000 to be provided and has agreed to take and pay for all stock not subscribed for by the stockholders. This underwriting, however, has not been carried on by a strictly banking syndicate, but has been participated in generally by banking firms and individuals.

Upon the full consummation of the reorganized plan, it is anticipated that the new company will possess, among others, assets consisting of $2,000,000 of cash and $6,233,300 of first mortgage bonds of the California-Idaho Company, which bonds are a prior lien upon 33,000 acres of land in California. The $2,000,000 of cash is the amount estimated to be left from the working capital subscribed after payment of various amounts for acquiring the properties, and paying creditors and organization and reorganization expenses. Through its ownership of the capital stock of the United Water & Light Company, the reorganized company will own directly or indirectly $42,011,500 of the outstanding stock of thirty-five electric light, water works and traction companies and one coal company. These companies, together, have $59,585,000 of capital stock outstanding, $1,385,000 of which is pledged under the mortgage of the United Water & Light Company.

Included in one of the circulars of the stockholders is a letter from Sanderson & Porter, estimating the earnings of the new company for the first full year's operation and income from securities held. Earnings received and accrued are placed at $1,500,953 and $500,000 is allowed for amounts to be left with subsidiary companies and for general expenses of the new company. Interest on the $6,250,000 of collateral trust bonds of the new company amounting to $312,500 is then deducted, leaving $688,453. From this is deducted $350,000 for the first preferred dividend, leaving a balance of $338,453 for the participating preferred and common stocks. The details of these proposed stock issues were given in the ELECTRIC RAILWAY JOURNAL of March 21.

The presidency of the reorganized company, as noted above, will be filled by H. Hobart Porter, and the following have been chosen as directors: E. C. Converse, A. H. Wiggin, Samuel Insull, Guy E. Tripp, James D. Mortimer, William Nelson Cromwell, H. Hobart Porter, J. B. Finley, W. B. Schiller, Charles R. Scott, H. J. Delanoy Meijer, Theodore Revillon, H. C. Huffer, Jr., Andrew V. Stout, Charles H. Payson, Henry Russell Platt and Henry H. Pierce. It will be noticed that the above list does not contain the names of any in the old board of directors of the American Water Works & Guarantee Company. No information is as yet available in regard to the other officers of the new company, or the personnel of the voting trust.

According to a decree entered in the United States Circuit Court in Pittsburgh on March 16, the receivership will be closed by the sale of the assets of the company on April 15, 1914. The upset price is $1,000,000. The property will then be purchased in accordance with the reorganization plan.

Tramways and Light Railways in Chosen, Corea.

According to the annual report of the Railway Bureau of the Government-General of Chosen, Corea, for the year ending March 31, 1912, the tramways and light railways in Chosen in operation at the end of the year were three, the Nikkan Gas-Electric Company and two others. During the year sanction was given for the construction of 14.2 miles of track and applications were rejected for manual tramways aggregating 27 miles in length. The mileage open to traffic at the end of the year totaled 20.9 miles, consisting of 13.4 miles of electric tramways, 6.2 miles of light railways and 1.3 miles of manual tramways. The aggregate capital of these companies totaled yen 6,572,408, while the amount invested in tramway and light companies amounted to yen 1,675,557. Passengers during the year numbered 6,644,804 and passenger mileage reached 627,020. The receipts were yen 258,353 and the expenditures yen 156,937, leaving a balance of yen 101,416.

Central Park, North & East River Railroad, New York, N. Y.—George W. Linch, receiver of the Central Park, North & East River Railroad, and several directors of the company have been made defendants in a bill of equity filed in the United States District Court in Philadelphia by F. B. Kelly, owner of twelve shares of stock in the company, who charges that more than $2,000,000 of the assets were wasted through mismanagement of the directors. He asks for a decree ordering them to pay the company the value of the property alleged to have been wasted. A similar action brought in New York by F. C. Titus, Jr., is still pending.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—A quarterly dividend of 1¾ per cent has been declared on the $1,000,000 of common stock of the Chippewa Valley Railway, Light & Power Company, payable on April 1, 1914, to holders of record of March 30, 1914. This compares with 2 per cent paid in January, 1914, and in each quarter in 1913.

Cincinnati (Ohio) Traction Company.—The Tillotson & Wolcott Company, Cleveland and Cincinnati, is placing at par and interest $80,000 of equipment trust 5 per cent gold certificates, series E, of the Cincinnati Traction Company. These are part of an issue of $200,000 dated March 1, 1914, the authorization of which was noted in the Electric Railway Journal of March 7, 1914.

Columbus, Marion & Bucyrus Railway, Marion, Ohio—The Columbus, Marion & Bucyrus Railway was reorganized on March 25, 1914, when the following officers were elected: President, George Whysall, who had been the agent of the bondholders' committee in operating the road since it was purchased in May last year; vice-president and treasurer, Charles Gallinger; secretary, Ray C. Oswald. The directors are F. L. Hopley, William H. Auck and Charles Gallinger, Bucyrus, Ohio, and Ray C. Oswald and George Whysall, Marion, Ohio. Mr. Whysall will continue as general manager. On the following day two deeds of trust, one for $100,000 to the Guardian Savings & Trust Company, Cincinnati, Ohio, and the other for $250,000 to the Columbia-Knickerbocker Trust Company, New York, N. Y., were prepared for filing in both Marion and Crawford County. The bonds of $100,000 to be issued under the first mortgage will bear 6 per cent interest and the proceeds are to be used to pay the expenses of the transfer and for contemplated improvements. The second mortgage bonds of $250,000 will bear interest at the rate of 3 per cent the first year, 4 per cent the second year and 5 per cent thereafter.

Consolidated Cities Light, Power & Traction Company, New York, N. Y.—A quarterly dividend at three-fourths of 1 per cent was declared on the capital stock of the Consolidated Cities Light, Power & Traction Company, payable on April 1, 1914, to holders of record March 15, 1914. This compares with one-half of 1 per cent paid in January, 1914 and in October, 1913, when the initial disbursement was made.

Dallas (Tex.) Electric Corporation.—Stone & Webster offer a limited amount of Dallas Electric Corporation first mortgage collateral trust 5's, at 97½ and interest to yield about 5.40 per cent. Through the deposit of collateral the bonds are secured by first lien on the properties of local companies which do an electric railway, electric lighting and power business in Dallas. The mortgage under which the above bonds are issued is closed, and the sinking found, which amounts to 1 per cent per annum, has thus far retired $458,000 of the bonds.

Eastern Pennsylvania Railways, Pottsville, Pa.—The Eastern Pennsylvania Railways reports for the twelve months ending Feb. 28, 1914, as follows: Gross earnings, $822,088, being an increase of $97,597; operating expenses, $476,683.22, an increase of $58,172; net earnings, less taxes, $328,371, an increase of $34,954. After deduction of interest on underlying bonds and rentals $282,944 was available for major bond interest, an increase of $54,555.

Eastern Power & Light Corporation, New York, N. Y.—The Eastern Power & Light Corporation, which controls the Reading Transit & Light Company, has secured control of the Lebanon Valley Electric Light Company, Lebanon, Pa., through the purchase of the holdings of the Weaver interests, which are said to have received $41,500 in cash and $75,000,000 of the common stock of the Eastern Power & Light Corporation for their stock interest in the Lebanon Valley Electric Company.

El Paso (Tex.) Electric Company.—Stockholders of the El Paso Electric Company voted at a meeting held on March 9, 1914, to increase the common stock of the company by $1,000,000, making the present authorized capital stock $1,000,000 of preferred stock and $3,000,000 of common stock. It is expected that $375,000 of the new common stock will be offered pro rata to preferred and common stockholders of record March 16, 1914, as noted in the Electric Railway Journal of February 28, 1914.

Fort Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—Charles D. Barney & Company, Philadelphia, Pa., are offering at 82½ and interest, to yield 6.6 per cent, first consolidated mortgage 5 per cent bonds of the Fort Wayne & Wabash Valley Traction Company, due on March 1, 1934. These bonds are an underlying issue of the Fort Wayne & Northern Indiana Traction Company and are a closed mortgage issue with $6,966,000 outstanding. The bonds of the Fort Wayne & Northern Indiana Traction Company are reserved to retire the divisional bonds at maturity.

Grand Valley Railway, Brantford, Ont.—The purchase of the Brantford Street Railway and the Grand Valley Railway by the city of Brantford was endorsed by the ratepayers' vote on March 23, 1914. The proposal of such a purchase was noted in the Electric Railway Journal of Feb. 21, 1914.

Interborough Rapid Transit Company, New York, N. Y.—The banking syndicate composed of Lee, Higginson & Company, Boston, Mass., and N. W. Harris & Company and Kissell, Kinnicutt & Company, New York, N. Y., which recently purchased a second lot of $10,000,000 of Interborough Rapid Transit Company 5 per cent first mortgage bonds, announces the disposal of these bonds and the exercise of an option on an additional $1,000,000 of bonds. It is reported that these bankers have within six months marketed $41,000,000 of these bonds.

Ithaca (N. Y.) Traction Corporation.—The Ithaca Traction Corporation, which succeeded the Ithaca Street Railway on April 1, 1914, has elected officers as follows: R. B. Williams, Jr., president; H. W. Fitz, first vice-president; Charles E. Hotchkiss, second vice-president; H. A. Clarke, third vice-president and secretary; T. P. Clancy, treasurer. An account of the hearing before the Public Service Commission of the Second District of New York in regard to the proposed reorganization plan of the Ithaca Street Railway, which was sold under foreclosure recently, was published in the Electric Railway Journal of March 7, 1914, page 557.

Joliet, Plainfield & Aurora Railroad, Joliet, Ill.—The minority bondholders of the Joliet, Plainfield & Aurora Railroad have organized to protest against the recent sale of the road to the majority bondholders for $250,000, as noted in the Electric Railway Journal of February 21, 1914. They estimate the minimum value of the road at $500,000.

Lake Shore Electric Railway, Cleveland, Ohio.—The Lake Shore Electric Railroad has notified the State Public Utilities Commission that it has been unable to sell $70,000 of bonds recently authorized by the commission at 85, and permission has been asked to use the bonds as security for a loan of $42,000.

Monongahela Valley Traction Company, Fairmont, W. Va.—According to an official announcement, the 5 per cent general mortgage bonds of the Monongahela Valley Traction Company have been made tax exempt in the State of Pennsylvania.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company and the Canton-Akron Consolidated Railway, which is controlled by the former company, have united in a joint request for permission to issue $58,000 of general consolidated bonds.

Nova Scotia Tramway & Power Company, Ltd., Halifax, N. S.—A bill was introduced in the Nova Scotia Legislature on March 24, 1914, to incorporate the Nova Scotia Tramway & Power Company, Ltd. The names of the directors are largely the same as those on the Halifax Tramways.

The capital is to be $5,000,000. The bill authorizes the purchase of the Halifax Tramways, which is empowered to sell the present outstanding stock at $170 a share. The Nova Scotia Light & Power Company agrees to transfer to the company all its rights and lands at Gaspereaux and at Sheet Harbour. The Halifax Electric Tramways operates 13.15 miles of line and fifty motor cars. Its authorized capital stock is $1,500,000. Of this amount $1,400,000 is outstanding. The company also has issued and outstanding $600,000 of gold bonds which are due on Jan. 1, 1916.

Ocean Shore Railway, San Francisco, Cal.—The Railroad Commission of California recently heard an application by the reorganized Ocean Shore Railway to issue $200,000 of bonds for the purpose of electrifying its line between San Francisco and Half Moon Bay, and an alternative proposition to issue $60,000 of bonds for the purchase of three gasoline cars, if it was found impracticable to market the larger bond issue at the present time. F. W. Brady, president of the company, testified that holders of real estate along the Ocean Shore Railway had demanded better train service and had agreed to subscribe for $60,000 of bonds if the commission would approve the issue. Some opposition was made on the ground that the title of the new company is still in doubt, pending a decision by the State Supreme Court, and that there is a possibility that the bonds might be invalidated if the decision should be in favor of the stockholders and bondholders of the defunct Ocean Shore Railroad.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has obtained control of the Willamette Valley Southern Railway, which is building a standard gage electric line on private right-of-way 32 miles in length, from Oregon City to Molalla and Mt. Angel, Ore. The new line connects at Oregon City with the Portland Railway, Light & Power Company's interurban service to Portland and when completed will give through connection from Portland to Mt. Angel, a distance of approximately 47 miles. Seven miles of track has already been laid and more than two-thirds of the grading has been finished. The line will be operated by electricity at 1200 volts and the track will be almost entirely of 70-lb. rail with rock ballast. The road is being constructed and will be operated under the direct supervision of the Portland Railway, Light & Power Company.

Underground Electric Railways, Ltd., London, England.—According to the sixteenth annual report of the directors of the Underground Electric Railways, Ltd., London, England, for the year ended Dec. 31, 1913, the gross revenue of the company for 1913 was £629,817, as compared with the gross income at the rate of £558,438 per year for the second half of 1912. There was a surplus of £45,170 after meeting the full 6 per cent interest (with income tax) on the income bonds of 1948, as compared with £2,996 brought forward from 1912. The net revenue of the company from investments in properties (including general interest), after deducting general expenses and including the balance brought forward, amounted to £623,838. The deduction of £84,489 for the service of the 4½ per cent bonds of 1933 left a surplus of £539,349. This amount, according to the report, will be applied as follows: £26,830 for payment under the guarantee on Central London Railway assented stocks for 1913; £76,380 for interest at the rate of 6 per cent per annum on the £1,273,000 of 6 per cent first cumulative income debenture stock, and £390,969 for interest at the rate of 6 per cent per annum, plus income tax on £6,136,050 of 6 per cent bonds of 1948, leaving a balance of £45,170, as noted above.

West Penn Traction Company, Pittsburgh, Pa.—G. B. Caldwell, vice-president of the Continental & Commercial Trust & Savings Bank, Chicago, Ill., and H. R. Platt, a Chicago attorney, have organized an underwriting syndicate for the purchase of $6,000,000 of three-year 6 per cent collateral trust notes of the West Penn Traction Company. This syndicate is composed of prominent bankers and bond houses in New York, Chicago and Pittsburgh, and is managed by the Continental & Commercial Trust & Savings Bank, Chicago, Ill., and A. B. Leach & Company, New York, N. Y. The proceeds of the note issue are to be used to retire all the existing indebtedness of the company and provide money for improvements and extensions during 1914.

Dividends Declared

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 2 per cent, common.

Consolidated Cities Light, Power & Traction Company, New York, N. Y., quarterly, ¾ of 1 per cent.

Easton (Pa.) Consolidated Electric Company, 2 per cent.

Louisville & Northern Railway & Lighting Company, New Albany, Ind., quarterly, 3 per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO					
1m., Feb., '14	$82,929	$55,426	$27,504	$31,588	†$4,084
1 " " '13	81,277	52,728	28,550	30,705	†2,155
2 " " '14	176,981	115,567	61,415	63,483	†2,069
2 " " '13	172,820	112,007	60,813	61,647	†834
COLUMBUS (GA.) ELECTRIC COMPANY					
1m., Jan., '14	$55,986	*$24,205	$31,781	$25,282	$6,499
1 " " '13	57,598	*27,514	30,084	19,919	10,165
12 " " '14	642,873	*291,343	351,530	278,042	73,488
12 " " '13	620,849	*272,064	348,785	228,274	120,511
DALLAS (TEX.) ELECTRIC COMPANY					
1m., Jan., '14	$201,071	*$128,399	$72,672	$26,778	$45,894
1 " " '13	170,815	*106,094	64,721	24,635	40,086
12 " " '14	2,223,756	*1,302,363	921,393	305,113	616,280
12 " " '13	1,857,207	*1,112,647	744,560	295,278	449,282
EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.					
1m., Jan., '14	$55,014	$36,589	$18,425	$8,244	$10,181
12 " " '14	504,183	291,814	212,369	74,859	137,510
EL PASO (TEX.) ELECTRIC COMPANY					
1m., Jan., '14	$92,713	*$49,548	$43,166	$4,284	$38,882
1 " " '13	80,922	*41,843	39,079	1,971	37,108
12 " " '14	907,906	*486,064	421,842	50,328	371,514
12 " " '13	804,466	*436,441	368,025	64,477	303,548
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.					
1m., Jan., '14	$197,277	*$120,147	$77,130	$36,485	$40,645
1 " " '13	169,615	*105,124	64,491	33,660	30,831
12 " " '14	2,400,727	*1,367,396	1,033,331	424,037	609,294
12 " " '13	2,051,265	*1,197,070	854,195	405,197	448,998
HOUGHTON (MICH.) COUNTY TRACTION COMPANY					
1m., Jan., '14	$22,137	*$15,198	$6,939	$5,610	$1,330
1 " " '13	24,379	*15,776	8,603	5,752	2,851
12 " " '14	294,611	*179,682	114,929	67,450	47,479
12 " " '13	309,760	*172,166	137,593	67,758	69,835
JACKSONVILLE (FLA.) TRACTION COMPANY					
1m., Jan., '14	$62,546	*$38,152	$24,394	$12,868	$11,526
1 " " '13	49,823	*33,567	16,256	11,039	5,217
12 " " '14	692,344	*443,174	249,170	145,546	103,624
12 " " '13	562,483	*380,131	182,352	120,751	61,601
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO					
1m., Feb., '14	$248,006	$154,878	$93,128	$50,031	$43,097
1 " " '13	222,570	138,129	84,441	45,197	39,244
2 " " '14	518,967	326,170	192,797	99,493	93,304
2 " " '13	460,036	280,379	179,657	89,868	89,789
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., Jan., '14	$754,035	*$434,634	$319,400	$173,899	$145,501
1 " " '13	701,640	*437,914	263,726	165,797	97,929
12 " " '14	8,665,995	*5,005,097	3,660,899	2,071,120	1,589,779
12 " " '13	8,294,702	*4,797,859	3,496,843	1,986,582	1,510,261
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Feb., '14	$234,971	*$139,485	$95,486	$44,762	$50,724
1 " " '13	228,413	*138,327	90,087	45,875	44,212
2 " " '14	492,949	*291,764	201,186	87,851	113,335
2 " " '13	472,754	*286,893	185,861	91,692	94,169

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*Includes taxes.

†Deficit.

Traffic and Transportation

Chicago Considering Interurban Market Service

The Chicago City Council recently authorized the Mayor to appoint a commission to investigate market conditions in Chicago and the representatives of the interurban roads entering the city were invited to advise the commission of the possibility of shipping foodstuffs by the interurban lines. E. J. Bock, general superintendent of the Chicago & Milwaukee Electric Railroad; Richard Breckenridge, general freight and passenger agent of the Aurora, Elgin & Chicago Railroad; J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, and F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Interurban Railway, appeared before the commission. Each representative outlined to the members of the commission the possibilities of taking advantage of electric railways to improve Chicago's market conditions. Mr. Breckenridge said:

"Unlike other municipalities Chicago has never shown a disposition to utilize the electric lines to their full extent. It is true that the Aurora, Elgin & Chicago Railroad and to some extent the Chicago, Lake Shore & South Bend Railways carry passengers into the downtown district, but only the Chicago & Interurban Traction has the right to bring milk, produce or any freight into the city. The Aurora, Elgin & Chicago Railroad brings three carloads of milk daily to the western limits of Chicago and could bring as many more were it enabled, as are its steam railroad competitors, to deliver these shipments into the city as far as Canal Street. It is, of course, impossible to say what a freight rate will be to a point not yet decided and under unknown conditions. I think I am safe in saying that if the electric road is allowed direct access to your market, the rate will be less for fast service than the cost of the present inferior service, particularly considering the teaming cost and freight-house delays that will then be eliminated. The electric roads operate more intensively. They will run more trains than the steam roads and make stops convenient for the growers. The steam roads now have more business in Chicago than they can handle with dispatch. Being ambitious for traffic, the electric road will foster and promote this business to the benefit to the consumers of Chicago."

The commission is compiling data and expects to report to the City Council in the near future.

Brooklyn Rapid Transit Tax Burden

In the series of advertisements which it is publishing in the Brooklyn newspapers, dealing with various phases of its activities, the Brooklyn (N. Y.) Rapid Transit Company recently included the following statement headed "Why We Need the Nickels," setting forth plainly the tax burden which the company is called upon to meet:

"About fourteen years ago we published some figures showing that our taxes averaged $2,900 per day. These figures caused much comment, not only in this community but throughout the country. The weight of the burden was a revelation.

"But by comparison with last year's figures we lived then in good old easy times.

"In 1913 we actually paid in taxes to city, state and nation $1,770,217.

"This was at the rate of $4,850 per day!

"Our average receipt per passenger was 3.74 cents. The expense of transporting (not including taxes) was 2.91 cents, leaving the net return per passenger 0.83 of 1 cent.

"Therefore, we had to carry 584,000 passengers each day to yield profit enough to pay our tax bills!

"One dollar out of every $3.57 earned went to city, state or nation—equal to a net income tax of 28 per cent.

"There were ten different kinds of taxes, to wit: special franchise, tracks, etc., outside of special franchise, parcels of real estate, local capital stock, state capital stock, city tax on earnings, state tax on earnings, federal income, car license fees, bridge tolls.

"These were divided as follows: to city, $1,368,328; to state, $320,416; to nation, $81,473; total, $1,770,217.

"The amount paid to the city alone was more than sufficient to pay all the cost for 1914 of the following departments of city government as authorized in the budget: board of estimate, commissioners of sinking fund, Mayor's office, city chamberlain's office, Municipal Civil Service Commission, commissioners of accounts, bureau of weights and measures, bureau of licenses, commissioner of licenses, board of assessors, art commission, examining board of plumbers.

"The amount paid to the city alone was more than the entire expense of maintaining the parks of Brooklyn and Bronx and their administration. It was more than the entire cost of maintaining the public libraries of Manhattan, Brooklyn and Queens. It was equal to 60 per cent of this year's budget for all those manifold municipal activities under the jurisdiction of the Borough President of Brooklyn.

"The average tax paid to the city per capita in Brooklyn for 1913 was about $17.

"Our tax bill to the city, therefore, was the equivalent of the tax bills of nearly 78,000 persons!

"These are astounding figures. They indicate not only the extent of our financial contribution to the city's support, but the handicap and burden upon us in attempting to give additional transit facilities. They are food for reflection for those who criticise car service.

"Our annual tax bill, capitalized at 5 per cent, would permit an expenditure of $35,400,000 for added improvements and extensions.

"It would build 35 miles of new subway tracks.

"And yet when we, and suffering citizens, apply to the city, as we must, for the privilege of furnishing new facilities—even though some of these offer no present prospect of additional profits, as for instance franchises on Metropolitan Avenue, Atlantic Avenue and Eighth Avenue—some short-sighted public officials insist that these should not be permitted except upon still more burdensome conditions that make acceptance impossible.

"The further you go into this story of the nickels, how irresistible is the conviction that from every point of view Our Interests are Your Interests."

Hearing on Fares Between Worcester and Jefferson

Hearings were concluded by the Massachusetts Public Service Commission on March 19, 1914, upon the petition of a committee for the town of Holden for a reduction of fares from 15 cents to 10 cents between Jefferson and Worcester, on the Worcester Consolidated Street Railway. The petitioners were represented by Webster Thayer, and the company's case was conducted by Francis H. Dewey, president of the company. The burden of the petitioners' case was that the existence of a third 5-cent-fare zone between the center of Holden and Jefferson, a distance of about 1.6 miles, was inequitable.

Mr. Dewey stated that the Worcester Consolidated Street Railway purchased the Worcester & Holden line for $150,000, and he contended that the company cannot afford to carry passengers from Worcester to the end of the line in Jefferson for less than 15 cents. The distance is 9.66 miles. The present fare includes a free transfer to or from all parts of Worcester, which increases the maximum ride to about 14 miles for 15 cents. Traffic counts show that if the 10-cent fare is established the reduction in income on the line will be at the rate of $11,000 per year. Careful studies by the company's auditor show that the yearly present income of the line from the city hall, Worcester, to Jefferson is $56,451, and that the net earnings are about $7,500, or 5 per cent on the cost of the Worcester-Holden branch of the Consolidated system. Last year the company paid 5½ per cent on all its outstanding stock. If the fare reduction is effected, the line will face a deficit of $3,500 which must be made up by the rest of the system. Northborough, Sterling and other towns separated by a second municipality from Worcester as a rule pay 15 cents in three fare collections between these communities and the city hall in Worcester.

In response to a request by the petitioners' counsel for a physical valuation of the Worcester-Holden line, Mr. McLeod, chairman of the commission, set forth his view upon the treatment of such problems in small town cases in part as follows:

"It is practically impossible for a commission of this kind to make a physical valuation in any matter involving some rearrangement of fares upon a street railway system unless the claim is positively made that any change in the nature suggested by the petitioners would be confiscatory. It is impractical, in handling a large number of such cases, to make a valuation. This matter must be considered as affecting the Worcester Consolidated system as a whole. When this line was consolidated with the Worcester company there was no longer any legal obligation that the line should pay its proper return upon the value of the property, provided that the general arrangement of fares over the system is just and provided there is no undue encroachment upon the revenues of the company as a whole. The question whether or not the particular branch line is earning a fair return is not conclusive, because there may be considerations in the case which make it desirable in the interest of the general public, especially if it can be shown that the service and fares rendered at the present time are not reasonable, that some of the burden in carrying the line should be thrown upon the system as a whole. Another phase is whether these fare limits bear any just relationship to the fare limits on other similar lines serving in the main a similar territory, in view of the effect of the decison as a precedent."

The case was taken under advisement.

Prepayment Cars in Winnipeg.—Commissioner Robson of the Manitoba Public Utility Commission will order that all cars to be built in future for the Winnipeg Electric Railway shall be of the pay-as-you-enter type. The company proposes to arrange in future to have its cars stop on the near side of the street.

Record Run on Oakland, Antioch & Eastern Railway.—A three-car train of the Oakland, Antioch & Eastern Railway, Oakland, Cal., established a record for passenger trains between Sacramento, Oakland and San Francisco on March 22, 1914, by making the run to Oakland in two hours and eighteen minutes and to San Francisco in two hours and fifty-five minutes.

Plan to Establish "Suburban Day."—The interurban electric railroads running into Kansas City, Mo., probably will co-operate with the Merchants' Association in establishing "Suburban Day." One day of each week will be set aside for out-of-town shoppers and special inducements will be offered on that occasion. A day on which traffic is normally light will be selected, according to present plans.

Illinois Fare Case Under Advisement.—The Illinois Public Utility Commission has taken under advisement the protest lodged by patrons of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., against the company in connection with its proposal to substitute a sixty-ride ticket book for the present fifty-four ride ticket book. It is claimed by the petitioners that the change will involve an advance of 10 per cent in rates.

Employees' Bulletins in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has begun the publication of an employees' bulletin. The paper is in the shape of a folder with eight pages and is 3½ in. wide by 6 in. high. Like the similar publication of the United Railways & Electric Company, Baltimore, Md., the Brooklyn bulletin deals with some subject of specific interest to the employees. The issue of March 18, 1914, contained an appeal to the men. The appeal is headed "Concerning Profanity," and is signed by William Seibert, superintendent of the surface lines.

The Topeka Advertising Campaign.—The Topeka (Kan.) Railway has emphasized a fundamental principle of merchandising in its recent advertisements exploiting its service and the large return the people secure for a 5-cent fare. "The maximum of demand insures the minimum of cost," ran a recent ad. "If only a few people used the street car it would necessarily increase the cost of transportation." The advertisement pointed out that where street railway service is generally used the price is low and that only by such use can service be improved.

Extension of Boston Transfers Approved.—The Massachusetts Public Service Commission has approved a rearrangement of free transfer privileges by the Boston Elevated Railway at the Scollay Square station of the Tremont Street subway between Cambridge bridge cars and subway cars, so that passengers boarding inbound Cambridge bridge cars and paying fares east of Kendall Square may transfer to north and south-bound cars in the subway at Scollay Square, and that checks may be issued from Scollay Square to cover travel in the reverse direction.

Change in Terms of Mileage Ticket.—The Albany Southern Railroad, Hudson, N. Y., with the approval of the Public Service Commission of the Second District of New York, has changed the rules and regulations governing the sale and use of 500-mile ticket books. The limit as to time for use has been made one year from date of sale and the minimum coupon detachment for any ride has been changed from four to three. A table showing the distances between all stations and stops provided to govern coupon detachments has been filed with the commission.

Illinois Utilities Commission Permits Free Rides.—The State Public Utilities Commission of Illinois has made a ruling in favor of free transportation being extended by carriers to policemen, firemen and letter carriers. On Jan. 17, 1914, the commission decided that for the present the new body would follow the ruling of the Interstate Commerce Commission and would permit free rides to employees of public utilities and to policemen, firemen and letter carriers only when such privilege was provided for in contractual ordinances previous to the establishment of the new commission.

Fare Question in Oakland.—The Chamber of Commerce of Oakland, Cal., and seven improvement associations of East Oakland have asked the Railroad Commission of California to compel the Southern Pacific Company to collect only 5 cents for a continuous ride in one direction in Oakland. The company is charging a 10-cent fare between such points as Oakland pier and Melrose Heights, and has asked the commission to authorize this fare on the ground that it is just and barely compensatory. The commission has set May 9, 1914, as the date for a formal hearing on the railroad company's application.

Organization of Improvement League Completed.—The organization of the New London County Improvement League was completed at a meeting on March 16, 1914, at which the complete list of directors from the towns was made up and the officers of the league were elected. The attendance at the meeting was fifty. This is the organization with which the Shore Line Electric Railway, Norwich, Conn., proposes to co-operate with the end in view of furthering agricultural development along its lines. The plans of the company in this connection were referred to at length in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, page 561.

Heavy Freight Traffic at Louisville.—R. H. Wyatt, general freight and passenger agent of the Louisville & Interurban Railway, Louisville, Ky., stated recently that the company's freight business for the first three months of 1914 was the heaviest in its history. Mr. Wyatt attributes a good deal of the activity in freight movements on the company's interurban lines around Louisville to shipments of feed, the requirements of the farmers being unusually heavy in this line, on account of the poor growing season last year. Other goods are also carried in large quantities, however, indicating a growing appreciation on the part of the country merchants of the advantages of the company's rapid and frequent service.

Re-routing Cars in Columbus.—Plans for re-routing cars on a number of lines are being prepared by the Columbus Railway, Power & Light Company, Columbus, Ohio. The West Broad Street cars are to be run from Broad Street north on Front Street to Long Street and thence over the Mt. Vernon Avenue route. The cemeteries and the Leonard Avenue lines are to be united and the Pennsylvania Avenue cars are to be operated south on Fourth Street to Livingston Avenue, where the route will terminate. The Oak Street line on North High Street will be replaced by a short line circling into Fourth Street by way of Main and Chestnut Streets. These changes are contemplated in order to relieve the growing congestion on High Street. They will involve an expenditure of $50,000 to $60,000 on West Long Street.

Mail Service Discontinued on Account of Inadequate Compensation.—The West Chester (Pa.) Street Railway restored the early mail service between West Chester, Kennett Square, Downingtown and Coatesville on March 19, 1914. The extended period of service was agreed to by Jonas L. Rice, manager of the company, in conference with Norris B. Slack, county chairman of the Democratic committee. When the contract between the United States postoffice department and the West Chester Street Railway expired on March 16, 1914, the latter refused to renew on account of the greatly increased amount of mail carried and the small compensation allowed by the government for the service. It is hoped that at the expiration of the month's grace the government will arrange to compensate the company on a basis commensurate with the volume of business carried.

Fare Cases Before Oregon Commission.—With the completion of introduction of evidence in the Linnton rate case of the United Railways, Portland, Ore., on March 20, 1914, the hearing was postponed until April 20, 1914, by Clyde B. Aitchison of the Railroad Commission of Oregon so that the defense may go over the evidence. In the Linnton case the United Railways asks permission to increase fares to Linnton. Another electric railway fare case, the application of the Tualatin Valley Transportation Association for a reduction of rates on the Oregon Electric Railway between Portland and places in Tualatin Valley, is before the commission and hearings are now being held. The association set forth that the fare of 5 cents to Capitol Hill, 3 miles; 20 cents to Garden Home, 6.9 miles, and 40 cents to Tualatin, 14.4 miles, is excessive and discriminatory. The association contends that the Portland Railway, Light & Power Company carries passengers much farther than 7 miles for 5 cents and that the United Railways has a 5-cent fare to Linnton, 8½ miles from Portland.

Limited Stop Cars for Cambridge, Mass.—The Boston (Mass.) Elevated Railway is gradually extending its limited-stop surface car service during rush hours in various suburban districts. The latest line to be taken up in this connection is the Newton-North Cambridge route, between North Cambridge, Harvard Square and Mt. Auburn bridge, the plan being to run cars express from these limiting points to Harvard Square in the morning rush and express from Harvard Square outward in the afternoon rush. To care for local travel cars will stop to pick up passengers when outward bound and to discharge passengers when going inward. New "limited-stops" signs, 21 in. by 19 in. in dimensions, and painted red and white, are to be used at each end of the car. The word "stops" is carried in the center of a red disc 13 in. in diameter, to enable these cars to be identified from the sidewalks and thus to avoid possible injury by automobiles to patrons who might occupy the streets in endeavoring to classify cars as local or express service units. The display of the signs is under control of street inspectors and station masters.

Suggestions from Employees Regarding Transportation Improvements.—Every attache of the general offices of the Metropolitan Street Railway, Kansas City, Mo., has been urged to keep his or her eyes open for ideas which will tend to make for greater efficiency, not only in his or her own department, but more especially in the transportation department, which is in constant touch with the public. To give general office employees more scope a set of tickets has been issued to each member of the staff intended to show the time spent by employees of the offices in going to work on the cars in the morning and returning home at night, as well as during the lunch hour, provided any make the round trip at that time. The company receives many unsolicited suggestions daily from the public, but the majority of these are unsuitable for adoption as they come from persons without experience in street railway work. By securing reports from its own employees, the company hopes to receive practical suggestions, as the office staff appreciates what can and cannot be put into execution. The tickets will be turned in to the heads of the various departments for transmission to the executive officers, who will be the judges as to the advisability of adopting such plans as may be proposed. The blanks call for reports from the employees in regard to the line on which they travel, the car number, the direction, the places at which they board cars, the places at which they leave cars, the number of passengers, the block number, the time off, the time on and such remarks and suggestions as they may care to make.

Personal Mention

Mr. Frank J. Duffy, manager of the Southern Railway & Light Company, Natchez, Miss., has been elected president of the company.

Mr. George Theis, Jr., president of the Arkansas Valley Interurban Railway, Wichita, Kan., has, in addition, been appointed general manager of the company to succeed Mr. O. A. Boyle, who continues as a director.

Mr. W. H. Trask, formerly commercial agent of the Idaho Railway, Light & Power Company, Boise, Idaho, has become connected with the commercial department of the Utah Power & Light Company, Salt Lake City, Utah.

Mr. William Temple Emmett was nominated by Governor Glynn for appointment to the Public Service Commission of the Second District of New York just before the close of the legislative session of March 28, 1914, and the appointment was confirmed by the Senate.

Mr. George Whysall, who has been acting as agent of the bondholders committee in charge of the operation of the Columbus, Marion & Bucyrus Railway, Marion, Ohio, since the sale of the property in May, 1913, has been elected president and general manager of the reorganized company.

Mr. Charles Whipple Smith, Boston, Mass., has been elected treasurer of the Boston Suburban Electric Companies, succeeding the late Alden E. Viles. Vacancies in the board of trustees caused by the deaths of Mr. Viles and the late Frank A. Day, of Newton, Mass., have not been filled.

Mr. Frank Irvine, professor of law at Cornell University, was nominated by Governor Glynn for appointment to the Public Service Commission of the Second District of New York just before the close of the legislative session of March 28, 1914, and the appointment was confirmed by the Senate.

Mr. H. Hobart Porter, of Sanderson & Porter, New York, N. Y., will be elected president of the American Water Works & Electric Company, Pittsburgh, Pa., which is to succeed the American Water Works & Guarantee Company, the plans for the reorganization of which are referred to at length elsewhere in this issue.

Mr. W. N. Smith, who has been connected recently with the Edison Electric Illuminating Company, Boston, Mass., and who was formerly electric traction engineer of Westinghouse, Church, Kerr & Company, New York, N. Y., has accepted a temporary engagement with the San Francisco-Oakland Terminal Railways, Oakland, Cal. Mr. Smith will do consulting work for the company, assisting Mr. A. W. McLimont, the new general manager. This work will occupy Mr. Smith until June 1 or July 1, 1914.

Mr. D. H. Howard has been appointed engineer of maintenance of way of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill. Mr. Howard was graduated from Purdue University as a civil engineer, and prior to accepting this new position was connected with the maintenance of way departments of the Pennsylvania Railroad Lines West of Pittsburgh, the Southern Pacific Railroad in Texas, and with the Chicago & Western Indiana Railroad on track elevation through Chicago. In his new position he reports to Mr. C. J. Jones, superintendent of transportation and chief engineer.

Mr. H. M. Kochersperger, vice-president of the New York, New Haven & Hartford in charge of finance and accounting and vice-president of the Connecticut Company, has resigned on account of ill health. He has been granted leave of absence until July 1 next, after which he will draw a pension under the company's rules. His duties in the accounting department will be assumed by Mr. J. M. Tomlinson, general auditor, and in the financial department by Mr. A. S. May, treasurer. Mr. Kochersperger has been with the New York, New Haven & Hartford Railroad for twenty-seven years. For six years prior to that he had been with the old New England Railroad. From May 1, 1887, to January, 1904, he was comptroller; from Jan. 1, 1904, to Nov. 16, 1906, he was third vice-president, and on Nov. 17, 1906, he was elected vice-president.

Mr. George M. Schulz was nominated by Governor Glynn for appointment to the Public Service Commission of the First District of New York just before the close of the legislative session of March 28, 1914, and the appointment was confirmed by the Senate. Mr. Schulz succeeds Mr. John E. Eustis, whose term of office has expired. He is forty-five years old and a native of New York City. He was educated in the public schools and was graduated from the College of the City of New York in 1892 and from the New York Law School two years later. He was admitted to the bar at once. Mr. Schulz was elected surrogate of Bronx County on the democratic ticket last year. Before that he was a city magistrate, having been appointed by the late Mayor Gaynor. He had represented the district in which he lives in the Assembly and in the Senate.

OBITUARY

Nathaniel Ewing, chairman of the Public Service Commission of Pennsylvania and noted jurist, is dead. Judge Ewing was born in Uniontown, Pa., on June 17, 1848. He was graduated from Princeton in 1860. He served on the bench in Fayette County and was chosen a member in 1908 of the State Railroad Commission, which was supplanted by the new Public Service Commission created by the last Legislature. Governor Tener appointed him chairman of the new commission.

Safety Calendar in Brooklyn

The Brooklyn Committee of Public Safety-Brooklyn Rapid Transit System has distributed to the public schools in Brooklyn with the approval of the Board of Education copies of a children's safety crusade calendar for 1914, one calendar being intended for display in each class room. The calendars are 21½ in. wide by 27 in. high. At the top of each of the twelve sheets a space 14 in. high by 18 in. wide has been reserved for the display of a picture showing the consequences of too little thought on the part of children and others in crossing streets and in boarding cars and alighting from them. The calendar proper giving the days of the month, etc., occupies a space 12½ in. wide by 8½ in. high under the display picture, and the calendar proper is flanked on either side with a sentence of warning based on the picture at the top, displayed in a box 3 in. wide by 8½ in. high. In one or two instances the sentences were interdependent; that is, they read over from the left side to the right side of the calendar. The warnings displayed on the calendar follow:

"Never play games across car tracks."
"Your own fun may cost another's life."
"Never spoil your fun by taking a chance."
"You can't always let go when you wish."
"Safe way to board: Grip handle with right hand."
"Safe way to alight: Grip handle with left hand."
"Look both ways before crossing street."
"Eyes can't guard if you don't use them."
"Runaway horses only one of many dangers."
"Street belongs to wagons, autos, trucks and trolleys."
"This also could happen playing 'cat.'"
"Better lose the game than lose a leg."
"When a small machine meets a big machine, which one suffers the greater injury?"
"He did not wait until car stopped."
"Your life may pay for undue haste."
"Broken wires may be life wires. When you find one call policeman."
"All persons have safety duties."
"Never risk neglecting your own."
"You may be struck by speedy autos even if you land on your feet."
"Auto may turn out, street car cannot. Safe way: Always let them pass."

The New York *Press* on March 8, 1914, published in its magazine section an illustrated article on the safety work being carried out by the Brooklyn (N. Y.) Rapid Transit Company in Brooklyn, under the direction of Mrs. Jessie P. McCall, secretary of the Brooklyn committee of public safety and director of the safety campaign in the public schools. Some of the illustrations were the same as those used in connection with the extended article on this work which appeared in the ELECTRIC RAILWAY JOURNAL of Dec. 13, 1913, page 1222.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***City Railway, Mount Vernon, Ill.**—Incorporated in Illinois to build an electric railway. Capital stock, $40,000. Incorporators: L. G. Pavey, C. C. Baldwin and Earl Green.

***Salisbury Interurban Railway, Annapolis, Md.**—Application for a charter has been made by this company in Maryland to build an electric railway and other public utilities in Wicomico County. The railway will extend from Nanticoke Point, on the Nanticoke River, on the west side of Wicomico County, to Willards on the east side of the county, via the different towns and villages. The company asks for power to build lateral branches in any part of the county. Incorporators: E. Riall White, H. James Messick, Wade H. Bedsworth, Raymond K. Truitt, Henry W. Ruark, Wade H. Insley and Mark Cooper, all of Wicomico County.

***Ithaca (N. Y.) Traction Corporation.**—Chartered in New York to take over the property and franchise of the Ithaca Street Railway, which was sold under foreclosure, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 31, 1914, page 282. Capital stock, $1,000,000.

***Newark, Williamson & Northern Railroad, Newark, N. Y.**—Application for a charter has been made by this company in New York to build a 15-mile electric railway between Newark and Williamson. Capital stock, $150,000. Headquarters: Newark. Directors: Ernest I. Edgecomb, vice-president of the Newark & Marion Railway; Harry J. Clark, purchasing agent of the Newark & Marion Railway; J. Leslie Kincaid, John F. Durston, George A. Smith, Frank E. Young, all of Syracuse; Harold C. Beaty, Skaneateles, and Judson L. Transue and Willis P. Rogers, Williamson.

***Meigs Valley Traction Company, Caldwell, Ohio.**—Incorporated in Ohio to build an electric railway. Capital stock, $20,000. Incorporators: C. S. Carr and others.

***Ardmore (Okla.) Electric Railway.**—Chartered in Oklahoma to build a 7-mile electric railway in Ardmore and its suburbs. It will furnish power for lighting purposes. Capital stock, $100,000. Incorporators: George A. Craven, James C. Mort and John F. Easley, Ardmore and Asa B. Hale and William Craven, Milton, Iowa.

***Eastern & Western Railroad, Easton, Pa.**—Chartered in Pennsylvania to build a 4½-mile interurban railway from Easton to Hopes Lock. Capital stock, $50,000. Incorporators: George F. Baer, president of the Philadelphia & Reading Railway; R. W. De Forrest, W. G. Besler, T. W. Coons, E. J. Fox, W. E. Chipman and Horace Lehr.

***Uvalde & Northern Railroad, Uvalde, Tex.**—Chartered in Texas to build a 55-mile electric or steam railway from Uvalde to a point at or near the headwaters of Camp Wood Creek in Real County. Capital stock, $60,000. Incorporators: L. J. Smith and E. H. McVey, Kansas City, Mo.; L. J. Wardlaw, Sonora, Tex.; Fred C. Adams, Will A. Morriss, W. P. Brice, J. J. Ford, S. P. Skinner and Sidney Turner, San Antonio, and R. C. Walker, Austin, Tex.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has received a franchise from the Council for a line from its terminal on Fifteenth Avenue along that thoroughfare and Norwood Boulevard to Thirty-fifth Street.

Danville, Ill.—The Danville, Crescent & Kankakee Traction Company has asked the Council for a franchise in Danville. This line will connect Danville, Crescent City and Kankakee. E. E. Mayer, Crescent City, president. [E. R. J., Jan. 17, '14.]

Cumberland, Md.—The Cumberland Electric Railway has received a franchise from the Council to extend some of its lines in Cumberland.

Batavia, N. Y.—The Batavia Traction Company has received a fifty-year franchise from the Council in Batavia. Stephen W. Brown, Batavia, is interested. [E. R. J., March 21, '14.]

Bartlesville, Okla.—The Union Traction Company, Independence, has received a franchise from the Council in Bartlesville.

Barrie, Ont.—The Toronto, Barrie & Orillia Railway has received a franchise from the Council in Barrie. The Ontario Legislature is being asked to authorize the company to increase its bond issue and to extend the time for construction. [E. R. J., Jan. 31, '14.]

Guelph, Ont.—The Guelph Radial Railway has received from the Ontario Legislature an extension of time on its franchise within which to complete a number of authorized lines in Guelph and it has also received authority to build several extensions.

Ottawa, Ont.—The Rainy River Radial Railway has asked the Canadian Parliament for an extension of time to build its railway authorized by Chapter 152 of the statutes of 1910. Lewis & Smellie, Ottawa, Ont., are solicitors for the applicants. [E. R. J., Jan. 18, '13.]

Port Arthur, Ont.—The Port Arthur Street Railway will ask the Ontario Legislature for a franchise to extend this line to McIntyre, Gorham and Ware.

Houston, Tex.—The Houston Electric Company has asked the Council for a franchise to double track Main Street from Capitol Avenue to Dallas Avenue in Houston.

Salt Lake City, Utah.—The Utah Light & Railway Company has asked the County Commissioners for two extensions of its lines in Salt Lake City. One franchise calls for the extension of the Holliday interurban line from its present terminal to the power station of the company in the mouth of Big Cottonwood Canyon. The other contemplates an extension of the Seventh East or Wandamere line from the city limits to Fourteenth South Street, and thence west on Fourteenth South to a connection with the State Street line in Salt Lake City.

Medical Lake, Wash.—The Washington Water Power Company has received a franchise from the Council for an extension on Jefferson Street in Medical Lake.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company and the Jefferson County Commissioners will construct a reinforced concrete bridge over Village Creek at Twenty-sixth Street in Birmingham at a cost of $6,000.

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—An extension of the Walnut Street line from Twelfth Street to the site of the Gulf States Steel Company's plant in Gadsden will soon be built by this company.

San Joaquin Light & Power Company, Bakersfield, Cal.—An extension of this company's lines to the new Taft School in Taft will be built at once.

Fresno (Cal.) Interurban Railway.—Announcement has been made by J. B. Rogers, promoter of this interurban railway, that work will be begun at once on the line between Fresno and Clovis. It is planned to connect this line with the lines of the Fresno Traction Company in the city limits of Fresno.

Fresno, Clovis & Academy Interurban Railway, Fresno, Cal.—Work will be begun at once by this company on its 24-mile line between Fresno, Clovis and Academy. F. S. Granger, Clovis, president. [E. R. J., Feb. 28, '14.]

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Work has been begun by this company on the broadgaging of the branch line from Lorenzo Junction, on East Fourteenth Street, to San Lorenzo. The change will obviate the necessity of changing passengers at the junction and will permit the running of through cars to San Lorenzo. The branch is 1 mile long.

Geary Street Municipal Railway, San Francisco, Cal.—The contract for building the municipal railway on Van Ness Ave. and Chestnut St. in San Francisco, has been awarded to Mahoney Bros., San Francisco. They are to lay the tracks and install the concrete trolley poles and underground conduits, all of the materials being furnished by the city.

San José (Cal.) Terminal Railway.—An effort to revive this project, a proposed line between San José and Alviso, was made at the last meeting of the Mayor and Common Council, when Judge F. G. Brown, San Francisco, and E. M. Landis, of the Tidewater & Southern Railroad, submitted two ordinances which were given first reading. The original franchise was granted Jan. 3, 1912, and some work was done, but the time for competition elapsed some months ago. One of the ordinances introduced extends the time to Jan. 1, 1915. The second ordinance is for a franchise for a connecting line in this city, begining at Second Street and St. James Street, thence to the Guadalupe Creek, to Santa Clara, to Vine and south to the city limits of San José.

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company has awarded a contract to the J. Hughes Construction Company, San Francisco, for grading the 12½-mile section of its line from Dixon south to a connection with the Oakland, Antioch & Eastern Railroad. This line will ultimately be extended through the west side of the Sacramento Valley to Red Bluff. H. R. Timm, Dixon, secretary. [E. R. J., Feb. 14, '14.]

Jacksonville (Fla.) Traction Company.—A 3½-mile extension to Black Point Park will be constructed by this company in the near future.

Savannah (Ga.) Electric Company.—During the next few weeks this company expects to rebuild 1½ miles of its line in Savannah. Material for the reconstruction is on hand.

Kankakee (Ill.) Electric Railway.—During the next six weeks this company will award contracts to build 1000 ft. of new roadbed and track on the south side of the river. It will also build a ½-mile extension with new rails in the Merchants' subdivision.

***Kewanee, Ill.**—Plans are being made to begin surveys soon for a 35-mile electric railway from Kewanee southeast via Bradford to Henry. C. G. Lampman, Cedar Rapids, Ia., and associates are interested.

Chicago, Waukegan & Fox Lake Traction Company, Sycamore, Ill.—During the next four months this company will award contracts to build a line to Woodstock.

Tri-State Traction Company, Warsaw, Ill.—This company, incorporated to build an electric line from Quincy to Hamilton, has filed amended articles of incorporation to extend the line to East Burlington, directly opposite Burlington, Ia., on the Mississippi River. J. Henry Bastert, Quincy, is interested. [E. R. J., Feb. 15, '13.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has notified the Board of Public Works that it will put in new track work and paving at the intersection of Capitol Avenue and Washington Street, Pennsylvania and Ohio Streets, and at Illinois and Washington Streets, at an expense of about $50,000. The company also expects to repair its track and the paving between the tracks in Washington Street, from Delaware Street to Noble Street, in Indianapolis.

New Albany & French Lick Valley Traction Company, New Albany, Ind.—This company advises that surveys have been completed for its 53-mile line between New Albany and French Lick. It has not yet decided when construction will be begun. John H. Martin, Palmyra, president. [E. R. J., Mar. 21, '14.]

Union Traction Company, Independence, Kan.—Work will shortly be begun by this company on its extension from Coffeyville to Nowata.

Salina, (Kan.) Street Railway.—During the next six weeks this company will award a contract for about 100 tons of rails to be used for reconstruction work. Within the next few weeks this company will rebuild about 1 mile of track and plans are being made to build about 1½ miles of new track to the Country Club and cemetery, via Oak Dale Park.

Louisville (Ky.) Railway.—Work has been begun by this company on the reconstruction of its lines on Main Street, relaying them with heavy foundations, preliminary to the reconstruction of the street by the city.

Orleans-Kenner Electric Railway, New Orleans, La.—Grading has been completed on 12 miles of this line and tracklaying is about to be begun. This is part of a plan to build an electric railway to connect New Orleans, Kenner and Hanson City. A. Smith Bowman, New Orleans, president. [E. R. J., Dec. 20, '13.]

Rockland, South Thomaston & St. George Railway, Rockland, Me.—About May 1 this company will award contracts to build 2800 ft. of new track in Rockland.

***Fenton, Mich.**—Henry Hoover and associates are considering plans to build a 60-mile electric railway between Fenton and Howell.

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Grading has been completed on the 12-mile section of this line between Robbinsdale and Champlain and plans are being made to award contracts soon to build this 70-mile railway between Minneapolis and St. Cloud. E. G. Potter, 433, Andrews Building, Minneapolis, president. [E. R. J., Dec. 13, '13.]

Niobrara, Sioux City & Omaha Railway, Omaha, Neb.—Surveys have been completed, most of the right-of-way secured and arrangements are being made by this company to begin work in June on the interurban electric railway which will extend from Omaha to Elk City and thence on to Norfolk, with a branch from Elk City to South Sioux City, from South Sioux City to Niobrara and from Niobrara to O'Neill, with a cross line from West Point to Decatur. Orders for equipment will be placed as soon as the Railway Commission issues its certificate of authority to the company to sell bonds and stocks. Charles W. Baker, Omaha, is interested. [E. R. J., July 12, '13.]

Trenton & Mercer County Traction Corporation, Trenton, N. J.—An extension from Yardville to Crosswicks will soon be built by this company.

Ontario Light & Traction Company, Canandaigua, N. Y.—This company is asked to consider plans to extend its West Avenue line southward from the end of West Avenue through Lincoln Avenue to Chili Avenue in Gates.

***Mandan, N. D.**—It is proposed to build an electric line to connect Mandan, Yuco, Center and into Dunn County.

Ohio Traction Company, Cincinnati, Ohio.—Plans are being made by this company to extend its lines in Hartwell and Carthage.

Lake Shore Electric Railway, Cleveland, Ohio.—It has been announced that this company will spend $100,000 in straightening curves and making improvements on its line between Huron and Rye Beach. The line will be built on a private right-of-way and will make the running time ten minutes between Sandusky and Cleveland. Construction work will begin within a few days and will be finished about Aug. 1.

City Railway, Dayton, Ohio.—An extension of the Third Street line in Dayton along Smithville Road for 1 mile is being considered by this company.

Youngstown & Sharon Railway & Light Company, Youngstown, Ohio.—An extension is being built by this company to its new freight station at Hubbard Junction.

Aylmer, Ont.—Sentiment in favor of Hydro-Electric Radial Railways in Aylmer district crystallized in a gathering in the town hall on March 16. The speakers included Hon. Adam Beck, chairman of the hydro-electric power commission of Ontario; J. W. Lyon, Guelph, Ont., chairman of the hydro-electric union of Ontario; Philip Pocock, chairman of the London, Ont., water commission, and Dr. Sinclair, Aylmer, Ont. London and Port Burwell have asked the commission to have its engineers make a survey, and a number of such petitions were handed to Mr. Beck, who assured his hearers that a fully equipped survey party of engineers was to be expected about March 24.

Brantford, Ont.—Brantford ratepayers have voted in favor of the purchase of the Brantford Street Railway and the Grand Valley Railway from Brantford to Galt.

Peterborough (Ont.) Radial Railway.—This company plans to build several extensions during the summer. The city is laying 1 mile of pavement along the business street and the company is removing its old tracks from this portion of its system and replacing them with new rails. It is also running a siding to the Canadian Pacific Railway depot.

Toronto (Ont.) Railway.—The board of control has approved of a plan for this company's proposed railway to the eastern entrance to the exhibition grounds.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—This company is rebuilding with 80-lb. rails and paving about 1½ miles of its line in Windsor and in Sandwich.

***Windsor, Ont.**—Mayor Clay announced on March 20 that he would take immediate steps to bring about the building of a municipal electric railway in Windsor.

***Drewsey, Ore.**—A company has been organized for the purpose of building an electric railway from Riverside up the Malheur River to Drewsey and the Logan Valley. Power will be obtained from John E. Johnson & Sons, the promoters of the power project on the Malheur River. Officers: J. L. Sitz, president; I. M. Davis, vice-president; W. D. Baker, secretary, and C. W. Drinkwater, treasurer.

Portland Railway, Light & Power Company, Portland, Ore.—Extension of the proposed cross-town car line from the north end at Mason Street to Alberta Street, there to connect with the Alberta car line, is being considered by this company.

Harrisburg (Pa.) Railways.—During the next few weeks this company plans to rebuild between 2 and 3 miles of city track. All material has been purchased.

Wayne County Street Railway, Honesdale, Pa.—Preliminary arrangements are being made by this company to begin work soon on its 20-mile electric railway from Hawley along the old canal bank through Tanner's Falls, White Mills, Indian Orchard and Beach Lake to Main Street in Honesdale. Plans call for concrete ties, 70-lb. rails and permanent pavements. Six bridges with concrete abutments will be put in. John I. Riegel, Scranton, chief engineer. [E. R. J., June 7, '13.]

Moose Jaw (Sask.) Electric Railway.—Plans are being made by this company to extend several of its lines in Moose Jaw.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—This company has placed in operation its line between Greenville and Spartanburg, a distance of 90 miles.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—During the next few weeks this company plans to build a 1-mile extension in Chattanooga. All material has been provided for.

Nashville (Tenn.) Traction Company.—This company is making plans for a large amount of work for the current year, a large part of which will be handled in connection with the steam railroads and city authorities, this being especially true of bridge work.

El Paso (Tex.) Electric Company.—C. E. Kellogg, general manager of this company, states that for some months it has been known that plans were being fostered for the construction of an interurban electric railway line up the Rio Grande Valley perhaps as far as Las Cruces, New Mexico. But when questioned as to whether or not the construction of an addition to the power plant and the installation of new machinery meant that the interurban would likely be constructed, Mr. Kellogg said that the $350,000 improvements had no bearing on such a line up the valley. He added that he did not think the time for such a line was opportune for about at least two years.

Utah Light & Railway Company, Salt Lake City, Utah.—Tentative plans have been drawn by this company for two proposed routes to connect Salt Lake and Ogden with an interurban line, to be an extension of the present line running to Centerville. Only 5 miles of the line will be finished this year—the extension from Centerville to Farmington—but in next year's budget money for the entire road will be included and Salt Lake and Ogden will be connected with another interurban line during 1915, making four railroads between the two cities. Two routes to Ogden are designated in the tentative plans which have been drawn up by L. L. Dagron, chief engineer of the Utah Light & Railway Company.

Milwaukee Western Electric Railway, Milwaukee, Wis.—Surveys are being made and grading will soon be begun by this company for a line from Milwaukee to New Butler.

Sheboygan Railway & Electric Company, Sheybogan, Wis.—Plans are being made to rebuild this company's lines between Sheboygan and Sheboygan Falls in the near future.

SHOPS AND BUILDINGS

Savannah (Ga.) Electric Company.—During the next few weeks this company plans to rebuild with fireproof construction its carhouse on Gwinnett and Ott Streets in Savannah.

Niobrara, Sioux City & Omaha Railway, Omaha, Neb.—The plans of the company contemplate the expenditure of $1,000,000 to $1,500,000 in Omaha on terminals and a passenger and freight depot, the site of which has not been decided upon, though it has been determined that these terminals must be near the business center of the city.

Youngstown & Sharon Railway & Light Company, Youngstown, Ohio.—This company will abandon its old depot in Hubbard, and the dispatcher's office, passenger station and freight office will be transferred to the new brick building at Hubbard Junction, a part of which is used as a substation for the company.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being formulated for alterations to be made in this company's main offices at Alder Street and Broadway in Portland. The improvements will cost about $15,000.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company to build a new passenger station and transfer station at Comal Street and Jefferson Avenue in Dallas. The structure will be of ornamental brick construction.

POWER HOUSES AND SUBSTATIONS

United Railroads, San Francisco, Cal.—This company's store room at its power house in San Francisco was damaged by fire on March 20. The loss is estimated to be about $1,000.

Kankakee (Ill.) Electric Railway.—During the next six weeks this company plans to purchase a new boiler with a capacity of 250 hp.

Baton Rouge (La.) Electric Company.—Plans are being considered by this company for the removal of its power plant in Baton Rouge to a point on the river front which will be more accessible to the railway.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 300-kw rotary converter.

Public Service Railway, Newark, N. J.—This company has ordered two 20,000-kw turbo-generators from the General Electric Company for its new power station at Newark.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company has awarded the following contracts for the equipment of its new power station at Lowellville: General Electric Company, one 1000-kw motor-generator set and miscellaneous switchboard equipment, one Westinghouse 1500-kw transformer and two 2500-kw transformers with switchboard equipment; Edge Moore Iron Company, three 600-hp boilers with Foster superheaters; P. F. Shaw, piping; Vulcan Soot Cleaning Company, soot cleaners; A. & S. Wilson, builders; Canady Combustion Company, combustion controllers; American Engineering Company, stokers.

Ottawa (Ont.) Electric Railway.—Two new substations have just been put into operation by this company, at a cost of $60,000 each. One of these stations is on Nelson Street, near Rideau, designed to supply increased power to the eastern section of the city; the other is on Center Street to supply the southwestern district of Ottawa.

Toronto Suburban Railway, Toronto Junction, Ont.—This company has awarded a contract to the Canadian General Electric Company for substation apparatus and car equipments, for the new line from Toronto to Berlin. There will be three substations; 1500-volt rotary converters, each of 500-kw capacity, will be used, power being transmitted to the substations at 25,000 volts.

El Paso (Tex.) Electric Company.—Important improvements have been begun at this company's power plant. A new 5000-kw turbo-generator is to be installed to supply the additional power needed in El Paso and the Rio Grande Valley for industrial and agricultural purposes.

Manufactures and Supplies

ROLLING STOCK

Jacksonville (Fla.) Traction Company has built a wrecking car in its own shops.

Keokuk (Ia.) Electric Company has ordered one car from the American Car Company.

Mansfield Railway, Light & Power Company, Mansfield, Ohio, expects to purchase three single-truck city cars.

Columbus (Ga.) Railroad expects to purchase three semi-convertible single-truck cars within the next six weeks.

Bloomsburg & Millville Street Railway, Bloomsburg, Pa., is contemplating the purchase of about three closed motor passenger cars.

Chicago, Waukegan & Fox Lake Traction Company, Sycamore, Ill., expects to purchase new cars within the next four months.

St. Joseph Valley Railway, Elkhart, Ill., has ordered one 54-ft., 150-hp, 40-passenger motor car from the Hall-Scott Motor Car Company.

Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B., will probably purchase several new single-truck cars during the year.

Houston (Tex.) Electric Company, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, as expecting to purchase ten double-truck cars, has ordered these cars from the American Car Company.

El Paso (Tex.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, as expecting to purchase six closed 32-ft.-4-in. city cars, has ordered these cars from the St. Louis Car Company.

Northern Texas Traction Company, Fort Worth, Tex., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, as being in the market for twenty cars, has ordered these cars from the American Car Company.

United Railways & Electric Company, Baltimore, Md., has ordered eighty-five semi-convertible pay-as-you-enter cars from The J. G. Brill Company. The cars will be equipped with closed vestibules and folding steps.

Pacific Great Eastern Railroad has ordered one 65-ft., 250-hp, 52-passenger motor car from the Hall-Scott Motor Car Company, and three trailer cars from the Canadian Car & Foundry Company, Ltd., for use with the motor cars.

Canadian Northern Railroad, Toronto, Ont., is sending out inquiries for equipment for eight all-steel passenger cars to be operated in suburban service upon completion of the electrification of the Montreal tunnel and terminal.

Bryan & Central Texas Interurban Railroad, Bryan, Tex., has ordered from the Hall-Scott Motor Car Company two passenger motor cars, each 52 ft. 4 in. long, with 100-hp motors, and each having a capacity of seventy-two passengers.

Harrisburg (Pa.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, as contemplating the purchase of new cars, expects to purchase ten cars during the summer. Specifications will not be ready for at least thirty days.

Easton (Pa.) Transit Company has ordered nine pay-within, semi-convertible, single-truck cars from The J. G. Brill Company, not six, as incorrectly stated in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914. The following details are specified:

Seating capacity	32	Destination signs	Hunter
Weight	12,900 lb.	Fenders	H. & B.
Length of body	20 ft. 8 in.	Gears and pinions	Gen. Elec.
Width over sills	7 ft. 10½ in.	Gongs	Adams Westlake
Width over all	8 ft. 2 in.	Hand brakes	Peacock
Height, rail to floor,	33 15-16 in.	Heaters	Consol.
		Headlights	United States
Body	wood	Journal boxes	Brill
Interior trim,	cherry stained mahogany	Motors	G. E. 67-2
		Registers	International
Headlining	Agasote	Sanders	Brill
Roof	arched	Sash fixtures	Brill
Underframe	metal	Seats	Brill winner
Bumpers	Brill	Springs	Brill

Car trimmings.........Brill
Control K-10
Curtain fixtures, Cur. Sup. Co.
Curtain material..Pantasote
Step treads..........Mason
Trolley base....Nuttall 13-D
Trucks...........Brill 21-E
Ventilators..Railway Utility
Wheels........Schoen 33-in.

TRADE NOTES

Holland Trolley Supply Company, Cleveland, Ohio, has appointed E. W. Backert sales manager of the company.

Eagle Smelting & Refining Works, New York, N. Y., has removed its offices to the Woolworth Building, New York, N. Y.

Universal Safety Tread Company, Waltham, Mass., has moved its main office from 141 Milk Street, Boston, to Waltham.

Peter Smith Heater Company, Detroit, Mich., has moved its offices and factory from 88 Isabella Street to 1725 Mt. Elliott Avenue.

Meikleham & Dinsmore, New York, N. Y., bankers, have appointed W. J. Kearney as their representative for the State of Maine with headquarters at their Boston office, 35 Congress Street.

H. W. Johns-Manville Company, New York, N. Y., has appointed Fred B. Smith as assistant to the president, T. F. Manville. For many years Mr. Smith has been secretary of the international committee of the Young Men's Christian Association.

Scholey & Company, Ltd., London, England, have received from the Maschinenfabrik Oerlikon an order for their special tool steel gear wheels and pinions for the motor equipments to be used in the electrification of the London & North Western Railway.

Continental Railway Supply & Equipment Company, Chicago, Ill., has been organized with a capital stock of $300,000 for the manufacture and sale of railway equipment and supplies. Oglesby Allen, Jr., Joseph P. Williams and Thomas P. McDonough are interested.

Ohmer Fare Register Company, Dayton, Ohio, on March 23 held its semi-annual banquet. Cash prices were distributed for suggestions made in regard to improvements in manufacture and for the welfare of employees. Talks were given by John F. Ohmer, president of the company, and others.

General Electric Company, Schenectady, N. Y., has received orders for the following car equipments: Washington, Baltimore & Annapolis Electric Railroad, five GE-233, 70-hp, 600-1200-volt four-motor car equipments; Philadelphia & Garrettford Street Railway, five GE-203, 50-hp four-motor equipments.

Hunter Illuminated Car Sign Company, Flushing, N. Y., was awarded the contract for destination signs on the six interurban cars which are being built by the Preston Car & Coach Company for the Niagara, St. Catharines & Toronto Railway. This item is a correction of the list of specifications for these cars in the ELECTRIC RAILWAY JOURNAL of March 28, 1914, which stated erroneously that the Electric Service Supplies Company had received the order for destination signs.

Roller-Smith Company, New York, N. Y., announces that in addition to its branch offices at 740 Monadnock Block, Chicago, and 711 Williamson Building, Cleveland, Ohio, it now has additional representatives as follows: Boston, Tompkins-Stoddard Company, 77 Franklin Street; Detroit, H. I. Shire, 1310 Majestic Building; Minneapolis, W. W. Geisse Company, McKnight Building; New Orleans, John S. Black, 908 Hennen Building; Portland, Ore., G. L. Priest, 229 Sherlock Building; San Francisco, H. B. Squires Company, 579 Howard Street.

Curtain Supply Company, Chicago, Ill., has appointed Walter Bentley to a position in the concern. Mr. Bentley's father, H. T. Bentley, is superintendent of motive power of the Chicago & Northwestern Railway, and has a high standing among railroad men, being past president of the American Master Mechanics' Association, also the Western Railway Club. Mr. Bentley saw to it that his son had a thorough railway training. Beginning in the stores department, Walter Bentley worked his way through almost all branches of railroad work, having served in the different departments of the shops and roadmaster's, general superintendent's and purchasing agent's offices. In the last few years he has represented the Baldwin Locomotive Works and the Standard Steel Works Company.

ADVERTISING LITERATURE

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a catalog describing its ball-bearing hangers.

American Vulcanized Fibre Company, Wilmington, Del., has issued a catalog entitled "From Field to Fibre," describing and illustrating its fibre shims for insulating steel ties, fish plates and a large number of other uses requiring both dielectric and mechanical strength.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-32 describing Duntley electric tools for interurban and street railways. These tools include track drills, heavy duty side spindle drills, center-spindle drills, angle gears, portable electric grinders and electric spike drivers. Bulletin E-31 describes electric drilling stands.

Niles-Bement-Pond Company, New York, N. Y., has issued a circular describing and illustrating its new design, high production boring and turning mills. All changes of feed and reversal, rapid power traverse or hand adjustment of saddles and bars, also cross rail adjustment and table control are within reach from the operator's position. Power may be transmitted to the machines by d.c. motor, belt or a.c. motor drive.

Wagner Electric Manufacturing Company, St. Louis, Mo., has issued Bulletin No. 104, entitled "A Manual of Electric Testing." Besides describing the line of portable instruments issued by this company, the publication describes various types of electrical instrument movements, the errors to which they are subject, and gives suggestions for their handling and care. The methods of making electrical tests on alternating current and direct current motors and generators and on transformers are explained at length and illustrated by comprehensive diagrams.

Union Switch & Signal Company, Swissvale, Pa., has issued a catalog describing its recently introduced TDB or traffic direction block signal system, especially designed for interurban railways. Two cars are permitted between sidings, each in a separate block and protected head-on and rear by "absolute" signals with a minimum of apparatus. There is but one track circuit and four signals to each opposing block unit. The blocks for opposing cars do not coincide with the blocks for following cars. This system enables the operating rules to be of the simplest kind because but two signal indications, *stop* and *proceed*, are used and there are no preliminaries. The catalog contains short illustrated descriptions of installations on the Chicago, Lake Shore & South Bend Railway, 55 miles; Indianapolis, Columbus & Southern Traction Company, 22 miles; Chicago, South Bend & Northern Indiana Railway, 9.5 miles; Louisville & Northern Railway & Lighting Company, 3.5 miles; Ohio Electric Railway, 4.2 miles; Scranton & Binghamton Railroad, 10.1 miles; Kansas City, Clay County & St. Joseph Railway, 70.1 miles.

NEW PUBLICATION

How to Build Up Furnace Efficiency. Seventh edition. By Jos. W. Hays, combustion engineer. Jos. W. Hays, publisher, Rogers Park, Chicago, Ill. 126 pages. $1.

In preparing this book for its seventh edition the author, whose sole effort, as in the previous editions, is to show managers, superintendents, engineers and firemen of power plants how they may actually work a real reduction in the coal bills, has altered his past method of exposition by treating the subject in a more popular style, so that the book will be more appreciated by the multitude of non-technical men who are anxious to get results first and who are content to let theories rest until results have been accomplished. With the above end in view, diagrams and illustrations, formerly lacking, are used to clarify some of the more complicated explanations in the text. Certain instruments and apparatus designed by the author are illustrated for the purpose of showing the apparatus which he has used in his combustion studies and in working out specific furnace efficiency problems in many plants.

Electric Railway Journal

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AN EASY WAY TO RAISE RATES

As a footnote to the discussion of labor conditions under municipal ownership, in the ELECTRIC RAILWAY JOURNAL of March 14, Italy provides an example of what to expect in case of labor trouble under government ownership of railways. Faced by a threat of a strike involving 100,000 state railway employees, the premier has agreed to pension and wage increases that will cost $3,000,000 annually, and he informed the Chamber of Deputies on Sunday, in what the press reports suggest to be an off-hand manner, that this sum was "to be obtained by increasing the railway rates." The system here exhibited has at least the merit of simplicity and dispatch. There are no long drawn-out hearings and investigations such as are necessary here to adjust wages or to increase rates. But of course the money to pay for the premier's liberality will come out of the pockets of Italian travelers and shippers, and in the long run it is very doubtful whether or not they will enjoy repeated experiences of this character which, history shows, are to be expected under municipal or government ownership of public utilities.

PUBLICITY ABOUT CAR DESIGN

A recent fuse scare on a fully-inclosed car of one of our larger city railways is a warning of the importance of acquainting the riding public with the entrance and exit features of radically new cars. The fully-inclosed car has now become a permanent feature of present electric railway practice, and its use is sure to grow on account of the intrinsic merits of the design. But while avoiding many of the evils of the previous types of car it has brought with it some problems of its own, and these must be settled in the right way if the car is to be as successful as it should be. One of these problems is that of the best way of avoiding disastrous results from a panic among the passengers. In the case in question a fuse under one of the seats blew out, and its careless replacement resulted in some flashes which burned the motorman and conductor slightly as they tried to correct the trouble. In the meantime disorder prevailed among the passengers, who actually thought there was no way for them to get out of the car except by smashing the doors. They did not even realize how easy it was to open the windows. Unfortunately, the motorman and conductor also lost their heads, and a serious accident was avoided only through the coolness of a policeman, who ran up to the car and pulled down the trolley pole. Of course, the fuse should not have been inserted with the power on, but a similar panic might have been caused by a fight or in a dozen other ways. For this reason instructions to the car crew only as to what to do in cases of emergencies will not suffice. In all fully-inclosed cars, whether of the center-entrance or end-entrance type, it will be well to post notices over the place where the door-operating devices are installed explaining how the doors may be opened, on the same theory that passengers on steam trains are kept acquainted with the location of the emergency levers of the airbrake and of the emergency toolbox.

CLASSIFIED ACCIDENT RECORDS

Two of the papers at the recent New York electric railway convention laid stress upon the value of classified accident records in determining what are the most important problems in accident prevention. The point is an excellent one. Accident prevention, while by no means a new subject, has received special attention only during the last few years, and, naturally, its features of greatest importance are not yet generally understood, nor is there any general agreement upon their character. As an example of the application of accident statistics to a definite problem, Edward A. Maher, Jr., of the Third Avenue Railway, found that boarding and alighting accidents on that system constitute 38.5 per cent of the total number and that they were being absolutely eliminated by the installation, on all cars, of folding doors and steps. This figure is a percentage of the number of accidents only and does not take into consideration the relative seriousness of the injuries, but assuming that the actual number is a rough approximation of the assessed damages Mr. Maher has determined that an expenditure of $310 per car for installing the extra safeguards will pay for itself in two years. This instance shows that some parts of the accident problem, at least, are capable of a solution that will bring a big return, even judged solely from the standpoint of dollars and cents. It also shows that possibly other phases of the question may be approached in a similar way. For example, if Mr. Maher's figures regarding the relative number of the accidents to children under fifteen years of age—4 per cent of the total—may be considered as representative, it is worth consideration whether the safety campaigns in the schools are as immediately important as the introduction of some means for eliminating boarding and alighting accidents, amounting to 38 per cent of the total, and for reducing the number of collisions with pedestrians and vehicles, amounting to 37 per cent of the total.

STANDARD RAIL SECTIONS In probably no other department of electric railway construction would greater economy come from standardization than in that of rail sections. Every variation in the section of a rail, no matter how slight, means a change in the rolls, and one of the complaints of the rail manufacturers in the past has been that the conflicting ideas or whims of railway companies have compelled the mills to keep in stock a large number of sets of rolls. For this reason the work on standards of the way committee of the Engineering Association and the adoption of these standards by the companies promise more direct results in the way of economy than almost any other, because the cost of maintaining the present variety of sections must necessarily be borne by the users of rails. Mr. Schreiber's article in this week's issue reviews in a most interesting way the development of rail standards by the Engineering Association and illustrates those recommended by the committees in past years. The latest sections are the result of this experience and presumably represent the best thought of the way engineers of the country for a desirable section. To have accomplished this much is most commendable, but it will be of little practical value unless the railway companies order enough rails of the present standard sections to warrant the manufacture of the necessary rolls. As yet no one can use these rails because no rolls have been cut for them. Would it not be well at the next meeting of the Engineering Association to take up this question of their practical adoption? The proposed sections will then have been before the industry for a year and a census of those who think sufficiently well of them to purchase rails of that type should be possible.

WHAT CONSTITUTES A SIGNAL FAILURE?

In view of the records of signal operation which are now becoming available, the various railways that have installed automatic signals or are about to install them certainly ought to unite on some uniform definition of what constitutes a signal failure. At present no definite rule exists, and as the number of failures is an extremely small proportion of the total number of signal movements, a slight difference in definition may cause the signals on one road to show a record very much better than those of another line where conditions are otherwise comparable. Certainly there is no sound reason for thus denying the stimulus of comparative records to the performance of automatic signals.

On one system a signal failure is charged for each train that is improperly stopped by a signal regardless of how or why the signal happens to be in stop position, and in addition, of course, the converse also applies. Exception to such a drastic rule as this has been taken on the ground that it is hardly proper to say that a signal has failed when a derailed car has knocked down a pole carrying the signal wires, or when a short-circuit of the signal-power wires is caused by exterior circumstances, such as a wire falling from some other circuit. In such cases it is said, and with a considerable degree of justification, that if the signals go to stop position they have fulfilled the duty for which they were designed.

Strictly interpreted the broadest ruling would involve charging a signal failure when a train was stopped on account of a broken bond, although this action has been held as one of the most important features of the track-circuit-controlled signal systems. Be this as it may, the fact remains that electric railway signal engineers today have no uniform basis for signal operating records, and judging from the excellent arguments put forward in favor of each of the various existing definitions of a signal failure, this uniform basis is not likely to be reached by any other method than weight of personal belief. We would welcome, therefore, expressions of opinion on this question from signal engineers throughout the country.

INHERITED DISCREPANCIES IN FARES

A result of consolidation which often gives trouble to the management of the system thus formed is the discrepancy between fares frequently found on different lines. Such conditions not seldom lead to charges of discrimination before public service commissions. The defence of cases of this kind is usually burdensome, not because the management is conscious of any desire to treat any portion of the territory with favoritism, but because equal service for equal compensation appears at first sight a sound doctrine. It is difficult to convince the layman that because he can ride 7 miles for a 5-cent fare on one line, it by no means follows that he should be allowed to travel a like distance on another line at the same rate, yet this can be done if all the facts are presented in clear form to intelligent patrons.

In many fare cases it is possible for the company to point out that it is carrying passengers at a loss on the line selected by the petitioners for comparison. No real reason exists why the fares on a consolidated line should be reduced to an unprofitable level because those elsewhere on the system are unduly low. Many of these situations result from rash promises by promoters, usually verbal, and unless they are legal obligations inherited by the consolidated company it is hard to see why the latter is bound to observe them, even as an ethical matter. Too great rigidity in the matter of fares as time passes is injurious to the community as well as to the company, for it stifles development in a score of ways. Again, special circumstances often fix fares on apparently similar lines, such as a heavy industrial traffic morning and night, the establishment of colonies of summer homes, Chautauqua assemblies, or steam railroad competition. Much can be done by emphasizing the improved quality of service resulting from a consolidation, by tabulating the maximum distances purchasable per fare, including transfers, by calling attention to the shortening headway on the disputed line, and by making it plain that while it is out of the question for every line on a system to earn a profit, every local reduction in revenue draws more heavily upon other portions of a road and must be made up somewhere in obtaining a reasonable return. Actual estimates of service cost are more convincing as a rule than pro-rated car-mile expenses applied to a particular line, and when the former are considered in connection with the total earnings and expenses of the system, the best basis for a just decision is secured. The co-ordination of fares on consolidated lines is a subject bound to demand more attention in the future, but in the meantime the income and expense analysis of specific lines will do much to disarm hostility in dealing with inherited discrepancies.

ENLISTING THE CO-OPERATION OF EMPLOYEES

Progressive managers of electric railways are uniformly of the opinion that a sympathetic interest in the welfare of an operating company on the part of the employees, of whatever rank, is one of the most important factors in the success of the enterprise. On small roads it is easier to cultivate such an interest than on great properties where the personnel is constantly changing and where the men behind the controller and the punch are out of personal contact with many of their superior officers. It is a good sign, however, that the ablest operating officials are trying to come into closer touch with their men than formerly, and one particularly successful superintendent remarked recently that he hardly dared to appear on the most congested street corner of the system in the rush hours for fear of delaying traffic through the voluntary salutes of motormen. Attendance of officials at employees' social events, sports, etc., helps to create a better mutual understanding and to enlist the energies of the men, whether members of the union or not, on behalf of good service and loyal support of the company.

Sometimes it is necessary to appeal to the men through printed bulletins in which particular problems may be clearly discussed from the point of view of the management, giving more time for their consideration than is afforded in a short personal talk. An instance of this procedure on behalf of co-operation was furnished recently by the Boston Elevated Railway Company, following the award of increased wages and improved working conditions to the men in the service by the late arbitration board. To acquaint the employees with the situation, which involved a serious cut in the company's dividend rate, President Bancroft issued a bulletin pointing out that the public has not been affected by the decision of the board; that the employees, through shortened hours, raised wages and other bettered conditions, have been benefited, and that the investors, through a reduced dividend, have been affected adversely. It was stated that the investors, at most, have never received more than a modest dividend and that in fairness it ought to be restored. The letter showed that if, through the diligence of conductors, one fare per half trip could be saved from loss, the increase in income to the company would be $672,177.70 annually, and the co-operation of the motormen was specially urged toward reducing the present average yearly cost of accidents of $700,716. In simple, plain terms the possibility of every employee doing something to increase the company's revenue or to save it from preventable loss was set forth, and the conclusion was drawn that it is the duty of every employee to aid the company to carry the heavy burden placed upon it by the award. The closing statement called the attention of the men to the fact that the company's future car revenues and accident record will show what the employees have done toward restoring the dividend.

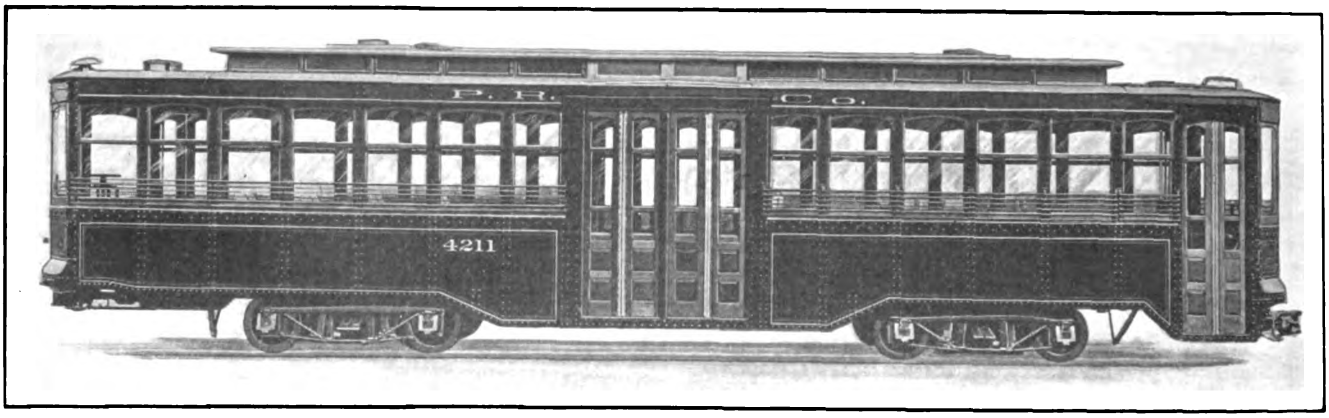
Frank discussions of this kind are bound to be received in a spirit of good will by employees capable of realizing the need of fair play for investors as well as for those in the service, and when such bulletins are worded in straightforward language on a man-to-man basis, their appeal is sure to be heeded by many of the rank and file who daily handle the detailed problems of serving the public safely and efficiently. The trouble in the past in this country has been that too often "the company" has meant nothing but a machine to those working for it in humbler capacities, and the realization of the very human needs of its stockholders, many of whom are persons in anything but affluent circumstances, has not been pressed home to the average platform man. The latter visualizes the influential company banker as the typical stockholder rather than the small merchant in the suburban town or the widow of the high-school principal, whose savings have gone into the securities of the road through years of self-denial and who feels the pinch of a cut in dividends certainly as keenly as motorman '8000" feels a protracted "lay-off."

There is room along these and similar lines for very effective educational work. The keynote of it all should be "co-operation." The effort should be made, by both precept and example, to instill the idea that the interests of the employee and the employer are largely the same. The doctrine of antagonism between capital and labor preached by the I. W. W. (or "I Won't Work") advocates is largely imaginary. Theoretically, it may sound reasonable to argue that the interests of capital and labor are diametrically opposed because capital wishes to buy what labor has to sell, hence capital is interested in reducing wages to the lowest point, while labor is interested in pushing them to the highest point possible. Practically, the employee prospers most when the company for which he is working is prosperous, and conversely, the company will get more real service out of its men and will be most prosperous when they are contented. Here is an important educational opportunity. Practical welfare work, such as a number of companies have undertaken, will help considerably along these lines, as it will show the interest which the company takes in the social condition and home life of its men. Profit sharing in some form is also helpful in promoting a spirit of mutual understanding, and the benefits following the investments by employees in the corporation for which they are working are but little realized in the railway field, although the plan has been carried out successfully in the industrial field.

Center-Entrance, End-Exit Cars for Pittsburgh

The Pittsburgh Railways Company Has Adopted as Standard a Modification of the Low-Floor Car Which Has Many Novel Features, Including a Four-Motor Control System Operating Without Resistance

After experimenting for a period of nearly two years the Pittsburgh Railways Company has adopted as standard a type of car that possesses many unusual features. Foremost among these are the small motors and wheels that permit the car floor to be kept down to a point which, in the center of the car, is only 24¾ in. above the rail. In this respect the new cars follow the principle developed in the original low-floor car used in Pittsburgh and described in the ELECTRIC RAILWAY JOURNAL for Aug. 3, 1912. Since that car was built, however, numerous improvements have been introduced. The lot of fifty cars which is now being shipped by the St. Louis Car Company differs from the original type in many particulars.



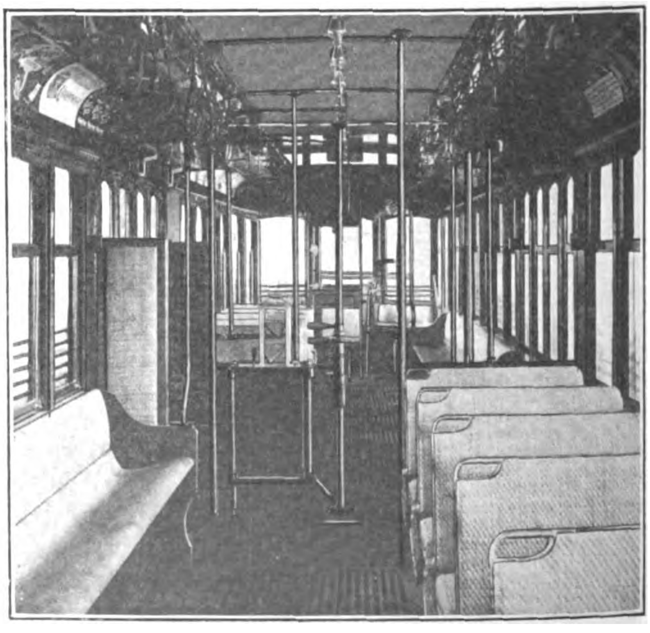
Pittsburgh Car—Side View Showing Center Doors and Front Exit

First among these is the use of a front exit as an auxiliary to the center doors with which the car is furnished. This really makes the car a compromise type, because the two doors at the center are not used to provide a separate exit and entrance, but are made thoroughly flexible in their use, so that, if desired, both may be used as an entrance or both as an exit. There is no definitely assigned path for the movement of passengers, the conductor directing the movements of the passengers in and out of the car in accordance with the immediate needs.

This radical departure from the usual custom of training the public along rigidly-prescribed lines is stated to have been adopted on account of the peculiar conditions existing in Pittsburgh. In that city it is customary, on outgoing cars during the rush hour, for all passengers to be loaded at three or four loading points within the restricted business district. They may be carried for several miles before any unloading takes place and then are dropped off in small groups as on an ordinary suburban line. The exact reverse of this process takes place with inbound cars, and in consequence the use of both center doors for an entrance or for an exit is of distinct value in decreasing the time of stops.

The front exit door is under the control of the motorman, and it provides a means for short-distance riders to get off the car at congested loading points without interference from incoming passengers. It also eliminates the necessity for the conductor to leave the center doors open and unguarded when he gets off to throw a switch or to signal to the motorman at grade crossings. A mirror is installed over the right-hand front window at each end of the car so that the motorman may see what the conductor is doing without having to turn around. The mirror also warns the motorman of passengers moving to the front of the car to make use of the front exit door. This mirror is set at the maximum possible height so that there is no danger of the motorman's view being obscured by the heads of standing passengers.

When the car is in operation the conductor stands beside a stanchion which is placed in the exact center of the car, and entering passengers pass on either side of him in case both center doors are used for entrances. On this stanchion are two handles for operating the doors so that the conductor has no need of moving out of his position. The fare box is carried in a frame of gas pipe that is hung from the center stanchion. It may be swung around on its support to either side of the car, and when the car is in operation it is located immediately in front of the open doors, thus



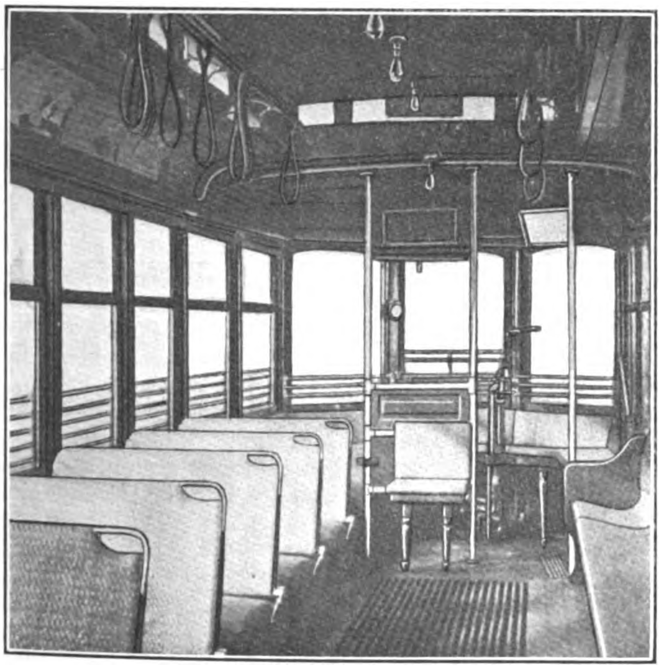
Pittsburgh Car—Interior View Showing Arrangements of Seats and Swinging Fare Box Supported on Stanchion in Center of Car providing a clear space in front of the passengers who make use of the folding seats along the doors on the blind side of the car.

There are only two handles for operating the doors, and they are carried on the center stanchion. Each of these handles operates one of the two doors on the entrance side of the car. When the car changes ends and the doors on the opposite side of the car are to be used, the operating rods which extend over the center stanchion to the operating mechanism of the door are disconnected, swung around to the other side of the car and connected to the operating mechanism of the opposite doors. The connections are made by easily-removable pins, and in order to avoid any possibility of wrongly connecting the doors one of the two operating mechanisms on each side and one of the rods are painted red, and the others are painted black.

The destination signs are located in the monitor over the center doors, and at each end of the car is a large, illuminated route-indication sign in a wooden frame.

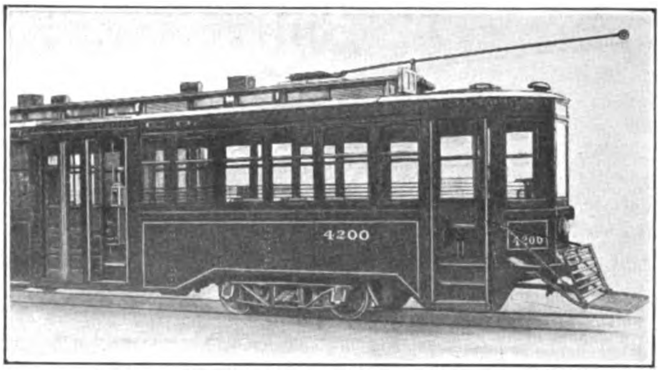
SEAT AND STEP ARRANGEMENT

The seating arrangement, as shown in the accompanying plan of the car, is a combination of cross and longitudinal seats, the longitudinal aisle seats provided in the original low-floor car having been abandoned on account of the difficulty which they introduced in the interior movement of passengers. The ends of the car are provided with circular seats, no bulkheads being installed. There is also provided a single seat attached to stanchions at each end of the car. The stanchions are used primarily to support a folding seat for the motorman and to act as guides for a curtain at the motorman's back to keep the lighted interior of the car from obscuring his view at night. Folding seats are located in front of the unused doors on the blind side of the car.



Pittsburgh Car—View Showing Stationary End Seats and Location of Control Handles—Motorman's Mirror Over Right-Hand End Window

There is a ramp in the floor between the trucks and the center. This gives a rise of 3 in. and, together with a transverse ramp between the step and the longitudinal center line of the car amounting to 1 1/16 in., it makes the minimum floor height 24¾ in. This is divided into one 15¼ in. step from the ground and one 9½-in. interior step. At the front exit the floor height of approximately 2 ft. 5 in. is divided into three steps, of which two are interior and are about 8½ in. each.



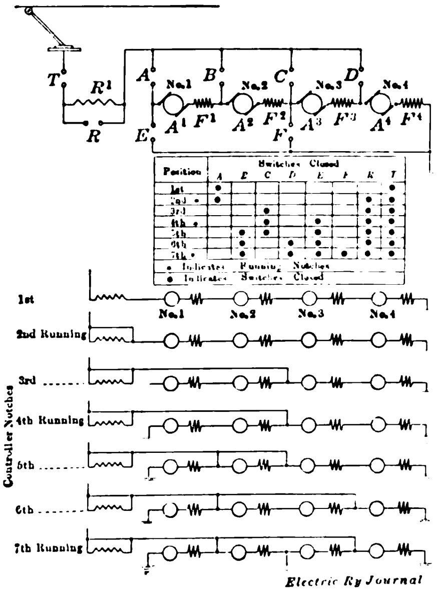
Pittsburgh Car—View Showing Interior Steps at Center and Front Doors

A notable innovation is the use of immovable semicircular seats at both ends of the car. The controller at each end is set below the seat and the shaft is extended up through the seat and through a pipe railing slightly above the ordinary height of an arm rest. When the car is being operated in either direction the controller and reverser handles are put in place on the shaft of the controller drum, the motorman standing in back of the fixed seat at the front end. The controller drum handle extends through the hollow reverser shaft so that both handles have the same center. Through the pipe-railing also extends the shaft of a mechanically-operated sander, and at the right of the motorman another piece of pipe railing affords a support for the removable hand-brake wheel and air-brake handle. At the rear end of the car all of these handles are removed, leaving the pipe railings with no projecting pieces and permitting passengers to use all of the end seats.

The doors are all of the interior combined swinging and sliding type which is standard on the Pittsburgh Railways. All are mechanically operated by short handles on interior stanchions. The approximate net door opening is 2 ft. 4 in. It will be noticed from the plan of the car that while the extreme width is 8 ft. 2 in. the ends of the car are reduced in width to 7 ft. This has been done on account of clearance difficulties in the city of Pittsburgh. The cars, complete with double-end control and couplers at each end, weigh 38,000 lb.

CONTROL WITHOUT RESISTANCE

The greatest novelty in the car equipment is the use of a new form of controller. This, like the small



Position	Switches Closed A	B	C	D	E	F	R	T
1st	●							●
2nd •	●						●	●
3rd			●				●	●
4th •			●		●		●	●
5th		●	●		●		●	●
6th		●		●	●		●	●
7th •		●		●	●	●	●	●
• Indicates Running Notches								
● Indicates Switches Closed								

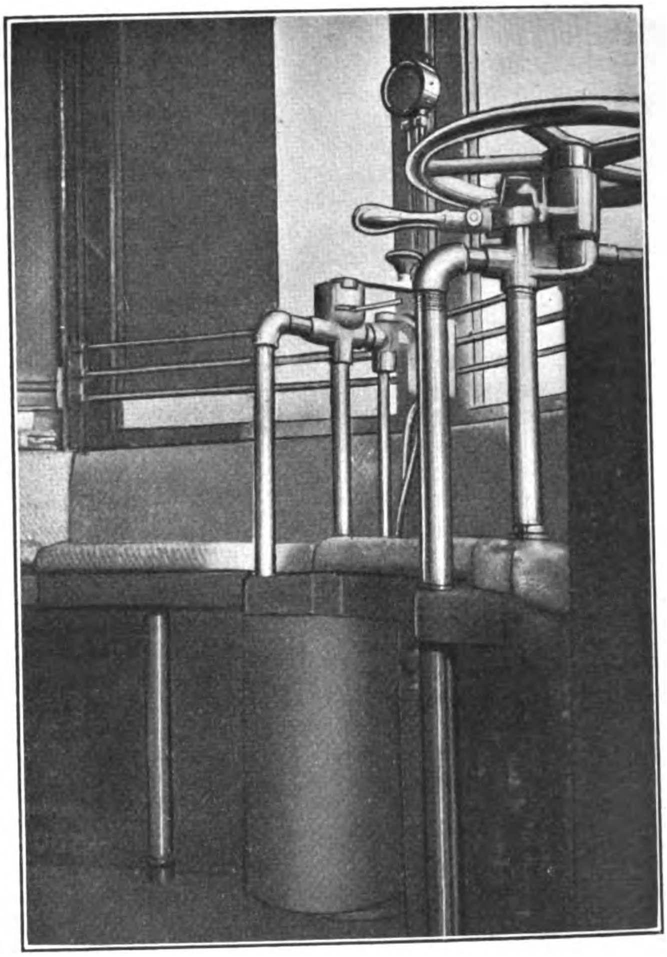
Pittsburgh Car—Diagram Showing Control Connections motors, has been developed and patented by P. N. Jones, general manager Pittsburgh Railways. It operates by using a permanent series connection between all of the motors in a four-motor equipment without the use of any resistance.

The operation is shown in the accompanying diagram. There are seven notches on the controller, of which three are running positions. On the first notch the four motors are connected in series through a small resistance which is used only to avoid the jar of starting when the gears and pinions are worn so that back lash exists between the teeth. The second notch of the controller leaves all motors in series, but cuts out the resistance, and this is a running position. The resistance remains cut out on all subsequent notches.

The third controller notch connects two motors in series, leaving the other two to run idle, thus giving an easy transition to the fourth controller notch in which the motors are connected in series-parallel. This is a running notch.

In the fifth position of the controller handle two of the motors are left in series, and one of the other two motors takes full voltage, the third motor running idle. In the sixth position one of the two motors in series is cut out, the car being propelled during this period by two motors, each of which takes full voltage. In the seventh position, which is the notch for full speed running, all motors are in parallel and take full voltage. Switches marked *A* and *E*, and *C* and *F* are interlocked to prevent any possibility of simultaneous closure, and consequent short circuit.

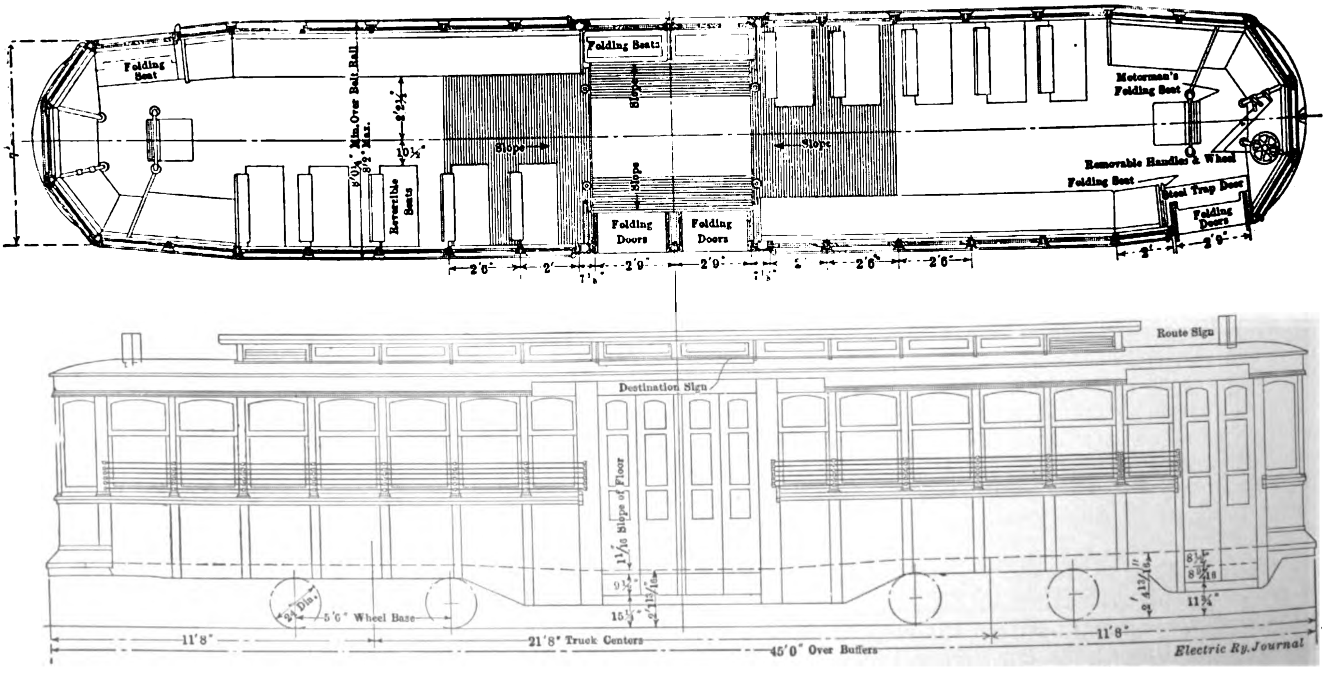
The control system is operated by a master controller and a switch group with eight unit switches specially designed for light weight and small bulk. This number includes the usual main-line circuit-breaker, which has a reset and is closed in all operating positions of the controller. It may be said that a drum controller operating on this principle has been built with the idea of eliminating remote switches and master control, but it has not as yet been put into service. It was made up from an old K-11 drum controller with two of the segments omitted.



Pittsburgh Car—Control and Air Brake Handles Supported on Pipe—Bracket at End of Car

It will be noticed from the diagram that motor No. 4 is in circuit all the time, whereas the other motors have variable periods of interruption during acceleration. However, it has been found that this No. 4 motor does not tend to get hot because on all of the running notches the work is evenly distributed between all four motors.

The line switch installed in the main circuit is of the simplest magnetically-operated type, and although the


Folding Seat
Folding Seats
8'0¼" Min. Over Belt Rail
8'2" Max.
8'2½"
10½"
Reversible Seats
Slope
Slope
Slope
Slope
Folding Doors
Folding Doors
Motorman's Folding Seat
Removable Handles & Wheel
Folding Seat
Steel Trap Door
Folding Doors
2'6"
2'
7⅛"
2'9"
2'9"
7⅛"
2'6"
2'6"
2'
2'9"
Route Sign
Destination Sign
1 1/16" Slope of Floor
9½"
15½"
2' 13/16"
24" Dia.
5'6" Wheel Base
11'8"
21'8" Truck Centers
45'0" Over Buffers
11'8"
8½"
8 9/16"
11¾"
2' 4 13/16"
Electric Ry. Journal

Pittsburgh Car—Plan and Elevation Showing Door and Seat Arrangement

original controller has been in use for more than one year it is still operating satisfactorily. However, both the main switch and the bridging cut-outs for the motors have been in a process of development until very recently and details as to their construction are not available.

Owing to the practical elimination of resistance and to the method of making the transitions, the new controller has eliminated most of the losses inherent in the older types. To demonstrate the extent of this saving a comparative test was made between two cars of exactly the same weight and with the same equipment. One was equipped with the new controller and one with a controller of the standard type. The test lasted during a period of three months, and the cars changed runs every day; that is to say, a certain crew would handle one car on one day and the other car on the next day.

The trucks were interchanged every few weeks, and the two pairs had different gear ratios. The meters on the cars also were changed and calibrated each week and the results compared, so that, while the number of stops was not taken into consideration, it is believed that as a comparison the tests were as accurate as was practically possible. The cars ran on the Frankstown Avenue line in Pittsburgh and upon this line the number of stops is very high.

The average saving in current consumption under these conditions was found to be approximately 12 per cent over the ordinary series-parallel controller. One of the two trucks was geared to do the required work most efficiently, the gear ratio used being better suited to the route than that on the other test truck and in fact better than those on the regular cars on the same run. Table No. 1 shows that if only the large pinions had been used the saving in current through the use of the new controller would have been 13 per cent instead of 12 per cent because of the greater losses with the resistance type of control. However, the summaries of the tests with both gear ratios are given herewith. In addition the same figures are given in the comparison of Table II to show the influence of the gear ratio on power consumption. It will be seen that, with the old type of control with resistance, the saving effected by changing from a 16-tooth pinion to a 15-tooth pinion amounted to 5.4 per cent. With the new type of control the saving effected by the same change in pinions amounted to 2.3 per cent. Under ordinary conditions the cars on the Frankstown Avenue line average 12 stops per mile, the schedule speed being 9.5 m.p.h.

TABLE I—RELATIVE POWER CONSUMPTION WITH DIFFERENT CONTROLLERS

	Passengers	Miles	Passengers per mile run	Watt hours per ton mile	Saving per cent
Gear ratio: 16:57 on both cars.					
Resistance type control......	48,080	4885	9.85	148.5	...
Control without resistance...	39,607	4471	8.85	128.5	13.5
Gear ratio: 15:58.					
Resistance type of control...	49,381	5290	9.32	140.5	...
Control without resistance...	47,060	4711	9.97	125.5	10.7

TABLE II—INFLUENCE OF GEAR RATIO UPON POWER CONSUMPTION

	Passengers	Miles	Passengers per mile run	Watt hours per ton mile	Saving per cent
Resistance type of control.					
Gear ratio 15:58............	49,381	5290	9.30	140.5	5.4
Gear ratio 16:57............	48,080	4885	9.85	148.5	...
Control without resistance.					
Gear ratio 15:58............	47,060	4711	10.	125.5	2.3
Gear ratio 16:57............	39,607	4471	8.85	128.5	...

A further set of results was obtained during the month of March, both cars being equipped with a gear ratio of 15:58. During this period the car with resistance type of control carried 29,921 passengers and ran 3264 miles, giving a unit load of 9.15 passengers per mile.

The car with the new control carried 27,613 passengers, and ran 2964 miles, giving a unit load of 9.32 passengers per mile. The power consumption was 130.5 watt-hours per ton mile. These figures show a saving of 10.6 per cent for the new control, almost exactly the same as in the first test.

The new controllers have been in use for approximately a year on seven cars. With the original car thus equipped a mileage of 50,000 has been made since the controller was first installed.

BAVARIAN REPORT ON STEAM VERSUS ELECTRIC OPERATING COSTS

Under date of February, 1914, the Bavarian Ministry of Communications presented to Parliament a report on the electrical exploitations of state water-powers. This report is of special interest from the railroad electrification standpoint inasmuch as it shows the changes which have occurred in the relative costs of operating with steam or electricity. It appears that in 1910 the State was willing to pay a maximum of $2,845,000 for electrical energy to supply the Munich-Garmisch-Partenkirchen and the Munich-Holzkirchen lines. At this time the comparative annual operating costs of the lines affected were as follows: steam, $709,218; eletcricity, $508,578; annual difference in favor of electrical operation, $200,640. These figures covered the handling of 2,201,053 train miles and 426,181,180 metric ton miles with 32,560,000 kw-hr. at a maximum price of 0.77 cent per kw-hr. in the power plant.

The report then goes on to say that, while the 1910 comparison was correct as based on steam costs of the years 1905 and 1906, it was no longer so. Steam locomotives had been greatly improved by the addition of superheaters, while the first cost of the electric locomotives has increased. A comparison under these later conditions showed the following for all lines of the divisions named except the Garmisch-Partenkirchen, Scharniz and Garmisch-Partenkirchen-Griesen lines, which are now in operation: steam, $710,999; electricity, $538,818; annual difference in favor of electricity, $172,181. These figures cover the handling of 2,306,763 train miles and 447,268,000 metric ton miles with 33,240,000 kw-hr.

The ministry assumes that the electric locomotives would require only 10 per cent reserve compared with 25 per cent for steam. Seventy-five electric locomotives, costing $2,795,000, just for the locomotives, would do the work of 101 steam locomotives, costing $1,659,750. The life of equipment was taken to be as follows: locomotives, whether steam or electric, twenty-five years; overhead-contact system, fifteen years; transmission poles, feeders and insulators, fifty years; transformer stations, twenty-five years.

The reason ascribed for the increased first cost of electric locomotives is chiefly inexperience with the first designs, which were too light for the service in some respects. Of course, the prices might be expected to go down after standard types had been evolved. It was impossible to say when electrification of the Bavarian State Railways as a whole should be recommended, as the data from the present experimental lines were not yet ample enough to form a decision. It would be necessary to wait a reasonable time after transmission, line and locomotive troubles incidental to the early days of operation had been corrected. It was also desirable to wait until further experiences had been gained on the newer electrifications of Innsbruck-Garmisch-Partenkirchen-Reutte and Salzburg-Bad Reichenhall-Berchtesgaden. Each of these lines is 24.8 miles long, and they are well suited for speed tests since they include grades of 3.3 to 4 per cent as well as long level stretches.

The New Standard Grooved Girder Rail Sections

The Author Traces the History of the Development of the Present A. E. R. A. Standard Girder Rail Sections and Discusses Their Applicability in Present Practice—He Suggests the Adoption of Revised Standards in T-Rails

BY MARTIN SCHREIBER, ENGINEER MAINTENANCE OF WAY PUBLIC SERVICE RAILWAY COMPANY

The American Electric Railway Engineering Association performed an important work at its last Atlantic City convention in the final development of four standard girder rails for tangent and curved tracks in paved streets. The need of these rails was recognized for many years. Long before, the steam roads were pioneers in advocating the uniform T-rails, which resulted in the well-known standard designs of the American Society of Civil Engineers. In Great Britain we find even girder rails standardized. Figs. 1 and 2 show one of the British standard rails and its guard. Unfortunately the conditions under which the foreign installations must be made do not coincide with our practice. Only during the last summer the writer had the pleasure of discussing track construction with a gentleman from Glasgow. One of this gentleman's first criticisms of the track construction in America was the large variety of rail sections that he found here.

About three years ago, when the writer was particularly interested in the development of the standard rails for the Engineering Association, he found some 200 different sections actually in use. While it was true that "live" sections were considerably less than this number, still many of the sections in use then were available, and rolls and equipment were yet on hand for the manufacture of many of them. It is only fair to concede that electric railway engineers have fully realized that standard rails would eventually mean better service and cheaper track, but the whole situation had not been altogether in their control. Besides, the development in the electric railway industry, especially of equipment, was not mature, and the time has hardly been ripe for standard rails until now.

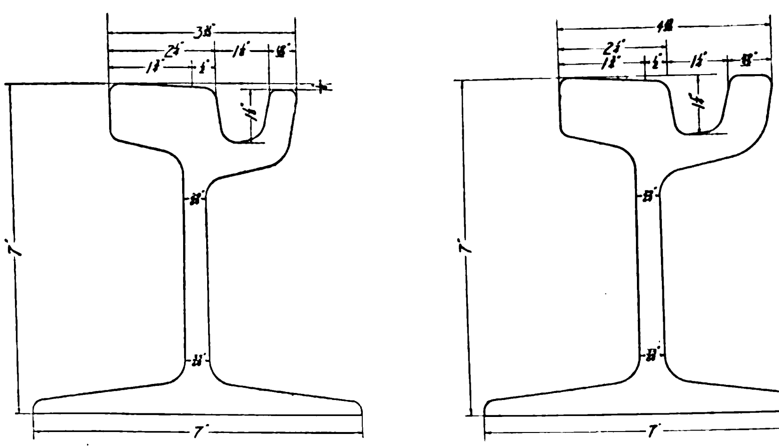
DEVELOPMENT OF THE STANDARD GIRDER RAILS

It may be of interest to trace the development of the standard girder rails that were finally proposed by the Engineering Association. The first actual design of the grooved girder rail for paved streets was that proposed as standard by the committee on rails and rail matters of the American Street & Interurban Railway Association, presented at the 1907 convention. There were two 7-in. and two 9-in. grooved rails, the former weighing 137 lb. and 122 lb. to the yard, respectively, and the latter weighing 122 lb. and 98 lb. to the yard, respectively. In the same report were also recommended two 7-in. and two 9-in. tram rails, together with designs for 7-in. and 9-in. guard rails for use with both grooved and tram sections. Figs. 3, 4, 5 and 6 show in detail the tram and grooved rails for the straight track.

No further progress was made during 1908, but in 1909 the committee on way matters confirmed the report of the 1907 committee, relative to the 7-in. and 9-in. grooved girder sections.

The committee on way matters for 1910 approved the principles outlined in the previous reports, but submitted in detail for consideration the designs for 7-in. and 9-in. grooved girder rails, shown by Figs. 7 and 8. The reasons for submitting alternative designs were that the committee considered the previous sections to be too heavy and their first cost too high.

In 1911 the same committee revised the work of all preceding committees and confined its attention to the design of a 9-in. grooved girder rail, as shown in Fig. 9, submitting a thorough and careful analysis of the principles which governed each detail. The design submitted by this committee comprised one radical departure from any other rail section that had previously been in use or proposed, in that it provided for a tapered web. The reason given by the committee for the change in design was a mathematical one. It was explained that in the case of wagon loads on the tram or when cars sway from side to side, the web acts as a cantilever, and its stability is directly proportional to the cube of the cross-section at the base. The web provided in the 9-in. rail submitted by the committee, therefore, had about two and one-half times the stability of the straight web 9/16-in. thick, although containing practically the same quantity of metal as the rail with the uniform web. The committee of 1911 was very anxious that the 9-in. girder rail, that it proposed, should be adopted as standard, but the convention decided that it would be better to prepare designs for both the 7-in. and 9-in. rails for straight track and 7-in. and 9-in. rails for curved track, rather



Figs. 1 and 2—British Standard Rail Section No. 5 and Its Guard; L. S. Sec. 110-413 and 116-414

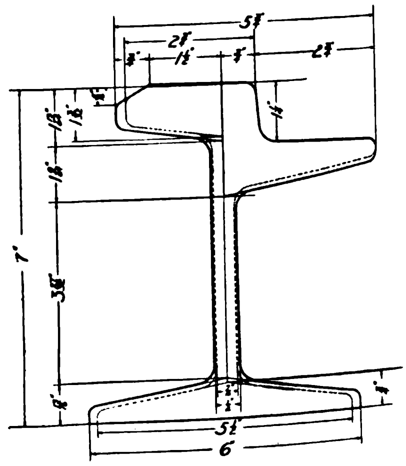


Fig. 3—7-In. Tram Rails Recommended in 1907; Weights 122 Lb. and 96.4 Lb.

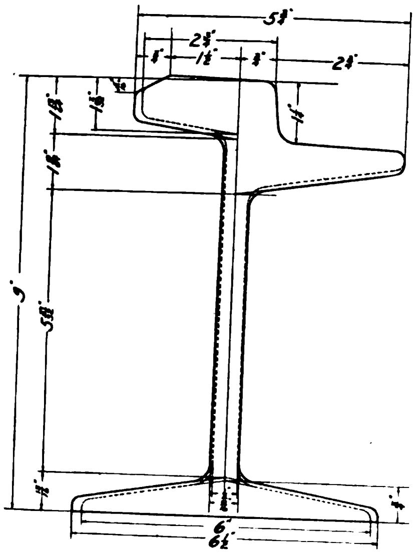


Fig. 4—9-In. Tram Rails, Recommended in 1907; Weights, 137 Lb. and 120.3 Lb.

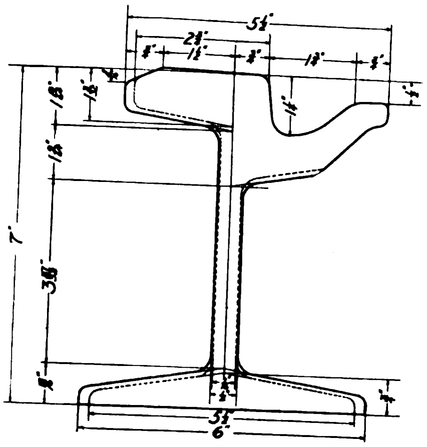


Fig. 5—7-In. Grooved Rails, Recommended in 1907; Weights, 122 Lb. and 98 Lb.

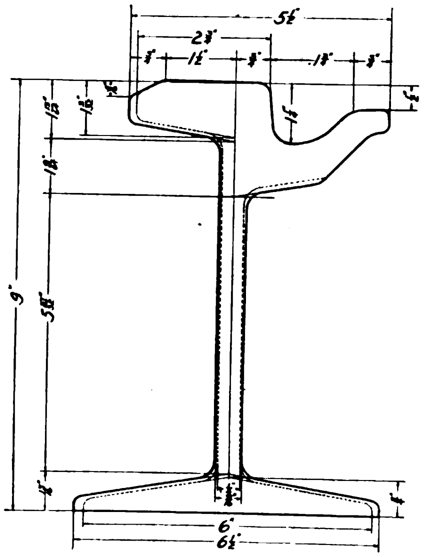


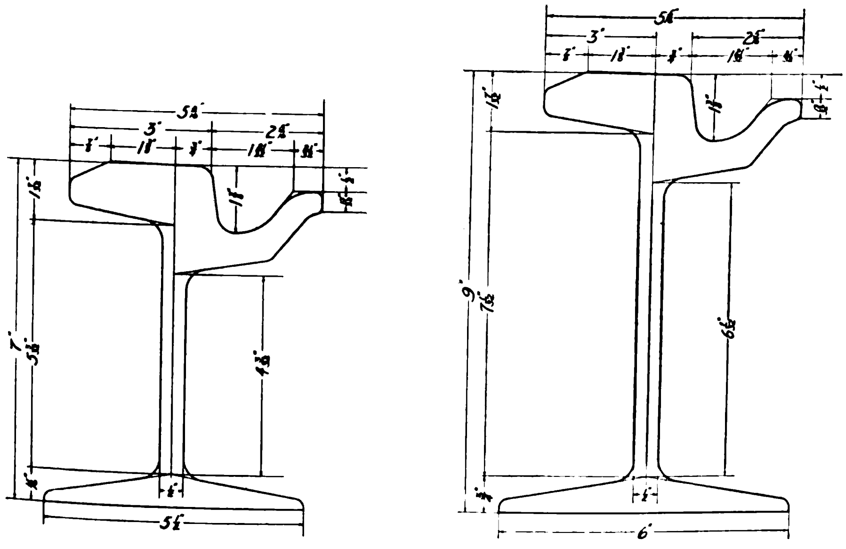
Fig. 6—9-In. Grooved Rails, Recommended in 1907; Weights, 137 Lb. and 122 Lb.

than a design for one rail only. Accordingly, the committee on way matters for 1912 approved the 9-in. design submitted by the 1911 committee and also presented three additional designs covering a 7-in. grooved rail for straight track and a 7-in. and a 9-in. guard rail for curved track. Although these four designs appeared to be very nearly what was required, the committee on standards did not approve the recommendations of the way committee, principally on account of the contour of the throat of the guard rail and referred the whole question back for further action of the way committee reporting to the 1913 convention. Fig. 10 shows the design of the 7-in. grooved rail with tapered web that was included in the 1912 committee's report.

The 1913 committee on way matters, with the experience of all previous committees and the large number of discussions that had occurred in committee meetings and on the convention floors, was determined to produce satisfactory designs. Accordingly, it submitted at the 1913 convention plans for four standard rails, including those for straight and curved track, both 7-in. and 9-in. These designs were not only approved by the committee on standards, but the action was also ratified by the convention and the rails now the standard for the association are as shown in Figs. 11, 12, 13 and 14.

THE COMMITTEES' OLD AND NEW DESIGNS

Thus, after six years of continuous work by the way committees, we have four standard rails. It is interesting at this time to compare the original rails, as produced by the 1907 committee, with the rails recommended by the committee of 1913. If we compare only the weights of the rails we find that there is very little difference, and the layman may wonder why the committees were so long in arriving at the final decisions. Closer examination, however, develops the fact that a great deal has been accomplished. In the first place, in 1907 sixteen rail sections were proposed as standard, in 1913 only four. This is due to the fact that the 1913 committee felt justified in eliminating the tram rail altogether, and also that it proposed only one 7-in. and one 9-in. rail, instead of two of each. Most engineers will now admit the wisdom of the action of the 1913 committee. At any location where a tram rail would be allowed by the municipal authorities, it seemed that a T-rail would be just as efficient from the latter's point of



Figs. 7 and 8—7-in., 106-lb. Grooved Rail and 9-in., 120-lb. Grooved Rail, Recommended as Standard in 1910

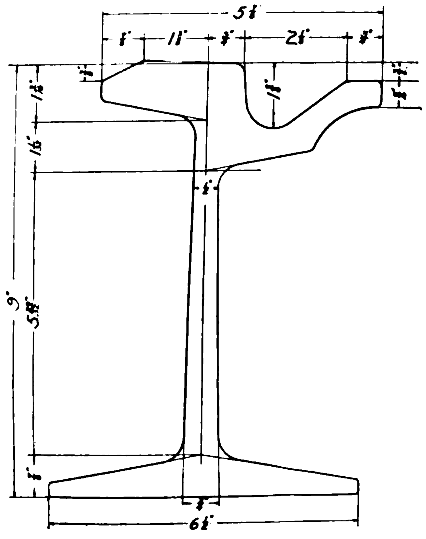


Fig. 9—9-In., 136-Lb. Grooved Rail, Recommended in 1911

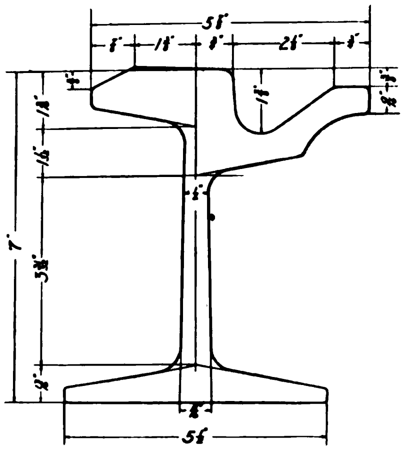
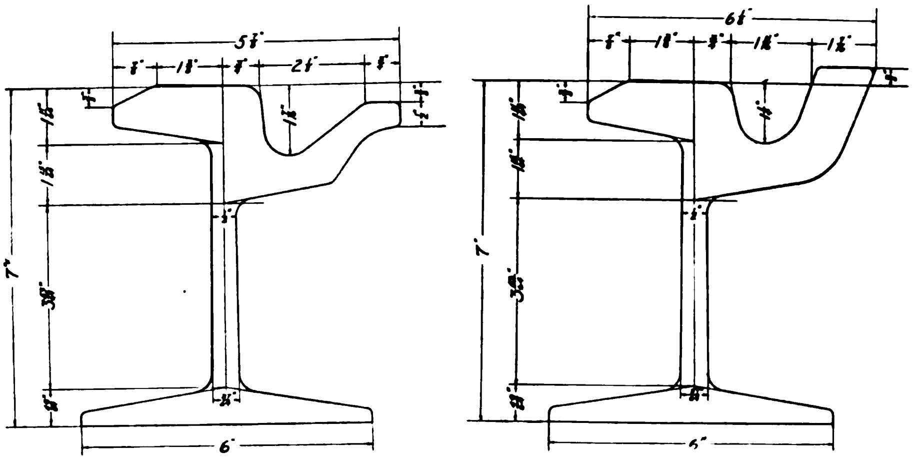


Fig. 10—7-In. Grooved Rail Recommended as Standard in 1912



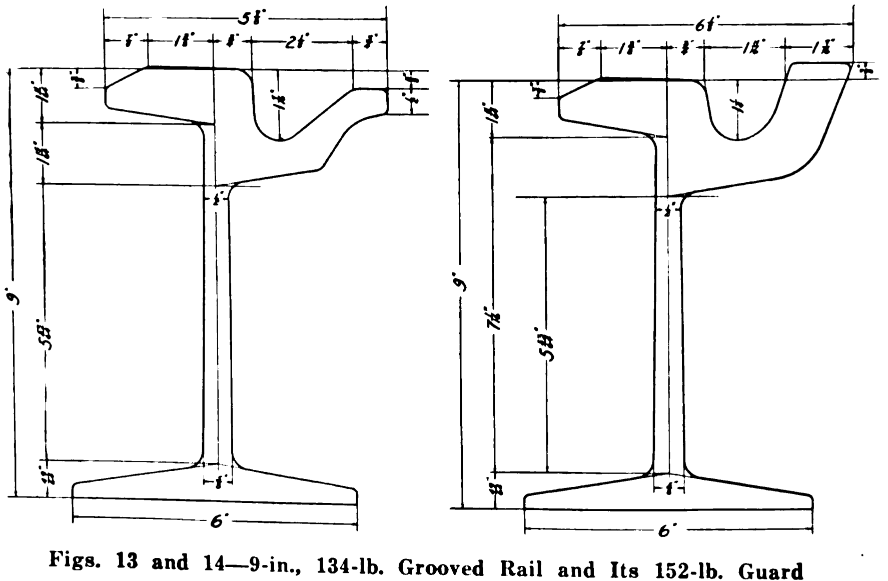
Figs. 11 and 12—7-in., 122-lb. Grooved Rail and Its 140-lb. Guard Rail, Recommended as Standard in 1913

view, and certainly largely preferred to any other type of rail from the railway company's standpoint. If the T-rail is not approved it seems that there is not any reasonable alternative but the grooved girder rail.

When the 1907 committee made its recommendations, there was considerable question about the tendency of modern equipment, especially as to the weight of cars, and the committee was entirely justified in recommending these types of rails. The 1913 committee, however, had the advantage of seeing the problem of equipment further developed, and it is fortunate that it was able to recommend to the association a single 7-in. and a single 9-in. rail to cover average conditions. Every engineer appreciates that the smaller the number of standard sections from which it is possible to select, the better it is, not only for the railway company but also for the manufacturer of the material, because it means improved and cheaper product and better delivery.

As stated above, for example, one of the 9-in. grooved rails of 1907 weighed 137 lb. and the 9-in. grooved rail of 1913 weighed 134 lb., a difference of only 3 lb. There are, however, material differences in design. The contour of the head is modified, in that the width of the wearing surface of the later rail is 2⅛ in. as against 2¼ in. in the old rail. The depth of the bevel, also, of the new design is 1/16 in. greater than in the 1907 rail, and the length of the bevel is ⅛ in. greater. The advantages of these changes accrue principally to railway properties that are still using a narrow tread of wheel in that they allow longer life of the rail before ridges appear on the wearing surfaces. The over-all width of the head of the 1913 rail is ⅜ in. greater than that of 1907, and the depth of the lip below the head is ⅛ in. less. These latter changes were made to afford better paving and vehicular conditions.

Another important improvement in the 1913 rail is the increase in depth of the groove from 1¼ in. to 1 7/16 in. This point was very difficult to decide, on account of the early practice providing a depth of only 1⅛ in., and some of the rail rolled during the last few years has a depth of 1½ in. It is very desirable to have the groove deep to give maximum wearing value to the head; nevertheless, it has been thought undesirable by many because of vehicular traffic and of the cutting down of the fishing depth, especially in the case of the 7-in. rail. The design of the web of the new rail is entirely different from that of the old in that the taper of the 9-in. rail is ½ in. at the top and ⅝ in. at the bottom. This arrangement, as explained, increases the stability, tending to prevent corrugation which has been a serious menace particularly in the last few years. It will be noticed that the width of the base of the heavy 1907 9-in. rail was 6½ in., while that of the rail proposed by the 1913 committee is only 6 in. In the committee's opinion, it was only necessary



Figs. 13 and 14—9-in., 134-lb. Grooved Rail and Its 152-lb. Guard Rail, Recommended as Standard in 1913

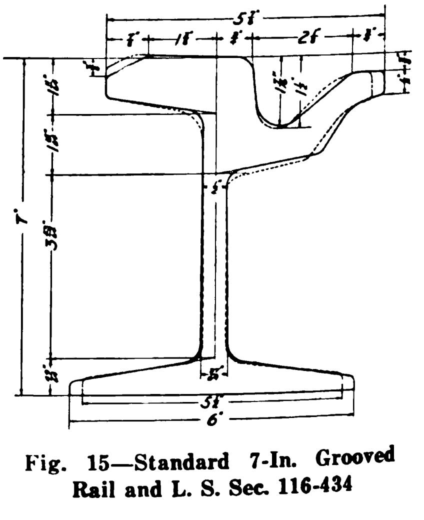


Fig. 15—Standard 7-In. Grooved Rail and L. S. Sec. 116-434

to design a base that would be of sufficient width for bearing, and at the same time the narrow base allowed more uniform rolling.

Generally, the same arguments apply to grooved guard rails, but in the latter, there is a distinct tendency toward a change of contour and an increase in the width of the throat. Of course the design of the throat of the guard is altogether a question of construction of the equipment. The equipment has been considerably developed since the 1907 committee's deliberations were presented. In fact it is now generally conceded that it is necessary to provide a guard that will take care of a standard A. E. R. E. A. flange and a wheel-base varying from 4 ft. to 6 ft., with radius of curved track varying from 40 ft. upward. The fact that the throat in the guard rail has been designed only 1¼ in. deep seemed to be an advantage because the wear on the guard is not apt to come on the bottom of the groove but rather on the sides, and the decrease of the groove allows an increase in the depth of the guard, which is desirable on account of the large strain on the guard by the wheels of cars taking curves.

The committee of 1913 is also to be congratulated because an honest effort was made to create rails that would, so far as possible, not only conform to the principles that were required to be met but also fish with existing rails. For example, the 9-in. grooved rail fishes with Pennsylvania Steel Company's sections No. 125-273 and No. 151-283 and Lorain Steel Company's sections No. 125-423, No. 132-440 and No. 150-441. It is at once apparent that it is much easier for any railway company to adopt standard rails if no changes are required in the joints.

MODERN RAILS IN USE

It is worth while to examine the practice in representative American cities of rails in use at the present time. Characteristic practice is shown by the rail sections used in the following cities as given by the section numbers. These are, Brooklyn, No. 105-453; New York, Nos. 110-404 and 122-428; Philadelphia, No. 141-395; Boston, Nos. 132-440 and 151-462; Chicago, No. 129-403; San Francisco, No. 106-422; Pittsburgh, Nos. 132-440 and 116-434; Cleveland, No. 95-400; Newark, No. 116-434, and Louisville, Nos. 125-460 and 103-426. The section numbers referred to above are the Lorain Steel Company, and the Pennsylvania Steel Company has corresponding rails.

Although the extraordinary conditions and requirements in some locations may require for a time at least the use of special rail sections, as for example, slot rail or other special construction required by ordinance, still the new standard rail of the association may very easily be substituted in a large number of instances. It is a fact that the present rails all conform to the new design, as shown by the tendency of the designs to offset the gage line from the center of the web, thereby causing the rail to be better balanced when under the influence of the wheel load. The application of the principle of increasing the thickness of web and depth of groove is also apparent. Indeed, we find rail recently used in Pittsburgh and Boston that will actually fish with the new 9-in. section recommended by the Engineering Association. Fig. 15 shows the present rail sections of the Public Service Railway as compared with that of the new standard 7-in. grooved girder rail. These latter rails correspond very closely, and it was unfortunate that the committees were not able to arrange the design of the new rail to fish with this section, as it is extensively used by a number of companies.

From the foregoing it is seen that the committees have worked very close to the prevailing tendency of present practice in designing the new sections, and the work is commendable in every way. It is true that any section whatever which might be advocated is subject to criticism, but no one can question the soundness of the broad principles underlying the design of the new rails, as these principles are practically ratified by most experienced electric railway engineers. The manufacturers of rails have been just as keen to produce a standard as have the railway companies, and they deserve a great deal of credit for their hearty co-operation in all of the committee's deliberations. It is also fortunate that almost simultaneously with the introduction of approved design of rails we have the new standard specifications for open-hearth rail, which have been ratified by the American Electric Railway Engineering Association and also by the American Society for Testing Materials.

It may be said, therefore, that the electric railway industry is in a better position to-day to know what is actually required in the way of grooved girder rails than ever before. The future will see a further reduction in the number of rail sections through a more general use of the 7-in. rail, eliminating the 9-in. rail to a large degree. Primarily the demand for 9-in. rail was caused by the use of deep paving blocks and mechanical joints. Both of the latter are rapidly disappearing in modern practice, and there is no good reason why the 7-in. rail with welded joints and with shallower paving will not answer as well as the 9-in. rail. And it certainly has less first cost.

The fact that the energies of the way committees have been devoted to producing the standard grooved girder rail sections, probably caused some oversight in revising the designs of the standard T-rails of the association. The present is the proper time to revise these standards. Probably one weight of high T-rail will be sufficient, and it is to be hoped that this standard rail will be of some now standard section. So far as the low T-rail is concerned, the association seems to have acted properly in following the standard of the steam roads.

FOLDING STEPS FOR KANSAS CITY RAILWAY

Folding steps have been installed on many cars operated by the Metropolitan Street Railway, Kansas City, Mo., and the installation will be made general as rapidly as the mechanical department can make the necessary changes. The folding steps will be used, at least temporarily, only on the front doors, which are used for exits and entrances. The folding step operates in connection with the door. A feature of the new steps is a delay mechanism, whereby the step drops into place before the door opens to an appreciable extent. If the step fails to work, the door cannot open, as the operations are interlocking. It is believed that this phase of the installation will prevent accidents, many of which are reported to have occurred where the door opens and the step fails to drop. The grab-handles are inside the door, thus discouraging passengers from attempting to board a car when the front door has been closed and it is ready to start.

According to the *Near East* the Périer concession for tramways in Jerusalem includes the following terms: work to be completed within two years; concession to last forty years. The municipality is to receive 30 per cent of the net profits of the railway and lighting services, of which two-thirds will be used for the benefit of Jerusalem and one-third for the benefit of the district. Branches of tramway lines to different parts of the city, as well as to Bethlehem, will be constructed. There will be four separate lines, all starting from the Jaffa Gate, one of them going out to Bethlehem. The concessionaires also have the right of water supply and electric lighting.

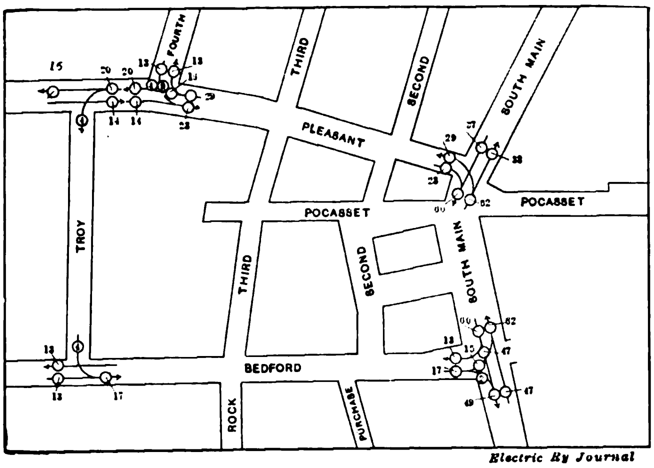
Report on Traffic Congestion in Fall River, Mass.

Abstract of an Investigation by D. C. & Wm. B. Jackson of the Factors Limiting Street Railway Service in the Center of a Representative New England Textile Manufacturing City

At the request of the Fall River (Mass.) Chamber of Commerce, the engineering firm of D. C. & Wm. B. Jackson, Chicago and Boston, has investigated the problem of street railway traffic congestion in the heart of that city. As a result it has filed an exhaustive report analyzing the conditions bearing upon this phase of the service, with recommendations for certain improvements in track arrangement, traffic regulations, handling of cars and re-routing. The adequacy of the service was not investigated, as the authors were directed to devote practically their entire attention to the problem of reducing congestion. An abstract of the report follows.

LAYOUT OF FALL RIVER AND CHARACTER OF TRAFFIC

The city of Fall River, situated at the mouth of the Taunton River on Mount Hope Bay, lies on land of rugged topography, and its streets are crooked and narrow. It is an important center of cotton manufacturing and had a population of 119,295 people in 1910.



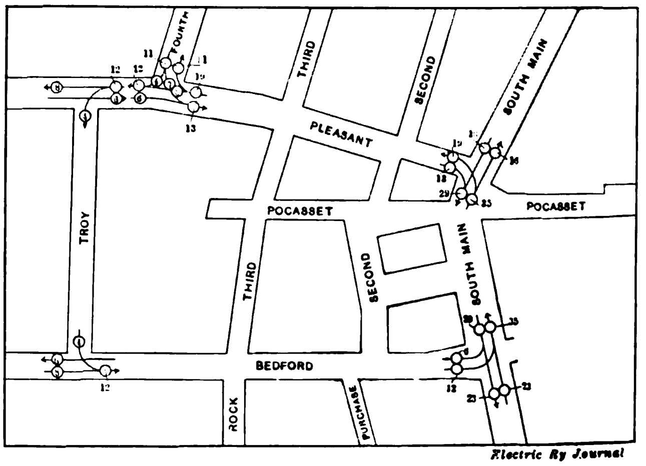
Fall River Traffic—Rush-Hour Car Traffic

The Bay State Street Railway operates the local car service, and in the fiscal year 1913 carried 106 times the full population of the municipality within the city limits. It is estimated that the population in 1920 will be 140,000.

The city rises somewhat abruptly from the shore of the bay, and the City Hall district, which is in a valley-like depression between the sections of the city north and south and lying between the wharves and the location of the mills to the eastward, early became and has remained the commercial heart of the town. The city is radial in character from the City Hall outward, but the City Hall is not at the center of gravity of street railway traffic. Main Street, between Pleasant and Bedford Streets, affords the only satisfactory route for a street railway connection between the northern and southern portions. This condition, together with the narrow streets, heavy vehicular traffic and the absence of rigid traffic regulations, has caused objectionable congestion in the City Hall district.

A heavy vehicular traffic occurs along Central and Pocasset Streets to and from the waterfront, and because of favorable grades these streets are destined to continue to play a vital part in the cross-town handling of heavy mill products and merchandise. The highest number of vehicular movements at the Central and Pocasset Street crossings of Main Street in a fifteen-minute period are at the rate of from six to seven per minute, and at the ends of Third Street there are five vehicles per minute, with a smaller movement at Second Street. Fortunately, the maximum vehicular movement does not coincide with the street car maximum. The former occurs between 10 and 11 a. m. and the latter between 5 and 6 p. m. The maximum car movements on Dec. 1, 1913, at South Main and Pleasant Streets were at the rate of 160 cars per hour between 5:45 p. m. and 6 p. m., and at North Main and Bedford Streets the maximum was at the rate of 130 cars per hour between 5 p. m. and 5:15 p. m.

A comparison of the density of teaming and street car traffic in the maximum hour on important streets in the City Hall district shows that Main Street, between Pleasant and Bedford Streets, cannot escape congestion unless vehicles and cars are kept moving. This tendency to congestion is exaggerated by switching and trolley turning of twelve to fifteen cars in the busy hour immediately in front of the City Hall, by the same operation for five or six cars opposite Granite Street, by switching and turning east of the Pleasant Street neck, and by the blocking of both north-bound and south-bound tracks because of the use of cross-overs by cars entering Bank Street and Franklin Street. The heavy afternoon vehicular traffic overlaps the street railway rush-hour traffic slightly but dies down rapidly after 5 o'clock. The street railway traffic is heavier on Saturday afternoons and summer Sundays than on week-days, but teaming traffic is then little or nothing.



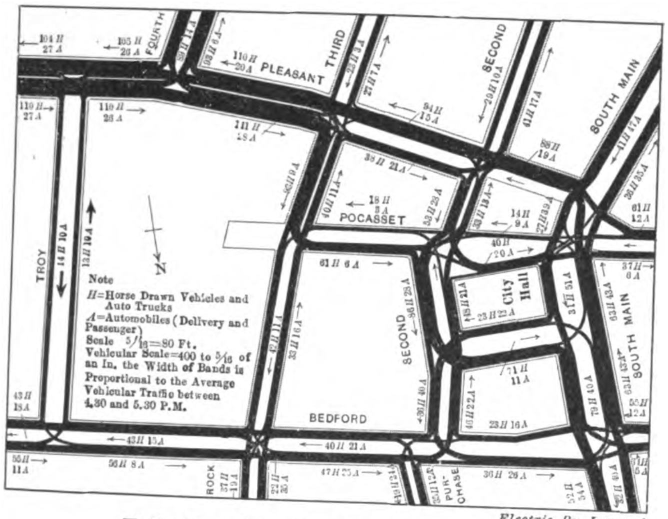
Fall River Traffic—Normal-Hour Car Traffic

EFFECT OF AUTO-TRUCK SERVICE

Relatively few auto trucks are as yet in use in Fall River, but the expectation is that the number will materially increase. Motor vehicles alone and moving cause little congestion, but such traffic requires wider spacing in the streets for safety. The special committee on bituminous materials for road construction of the American Society of Civil Engineers has just reported in favor of a unit width of traffic lines of 9 ft. or 10 ft., instead of 7 ft. or 8 ft., on account of the greater clearance required by motor trucks. The maximum normal width of vehicles in Fall River is 7 ft., and the maximum width of open cars in the city is 9 ft. There is no compelling reason why the loading and transfer point in front of the City Hall should not be continued for all the existing street railway routes, provided proper vehicular traffic regulations are introduced and provided street cars are kept circulating. Except for the blocking of the tracks by unnecessary delays and car stoppages, many more cars could be operated through this district without causing serious congestion. The greatest congestion arises because wagons and automobiles are allowed to occupy for indefinite periods the space along the curb which should be used for through vehicular traffic. Somewhat the same conditions exist in other streets. A parking space for vehicles off the main streets is needed.

AMOUNT OF CAR SERVICE

Fall River has perhaps an abnormal amount of single track for a city of its size, owing to the narrowness and crookedness of its streets. It appears impracticable greatly to increase the amount of double track. The Bay State company has for urban winter operation at present thirty-three single-truck, closed passenger cars seating from twenty-eight to thirty persons each and thirty-four double-truck closed cars seating from thirty-six to forty-eight each. On Dec. 1, 1913, sixty of these cars were being operated in the rush hour between 5 p. m. and 6 p. m. on the urban routes. During the summer the company can put into service seventy single-truck and eighteen double-truck open cars and twenty-four single-truck and twenty-two double-truck closed cars, making a total of 134 cars available.



Note
H=Horse Drawn Vehicles and Auto Trucks
A=Automobiles (Delivery and Passenger)
Scale 5/16=80 Ft.
Vehicular Scale=400 to 5/16 of an In. the Width of Bands is Proportional to the Average Vehicular Traffic between 4.30 and 5.30 P.M.

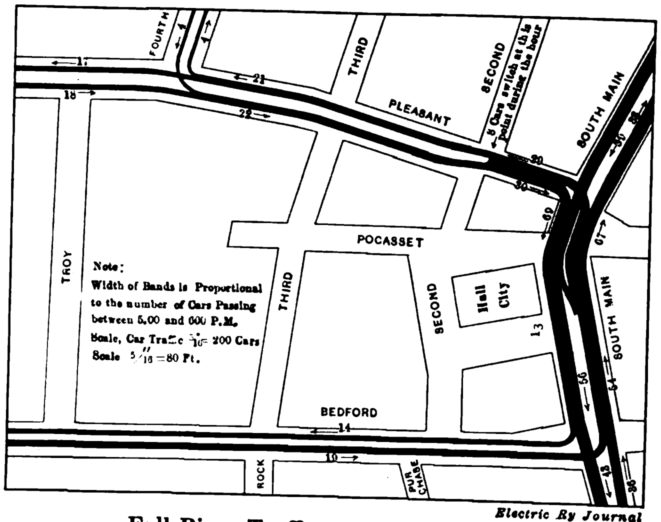
Electric Ry Journal

Fall River Traffic—Vehicular Traffic

The number of cars proper to be operated upon the various routes within a city depends primarily upon the traffic offered on the routes, and in a radial city like Fall River the central district becomes a common transfer point. The operating schedules directly affect the problem of congestion in the central district, but limitations of facilities in handling cars should not be allowed to determine the number of cars operated on various routes, since the latter should be determined by the requirements of the traveling public. The scheduled trip speeds lie near 8 m.p.h. in Fall River, which is a satisfactory figure for the local streets. The company's car schedules appear reasonably satisfactory.

The serious car congestion now arising is determined by the number of cars in the rush hour and the manner of their handling. The actual car movements in the rush hour are larger than the company's schedules of regular and tripper cars indicate, owing to additional switching and to express-car and work-car movements and to the fact that delays of the schedule chance to bring certain additional cars into the congested area during this rush period. All the cars of the local service and the interurban cars come into the City Hall block, and the regular scheduled urban cars entering from the south considerably overbalance those from the north. This causes much switching of cars in the City Hall district, and consequent delays. Further congestion is due to opposing movements on single-track lines and to lay-overs of the Taunton interurban and railway depot cars. Again, trippers from the Stafford Road carhouse are switched at crowded points.

Two carhouses are operated, one at North Main and Old Colony Streets, 0.75 mile north of the City Hall, and the other at Stafford Road and Albert Street, 1.5 miles southeast of the City Hall. More than 90 per cent of the cars are operated from the Stafford Road carhouse. The express terminal is operated by an interurban company at Bedford and Sixth Streets, about 0.2 mile eastward from the City Hall. Six of the night trippers come from the Main Street carhouse and twenty-five from the Stafford Road house, twenty-three of the latter causing much congestion on South Main Street by being routed over the single-track line on Rodman Street.



Note:
Width of Bands is Proportional to the number of Cars Passing between 5.00 and 600 P.M.
Scale, Car Traffic 5/16= 200 Cars
Scale 5/16″=80 Ft.

Electric Ry Journal

Fall River Traffic—Street-Car Traffic

RELIEF METHODS PROPOSED

Four principal methods of relieving congestion have been considered:

(1) By routing the cars so that those entering the City Hall district from one direction will leave it in another direction without reversing. This plan of through-routing is already in effect for the greater portion of the regular local cars, and careful studies indicate that sufficient further through-routing cannot be done to eliminate the congestion.

(2) By the construction of loop tracks over which cars not through-routed may be operated when passing through the congested district.

(3) By reversing trolleys and switching cars beyond the congested district, instead of within that district as is now the practice with many of the cars.

(4) Main-stem operation, with cars passing up and down Main Street, with cars on the cross streets stopping and transferring between cars on the main stem and then returning on their routes.

All of these methods have been used in different cities. The first is extensively used in Fall River, and the second will ultimately become essential as the city grows. Associated with it should go the widening of Third Street and probably the extension of High through to Troy Street, affording traffic and street car outlets in that direction, and other improvements beyond the scope of the present investigation. The third plan may be introduced at present to relieve existing conditions, and if it is associated with a loop on Troy or Third Street, over which only a limited number of cars shall be operated, this solution will be very satisfactory for a period of years; but the final solution will rest with further looping of the cars, since an extension of the business district will ultimately make the shuttle switching required by this method an inconvenience. The fourth method is inadvisable in a city like Fall River on account of the inconvenience imposed upon passengers by largely increasing the transfer traffic, and also because of the inconvenience and danger which would arise from blocking up the ends of important side streets by standing cars.

Some through-routing might be done with interurban cars, but the service would tend to become unbalanced, and if certain local cars were through-routed it would involve disadvantages to schedules now adjusted to the satisfaction of the public. An arbitrary change of street car schedules for the purpose of through-routing is likely to cause more inconvenience than advantage. The cars serving the railroad station cannot be satisfactorily through-routed, chiefly because their running times are adjusted to train arrivals. Wherever the schedules can be arranged rationally and normally for through-routing, it ought to be accomplished now and in future, but the existing requirements of passengers do not call for a sufficient change of frequency of service on various streets to be of material value in improving through-route arrangements, and the company has done about all the through-routing practicable as an aid to avoiding congestion in the central district.

RECOMMENDATIONS

The Pleasant Street neck should be double-tracked at once, the street being widened at such time as the city's finances permit. The branch-off curves to and from Main Street should be improved by shifting the tracks in the latter thoroughfare slightly to the west.

The Bank Street entry from Main Street should be improved by installing a double branch-off into the single track on Bank Street, with an electric track switch for the north-bound track in Main Street. The same thing should be done in Franklin Street, and if exact surveys show it to be possible, a turn-out is desirable in each of these streets near Main Street; otherwise automatic track switches should be installed and the arrangement of the electric signals improved.

The switching of cars and shifting of trolleys in front of the City Hall or elsewhere on Main Street between Franklin and Rodman Streets, and on Pleasant Street, should be prohibited except in extreme emergencies.

The company should not permit cars to lie over in the streets awaiting departure, and if interurban lay-overs are necessary, a terminal should be provided.

To handle cars not through-routed, cars from Pleasant Street (except Rodman Street) and South Main Street not through-routed should switch at a new crossover on North Main Street between Pine and Cherry Streets (or at the terminal of the Bank Street single track), and cars not through-routed coming from North Main Street should switch on Fourth Street, between Pleasant and Hartwell.

It is desirable to authorize the laying of a track on Troy Street, for loop service, but to limit rigorously the traffic to eight cars per hour in the rush-hour period until traffic provisions can be made to prevent the standing of vehicles in Bedford Street between Third and Main. This will afford a relief passage for rectifying the car schedule in the event of an interruption for which shuttle switching might cause too much delay. Third Street should be widened, thereby becoming a logical street for a loop-track service.

The need of electric switches at the Bank and Franklin Street branch-offs has been discussed. They should be installed at the entries from Main into Pleasant and Bedford Streets, unless the company continues to maintain switchmen at these points.

A track should be laid in Globe Street, from Stafford Road to East Main Street, to facilitate handling cars to and from the Stafford Road carhouse, now dependent on a single-track entry into the heart of the city.

A track on Morgan Street, connecting Fourth and South Main Streets, is desirable for the use of outbound cars. The entrance to a local schoolyard should be moved to another street.

The standing of vehicles should be prohibited in Main Street between Anawan and Granite Streets (except on the west side of South Main between Anawan and Pocasset) as well as the Pleasant Street neck. A twenty-minute or thirty-minute standing limit appears reasonable on Bedford Street between Main and Third.

Any vehicle should be prohibited from stopping or standing on a crosswalk or in such a position near a street corner that its nearest point is less than 10 ft. from the curb of an intersecting street. It will be necessary for the city to give attention to the width of vehicles and the conditions of their loadings unless some of the streets are widened.

The accompanying drawings show the traffic in the City Hall district resulting from the carrying out of the foregoing plans, both for ordinary and rush hours. In the diagrams on page 816 the numbers placed near the small circles indicate the numbers of cars passing the corresponding points, per hour, in the directions indicated by the arrows.

But little additional burden is put on Bedford Street, and a satisfactory terminal is provided for every car route not through-routed. The switching space on Fourth Street between Pleasant and Hartwell Streets is wide and little burdened with traffic. It is proposed to limit the cars which switch here to seven per hour, and the arrangement can be utilized for several years without inconvenience. As the city grows streets must be cut through to provide additional through routes for all kinds of traffic.

ELECTRIC CONDUCTIVITY OF EXHAUST GASES FROM STEAM LOCOMOTIVES

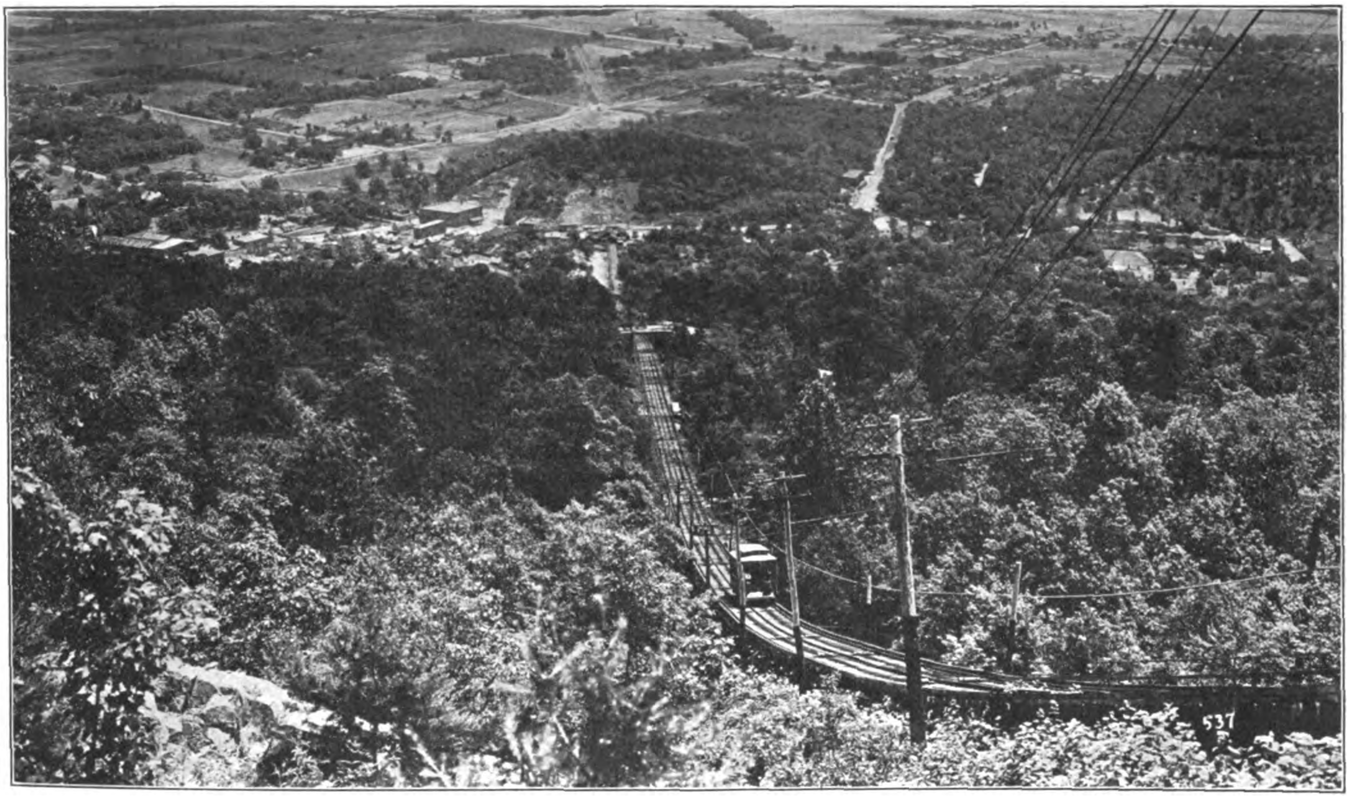
The results of investigations of the electrical conductivity of the exhaust from steam locomotive stacks have recently been published showing why discharges from high-voltage trolley wires to steam locomotive stacks can occur through distances much less than usual when gases and vapor are escaping from the latter. Experiments show that the greater conductivity under these conditions is due to the ionization occurring in the space between the wire and the track produced by the friction of the escaping gases and moisture. Experiments were made with a locomotive under a wire and with its blower closed, half open and wide open. The break-down voltages between wire and stack were compared with those required to break down the same length of air path with the locomotive removed. On the average it required about one-half the voltage to break down the air with the locomotive present.

A. L. Rohrer, lectrical superintendnt, and J. J. Linebaugh, of the General Electric Company, gave on April 1 before the Ohio State University branch of the American Institute of Electrical Engineers a lantern slide and moving picture lecture of the electrification of the Butte, Anaconda & Pacific Railroad. The moving pictures showed the difficulties overcome by the engineers.

ELECTRIC TRACTION ON LOOKOUT MOUNTAIN

BY E. D. REED, GENERAL SUPERINTENDENT CHATTANOOGA RAILWAY & LIGHT COMPANY

For years the only way by which the top of famous Lookout Mountain could be reached, other than by wagon road or footpath, was by the line operated by the Lookout Incline Railway Company. About twenty-five years ago a corporation known as the Chattanooga & Lookout Mountain Railway Company built a single-track steam railway line from St. Elmo for a distance of about 8 miles to the summit of the mountain. After a few years this railway was abandoned and the tracks were removed.



Lookout Mountain—View Looking Down Incline Taken from Point Near Head of Incline

Early in 1913 the Lookout Mountain Railway Company, which had acquired the right-of-way of the old company, began the construction of an overhead trolley line over virtually the same route. This new line has recently been completed and put in operation. It is in addition to the old incline, which is still in use to carry tourists and residents to and from the summit of the mountain.

The new line forms part of the system of the Chattanooga Railway & Light Company, which is operated by E. W. Clark & Company.

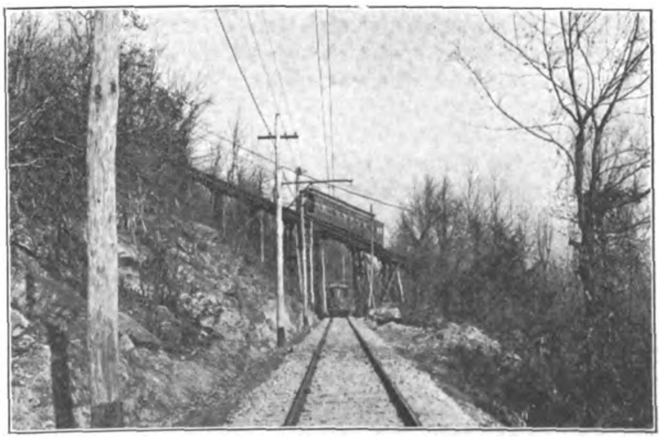
TRACK AND LINE

Beginning at St. Elmo, the new line branches from the tracks of the Chattanooga Railway & Light Company and by a cut of 800 ft. reaches the old location of the steam road. By a circuitous route along the slopes of the mountain, at a grade of only 3½ per cent, it reaches the summit. The new line is laid with 70-lb. A. S. C. E. T-rails on oak ties, 6 in. x 8 in. x 8 ft., and ballasted with crushed limestone. The rails are equipped with continuous joints and are bonded with No. 0000 protected bonds 13 in. long. High-speed split switches and spring frogs are installed at the four turnouts.

The overhead construction is of the bracket suspension type, the poles being spaced about 100 ft. apart. Two-inch pipe brackets are attached to each pole, and these in turn support two No. 00 grooved trolley wires. This method does away with the need for overhead switches at the turnouts, and at the same time gives additional feeder capacity.

The cars are 42 ft. 9 in. long and have 28-ft. bodies. They are mounted on double trucks equipped with four motors of 50 hp each. Motor control of the Westinghouse H.L. type allows the operation of six cars per train. The cars are equipped with National air brakes and are designed for moderately high speed. Current at 600 volts is obtained from the Chattanooga Railway & Light Company and is used by both the electric railway and the incline.

For nearly 8 miles the new line winds its way up the rugged sides of Lookout Mountain, affording views of surpassing and impressive beauty. The entire valley below stretches out for the admiring gaze of passen-



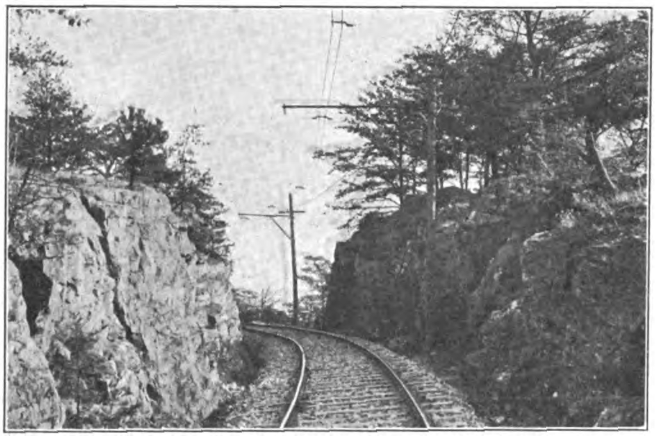
Lookout Mountain—Crossing of Electric and Incline Railways gers. The winding character of the route gives probably the most varied and comprehensive views of Chattanooga, the Tennessee River, Walden's Ridge and the surrounding country.

INCLINED RAILWAY

The inclined railway has its lower terminus at St. Elmo and operates for a distance of 4750 ft., a line running to the top of the mountain. The difference in elevation between St. Elmo and the Lookout Mountain station, at the summit of the mountain, is approximately 1500 ft. The average gradient is about 35 per cent, reaching a maximum near the head of 67 per cent.

This railway is built with 56-lb T-rails laid on 6-in. x 8-in. x 8-ft. ties and is standard gage throughout. A turnout is located half way between stations, and between this turnout and the head of the incline three rails are used instead of two independent double tracks.

By an ingenious arrangement of the switches of the turnout and by having inside wheel flanges on one car and outside wheel flanges on the other, it is possible to dispense with any movable parts at the turnout switches. A large part of the line, particularly at the upper end, runs over substantial wooden trestles.



Lookout Mountain—A Typical Rock Cut on the New Right-of-Way

The two cars operated on this railway are built at an angle to fit the average grade. These cars are 31 ft. 1¾ in. in length and have a capacity of forty-five passengers each. They are large and comfortable, with electric lighting and heating and have observation platforms on the lower ends. The cars are hoisted to the top of the mountain by a modern electric-driven hoist with two motors of 130 hp each. They are operated at 600 volts each, driving winding drums over which two 1¼-in. steel cables are wound. At different points, 30 ft. apart, along the incline are small sheaves on which the cable travels as the car ascends and descends the mountain.

It is impossible to hoist a car past a given point at the head of the incline, as the current is shut off gradually by a set of electric switches which are tripped as the car enters the station. Each car is equipped with an Otis double-grip safety device, capable of holding 50,000 lb. This device is automatically operated by a centrifugal governor which applies the safety device should an excessive speed be reached. It is also provided with a hand-operated mechanism which can be operated by the conductor on the car. This grip engages in a 6-in. x 8-in. yellow-pine stringer bolted to the outside of the track for the full length of the incline. A safety brake on the main winding drum, operated either automatically or by the engineer at the power house, will also stop the car in emergencies.

ARLES-SUR-TECH - PRATS DE MOLLO SINGLE-PHASE RAILWAY

Early in August, 1913, a 6000-volt, twenty-five-cycle single-phase railway was completed for operation between the cities of Arles-sur-Tech, Prats de Mollo and Saint-Laurent de Cerdans. These towns are in the eastern Pyrenees adjacent to the Spanish border. The road is operated by the Midi Railway, which owns the electrical and mechanical equipment, but the right-of-way and fixed structures are the property of the Department of the Eastern Pyrenees. The new lines enjoy a large tourist traffic, but they were built primarily to improve freight and passenger intercourse between the towns named. The system is divided into two lines, one 20.7 km (12.8 miles) and the other 18.7 km (11.6 miles) long. The track is of meter gage, and a large part of it is built on the public highway. The rails weigh 40 lb. per yard. The maximum grade is 5 per cent, and the smallest curve has a radius of 25 meters (82 ft.).

The daily service in each direction consists of three trains which make connection with the standard gage main line of the Midi Railway at Arles-sur-Tech. All trains handle passengers and freight. A train usually consists of a 28-ton motor car and enough trailers to make a weight of 50 metric tons empty. The maximum train weight is 70 tons. The speed is limited to 26 km an hour (16.1 m.p.h.).

The contact line receives 6000-volt, twenty-five-cycle energy direct from a water-power plant which contains three 200-kva to 300-kva generators. The plant is located at Piug Redon, which is almost at the center of the line. The feeders are of aluminum, 93 mm^2 (about No. 000), in section (and their greatest length is 10 km (6.2 miles). The return circuit is made through the rails and through an aluminum cable of the same section as the positive feeders.

The catenary line is carried on kyanized wooden poles spaced 40 m. (132.2 ft.). The catenary is of single suspension type, consisting of a steel cable of 20 mm^2 (about No. 4) section and a copper trolley of 50 mm^2 (about No. 0) section. The hangers are of steel and are suspended at intervals of 3 m (9.8 ft.). Double insulation is used throughout.

Each of the four motor cars is of center-entrance type. It seats seven first-class passengers, seventeen second-class passengers and also has room for four passengers in each operating cab. The cars are 11.4 m (37.4 ft.) long over the bumpers and are mounted on double trucks, 5.2 m (17 ft.) between centers. Lubricators are carried on the trucks owing to the great amount of curvature. Each car has four six-pole motors of the Latour series repulsion type, having an hourly rating of 50 hp each at 300 volts, twenty-five cycles. The gear ratio is 18:85. Each motor is provided with a self-induction coil which limits the speed of the car to 16.1 m.p.h. An 0.6 hp 45-volt blower motor provides artificial ventilation for the motors when they are used for electric braking. Westinghouse automatic air brakes are also installed.

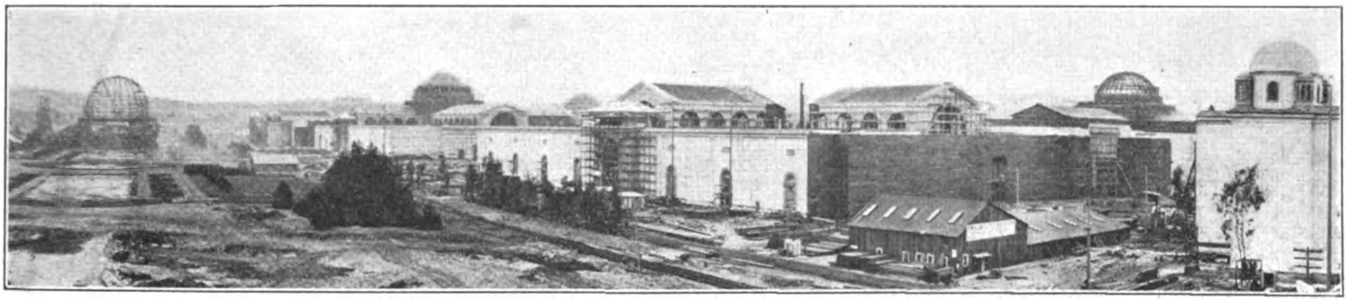
The motors are supplied by two single-phase oil-insulated auto-transformers, each of 96 kva capacity. Five taps ranging from 110 volts to 350 volts are used for propulsion, one of 45 volts is used for lighting and for the blower motor and one between the fourth and fifth tap of the propulsion voltages is used for electric braking. The controller is of the platform type with five running speeds to correspond to the transformer taps and seven positions for electric braking. The electric equipment was furnished by the Jeumont Company (Ateliers de Construction Electriques du Nord et de l'Est.).

PROGRESS ON THE PANAMA EXPOSITION

The accompanying engraving is a recent view of the grounds of the Panama-Pacific International Exposition, to open in San Francisco in 1915, and shows a part of the main exhibit section. As will be noted, the exposition lies in a great natural amphitheater encircled on the south, east and west by the hills of San Francisco and the wooded slopes of the Presidio reservation, part of which are seen in the background. The photograph was taken at a considerable elevation and consequently gives no idea of the great height of the buildings.

The large steel frame seen in the center of the gardens is that of the dome of the Palace of Horticulture. This dome is 186 ft. in height and 152 ft. in diameter. When completed it will be covered with glass and at night colored searchlights will play upon the glass from within. In the foreground is seen a part of the south gardens.

The large group of buildings on the right consists of eight exhibit palaces. Four of these face on San Francisco harbor and four border upon the south gardens. Those facing the south gardens and forming a continuous east and west façade are, left to right, the palaces of Education, Liberal Arts, Manufactures, and Varied Industries. Those facing the harbor are Food Products, Agriculture, Transportation and Mine and Metallurgy.



Panama-Pacific Exposition—Panoramic View Showing Present Condition of the Buildings and Grounds

The large white dome is that of the Palace of Education; this dome is 160 ft. in height and 100 ft. in diameter. The next dome, from left to right, not painted, is of similar proportions and belongs to the Palace of Liberal Arts. Behind the dome of the Palace of Liberal Arts may be seen the dome of the Palace of Food Products. The next building to the right and prominent in the picture is the Palace of Manufactures, on which the dome has not yet been superimposed. The cross naves in this palace, at the intersection of which the dome will be placed, are 110 ft. in height. The next dome seen is that of the Palace of Transportation; at the extreme right of the picture can be seen one corner of the Palace of Varied Industries. In the opening in the center of the group and to the right of the first two domes, will be located the Tower of Jewels, which will rise in terraces to a height of 433 ft. The tower will be pierced by an archway 125 ft. high, through which visitors will enter from the main gates of the exposition into the court of honor.

Machinery Hall, 9 acres in area, is now practically completed. Three buildings are almost finished, and all will be ready to receive exhibits by July 1 of this year. The exposition opens Feb. 20, 1915.

A forty years' concession has been granted locally to the French banking firm of Perier for the construction of a tramway line from Jerusalem to Bethlehem, the lighting of the city with electricity, and a water supply from Wady Forah.

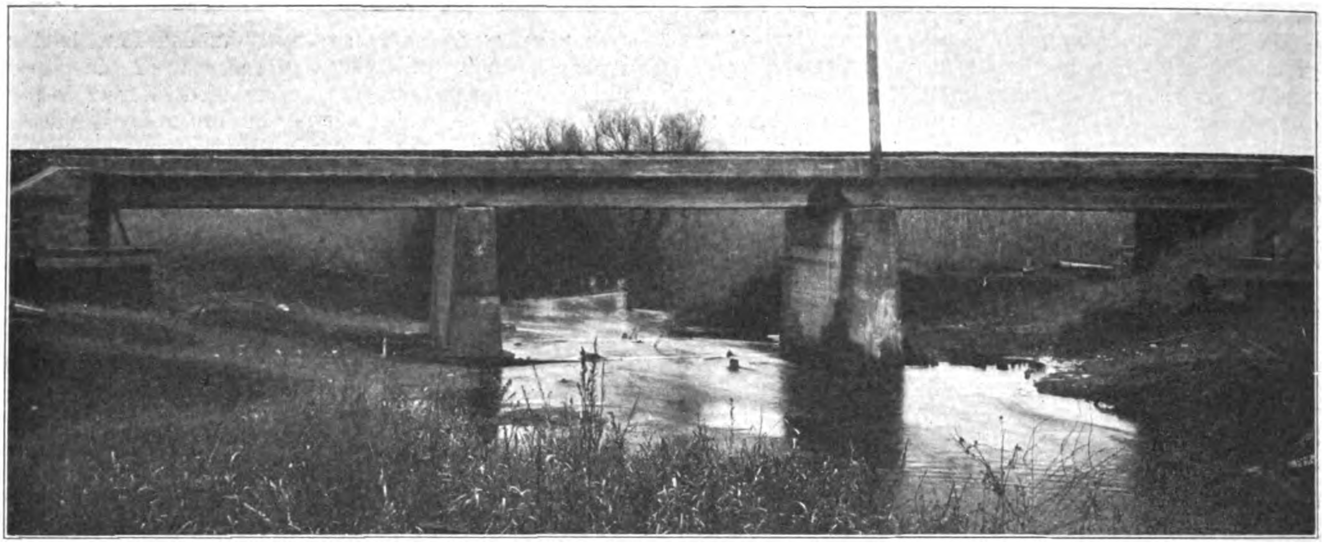
RECOGNITION OF "GOING VALUE" FOR RATE MAKING

The unanimous decision recently handed down by the New York Court of Appeals in the case of the Kings County Lighting Company is of decided interest in the public utility field by virtue of its recognition of "going value," which the Public Service Commission for the First District of New York had refused to recognize as a tangible factor in the determination of rates. Furthermore, it confirms the Appellate Division in rejecting the commission's inclusion of annual appreciation of land as an item of income.

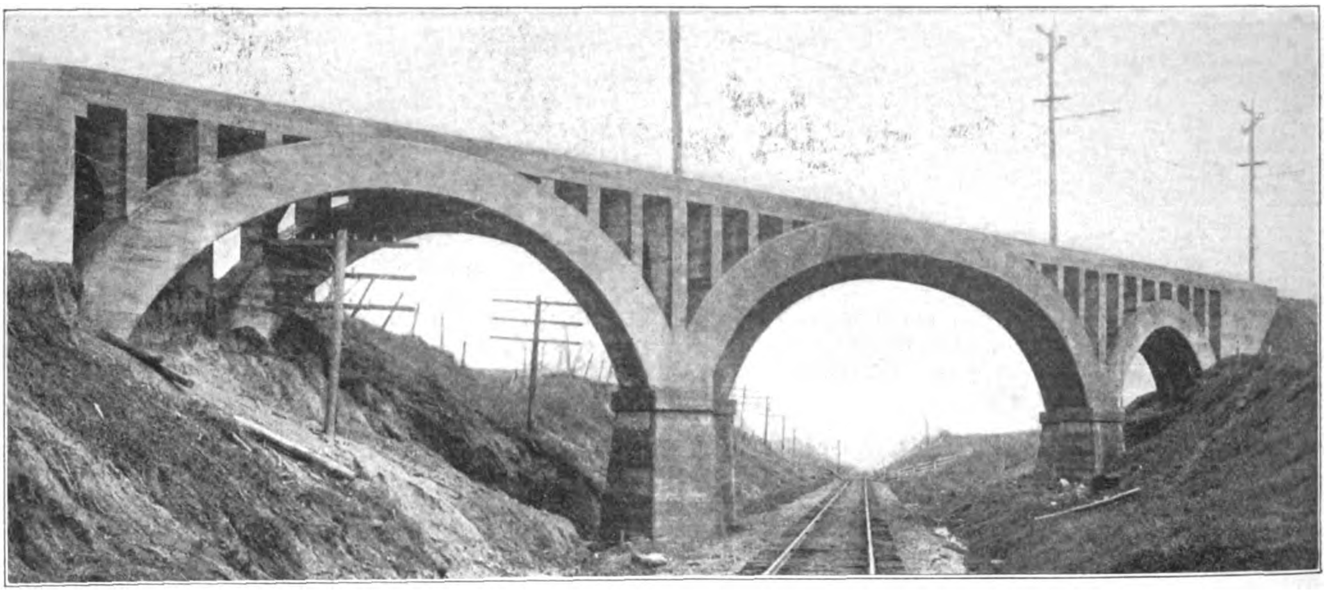
The main points of the decision, presented by Judge Miller, are these. The court defined "going value" for rate purposes as the amount equal to the deficiency of net earnings below a fair return on the actual investment due solely to the time and expenditures reasonably necessary and proper to the development of the business to its present stage and not comprised in the valuation of the physical property. This was to be appraised by showing the actual expenditures of the company, the original investment, its earnings from the start, the time actually required and the expense incurred in building up the business, all expenditures not reflected by the present condition of the physical property, the extent to which inefficient management or other causes had prevented or depleted earnings, and any other facts bearing on the question, it being kept in mind that the ultimate fact to be determined was not the amount of expenditures but the deficiency from fair returns for causes under consideration.

The court stated that the difficulty of determining the item of "going value" would not justify the disregard of such a factor. It might be conceded that "going value" had no existence apart from tangible property and that commercially there was but one value, that of the property as a whole. As the rates, however, could not be made to depend upon the exchange value (which in turn would depend upon the rates), it would seem to be necessary to appraise the physical property and the going value separately.

The main point to be decided in the case was the rate to be charged not by a new company with no business but by an old company with an established business, and the decision of the court had to cover an investigation of whether or not the company had already received a fair return on its investment. The court decided that inasmuch as no dividends appeared to have been paid by the original company or by the present company prior to 1907, the company had not received a fair return in the earlier years. On the assumption that there was a reasonable need of the service from the beginning and that the failure to pay dividends was not caused by inefficient management, an accumulation of a surplus or undivided profits, the investment of earnings in permanent additions or betterments, none of which was asserted, the court decided that "going value" was an element in this case which the commission should have determined.

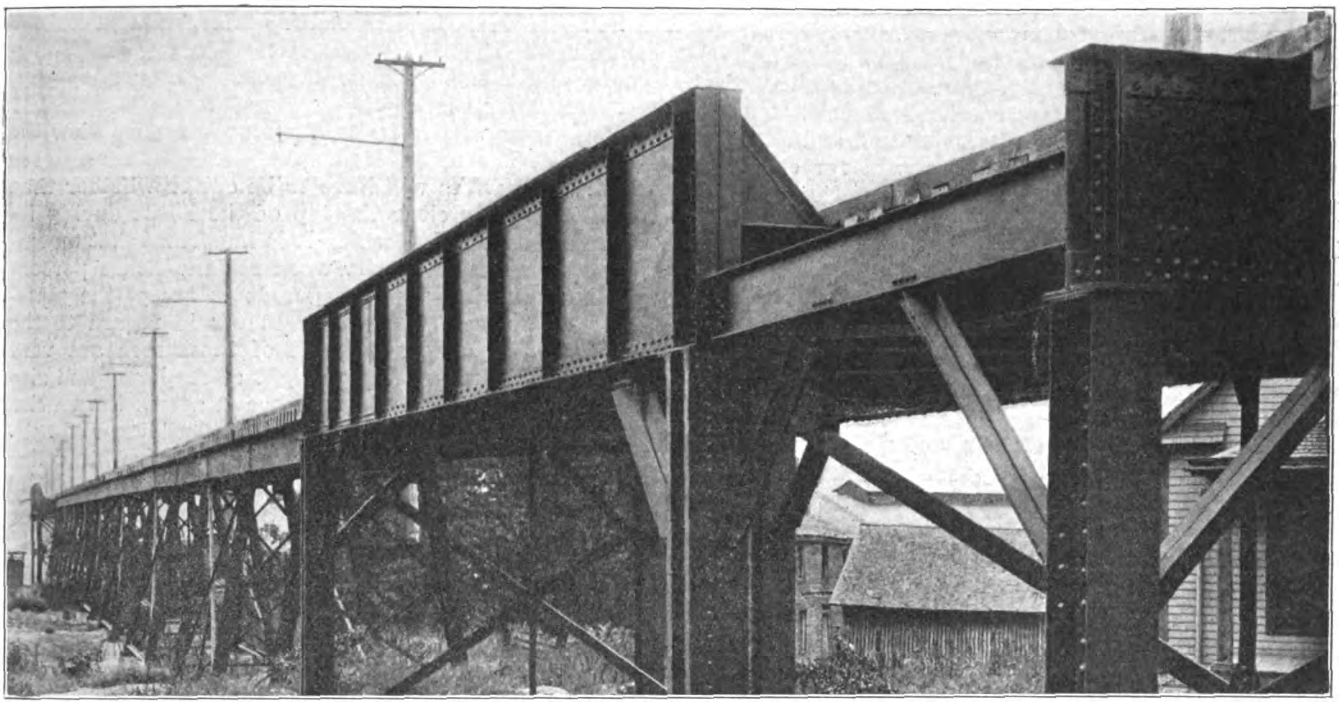


Indiana Union Traction Company—Concrete Bridge Over Blue River Between Muncie and New Castle



Indiana Union Traction Company—Concrete Arch Bridge at Fayne Junction

Indiana Union Traction Company—Plate Girder Over Big Four Railroad



Indiana Union Traction Company—Steel Bridge Over Woodward Street, New Castle

RECENT IMPROVEMENTS BY THE INDIANA UNION TRACTION COMPANY

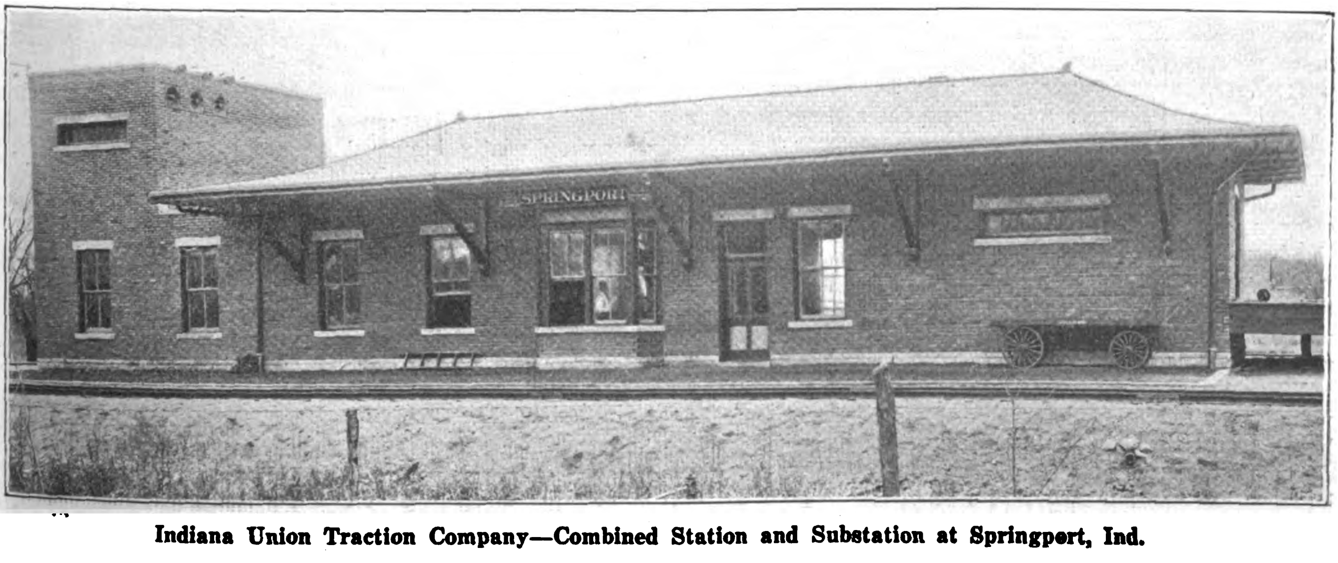
H. A. Nicholl, general manager Indiana Union Traction Company, reports the recent completion of the Muncie-New Castle line. This permits the company to give through service from Muncie to Indianapolis. Limited and local service will both be given over the new line every hour.

The new line is 18½ miles long and is exceptionally straight and level. The maximum grade is 1½ per cent and except in cities the maximum curvature is 2 deg. Full speed can therefore be maintained on all curves. The line is single-track, laid with 70-lb. rail and gravel-ballasted, 3000 yd. of ballast being allowed to the mile. Cedar ties are used except on the curves, where they are of oak. The Bonzano rail joint is used throughout.

The most interesting feature of the design of the new road is the provision for eliminating grade crossings, especially in entering New Castle. Both steel and concrete bridges were constructed and the typical ones are illustrated herewith. These bridges were designed by W. J. Watson & Company, of Indianapolis, and were installed under the direction of the master mechanic of the company, R. W. Heming.

The illustrations show a remarkably graceful skew, concrete-arch bridge over the Big Four road at Fayne Junction and a concrete girder bridge over the Blue River. For the abutments and piers of these the concrete has the proportions one part of cement, two and one-half parts of sand and five parts of 2-in. broken stone or gravel. For the arch rings, spandrel walls, girders, beams, slabs and copings, one part of cement, two parts of sand and four parts of 1-in. broken stone or gravel were used. All concrete was machine-mixed, and in placing reinforcement the minimum distance allowed between steel and concrete surface was 2 in. In mixing concrete the contract called for the following quantities of ingredients per cubic yard: 1.3 barrel cement, 0.46 cu. yd. sand and 0.88 cu. yd. stone. Typical steel bridge construction is shown on this page and the preceding one.

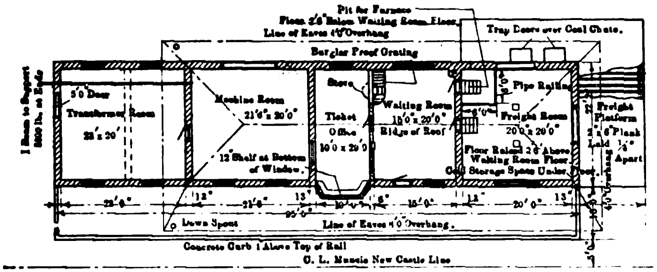
For all of the bridges uniform moving loads of 4000 lb. per linear foot of track were assumed with a concentrated load of 50,000 lb. on one axle at any point.



Indiana Union Traction Company—Combined Station and Substation at Springport, Ind.

The steel bridges were designed to conform to Cooper's specifications for steel railway bridges.

Views are also shown of a typical station, located at Springport, about 11 miles south of Muncie. This is a combined passenger and express station and electrical substation. The building was designed for operating efficiency so that one man can act as substation operator and at the same time sell tickets, etc. The ticket office is between the two main sections of the building with easy access to both.


Pit for Furnace
Floor 2'6" Below Waiting Room Floor
Line of Eaves 4'0" Overhang
Tray Doors over Coal Chute.
Burglar Proof Grating
5'0" Door
Transformer Room
22' x 20'
Machine Room
21'6" x 20'0"
12" Shelf at Bottom of Window.
Stove
Ticket Office
10'0 x 20'0
Waiting Room
15'0" x 20'0"
Ridge of Roof
Pipe Railing
Freight Room
20'0" x 20'0"
Floor Raised 2'6" Above Waiting Room Floor
Coal Storage Space Under Floor.
Freight Platform
2" x 6" Plank Laid ½" Apart
22'0"
12"
21'6"
13"
10'0"
6"
15'0"
12"
20'0"
13"
95'0"
Down Spout
Line of Eaves 4'0" Overhang.
Concrete Curb 1 Above Top of Rail
C. L. Muncie New Castle Line

Electric Ry Journal

Indiana Union Traction Company—Plan of Station and Substation Building at Springport, Ind.

On the substation side the rotary-converter room adjoins the ticket office with the transformer room beyond. The roof of the latter is higher than the main roof to accommodate the incoming high-tension lines. The other end of the building contains the mailing room and the freight room, the latter having its floor at the elevation of the loading platform. This gives coal storage below without much excavation.

HOUSE MOVING JOBS

BY G. H. M'KELWAY, ENGINEER OF DISTRIBUTION BROOKLYN RAPID TRANSIT SYSTEM

The moving of a building across the tracks of a street railway is an operation never enjoyed by either the person moving the house or the officials of the railway. To the house movers there is always the danger that the house will be damaged by the overhead wires or the necessity of spending much money in having those wires moved out of the way, while to the railroad company the job means more or less interference with the operation of cars. To both, in order to minimize delays to the car service, house moving means night work with its attendant discomforts and dangers.

Although the greatest sufferer is generally the railway company, yet it cannot refuse to cut its wires and let the building pass. This fact has been decided by the courts. But the same decisions have said that the house mover must cross at such times and in such manner as to cause as little delay as possible, and also that the railway company can use its own employees in caring for its wires and charge their time together with any other expense to the house mover.

That the railway company should expect the mover to pay any part of the cost of caring for the wires is often a surprise to the latter. He seems to think that the house has as much right on the street as the cars of the railway, and that if the company has obstructed the full use of the streets by putting up its wires it should be compelled to remove them without charge whenever necessary.

When the average owner has found out that the company expects him to bear the expense of moving the house across the line, the next thing that he will wish to do will be to bring to the office some politician who he believes has enough power to compel the railway to let him pass free. It is almost always a mistake to succumb to any pleadings or threats from the "city father," for if he once succeeds in procuring the privilege for one constituent he will advertise his achievement everywhere, and then it will be hopeless to expect any payment for later cases.

The proper way is to have a representative view the building and ascertain its height, on the timbers, to see whether the wires will have to be cut or whether they can be raised to clear the top of the house during its movement across the track. It is important that an employee experienced in the work see the house personally, because it is very dangerous to accept the statements of the owner or house mover in regard to the height of the building. Both of these men are very prone to underestimate the height of the house and also the time that it will take to move it across the tracks.

After the employee has viewed the building and estimated what it will cost to care for the wires, and due allowance has been made for contingencies like bad weather, the owner or house mover should call at the office to sign a carefully worded agreement and also to deposit in advance the estimated amount which the work will cost the railway. This advance deposit should be insisted on in all cases, especially where the signer of the agreement is the house mover and not the owner of the building, for many movers rent much of their equipment and are not on a very sound financial basis. Even when the deposit is more than necessary it is well to place in the agreement a paragraph which requires the payment, by the person moving the house, of any contingent expense not covered by the deposit.

If the house owner should object to the deposit of enough money to cover the usual liberal estimate, he may be told that the money will be kept for a few days only and that then the surplus will be returned. To the actual cost of labor and material a charge of 10 or 15 per cent should be added to cover supervision and the use of tools. This item should be explained in the agreement to avoid misunderstanding. The agreement should also contain clauses calling for at least twenty-four hours' notice before the house is to cross the line, so that arrangements can be made for getting out the line crews without trouble and also to permit the rearrangement of the car schedules which will be disturbed by the crossing. The agreement, further, should specify the hours between which the crossing will be made, this time being preferably in the early hours of the morning. In order to prevent careless work which will block the line longer than necessary, the house mover should have a certain definite time in which to do his work. If the line is blocked for a longer time, he should be made to pay a specified sum for each hour or fraction thereof as liquidated damages for the delay.

An agreement holding the railway blameless for any damages on account of the moving of the house should be prepared by the legal department, or approved by it.

Beside the requirement calling for the payment of all expense directly incurred on account of the crossing, some companies require the person who moves the building to pay a depreciation charge based upon the value of the wire cut. This charge is generally a percentage of the cost to run a reel of wire of the size damaged on account of the crossing. While this practice is confined to only a few railways, it is probable that it is not followed more extensively because the other companies do not know that such a charge is made by anyone. As there is no doubt that the wire is damaged by the cutting, it seems only fair that the house mover should reimburse the railway for its decreased value as well as for the direct expense of the labor and material. The only doubtful point would be the percentage of first cost that should be considered as the value of the depreciation.

NATIONAL EFFICIENCY EXPOSITION

At the National Efficiency Exposition which was opened in New York City on April 4, several sections of the exhibit were devoted to rapid transit matters, the Public Service Commission of New York, First District, and the Interborough Rapid Transit Company being among the exhibitors. Efficiency in the operation of public utilities and in the construction of subways is the keynote of the Commission's exhibit, which is divided into two parts—one relating to the regulation of corporations and the other to rapid transit.

Models, charts and lantern slides are prominent features of the rapid transit section of this exhibit. Among the models are interesting representations of the proposed subway stations on the new dual subway system at the Grand Central Station and at Times Square. The Commission also shows a model of the new subway car to be used by the New York Municipal Railway Corporation in the operation of the new Broadway-Fourth Avenue subway. This model was built by the Brooklyn Rapid Transit Company and is loaned to the Commission for the exposition. The new car will be 67 ft. long and 10 ft. wide, whereas the cars used in the existing subway are 51 ft. 5 in. long and 8 ft. 8¾ in. wide. It is calculated that the new car in rush hours will seat seventy-eight persons, as against forty-four in cars now in use. There is also a chemical laboratory with apparatus such as is used for determining the purity of air in the subway. This will be used to make an analysis of the air from day to day in the Grand Central Palace, the building in which the exposition is being held. Charts showing the results will be placed on exhibition.

Not the least popular feature of the rapid transit exhibit is a stereopticon displaying on a screen rapidly succeeding views of actual subway construction. These views are taken from actual photographs made by the Commission's photographer during the progress of the work, and they tell the story of subway building from the breaking of ground to the operation of trains. Maps of the dual subway system and charts showing the number of contracts already awarded are prominently displayed.

In the exhibit covering public utility regulation the Commission shows many interesting illustrations of its work. In this exhibit also there is a stereopticon exhibition. It is devoted principally to the illustration of various protective and safety devices used by corporations under the jurisdiction of the Commission—many of them installed by order of the Commission. There are also shown some of the results of the Commission's work in regulating transportation companies. Models and photographs of old and new street cars are displayed, including a model of the new center-entrance car of the Brooklyn Rapid Transit System which has been loaned by the company, and photographs of the New York Railways Company's new types of cars, including the so-called stepless car and the double-deck car. There is also an interesting photograph of the street-car parade made by this company last year, when all types of cars from the little horse car of the eighties to the stepless car of the present day were exhibited in the streets. Illustrations also are given of the Commission's work in improving the ventilation of street cars.

Many interesting charts showing the peculiar conditions of traffic in this city are displayed. Others show the investment in transportation, gas and electric properties in the city of New York, and the number of stock and bond applications approved in comparison with the number rejected. On such charts it appears that there are ninety-eight actual operating and lessor companies, of which sixty-eight are transportation and thirty gas and electric corporations. The combined capitalization of the ninety-eight companies is $1,173,630,574. During the life of the Commission applications for the issue of stocks and bonds aggregating $761,046,557 have been made. Of these the Commission allowed $517,535,219, and disallowed $182,616,622. The applications representing the difference between these amounts were either withdrawn or were pending at the end of the year. The total amount of money collected in passenger fares during the last fiscal year was $87,718,359, which is equivalent to about $17.50 per capita on a basis of 5,000,000 population.

INTERBOROUGH RAPID TRANSIT COMPANY'S EXHIBIT

An elaborate exhibit is given by the Interborough Rapid Transit Company. Working models, charts and photos cover completely every detail connected with operating this transit system, of which the subway division now handles upward of 1,200,000 people daily, three times its original capacity, and upon which in the last nine years 2,198,000 persons have been carried at a high rate of speed without a single passenger fatality.

A picturesque exhibit of photographs is shown which gives the history of the city of New York's transit system. The first street-car line in the world, the New York & Harlem line, was inaugurated in 1832. The first elevated railway car was in operation on Greenwich Street in 1870. This was a cable car. In 1873 the first steam elevated railway was begun, and in 1886 came the first street cable car. In 1905 the Interborough constructed its first steel passenger car.

A model of the interior telephone system of the Interborough with its 1550 phones, 8000 miles of cable, with twenty-four operators handling 16,000 daily calls is part of the Interborough's exhibit. Other working models show the multiple-unit system of car control, the electro-pneumatic brake, the automatic, speed-control train signal, by means of which it is possible for subway trains to approach an occupied station to within a short distance of the train ahead, and the emergency alarm system, in which alarm boxes are so located along the subway as never to be farther away from an employee than 200 ft. When the switch in one of these boxes is pulled down, the power is immediately cut off from the four rails in the subway. There are also block-signal system devices and others to show how power is conserved by the Interborough.

The "welfare work" carried on by the Interborough is illustrated by means of photographs showing the company's stores, recreation rooms, restaurants, athletic field, baseball and football teams. Statistics showing the work accomplished by the Volunteer Relief Association and the "Sunshine Committees" maintained by employees of the road are also on display.

The most striking feature of the exhibit is a diagrammatic elevation of a complete power station mounted above a glass box through which a stream of water flows continuously. The flowing water represents the path of the heat through the plant, various outlets of proper size being provided to show the losses that take place such as in the stack and condenser, and the effective power in the form of electrical energy being discharged through an outlet at the end corresponding to the switchboard. Another feature is a pair of photographs of 600-hp boilers, of which one is set above three model cars, the number propelled by one boiler in 1905. The other photograph of the same boiler, which represents present conditions to-day, is mounted above ten miniature cars, showing an increase of more than 300 per cent in capacity. Numerous other graphical methods of displaying efficient operation are employed and these indicate remarkably well that if the economies had not been made since the Interborough began operations, the extensions now under construction would not have been profitable at a 5-cent fare. In fact, as pointed out by illuminated pictures, the modern skyscraper is a possibility only because of the existing transportation facilities.

A. E. R. A. SECTION WORK AT DENVER

BY W. M. CASEY, TRAINMASTER DENVER CITY TRAMWAY AND PRESIDENT OF DENVER A. E. R. A. SECTION

The Denver City Tramway section of the American Electric Railway Association was organized Sept. 19, 1912, with a charter membership of thirty-two. Since that time it has enjoyed a steady and healthy growth until, at present, we have 100 enthusiastic members.

Meetings are held on the third Thursday of each month, and the attendance invariably reaches about 90 per cent of the total membership. Each meeting is confined to the discussion of a single subject, upon which a paper is prepared by someone who is thoroughly conversant with all matters pertaining thereto. After the reading of such paper a general discussion ensues, all questions brought out thereby being thoroughly gone over. The proceedings are taken by a stenographer and published in the *Tramway Bulletin* for the benefit of those who wish to make a deeper study of the points brought out.

The eligible list includes all employees of the company. Each department is, therefore, well represented, trainmen being in the majority. Subjects for discussion are varied in order that each department may "have its inning." This method serves a double purpose; first, the employees of each department acquire a knowledge of their own work, which renders them more efficient in the performance of their duties; second, the employees of each department learn of the trials and troubles of the others, thus giving them a better understanding of the work performed in other departments and rendering them more tolerant of such shortcomings as may be attributed to fellow workmen. The heads of the various departments, as well as all others in authoritative positions, are regular attendants and enthusiastic supporters of the section, fully realizing its importance as an educational factor.

Briefly, the section has developed a unity of purpose that never before existed, having for its object the improvement of the industry in general and of the Denver City Tramway in particular.

Each employee who becomes a member very quickly realizes the advantages to be gained for himself, the opportunity for education and the advancement toward greater efficiency which such membership affords. He at once becomes a responsible part of the system and a booster for the welfare of the company.

To carry this idea out a little further, let us imagine a system with 1000 trainmen (all members of the company section), coming in daily contact with hundreds of thousands of people. What a wonderful factor as a molder of public opinion this would be!

It is my opinion that the establishment of company sections in the various cities throughout the country is one of the most noteworthy aims ever conceived by the American Electric Railway Association. The surprising feature to me in this connection is that a great many member companies have withheld their interest in the movement.

The breadth of the subjects discussed since the organization of our section is indicated by the following list:

SUBJECTS DISCUSSED AT THE REGULAR MONTHLY MEETINGS HELD BY THE DENVER A. E. R. A. SECTION SINCE ITS ORGANIZATION, SEPT. 19, 1912.

Oct. 23, 1912, "The A. E. R. A. Convention," C. B. Wells, Norman Read, John Messner, George Dolezal.
Oct. 23, 1912. "Benefits and Aims of Company Sections," W. M. Casey.
Nov. 21, 1912. "Progression," C. A. Swift.
Nov. 21, 1912. "Accidents," Warren C. Swisher.
Dec. 19, 1912. "Coasting and Economy," W. O. Wade, engineer Railway Improvement Company, New York.
Jan. 17, 1913. "Brakes, Trucks and Wheels," George W. Dolezal.
Feb. 20, 1913. "Development of Electrical Generating Apparatus for Traction Service," W. E. Casey.
March 20, 1913. "Conductor and His Duties," E. M. Nesbit.
April 17, 1913. "Electricity as Applied to Traction Work," Norman Read, chief electrical engineer.
May 15, 1913. "The Trainman and His Duties," E. A. Bodie, motorman, East Division.
June 19, 1913. "Lightning Arresters in Traction Work," B. C. J. Wheatlake, General Electric Company.
July and August, 1913. No meetings.
Sept. 18, 1913. "Evolution of the Electric Railway Motor," E. C. Means, Westinghouse Electric & Manufacturing Company.
Oct. 16, 1913. "Air-brakes as Applied to Electric Railway Practice," T. A. Heddendahl, Westinghouse Traction Brake Company.
Nov. 20, 1913. "The A. E. R. A. Convention," W. M. Casey.
Nov. 20, 1913. "Review of Papers Presented During the Year," W. H. McAloney.
Dec. 18, 1913. "Track Conditions and Our Recent Storm," A. M. Evans, superintendent of way.
Jan. 15, 1914. "Relation of Conductor to Motorman and Vice Versa," T. W. Topping, East Division.
Jan. 15, 1914. "What the Duties of Motorman and Conductor Should Be and How Each Should Help the Other," H. N. Hilling, Central Division.
Feb. 19, 1914. "A Safety Millennium," C. B. Wells, superintendent of transportation.
March 19, 1914. "A Single-Phase Traction System from the Power House to the Motor," W. H. Edmunds, Denver & Interurban Railroad.

DEVELOPMENT OF THE ELECTRIC MINE LOCOMOTIVE

At the monthly meeting of the American Institute of Electrical Engineers held in Pittsburgh April 9 and 10 under the auspices of the committee on the use of electricity in mines, a number of papers were presented dealing with various phases of the subject covered by the name of the committee. Of these papers the only one of direct interest to electric railway men was that on the development of the electric mine locomotive by G. M. Eaton.

Mr. Eaton stated that during the past seventeen years the mine locomotive had been greatly improved in the matter of compactness, as shown by a reduction in block displacement per horse-power of 3.88 cu. ft. to 1.54 cu. ft. By block displacement is meant the product of the length, height and width of the machine. The improvements comprise the following features: the electrical equipment is now especially designed for mine service, the machine is staunch in construction, there is the maximum perfection of apparatus without sacrifice of easy inspection, single reduction gearing is used, the locomotive is low in height and has short overhang and the design as a whole is very compact. The improvements over the earlier type have consisted in the use of steel frames, rendering the motors and bearings accessible, the introduction of motors with commutating poles and of high continuous ratings, the use of substantial resistance grids and durable controllers with magnetic blowouts, the introduction of improved collecting devices, etc. During seventeen years the minimum height of locomotives has been reduced to about 27 in. and the possible tractive effort per inch of height has been nearly quadrupled. The paper shows clearly that the modern mine locomotive is a machine in every way entitled to respect. Much designing skill has been lavished upon it.

For several months the Liverpool Tramways Committee has had under consideration a proposal to utilize the tramway system at night for the transportation of merchandise between Liverpool and other Lancashire towns. For this traffic specially designed tramcars would be constructed. In order to provide for the prompt distribution of the goods it is proposed to create depots at different points along the route between, say, Liverpool and Manchester, and from these depots to distribute the traffic in adjoining areas by means of motor trucks. It is thought that this plan would aid in solving the dock-congestion problem.

COMMUNICATIONS

MAINTENANCE AND DEPRECIATION

STATE OF NEW YORK; PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT
NEW YORK, April 7, 1914.

To the Editors:

In response to your request for a description of the methods prescribed by the Public Service Commission for the First District respecting maintenance and depreciation accounts and the purpose of the commission in adopting such methods, I may explain that the method of handling maintenance expenses, particularly the cost of replacements, is necessarily dependent upon the method of keeping the property or fixed capital accounts. The aim of the commission being to secure on the books of the utilities a reflection of the cost of the property used or useful at any given time in the public service, it becomes of prime importance to provide for the recording, in the property accounts, of changes that occur from time to time in the physical property. Capital expenditures do not cease when a utility begins commercial operations. Moneys must be provided for additional equipment, for extensions and for improvements, and so far as such property does not represent a mere substitution for other property no longer serviceable it represents an additional investment of capital, but there are bound to be deductions as well as additions to the investment; with population, traffic may shift, a down-town route becomes unprofitable and is abandoned, steam engines are taken off the elevated railways or horses off the surface lines, and as a consequence a portion of the investment disappears. A proper system of accounting will require that the necessary entries be made on the books to take out of the investment or property account the cost of every considerable piece of apparatus or other item of property that becomes unserviceable, whether or not it is replaced with a new instrument of the same kind.

The accounting order of the Public Service Commission therefore requires that deductions or credits shall be made to the property accounts for all withdrawals or retirements of fixed capital. With this rule, it becomes immaterial whether new property acquisitions represent replacements or additional property, for in either case the increase in the investment account will represent merely the excess cost of new installations over the cost of property retired. In financing the expenditure the company could issue new securities only for the net increase in investment account and would have to draw out of its surplus profits an amount equal to the cost of the property retired from service. If no provision were made for the deduction from revenue of the amount that represents the gradual consumption of capital in service until it becomes necessary to retire or replace such capital, the burden put upon revenue would be very unevenly distributed. A power station, for example, may be in service for a period of fifty years, in which case 2 per cent of the cost of the station is consumed annually. If, however, no charge is made against revenue for this depreciation, profits will be overstated until the station is retired or replaced, and in that year the revenue will be unduly burdened and profits may entirely disappear. Hence the necessity of making a charge against the revenue of each fiscal period for the depreciation that occurs during that period on property in service.

If the expenditures charged to the property or investment accounts are to be identified with the actual property in use, they must necessarily include not only extensions and other additions, but also renewals and replacements of all the considerable items of apparatus, equipment and structures that can be individualized. Replacements of parts of units or structures, however, are regarded as repairs, and their cost is included in the repair accounts. Ordinarily, there will not be much difference of opinion as to what piece of property constitutes a unit to be treated as a capital replacement and what constitutes *part* of a unit to be treated as a repair or maintenance replacement, except in the case of continuous capital such as track, electric line construction, etc. To secure uniformity it may become necessary to define a unit of track, etc. For the present, the commission has contented itself with making a $100 expenditure the boundary line between capital replacements and repairs of structures. It may be observed, parenthetically, that the new subway contracts contemplate the specification by the commission of the "principal parts" of the railroad and equipment, which upon their retirement, will be chargeable to the depreciation fund as distinguished from the minor parts, which will be maintained by charges to the repair accounts. The Board of Supervising Engineers in Chicago has already had occasion to prepare such schedules of principal parts in order to distinguish between charges against the maintenance fund and the renewal fund.

In order that the consumption of capital other than that replaced by repairs or ordinary maintenance may be taken into account in the derivation of profits, the commission's accounting rules require utilities to set aside out of revenues the amounts estimated to be necessary to provide for the ultimate replacement of property. Such amounts are included in maintenance of way and structures and maintenance of equipment and constitute with repairs the upkeep of the property. The reason for this combination is that the life of the physical property (and hence the depreciation) is dependent upon the promptness with which ordinary repairs are attended to. If repairs are neglected and the property allowed to run down and its life expectancy shortened, there will remain a larger balance in the depreciation reserve to take care of the earlier replacements necessitated by a policy of skimping repairs. A blanket depreciation estimate, however, cannot yield entirely satisfactory results, and this method is to be regarded merely as a first step.

As stated in the report that I presented as chairman of the committee on statistics and accounts of electric railways at the annual convention of the National Association of Railway Commissioners in Washington last October, "The discussion of renewal and depreciation accounts in this country is still in its early stages. The Interstate Commerce Commission in its classification of operating expenses of steam railroads in 1907 prescribed depreciation and renewal accounts for the several classes of rolling stock, and since then several of the state commissions have required electric railways to set up depreciation accounts in two or more groups. * * * There is a growing belief, however, that accuracy in estimating the necessary reservation to be made for deferred renewals must necessarily depend upon the detailed itemization of renewals. This has been recognized by the Interstate Commerce Commission in its accounting series circular No. 35, containing the tentative 1913 revision of operating expenses of steam railroads. Each of the numerous repair accounts is combined with its own depreciation account. Under Maintenance of Road, for example, there are thirty primary accounts besides the depreciation accounts, twenty-three in number. Such detail in accounting will eventually insure more careful and accurate estimates of current depreciation as it occurs.

A. F. WEBER, Chief Statistician.

MACON RAILWAY & LIGHT COMPANY
MACON, GA., April 3, 1914.

To the Editors:

I have read with a great deal of interest the editorial in your issue of March 21 on the subject of maintenance and depreciation, and the communication of President T. S. Williams, of the Brooklyn Rapid Transit Company, together with others appearing in the two issues, which seem to strike the nail fairly on the head. Should other executive and accounting officers express their views, a much more comprehensive understanding can be reached. In the meantime good, wholesome food will have been digested by the time of the American Electric Railway Association convention next October, with the result that a better understanding among the various railway presidents, managers and accountants will be obtained.

There must necessarily be some give and take in attempting to standardize where it requires the approval of a number of persons and corporations; but if the accounting officers will make a careful study of the proposed new tentative system of accounts, a great majority of them will, I believe, feel that it comes nearer meeting all requirements than any proposition presented to date.

Personally, I think that the American Electric Railway Accountants' Association, together with the representatives of the Interstate Commerce Commission, are to be congratulated upon the results obtained, and I for one have no criticism to offer.

LEM S. BOGGS, General Manager.

TENTATIVE SYSTEM OF ACCOUNTS

MOBILE LIGHT & RAILROAD COMPANY
MOBILE, ALA., April 4, 1914.

To the Editors:

When accounting series circular No. 41 was issued by the Interstate Commerce Commission on Feb. 28, 1914, accounting officers were invited to offer criticisms and suggestions, but as March 21 was stated as the latest date for the receipt of such criticisms or suggestions, and it is manifestly impossible for any one to study carefully each item covered by the classifications in the space of three weeks, it is unfortunate that more time was not allowed by the commission for the proper study of the proposed classifications. Just why electric railways were given three weeks, and steam railways over three months for criticisms of proposed changes in classifications to take effect on July 1, 1914, has not been explained.

The chief examiner of accounts of the commission has gracefully acknowledged the assistance of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association, in the preparation of the tentative classifications, and I feel that the thanks of all electric railway accountants should be tendered to the members of this committee for their valuable work.

The general instructions accompanying the classifications seem to have been prepared with great care, and contain important instructions which are necessary to a proper understanding of the text of the accounts.

The method of handling "rents" in the new classifications is open to discussion, and it would seem to be desirable to make some changes in the plan proposed. The balance sheet and profit and loss accounts appear rather elaborate for a small property, but their use by all lines will prove of great advantage to investors and others interested, and should be welcomed by the publishers of financial manuals, as an examination of the balance sheets now published from year to year in various manuals shows that they are not uniform. Some contain items consolidated to such an extent as to make them worthless for comparative purposes or for the determination of actual conditions.

The proposed forms of income account, general balance sheet and profit and loss accounts have not been issued before by the commission for the use of electric railways, and, although these accounts are similar in many respects to the steam railway classifications in use, most electric railways have been using forms of income account, balance sheet, and profit and loss statements that were prepared to meet the needs of the officials of each particular line. Radical changes will be necessary with some lines to conform to the new classifications, if adopted. As these classifications will probably be adopted as standard throughout the country, careful attention should be paid to every item shown.

An important change in the classification of operating expenses is the introduction of a new general account under the heading "power," "in order to bring together, under one general account, the expenses incident to the maintenance and operation of power-plant building and equipment, etc." This change is very desirable, but why should not this account include all determinable operating expenses affecting power, such as the cost of insurance on buildings and equipment, boiler insurance, accident insurance, payments for injuries and damages, stationery, etc.? These expenses are now grouped under the head known as "undistributed accounts."

The use of these accounts, in my opinion, is a reflection on the ability of electric railway accountants, as it is practically an admission that the items do not belong under the head of "general expenses," but to save possibly a little work they are shown as "undistributed." In my opinion the classification should provide primary accounts under the proper headings for the so-called "undistributed accounts," and if any companies desire to show such accounts as "undistributed" they may be permitted to do so, but all reports to the commission should show the charges properly distributed. The monthly and yearly reports of operating expenses of all companies would be much more valuable if all determinable charges were shown under each general account. Taxation problems, valuation problems and cost-account systems would all be helped by the abolishment of the present "undistributed accounts," as, in my opinion, there is no valid excuse for their existence. If they are general administration expenses, they should be shown as such, and not be carried in the classification in their present shape.

Under "way and structures," "equipment" and "power," equalization accounts have been provided. While these accounts may be used by some companies, they offer an opportunity for manipulation, and I do not believe that they are either desirable or necessary. By charging material to operating expenses when used, and not when bought, and by charging labor in the month in which it is expended, each month's operating expenses would reflect the actual expenses of that month, and would not show a fictitious amount, that might be desired for some special reason.

A separate primary account for parks, etc., has been used by this company for several years, and it would seem desirable to include in this account the maintenance and depreciation charges on parks and resort property.

A new account, No. 40—"equipment retired"—has been provided, and instructions have been issued concerning the treatment of depreciation and charges for abandoned property. There has been no uniformity in the past in handling of charges for depreciation, and property retired or abandoned, and any step toward standardizing in this direction should be welcomed.

Taken as a whole, the classifications are generally acceptable from an electric railway accountant's point of view, and it is fortunate that such is the case in view of the limited time given for the presentation of criticisms, or objections, to the commission.

M. W. Glover, Secretary and Auditor.

Atlantic Coast Electric Railway
Asbury Park, N. J., April 3, 1914.

To the Editors:

I have carefully examined the tentative classification of accounts promulgated by the Interstate Commerce Commission. I do not find a great deal of material for discussion as they are very similar to the classification adopted by the Public Utility Commissioners in this State. I will say, however, that the result shows painstaking efforts on the part of the committee, and I hope their efforts will be rewarded to the extent that the classification will remain in effect without further changes for some time. G. B. Cade, Secretary.

Union Traction Company of Indiana
Anderson, Ind., April 6, 1914.

To the Editors:

I have read with considerable interest the communications regarding the Interstate Commerce Commission accounts in the April 4 issue of the Electric Railway Journal. In the letter from Mr. Bigelow, auditor of the Joplin & Pittsburgh Railway, mention is made of the introduction of an account for amortization of franchises. Mr. Bigelow is evidently under the same misapprehension regarding the purpose of this account as some other accountants who have not fully understood the purport of the text.

This account is intended to include each month the monthly proportion of the *cost* of limited franchises. This "cost" is the only amount that must be amortized and there is no provision in the account for amortization of the value of franchises merely because such franchises may have been valued by the company and are included in its statement of assets and liabilities. The account, as provided, will not be used unless the company has actually made expenditures, such as legal expenditures or cash payments to municipalities for the purpose of securing franchises. The new system of accounting is not retroactive; if the cost of securing a limited franchise had been $30,000 and twenty years of the life of the franchise had expired at the date the new classification became effective, there seems to be no good reason why it would not be perfectly proper for the carrier to charge operating expenses with $1,000 per year for the remaining ten years of the life of the franchise. If, however, the entire cost had been originally charged to capital accounts I do not believe the Interstate Commerce Commission would expect or require a company to go back to the original entries and take out the remaining one-third of the franchise cost for the purpose of charging it into operating expenses during the next ten years.

The text of the account, as submitted in the tentative classification, was revised at the recent meeting in Washington of the committee on standard classification of accounts with the Interstate Commerce Commission representatives, in order that the account would be better understood.

W. H. Forse, Jr., Secretary and Treasurer.

MOVIES FOR ELECTRIC RAILWAYS

Washington Railway and Electric Company
Washington, D. C., April 7, 1914.

To the Editors:

I heartily endorse your editorial in the Journal for April 4, on "Movies for Electric Railways." I have just finished a course of lectures to our trainmen, and I am thoroughly convinced that this is one of the best ways of instructing the men, as much more can be accomplished in a shorter time than by any other means that I know of.

I also endorse your proposition for a central agency, as in our case we had to secure a moving picture reel from Chicago at considerable expense. Now that all of our men have seen this reel, it is but little use to us, excepting to show to new men who are just entering the service. I hope that your suggestion will be taken up by the American Electric Railway Association and pushed through as rapidly as possible, as I believe great good can be accomplished by such a method.

W. F. Dement,
Assistant Superintendent of Transportation.

DISCUSSION ON PUBLIC UTILITY VALUATION AND DEPRECIATION

At a meeting of the American Society of Civil Engineers on April 2 further discussion developed on the report of the committee on valuation for rate-making purposes. This committee is composed of F. P. Stearns, chairman, T. H. Johnson, W. J. Raymond and Alfred Noble, J. P. Snow and Leonard Metcalf.

The session was opened by G. S. Williams, Ann Arbor, Mich., with a brief explanation of the importance of the subject and the advisability of thrashing it out to a definite conclusion, to which the support of the society would be given. The main characteristics of the general discussion following were that it dwelt almost entirely with principles of railroad valuation to the exclusion of other forms of public utility enterprise and that it was inadvisable to bring in at this time the subject of rate making as an object for valuation.

Prof. G. F. Swain, of Harvard University, commended the report highly as to its general conclusions and the value of the matter collected, but criticized its contents regarding the question of depreciation and the bearing of that item on the topic of valuation. Professor Swain considered that rates should be based upon the cost of reproduction new and not upon this item less depreciation. He thought that a depreciation allowance should be set aside each year for keeping the property up to date without additions to capital, and he favored a sinking fund method for this. Any method which included the consideration of the original cost, he thought, would be impracticable, because in many instances the figures on this would not now be available. He did not favor repeated determinations of cost of reproduction new but thought that such determination supplemented by a requirement for correct accounting to take care of future depreciation would be the most practical method of procedure. Professor Swain presented data for an interurban electric railway ten years old, at the present time earning a net of 12 per cent and paying 8 per cent in dividends with a 4 per cent annual surplus to provide for depreciation and renewals. The figures showed that the net earnings of the first few years were low and had all been paid out in dividends, so that in the ten-year period there had been accumulated only a 12 per cent total depreciation reserve. In case the records of the company should be lost and a valuation be made, the cost to reproduce new would be found as the original cost, $1,000,000, and the depreciated value on which the committee would base the rate would be $720,000. It is to be noticed in this regard that the committee included in developmental expense the early deficit between what was earned and the desirable 12 per cent, thus bringing the total value back up to $1,000,000.

D. W. Lum, Washington, D. C., made a protest in regard to the presentation of a report on rate-making at the present time. While admitting the influence of the society and believing that it would not desire to have any unjust situations created by any report on the subject, he failed to see how the methods proposed by the committee were in harmony with present practice, and he believed that the committee should have followed its instructions and adhered to the federal law governing appraisal of common carriers' properties for no specific use. Mr. Lum made an argument for "service value" as a basis for rates.

Samuel Whinery, New York, gave a brief discussion of some of the general factors involved in the report. He objected to the introduction of many involved theories and diction, upon the meaning of which engineers themselves were divided and which therefore would be most incomprehensible to men in other professions. In particular, he objected to the term "depreciation," holding that the conflicting views in regard to it were caused by a misunderstanding of its use. What he really understood by depreciation was a diminished value determined by price and not from any probability of life or actual experience. He thought that a valuation could be made without considering depreciation and that expert appraisers would not be inclined to pay much attention to any depreciation formulas.

Martin Schreiber, Newark, N. J., presented to the association the results of the investigation made by the committee on life of railway physical property of the American Electric Railway Engineering Association, which was completed last year after three years of work. He said that this association had had access to the records of most of the large electric railways of the country, and he offered to the society the data compiled. The members of the electric railway committee had first thought that provision for depreciation in electric railway property could be satisfactorily made in accordance with the plans of the American Society of Civil Engineers but found that a practical application of this plan was unsatisfactory. Mr. Schreiber read the report of the committee to the effect that the elements causing difference in the life of similar apparatus (such as use, climate, maintenance, obsolescence, human factor, public demand, earnings, etc.) were so complex that no tables could be drawn up for the determination of the useful life and that the probable life in any case would better be fixed by careful survey.

J. N. Dodd, New York, contended that the figure to be arrived at in any valuation proceeding should be the cost of the plant of a possible competitor. This would involve the substitution of the most modern construction and equipment for that being valued.

C. R. Harte, New Haven, Conn., called particular attention to the lack of a uniform system of terms in connection with the valuation work and he mentioned in particular the different attributes to depreciation that are often confused. Mr. Harte stated that the reproduction method of cost new less depreciation was only one source of information as to value. The fair value of a property used and useful for the public was neither the cost to produce nor the cost to reproduce. It was the capitalized earning power. It had been argued that for rate-making purposes the earning power could not be considered inasmuch as it was the direct function of the rates to be regulated, but economic forces would compel the practical equalization of rates, even though different values of competing utilities would otherwise prompt them to charge different rates for the same service. Mr. Harte stated that he would substitute for physical value the inherent value of services rendered.

The afternoon session proved insufficient to accommodate all who had discussions to give on the subject so an evening session was held. One of the first speakers at this meeting was J. H. H. Muirhead, Glasgow, Scotland, who criticized the report in several respects. He thought that it should give decided definitions and also that 8 per cent did not represent an ample repayment for the early risks in railroad construction or the present operating risks. In his opinion, the value of the franchise should be included in the valuation of the property of a utility as well as the cost of protecting the utility's interest from adverse legislative action.

M. L. Byers, New York, admitted the possibility of using the "fair value-fair return" theory of rates for gas plants and water works, but thought that the committee should work out more in detail the application of this scheme to railway tariffs. He stated that railway transportation was a complicated service not comparable with the single product of gas plants and water works and that fair value and fair return must be the average of a future period in which the service would vary with the tariff and must be forecasted.

H. M. Stone, Kansas City, Mo., presented a written discussion mainly on the point that the report of the committee did not apply to railways under competitive conditions. He stated that W. J. Wilgus in his paper on "Physical Valuation of Railroads" had stated the question of depreciation for the purpose of rate making very convincingly from the standpoint of the accountant working with the engineer on the subject, but that there were equally important reasons why depreciation, in the common sense of the word, should not be deducted from the cost of reproduction new as of the date of valuation. Mr. Stone said that he failed to find any provision in the general provisions of the committee for contingent funds. His method of providing for depreciation would be by including renewals in operating expenses and providing for unusual replacements by temporary expedients. He did not see how the appreciation of land could be used directly to offset the depreciation of plant. His main conclusion was that there are values of depreciation for sale purposes not applicable to the taxation or the rate question.

J. P. Snow, Boston, of the special committee, spoke briefly on some of the considerations that the committee had in mind in planning its report. He said that it was the opinion of the members of that body that in the valuation of property and the fixing of rates the cost of service to the producer or utility should be used and not the value of the service to the user.

Mr. Williams resigned the chair in order to take part in the discussion and expressed his views on the proper definition of depreciation and on some of the factors that he thought should be included in a valuation. Depreciation was defined by him as the difference between the present worth of a future service of a new article or system and the present worth of the future service of the article or system under consideration. Mr. Williams thought that brains should be included in the valuation of a utility property and since watered stock frequently represents capitalized brain power, he thought it legitimate to include this in the valuation.

In closing the discussion, F. P. Stearns, Boston, chairman of the special committee, replied to some of the criticisms that had been aimed at the report of the committee, stating that most of these were applicable, if at all, to only the minor portions of the report. According to him, the whole question of valuation depends upon the theory that if the owner of a utility property is to receive the benefit of an unearned increment with the rise in value of its own and adjacent property, it should be required to bear the portion of an unearned decrement in cases where that occurs.

No definite action was taken at this meeting on the report under discussion, inasmuch as additional opportunity is to be given in the near future for a more general impression of the society concerning it.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

EQUIPMENT DEFECTS—TROLLEY BASES

BY C. W. SQUIER, E. E.

The functions of a trolley base are to provide so flexible a support for the trolley pole that it will have free movement both laterally and vertically while exerting the pressure necessary to keep the trolley wheel in contact with the wire.

A freely swiveling base is most essential in order that the trolley wheel may follow the overhead line. To provide this extreme sensitiveness roller and ball-bearing bases have come into general use. Both types operate satisfactorily when provided with properly hardened parts. By using ball bearings a lower base can be obtained than with roller bearings, but on the other hand roller bearings give greater wearing surfaces. Various pressure spring arrangements are in use. Some bases have springs in tension and others have springs in compression. Further, some bases have but a single spring, while others have a battery of springs.

By reason of its location the trolley base is more inconvenient to get at than other parts of a car equipment. In some cases, even, it seems to be expected to do its work without receiving any care at all. A representative of a manufacturing company which also repairs trolley equipment stated recently that many of the old bases returned to his company lack nothing but lubrication.

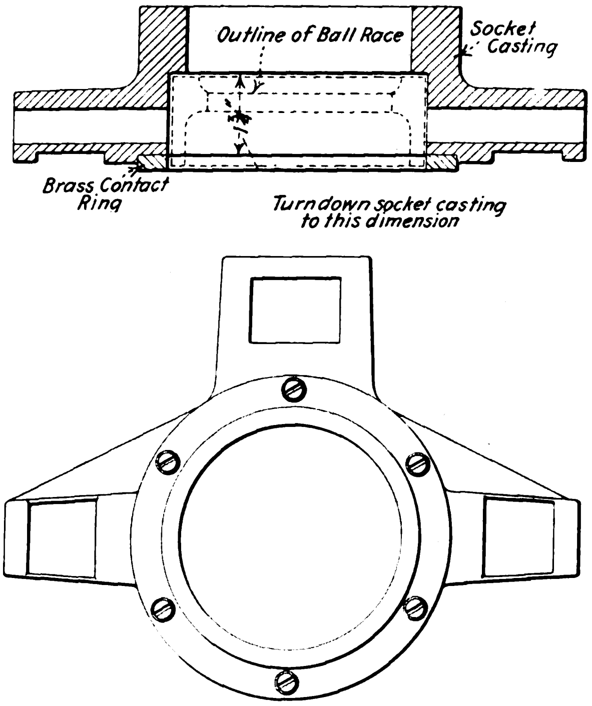
The chief troubles with trolley bases are the following: Broken or weak springs, worn bearings and pins, worn center post, loosened nuts and bolts, flat or pitted rollers or balls, burned ball races, burned or broken shunts, burned contact plates and burned-off leads or terminals.

BROKEN OR WEAK SPRINGS.

A spring which is in tension breaks most frequently at the end loops or at the bend where the loop joins the first turn of the spring. The number of such breakages can be reduced by keeping the parts over which the springs hook in good condition so that the loops have a maximum amount of bearing surface. By the use of a magnifying glass one may often discern small cracks in new springs at the bend from the loop to the first turn of the spring. These cracks are evidently due to the method of manufacture, and while such springs are strong enough to withstand heavy strains they will ultimately break at these fissures. Springs are also weakened from the gradual loss of their power to resist elongation or to the compression which follows the slow accumulation of a permanent set.

In older types of bases the full power of the springs may not be available for producing tension at the trolley pole because of excessive friction in such parts as the cross pin that forms the up and down bearing for the trolley pole, the cross head in its guide, the side rod bearings which carry the trolley spring pressure and the trolley springs themselves on their guides. It is very difficult to keep these parts lubricated, as rain forces the oil out on the roof of the car and the windows and sills often become bespattered and soiled from oil. In the later designs of stands an effort has been made to provide bearings which do away with the necessity for constant oiling at friction points, and the designers have also endeavored to provide for a uniform pressure of the trolley wheel on the wire at different elevations.

Tension springs are sometimes weakened by overstretching them during installation. One bad practice, for example, is to force a screwdriver or other sharp tool between the spirals of the spring, and to use this as a lever to hook the eye over its post. This scheme is liable to force the spirals apart to such a distance that they will not come back to their original position.



Trolley Bases—Socket Casting with Contact Ring Assembled

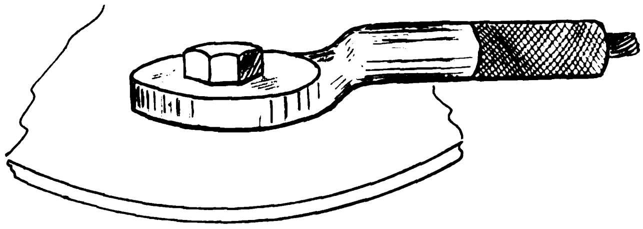
WORN BEARINGS AND PINS

Worn bearings at various parts of the base are a constant source of trouble. In a great many cases the desire to keep down the weight has given us bases with not enough material in them to permit the boring and bushing of worn bearings. Some roads have gone to the expense of making patterns of new castings which are provided with sufficient material to allow all wearing parts to be bushed. An accompanying drawing illustrates one method of bushing a yoke to take care of excessive wear.

NUT, BOLT, BALL AND ROLLER TROUBLES

Loose nuts and bolts are a constant source of trouble on all parts of a car equipment. Trolley bases are no exception, as they are constantly under vibration. All nuts should have lock washers, and if difficulty is then experienced cotter keys should be added.

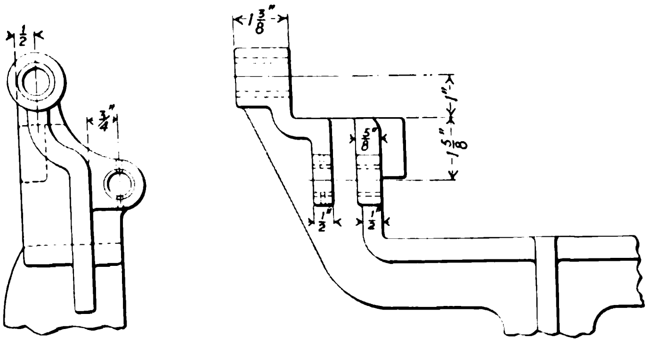
Where ball bearings are used the races are usually insulated from the socket casting to prevent them from carrying the trolley current. Notwithstanding this precaution, the frequent discovery of burned ball races and balls shows that they do carry current. This action may take place in several different ways. For instance, the contact shunts that carry the current from the socket casting to the base plate occasionally get bent out of position so that they bear on the race and socket casting at the same time. Current then passes across the contact face of the shunt to the ball race and thence through the balls to the base plate, causing the burning of the balls and race. Moisture and dirt collect on the surface of the insulation, and the current then has an easy path to the ball race. Again, contact shunts are sometimes torn off entirely and current then passes over the surface of the insulation from the socket casting to the race.


Trolley Bases—Soldered Terminal for Leads

When new ball races are installed care should be taken to see that the lower edge of the ball race does not project beyond or come flush with the contact surface of the socket casting. This precaution will prevent the contact shunts from bearing on the race, for then they cannot touch the edge of the race while still remaining in contact with the face of the socket casting.

BURNED OR BROKEN SHUNTS AND BURNED-OFF LEADS OR TERMINALS

Of necessity, trolley bases must be made very low. As a result, the distance from the socket casting to the base plate is usually not more than 1 in. to 1¼ in. This, then, is all the space that is available for contact shunts. It is very difficult to get in this space a spring which is efficient enough to give the necessary current transmitting pressure of the contact shunt against the socket casting. The springs soon take a permanent set and arcing then takes place between the contact surface of the socket casting and the shunt. As a result, the shunt is burned away or else the contact surface of the socket casting becomes so rough from the arcing that the shunts are torn off. The surface of the socket casting is thus destroyed, and in most cases it is necessary to install a new casting. A second drawing shows a brass contact ring which was made to screw to the face of the socket casting. As this ring is of brass, it forms a better conducting surface than the steel casting, and if it becomes burned it can easily be replaced at small expense. This ring also permits the re-use of socket castings that have become slightly burned since the lower face of the casting can be turned off for the reception of the contact ring.



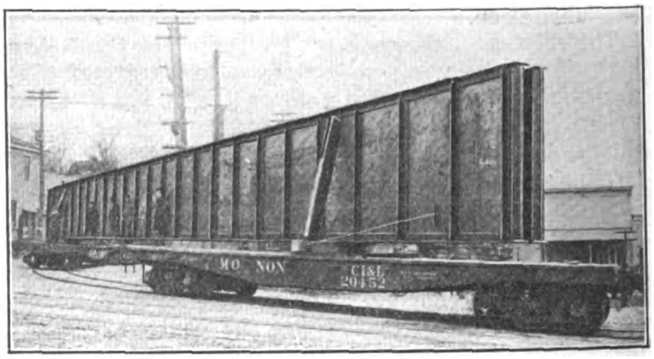
Trolley Bases—Bushings Pressed in Yoke

The common form of terminal used on trolley bases consists of a hole in a lug to receive the lead. The hole is provided with set screws to clamp the lead in place. Leads become loose from the working out of the set screws or because the screws are not tightened when a new base is installed. If the screws stay in place, they soon become so rusty that it is almost impossible to remove them when it is necessary to install a new base. If the leads become loose, the arcing thereby initiated soon burns away the lead and terminal. A better form of terminal which can be quickly and easily removed is shown in an accompanying drawing. This consists of a standard soldered terminal such as is used for the ground leads on motors. If the trolley lead is soldered into this properly, there is no danger that the lead will burn off at this place. This terminal is then bolted to the base plate, where a spot-finished surface is provided to give a good contact surface.

HANDLING LONG GIRDERS ON A SHORT CURVE

BY JACK ABBOTT, SUPERINTENDENT FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY

In rebuilding at Lafayette, Ind., the Wabash River bridge which was wrecked by the flood of March, 1913, it was necessary to transport thirty-six girders 120 ft. 4 in. long and 9 ft. 7 in. high. A pair of these girders of the type shown in the accompanying cut weighed 184,000 lb. The girders were loaded on three rigidly coupled cars, the middle car being used as an idler. It was impossible to turn the girders in the street at the location of the bridge. The steam railroad therefore turned the girders over to our local street railway at the first siding, about 8 miles out of town. As our line has some very sharp curves it was necessary to take the middle car out. We carried one section at a time, making the girder itself serve as a coupling pole. The view shows the position of the bridge girder relative to the rail on a 100-ft. radius curve, and in this position it swung clear of the car about 20 ft.

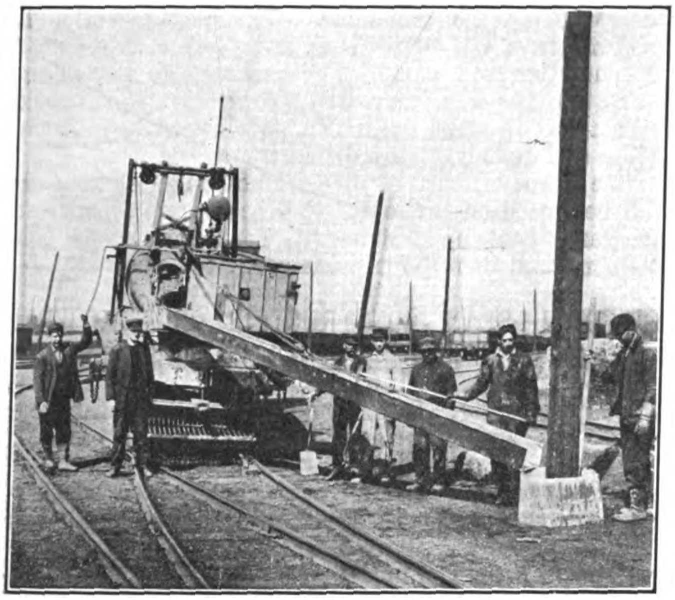

Handling Long Girders on Short Curve

A "safety-first" meeting of the trainmen of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, held on March 10, 1914, in New Albany, Ind., was attended by more than 100 conductors and motormen of the two companies.

CONCRETE-MIXING CAR FOR REINFORCING DECAYED POLES

BY A. J. PURINTON, GENERAL SUPERINTENDENT EAST ST. LOUIS & SUBURBAN RAILWAY

In former years, when the price of wooden poles was much lower than at present, it was the custom to replace them with new ones when the decay at the ground line was such as to leave a doubt as to their safety. The growing demand, along with the subsequent increase in price, has caused many companies to take steps to preserve the life of each pole as long as possible. Although a pole may be in good condition otherwise, it decays and will finally break at the ground line.



End View, Showing Chute Transportation of Concrete from Mixer to Reinforce Pole

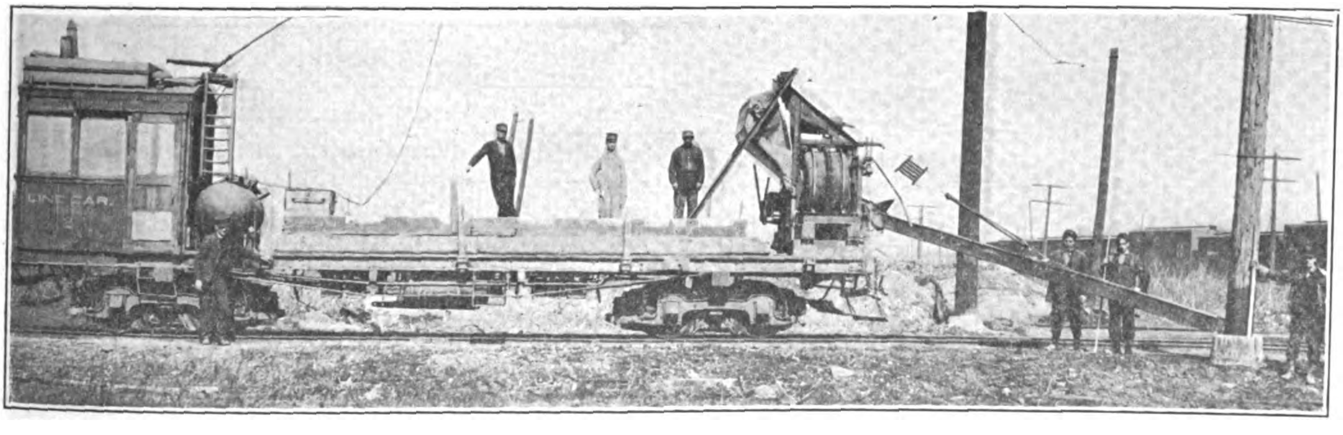
The Orr system of using reinforced concrete, as controlled by Hubbard & Company, Pittsburgh, Pa., to strengthen the pole at its weakest point has been used successfully for some time by the East St. Louis & Suburban Railway, East St. Louis, Ill. Recently, however, the railway company has devised a new method of carrying, mixing and depositing the concrete, which has reduced the cost materially by saving both in time and labor.

Previous to building the concrete-mixing car which is now used, material for the reinforcing was loaded on a work car and transported to the site where the concrete was mixed and placed by hand. It was found, however, that for reinforcing either a small or large number of poles, the cost of doing the work in this manner was so high as to make it almost prohibitive. In order to lower this cost of concreting, it was decided to place a small mixer on a work car to replace the hand labor as far as possible. This equipment comprised a 40-ft. double-truck flat car with removable sides at one end of which an 8-ft. square cab for housing the control apparatus was provided.

The mixer, a No. 0 special Marsh-Capron, is mounted on the rear end and is set as high on the car as overhead clearance conditions would permit, thus giving a vertical drop of about 8 ft. from the spout of the mixer to the rails. This mixer is driven by a GE-1000 motor through reduction gears, and both motor and gears are enclosed in a weatherproof housing. To eliminate the variable speed of the motor it was converted from a series to a shunt-wound, and the speed of the mixer is 20-21 r.p.m., which makes its capacity 6 cu. ft. per minute. The motor operating the mixer is controlled by the motorman from the cab.

A 200-gal. cylindrical tank is mounted directly behind the cab. Air from the brake reservoir, admitted to the tank through a reducing valve, maintains a constant pressure of 10 lb. From this tank the water is forced through piping to a small measuring tank on top of the mixer. This measuring tank is automatic in its action and can be adjusted to measure out any given quantity of water. In addition, all the material necessary for a day's work can be carried on the car. The loading skip of the mixer, when lowered, lies flat on the deck so that material may readily be shoveled into it.

The mixer discharges into a chute 18 ft. long and 10 in. square, which is open along the top to permit the use of scrapers should the concrete fail to flow. The chute is pivoted at the mixer and supported at the discharge end by a guy, thus allowing it to be swung to either side of the track and raised or lowered, as conditions may require. With a few exceptions this chute is long enough to reach all the poles on the system on either side of the track, and has sufficient fall to allow the concrete to flow by gravity. Since this car has been in operation it has been found that the cost of concreting a pole has been reduced by half or more, while from two to three times as many poles may be reinforced in a day by this equipment as by hand.



Side View of Equipment Used for the Concrete Reinforcement of Poles at the Base

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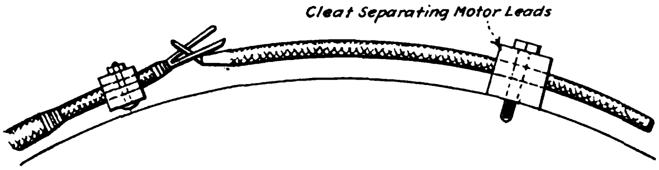
A new feature of the telephone directory which is now being distributed in New York is the useful information section for readers who desire general information. The section contains facts concerning overhead, surface and underground car service, railroad stations, ferries, public buildings, and other points of general interest.

DEVICE FOR CONNECTING MOTOR LEADS TO CONTROLLER USED TO RUN TRUCKS FROM UNDER CARS

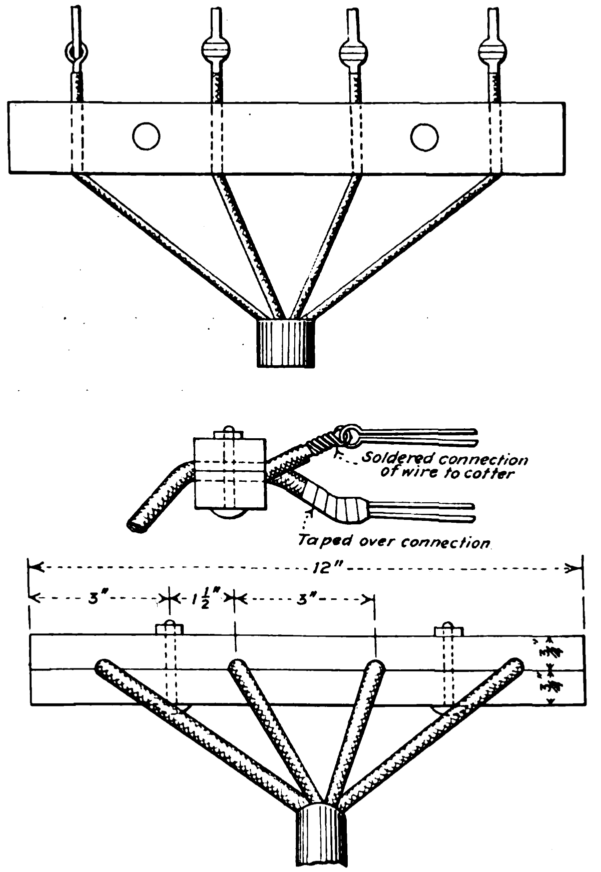
BY R. H. PARSONS

Most railways jack up their cars and run out the trucks to overhaul the equipment, and many shops are equipped with a controller and flexible cable to move the motor truck by electricity rather than by man power. Time requires that some simple device be used to make a connection between the controller leads and the motor leads. The accompanying three sketches illustrate a safe, speedy and effective method for the purpose.



Shop Controller—Connection Between Controller and Motor Complete

It is best that the controller used be wired in connection with resistance and the four motor leads, so as to get either direction of motor rotation as in regular car service. The four motor leads, made up of No. 6 extra flexible wire and formed into a cable of sufficient length, are brought to a wooden cleat 1½ in. square and 12 in. long. When it was a solid block four holes had been drilled through this cleat to the exact size of the wires, and then it had been sawed full length in line with the center of the holes. The wires are placed in the lower half of the cleat corresponding to the order of the leads from the motor, and then both halves of the cleat are bolted together to clamp the wires in place. The wires are brought through the cleat for about 2 in. and are then attached to a spring cotter pin 3 in. long and ⅜ in. in diameter. Each wire is looped through the eye of the cotter, twisted back over itself, soldered and then taped over the connection and over the eye of the cotter.



Controller Connection—Details of Connection to Cleat

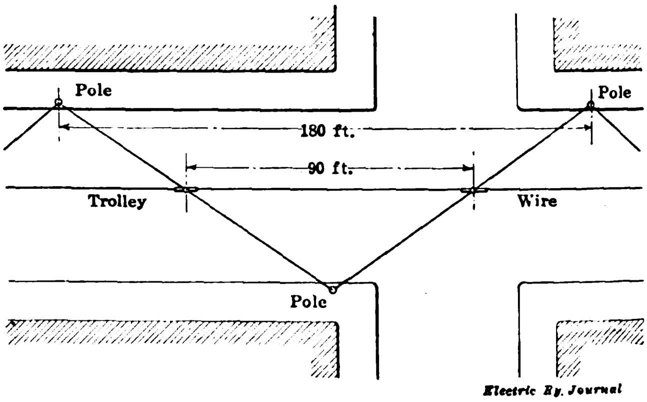
To connect the motor to the leads, simply put the cleat on the top of the motor shell and place the lead from the motor between the fingers of the cotter pin. It is not necessary to use care in matching the leads, as the motor will run as well if the two field leads from the motor are connected to the two armature leads from the controller, or vice versa, and the direction can be changed from the controller. The only exception is that if one of the motor leads is grounded on the shell or truck this lead would, of course, have to be connected to the proper lead from the controller, which could be marked in some way. The flexible cable is harmlessly and quickly removed just by pulling it off.

The method described involves no danger as the cleat can be placed on the motor or truck where convenient, the leads bent up a little, the connection made in a moment, and then the truck is ready to be moved.

DIAGONAL SPAN CONSTRUCTION ON STAGGERED POLES USED FOR SINGLE TRACK IN CLEVELAND

BY JAMES SCOTT, SUPERINTENDENT OF OVERHEAD CONSTRUCTION CLEVELAND RAILWAYS

The novel form of overhead construction which is shown in the accompanying illustration has recently been introduced on the Cleveland Railways. This arrangement consists in eliminating alternate poles on opposite sides of the street so that the span wires extend diagonally across the street from pole to pole supporting a trolley wire at intervals of 90 ft., although the spacing between two poles on the same side of the street is 180 ft.



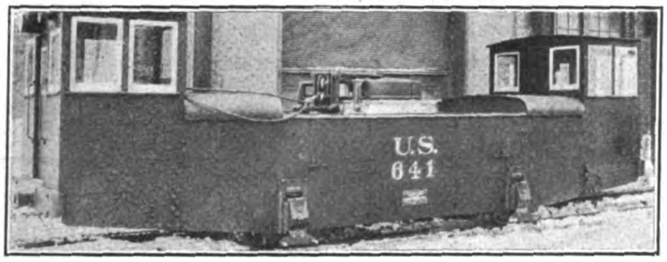
Staggered Poles for Single Trolley Wire in Cleveland

The arrangement is used on single-track lines not only because of the great reduction in expense owing to the use of only half of the usual number of poles, but also because standard double-track construction can be introduced when the line is double-tracked by setting up additional poles and moving the ears on the trolley wire. The poles are 28 ft. long set 6 ft. in the ground. They are made of standard pipe 7 in. x 6 in. x 5 in. and weigh 634 lb. The wire is maintained at the standard height of 18 ft. with a maximum sag of 6 in.

The record of passenger train performances on the steam railroads of the State of New York for the month of January shows that during the month the number of trains run was 65,954. Of the number of trains run 81 per cent were on time at the division terminal.

THREE-PHASE TOWING LOCOMOTIVES FOR PANAMA

The first electric towing locomotives for hauling vessels through the locks of the Panama Canal are now being received at the Isthmus. In all forty "electric mules" are being built by the General Electric Company. The machines weigh 82,500 lb.; measure 32 ft. 2½ in. long by 8 ft. wide by 9 ft. 3 in., the greatest height over the cabs; have an available tractive effort as high as 47,500 lb. and a windlass rope pull of 25,000 lb. Four of them, two on each side, will ordinarily propel steamships through the locks. Sometimes six engines will be needed to handle extra large vessels; in every case two astern, acting as a brake on the ship's movements, will give direction to her course. No vessel will be allowed to enter the locks and go through on her own power.



Towing Locomotive for Panama Canal

The locomotive is built up of cast-steel side and end frames, cross-ties and bedplates. It is mounted on two axles with wheels in accordance with M. C. B. standards. The entire frame is supported from journal boxes of the regular railway type by means of coiled springs. The sides and top of the body are enclosed by sheet-iron covers which fit in place and are removable. At each end are inclosed cabs so that the locomotive may be operated from either end.

The locomotive is propelled by means of a rack rail while towing and while going up or down the steep grades from one level to another at a speed of 2 m.p.h. While running idle or on return tracks, the speed is changed to 5 m.p.h. and the machine is propelled by the regular traction method, the rack pinion being entirely released. This change is effected by manually-operated clutches located in the gear mechanism in connection with a lever in each cab similar to a steam locomotive.

The locomotive is driven by two 75-hp totally-inclosed motors of the mill type, one being direct connected through reduction gearing to each axle. Three-phase, twenty-five-cycle, 220-volt current is used and is collected by contact plows. The motor and traction gearing are mounted on a common baseplate, which in turn is mounted on a driving axle and spring suspended to the locomotive frame the same as in regular railway practice.

In the center of the locomotive is located a vertical windlass with drum, the capacity of which is 800 ft. of 1 in. steel hawser cable. The windlass, with its driving motors and gearing, is mounted on a solid baseplate and is likewise independent of the movement of the locomotive frame. The cable drum extends above the locomotive cover and has a floating guard placed around it to retain the cable while coiling loose. The windlass cable is handled by two 20-hp motors, also totally inclosed and of the mill type. One is geared for a rope speed of 12 ft. per minute at a pull up to 25,000 lb. at 2 ft. radius, and its function is to adjust the position of the ship for anchor or while being towed through the locks. The other motor is geared for a rope speed of 200 ft. per minute at 2 ft. radius, and its duty is to take up slack or pay out cable or wind in any part of the entire length of cable, as may be required. The cable drum is driven through a friction device which can be set at any desired value from zero up to the full capacity of the motor.

The traction motors, as well as the windlass motors, are controlled from either cab. The two traction motors are operated by one master controlled and contactors forward and reverse while the windlass motors are operated by a reversible drum controller, and the clutch on the main vertical shaft by a solenoid.

SCRAPER USED TO REMOVE SNOW AT SYRACUSE

During the past winter the New York State Railways purchased for trial the snow scraper shown herewith. The scraper is built of wood and does practically the same work in removing snow that a wheel scraper does in earth. It gathers the snow in a pan, and the load is dumped merely by pulling a lever. Where the haul is not over 400 ft. to 500 ft. it does excellent work.

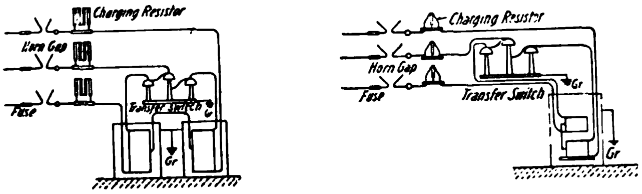
However, as the haul was generally more than 1000 ft. the New York State Railways used it in Syracuse mostly for scraping the snow into piles to be picked up by wagons. The scraper was very efficient, as it took the place of fifteen or twenty men with shovels. The heaviest snowstorm this year, which came in the night and was practically a blizzard, made it very difficult to get extra men out to keep the special work layouts in the center of the city clear of snow. The company brought out the scraper and had practically no trouble in keeping six or eight large layouts in operating condition, by scraping the snow off the special work to the side of the street. The view shows that a man rode on the front of the scraper while it was loading, as it was found that, on account of its lightness, the scraper had a tendency to tip up in the front. However, this did not prove a serious objection. The scraper was furnished by the Lisbon Falls Manufacturing Company, Lisbon Falls, Me., and cost $75 delivered in Syracuse.

Snow Scraper Clearing Special Work at Syracuse

Lord Knaresborough, chairman of the North-Eastern Railway, England, in addressing the stockholders at their annual meeting, alluded to the electrification of the ore freight line from Shildon to Newport. The work, he said, was well in hand, and the first of the ten electric locomotives almost completed. The problem of hauling freight traffic by electric locomotives was not entirely new to the company, but this was the first instance in which it had been tried upon anything like a comprehensive scale. In view of its experimental nature, the directors had deemed it advisable to defray the whole cost, $730,500, out of current expenses.

ELECTROLYTIC LIGHTNING ARRESTER WITH CHARGE-AND-DISCHARGE RESISTOR

For protecting cable systems, motors and generators connected directly on a line without transformers, or transformers with weak insulation on their end turns, the Westinghouse Electric & Manufacturing Company has recently introduced the Type AK lightning arrester, which has a charge-and-discharge resistor in series with the standard electrolytic element. This resistor limits the charging current to a low value and damps out any surges that might result in charging, particularly if the system contains enough capacity to produce resonance. The arrester is made for circuits up to 14,500 volts.



Diagrams of Connections for Electrolytic Arresters with Resistors

The electrolytic element consists of treated aluminum trays filled with electrolyte, stacked one on another, and separated and insulated from each other by porcelain spacers on the periphery of the trays. The number of trays in a stack depends upon the normal voltage of the line on which the arrester is to be used. The stacks after being placed in frames are arranged in welded steel tanks and immersed in oil.

In operation, a film of the electrolyte forms on the surface of each tray. This film has a high resistance at normal voltages, but a very low one at abnormal voltages. It therefore forms a free path for abnormal voltages or static charges, but upon cessation of the abnormal stress the film instantly regains its high resistance. The arrangement of the trays and the electrolyte is such that the electrolytic element acts as an electrostatic condenser. The flow of current, due to the capacity of this condenser, varies inversely as the frequency of the circuit.

When an electrolytic arrester is being charged, surging currents are set up in the system. Under most conditions these are harmless, due to insulation of the apparatus connected in the same circuit. However, to avoid dangerous surges, the graphite resistor is used to damp them out and limit the charging current to a low and safe value. This resistor is connected in series between the horn gap and the arrester in each phase. It is shunted, however, by a series of non-arcing metal spark gaps which are auxiliary to the main horn gap. In the operation of charging the horn gap is short-circuited, as usual, and at the normal voltage of the circuit the charging current takes the resistance path rather than the shunt auxiliary gap path. A discharge due to lightning or static disturbances easily breaks down the auxiliary spark gap path, and the discharge passes through the same rather than through the resistor, thereby assuring precisely the same freedom of discharge as an arrester which does not use the charging resistor. When the circuit is restored to normal voltage and frequency after the discharge the auxiliary spark gaps cannot maintain the circuit and it is shunted to the resistance path. This action is materially helped by the use of multiple gaps between-non-arcing metal. The resistor limits the amount of dynamic current flowing, and thus aids in the final action of opening the circuit by the rise and final break of the arc on the horn gap.

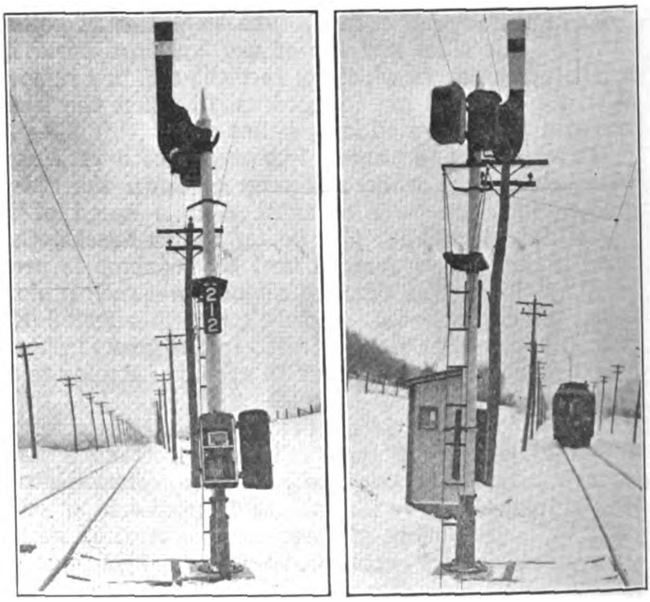
On each occasion of charging ungrounded neutral arresters to rebuild these films, after once bridging the horn gaps, the leads connecting the two middle legs to the ground and to the center fuse, respectively, should be interchanged and the gaps be bridged again, thus serving to charge all the "legs" of the arrester. To facilitate this charge a transfer switch is provided. A handwheel is so geared to this transfer switch that the switch can be reversed without the operator in any way coming in contact with live parts, the frame of the arrester being grounded.

NEW DOUBLE-TRACK SIGNALS ON THE NEW YORK STATE RAILWAYS

The New York State Railways have recently installed automatic block signals on the double-track interurban line between Utica and Little Falls, N. Y. The apparatus for this system was furnished and installed by the Union Switch & Signal Company under the direction of G. N. Brown, electrical engineer, New York State Railways, the signals being of the style-T-2", three-position type, operating in the upper left-hand quadrant.

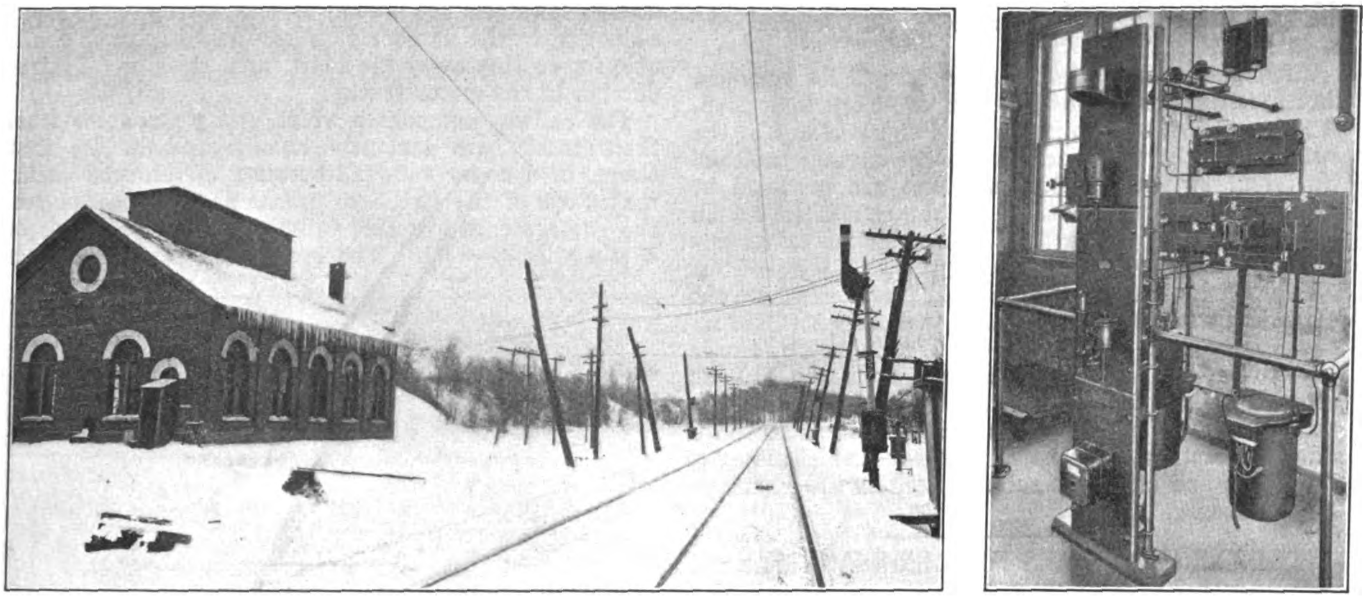
The service on this road consists of high-speed passenger traffic as well as express and baggage delivery, the cars being operated by direct current supplied at 600 volts from an overhead trolley wire.

Current for the operation of the signal apparatus is supplied from two substations, one located at Little Falls and the other at Frankfort. The signalled territory is divided into two sections, one extending from Utica Park to Frankfort Junction, for which power is supplied from the Frankfort substation, and the other extending from Herkimer Wye to Little Falls, current being supplied from the Little Falls substation.



Utica Signals—Front and Rear Views of Signal Mast Showing Positions of Operating Mechanisms and Relays

The substation equipment for the signals includes a duplicate set of 5-kva, oil-cooled, step-up transformers, together with the necessary switchboard equipment to provide means for cutting each transformer in or out so that either one may be used. The current is furnished at 370 volts, forty cycles, single phase, and is stepped up to the 2300-volt signaling mains, for transmission over No. 8 bare copper wires installed on the pole line. At the various signal locations it is stepped down by means of oil-cooled transformers to 110 volts for the operation of the signals, and to 12 volts for the operation of signal lights and relays. The signal switchboards are provided with an ammeter, a wattmeter and an inverse time element relay, the latter being arranged to automatically open the connection to line in case of trouble.



Utica Signals—Exterior View of Little Falls Substation and Signal System—Panel Board

All track circuits are of the alternating current "two-rail" return type, with impedance bonds inserted between the ends of abutting circuits to provide a path for the return of the propulsion current. Transformers with closed magnetic circuits and without adjustable magnetic leakage blocks are provided at the various locations for stepping-down the 2300-volt current derived from the signal power mains. These transformers are also provided with suitable secondary windings to supply current at the proper voltage for the operation of the various track circuits. The track relays are of the Union Switch & Signal Company's two- and three-position, Model 12, polyphase type, and have two windings, one connected to the track and the other to the 12-volt secondary of the signal transformers. These instruments are protected by 10-amp fuses inserted in the connections between the track and the relay and 5-amp fuses in the connections between the transformers and the relays. The inductive bonds installed at the end of all track circuits are arranged to carry continuously, without excessive heating, a return propulsion current of 500 amp per rail, or 750 amp for one hour.

Utica Signals—East-Bound and West-Bound Signals and Telephone Booth Near Frankfort Substation

The signals are of the three-position type, having one arm operating from 0 deg. to 45 deg. and 45 deg.

to 90 deg. in the upper left-hand quadrant, with a.c. slots and motors. In general design and structure these signals are in accordance with the Railway Signal Association standard, with white ash blades. The electric lights for signals are of the 12-volt, 2-cp tungsten type, two bulbs being provided for each lamp so that the necessary indication will be provided should one of them fail.

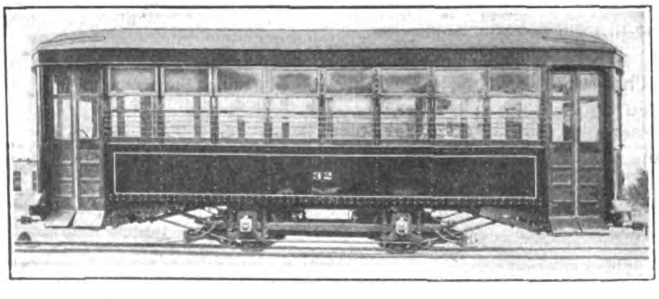
The signal-control circuits are arranged for standard three-position operation, giving a two-block indication. It is impossible to obtain a proceed signal if any of the switches in the block are not in the normal position. Universal switch circuit controllers are provided at each switch and are so adjusted that, should the switch fail to be in the proper position, the signal-control circuit will be held open and the signal will indicate stop.

All switch stands throughout the territory where the signals are located are provided with lamps which accommodate two 110-volt, 2-cp Westinghouse Mazda bulbs, lighted by current obtained from the 110-volt secondary of the signal transformers. This obviates the necessity of the trackmen making daily trips to the various locations for the adjustment and cleaning of oil lamps, and assures a suitable light in the apparatus at all times.

SINGLE-TRUCK CARS FOR MERIDIAN, MISS.

During the past year the Southern Car Company, High Point, N. C., has furnished to the Meridian (Miss.) Light & Railway Company seven single-truck, non-bulkhead, vestibuled cars of the design illustrated. It is interesting to note that this type of fully-inclosed car is meeting with favor in Southern cities as well as in colder climates. The length of the carbody over the end panels is 20 ft. 8 in., and over the platform crown pieces 30 ft. 8 in. The width of the carbody at the sill including the panels is 7 ft. 10 in. and the extreme width over all is 8 ft. 3 in. The upper sashes are stationary and the bottom sashes are arranged to drop. Both platforms are furnished with two-leaf folding doors to which hinged steel guards are secured to cover the steps when the doors are closed.

The underframe consists of yellow pine side sills and oak end sills, both being reinforced by 4-in. x 6-in. steel angles. The cross-sills are of white oak, those which carry the inner end of the platform knees being reinforced by steel plates which are bolted to the cross-sills and to the side sills. The truck sub-sill is of yellow pine reinforced by 5-in. 65-lb. channel, which is bolted to the sub-sill and the bottom framing. The body and roof framing are of white ash and oak. The side panels are sheathed with poplar but covered with No. 20 sheet steel. The roof is reinforced with a steel carlin at each side-post. The inside finish of the car is of white ash, natural color, while the ceilings are of three-ply maple veneer. Despite the short length of the car transverse seating six pairs of double seats is used principally and there are also four two-passenger corner seats, all made of birch slats.

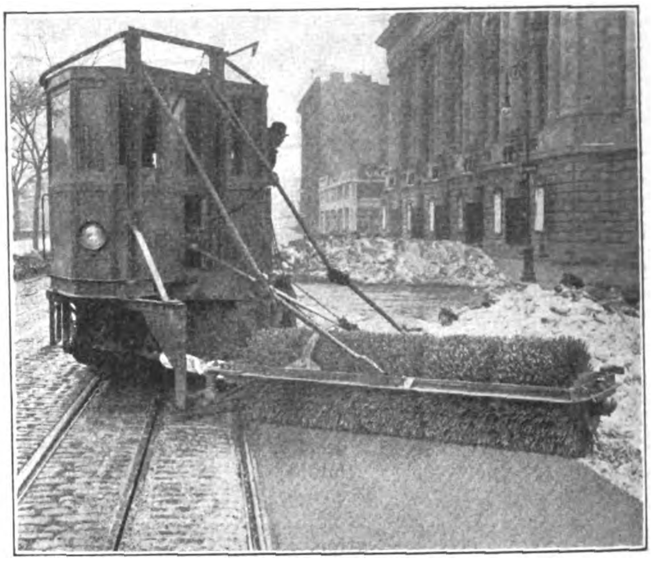


Vestibuled, Non-Bulkhead Car for Meridian, Miss.

OUTBOARD SNOW-SWEEPER FOR NEW YORK

The New York Railways Company during the last severe snowstorm placed in experimental service a novel sweeper broom which bids fair to solve the snow problem in New York. The situation in this city after a heavy snowstorm has become serious, owing to the rapid reduction in the number of horse-drawn vehicles available for carting away the snow, since the general introduction of the motor truck.

The railway companies which sweep the snow from their tracks are seriously handicapped in the first stages of a heavy snowfall because all vehicular traffic makes use of the street-car tracks and, in consequence, the surface cars are able to operate only at speeds of 2 m.p.h. or 3 m.p.h. The resulting loss in passenger receipts is enormous, it being stated that the New York Railways alone loses from $30,000 to $40,000 a day during the first week of any heavy snowstorm.



Out-Board Snow Sweeper in New York

Owing to these conditions, the New York Railways has decided to install rotary brooms on its sweeper cars which will sweep not only the tracks but also the street for 12 ft. on each side of the track. In this way there will be provided a path for vehicles that is clear from snow and the vehicles can be kept off the tracks. The sweeper-broom as shown on the accompanying illustration is carried on a boom which swings outward from the track at an angle of about 45 deg. This angle may be changed as desired so that when the snow piles up at the gutters the angle may be decreased and more room left in which to pile the snow.

The trials of this new type of broom were so satisfactory during the last storm that the company has decided to rebuild all of its seventy-five sweeper cars. This number will provide one sweeper for each mile of double track, and as the speed of 7 m.p.h. is expected since the vehicular congestion will be decreased every part of the line will be swept once in nine minutes. As a result, the actual amount of snow to be picked up at each passage of the broom will be quite small.

The seventy-five sweepers now being equipped with this out-board broom are to be reconstructed so that the broom swings between the trucks instead of at the rear of the sweeper car as in the trial car. There will be a small house on the end of the boom and the broom-operator will be located in this. He will have control not only of the operation of the broom but also of the position of the boom so that he will be able to swing the broom back within the clearance limits of the sweeper car whenever necessary.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

New York.—Capitalization Value—Power of Public Service Commission to Increase Rates.

The stock corporation law (Consol. Laws 1909, Chap. 59), Sec. 55, permits stock to be issued for the value of property purchased and provides that, in the absence of fraud, the judgment of the directors as to the value shall be conclusive. Public Service Commission law (Consol. Laws 1910, Chap. 48), Sec. 55, requires that there must be an order of the commission authorizing the issue and stating that in the opinion of the commission the property to be paid for by the issuance of the stock is reasonably required for the necessary purpose of the corporation. A mortgage covering the property and franchises of a street railway company was foreclosed, and the purchaser, acting for the owner of most of the bonds secured, paid $912,000 for the property and franchises. The purchaser and associates filed certificates, required by the stock corporation law, Sec. 9, and formed a new corporation to take over the property and operate the railroad. The Public Service Commission, under the Public Service Commissions law, Sec. 55, refused to authorize the issue of bonds for the full amount of the purchase price because the property was not of that value. Held, that the capitalization was not restricted to the actual value of the property purchased, but when the good faith of the transaction was established the judgment of the directors was binding on the commission and the purchase price was the fair basis of capitalization.

Under the Public Service Commissions law (Consol. Laws 1910, Chap. 48), authorizing the commission to fix the value of corporate property, the commission should not have taken into consideration, in fixing the value of the property of a street railway company for the purpose of a stock issue, the fact that the property was weighed down by a 5-cent-fare franchise, as the power of the Public Service Commission to fix reasonable rates involves the right to increase as well as to lower, and the rates are to be reasonable to the public and reasonable to the corporation. (People ex rel. Westchester St. R. Co. et al. v. Public Service Commission for Second Dist. of New York et al., 143 N. Y., Sup., 148.)

New York.—Taxation—Assessment—Franchise Taxes.

In assessing a street railway company's special franchise for taxation, earnings and expenses incurred by the street railway in operating cars over another company's line should be disregarded.

Where a street railway company upon a proceeding to assess its franchise for taxation introduced evidence showing its property's depreciation, although the rule of a decision which then prevailed allowed credit for depreciation only on the sinking fund theory, the street railway company, on certiorari to review the assessment, may, the rule of decision having been reversed, claim credit for the actual amount of depreciation, this not being a change in its theory of action.

In assessing a street railway company's franchise, payments made to the city as rent for the use of streets and in accordance with the terms of the company's charter should be deducted.

In assessing a street railway company's franchise, the value of materials and supplies on hand which were necessary for the operation of the road may be included in the working capital on which the company is allowed a deduction.

In assessing a street railway company's franchise, the value of paving laid by it between the tracks should be considered, even though the company does not own the pavement, as it was compelled to lay it in constructing the line.

In assessing a tax on the street railway company's franchise, the cost of removing pipes and other obstructions which were removed when the company installed underground electric power should be considered.

In assessing a franchise, development and organization expenses consisting of promoter's profits, payment for legal services, and other services necessary to render the franchise of value must be excluded. (People ex rel. Metropolitan St. Ry. Co. v. State Board of Tax Com'rs, City of New York, Intervener, 144 N. Y., Supp. 74.)

North Carolina.—Eminent Domain—Condemnation of Land—Private Purpose.

Where a traction company had the power of eminent domain, not only by virtue of its charter, but expressly conferred by Revisal 1905, Sec. 1138, 2575, it was no objection to its exercise thereof that its charter also authorized it to engage in private business in addition to its authority to operate a street railway.

Where a traction company was also authorized to generate electricity for public use and had received the power of eminent domain by its charter and by general statute, it was no answer to its application to condemn land that it intended to use the same for private, as distinguished from public, purpose, since if, after acquiring the land for public use, it devoted it to a private purpose, such use could be terminated by quo warranto. (Wadsworth Land Co. v. Piedmont Traction Co. et al., 78 Southeastern Rep., 298.)

Virginia.—Charter Provision for Paving Not Revocable by Municipality.

Where the charter of a street railway company, incorporated by the State, provided that it should keep that portion of the street occupied by its tracks well paved and in good repair without expense to the municipality, those provisions were mandatory, and the city council could not shift any burden from the company to the municipality, any attempt to do so being ultra vires. (Norfolk & P. Traction Co. v. City of Norfolk, 78 Southeastern Rep., 546.)

Wisconsin.—Franchise Is Grant from State.

Under St. 1911, Sec. 1862, providing that any municipal corporation may grant to any street railway company the use of any of its streets for the purpose of laying tracks and running cars thereon, the municipality acts as the agent of the State, the franchise is a grant from the State, and the State alone can question its validity. Hence an action could not be maintained by a city to compel the removal of street car tracks from certain streets on the ground that the franchise was invalid, where the State, through the Attorney-General, declined to become a party. (City of Milwaukee v. Milwaukee Electric Ry. & Light Co., 144 N. E. Rep., 206.)

LIABILITY FOR NEGLIGENCE.

Alabama.—Collision with Team—Negligence from Speed.

Code 1907, Sec. 5476, which requires a railroad to acquit itself of negligence when stock or other property is injured on its tracks, does not apply to street railroads. In an action against a street railway for damages from a collision with a wagon and team the burden was upon the plaintiff to show not only negligence, of which the running of the car in excess of the speed limit was evidence, but also that such negligence was the proximate cause of the injury complained of. When he has done this, the defendant, who is seeking to escape liability on the ground of contributory negligence, must prove such contributory negligence.

The running of a street car in excess of the speed limit fixed by the city ordinance is negligence per se. (Montgomery Light & Traction Co. v. Riverside Co., 62 Southern Rep., 311.)

California.—Evidence of Intention to Stop from Signal.

Where the crew on an electric car gave the signal to stop, the jury, in considering the contributory negligence of a person struck by the car, might consider his right to rely on such signal rather than his observation, it appearing that the accident was at night and the headlight made such a blinding glare that the speed of the car could not be determined. (Simoneau v. Pacific Electric Ry. Co., 136 Pacific Rep., 544.)

Indiana.—Liability Notwithstanding Contributory Negligence of Plaintiff.

Where a motorman saw a pedestrian in a place of danger and could have avoided or mitigated the danger by the use of reasonable means at his command, the company was liable for the pedestrian's injuries, even though the pedestrian's negligence continued to the instant of his injury, since his negligence would not be contributory negligence, the active or proximate cause of the injury being the motorman's negligence. Hence it was proper to refuse an instruction that the pedestrian could not recover, even if the motorman was negligent, if his own negligence continued up to the time of his injury. (Indiana Union Traction Co. v. Kraemer, 102 N. E. Rep., 142.)

Kansas.—Injury to Alighting Passenger—Negligence—Presumption.

The mere fact that a passenger is upset by the motion in starting an electric car does not establish negligence in those operating it, as the movement may be one that is usual and incident to that means of transportation, but proof of an injury received by a passenger from the sudden and violent starting of a car as he was alighting therefrom is ground for an inference of negligence against the railway company. (Ewing v. Wichita Ry. & Light Co., 137 Pacific Rep., 940.)

Kansas.—Liability for Unsafe Stopping Points.

A street car company may be held responsible for negligence in stopping its car and inviting passengers to enter it at a place made dangerous by temporary repairs upon the street, although the work is being done by the city and the company has no control over it. (Haas v. Wichita R. & Light Co., 132 Pacific Rep., 195.)

Kentucky.—Verdict for Excessive Damages Not Disturbed.

A verdict for personal injuries will not be disturbed as excessive, though large, unless so entirely disproportionate to the injuries sustained that it must be the result of prejudice and passion. (South Covington & C. St. Ry. Co. v. Cahill, 152 S. W. Rep., 792.)

Louisiana.—Failure to Provide Sand Not Always Negligence.

A street railway company was not negligent in failing to provide sand to prevent cars from skidding or the wheels from slipping on wet rails where the use of sand had been tried and found ineffective because of the damp climate. (Wolf et al v. New Orleans Ry. & Light Co., 63 Southern Rep., 393.)

Louisiana.—Collision with Fire Apparatus.

While firemen and their apparatus have a right-of-way at a street railway crossing, in the case of collision with a street car the company will not be held liable in damages where the evidence tends to show that the motorman used ordinary care in discovering the approach of the fire apparatus and in endeavoring to avoid a collision and that the driver did not keep a proper lookout and did not slow up on approaching the street car tracks. In such a case where the evidence, as usual, is conflicting the verdict of a jury in favor of the defendant will not be disturbed unless clearly wrong on the facts. (Coles v. New Orleans Ry. & Light Co., 63 Southern Rep., 401.)

Louisiana.—Care Required from Driver of Vehicle.

The driver of a vehicle must take care not to drive so close to a moving car as to be struck by it, and, if it is necessary, he should drive into the gutter to avoid a position of danger. (Weiss v. New Orleans Ry. & Light Co., 62 Southern Rep., 216.)

Maine.—Master and Servant—Contributory Negligence.

Plaintiff, who was injured by running his motor car into freight cars which had been temporarily switched onto the main line, was guilty of contributory negligence, where he had an unobstructed view of the cars from 1500 ft. and 2000 ft., the greater part of which distance was on a straight line, though he testified that he was within 200 ft. of the cars when he first saw them, so that he could not stop in time to avoid a collision. (Paradis v. Lewiston, A. & W. St. Ry., 88 Atlantic Rep., 992.)

Maryland.—Injuries to Passenger Standing in Baggage Compartment—Jerks During Operation.

Where a passenger entering an electric car found all the seats taken and proceeded without invitation to the baggage compartment and there stood up, though he could have stood up in the passenger coach, and on a jerk of the car grabbed the door jamb, and the door, which was open, closed on his hand, injuring it, he is guilty of contributory negligence precluding recovery.

The court will take cognizance that electric cars do not run perfectly smoothly and that there are certain irregular movements to which they are subject. (Dawson v. Maryland Electric Rys. Co., 86 Atlantic Rep., 1042.)

Massachusetts.—Pedestrian at Corner Hit by Overhang—Company Not Liable.

Where plaintiff was struck by the overhang of a street car as it was rounding a curve, while she was going diagonally from one street corner to another, and it did not appear that the motorman had any knowledge that plaintiff was in dangerous proximity to the car or track, there was no proof of negligence. The motorman was not required to anticipate the approach of pedestrians from the rear or side of the car who might be injured by the overhang as the car rounded a curve. (Brightman v. Union St. Ry. Co., 103 N. E. Rep., 380.)

Massachusetts.—Negligence May Be Imputed to Child Six Years Old.

Where plaintiff's intestate, a child of six years, started to run across a track in front of a rapidly approaching street car in plain view, and so near that it struck her just as she got on the track, and there was nothing to obstruct her view or distract her attention, and the evidence failed to show that she used any care at all for her own safety, there could be no recovery, for even a child of tender years must use some care under such circumstances. (Walukewich v. Boston & N. St. Ry., 102 N. E. Rep., 311.)

Michigan.—Depression in Pavement.

A depression 12 in. square and of a maximum depth of 3 in., situated a step away from where a passenger would alight from a street car, was not an unsafe place for the landing of passengers. (Fuller v. Detroit United Ry., 142 N. W. Rep., 572.)

Minnesota.—Passenger in Baggage Compartment.

Plaintiff was injured while riding in the baggage compartment of one of defendant's cars. He was sitting in the doorway with his feet hanging outside. His feet came into contact with a platform of defendant. The train was overcrowded. There is evidence that defendant's trainmen directed passengers to ride in the baggage car, assented to their sitting in the doorway with their feet outside, took up tickets from them while so seated, and on one occasion cleared a place for them to sit in this manner. Held to be a question for the jury whether there was imposed on defendant a duty to warn passengers of the proximity of this platform to the track, and whether failure to give such warning was negligent. When a passenger carrier overcrowds its train beyond its seating capacity it is bound to exercise care proportionate to the increased danger caused by such overcrowding. The question of plaintiff's contributory negligence was also for the jury.

Where an act ordinarily negligent is done by a passenger upon the express or implied invitation of the employees in charge of the train the passenger will not as a rule be charged with contributory negligence as a matter of law. But the act of the passenger may be so obviously dangerous that even such invitation will not relieve him of contributory negligence. The act of plaintiff in this case was not so inherently dangerous that it can under all the circumstances be said to be negligent as a matter of law. (Shields v. Minneapolis, St. P., R. & D. Electric Traction Co., 144 N. W. Rep., 1092.)

New York.—Injury to Passenger While Passing from Platform to Inside of Car.

An elevated railway company stopping a car to discharge and receive passengers need not delay starting the car until a passenger in normal physical condition is seated, but the conductor may give the starting signals after the passenger is fully on the car, and a female passenger sixty-five years old who is not suffering from any disability is within the rule and may not recover for an injury sustained by the starting of the car before she had time to enter the door of the car from the vestibule. (Martin v. Boston Elevated Ry. Co., 103 N. E. Rep., 828.)

Pennsylvania.—Contributory Negligence of Driver of Vehicle.

Where a person driving at a slow trot on a street running at right angles to a street upon which a street car line was operated was injured from a collision between his horse and a street car, and he had an uninterrupted view from the direction in which the car came for 350 ft., he was guilty of contributory negligence as a matter of law. (Shope v. Central Pennsylvania Traction Co., 88 Atlantic Rep., 920.)

Pennsylvania.—Injury by Fender.

Where a woman steps in front of a street car which she knows is approaching and is injured, her contributory negligence bars any recovery, whether she was struck when she stepped on the track or by the fender before she came to the track. (Underwood v. Pittsburgh Rys. Co., 86 Atlantic Rep., 184.)

News of Electric Railways

Proposal for Temporary Operation at Three Cents in Toledo

At the meeting of the special street railway committee of the City Council at Toledo, Ohio, on April 4, Henry L. Doherty, acting for the Toledo Railways & Light Company, suggested that the city grant the company a twenty-five-year franchise, with the fare for the first year fixed at five tickets for 15 cents or 5 cents in cash, to determine whether or not such rate is adequate. Mr. Doherty offered to have the attorneys for the company prepare a franchise ordinance along these lines, and on April 7 it was announced that the company would present the proposed tentative ordinance at the meeting of the franchise committee of the Council on April 9.

The street railway committee did not heed Mr. Doherty's request on April 4 to operate at the regular fare. In consequence the company has adhered to the policy referred to in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, of carrying free all passengers who refused to pay the regular rates. Except among those connected with the city administration the general disposition of the patrons is to pay the regular fare. In the plea which he entered for the company on April 4, Mr. Doherty said that, in reality, the low fare should not begin until the routes are rearranged and new cars secured, as the property was now not in the best shape for giving the most favorable results.

An ordinance of the kind suggested by Mr. Doherty would provide that the rate of fare should be fixed after one year so as to insure an adequate return to the company and that it should be modified at the end of each five-year period thereafter, if found necessary. Mr. Doherty told the committee that, if the proposition was taken under consideration, he would remain in Toledo and give the franchise matter his undivided attention until a final agreement was reached. The proposal for trial operation for a year was made, Mr. Doherty said, because a certain faction in the city could not be convinced without an actual physical test that operation at the 3-cent fare was unprofitable. He contended that the fact that 85 per cent of the people using the cars pay the regular fare rather than ride free indicated that the patrons of the company were not in favor of the adoption of confiscatory methods.

Assistant City Solicitor John Schlatter expressed the belief that the request made by Mr. Doherty could not be granted without repealing the Schreiber ordinance. Mr. Doherty said he did not ask for the repeal of the ordinance now, but if negotiations were opened along the line of his suggestion, he desired that the company be allowed to operate at the regular fare until an agreement had been reached.

On April 6 City Solicitor Thurstin said that his office was so busy with routine matters that the force could not give proper attention to the case against the company in the common pleas court for the collection of $250 a day rental from the Toledo Railways & Light Company for the use of streets on which franchises have expired. He desired an appropriation of $10,000 to defray the expense of engaging special counsel to assist him in the case against the company. It was the intention of Mr. Thurstin to file a petition on April 6 asking for an injunction to restrain the company from collecting more than a 3-cent fare and from selling tickets at the rate of six for 25 cents, but he concluded to await the action of Council on his request for funds for the employment of additional counsel.

Mr. Doherty has made a formal proposal to the City Council that the decision of Federal Judge Killits in the recent injunction case be referred back to Judge Killits himself for interpretation. Mr. Doherty's letter was referred to the franchise committee of the Council. He said in part:

"Immediately upon receipt of Judge Killits' opinion last Monday evening, we prepared an epitome of it which we submitted to your honorable body so that objections might be made if our statement should in any way seem to give an unfair interpretation of his opinion. This communication was received, read and referred to the committee. Two members of the staff of the city solicitor were present when it was read and no objection was raised. We were quite surprised later to learn from the newspapers that the city solicitor charged that a misstatement had been made regarding the purport of Judge Killits' opinion. It does not seem possible to us that there can be any different interpretation of Judge Killits' opinion than that given by us. Judge Killits said:

"'That the company may run its cars day by day without the city's consent and charge fare because its service is a public necessity; it may charge a rate that will pay its expense of operation, including proper maintenance charges, and a fair return for the use of the investment.'

"We request your honorable body either to concur in our interpretation of this matter or to take the necessary steps to clear up an unwarranted confusion, and promise our co-operation to this end. We urge that you instruct your city solicitor to prepare a distinct statement as to his interpretation of Judge Killits' opinion and that you further instruct him that if his interpretation differs from ours that he should join us in asking Judge Killits to decide which of us is right in interpretation."

Arbitration Hearings Closed at Northampton

Closing arguments in the Northampton (Mass.) Street Railway wage case were heard by the arbitration board on April 3. On behalf of the men it was urged that wages should be increased on account of the rising cost of living and the strong financial condition of the company, its favorable accident record and progressive management. The sliding scale was criticised and citations of wage rates on other roads questioned at length. It was contended that high individual yearly earnings were largely due to overtime work.

E. L. Shaw, for the company, said that in his opinion the men had not made out a case. The feeling that one was working for less than adequate compensation was common to human beings everywhere. The investors in the company's stock had received less than a savings bank return on their money during the last five years, and when some $300,000 of the road's bonds became due the present security holders had to buy the new stock issued to meet this obligation. The evidence of L. F. Babbitt, purchasing agent of the Northampton state hospital, that the cost of supplies had decreased 9 per cent in the past year, was a direct indication that the cost of living was falling.

Mr. Shaw pointed out that the company has raised wages 44 per cent since 1897, while the men urged that the cost of living had risen 24 per cent in this period. The increases amounted to from $150 to $250 per man on the year's wages. The men in the maintenance department of the company were exceptionally well paid, one lineman receiving $1,039 for the year. If these men had testified before the board much evidence would have appeared showing the liberality of the company's compensation. Regarding platform wages, Mr. Shaw said that although the hourly rates on the basis of a ten-hour day were 21 cents the first year and 26 cents the sixth year, and later a full day was allowed for nine and one-half hours' work, and on this basis the hourly rates are 22.1 to 27.36 cents. The men asked for $2.50 a day for the first six months' service, $2.75 for the second six months, and $3 per day thereafter. As the statutes require a day's work of nine hours to be completed in eleven this would mean a wage scale of from 27.77 to 33.33 cents. The present financial condition of the company made an increase in wages impossible. During the last five years the operating expenses and taxes had increased in greater proportion than the gross receipts. In 1909 the employees received 48 per cent of the operating expenses and in 1913 57 per cent. The average rate of dividend paid by the company did not exceed 6 per cent in the past twenty-one years. The company was able to secure all the men it needed at the present wage scale, many men from other crafts being attracted to the service on account of the steady work afforded. The company felt that while a man could be taught to handle a car and collect fares in a short time, the development of "railroad sense" and the ability to deal with the public were matters that required time and made a man more valuable as the years went by. The average rate of wages paid by the company was only 7.5 mills less per hour than the average of nineteen street railways in Massachusetts, and was exactly the same as that paid by nine companies which had less than 50 miles of track.

New Haven Electrification

So far as engineering and construction experience can indicate, the overhead contact and distribution system of the New York, New Haven & Hartford Railroad between New York and New Haven, it is believed, will be completed by June 1. Electric freight, passenger and switching service can then be established between New York and New Haven. The extent of this service is dependent upon the electrical output of the power house at Cos Cob, Conn. Exactly to what extent trains will be operated by electricity upon the completion of the work now in progress it is difficult to state. The trains to be operated in this manner after that date will naturally be arranged so as to secure the greatest electric movement consistent with the normal output of electricity from the Cos Cob power station of the company.

The original electrification of the New Haven road between Stamford and Woodlawn, begun in 1905 and completed in 1907, embraced 21½ miles of route and 110 miles of single track. As the New York Central & Hudson River Railroad had the year previous electrified its track from the Grand Central station to Woodlawn, where the junction with the New Haven tracks is made, a distance of 12 miles, this made the total route distance for the New Haven company's original electric service between the Grand Central Station and Stamford 33 miles.

After a considerable experience with the electric service between these points it was decided to electrify the six-track Harlem River Branch, connecting Harlem River with the main line at New Rochelle, and subsequently to extend the electrification of the road east from Stamford to New Haven. In these plans the final object in mind was the putting of all passenger, freight and switching service upon an electric basis. With this end in view appropriations were made for an addition to the electrical output of the Cos Cob station, for additions to the main line, yards and siding electrification and for additional locomotives of the freight and switching type. Heavy expenditures were required elsewhere on the property and for this reason it became necessary to forego the building of power plants required at the eastern and western extremities of the electrification zone. The increase made in the output of the Cos Cob power plant, as provided for in these appropriations, would permit of a very large percentage of complete electric service as soon as the overhead contact and distribution system is ready. It will not, however, permit of 100 per cent of electric service until the eastern and western plants shall have been provided. Complete electric operation therefore will be delayed until suitable arrangements for additional power and electric locomotives can be obtained.

Subsidies Sought for Radial Electric Railways in Canada

On March 26, 1914, the representatives of the Canadian government at Ottawa received a deputation of about 1500 public and private citizens from Western Ontario who waited on Premier Borden and his Ministers to urge Dominion aid for the projected provincial radial railway system and the improvement of the Welland and St. Lawrence artificial waterways. Four memorials were read, among them the hydro-radial memorial, presented in behalf of 250 municipalities, for a federal subsidy of $6,400 a mile for such electric railways as may be recommended to be constructed by the hydro-electric commissioners. Premier Borden pointed out that the proposals were many and had not been received by the government in advance. In the circumstances, he could only promise consideration by himself and his colleagues.

Thomas Marshall, Monck, Ont., has presented a resolution in the Ontario Legislature to require the Canadian government to help the municipalities of Ontario by granting a subsidy to the hydro-electric radial railways to provide for their construction.

Strike on Kansas Interurban Line.

The lines of the Union Traction Company, which operates between Coffeyville, Independence, Cherryvale and Parsons, Kan., and in Coffeyville and Independence, were tied up for a short time on March 31, when all but twelve motormen and conductors went on strike. Crippled service, however, was maintained for the remainder of the day. Linemen, men who had been trained in anticipation of the walkout, and the regular carmen who refused to leave their work manned the cars on the following day, and the full schedule was resumed. On April 2 and 3, the company had the situation well in hand. The men who went on strike demanded higher wages, shorter hours, establishment of the seniority rule and recognition of the union. The strike was precipitated, however, by the discharge of three men. The crews demanded reinstatement, an explanation, or both. The Union Traction Company's officials refused both demands and the walkout followed. Little trouble marked the strike, the fifty disgruntled men contenting themselves with hooting the new employees. On April 2 a committee of the strikers visited the city commissioners of Independence. D. H. Siggins, president and general manager, represented the company. The commissioners took the attitude that they had a right, as custodians of the public safety, to inquire as to whether competent men were being used on the cars. Mr. Siggins asked them to present the matter in writing.

Referendum Vote Defeats Chicago's Comprehensive Subway

At the biennial aldermanic election held in Chicago on April 8 the proposed comprehensive subway system was defeated. Prior to the election an ordinance had been prepared and bids had been asked on the detailed plans and specifications. This request for bids was widely advertised, but nothing came of it except some counter propositions made by little-known interests. The majority against the subway scheme was about 150,000. It had been shown clearly before the election that it was impossible under the existing state laws governing franchises to induce private capital to finance the comprehensive subway system. The vote is taken to indicate that the public would favorably consider the initial subway plan submitted by Bion J. Arnold and the Board of Supervising Engineers.

State Co-operation Proposed in Rhode Island

James M. Scott, James Harris, and George M. Thornton have been suggested as members of a commission to work in conjunction with the trustees to be appointed for the Rhode Island Company, in a resolution which was introduced in the Rhode Island Legislature on April 8 by Representative David J. White of East Greenwich. In explaining the reason for the introduction of his resolution Mr. White declared that Rhode Island capital should be used to purchase the roads. He said in part:

"The total number of shares of stock of the New York, New Haven & Hartford Railroad, held in Rhode Island is 47,270. The number of shares held by individuals is 26,034; held by trustees, 7877; trust companies, 6020; insurance companies, 2495; real estate companies, 1100; hospitals, 850. The remainder is held by banks, estates and guardians. My purpose in introducing this resolution is to establish a commission clothed with authority by the General Assembly of this State to stand between the stockholders of the New York, New Haven & Hartford Railroad and its kindred interests, and prevent further harm to them."

The Ohio Valuations

In requiring public utility companies to file appraisals of their property with it by Aug. 1, the desire of the Ohio Public Utilities Commission has been merely to secure means of obtaining information to guide its representatives in their work. An extension of time for filing the appraisals will be granted where it can be shown that the work cannot be completed within the time named. The appraisals are to show the value as of July 1. E. W. Doty, a member of the commission, says it is not alone the reproduction value that is required, nor is this the main element, but that the appraisal, rather, is to be historical and analytical.

Snow Removal Responsibility Fixed.—Judge Winchester of Toronto, Ont., in passing upon the differences between the officials of the city and the officers of the Toronto Railway over the question of snow removal, said that it was the duty of the Toronto Railway to remove the snow, as required by the city engineer.

Work Begun on Third-Tracking New York Elevated Lines.—The T. A. Gillespie Company has begun work on its contract with the Interborough Rapid Transit Company for the third-tracking of the Third Avenue elevated railroad in Manhattan. A third track is to be added to this line as well as to the Second Avenue and Ninth Avenue elevated railroads.

Franchise Sustained.—On March 30, 1914, Common Pleas Judge Garver rendered a decision holding that the twenty-five year franchise granted to the Lake Shore Electric Railway by the Council of Fremont is operative and that the referendum petitions filed by the Municipal League are illegal because they were filed with the clerk of the Council instead of with the board of elections.

Steinway Tunnel Assigned to City.—The Board of Estimate of New York has authorized Mayor Mitchel to receive on behalf of the city the deed and assignment of the Steinway tunnel from the Interborough Rapid Transit Company. It has also adopted the report of the comptroller on the contract for the reconstruction of the tunnel for temporary operation. The Steinway tunnel was built by a private corporation at a cost of $8,000,000. The city has taken it over at a cost of $3,000,000 and will operate it as a part of the dual system of subways.

Progress of Pittsburgh Subway Ordinance.—The Pittsburgh City Council was informed on March 31, 1914, by Assistant City Solicitor C. K. Robinson that he had been visited by a representative of New York capitalists who requested that their syndicate be kept informed as to the developments in the Council's action on the new subway ordinance. The measure has been amended by striking out the provision that the company must get the consent of the Council to change the rate of fare and inserting a clause that a rate of 5 cents shall prevail within the city limits.

Suit Against Chicago Railways Dismissed.—In April, 1913, J. B. Hogarth, formerly a division superintendent of the Chicago (Ill.) Railways, filed suit in the Circuit Court for $2,500,000, naming as defendants Henry A. Blair, Samuel Insull, Ira M. Cobe, Frank A. Vanderlip and Samuel McRoberts. Mr. Hogarth sought to recover one-half of a promotion fund which he declared was to have been divided equally between himself and Henry A. Blair, who was then chairman of the board of directors of the Chicago Railways. Judge Baldwin dismissed this suit on March 26, 1914.

Bids for Subway Section in New York.—Bids have been called for by the Public Service Commission for the First District of New York to be opened on April 24 for the construction of Section No. 2 of Routes Nos. 4 and 36, the Broadway subway in Manhattan, for operation by the New York Municipal Railway Corporation. This subway is already under construction from the lower part of Manhattan to Broadway and Twenty-sixth Street. Section No. 2 extends under Broadway from Twenty-sixth Street to about Thirty-eighth Street. On this section there will be a local station at Twenty-eighth Street and an express station at Thirty-fourth Street.

Akron Agreement to Be Signed Soon.—Delos F. Wilcox of New York has been retained by the Intercity Traction League to investigate conditions on the various lines of the Northern Ohio Traction & Light Company. The league is a voluntary organization, made up of the representatives of the people of the various towns and cities through which the company operates. It is said that the agreement between the city of Akron and the Northern Ohio Traction & Light Company will be signed soon. In accordance with the agreement, the company will withdraw the suit through which it sought to prevent the city from taking its water supply from the Cuyahoga River, and on the other hand the city will pay the company $248,000, due on a contract.

Chicago's Traction Fund.—The traction fund of Chicago, Ill., comprising 55 per cent of the net receipts of the surface railways, will amount to $2,831,912 for the year 1913, according to figures compiled at the comptroller's office. An advance payment of $1,000,000 has been received by the city in the form of two certified checks, one for $600,000 from the Chicago Railways, the other for $400,000 from the Chicago City Railway. Last year the city's share of the receipts was $2,529,033, of which $1,412,870 was contributed by the Chicago Railways and $1,116,163 by the City Railway. According to City Comptroller Traeger the total deposited in the fund, plus accrued interest, Dec. 31, 1913, was $11,018,146, out of which $145,083 has been expended.

Operating Agreement Signed in Tacoma.—The agreement between the city of Tacoma, Wash., and the Tacoma Railway & Power Company for the operation of the railway to the tideflats has been signed by L. H. Bean as general manager for the company and Mayor Seymour for the municipality. The $35,000 of municipal bonds will now be sold and the line constructed. The agreement provides for a lease of the city owned tracks to the company to run for 7½ years. The company is to pay the city 4 per cent on the investment and one half of the proceeds after the company has been allowed six per cent on its investment. Transfers will be issued between the tideflats line and the other lines operated by the Tacoma Railway & Power Company.

Plans for Opening Seattle Municipal Line.—The section of Seattle's municipal railway known as Division A extending from Third Avenue and Pike Street to Salmon Bay at Thirteenth Avenue West and Nickerson Street is expected to be ready for operation by May 1, 1914. Division "A," as the first unit of a municipal line to extend the full length of the Rainier Valley will be known, represents an investment of about $490,000, from a bond issue of $800,000 authorized by the voters three years ago. Twelve cars have been delivered. Oliver T. Erickson recently introduced a resolution in the Council authorizing the Board of Public Works to prepare plans and specifications for the construction of Division "B" of the municipal railway system. The plan anticipates a physical connection between Division "A" and Division "B."

Injunction to Restrain Construction of Cleveland Crosstown Line.—William J. Ward and C. A. Fagan, as taxpayers, have filed an injunction suit in common pleas court to prevent the Cleveland Railway from proceeding with the construction of a crosstown line on East Seventy-ninth Street. William J. Springborn, director of public service, is made a party defendant in the suit. The petition states that the franchise to build the line was passed on March 16, 1914, and that the forty days necessary to elapse before it becomes operative under the new charter have not yet passed. It further states that an effort is being made to secure a referendum vote, but that construction work is proceeding steadily on the line during the time that it was intended there should be no action on the part of the company so as to permit action to secure a referendum.

Monorail Line Dismantled.—Thomas W. Whittle, park commissioner of the Bronx, was authorized by the Board of Estimate of New York at a recent meeting to hire vehicles in which to carry passengers for a 5-cent fare over the route of the Pelham Park & City Island Railroad, a monorail line. The board also ordered that no more time should be granted to the monorail company, and instructed Mr. Whittle to see that the company's property was removed. Mr. Whittle obtained vehicles, and on March 21, the day after the resolutions were adopted by the board, started in to provide transportation. Horse-drawn buses were used the first few days. These were replaced by gasoline vehicles, and now three automobile buses are being run. The rails of the monorail line have been removed. Commissioner Whittle has been instructed by the Board of Estimate to submit a report on City Island transportation.

Meeting to Consider Proposed Missouri Accounts Classification.—A meeting of the members of the Missouri Association of Electric, Gas, Street Railway & Water Works Association was held in St. Louis on April 1, with Philip J. Kealy, of the Kansas City Railway & Light Company, presiding, for the purpose of considering the tentative classification accounts proposed by the Missouri Public Utilities Commission, and affecting all of the utilities of the State, with the exception of electric railways. Classifications for this branch of public service corporations have not yet been announced. About fifty members were present.

Resolutions were adopted making it the sense of the meeting that the date of the hearing on the questions involved be changed from April 15 to a later date, that those principally affected might have time to study the details of the issues involved. Another resolution, asking that the new classifications be withheld from commission until at least Jan. 1, 1915, was adopted.

Extension of Time for Construction Granted.—Two months' extension of time has been granted to the Hudson & Manhattan Railroad in which to begin the construction of the extension of its present line from Thirty-third Street and Sixth Avenue, New York, N. Y., to the Grand Central Station. The franchise provided that the company should actually begin digging within six months of the filing of the consents of the property owners. These were duly filed on April 28, 1910, and since then various extensions of time have been allowed the company, the last expiring on April 28. As far as possible it is the desire of both the Public Service Commission and the company to have the construction necessary at both Thirty-third Street and Sixth Avenue and at the Grand Central Station on the Hudson & Manhattan Railroad proceed simultaneously with the other subway work at these points, and so far the plans of the Interborough Rapid Transit Company at the Grand Central are not finished.

Kansas City Ordinance Vetoed.—Mayor Jost, of Kansas City, recently vetoed the ordinance providing for the construction of street railway lines on Twenty-fourth Street between Broadway and Main Street. The Mayor was advised by the city counselor that the Council has no power to grant such a franchise unless written consents were obtained from the owners of most of the frontage property. The Terminal company, which owns most of the property referred to, would not give its consent. Mayor Jost made this clear in a letter to the Council, in which he said in part: "The problem of routing cars to the Union Station should be taken up and handled in a practical way and the entire work provided for in one grant. I have heretofore expressed the opinion that it is unwise to make any such valuable grants so long as the street railway properties are in the hands of the federal court, and it is beyond the power of the State and of the city to regulate and control the same, and I still incline to that opinion. In order that the views of Federal Judge Hook, who has charge of this property through his receivers, may be obtained in regard to this whole matter, I have signed Ordinance No. 19,154 providing for a track on Broadway from Fourteenth Street to Southwest Boulevard, which is a link in the plan as I think it should be worked out." Mayor Jost's veto was sustained by the Council.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK

Governor Glynn has approved the measure to amend the public service commissions law in relation to the free transportation by common carrier of mail carriers in uniform. The Healy bill authorizing the Public Service Commissions to suspend new rate schedules filed by public utilities corporations, pending their determination as to the reasonableness of the increases, has been signed by Governor Glynn. The Governor has also approved the Pollock bill amending the general corporation law by providing that the existence of an easement in real property acquired or reserved by a municipal railroad or other transportation corporation shall not be deemed an encumbrance under any law relating to investments and mortgages on real property, but effect of such an easement shall be taken into consideration in determining the value of property. The Governor has announced that he will veto the Coates-Maier bill designed to have the holdings of minority stockholders in cases of railroad consolidation valued by appraisers appointed by the Supreme Court.

Governor Glynn has signed the Senate bill authorizing the Public Service Commission of the First District to enter into contracts for installing and operating telephones in the subways, the contracts to be subject to termination at the discretion of the commission. He has also signed the act to amend the public service commission law in relation to the issue of stocks by railroad and street railways.

Financial and Corporate

Stock and Money Markets

April 8, 1914.

The general level of the prices of the securities dealt in on the New York Stock Exchange to-day, instead of improving, lost about three times the small gain which had been made during the preceding three days of trading. Dealings increased considerably in volume, but this expansion occurred only under increased selling pressure. Railway and other bonds were irregular. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 2¾ @ 3 per cent; six months, 2¾ @ 3 per cent.

On the Philadelphia Exchange to-day trading was light and lower levels were established.

The Chicago market was broad and steady to-day. Chicago Railways issues were in demand, series 1, 2, 3 and 4 all being dealt in. The bond transactions totaled $29,000, par value.

The Boston market to-day was dull and somewhat irregular, but rather easier in tone.

The active issue in the trading in Baltimore to-day was United Railways & Electric stock. The bond transactions totaled $38,100, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Apr. 1	Apr. 8
American Brake Shoe & Foundry (com.).....	88½	88½
American Brake Shoe & Foundry (pref.)....	139	139
American Cities Company (com.)...........	36	35¾
American Cities Company (pref.)..........	63½	62
American Light & Traction Company (com.)..	367	365
American Light & Traction Company (pref.).	107	107
American Railways Company	38	37½
Aurora, Elgin & Chicago Railroad (com.)....	42	41
Aurora, Elgin & Chicago Railroad (pref.)....	78	77
Boston Elevated Railway	82	81
Boston Suburban Electric Companies (com.)..	7	7
Boston Suburban Electric Companies (pref.)..	63	•63
Boston & Worcester Electric Companies (com.)	•6¼	•6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company...........	92¾	92⅛
Capital Traction Company, Washington......	104¼	101
Chicago City Railway	a170	145
Chicago Elevated Railways (com.)..........	20	20
Chicago Elevated Railways (pref.)..........	65	65
Chicago Railways, ptcptg., ctf. 1............	90	90½
Chicago Railways, ptcptg., ctf. 2............	30	32
Chicago Railways, ptcptg., ctf. 3............	6	6
Chicago Railways, ptcptg., ctf. 4............	2½	2
Cincinnati Street Railway	105	105
Cleveland Railway	104½	103
Cleveland, Southwestern & Columbus Ry. (com.)	•4	•4
Cleveland, Southwestern & Columbus Ry. (pref.)	•23	a23
Columbus Railway & Light Company.........	13	13
Columbus Railway (com.)..................	53½	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	71	•71
Detroit United Railway	a80	a80
General Electric Company	147	146
Georgia Railway & Electric Company (com.)	121	120¼
Georgia Railway & Electric Company (pref.)	85¾	88
Interborough-Metropolitan Company (com.)..	15¼	15¼
Interborough-Metropolitan Company (pref.)..	60⅜	61½
International Traction Company (com.)......	•30	80
International Traction Company (pref.).....	•85	a85
Kansas City Railway & Light Company (com.)	•10	15
Kansas City Railway & Light Company (pref.)	•25	35
Lake Shore Electric Railway (com.)........	•5½	5
Lake Shore Electric Railway (1st pref.)......	•85	92
Lake Shore Electric Railway (2d pref.)......	•22	22
Manhattan Railway	130	130
Massachusetts Electric Companies (com.)....	11	11
Massachusetts Electric Companies (pref.)....	61½	61
Milwaukee Electric Ry. & Light Co. (pref.)...	•95	95
Norfolk Railway & Light Company..........	25¼	25¾
North American Company	78½	76⅞
Northern Ohio Traction & Light Co. (com.)..	70	58
Northern Ohio Traction & Light Co. (pref.)..	101	101
Philadelphia Company, Pittsburgh (com.)....	42½	41¼
Philadelphia Company, Pittsburgh (pref.)....	40	40
Philadelphia Rapid Transit Company........	17½	16¾
Portland Railway, Light & Power Company..	•54	51
Public Service Corporation	112	113
Third Avenue Railway, New York...........	43½	43½
Toledo Traction, Light & Power Co. (com.)..	a20	•20
Toledo Traction, Light & Power Co. (pref.)...	a70	70
Twin City Rapid Transit Co., Min'apolis (com.)	104⅝	104
Union Traction Company of Indiana (com.)..	•11½	11½
Union Traction Company of Indiana (1st pref.)	•80	75
Union Traction Company of Indiana (2d pref.)	•14	14
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (com.)...........	20	18
United Rys. Inv. Company (pref.)...........	48	44
Virginia Railway & Power Company (com.)..	50	51¼
Virginia Railway & Power Company (pref.)..	96	96
Washington Ry. & Electric Company (com.).	87⅝	88¼
Washington Ry. & Electric Company (pref.)..	87	86½
West End Street Railway, Boston (com.)....	71	70
West End Street Railway, Boston (pref.)....	92	91
Westinghouse Elec. & Mfg. Company.........	75	74⅝
Westinghouse Elec. & Mfg. Co. (1st pref.)....	119	118

• Last sale. a Asked.

ANNUAL REPORTS

Public Service Corporation of New Jersey

The combined results of operation of the Public Service Corporation of New Jersey, Newark, N. J., and subsidiary companies for the year ending Dec. 31, 1913, are shown by the following statement:

Operating revenue of subsidiary companies	$34,592,473
Operating expenses and taxes	$18,844,608
Amortization charges	1,007,590
Total	$19,852,198
	$14,740,275
Non-operating income	377,972
P. S. C. income from securities pledged and from miscellaneous sources	2,308,874
	$17,427,121
Income deductions of subsidiary companies (bonded interest, rentals and miscellaneous interest charges)	11,911,316
	$5,515,805
P. S. C. income deductions:	
Interest on perpetual interest-bearing certificates	$1,202,026
Interest on P. S. C. general mortgage 5 per cent bonds	1,598,143
Interest on miscellaneous obligations	155,589
Amortization of debt, discount and expense	102,348
Sinking fund for P. S. C. general mortgage 5 per cent bonds	209,500
Total	$3,267,606
Net income	$2,248,199
Appropriation accounts of subsidiary companies:	
Additional amortization of capital	$368,719
Amortization of new business expenditures prior to Jan. 1, 1911	40,330
Adjustments of surplus account	80,585
Total	$489,634
	$1,758,565
P. S. C. appropriation accounts:	
Sinking fund accruals applicable to 1912	$52,375
Adjustments of surplus account	20,249
	$72,624
Net increase in surplus	$1,685,941

Dividends at the rate of 6 per cent per annum aggregating $1,500,000 were paid during the year. According to the report the net increase in surplus after the payment of dividends of only $185,950 was caused by the large amount set aside for amortization charges during 1913, this being $1,376,309, as compared with $722,078 in 1912. If the amount of $261,875 set aside for the sinking fund is included, the grand total for the year for amortization of properties and redemption of all securities amounted to $1,638,185.

Operating revenues of the subsidiary companies increased $2,123,072 during 1913, but this figure includes in operating revenue certain items which under the system of accounts in effect for gas and electric companies prior to Jan. 1, 1913, were treated as deductions from operating expenses. The increase in operating revenues and non-operating income of the subsidiary companies is shown by the following comparative figures: Electric properties in 1912, $7,582,373; in 1913, $8,545,845; gas properties in 1912, $9,809,607; in 1913, $10,222,668; railway properties in 1912, $15,262,426; in 1913, $16,201,932. The miscellaneous income of the Public Service Corporation increased from $1,939,338 in 1912 to $2,308,873 in 1913, giving a total increase from $34,593,804 in 1912 to $37,279,319 in 1913. The increase in the operating revenue of the railway properties was 5.5 per cent. The total passengers carried increased to the same extent.

The taxes paid during 1913 amounted to $2,062,982, an increase over 1912 of $189,963. The fire insurance carried as of Dec. 31, 1913, amounted to $28,209,751. This was an increase over the preceding period of the previous year of $1,349,082, but the premiums for 1913 actually decreased to the extent of $10,299 and the rate per $100 of insurance decreased from 44 per cent in 1912 to 38.3 cents for 1913.

During the year the company expended $65,478 for welfare work, as compared with $61,116 in 1912. The cost of accidents arising under the employer's liability act was $56,421. This amount was made up of total payments provided by the act amounting to $37,335, additional compensation paid under the authority of the welfare committee amounting to $10,525 and departmental expenses of $8,560. The accident account of the railway properties, including the cost of operation of the claim department, absorbed 4.15 per cent of the passenger receipts as against 4.32 per cent for 1912.

In regard to the voluntary wage scale which the railway properties put into effect as of Jan. 1, 1914, the report states that during 1914 this will involve an increase of the expenditure of approximately $200,000, which is believed to be the largest single increase in the pay of trainmen ever put into effect at one time by any electric railway company in this country.

During the year the total number of prepayment cars in service upon the system was brought up to 1156. In track work, 42.2 miles were reconstructed and 14.6 miles of track extensions were completed. The most important improvement completed during the year was the construction of the road between Elizabeth and Metuchen which, together with the reconstruction of the old Trenton & New Brunswick property, made a complete trans-state line. During the year the company continued its policy of building permanent homes for its subsidiary companies in the various centers of their activities. Office additions and improvements were made at Trenton, Elizabeth and Montclair and sites were acquired in Hackensack, Passaic and Hoboken for the construction of offices. In regard to what the company considers the most comprehensive development in its history—namely, the construction of the modern combination street railway terminal and office building in Newark—it is stated that with the recent approval of the necessary ordinances the company intends to push the work rapidly so that the entire project may be completed not later than Jan. 1, 1917.

Louisville Railway

The statement of income, profit and loss of the Louisville (Ky.) Railway for the fiscal year ended Dec. 31, 1913, is as follows:

Passenger revenue, city lines	$3,090,654
Revenue for mail and advertising	18,349
Net revenue from interurban lines and interest	196,815
Income from other sources	117,272
Gross earnings	$3,423,090
Operating expenses, including maintenance	1,848,518
Net income from operations	$1,574,572
Deduct:	
State, county and city taxes	266,259
Interest to date paid and accrued	585,834
Total deductions	$852,093
Net income	$722,479
Dividend on preferred stock	$125,000
Dividend on common stock	545,660
Accident fund	36,496
Total	$707,156
Surplus for period	$15,323

The report states that improvements made during 1913 were of such a varied character that only the more important ones could be referred to. Attention is then called to the new powerhouse installed at Twentieth and High Streets, the extension of the conduit system, the almost completed building of new car shops at Twenty-ninth Street and various track renewals and installations.

The company built in its own shops ten new trail cars of the center entrance type. These, it is stated, have been in operation for the past three months and have proved very popular with the public.

South Carolina Light, Power & Railways Company

The statement of income, profit and loss of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., for the year ended Dec. 31, 1913, follows:

Gross earnings	$375,306
Operating expenses	127,613
Net earnings	$247,693
Taxes	15,376
Balance	$232,316
Interest on funded debt	150,000
Balance	$82,316
Dividends on preferred stock	30,000
Surplus	$52,316

Comparing the earnings shown by the above statement with those for the year 1912 of the predecessor companies of the South Carolina Light, Power & Railways Company, there is noted an increase in gross earnings of 10.5 per cent, while net earnings increased 8.5 per cent. The report of the company calls attention to the fact that it enjoys a great diversity of income, evidenced by the fact that about 55 per cent of its income is derived from the operation of various public utilities, 30 per cent from the sale of power to cotton mills and 15 per cent from other manufactories.

During the year 1913, general additions were made to the power plant, gas plant and street railway system at a cost of $179,446. The principal improvements to the railway department were the construction and reconstruction of track, the construction of new pavements and additions to the carhouse, the building of a machine shop, the purchase of five new cars and the rebuilding and repainting of fifteen old cars, as well as the equipping of both old and new with new double equipment Consolidated car fenders.

The report says that "in addition to making these important improvements a liberal outlay was made for maintenance, so that the properties of the company are in first-class operating condition." No detailed analysis is given in the report, however, to show what proportion of the operating expenses consisted of maintenance charges.

United Power & Transportation Company

The statement of earnings of the United Power & Transportation Company, Camden, N. J., for the fiscal year ended Dec. 31, 1913, is as follows:

Credits:		
Income from dividends, interest, loans, etc.		$784,698
Debits:		
Expense account (interest on notes, etc.)	$29,773	
Taxes	3,296	
Payments on United Railways gold trust certificates	316,720	
Payments on Delaware County gold trust certificates	39,956	389,745
Surplus for 1913 after paying fixed charges		$394,952
Balance to credit of profit and loss, Dec. 31, 1912		1,289,391
		$1,684,343
Adjustments during 1913, credit to profit and loss		97,814
		$1,782,157
Dividend paid July 31, 1913	$181,125	
Dividend payable in January, 1914	218,500	399,625
Balance to credit of profit and loss, Dec. 31, 1913		$1,382,532

The credit item to profit and loss of $97,814 in the above statement arose from the fact that the company received additional shares of capital stock from the United Traction Company, Reading, Pa., and the Edison Illuminating Company, Lebanon, Pa., in payment of money advanced on account of construction, improvements and betterments to these properties.

The gross income of the company decreased from $999,514 in 1912 to $784,698 in 1913, but this was due to the fact that the 1912 figure included proceeds arising from the sale of certain treasury securities by subsidiary companies after the payment of their outstanding liabilities. The total of the expense, interest and tax items showed only a slight increase. Dividends decreased from $460,000 in 1912 to $399,625 in 1913, while the surplus as of Dec. 31, 1913, was $1,382,532 as compared to $1,289,391 the year previous.

United Railways Investment Readjustment Plan

On March 31 Mason B. Starring, president of the United Railways Investment Company, New York, N. Y., which controls the United Railways of San Francisco, presented to the stockholders of the company a report made by a special committee to which had been delegated the work of formulating a plan for the readjustment of the debt and income of the company and the payment of dividends. This plan, which will be presented at the annual meeting on May 1, has as its main features the reduction of the classes of securities of the company to three—namely, collateral trust twenty-year sinking fund 5 per cent gold bonds, prior preference stock and common stock.

The plan contemplates the payment and extinguishment of the three issues of preferred stock, dividend certificates, the 6 per cent serial notes and the 6 per cent convertible gold notes of 1910, the cancellation of the trust indenture securing such convertible bonds, and the close of the collateral trust agreement securing the collateral trust 5 per cent bonds so that no further bonds may be issued thereunder. In formulating the plan the committee regarded it as fundamental that every reasonable precaution should be adopted fixing the dividends distributable to the preferred stock holders within limits that would give assurance of continuance and to reduce the company's outstanding capitalization to the simplest form.

Under the suggested plan the preferred stockholders are offered an opportunity of acquiring through an exchange for common stock more than one third interest in the equity of the property and to share in that extent any dividend distributed to the common stock. The prior preference stock which it is proposed to create is to be entitled to 7 per cent cumulative dividends. Of the authorized amount of $12,500,000, the sum of $4,368,000 is to be immediately issued for the retirement of $1,462,500 of preferred stock dividend certificates, $1,300,000 of 6 per cent serial notes, $810,000 of 6 per cent convertible gold bonds and $600,000 of floating debt, the residue to be held for general purposes. An amount of $8,000,000 of this prior preference stock is to be reserved to be used in exchange for the outstanding preferred stock, par for par.

The common capital stock of the company is to be increased from $31,000,000 to $32,400,000, and $12,000,000 is to be reserved for exchange for shares of the present preferred stock. Each holder of preferred stock (listed) is to receive for each share plus accumulated dividends 50 per cent of the par value of such share in 7 per cent prior preference stock and 75 per cent in common stock. Each holder of preferred stock (unlisted) will receive for each share plus accumulated dividends 50 per cent of the par value of such share in 7 per cent prior preference stock and $65.25 of common stock. The present authorized issue of preferred stock is to be reduced from $25,000,000 to $16,000,000.

Holders of each class of stock of the company are to be afforded an opportunity to subscribe for the new prior preference stock at par in an amount equivalent to 12 per cent of the par value of their holdings. Stockholders accepting the plan but not desiring to acquire the new prior preference stock on this basis may pay $2 per share for each share assenting. Stockholders accepting the plan and subscribing to the new prior preference stock may also pay $2 per share and the money derived from these payments is to constitute the compensation for a syndicate organized to underwrite the subscription, by the stockholders, of the $4,368,000 of prior preference stock. This $2 payment is made necessary by the fact that under the laws of New Jersey, in which State the company is incorporated, the stock must be sold at par and the committee had to devise means for providing without recourse either directly or indirectly to the company such a sum as might reasonably be needed to induce a syndicate to underwrite the stock. The plan concludes with a detailed list of various options which are given stockholders in the matter of subscribing to the new stock. Depositaries are to be opened in New York, Philadelphia and Pittsburgh and the plan if approved by the stockholders is to become operative after the assent of at least 80 per cent of each class of stock.

According to the statement made by Mr. Starring, it is anticipated that the net earnings of the company on the present basis of receipts will be somewhat in excess of $900,000 per annum, which, after the extinguishment of some of the present capitalization, will be ample to provide dividends of 7 per cent on the prior preference stock. Furthermore the effectuation of the plan should afford the present preferred stockholders an opportunity to share in the earnings of the company to an extent equivalent to a return on the present holdings in excess of 5 per cent per annum.

Amended Reorganization Plan of Ithaca Companies

The Public Service Commission for the Second District of New York on March 25 rendered a decision approving with certain alterations the plan presented for the reorganization of the Ithaca Street Railway and the New York, Auburn & Lansing Railway, as noted in the ELECTRIC RAILWAY JOURNAL of March 7, 1914, page 557. Consequently an amended plan of reorganization was published by the reorganization committee under date of March 30, 1914.

The main provisions of the amended plan are these. A railroad company, which, it is stated, will be called the Central New York & Southern Railroad Corporation, will be formed to acquire the property of the New York, Auburn & Lansing Railroad. A street railway company to be known as the Ithaca Traction Company will be formed to acquire the properties of the Ithaca Street Railway, which were recently sold under foreclosure and which include the properties of the Cayuga Lake Electric Railway and the Ithaca & Cayuga Heights Railway. The railroad company is to acquire the entire amount of capital stock and the first refunding mortgage bonds of the street railway company to be issued under the plan. The first refunding mortgage bonds of the street railway are to be secured by a first mortgage upon the properties of the company acquired under foreclosure, subject only to $275,000 of underlying bonds.

The railroad company is to have an authorized capital stock consisting of $725,000 of cumulative non-voting preferred stock, subject to redemption or retirement in whole or in part upon any interest dividend date at 150 and accumulated dividends. There will be an authorized issue of $1,275,000 of common stock and an authorized issue of $4,000,000 face amount of first and collateral trust mortgage 5 per cent gold bonds. The street railway company will have an authorized capital stock of $1,000,000 and an authorized issue of $2,000,000 face amount of first refunding mortgage 5 per cent gold bonds.

Of the securities so authorized there will be issued from time to time as needed to carry out the provisions of the reorganization plan, the following amounts: By the railroad company, first and collateral refunding mortgage 5 per cent gold bonds, $1,000,000; preferred stock, $725,000; common stock, $375,000; by the street railway company, first refunding mortgage 5 per cent gold bonds, $488,000 and capital stock of all one class, $400,000.

The $1,000,000 face amount of first and collateral trust mortgage bonds of the railroad company are to be issued and sold at not less than 80 and such part of the proceeds as needed for use in acquiring and vesting in the railroad company ownership of the properties of the New York, Auburn & Lansing Railroad and in the street railway company the property of the Ithaca Street Railway. The remaining $3,000,000 of these bonds are to be reserved for issue from time to time upon the acquisition of branches or extensions of the properties of the railroad company or additional bonds or stock of the street railway company. The $725,000 of the preferred stock of the railroad company is to be available for issue to depositors under the Auburn and Ithaca agreements and the $375,000 of common stock is to be used with the proceeds of the bond issue to aid in discharging the expenses of reorganization and the acquisition of properties.

The $488,000 of first refunding mortgage 5 per cent gold bonds of the street railway company are to be acquired by the railroad company through the use of a corresponding amount of railroad bonds. An amount of $310,000 of the traction bonds are to be reserved for the exchange, purchase or retirement of the underlying bonds of the street railway company. The present issue of capital stock of the street railway company in amount of $400,000 is to be acquired by the railroad company through the sale of a corresponding amount of the latter's preferred stock.

The decision rendered by the Public Service Commission on March 25 was simply an approval of the reorganization plan as it is now amended. It is proposed now to incorporate the two new companies and to proceed with the following out of the details of the reorganization plan, at which time the question must again be presented to the commission for formal approval in regard to each new company.

Special Meeting of New Haven Stockholders

According to the call for the meeting of the stockholders of the New York, New Haven & Hartford Railroad on April 21, 1914, they will be asked to consider and act upon the question whether, "in accordance with an arrangement made between the attorney-general of the United States and representatives of the company, this company shall consent that a decree be made by the United States District Court for the southern district of New York in a suit to be brought by the United States of America, which shall, among other things, provide in substance:

"1. That when the Legislature of Massachusetts shall have removed the prohibition in the charter of the Boston Railroad Holding Company against disposing of the stock of the Boston & Maine Railroad, the stock of said holding company shall be transferred at once to five trustees, and that after arrangements have been made to protect the minority stock of said holding company, said trustees shall sell said Boston & Maine stock prior to Jan. 1, 1917.

"2. That all the shares of capital stock of the Connecticut Company and the Rhode Island Company shall be placed in the hands of trustees, five for each corporation, who shall sell said stocks within five years from July 1, 1914.

"3. That the securities of the Merchants' & Miners' Transportation Company now held by the New England Navigation Company shall be placed in the hands of three trustees, who shall sell said securities within three years from July 1, 1914.

"4. That the securities of the Eastern Steamship Corporation held by the New England Navigation Company shall be sold within three years from July 1, 1914, and in the meantime the New England Navigation Company shall be enjoined against voting upon the stock of the Eastern Steamship Corporation.

"5. That in case the Interstate Commerce Commission shall not take such action under the Panama canal act as to authorize this company to retain control of the steamship lines on Long Island sound, the right shall be reserved to the court to take further action with regard to the control of said steamship lines.

"6. That the securities held by this company in the Berkshire Street Railway shall be sold within five years from July 1, 1914.

"7. That this company shall sell the shares of corporations owning or controlling street railways within the state of New York within five years from July 1, 1914.

"8. That, upon application of this company or any body of trustees provided for in said decree, and for good cause shown, the time within which said trustees in any case are obliged by the terms of said decree to sell the securities held by them may be extended by said court."

The call also provides for consideration and action upon the proposed amendment to the by-laws of the New York, New Haven & Hartford Railroad to reduce the directorate to not less than fifteen nor more than twenty-three members.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—The sale of the Alton, Jacksonville & Peoria Railway has been authorized by the Circuit Court of Madison County, Ill. There are outstanding against the company mortgage claims of $600,000, receiver's certificates of $100,000 and other liens of $60,000. As stated in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 608, the property may be purchased by the Clark interests, which control the East St. Louis & Suburban Railway.

Bucks County Interurban Railway, Trenton, N. J.—Interests identified with the Bucks County Interurban Railway have secured control of the Doylestown Electric Company through the purchase of the controlling interest in the stock of that company. New officers have been elected as follows for the Doylestown Electric Company: Sidney L. Wright, president; Walter T. Bilyeu, secretary and treasurer; John Yardley, assistant secretary and treasurer; Gaylord Thompson, general superintendent; Sidney L. Wright, William Redwood Wright, Frank Battles, W. Frederick Snyder, Gaylord Thompson, John Barbler, Walter T. Bilyeu, directors.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has approved the pledge by the Buffalo & Lackawanna Traction Company of $100,000 of its first mortgage 5 per cent twenty-year gold bonds with the Columbia National Bank, Buffalo, N. Y., as collateral security for a loan of $75,000.

Calumet & South Chicago Railway, Chicago, Ill.—The Calumet & South Chicago Railway has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $600,000. N. W. Halsey & Company, New York, N. Y., have purchased $350,000 of Calumet & South Chicago Railway first mortgage 5 per cent bonds due in 1927, and are offering them at 95 and interest.

Central New York Southern Railway Corporation, Ithaca, N. Y.—The Central New York Southern Railway Corporation has been incorporated to succeed the New York, Auburn & Lansing Railroad. The company has elected officers as follows: Roger B. Williams, Jr., president; H. W. Fitz, first vice-president; Charles E. Hotchkiss, second vice-president and general counsel; H. A. Clark, third vice-president, secretary and general manager; T. P. Clancy, treasurer. These officers are the same as those elected for the Ithaca Traction Corporation, the successor to the Ithaca Railway. The reorganization plans for the companies are referred to in detail on page 846 of this issue.

Chicago (Ill.) Elevated Railways.—The Chicago *Economist* said in the issue for April 4, 1914: "It is stated officially that the $30,000,000 collateral 5 per cent notes of the Chicago Elevated Railways which are to mature on July 1, 1914, will be paid. Just what the financing which must take place this summer will be has not been decided. Additional funds must be obtained to make additions and betterments. The plan generally talked of is that a first and refunding mortgage on the Northwestern Elevated Railroad, which ultimately will cover all the property of the company, will be drawn. No definite plans have been formulated for refunding the outstanding issues of Metropolitan and the South Side Elevated bonds. The National City Bank, New York, has been in negotiation with several local banks."

Chicago (Ill.) City Railway.—The Chicago City Railway has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $3,000,000. N. W. Halsey & Company, New York, N. Y., have purchased $1,560,000 of Chicago City Railway first mortgage 5 per cent bonds due in 1927, and are offering them at 100 and interest.

Chicago (Ill.) Railways.—The Chicago (Ill.) Railways has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $4,000,000. A syndicate which includes the National City Bank and Harris, Forbes & Company, New York, N. Y., is offering $3,000,000 of the first mortgage 5 per cent gold bonds of the company at 98½ and interest. The bonds now issued are part of the $4,000,000 authorized by the commission, the difference having been sold previously in the form of temporary certificates.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—The item which was published in the issue of the ELECTRIC RAILWAY JOURNAL for April 4, page 795, in regard to the dividend of the Chippewa Valley Railway, Light & Power Company, was in error. The company paid quarterly dividends of 2 per cent on its common stock on Jan. 1, 1914, and on April 1, 1914, these being exactly the same dividends as were paid on the common stock quarterly during the year 1913. The common stock of the company now outstanding is $1,100,000, and not $1,000,000, and it was on $1,100,000 that dividends have been paid at the rate of 2 per cent quarterly since January, 1913. The company reports that its gross and net earnings for the first quarter of 1914 showed a substantial increase over the earnings of 1913.

Cincinnati (Ohio) Traction Company.—On April 3, 1914, the Ohio Public Utilities Commission ordered the Cincinnati Traction Company and the Cincinnati Street Railway to make an inventory of their property as of April 1, 1914, and have it completed by Oct. 1, 1914.

Denver (Col.) Tramways.—The Denver Tramways has been organized to take over the Denver City Tramways and subsidiary properties. The new company will have $10,000,000 of common stock, $3,000,000 of 7 per cent cumulative preferred stock and $3,000,000 of 6 per cent convertible debenture bonds, convertible between April 1, 1915, and April 1, 1918, into 7 per cent preferred with a bonus of 25 per cent of common. Of the bonds $2,500,000 will be issued and $500,000 held for future purposes. These bonds will be offered to the stockholders of the Denver & Northwestern Railway at 97½ and the proceeds of the issue will provide for the liquidation of the floating debt and for ample working capital. The Denver & Northwestern Railway, the holding company for stock of the present Denver City Tramway, will remain undisturbed with its $6,000,000 of bonds and its holdings of $9,000,000 of stock of the Denver City Tramway, which will be converted into stock of the new company. Among the directors of the new company will be George C. Clark of Clark, Dodge & Company, New York; C. M. Clark of E. W. Clark & Company, Philadelphia; Seeber Edwards of the Industrial Trust Company, Providence, R. I., and Samuel D. Nicholson, Denver. The Consolidated Securities & Investment Company, all the $500,000 of stock of which will be owned by the Denver Tramways, will take over the Boulevard Realty Company, Denver & Inter-Mountain and other subsidiaries not directly concerned in the operation of the street railway system. All subsidiaries, including the Denver City Tramway, will be dissolved as soon as affairs can be adjusted. The new company started on April 1 with current assets of $811,527, including $533,361 cash, and with current liabilities of but $67,186, outside of $589,600 accrued interest and taxes and $12,775, service liabilities. Underlying bonds of the new company aggregate $17,819,295.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has filed with the Secretary of State of New York a certificate increasing its authorized capital stock from $2,000,000 to $5,000,000.

Hudson & Manhattan Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has granted permission to the Hudson & Manhattan Railroad to issue $154,000 of 5 per cent first lien and refunding mortgage bonds, which will be dated Feb. 1, 1913, and will run to Feb. 1, 1957. They are to be sold at not less than 85, and are to be redeemable at 105, plus accrued interest. The proceeds will be devoted to reimbursing the company for money expended from income to discharge previous obligations. The mortgage under which they are to be issued is for $65,000,000, and the commission already has approved of an issue of $37,055,000.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—N. W. Harris & Company, Inc., E. H. Rollins & Sons and Perry, Coffin & Burr, Boston, Mass., are offering at 94½ and interest, yielding 5⅜ per cent, $2,935,000 of Kansas City, Clay County & St. Joseph Railway first mortgage 5 per cent gold bonds dated Sept. 1, 1911, and due Sept. 1, 1941. The interest on these bonds is payable on March 1 and Sept. 1 in New York City and the bonds are callable on any interest date at 105 and interest. They are in the denomination of $1,000 and are registrable as to principle only. The Equitable Trust Company, New York, N. Y., and F. J. Downing, Kansas City, are trustees under the mortgage securing the issue. The circular from the bankers includes a statement in regard to the Kansas City, Clay County & St. Joseph Railway, signed by Phillip L. Saltonstall, president. The authorized capital stock of the company is $10,000,000. Of this amount $4,000,000 has been issued. The total authorized issue of 5 per cent gold bonds is $10,000,000. Of this amount $3,135,000 has been issued. The road has been in complete operation only since May 1, 1913, and the earnings for the initial ten months of operation were as follows: gross earnings, $500,427; operating expenses and taxes, $266,849; net earnings, $233,578; ten months' interest on $3,135,000 of first mortgage 5 per cent bonds, $130,625; surplus, $102,953.

Mesaba Railway, Virginia, Minn—The syndicate composed of Tucker Anthony & Company, Boston, Mass., and C. D. Barney & Company, New York, N. Y., has sold to W. H. Newbold's Sons and Graham & Company, Philadelphia, Pa., the $1,100,000 of first mortgage twenty-year 5 per cent bonds of the Mesaba Railway, due in 1932. The purchasers of the bonds propose to offer the issue for public subscription.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The New York, New Haven & Hartford Railroad is said to have arranged for the sale of its interest in the Merchants' & Miners' Transportation Company to interests headed by the Mercantile Trust Company, Baltimore, Md., and affiliated with the minority ownership in the line. It is understood that the transaction is for cash, but its terms have not been announced. The disposal of this property by the New York, New Haven & Hartford Railroad is in accordance with the terms of the agreement for the segregation of the company's property entered into with the federal department of justice. The Aetna Life Insurance Company, Hartford, Conn., is reported to have sold at about

$70 a share 5000 shares of New York, New Haven & Hartford Railroad stock, thus practically liquidating all of its holdings of this issue. On Jan. 1, 1914, the company appeared as the owner of 5319 shares which it carried on its books at $409,563, or $77 a share.

North American Company, New York, N. Y.—The North American Company has issued a circular to stockholders offering them for pro rata subscription, in proportion to their respective holdings of stock on the books of the company on April 22, 1914, $3,000,000 of Wisconsin Edison Company debenture bonds and 30,000 shares of capital stock. The terms and conditions of the privilege of subscription are as follows: Each holder of 100 shares of North American stock is entitled to subscribe to a $1,000 debenture bond and ten shares of stock of Wisconsin Edison Company for $1,360. The holders of fifty shares may subscribe to a $500 bond and five shares of stock for $680, and the holders of ten shares to a $100 bond and one share of stock for $136. Warrants will be mailed on April 23 to holders of record April 22, and no subscriptions will be received unless accompanied by warrants. The debenture bonds and shares of stock have been underwritten and all not subscribed for on or before May 15, 1914, will be sold to members of the syndicate, who have agreed to purchase the same. The syndicate is headed by William C. Sheldon & Company and G. Ulbricht. The authorized amount of 6 per cent convertible debentures of the Wisconsin Edison Company is $10,000,000, of which $6,500,000 is outstanding, and the capital stock authorized, which is without nominal or par value, is 400,000 shares, of which amount 215,000 shares are outstanding.

Portsmouth (Ohio) Street Railway.—The Public Utilities Commission has authorized the Portsmouth Street Railway to issue $425,000 of first mortgage bonds, the proceeds to be used to construct a line between Portsmouth and Ironton, a distance of 20 miles. The company has also been authorized to capitalize improvements and betterments to the amount of $250,000.

Scranton & Wilkes-Barre Traction Corporation, Scranton, Pa.—Control of the Scranton & Wilkes-Barre Traction Corporation has passed to a syndicate in which William C. Sproul, Wilmington, Del., Bioren & Company, Philadelphia, and George S. Fox & Sons, Philadelphia, are interested. The Scranton & Wilkes-Barre Traction Corporation controls the Lackawanna & Wyoming Valley Railroad.

Second Avenue Railroad, New York, N. Y.—The attorney for a small judgment creditor against George W. Linch as receiver of the Second Avenue Railroad, appeared in the Supreme Court recently before Justice Weeks with the attorneys of two other similar judgment creditors and argued a motion for the "termination of the receivership" of the company. Each of the three claims were for only about $150 damages for personal injuries received since the road went into the hands of the receiver. Brainard Tolles, attorney for Mr. Linch, said that although the judgments against the receiver for personal injuries were just debts they should not take precedence over other expenses which were clearly regarded by all courts as operating expenses. In accepting the brief filed by Mr. Tolles Justice Weeks said: "My present impression is that all I can do is to order you to pay these small judgments for personal injuries and let you take the matter up to the Court of Appeals. I do not see any justice in regarding these judgments for personal injuries as other than operating expenses. They ought to be paid even ahead of back taxes."

Southern Pennsylvania Traction Company, Chester, Pa.—The Southern Pennsylvania Traction Company has arranged with Newburger, Henderson & Loeb, Philadelphia, Pa., to furnish the funds necessary to acquire on May 1, 1914, the $250,000 of first mortgage 5 per cent bonds of the Chester Traction Company. The plan provides for the extension of the bonds from May 1, 1914, for thirty years, with an option to retire them after 1918 at 103 and interest, or to receive from the bankers the amount which will be due upon their acquisition of the bonds. Holders are requested to deposit their bonds with the bankers on or before April 15.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The Washington Stock Exchange has listed $1,455,450 of the preferred stock and $5,079,000 of the 5 per cent bonds of the Washington, Baltimore & Annapolis Electric Railroad.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—The Youngstown & Ohio River Railroad has reduced its preferred stock dividend from 4 per cent to 3 per cent per annum.

Dividends Declared

Boston (Mass.) Suburban Electric Companies, quarterly, 1 per cent, preferred.

Chippewa Valley Railway Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred; quarterly, 2 per cent, common.

Dallas (Tex.) Electric Company, 3 per cent, first preferred; $2.50, second preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Metropolitan West Side Elevated Railway, Chicago, Ill., quarterly, 1¼ per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Ottawa (Ont.) Electric Railway, quarterly, 3 per cent.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

South Side Elevated Railway, Chicago, Ill., quarterly, 1½ per cent.

Stark Electric Railroad, Alliance, Ohio, three-quarters of 1 per cent.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE					
1m., Feb., '14	$57,347	*$28,985	$28,362	$17,422	$10,940
1 " " '13	54,385	*26,905	27,480	17,340	10,140
12 " " '14	771,941	*350,992	420,949	207,684	213,265
12 " " '13	718,240	*325,530	392,710	202,074	190,636
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.					
1m., Feb., '14	$88,664	*$54,664	$34,000	$27,208	$6,792
1 " " '13	88,878	*55,505	33,373	23,740	9,633
12 " " '14	1,208,315	*715,896	492,419	304,803	187,616
12 " " '13	1,091,523	*654,994	436,529	271,621	164,908
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, CLEVELAND, OHIO					
1m., Feb., '14	$24,813	*$16,233	$8,581	$10,828	†$2,248
1 " " '13	24,548	*15,910	8,639	10,278	†1,589
2 " " '14	53,627	*33,027	20,594	21,817	†1,017
2 " " '13	52,643	*22,591	20,052	20,699	†647
EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.					
1m., Jan., '14	$231,944	*$153,258	$78,686	$48,102	$30,584
1 " " '13	213,628	*122,912	90,716	48,356	42,360
12 " " '14	2,719,696	*1,635,163	1,084,533	588,880	495,653
12 " " '13	2,474,630	*1,368,113	1,106,517	578,772	527,745
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO					
1m., Feb., '14	$90,021	*$63,821	$26,201	$35,285	†$9,084
1 " " '13	89,199	*60,111	29,089	34,938	†5,848
2 " " '14	195,509	*132,301	63,209	70,342	†7,133
2 " " '13	190,192	*125,398	64,763	69,875	†5,082
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE					
1m., Feb., '14	$39,554	*$36,450	$3,104	$15,347	†$12,243
1 " " '13	41,349	*30,778	10,571	14,485	†3,914
12 " " '14	674,106	*439,654	234,452	181,299	53,153
12 " " '13	631,259	*388,670	242,589	173,146	69,443
MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.					
1m., Feb., '14	$69,801	$24,474	$45,326	$25,545	$19,781
1 " " '13	65,748	21,595	44,153	24,103	20,050
2 " " '14	148,307	57,744	90,564	51,112	39,452
2 " " '13	134,384	46,625	87,759	48,205	39,554
PORTLAND (MAINE) RAILROAD					
1m., Feb., '14	$64,123	*$50,027	$14,096	$22,713	†$8,617
1 " " '13	64,487	*55,664	8,823	10,274	†1,451
12 " " '14	1,036,612	*676,314	360,298	206,308	153,990
12 " " '13	991,339	*696,854	294,485	123,249	171,236

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*Includes taxes.

†Deficit.

Traffic and Transportation

Experience in Kansas City With Alternate Stops

One of the first electric railway companies in the United States to experiment with the so-called "odd and even" system of staggering car stops was the Metropolitan Street Railway, Kansas City, Mo. The company has successfully used the alternate stop on two of its lines since early in 1911, or almost three years. The odd and even system was put into effect on the Troost Avenue line on April 20, 1911, after exhaustive tests had been made. The new plan apparently proved its worth immediately, and on May 6 of the same year the plan was applied to the Brooklyn Avenue line. Both of these are important lines, and in volume of business handled are surpassed by few, if any, of the thirty-odd other lines operated by the company. After three years of operation of the alternate-stop system, officers of the Metropolitan Street Railway believe the plan to be thoroughly worth while. The public also received the odd and even system well and has made no effort to re-establish the old style on the two lines on which the new method is utilized. The alternating stop system is used only during rush traffic hours on week days, when the service is maximum. The plan is not approved on Sundays, it has been found.

At designated hours metal signs are placed on the front end of cars, marked "odd" and "even" respectively. The signs alternate. South bound cars bearing the "odd" sign stop at Thirty-third, Thirty-fifth, and other odd streets, while the "even" cars halt at Thirty-second, Thirty-fourth, etc. On the numbered streets, running east and west, the company had a problem slightly more difficult, as the intersecting streets bear names and not numbers, such as Locust, Oak, etc. This obstacle was overcome by the simple expedient of painting signs on the line poles alongside of the track at such intersections, the words "odd" and "even" again being called into play. A reduction of ten minutes per round trip has been effected on the Troost Avenue line in the morning by virtue of the alternating stop system. The run is now made in sixty-five minutes, as compared to seventy-five under former conditions. In the evening rush hour the running time is seventy minutes, as compared to seventy-five previously. A five-minute saving in the schedule on the Brooklyn Avenue line has been made on both morning and evening runs under the alternate stop system, the round trip formerly being made in sixty-five minutes, and now in sixty. While this saving of time is considered worth while, officers of the company are impressed particularly with the advantages which the system has developed of distributing the load more evenly.

Under former conditions, when a car halted on a corner where a crowd was waiting, the entire group usually boarded the vehicle, even if another car on the same line was just behind. With the alternate stop in operation, about half of the members of a crowd find that the car is an "odd" one and therefore not desirable in view of their destinations. They therefore await the arrival of an even car, the load at rush hours thus being evenly distributed over the cars on the two lines operating under the alternate stop plan.

Philadelphia Proposals in Pamphlet Form

The department of city transit of Philadelphia has issued a pamphlet in which A. Merritt Taylor, the transit director, replies to the proposals made by the Philadelphia Rapid Transit Company at the last meeting of the Councils' special committee on rapid transit, held on March 25. After comparing the Philadelphia Rapid Transit plan and the counter proposal for rapid transit development offered by the department, both of which plans are now before Councils awaiting public discussion, Director Taylor concludes that it would be more profitable to the city to have the city-built lines operated independently than by the Philadelphia Rapid Transit Company under the conditions demanded by that company in its proposals. He also suggests that the Public Service Commission be petitioned to inquire into the reasonableness of the exchange ticket charges, should no arrangements be made with the Philadelphia Rapid Transit Company. After a digest of the two plans, Director Taylor reviews the concessions obtained by the company under the 1907 contract with the city, and then discusses the company's ability to finance the additional investment of $9,438,300 recommended in the proposals of the department of city transit. Director Taylor thinks the Philadelphia Rapid Transit Company should be able to raise without difficulty this investment, upon the security of the equipment purchased, and by mortgaging the leasehold upon which "the company would receive a return upon its investment before the city secured any return whatever upon its investment, which, in the case of the Broad Street subway, would amount to $34,682,000."

Fare on Long Island Suburban Line Upheld.—The Public Service Commission of the Second District of New York has refused to order a reduction in the fare over the line of the New York & Long Island Traction Company to Floral Park, Mineola and other places.

Complaints Against St. Louis Company Dismissed.—The Public Service Commission of Missouri has dismissed the complaints filed with it against the United Railways, St. Louis, Mo., in which improper ventilation and overcrowding were alleged. The commission says that these important matters should only be taken up in connection with the street railway system of the city when treated as a comprehensive whole, and expressed the opinion that it is unwise to consider them in disjointed bits and make orders directed to fractional parts, when they are in reality inseparably interlinked with the whole.

Rapid Transit at Cincinnati Discussed.—At a recent meeting of the ways and means committee of the City Council of Cincinnati, Ohio, the Bleekman-White plan for building a union station and bringing the interurban cars into the city was discussed. It is thought that if the Arnold plan is found to incur too great an expense, the other proposition may be taken up. J. G. Schmidlapp told the committee that when he was interested in a plan to secure rapid transit for Cincinnati about ten years ago, his engineer informed him that the route chosen by Mr. Bleekman was the only feasible one from a financial standpoint.

Brooklyn Companies Accept Transfer Order.—The Coney Island & Brooklyn Railroad, the Nassau Electric Railroad and other surface railways in the Brooklyn Rapid Transit System have accepted the order recently made by the Public Service Commission for the First District for an entirely new system of transfers. The companies state that they will obey the order "under protest and compulsion" and without waiving any of their rights. The order takes effect on May 1, 1914, but the companies say it will be impossible to inaugurate the new system on that date, and desire such extension of time as may be necessary to put it into effect.

Protest Against Sale of Liquor to Employees.—When the Allegheny County license court opened for its annual session the first week in March the Pittsburgh (Pa.) Railways filed remonstrance against every saloonkeeper whose place of business is near a car house or a "relief" stop. Attorneys for the company explained to the court that those against whom remonstrances were filed had catered to the trade of motormen and conductors in uniform. It was the company's determination, the lawyers said, to prevent this. In each case the saloonkeeper went before the license court judges and promised not to sell intoxicants to railway employees who were in uniform.

Employees' Magazine in San Francisco.—The first issue of *The United Railroads Magazine* devoted to the interests of the employees of the United Railroads, San Francisco, Cal., was dated March, 1914, and was published during the latter part of the month. It contained eight pages and the sub-heads for departments under which the contents are arranged include "Trolley Sparks," "Commendable Records," "Safety First" and "Contributors' Box" in addition to the editorial announcement. As stated in the ELECTRIC RAILWAY JOURNAL of March 28, 1914, page 746, the editor of the magazine is Noble Hamilton, assistant to J. W. Lilienthal, president of the company.

Noonday Transfers on Utica Lines.—The New York State

Railways, Utica Lines, is by special permission of the Public Service Commission of the Second District of New York issuing noonday transfer tickets between Frankfort and Ilion, between Ilion and Mohawk, and between Mohawk and Herkimer. Passengers traveling between the above points between the hours of 12 noon and 1 p. m. (except on Sundays and legal holidays) and paying cash fares of 5 cents, or surrendering tickets or other form of transportation between such points and of face value 5 cents, will upon request to the conductor be given non-transferable tickets good for return from destination to starting point, if used the same day and between the same hours.

Relieving Congestion in Los Angeles.—The first step toward the permanent relief of electric railway congestion on Main Street, Los Angeles, Cal., was taken on March 22, 1914, when the new municipal railroad on San Pedro Street was opened. Under the temporary plan of relief that will be tried out, 112 trains per day will be taken off Main Street before 7 p. m., at which time the temporary station behind the Pacific Electric Railway building will be closed for the night and trains will be run into the depot from Main Street. They will be routed over the San Pedro Street line. Extra storage tracks are being built back of the depot and two additional loading platforms are being constructed for the benefit of the traffic to be handled before the permanent elevated is completed.

Prizes for Accident Prevention Essays.—To stimulate interest among its employees in the "safety first" movement, the Union Traction Company of Indiana, Anderson, Ind., has issued an announcement to the effect that prizes aggregating $30 will be awarded to trainmen writing the three best essays on the subject "Prevention of Accidents to Passengers." The announcements in regard to the essay contest were posted in every division headquarters and given to every trainman. The company will award $15 to the winner of first prize, $10 to the winner of second prize and $5 to the man writing the third best essay. The papers are to be turned in to the division superintendents of the company before May 11. E. E. Slick, claim adjuster, will be chairman of the committee of judges. Each local safety committee will have a representative on the committee appointed to judge the papers. All trainmen are eligible to compete for the prizes.

Texas Traction Advertising Department.—Since the completion of the Waco-Dallas-Corsicana interurban line in Texas, the Southern Traction Company and the Texas Traction Company have organized an advertising department to handle advertising in their cars, as well as to publish in the *Texas Interurban*, their official paper. For the purpose of setting forth the advantages of advertising in the cars of the companies, the advertising department has issued a pamphlet, "Facts for Advertisers," which contains information regarding the mileage, the number of cars and the average number of people handled per day or per month over each division. The purpose of the company magazine is stated in part as follows: "It is devoted to the interest of patrons and employees and the development of the territory traversed by the two interurban lines. Each month 8000 copies are printed and distributed free on all the cars operating over these two interurban railways."

Waste Paper Salvage in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has concluded that the systematic saving and selling of waste paper may be made profitable. Experiments have been conducted at the Forty-eighth and Harrison Street carhouse, from which the cars of seven lines are operated. These seven lines have averaged 200 lb. of waste paper daily, or three tons monthly. The present market price on paper is around 20 cents for 100 lb. in Kansas City. Each coach cleaner at the Forty-eighth and Harrison Street carhouse is equipped with a burlap bag into which he puts the waste paper in each car. As the sacks are filled they are stored in an old cable coach, now used only for that purpose. At the end of each month the sacks of paper are weighed and turned over to waste paper companies. The crews usually collect the waste after each round trip and stow it beneath one of the box seats pending the return to the carhouse. The officers of the company are now considering making the waste paper salvage plan general.

Suburban Fare Question in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, has written a letter to the chairman of the manufacturers' committee of St. Bernard dealing with the question of a possible reduction in fare to outlying suburbs through which the Mill Creek Valley lines of the Ohio Traction Company are operated. Mr. Schoepf suggested that the villages in the Mill Creek Valley combine in selecting a commission with power to represent them in negotiating with the company for revised rates of fare in all of the territory from the Zoo in Cincinnati to Glendale. He referred to the offer of the company of a 5-cent fare to Gas Hall, Carthage, under conditions previously outlined. In view of the fact that the communities met jointly to demand a 5-cent fare he saw no reason why they could not also jointly authorize a committee to determine what fare conditions would be equitable to both the company and the community which it serves. Despite the soundness of the argument that a reduced rate of fare helps to build up a community there is a point beyond which a 5-cent fare cannot be granted with any expectation of profit to the company or good service to the community.

Northampton Arbitration.—Evidence on behalf of the Northampton (Mass.) Street Railway was completed at the arbitration proceedings on March 28, 1914. L. D. Pellissier, general manager of the company, showed that a dozen men who were paid 17.5 cents an hour in 1900 now receive 27.36 cents an hour for every hour they are on duty. These men are allowed a rate of 26 cents and are credited with ten hours' work for every 9½ hours of service. It was stated that no company in Massachusetts pays the maximum wage in less than three years. Wages were raised on the Northampton Street Railway in 1909 and 1912. The maximum wage on the road has increased faster than the cost of living. Mr. Pellissier said that from his own four years' experience as a conductor he believed that five years are required to develop a car service man to the point of maximum efficiency and that a single year's experience involving four seasons only is inadequate to bring out the best that is in a motorman or a conductor. Officials of the union condemned the unwillingness of certain employees to take out extra cars late at night as contrary to the policy of the organization. The closing arguments in the wage case were heard on April 3 and are referred to at length on page 841 of this issue.

New Twin City Folder.—The Twin City Rapid Transit Company, Minneapolis, Minn., has issued its new folder "The Twin Cities, 1914." This is the ninth folder of the kind that the company has prepared. An effort has been made to improve each year's issue, with the result that the new one is unusually complete. A large map in the center of the folder shows the company's lines and the park systems of both cities. There have also been added very complete maps of the central portions of Minneapolis and St. Paul as well as other features. The text matter has been rewritten and contains all the significant historical, commercial and educational information about the territory very carefully condensed. The legends in and around the cities have been woven into the story, with the object of encouraging tourists to visit the twin cities and use the company's lines, although the company has kept modestly in the background. An elaborate system has been developed for distributing the folders. In a small advertisement which is published in the daily papers for a period of six or eight weeks in the spring, the company offers to send a copy of this folder to any address on receipt of 6 cents in stamps. From fifty to 150 letters a day are received during the time that the advertising campaign is being conducted, some of these inquiries coming from points within a radius of 400 miles of the twin cities. Very frequently the people who write from a distance for the folders express their intention of visiting the twin cities. All the steam railroads which enter Minneapolis and St. Paul are supplied with the folders and distribute them to the principal ticket agencies throughout the United States. The pursers of the Mississippi River steamboats also distribute them to passengers after leaving St. Louis and the hotels are supplied with the folders for display in their timetable racks. Altogether the character of the folder makes it worthy of entrance into places which are usually inaccessible to ordinary advertising matter. The folder is issued under the direction of A. W. Warnock, general passenger agent of the company.

Personal Mention

Mr. W. C. Phillips has resigned as superintendent of the Gary & Interurban Railroad, Gary, Ind.

Mr. John H. Sullivan, for the last twelve years general storekeeper for the Indianapolis Traction & Terminal Company, Indianapolis, Ind., resigned on April 1.

Mr. Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., sailed from New York on April 7 on the *Mauretania* for England. He expects to remain abroad until July.

Mr. Winthrop More Daniels, of New Jersey, who was nominated recently by President Wilson for appointment to the Interstate Commerce Commission, has been confirmed as a member of the commission by the Senate. Mr. Daniels is a member of the Board of Public Utility Commissioners of New Jersey.

Mr. Gaylord Thompson, vice-president and general manager of the New Jersey & Pennsylvania Traction Company and the Bucks County Interurban Railway, Trenton, N. J., has also been appointed general superintendent of the Doylestown (Pa.) Electric Company, control of which has passed to interests identified with the Bucks County Interurban Railway.

Mr. Norman Morrison, who has lately been connected with the Birmingham Railway, Light & Power Company, Birmingham, Ala., in a confidential capacity, has resigned from the company to join Mr. Jack Allison in the real estate business, with offices in the Steiner Building in that city. Mr. Morrison was connected with the company for twenty-six years.

Mr. T. L. Sturgeon, who was appointed in 1912 to take charge of the power installation of the entire system of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has returned to New York, where he is connected with the home office of the Republic Railway & Light Company, by which the Mahoning & Shenango Railway & Light Company is controlled.

Mr. Milan V. Ayres, formerly connected with Ford, Bacon & Davis, New York, N. Y., as statistician, has been appointed to the valuation board of the Interstate Commerce Commission. Before becoming connected with Ford, Bacon & Davis Mr. Ayres was chief engineer of the Mobile Light & Railroad Company, Mobile, Ala., and previous to that he was with the Rockland Light & Power Company, Nyack, N. Y. He was graduated from the Massachusetts Institute of Technology and was electrical and mechanical engineer with the Boston & Worcester Street Railway, Boston, Mass., for many years.

Mr. E. W. P. Smith has been appointed city electrician of Cleveland, Ohio. Mr. Smith was graduated in electrical engineering from Colorado College, Colorado Springs, Col., in 1908. After a year of operating experience in the West he entered the employ of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in the railway engineering department. Mr. Smith was later employed by the city of Cleveland in the smoke-prevention division where a preliminary report was prepared on the electrification of the steam roads which operate into Cleveland. During the latter part of 1913 he was connected with the mechanical department of the Lake Shore & Michigan Southern Railroad.

Mr. W. L. Davis, formerly assistant secretary and assistant treasurer of the Texas Power & Light Company and affiliated companies, has been appointed superintendent of accounts of the Strickland-Goodwin Management Association, Dallas, Tex., succeeding Mr. J. R. Wolfe, assigned to other duties. The Strickland-Goodwin syndicate owns and operates the lines of the Texas Traction Company, consisting of the interurban railway between Dallas and Denison, Tex., and lines in McKinney, Sherman and Denison, and the Southern Traction Company, which operates the interurban system between Dallas and Waco and Corsicana, also city lines in Waco, Corsicana and Waxahachie, consisting in all of about 300 miles of road.

Judge Frank Irvine, dean of the college of law, Cornell University, has accepted the appointment by Governor Glynn to the Public Service Commission for the Second District of New York. It is expected, however, that he will continue his duties as dean of the law college until the end of this year. Judge Irvine was born in Sharon, Pa., on Sept. 15, 1858. He was graduated from Cornell in 1880 with the degree of B. S., which corresponds to the present Arts degree. In 1883, having been graduated from the National University Law School in Washington, he was admitted to the bar. During these years Judge Irvine served as a clerk in the district attorney's office for the District of Columbia, and was later made assistant to the district attorney. He held this position until the spring of 1884. He practised law in Omaha until 1891 when he was appointed by the Governor of the State to fill a vacancy in the District Court of Nebraska. In the fall of that year he was elected to the full term on the democratic ticket. This court corresponds to the Supreme Court of New York State. He was made a member of the Supreme Court Commission, the highest court of the State of Nebraska, in 1893. Judge Irvine re-entered active practice in 1899, and returned to Cornell in 1901. On the death of Dean Huffcutt of the college of law in 1907 he succeeded to the deanship of that college. He is a member of the American Bar and New York Bar Associations and for the past seven years has served on the committee of the American Bar Association for the Simplification of Procedure.

OBITUARY

Henry H. Forsyth, secretary of the Forsyth Brothers Company, dealers in railway supplies, and a resident of Chicago since 1872, is dead.

John Kinnarney, former superintendent of construction of the Louisville (Ky.) Railway, died in Louisville recently at the age of sixty-nine years. Mr. Kinnarney was well known in Louisville by reason of his long service with the railway company. He was a native of Ireland.

Convention of the Doherty Organization

The annual convention of managers of operating companies of the Doherty organization was held at the Hotel Manhattan, New York, on April 6 to 10. The convention was the largest of the annual gatherings that have been held by the Doherty organization. About 150 representatives of 100 companies were in attendance. Nearly all the companies in the Doherty organization were represented. Ten regular sessions were held during the week. F. W. Frueauff presided at the opening session. George Williams acted as chairman during the new-business session. On the evening of April 9 there was an informal dinner at Healy's restaurant in New York.

At the opening meeting the subject of discussion was the relation of companies to the public, state and city commissions. Addresses on this subject were made by F. W. Frueauff and C. T. Brown. The next session was devoted in part to a discussion of the new financial plan of the Cities Service Company. Paul R. Jones, secretary and auditor of the Cities Service Company, discussed the relation of the auditing department to local companies.

The sessions of April 7 were devoted entirely to the natural-gas industry and industrial gas sales. Those who made addresses were Holton H. Scott, Alfred J. Diescher, Frank Fisher, C. L. Bullock, H. R. Straight, F. M. Lowry and Ira Neely.

On April 8 Elbert Hubbard, East Aurora, N. Y., addressed the convention on the subject of co-operation and the relation of employees of public utility companies to the public. Among the others who spoke were Henry Loebel, C. L. Bullock, W. H. Gardner, M. R. Bump, Holton H. Scott, F. J. Petura and R. G. Griswold.

There was a welfare and "safety first" session at which the discussion was led by G. O. Smith. One of the sessions was devoted to the topic of operating statistics of 1913. At the following session operating estimates for 1914 were considered. Henry L. Doherty was on the program for an address on "The Public Utility Manager."

The spring meeting of the Empire State Gas & Electric Association will be held at the Alert Club, Medina, N. Y., on April 22. The morning session will be devoted to the new workmen's compensation law and to the accident-prevention work of the safety committee.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***South Florida & Gulf Railroad, Kenansville, Fla.**—Incorporated in Florida to build an electric or steam railway from Kenansville in a southerly direction through Osceola County to a point on the Kissimmee River at or near Bassinger, a distance of 36 miles. Capital stock, $50,000. Officers: C. R. Armstrong, Rochester, Minn., president; Walter F. Schoch, Shokopee, Minn., vice-president; Henry F. Benter, Kissimmee, Fla., secretary and treasurer.

***Idaho-Pacific Railway, Pocatello, Idaho.**—Application for a charter has been made by this company in Idaho to build an electric railway to connect Twin Falls County with the Hagerman Valley. Capital stock, $250,000. Officers: M. J. Sweeley, president; H. A. Stroud, vice-president, and Henry Schildauer, treasurer.

Ismay, Ekalaka & Southern Electric Railway & Power Company, Ismay, Mont.—Application for a charter has been made by this company in Montana to build an electric railway from Ismay, on the Chicago, Milwaukee & St. Paul Railway, and about 75 miles east of Miles City, to Ekalaka, about 44 miles distant, and thence on to Camp Crook, S. D. Capital stock, $500,000. Officers: William Fulton, Ismay, president; David Bickle, Ismay, vice-president; George J. Murphy, secretary and treasurer; J. E. Prindle, general manager; A. J. Haley, assistant general manager. [E. R. J., Dec. 27, '13.]

***Nova Scotia Tramways & Power Company, Halifax, N. S.**—Application for a charter has been made by this company in Nova Scotia to take over the Halifax Electric Tramways as noted in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, page 795.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company's franchise for the Norwood extension will not be taken up by the company, and the line will not be built. The disagreement arose over the duration of the contract. The proposed franchise was for a line through the new Norwood Boulevard extension of the Birmingham Realty Company, connecting with the present Norwood line in Birmingham.

Dixon, Ill.—The Sterling, Dixon & Eastern Railway has received a franchise from the Board of Supervisors for a line on the Hazelwood road from the city limits of Dixon to the site which has been selected for a new state epileptic colony.

Paxton, Ill.—The Kankakee & Urbana Traction Company has asked the Council for a franchise in Paxton. The company has received a fifty-year franchise from the Council in Ludlow.

Orange, N. J.—The Public Service Railway has asked the Council for a franchise to extend its Central Avenue line in Orange.

Buffalo, N. Y.—The International Railway has received an extension of time of one year on its franchise on Bailey Avenue in Buffalo.

Charleston, S. C.—The Charleston & Summerville Interurban Railway has received an extension of time on its franchise from April 1 to Aug. 1, 1914. This 22-mile line will connect Charleston and Summerville. J. L. David, Charleston, president. [E. R. J., Aug. 30, '13.]

Chesterfield, Va.—The South Richmond & Chesterfield Railway has received a franchise from the Council in Chesterfield. This company plans to build an electric line from the intersection of Broad Rock Road and Hull Street, Richmond, to Falling Creek. John C. Robertson, Richmond, is interested. [E. R. J., Feb. 28, '14.]

***Seattle, Wash.**—The City Council has introduced a resolution authorizing and directing the preparation of plans to build an electric railway on Rainier Avenue and other streets in Seattle.

TRACK AND ROADWAY

Birmingham & Chattanooga Railroad, Birmingham, Ala.—About 2 miles of grading has been completed by this company on its 147-mile line from Birmingham, Ala., to Chattanooga, Tenn., via Oneonta, Boaz, Crossville, Sylvia and Wanhatchie, Tenn. Jordan & Phillops, Birmingham, have the contract for grading 10 miles of this line. W. W. Shortridge, Boaz, vice-president. [E. R. J., Dec. 27, '13.]

Rome & Gadsden Railroad, Gadsden, Ala.—The project to build the 60-mile electric line between Rome, Cave Springs, Center and Gadsden has been abandoned for the present, as financial backing could not be obtained to build the line. Louis S. Daniel, Cordele, general manager. [E. R. J., Nov. 29, '13.]

Lethbridge (Alta.) Municipal Railway.—This company will submit a by-law to the ratepayers asking authority to make the necessary expenditures to build the extension to Hardieville during the year. Plans are being considered to build about 4 miles of new track in Lethbridge during the year.

Parker, Colorado River Valley Electric Railway, Parker, Ariz.—Final surveys are being made and it is planned to begin work about May 1 on this 50-mile railway to connect Parker and Blythe. The power house will be located about ½ mile north of Parker on the Colorado River. The repair shops will be located in Parker. The company will furnish power for lighting purposes and will build a light plant at Parker. Capital stock, authorized, $500,000. Capital stock, issued, $50,000. W. H. Thorpe, manager. [E. R. J., Feb. 21, '14.]

Pacific Electric Railway, Los Angeles, Cal.—The construction of an electric railway to the crest of the San Bernardino mountains for a sight-seeing line is being considered by this company.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—An extension of the San Lorenzo line into San Lorenzo Grove is being considered.

Marin County Electric Railway, Mill Valley, Cal.—This company has been granted authority by the Railroad Commission to construct an electric railway in Mill Valley and to sell $67,000 in stock for its construction. The first branch of the new line will run up to the Cascades and the base of the trails to Tamalpais, Muir Woods, Big Lagoon and the Bolinas district. The line will extend along Throckmorton Avenue to the Northwestern Pacific depot and thence to the high school on the Sausalito road. [E. R. J., March 21, '14.]

***Redwood City, Cal.**—The San Mateo County Development Association has found that there are no legal obstacles to the county obtaining a right-of-way down the California peninsula for a railroad, and action will be taken immediately toward acquiring rights for an electric line out of San Francisco to Palo Alto. The right-of-way and the franchise will be held by the county until they can be disposed of to a company that will build an electric railroad and agree to operate it on a basis which will solve the rate question for the peninsula communities.

Santa Barbara & Suburban Railway, Santa Barbara, Cal.—An extension from Santa Barbara to Carpinteria is being considered by this company.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Grading has been begun on the section of this railway from the connection with the Oakland, Antioch & Eastern Railroad north to Dixon. The J. Hughes Construction Company has the contract for the work. H. R. Timm, Dixon, secretary. [E. R. J., April 4, '14.]

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—During the year this company plans to expend between $300,000 and $500,000 in the betterment of its lines in Honolulu. Engineers are engaged preparing estimates for materials needed and as soon as this work is completed orders will be placed for steel rails, fish plates, tie rods, cross-overs, switches and all other metal supplies required.

Kankakee & Urbana Traction Company, Urbana, Ill.—Ties and poles have been purchased by this company for its extension from Ludlow to Paxton. Grading has been completed and work will be begun at once.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—This company is asked to remove its tracks lying within the corporate limits of North Aurora, a distance of 1½ miles, from the east side to the center of the highway.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—Plans are being formulated by this company to begin work at once on its electric line to connect Boonville, Christney and Lynnville, Ind. At a recent meeting of the directors of this company the following officers were elected: J. P. Chrisney, president; James A. Hemenway, vice-president; T. P. Tillman, secretary and treasurer. [E. R. J., Feb. 7, '14.]

Union Electric Company, Dubuque, Ia.—During the next few weeks this company expects to build 1 mile of new track in Dubuque. All material has been purchased.

Fort Scott & Pittsburgh Railway, Fort Scott, Kan.—This company has asked the Kansas Public Utilities Commission for permission to sell $950,000 of bonds and $100,000 of stock. This is part of a plan to build a 35-mile line to connect Fort Scott and Pittsburgh via Garland, Arcadia, Mulberry and Frontenac. A. B. Dickman, Fort Scott, president. [E. R. J., March 21, '14.]

Garden City, Kan.—W. H. Baird, general manager of the Garden City Sugar & Land Company, states that the proposed electric railway to connect the company's numerous irrigation ranches will not be built this year. [E. R. J., March 28, '14.]

Iola (Kan.) Electric Railroad.—Extensive improvements are being made by this company on its lines in Iola and on the line between Iola and La Harpe.

***Pittsburg, Kan.**—Commercial organizations of Pittsburg and Columbus, Kan., are co-operating in plans for the construction of an electric railway from Columbus to Miami, Okla., a distance of 22 miles.

Kansas Central Traction Company, Topeka, Kan.—At a special election held at Columbus, Kan., on April 1, the proposition of issuing bonds to the extent of $10,000 to assist in financing an electric line from Columbus to Altamont was carried by a majority of 147. Oswego and other townships which will profit from the railway already have voted $35,000 in bonds, providing the line is in operation by Jan. 1, 1915. The company also proposes to build an electric line between Altamont and Coffeyville to connect with the Union Traction Company's line. [E. R. J., Jan. 24, '14.]

Arkansas Valley Interurban Railway, Wichita, Kan.—O. A. Boyle, general manager of this company, has disposed of his interest in the Interurban Construction Company to George Theis, Jr., who will assume the management of the company, which plans to build an electric line between Wichita and Hutchinson, Kan. Mr. Boyle will continue as a director of the company.

Louisville (Ky.) Railway.—It is understood that arrangements have been made between the Louisville Railway and the Louisville Board of Public Works by which the route of the company's crosstown line will be changed, the proposed construction of a heavy concrete bridge over Beargrass Creek at Ellison Avenue, sufficiently strong to bear double tracks, lending strength to this probability. The change would involve the amendment of the company's franchise to enable it to run on Ellison Avenue instead of on several other streets.

Madisonville-Nortonville Light, Power & Traction Company, Madisonville, Ky.—The construction of the proposed electric line between Madisonville and Nortonville is now pending on a proposition made by the company to the city, which contemplates the sale to the company of a franchise to furnish light to the city, to be distributed through the city's own plant. James Breathitt, Jr., representing the company, declared at a recent meeting in Madisonville that the company is in a position to begin construction work in thirty days and to push it rapidly to completion, but that it will not do so unless it is assured of a market for its surplus current in Madisonville. The City Council is considering the matter of passing an ordinance creating the franchise, as asked by the company. [E. R. J., March 21, '14.]

Shreveport (La.) Traction Company.—This company contemplates the double-tracking, extending and improving of several of its lines in Shreveport during the coming season.

Detroit (Mich.) United Railway.—During the year this company plans to reconstruct its Woodward Avenue tracks from Willis Avenue south to Witherell Street in Detroit. The new track will be 9-in. plain girder rails. The ends of the rails will be cast welded.

Electric Short Line Railroad, Minneapolis, Minn.—Steps are being taken by the citizens of Flandreau to have Flandreau made a station on the proposed new line which has been surveyed from Brookings southward through this section of the country. It is expected that a branch line will run from the main line in this vicinity westward to Mitchell via Rutland, while the main line will run southward to Sioux Falls and ultimately to Sioux City. It is believed the main line will reach Flandreau and extend east of the Milwaukee Railroad extending from Sioux Falls to Egan far enough to tap an extensive strip of country which now is entirely without railroad facilities.

Minnesota Central Railway, Minneapolis, Minn.—At a recent meeting of the directors of this company at Duluth it was decided to add about 7 miles of trackage to the original plans, so as to provide for a branch line from Ironton-Crosby to Cuyuna, and beyond to Manganese and Iron Mountain. This will make the proposed line about 45 miles long. This is part of a plan to build a line between Minneapolis, St. Cloud and Brainerd. Joseph Ferrier, Brainerd, vice-president. [E. R. J., Nov. 15, '13.]

Twin City Rapid Transit Company, Minneapolis, Minn.—The 1914 program of improvements and reconstruction work was recently announced. Two new routes will be built this summer in St. Paul, the Dale Street crosstown line and the Western Avenue line. The entire Dale Street route will be double tracked. A new line will be constructed as a branch of the Rondo and Maria line out Burns Avenue to Clarence Street. Completion of the Seven Corners loop and the paving of University Avenue are two of the large improvements the company will make. Other reconstruction work to be begun soon will be the rebuilding of the trackage and paving of Shelling Avenue from Selby Avenue to Grande Avenue in St. Paul.

St. Paul Southern Electric Railway, St. Paul, Minn.—This company announces that it will begin operation on the first section of its line between St. Paul and Hastings, Minn., June 1, 1914.

Hattiesburg (Miss.) Traction Company.—During the next few weeks this company will relay 5000 ft. of track in the paved district in Hattiesburg, using girder rails.

United Traction Company, Albany, N. Y.—Arrangements are being made for the extension of this railway to the Temperance Hill section of Watervliet.

Jamestown (N. Y.) Street Railway.—This company has asked to consider plans for an extension through Brooklyn Heights, via Baker, Palmer and Halleck Streets and Fairmont Avenue, Jamestown.

Meigs Valley Traction Company, Caldwell, Ohio.—Right-of-way has been secured and preliminary arrangements are being made for the construction of this line from Beverly to Pleasant City with a spur from McConnelsville to Crooksville. The line will connect at Beverly with the Parkersburg, Mariette & Interurban Railway and a branch will be built from Cambridge through Coshocton to New Philadelphia, where it will connect with the interurban to Cleveland. E. R. Myers is interested. [E. R. J., April 4, '14.]

Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Ohio.—This company's bridges at Lawrenceburg were recently carried away by high water. The company will replace them at once.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—Representatives of this company, Messrs. Breidinger and Clifford, met with the City Council of Barberton, Ohio, on April 2 to discuss the franchise desired to allow the construction of tracks on Frederick Street. They assured members of Council that the contract for the construction of the railway had been awarded and that work would begin on May 1. It must be completed to Orrville within one year. [E. R. J., Nov. 25, '11.]

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—An extension to Packard Park in Warren is being contemplated by this company.

Sapulpa (Okla.) Interurban Railway.—During the next few weeks this company plans to build a 1-mile extension to the City Park in Sapulpa.

Oshawa (Ont.) Railway.—During the next few weeks this company plans to build about 1500 ft. of new track in Oshawa.

Erie & Ontario Railway, Port Maitland, Ont.—Objections raised by the Hydro-Electric Commission of Ontario caused the elimination from the Erie & Ontario Railway bill of the clause giving the company certain rights for the development of water powers. The bill was passed, however, to allow the company to build from Port Maitland on Lake Erie, one line going to Smithville and another to Port Colborne. [E. R. J., Feb. 7, '14.]

Forest Hill Electric Railway, Toronto, Ont.—The Railway Committee of the Ontario Legislature has granted this company an extension of time until Dec. 15, 1914, in which to begin the construction of the line, and also to increase the bonding powers so that the bond issue could be increased from $30,000 per mile, as provided in last year's bill, to $40,000 per mile. [E. R. J., April 4, '14.]

Southern Oregon Traction Company, Medford, Ore.—Work will be begun at once by this company on the extension of its lines from the Siskiyou Heights addition east and north to the city reservoir, about 1 mile. Further extension will be made if arrangements can be made with the property owners.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company has placed in operation its line between Schaefferstown and Ephrata.

Manila Electric Railroad & Light Company, Manila, P. I.—Plans are being made by this company to extend its electric railway and electric power lines into some of the near-by provinces of Luzon. The extensions are said to include a railway to Paranaque, a further extension of the Malabon line to Obando, and electric lighting lines to near-by towns. The basin of the Angat River will be made the site of the hydroelectric plant the company plans to install to furnish power. T. W. Swift, president.

Moose Jaw (Sask.) Electric Railway.—An extension of the Hall Street line to Laurier Avenue in Moose Jaw is being planned by this company. Another extension from Main Street eastward on Hall Street for ½ mile will also be built.

Regina (Sask.) Municipal Railway.—Plans are being considered by this company to extend its lines in Regina at a cost of $250,000.

***Nashville, Tenn.**—The project to construct an electric railway from Nashville, Tenn., to Corinth, Miss., is being actively pushed by citizens of the towns along the proposed line, which would make the Nashville-Franklin Interurban Railway and the Middle Tennessee Traction Company from Franklin to Mt. Pleasant links in the completed railroad. Surveys are being made from Corinth for the purpose of locating the best route from that end. The Corinth Business Men's Club has undertaken to promote the construction of the line in that part of the country, and prospects seem favorable to some action this summer.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Preliminary work for the construction of the electric line between Fort Worth and Denton has been completed. The financing also is arranged for. E. E. Baldridge, Fort Worth, president. [E. R. J., March 14, '14.]

Seattle, Wash.—Councilman Oliver T. Erickson has introduced a resolution authorizing and directing the Board of Public Works to prepare plans and specifications immediately for Division B of the Municipal Street Railway in Seattle. This plan anticipates a connection between Division A and Division B by taking advantage of the common user provision covering the Fourth Avenue and Fourth Avenue South line of the Seattle, Renton & Southern Railroad, but in order to take advantage of this provision it will be necessary for the City Council to first repeal an ordinance passed three years ago revoking the franchise to that company.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—Work has been begun by this company on the extension between Eau Claire and Altoona.

SHOPS AND BUILDINGS

East St. Louis & Suburban Railway, East St. Louis, Ill.—Work has been begun by this company on its new passenger station at Collinsville Avenue and Main Street in East St. Louis. [E. R. J., Feb. 21, '14.]

St. John (N. B.) Suburban Railway.—Bids are being asked by this company to build a new carhouse to adjoin the present carhouses on Wentworth Street in St. John. The new structure is to be built with brick walls on concrete foundations. The entire frame will be of structural steel, and the floors are to be of reinforced concrete.

Public Service Railway, Newark, N. J.—Work will be begun at once by this company on its new terminal station on lower Broadway in Paterson. All the electric lines entering the city and those within the city limits will pass through the new terminal. Several of the present storage tracks will be removed and a new double track loop built to accommodate the extra lines. The new property purchased by the company adjoins that of the present terminal on the west. A new carhouse similar to the one at Market street will be constructed. It will be for the greater part concrete and steel, and will cover the entire property. Besides accommodations for the storage of upward of eighty cars, the new building will contain the mechanics' room, starter's office, locker rooms for the crews and social rooms for the men. It will also be equipped with modern appliances for the rapid repair of cars. The new property will be used entirely for storage and will contain tracks for about forty cars.

Lehigh Valley Transit Company, Allentown, Pa.—A new passenger station and dispatcher's office will soon be built by this company at Wales Junction.

POWER HOUSES AND SUBSTATIONS

St. Petersburg Electric Light & Power Company, St. Petersburg, Fla.—This company has completed its new power house at Second Avenue and Fifteenth Street, north, in St. Petersburg. The capacity of the new plant is 1500 kw. The cost is estimated to be about $175,000.

United Railways of St. Louis, St. Louis, Mo.—This company will add new substation apparatus to its equipment consisting of a 2000-kw rotary converter, 2200-kva air-blast transformer, switches and accessories. The order for this apparatus has been placed with the General Electric Company.

Niobrara, Sioux City & Omaha Railway, Omaha, Neb.—Work has been begun by this company on its new hydroelectric power plant in Niobrara which will be located on the Niobrara River. At the Niobrara head works 28,000 hp will be developed at the start with 47,000 hp held in an available reserve. It is proposed by the company to construct transmission lines to Norfolk, Omaha, Lincoln and Sioux City.

United Traction Company, Albany, N. Y.—This company will add to its substation equipment three 200-kva, 11,000-volt transformers and a 600-kw rotary converter. The apparatus has been ordered from the General Electric Company.

Oshawa (Ont.) Railway.—This company is installing a new motor generator at its power house in Oshawa.

Nashville Railway & Light Company, Nashville, Tenn.—Arrangements are being made by this company to build a new concrete smokestack at its Cumberland River power plant in Nashville. The smokestack will be 150 ft. high and 12 ft. in diameter inside and will replace two steel stacks 200 ft. high and 12 ft. in diameter.

San Angelo (Tex.) Street Car Company.—Work will be begun shortly by this company on its new power house in San Angelo. The cost to build and equip the new structure is estimated by the company at about $35,000.

Charleston-Dunbar Traction Company, Charleston, W. Va.—This company has installed in its power house at Dunbar a 375-kva Curtis turbo-generator, 300-kva, two-unit three-bearing synchronous motor-generator set and switchboard. The order for this equipment was placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn., expects to purchase one car.

Fitchburg & Leominster Street Railway, Fitchburg, Mass., is reported as expecting to buy one car.

Rhode Island Company, Providence, R. I., has issued inquiries for equipment on five new cars.

Quebec Railway, Light & Power Company, Quebec, Que., is refitting from four to six cars in its own shops.

Columbia Railway, Gas & Electric Company, Columbia, S. C., will build two 53-ft. cars in its own shops.

Waterville, Fairfield & Oakland Railway, Waterville, Me., is reported to be building one car in its own shops.

Dayton (Ohio) Street Railway has ordered five single-end pay-as-you-enter cars from the Cincinnati Car Company.

Jamestown, Westfield & Northwestern Railway, Jamestown, N. Y., has ordered one work car body from the Cincinnati Car Company.

Union Electric Company, Dubuque, Ia., has ordered six 41-ft. two-motor maximum-traction truck cars from the American Car Company.

Manhattan & Queens Traction Corporation, New York, N. Y., is overhauling sixteen of its former Third Avenue Railway cars. New curtains and seats are being installed in the cars.

Manhattan Bridge Three Cent Fare Line, Brooklyn, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, as expecting to purchase six closed passenger cars, has ordered these cars from the Southern Car Company.

Montreal (Que.) Tramways was incorrectly noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, as expecting to purchase 100 new cars. This company is not at present contemplating the purchase of new cars.

Northwestern Pacific Railroad, San Francisco, Cal., is reported as expecting to order thirteen motor cars to be used in the extension of the electric service from San Rafael to Petaluma and possibly Santa Rosa. The cars will have a capacity of seventy passengers each. Two gasoline-electric cars, with a capacity of fifty passengers each, are included in the new order.

Municipal Railway of San Francisco, Cal., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, as having ordered 100 California-type, pay-as-you-enter cars from the Jewett Car Company, has increased this order to 125 cars. The following details are specified:

Seating capacity	50
Weight, including elec. equipment	24,000 lb.
Bolster centers, length,	20 ft. 10 in.
Length of body	32 ft. 5 in.
Length over vestibule,	47 ft. 1 in.
Width over sills	9 ft.
Width over all	9 ft. 2½ in.
Height, rail to sills,	2 ft. 7 13/16 in.
Height, sill to trolley base,	8 ft. 11¾ in.
Body	metal
Interior trim	red birch
Roof	plain arch
Underframe	metal
Air brakes	West.
Axles	forged steel
Bumpers	8 in. channel
Cables	West.
Conduits and junction boxes,	West.
Control, type,	West. H. L. unit switch
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs,	Elec. Serv. Sup. Co.
Fare boxes	Johnson
Fenders	Eclipse Life Guard
Gears and pinions,	R. D. Nuttall Co.
Gongs	12 in. foot gong
Hand brakes	Peacock
Headlights	Golden Glow
Journal boxes	Baldwin
Motors,	West. 306-CA-4, outside hung
Paint	auto gray
Sanders	air operated
Seats	Hey Bros. & Wakefield
Seating material	red birch
Step treads	Mason
Trolley catchers	Ideal
Trolley base	U. S. No. 14
Trucks	Baldwin "L plate"
Varnish	Valentine & Hueter
Ventilators	ry. co. design
Wheels	34 in. rolled steel
Special devices,	steel floor mats

TRADE NOTES

Buda Company, Chicago, Ill., has appointed C. H. Bull as manager of its railway motor car department, with office at Harvey, Ill.

Wagner Electric Manufacturing Company, St. Louis, Mo., has opened a branch office in Suite 524, Syracuse University Block, Syracuse, N. Y., under the charge of J. W. Bryant, resident agent.

Meikleham & Dinsmore, New York, N. Y., announce that W. H. Padgett of Philadelphia has recently become associated with them, with headquarters at 1421 Chestnut Street, Philadelphia, Pa.

Esterline Company, Indianapolis, Ind., has been awarded a contract for 172 "Golden Glow" headlights for the city and suburban cars of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

F. B. H. Paine has opened an office as consulting engineer at 26 Cortlandt street, New York. He will specialize on corporate management, commission problems, the inter-relations of utilities and electric and gas contracts.

R. W. Cameron & Company, New York, N. Y., exporters, have received an inquiry from an electric railway in Australia for a storage-battery motor truck to be equipped with a jib crane with lifting capacity of 3360 lb., for lifting armatures and for general shop work.

Carnegie Steel Company, Pittsburgh, Pa., has received an order from the International Railways, Buffalo, N. Y., for 20,000 steel ties. This order is believed to be the largest order for steel ties ever placed by an electric railway.

William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., has appointed James C. H. Ferguson as Pacific Coast representative, with office in the Monadnock Building, San Francisco, Cal. Mr. Ferguson recently resigned from the position of Pacific Coast sales agent of the Midvale Steel Company, Philadelphia, Pa., which he has held for the past thirteen years.

Frank N. Grigg, Richmond, Va., for the past year district manager of the Standard Heat & Ventilation Company, with office at Washington, D. C., has been appointed sales agent for the Southeastern and Southern district of the Transportation Utilities Company, New York, N. Y., and the Rostand Manufacturing Company, Milford, Conn. His office is in Room 1201, Virginia Railway & Power Building, Richmond, Va. Mr. Grigg formerly spent ten years in the motive power and stores department of the Chesapeake & Ohio Railway. He left the railway field in January, 1903, to become eastern representative of the Adams & Westlake Company.

ADVERTISING LITERATURE

Waterhouse Welding Company, Boston, Mass., has issued a catalog describing and illustrating its welding and cutting plants.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder describing its steel out-door substations.

Railway Improvement Company, New York, N. Y., has issued a poster entitled "Making the Strap Hangers Happy" in connection with its Rico sanitary straps.

American Emery Wheel Works, Providence, R. I., has reprinted a chart from "Grinding Wheels," which was compiled and copyrighted in 1913 by the Independence Inspection Bureau of Philadelphia and Chicago. The chart analyzes the various causes of grinding wheel accidents.

Busch-Sulzer Brothers-Diesel Engine Company, St. Louis, Mo., has issued a pamphlet describing the Diesel engine which this company is now building for all classes of service in the United States. The pamphlet, which is made up in very attractive form and is profusely illustrated, contains a historical sketch of the Diesel engine and an outline of the reasons for its low fuel consumption over a wide range of loads. The economy is shown by several diagrams which compare its operation with that of steam engines, and, in connection with this, the guarantees of the builders are briefly explained. The pamphlet also includes material descriptive of the theory of the Diesel engine, together with a list of installations in industrial plants throughout the country.

Electric Railway Journal

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SQUARE DEAL FOR PUBLIC SERVICE MEN

Elsewhere in this issue is printed a digest of an address delivered in New York recently by Thomas N. McCarter, president of the Public Service Corporation of New Jersey. As usual Mr. McCarter's remarks were vigorous, frank and non-apologetic. He did not condone the past or present faults of public utility officials and promoters, but he did claim that these men are as good a class of citizens as any other and that there was no reason why a public service official should be considered a criminal simply because of the position which he occupies. Mr. McCarter welcomed the opportunity to state the company side of the case, a side for which, he said, it is extremely difficult to get a fair hearing. There is no doubt that the attitude of scepticism, displayed by a part of the public toward the utterances of railway managers and criticised by Mr. McCarter, is extremely unfortunate from the educational standpoint because it cuts off the supply of information from the only source from which first-hand data can be secured. If all utterances by utility officials are received with incredulity while the editorial pages of those newspapers which reflect what their readers think rather than the facts are regarded as gospel, the present unfortunate condition must continue. It can be removed only by a tedious process of truth dissemination and by object lesson after object lesson. Theoretically the public should be willing to give the corporation a square deal, but the public is an enormous mass of individuals largely insoherent unless compacted by some momentous and threatening issue. The officials personify the utility in the public mind. They must possess personality and ability to command confidence. Only through them and their work will the unfortunate conditions outlined by Mr. McCarter be corrected.

CLASSIFICATION OF SIGNAL FAILURES

The authors of the two communications published elsewhere in this issue on the subject of definitions for a signal failure are obviously in accord as to the desirability of using the general term in the broadest possible manner, but in addition both advocate classification into two or more sub-divisions. The point is timely. Signal failures are produced by such a multiplicity of causes that separate consideration of the different classes may be quite permissible. On the other hand, the comparative records of signal performance are certain to lose in effectiveness if an extended classification is introduced, for the reason that different opinions as to the relative importance of the various sub-divisions will becloud the main issue, which is, after all, nothing more than the definite determination of signal efficiency. Of course, if signal efficiency could be completely expressed by a single number, the ideal condition would be attained because comparisons could then be made directly without the necessity for confusing the mind with a lot of qualifying conditions which might or might not be of real importance in the final result. However, as indicated by our correspondents, it is obvious that classification of signal failures will serve as a compromise between the opinions of those who wish to limit the definition of a signal failure to actual derangements of the mechanism and of those who wish to use the term in its broadest sense, and, if the classification involves the use of only one of two new terms such as the "creditable failure" suggested by Mr. Leisenring little objection can be taken on the grounds of its introducing confusion.

UNEQUAL GROWTH OF TRAFFIC

Among the interesting points of Alexander Jackson's valuable paper on the rarely-treated subject of "The Development of Time-tables," which is published elsewhere in this issue, is a reference to the unequal growth of rush-hour and midday traffic on suburban lines. Mr. Jackson quotes a specific case where the business during the morning and evening rush hours has doubled and tripled, respectively in each case, within ten years, whereas the midday travel has remained almost stationary. In other words, the peaks have grown higher relatively as well as actually from year to year. The condition so accurately stated by Mr. Jackson is by no means unusual on other large city systems, although attention is seldom called to it. In the earlier stages of the growth of a suburb the lack of good stores and schools and the fondness for old associations are responsible for much of the intra-rush hour travel. As the section grows, a local business, educational and social center is created, with the result that the midday traffic tends to remain stationary in spite of the increase in population. The rush-hour traffic, on the contrary, grows constantly with the population because the essential character of this business, namely, transportation between home and place of business, undergoes comparatively little change. To be sure, the continued growth of the suburb also creates some purely local travel, but this is seldom important enough to affect the through-line service. It is self-evident that a condition of this kind adds greatly to the difficulty of giving the rush-hour personnel a full day's work. In the instance quoted by Mr. Jackson two-car operation has been adopted because, aside from other advantages, this train service requires only 50 per cent more men with every 100 per cent increase in cars.

APPOINTMENT OF MR. DANIELS The long delay in the Senate over the confirmation of the appointment of Winthrop More Daniels of New Jersey as a member of the Interstate Commerce Commission was an object lesson to the country of the lack of fair-mindedness which characterizes some of those who occupy prominent positions in the national government. The opposition to Mr. Daniels was enlightening. It was based on the fact that the New Jersey Board of Public Utility Commissioners, of which Mr. Daniels was a member, rendered a decision in the Public Service Gas Company case in which it made an allowance for non-physical values. The fact that the values are real and that the cost of them was just as tangible as the cost of any item of physical property entering into the investment were superfluous details to the objecting Senators. They pressed the charge that the New Jersey decision unduly favored the company because it made an allowance for values that were not physical. If the decision had declined to allow any values that were not physical would the Senate have held that Mr. Daniels could not make a fair Interstate Commerce Commissioner because he unduly favored the consuming public? It is agreeable to note that the position taken by President Wilson during the controversy was that he sought a fair-minded man for the office; with that quality of mind he would trust the decisions that would follow. The decision in the New Jersey case allowed 17.6 per cent for overhead charges and 30 per cent for going value. It would be evidence of rank prejudice of mind for a seeker after a commission appointment to declare that there are no values except physical values. It is fortunate that this low standard of public policy and morals did not apply in the selection of the new member of the Interstate Commerce Commission.

THE PHILADELPHIA ELECTRIFICATION

The suburban electrification project of the Pennsylvania Railroad between Philadelphia and Paoli, of which a preliminary account is published elsewhere in this issue, presents a great many unusual features. Prominent among these is the fact that only suburban traffic is to be handled electrically, the through trains being operated by steam as heretofore, and although this might seem to involve a failure to make use of the advantages of electric traction for a considerable part of the traffic regardless of the large investment for the overhead construction, the peculiar local conditions make the procedure a most logical one.

The reasons will be found in the basic idea upon which the project has been undertaken. This is that electric operation of the numerous suburban trains on the main line will relieve congestion at the Broad Street terminal in Philadelphia to a marked extent owing to the rapidity of handling and elimination of switching movements with the multiple-unit equipment, and the extension of the terminal, which otherwise would be required, can be postponed for several years. Indeed, standing purely by itself, the Paoli electrification is not considered as an exceptionally good example for demonstrating the economies of electric operation. The installation, however, will effect a sufficient reduction in operating expense to pay at least the interest charges on the whole investment and, for this reason, it becomes an infinitely better means for providing relief from the existing terminal congestion in Philadelphia than would the extension of the present tracks and terminal building and the retention of steam—a course which would probably involve quite as large an outlay without any hope of direct return. As time goes on, and the growth of traffic begins again to tax terminal facilities the electrification of the other suburban lines radiating from Philadelphia appears to be inevitable. Each one of these, when served by multiple-unit trains, will do its share in reducing congestion, and as the percentage of electrified routes in the district increases, the possible economies will obviously grow greater.

The provisions that have been made for the necessary car equipment furnish material for thought on the part of all steam railroad officials. The cars which are to be used in the electric zone are steel coaches now in regular steam passenger service. They were adopted as standard on the Pennsylvania railroad several years ago and were designed with the expectation of eventual use as multiple-unit equipments. In consequence, the decision to electrify the line to Paoli has involved expense only for the overhead construction and equipment and for the actual electrical apparatus on the cars. Electrification has required nothing to be scrapped. The lesson is obvious, and in view of the inevitability of electrification it may well be considered by every steam-railroad official.

The type of overhead construction to be used is novel, but it is by no means as novel as the thorough methods adopted by the consulting engineers in their investigations prior to the selections of the final design. This has included the erection of an experimental mile of four-track overhead construction in which has been installed every possibly satisfactory arrangement of catenary, hanger, insulator and contact wire. For months these various arrangements have been subjected to severe mechanical tests, and the undesirable constructions have been discovered without necessity for recourse to the costly experience of actual service.

Judged by the standard set by existing installations all of the constructions shown in the illustrations accompanying the description of the new line are exceedingly light. It may be that some will find fault with them for that reason, but, as a matter of fact, when one realizes the excellent service given by the overhead constructions characteristic of the interurban lines of the Middle West, it is difficult to avoid the conclusion that extreme substantiability for a trolley system is not necessary. Certainly any tendency toward lighter construction is most welcome for the reduction which it effects in the cost of installation.

UNIFORMITY IN FINANCIAL STATEMENTS

To the close reviewer of the annual reports of electric railways one of the most striking facts, in view of the long-continued movement for the standardization of accounts, is the dissimilarity existing among such reports as regards the make-up of the two financial statements—the statement of income, profit and loss and the balance sheet. As early as 1892 one of the speakers before the Street Railway Accountants' Association remarked that operating officials differed greatly in opinion as to the necessity and value of financial and statistical reports, and that it was almost impossible to get reliable data for the comparison of companies. It might be supposed that the promulgation of the several forms of statements from 1894 to date would have cleared up this difficulty. It appears, however, that although practically all companies use a detailed classification of accounts for their own records and for their reports to state commissions, there is a very wide variety in the forms in which they issue their annual reports to their stockholders. An examination of several of such reports recently received shows this variation in a striking way.

For instance, one operating report (South Carolina Light, Power & Railways Company) showed no itemization of gross earnings or operating expenses and handled taxes as a separate deduction from net earnings before interest was deducted. A second report (Atlantic Shore Railway) showed subdivisions for operating revenue but none for operating expenses, and included taxes, interest and adjusting entries in separate amounts among deductions from income. A third report (Public Service Corporation of New Jersey) was that of a company operating gas, electric light and electric railway properties, and although the operating revenues were allocated to these divisions, the operating expenses were given only in total. The chief features of report No. 4 (Northern Ohio Traction & Light Company) were that the operating expenses and taxes were included in one amount and that depreciation was made a profit and loss charge. In report No. 5 (Bay State Street Railway) taxes were grouped with interest and rentals in one total, as a deduction from gross income less operating expenses. Furthermore, dividends were deducted from the net divisible income, and the resulting surplus was increased by the surplus at the end of the former period, instead of the two surpluses being combined and then dispensed for dividends and other profit and loss charges, as in report No. 4. It is interesting to note that the title "gross income" used for the first revenue entry in report No. 5, from which operating expenses were deducted, was identical with the title used in report No. 2 for the sum obtained by adding miscellaneous income to the difference between operating revenue and operating expenses. In report No. 6 (Milwaukee Electric Railway & Light Company) depreciation and taxes were added to the operating expenses and deducted from the operating revenues. In report No. 7 (United Railways of St. Louis), however, the operating expenses and depreciation were all included in one total, and the taxes were subtracted from an amount called "surplus over operating expenses" in order to obtain the income from operation, instead of being included with either operating expenses or deductions from income. The final income statement (Honolulu Rapid Transit & Land Company) showed depreciation being accounted for as a deduction from income instead of as an operating expense or profit and loss charge.

Similar differences of form, arrangement and grouping of items appear in connection with the balance sheets. One report (Cleveland Railway) adopted a typographical arrangement in which the titles of the asset and the liability accounts are placed in the same column, while the amounts of the assets are carried in the second column and the liability amounts in a third column. Another statement (Cleveland, Painesville & Eastern Railroad), contrary to the usual accounting practice in America but like that in England, showed the liabilities ahead of the assets. Other differences almost as great in arrangement are shown in the other reports.

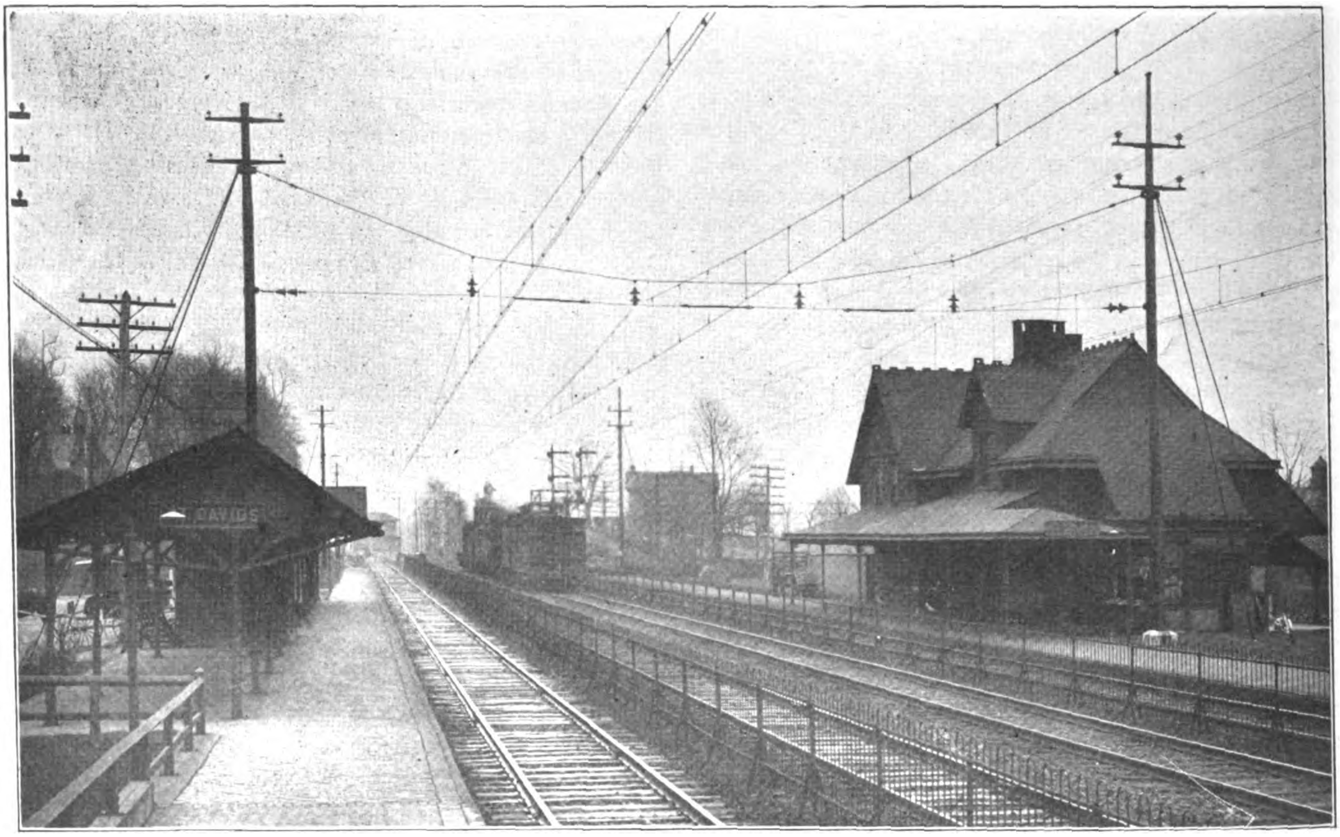
We realize that there may be local reasons in some cases for the methods of arrangement employed. At the same time greater uniformity in the printed reports issued to stockholders and often, as well, more detailed information, especially in regard to the operating accounts, would be of great assistance. The determination of whether the proper expenditures have been made for maintenance generally depends on a subdivision of the operating expense group, and the location of tax and depreciation charges has a marked effect on the relation between the operating revenues and the operating expenses, between the operating income and the operating revenues and between the total or gross income and the deductions from income. If one company includes taxes and depreciation charges in deductions from income and another does not, comparisons of the margins of safety of these companies are useless.

It should not be inferred that we are advocating that companies should give to their stockholders all the multitudinous detail that may finally accompany the entire Interstate Commerce Commission form of annual report, but the main divisions should be followed. It does not suffice that the facts are given to a state regulatory commission. The reports filed there are limited in value to the average investor because he is generally unable to visit the state capital to examine them and because the annual report of the commission is usually published long after the company's annual report and contains only the barest abstract of the financial operations of the individual companies. For this reason the average investor prefers to leave to the commission the task of watching the financial operations of the company during the fiscal period and to look to the company itself for the full data showing the actual results of these operations.

Philadelphia-Paoli Electrification on the Pennsylvania

This Suburban Electrification, Which Will Be Completed Within the Present Year, Possesses Many Novel Features, Including the Use of Standard Steam-Railroad Passenger Coaches, Electrically Equipped, and a New Form of Overhead Construction—A Preliminary Description Is Published

George Gibbs, during the course of his remarks before the last meeting of the New York Railroad Club, briefly outlined the immediate plans for electrification on the Pennsylvania Railroad which include the equipment of the main line from Broad Street Station in Philadelphia westward to Paoli—a distance of 20 miles.



Philadelphia Electrification—View of Experimental Installation on the Main Line Showing Preferred Type of Construction Over Left-Hand Track—Test Cars in Background

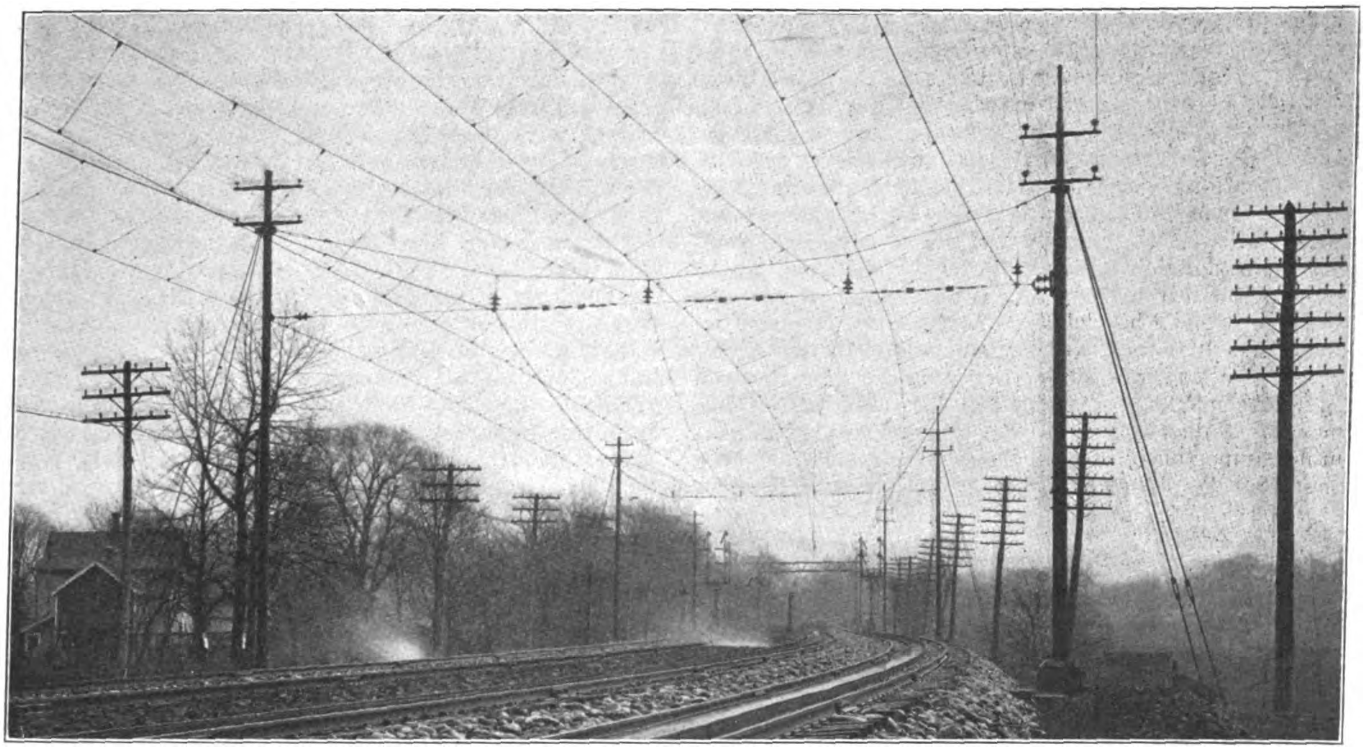
The active work of construction on this project is to commence within a few weeks, with the expectation of having it ready for testing by Dec. 31 of the present year; and, as the plans of the engineers, Gibbs & Hill, are now nearing completion, an amplification of Mr. Gibbs' remarks regarding this electrification is published in the following paragraphs. The project, while not of extraordinary physical magnitude, possesses unusual interest, first, because of the selection of the single-phase system of operation for suburban service, and second, because of natural interest in the Pennsylvania Railroad's vast electrification scheme, of which the present installation is a beginning.

EXISTING CONDITIONS

The proposed electrified section to Paoli will cover the first 20 miles of the main line west of Philadelphia. At present an exceedingly heavy suburban traffic is being handled over it in addition to the through trains. Most of the local trains are run to Paoli although some others continue west to the end of the suburban zone at Westchester, 31 miles from Philadelphia.

There are forty-seven outbound suburban trains and forty-nine inbound, making a very frequent schedule which has to be arranged so that the suburban traffic is sandwiched in between the through trains between Philadelphia and Pittsburgh. Of these through trains there are thirty-three outbound and thirty-six inbound, making a total, for all classes of passenger service, of 165 trains daily. The line has four tracks and the operating difficulties, once the trains are clear of the city of Philadelphia, are by no means acute. At Broad Street Station, however, a condition of congestion exists which has already established a limit to the amount of traffic that can be handled at the terminal. The station contains sixteen platform tracks, but these are led into a throat just outside of the station where six suburban routes converge, and this point sets a limit to the possible number of train movements in and out of the station and between the station and the storage yard just beyond the throat. The congestion at this point is considerably more of a handicap to train movement than that caused by the limited number of station platform tracks.

Suburban traffic over the main line west of Philadelphia is now handled in three-car trains during the



Philadelphia Electrification—Curve on Experimental Section Equipped with a Special Type of Flexible Hanger Supporting a Single Contact Wire

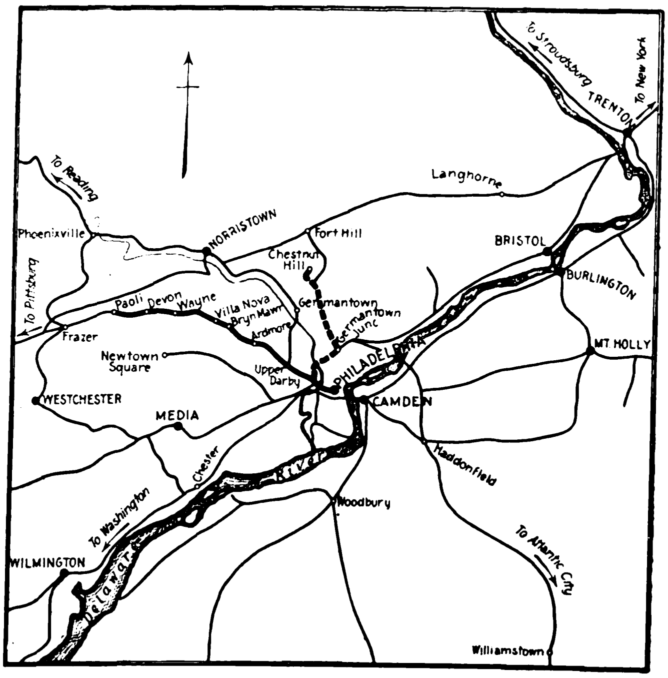
non-rush hours and, with one exception, in five-car and six-car trains during the rush hours. These small trains are hauled by passenger locomotives of almost the largest type in use on the Pennsylvania System, and, in consequence, the great excess of tractive power furnished for each train becomes available for producing rapid acceleration. The scheduled speed from Philadelphia to Paoli is 21 m.p.h. including nineteen stops, practically one stop per mile, and from this it will be seen that, so far as quick service goes, the operation by steam is exceptionally good.

REASONS FOR ELECTRIFICATION

At the present time the natural growth of traffic over the system under the conditions outlined above has reached the limit set by existing terminal facilities, and within the last few years the railroad company has faced the problem of providing some means for taking care of it. This could have been done either by increasing the terminal facilities at Broad Street at a large expense or else by introducing electric operation for the heavy suburban traffic. The latter plan has been adopted for the reason that it provides economies in operation which will be sufficient to pay the interest charges on the cost of installation, so that, practically speaking, the increase in capacity can be made to pay for itself. With the other alternative there would have been no opportunity for obtaining a direct return upon the heavy investment, and this has made obvious the desirability of electrifying the line.

Through the use of electrically-operated trains for the suburban traffic on the main line west from Broad Street Station, it has been found that a material reduction of train movement through the throat between the station and yard could be effected. The decrease has been estimated to be between 16 and 20 per cent. This is due in large part to the fact that the storage yard lies beyond the throat and that trains and steam locomotives entering the station have to be taken back through the throat after entering the station.

With multiple-unit electric cars these reverse movements will be unnecessary and the reduction in congestion will become almost proportional to the percentage of electrically-operated trains in service. In addition it has been found that the use of multiple-unit trains will provide the equivalent of two extra platform tracks in the station itself because the electric trains can be made ready for a return trip promptly after arrival in the station. This increase of 12½ per cent in the station platform capacity and the reduction in the number of movements through the throat have been estimated to be sufficient to care for the normal growth of


To Stroudsburg
To New York
TRENTON
To Reading
Langhorne
Phoenixville
NORRISTOWN
Fort Hill
Chestnut Hill
BRISTOL
To Pittsburg
Paoli
Devon
Wayne
Villa Nova
Bryn Mawr
Ardmore
Germantown
Germantown Junc
BURLINGTON
Frazer
Newtown Square
Upper Darby
PHILADELPHIA
MT. HOLLY
WESTCHESTER
MEDIA
CAMDEN
Haddonfield
Chester
River
To Washington
Woodbury
To Atlantic City
WILMINGTON
Delaware
Williamstown

Philadelphia Electrification—Map Showing Suburban Lines of Pennsylvania Railroad and Proposed Electrifications

traffic for the next six years, and as the economies effected by the improvement will pay interest charges on the investment required, the plans for electrification have been considered most satisfactory.

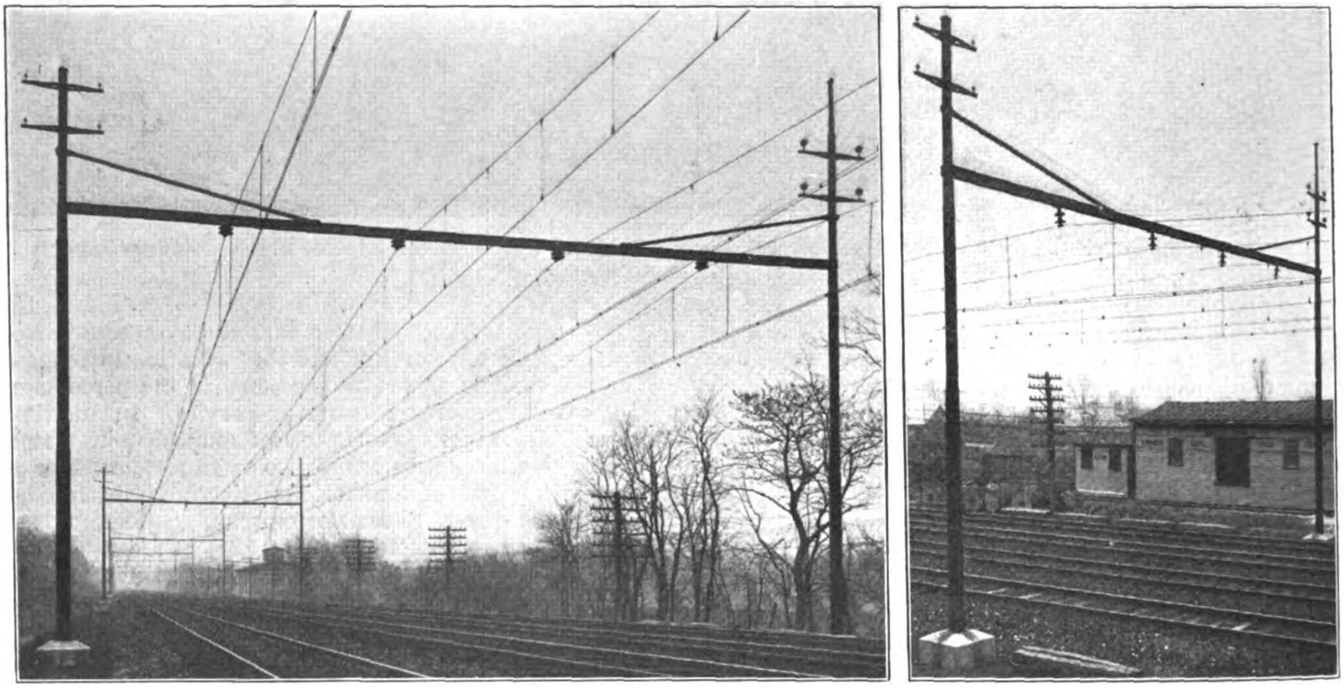
The single-phase system of operation has been adopted for the electrification not so much as a result of calculations based upon the conditions existing on the suburban line being equipped but more in the nature of a logical step toward the accomplishment of the Pennsylvania's general electrification plans, which include the introduction of electric operation between New York and Philadelphia, and its later extension on the main line west of Philadelphia. In this comprehensive scheme the actual requirements involved by the conditions surrounding the suburban traffic out of Philadelphia are, of course, of somewhat minor importance, and, as the whole problem has been the subject of continuous study and investigation by Gibbs & Hill, consulting engineers for the Pennsylvania Railroad, for several years, the choice of the single-phase system for the suburban line came as a natural consequence through the studies which applied to the general plan. Broadly speaking, the general reasons for the decision to use single-phase have been that the type of overhead construction for this system and the method of transmission makes possible the use of any type of tractor which has so far been suggested in the history of steam railroad trunk line electrification. In addition the apparatus as installed especially for the single-phase system is available for the split-phase locomotive, for any of the various types of single-phase motors, or for the use of the rectifier in case that becomes a practical commercial development; and there exist the advantages of high transmission voltage and ease of transformation from three-phase power lines working on twenty-five cycle frequency.

OVERHEAD CONSTRUCTION

Power will be furnished to the cars from an overhead catenary system carried on supports of the cross-catenary type. In this arrangement no structural steel bridges are to be used, but instead a span wire of heavy cable will be carried across the tracks between two tubular steel poles at 300 ft. intervals. From this will be suspended a single longitudinal catenary with a secondary messenger wire of copper and a trolley or contact wire of bronze. This cross-catenary type of overhead construction over a four-track main line has never been used heretofore in this country. Its obvious advantage outside of ease of erection and reduced maintenance and first cost is that the installation of transverse cables instead of structural steel bridges obstructs the view of motormen but little and, in consequence, the arrestive effect of semaphore signals at a distance is not diminished.

The longitudinal catenary will consist of a messenger cable supported from the cross-catenary cable, and from this in turn will be suspended the secondary messenger and trolley wires, both of the latter being practically horizontal. The secondary messenger wire acts as a conductor as well as a means for producing flexibility in the trolley wire, against which run the pantographs of the cars. In general the use of two lower wires is well known abroad and also in this country through the installations of the New York, New Haven & Hartford Railroad and the New York, Westchester & Boston Railway, but on the Pennsylvania installation the method of supporting the contact wire from the secondary messenger will differ materially from that used on these two roads. Small, two-piece clips will fasten the wires together at intervals of about 15 ft., and between every second pair of clips, or at intervals of about 30 ft., a hanger from the catenary will be attached to the upper wire. In the previously-mentioned installations a hanger is installed between every pair of clips instead of between every second pair, so that the new form of construction obviously reduces the number of hangers from the catenary cable without necessarily reducing the number of clips.

Current will be supplied from the contact wire at 11,000 volts, power being transmitted along the line at 33,000 volts or 44,000 volts and being reduced to 11,000 in three transformer stations. One of these stations is to be a central receiving station where the



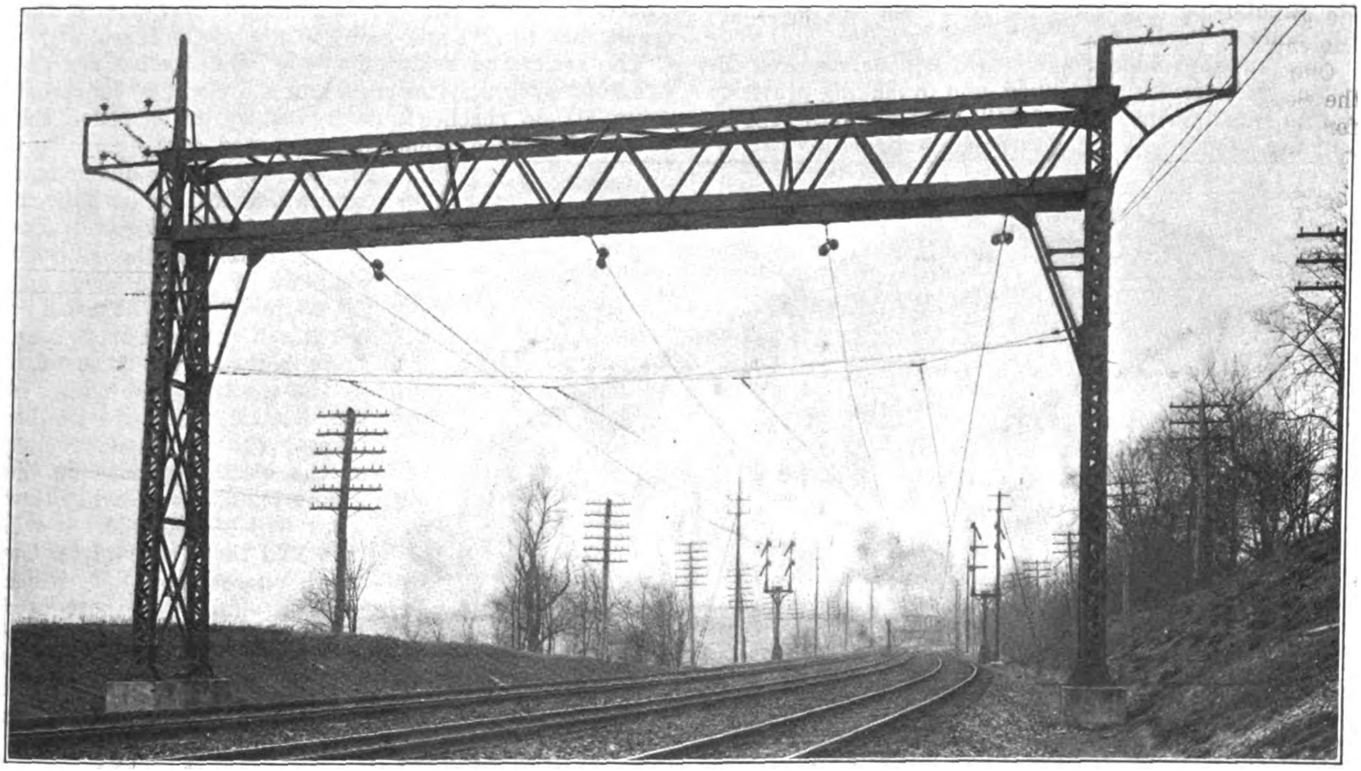
Philadelphia Electrification—Views of an Experimental Form of Catenary Bridge. The Cross-Catenary Type of Supporting Structure Has Been Found to Be Superior to This and Will Be Used for the Permanent Installation

power, which is to be purchased from the Philadelphia Electric Company, is transformed from 13,200 volts and supplied to the single-phase railroad transmission line. The location of the various transformer-station feeder points is to be made with a view to minimizing the inductive effect of the single-phase current, the line being sectionalized, and this engineering problem is being worked out at the present time. However, it may be said that, independent of the requirements of the electrification and simply because of the disastrous effects of the recent blizzard on the Pennsylvania Railroad, all telephone and telegraph wires along the right of way are to be placed underground. In consequence the question of inductive interference applies chiefly to commercial wires within the towns along the line of the railroad.

One of the most interesting features of the preliminary engineering work introduced by the consulting engineers has been the erection of an experimental mile of overhead construction at St. Davids Station on the main line, 14 miles west of Philadelphia. Views of this are shown in the accompanying illustrations. In the experimental section, which includes all four main-line tracks, a number of different forms of catenary construction have been installed, and these have been subjected to exhaustive tests for purposes of comparison. In all cases tubular steel poles with 10-in. butts set in heavy concrete foundations have been used for the main supports of the overhead system. Each pole is made up of three telescope sections with the bottom reinforced with an extra section of tubing extending several inches above the top of the concrete foundation, thus providing additional strength at the point of greatest tendency toward corrosion.

Two general forms of bridge support have been tried out. One of these has for the cross-bar an I-beam of about 8-in. depth which is attached to the pole by means of split clamps, the halves of these being bolted together. The I-beam is reinforced by diagonal T-bars extending from the pole downward to a point on the I-beam about 15 ft. out from the pole. From these I-beams is hung the longitudinal catenary construction, two suspension insulators being provided at each point of support. Structural steel anchor bridges will be installed at half-mile intervals.

Another general form of construction, and the one which is to be adopted with possibly some changes in detail, consists of a cross-catenary cable which replaces the I-beam. With this construction the poles are guyed by two 1¼-in. steel rods with turn-buckles. These are attached to the pole at the point of connection for the cross-catenary cables, and are anchored in back of the pole. On both curves and tangents, with this type of construction, the high points of the longitudinal catenary cables are provided with horizontal steady strains insulated from poles by double porcelain insulators, and wooden insulators about 3 ft. long are installed between each pair of tracks so that the different tracks may be kept separated electrically.



Philadelphia Electrification—View at End of Experimental Section of Track Showing Construction of Anchor Bridges Which Will Be Installed at Half-Mile Intervals

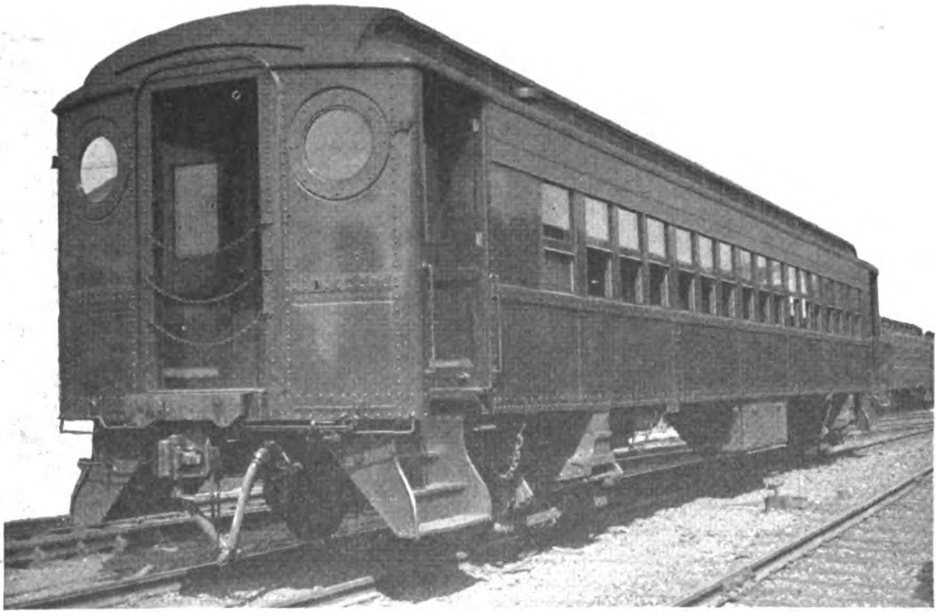
In some cases a single contact wire has been tried out, the hangers from the catenary being made of light, flexible wire. The same type of flexible hanger has been installed over some parts of the line that are equipped with the secondary messenger wire, although most of the construction has solid rods for hangers.

The experimental construction has not been operated under power and the tests have been carried on by mechanical means only. The testing outfit consists of a pair of cars equipped with pantographs and platforms for observers from which the contact wire may be inspected from close range. The tests have included hammer blows delivered in series at intervals of a few seconds for the purpose of demonstrating the ability of the construction to withstand vibration, and the test cars have also been run over the track by a steam locomotive attached to them. As the platforms provided for the observers are located at ample height the operation of both pantograph and overhead construction may be closely examined even when the test car is traveling at high speed.

CAR EQUIPMENT

The proposed installation includes consideration only of multiple-unit car service for the suburban traffic. For the present no electric locomotives are to be operated over the line and none are to be purchased for the installation. No freight of any kind is to be moved over the electrified section except by steam. The through passenger trains that run over the electrified zone number thirty-three outbound and thirty-six inbound, and these are also to be operated by steam. The same thing applies to several local trains which terminate at points considerably beyond the limits of the electrified zone. In the case of a few local trains which terminate at points only a comparatively short distance beyond Paoli, steam locomotives will be coupled direct to the electrically operated cars when they reach that station and they will be hauled as trailers beyond the electrified section. It should be said, however, that the greater part of the suburban traffic on the main line ends at Paoli.

One hundred multiple-unit cars will be required for the electric service as planned, and in making provision for this equipment Gibbs & Hill have put into practice an idea which is unique in steam railroad electrification and which is of far-reaching importance. The cars to be used are of the Pennsylvania "MP-54" type, of which there are already a large number in operation as standard passenger coaches in steam trains. They were designed and standardized several years ago solely with regard for future use as electric motor cars.



Philadelphia Electrification—Standard Type of Steel Passenger Coach Which Will Be Equipped with Motors for Use on Electrified Line

These coaches are of all-steel construction and are 54 ft. 6 in. long over corner posts with end platforms 5 ft. long at each end. The width over eaves is 9 ft. 11½ in. and the height to the top of the roof from the rail is 13 ft. The seating capacity is sixty-eight, there being thirty-two transverse double seats and four single corner seats. End and side doors are installed in the vestibules, but no center-entrance is provided for the car in accordance with the customary scheme of steam railroad practice. The weight of the body is approximately 54,000 lb. and the weight of the two trucks approximates 33,000 lb. The weight of electrical equipment will approximate 30,000 lb.

Each of the cars will be equipped with two 225-hp single-phase, commutator-type motors, both mounted on one truck. They will be furnished with multiple-unit control and the controller will be located in the vestibule, being protected when not in use by the end door at one side which opens inwardly. The circular end window behind which the motorman stands is hinged to swing inward when desired. A switchboard is to be mounted on the left-hand side of the end bulkhead at the motor-truck end and it will be inclosed by a pressed-steel door.

At the cars have been designed for use in steam passenger service on the Pennsylvania and also with the idea of using them eventually in multiple-unit electric trains, they are, with the addition of the electrical equipment and wiring, capable of being put into electric service at any time. The trucks installed on the cars for steam railroad service are suitable for trailer trucks under the cars after they are converted for electric service, but are not suitable for carrying motors. Therefore, when the car is changed over one of the trucks has to be replaced by a new motor truck.

The estimated requirements of the service are approximately 100 motor cars, and these will be converted from MP-54 coaches now in service or on order, the trucks discarded from the converted cars being used for trailer trucks under new cars which are to be built in the future. The motor trucks will be built by the railroad company in its own shops and the equipment for them will be purchased within a short time.

No trail cars will be operated in the multiple-unit trains in the electric zone, and in this respect the standard practice of the electric service on the Pennsylvania Terminal in New York will be followed. It will be noted that the cars for the single-phase Paoli line, which will be similar to those used in the Pennsylvania Terminal service, are to be equipped with motors only 2½ per cent larger, as the 600-volt d.c. cars in New York have 215-hp motors as against 225-hp motors on the new ones.

Current for the cars will be collected from the overhead wire by pantographs, one of which will be installed over the truck at one end of each car. The high-tension current will be carried by heavily insulated cables in conduits to a single main transformer hung from the framing underneath the car, and from this point it will be delivered to the motors at about 320 volts.

CHESTNUT HILL ELECTRIFICATION

A further step in the Pennsylvania electrification plans after electrifying the main line to Paoli, as announced by Mr. Gibbs, will be the equipment of the line to Chestnut Hill, 12 miles north of Broad Street Station in Philadelphia. This line is shown in the map on page 861 by heavy dotted lines. It is strictly a suburban line, twenty-nine trains a day being operated each way between the two terminal points to accommodate the present traffic, although this is rapidly increasing. This electrification will still further relieve the conditions in Broad Street Station, but the work of construction is not immediately in hand and will not be taken up until such time as business conditions warrant the installation.

Report on Winnipeg

From an Examination Made by R. M. Feustel, Recommendations Are Made for Pay-as-You-Enter Cars, Higher Speed, Elimination of Certain Stops, Etc.—The Viewpoints of the Public Utility and Public Are Considered and Their Relations Are Discussed

In August, 1912, H. A. Robson, Public Service Commissioner of Manitoba, employed the firm of Sloan, Huddle, Feustel & Freeman, of Madison, Wis., to investigate and make a preliminary report on the service being furnished by the Winnipeg Electric Railway in Winnipeg and vicinity. A preliminary report was made at that time, dealing with certain special traffic problems, and it was arranged to have a complete survey made during the heavy traffic period. This was done during the four months beginning Feb. 1, 1913, and a complete traffic survey was made under the direction of Mr. Feustel, now chief engineer of the Public Utilities Commission of Illinois. The completed report was filed with the Public Service Commission about Oct. 1, 1913, and was referred to the City Council, which adopted it after a conference with the officials of the company. Objections were made on the part of the company to certain minor provisions, but in the main the report was accepted.

The data collected were taken in the usual detail followed in such traffic surveys, and the results were plotted in the form of "Seat Demand," "Fluctuation in Traffic and Variation in Headway" and "Car Loading" curves.

The problem was considered in the report almost entirely from an adequacy-of-service standpoint. While it was understood that an equitable rate of return must be had in order that any company can continue in operating condition, no investigation was made as to earnings or operating expenses. These factors, however, were kept in mind in all the recommendations which were made for improvements in the service.

SOME OF THE DIFFICULTIES OF THE PROBLEM

In discussing some of the difficulties of the traffic problem on city railways the report says:

"The fact that the transportation business was well developed before the public became aware of its real importance and the relation it had to civic growth makes the problem somewhat harder to deal with. The utility has gone through a series of changes in the course of its development. The earlier systems have been done away with, horse cars giving way to steam and cable cars, and those in turn having been followed by the electric lines. Rolling stock and plant equipment have been scrapped, promotion profits have been taken out of the business by those interested in reorganizations, franchises have been bought and sold, lines have been built into unprofitable territory because of political influence, and to-day we have the utility company usually part of some larger syndicate with a relation to the people considerably different from that which was intended at the beginning of its existence.

"If there has been any fault in this matter the responsibility for the trouble lies quite as often with the public as with the utility. The public, through its representatives, has sold or given franchises to competing companies and cheerfully accepted the benefits of destructive competition, and many times by a demand for changes of equipment has placed a burden on the business which later on the public is to some extent obliged to carry under the agreements which are considered fair and reasonable between public utilities and cities at the present time. It is a matter now of the public and the utility coming to an understanding as to their relation to one another, and with this better understanding will come improved service to the community and more economical operating conditions for the company.

THE PROBLEM AS IT APPEARS TO THE PATRON

"The patron feels that he has a right to expect adequate service, which to him means a sufficient number of cars so that long waits will be unnecessary. He believes that as a usual thing comfortable seats should be furnished for all passengers except during certain portions of the rush hour, that the cars should be comfortably heated in winter, properly ventilated at all times and operated with safety and with the maximum amount of speed consistent with this safety. He feels that he should be able to go by the shortest reasonable routes to his destination, that there should be a universal transfer system and that the single fare zone should include the entire city with its immediate suburbs.

THE PROBLEM AS IT APPEARS TO THE UTILITY OWNER

"The owner feels that as long as his service is adequate and the rate of fare reasonable he should be allowed a virtual monopoly of the transportation business in the community. He feels that he should be allowed to operate the most approved type of equipment that the business can afford and that franchises should be freely given for tracks to be laid along such streets as will best serve the traveling public. He feels that cars in general should have the prior right-of-way over the streets along which they operate and that, especially during the rush hour, this right-of-way should be freely extended in order to facilitate the handling of these peak loads. He believes that full co-operation should be had from the public in the observance of such reasonable operating rules as are put in force by the company.

THE PROBLEM AS THE REAL ESTATE OWNER SEES IT

"The man who owns property or operates business often unfortunately views the problem in a rather narrow light. It is a rather easy matter for him to be convinced that the building of a line to some new suburban district in which he owns property or the routing of cars past his place of business is of paramount importance to the solution of the traffic problem of his city. This view, of course, is not held by all business men and property owners, but it is sufficiently prevalent to be a factor to be considered in dealing with the complaints of the service which come to those who are responsible for it.

THE PROBLEM AS IT APPEARS TO THE CITY OFFICIALS

"'City officials feel that the best service is given if passengers are carried to and from their place of business by the most direct route possible and over lines and in equipment which are well maintained. They feel that the company should at all times maintain the pavement between and adjacent to its tracks and that the company should pay for the cost of such reconstruction to its tracks as is necessary in making street improvements. They feel that extra cost of bridges or subways due to placing of tracks on or through such structures should be paid for by the company. They believe that free transportation should be given to certain of such public officials as mail carriers, firemen, policemen, etc. They believe that the company should be willing to remove unsightly poles or to place wires and track at its own expense in such position as might best meet any public improvement desired by the community as a whole. In the matter of franchises it is felt that the agreement should be of an indeterminate nature and that some ready means should be had whereby the readjustment of rates or investigation of service can be made either at stated periods or as the need becomes apparent.

ADEQUACY OF SERVICE

"It becomes necessary to give proper weight to the ideas held by these different interests, and it resolves itself into a determination as to what is the adequate service for the community in question. One statement as to what constitutes adequate street railway service might be as follows: That it consists in furnishing a sufficient number of cars to carry all the passengers who desire to ride with the greatest degree of safety to the passenger on the car and to the public on the street, with the maximum amount of speed consistent with such safety and with the maximum degree of regularity and certainty of schedule, with the maximum comfort to the passengers going over the shortest routes, and with an adequate return to the company for such service furnished."

METHOD OF TAKING TRAFFIC DATA

To determine the adequacy of service, inspectors were placed on the cars, and passenger counts were made showing the number of passengers on the car when passing all the important traffic points. These records were plotted in the form of car-loading curves, separate curves being plotted for the different characteristic periods of the day. From the car-loading curves the point of maximum loading was determined and inspectors were placed on the street at these points to note the fluctuation in headway and the number of passengers riding for the entire day. From these data the fluctuation of traffic and variation in headway diagrams were plotted. Totals for fifteen-minute periods were taken for the entire day, showing the number of people riding and the number of seats furnished for each fifteen-minute period. The totals for all the passengers riding for half-hour periods for all the lines for the entire day were also made, and the ratio of the maximum load to the average load was computed. This ratio was found to be approximately 140 per cent.

STANDARDS OF SERVICE

In measuring the service furnished it was considered that during the non-rush hours, except for accidental loads, seats should be furnished for all passengers who desired to ride. In order to furnish seats for all these passengers, from the ratio of the maximum to the average as computed for the lines, it was found necessary to furnish 40 per cent more seats than passengers riding during the non-rush hour.

The service during the rush hour was based on a maximum car capacity. The average seating capacity of the Winnipeg cars was determined, and to this seating capacity an allowable standing capacity of 4 sq. ft. per passenger was added. This gave the maximum load for the largest car as eighty-five passengers and an average load of seventy-nine passengers for all cars. It was considered reasonable to establish eighty-five as the extreme maximum load which should be allowed for schedule making.

In the determination of the ratio of the maximum load to the average load for the rush-hour period, 145 per cent was found to be the average for all of the lines. With a maximum allowable car load of eighty-five passengers, the average car load would necessarily be 85 divided by 1.45, or fifty-nine passengers. The seating capacity of the cars being forty-two, the number of seats necessary to keep the average load to fifty-nine passengers would be the ratio of 42 to 59, or approximately 71 per cent. In order, therefore, to limit the maximum load to eighty-five passengers during the rush-hour period, it would be necessary to furnish 70 per cent as many seats as there were passengers riding. To make a check as to the adequacy of service, a count was therefore made for at least three normal days of the total number of passengers riding by the point of maximum loading to determine whether 140 per cent as many seats were furnished as there were passengers riding for the non-rush hours and 70 per cent as many seats were furnished as there were passengers riding for the rush hours, the service being considered adequate. The change from the 70 per cent to the 140 per cent ratio ought to be made, the report says, in as gradual a manner as will be suitable to the particular line in question.

At present the company is building all of its own cars and has adopted as standard a double-truck closed car with a seating capacity of forty-two. The entrances and exits are both in the rear of the car, and there is only an emergency exit in the front of the car for the motorman. The seats are longitudinal and upholstered in plush. The report recommends the pay-as-you-enter system with front exit, cross seats for the middle part of the car and short longitudinal seats for each end and the use of rattan or slats instead of plush upholstery. The report also reommnded the near-side stop.

PROPER UNDERSTANDING BETWEEN PUBLIC AND COMPANY

In discussing the relations between the company and the public, particularly so far as operating conditions are concerned, the report says:

"While the first general need for satisfactory service is to have plenty of cars properly routed, there must be, in addition, the proper understanding and co-operation between the company and the public in respect to all matters of operation. While the public has a right to demand that the most improved methods for giving the best and safest service should be adopted, it, in return, should give the necessary co-operation that will make this service possible. The best co-operation is always had where there is a thorough understanding of the problems that must be met.

"Most of the larger utility companies have come to realize this growing need for getting closer to the people, and a publicity department has taken its place as a permanent feature of most utility organizations. This department has the special task of keeping the public informed as to what the company is doing to meet its needs. Complaints of service and suggestions receive real attention. Courteous explanations are made which often turn the possible faultfinder into a 'booster.' There is scarcely any branch of service where the public is met while in a mood that makes it harder to handle than is the case with passengers traveling during the evening rush hours.

The patrons are returning home after a day's work, usually tired and perhaps hungry. They are bent on getting home or to recreation as early as possible, and they feel that as soon as they leave their work their time is their own. By far the greater portion of complaints which a company receives comes from these evening rush-hour patrons. Many times the complaints are unreasonable, but they are made and will continue to be made until the service is bettered or a satisfactory explanation is given. The two most prolific causes for complaint are, perhaps, the irregularity of schedule and slow operation, with the interminable number of stops on certain lines."

SPEED OF OPERATION

The average speed of operation for the entire Winnipeg system during the non-rush-hour period was found to be about 8½ m.p.h. This was considered as from 10 per cent to 15 per cent slower than might safely be maintained, and it was suggested that the average speed should be as nearly as possible 9½ m.p.h. The accompanying table of non-rush hour speed in other cities is appended.

TABLE SHOWING COMPARATIVE AVERAGE SPEED IN MILES PER HOUR DURING NON-RUSH-HOUR PERIOD FOR DIFFERENT SYSTEMS

	Speed in M. P. H.
*Cincinnati	8.36
Cleveland	10.50
Columbus	9.50
Detroit	9.50
Indianapolis	9.80
Kansas City	9.00
Milwaukee	9.07
Omaha and Council Bluffs	9.50
St. Louis	9.40
St. Paul and Minneapolis	9.38
Winnipeg	8.35

*Slow speed in Cincinnati partly due to excessive grades.

ELIMINATION OF STOPS

The report also recommends a reduction in the number of stops. On this point it says:

"Most patrons are willing to admit that there are too many stops, but reluctance is shown at once if their own particular stop is questioned. It is felt that the inconvenience which would be experienced is overestimated. One of the larger systems in the United States was contemplating the elimination of certain stops and decided that after the congested district was passed the cars would stop at every third street. A study was made to see the effect this would have on the increased walking necessary per passenger. The cars were run as usual, stopping at every street, and inspectors were placed on the cars to note the number of passengers getting off the cars at points where under the new system no stop would be made. The number getting off at these streets was found on the average to be less than 33 per cent, as might have been expected. Other inspectors watched the direction taken by the passengers after they had left the car, and the data when analyzed showed that there would be about three-fourths of a block extra walk necessary per passenger for those getting off at the test points if the cars stopped at every third street. If this was limited to every other street, it can readily be seen that for those living on the particular cross street the extra walk would amount to one block, but for those living on parallel streets the walk might not be increased at all.

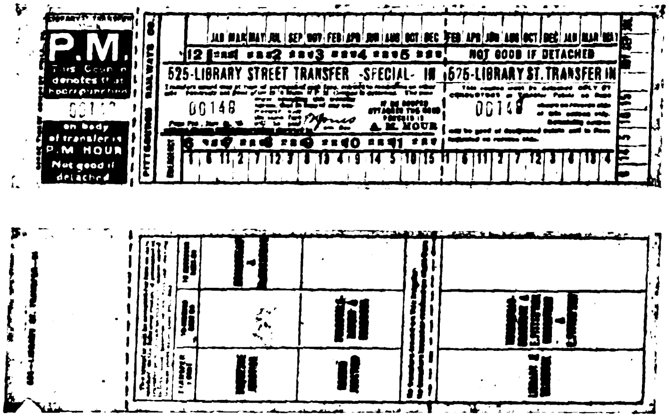
"As there are two parallel blocks to every cross block in distance away from the car line, the walk per passenger would be as follows if the population was evenly distributed: One-third would have one block, one-third would have one-half block extra, and one-third would have no extra walk, with an average of one-half block per passenger ordinarily using that particular street. The improved service for the through lines would much more than compensate for the time required in walking this extra distance. Of course, there would necessarily be exceptions, and stops would be made at all important traffic points. The system is recommended only for such lines as are now loaded beyond the comfortable limit."

NEW TRANSFERS IN PITTSBURGH

A new system of transfers has been recently developed by the Pittsburgh Railways. This eliminates the necessity for issuing a transfer on a transfer except in the case of certain short shuttle lines, for which a special form of ticket is issued.

The system provides three different types of ticket. One of these is of the usual form and is used in ordinary city work. Each route is supplied with its own transfers. The date numbers are arranged out of sequence to prevent disputes as to the intention of punch marks.

The other two types of ticket are provided with one and two detachable coupons, respectively, for retransfer when the passenger wishes to ride on two or three different lines. It is required, however, that the passenger shall indicate his destination when asking for his transfer so that in general passengers are prevented from retaining any part of the ticket. These transfers are changed every half month, the date numbers being 1-15 on one form and 16-31 on the other.


P.M.
P.M. HOUR
NOT GOOD IF DETACHED
525-LIBRARY STREET TRANSFER -SPECIAL- IN
525-LIBRARY ST. TRANSFER IN
A.M. HOUR

Front and Reverse Side of Single Coupon Transfer, Pittsburgh Railways

On the back of the coupon tickets are printed directions which limit the methods available to the passenger for reaching his objective point. The necessity for this is involved by the Pittsburgh scheme of running many different routes over the same street as the cars diverge from the business district of the city. The passenger is therefore obliged to select the proper car going to his destination, and he is not allowed to transfer over routes diverging from the main artery of travel if they have through cars of their own. In addition, the transfer points for two routes have in all cases been changed to the first point of intersection outside of the business districts of the city, toward which all the important streets converge. This obviates the possibility of using the transfer as a stop-over.

In some cases the limitations printed on the back of the ticket include every possible transfer that can be made from the route, but in general the passenger may not transfer from an inbound route to one which may eventually get him upon an outbound car on one of the major lines paralleling his original route.

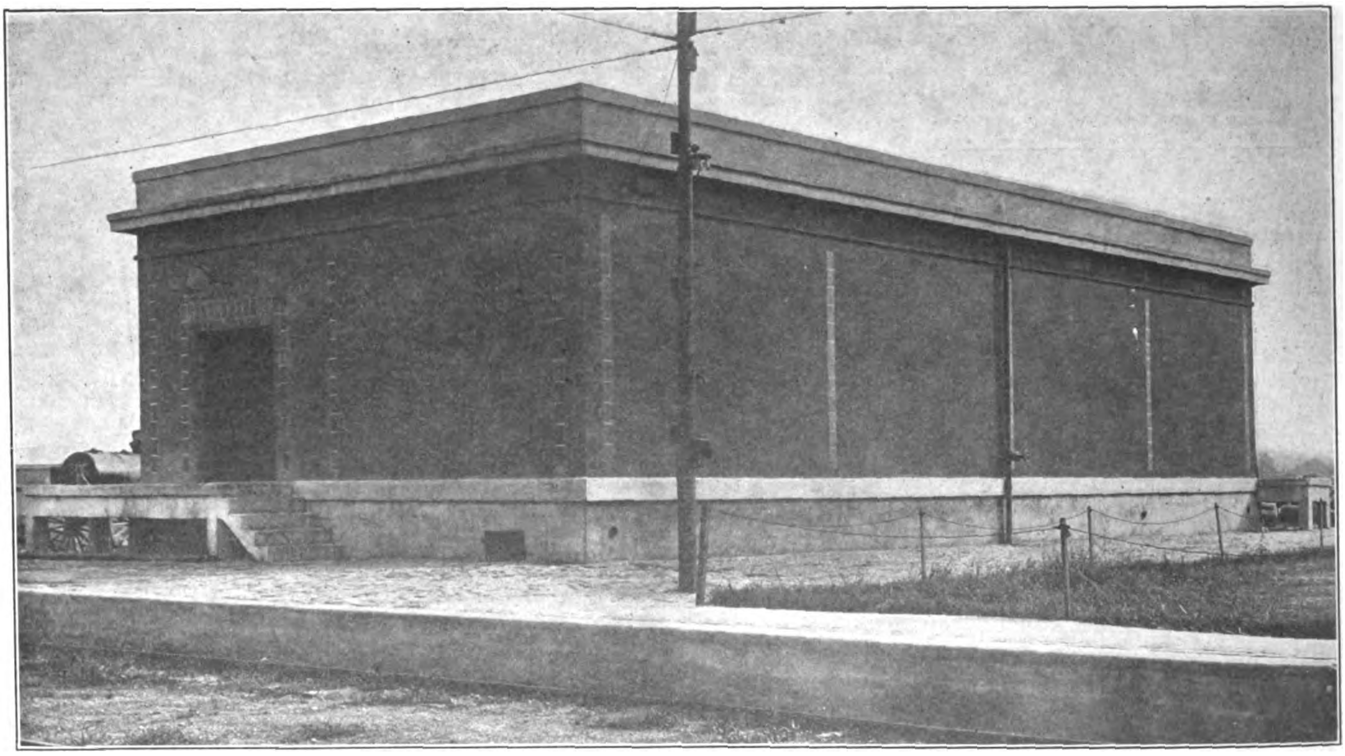
ROLLS FOR STANDARD RAILS

It has been announced that the Lorain Steel Company is cutting rolls for the standard 7-in. girder grooved rail of the American Electric Railway Engineering Association, described by Mr. Schreiber in the last issue of this paper, and also for the standard 7-in. guard rail to go with this girder rail. These sections will be known as L. S. sections 122-467 and 140-468.

Oil and Paint Storage Building at Baltimore

The Building Is of Artistic Design and Has an Unusually Safe and Efficient Method of Oil Storage and Handling—Paint Mixing Is Done by Machine

During 1913 the United Railways & Electric Company of Baltimore erected on its property at the Carroll Park shops a fireproof reinforced concrete oil and paint storage building. The structure is 60 ft. long, 30 ft. wide and 19 ft. high and is situated about 300 ft. from the group of shop buildings. The front of the structure is set back about 10 ft. from the edge of the transfer table pit. Consequently, the transfer table plays an important rôle in conveying oils and paints from the oil house to the paint shop itself. Its location is very favorable in minimizing the hazard to the large group of buildings that might result from any possible fire or explosion in the oil or paint storage building.



Baltimore Oil House—View of Building with Transfer Table Track in Foreground

CONSTRUCTION

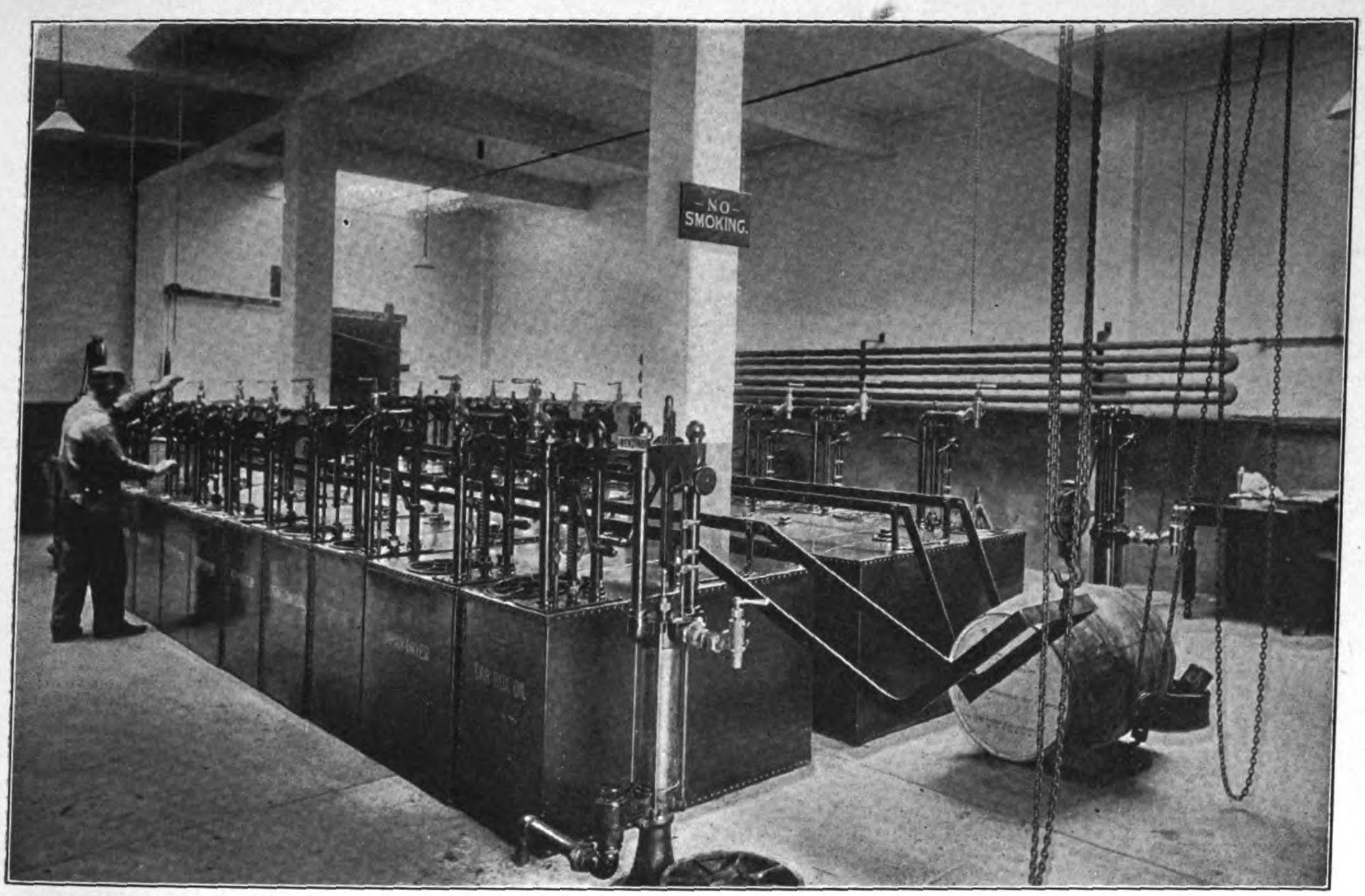
The exterior presents a very artistic appearance. The walls have a smooth cement finish for a distance of 4 ft. from the ground, then a "Moustic" finish for the remaining height with the exception of a smooth finish around the parapet. Flush with the outside surface of the walls are red tile inserts arranged in vertical rows and spaced at regular intervals. A strip of ground about 20 ft. wide paved with Belgian block encircles the entire building. This pavement is arranged to assist the heavy hauling of teams to and from the oil house.

The interior of the building consists of two rooms, one 44 ft. long x 29 ft. wide, containing tanks for storing oils, paints, varnishes and greases, and the other 14 ft. long x 29 ft. wide for a paint-mixing room. The rooms are separated from each other by a 6-in. concrete wall having a 4-ft. x 7-ft. doorway arranged with a single fire door. The front entrance has a 6-ft. x 7-ft. doorway fitted with double sliding fire doors. The rear entrance has a 4-ft. x 7-ft. doorway fitted with a single sliding fire door. Both front and rear entrances are approached by means of concrete stairs and platforms. The platforms are arranged just high enough to allow trucks to back up and discharge their loads of oil drums and barrels, so that railroad shipments can be conveniently handled.

The roof, which consists of a covering of slag on a reinforced concrete slab, has four large skylights, giving plenty of light to the interior of the building. In the skylight construction heavy wired glass was used. A parapet about 18 in. high surrounds the entire roof. Access is gained to the roof by means of an iron ladder placed on the outside of the building and fastened to the rear wall. As the walls are entirely void of windows, the interior receives natural light from the skylights only. Artificial light is furnished by ten 110-volt, 40-watt tungsten lamps, arranged in two series of five lamps each on a 550-volt circuit and spaced at proper intervals. One lamp of each series is placed in a bracket above the front and rear entrances, while the remaining eight lamps are used for the illumination of the interior. All wiring is inclosed in iron conduits.

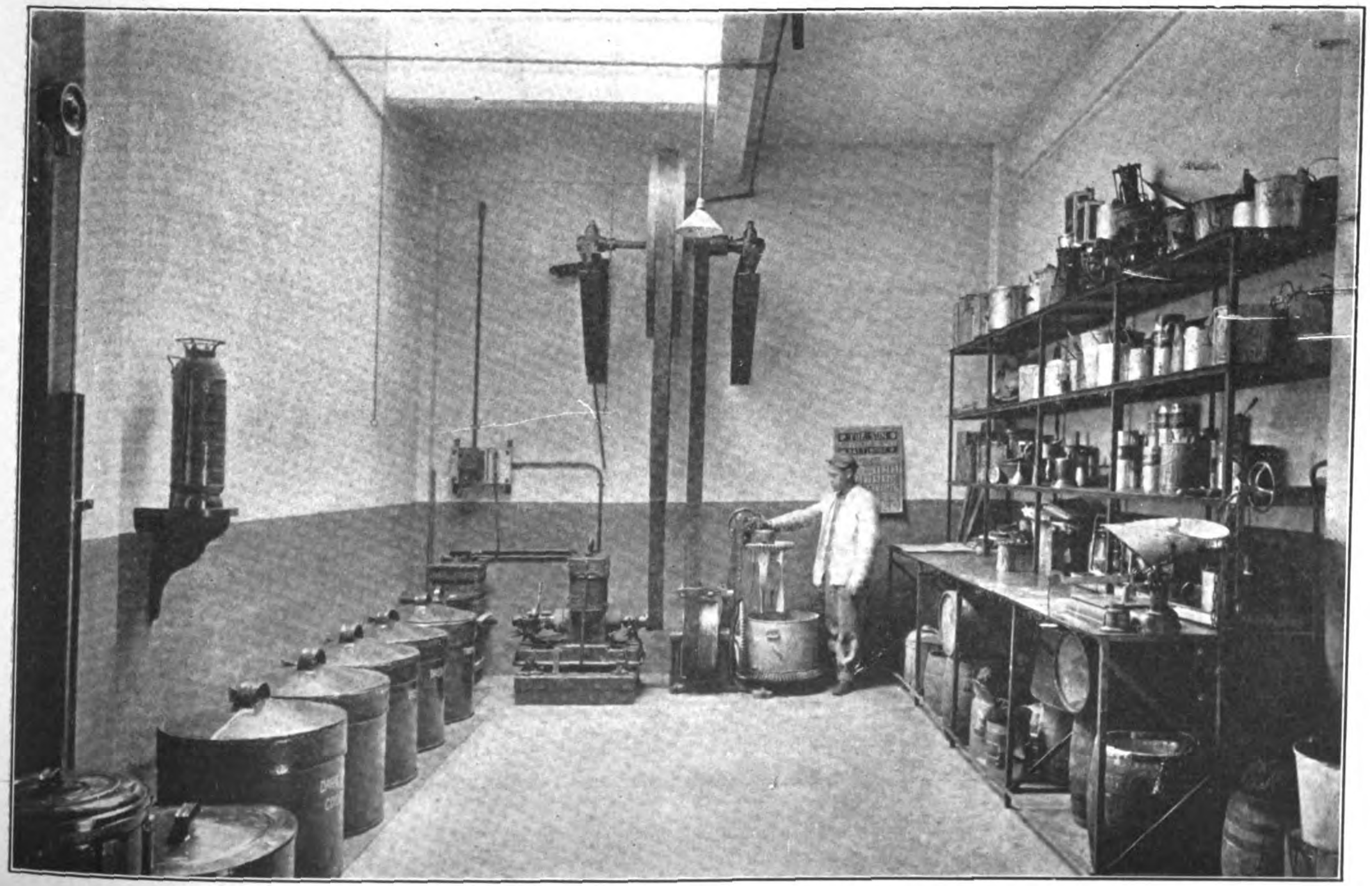
STORAGE EQUIPMENT

In order to dispose of all oils, paints, etc., as economically as possible and to facilitate their proper handling, a novel storage system has been installed by the Gilbert & Barker Company, Springfield, Mass. Arranged in the middle of the floor of the oil room are twenty-four tanks of 200-gal. capacity. These are placed in two rows of twelve tanks each. All tanks



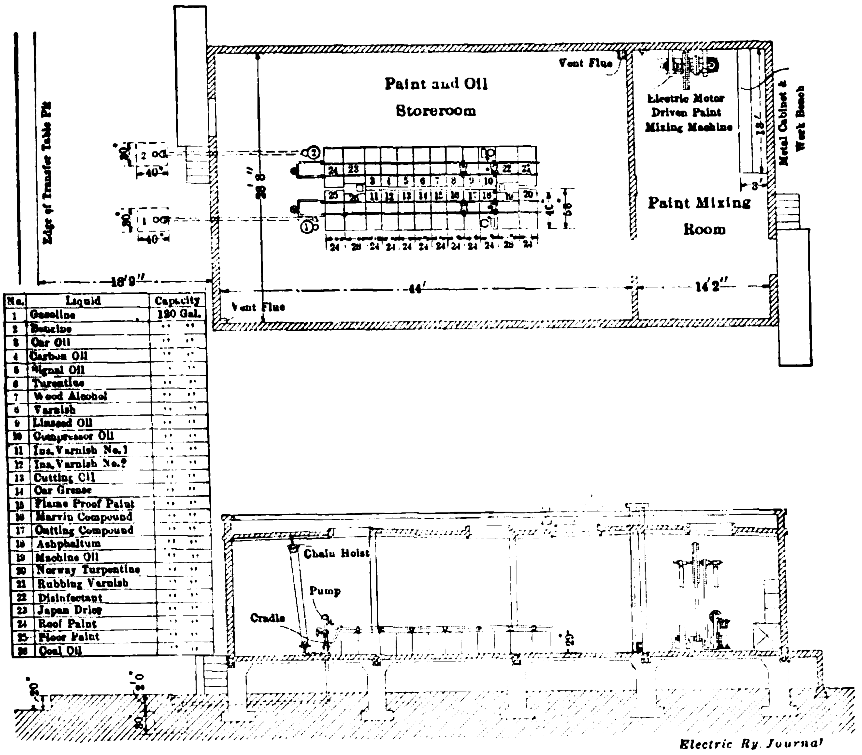
Baltimore Oil House—Storage Tanks and Barrel-Conveying Outfit, with Benzine Pump to Underground Storage in the Foreground

are rectangular in shape, and each is equipped with measuring pumps, a strainer for admitting surplus oil back into the tank, a vent covered with a screw cap which can be opened when about to refill tank from a drum or barrel, and also a measuring stick. This stick is fastened to a screw plug to aid in its



Baltimore Oil House—Mixing Paint by Means of an Old Bi-polar Motor, Belt Drive and Gearing easy removal when necessary to take a reading of the amount of oil in the tank.

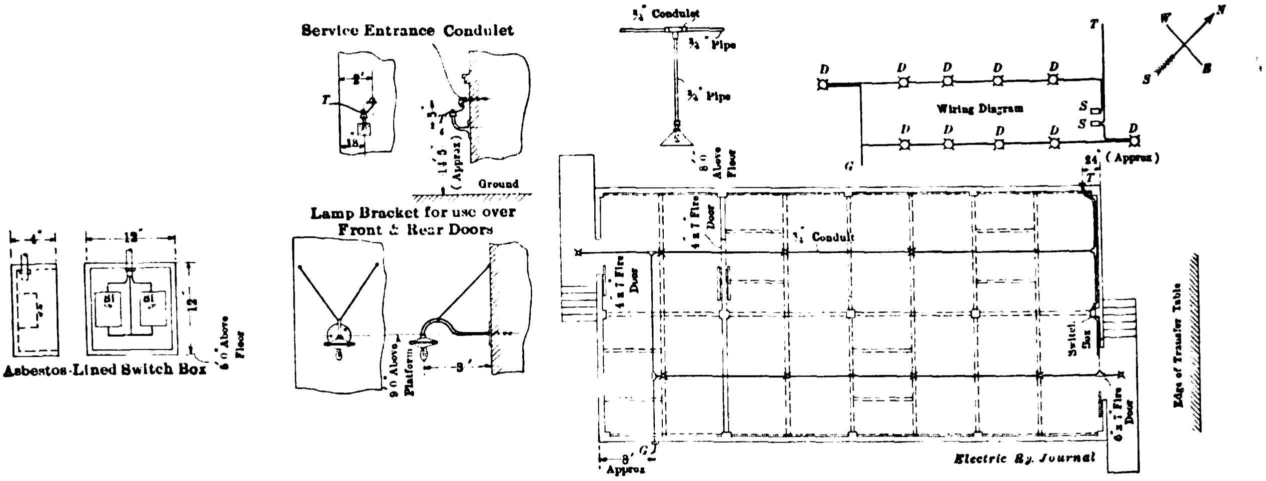
A runway, supported about 6 in. above the tanks by iron brackets, extends from end to end of each row. At one end of each runway is an iron cradle attached with a hinged joint to the runway, and the other end of the cradle is secured to a small chain hoist. When it is necessary to refill a tank the barrel or drum is simply rolled onto the cradle from the floor, the hook of the hoist is attached to the cradle, and the operator hoists the barrel until the cradle is level with the runway. The barrel is then rolled along the runway until it reaches the tank needing refilling. After the barrel has been emptied, it is rolled back again to the cradle, lowered to the floor and removed outside the building, ready to be carted away.



No.	Liquid	Capacity
1	Gasoline	120 Gal.
2	Benzine	" "
3	Car Oil	" "
4	Carbon Oil	" "
5	Signal Oil	" "
6	Turentine	" "
7	Wood Alcohol	" "
8	Varnish	" "
9	Linseed Oil	" "
10	Compressor Oil	" "
11	Ins. Varnish No. 1	" "
12	Ins. Varnish No. 2	" "
13	Cutting Oil	" "
14	Car Grease	" "
15	Flame Proof Paint	" "
16	Marvin Compound	" "
17	Cutting Compound	" "
18	Ashphaltum	" "
19	Machine Oil	" "
20	Norway Turpentine	" "
21	Rubbing Varnish	" "
22	Disinfectant	" "
23	Japan Drier	" "
24	Roof Paint	" "
25	Floor Paint	" "
26	Coal Oil	" "

Edge of Transfer Table Pit
Paint and Oil
Storeroom
Vent Flue
Electric Motor Driven Paint Mixing Machine
Metal Cabinet & Work Bench
Paint Mixing
Room
18'9"
44'
14'2"
Vent Flue
Chain Hoist
Pump
Cradle
Electric Ry. Journal

Baltimore Oil House—General Layout, Showing Quantities and Location of Materials Stored, Transport Means, Etc.



Service Entrance Condulet
Ground
(Approx.)
Lamp Bracket for use over Front & Rear Doors
9'0" Above Platform
Asbestos-Lined Switch Box
6'0" Above Floor
¾" Condulet
¾" Pipe
¾" Pipe
8'0" Above Floor
Wiring Diagram
D
S
G
T
¾" Conduit
4x7 Fire Door
Switch Box
Edge of Transfer Table
(Approx)
Approx
Electric Ry. Journal

Baltimore Oil House—Wiring Details for Electric Lighting

As benzine and gasoline are of a highly explosive nature and as the Board of Fire Underwriters will permit the storing of only a very small quantity within any building, both of these liquids are kept in separate tanks just in front of the building and buried 4 ft. in the ground. Each of these tanks is connected with a pipe to a measuring pump just inside the front entrance, one pump being in front and at one side of each row of tanks. The refilling of these tanks is readily accomplished by means of pipes leading to them from above the ground. The top of each pipe is capped and securely locked. One can readily perceive what a great improvement this method of distributing oils, etc., is over the old way of placing a number of barrels in a row with an ordinary valve or faucet rammed into each one. This latter practice is not only wasteful but increases the fire risk tenfold over the better scheme.

In the paint room the mixing of the paints is readily accomplished by means of a machine driven by a 10-hp 550-volt motor. After the standard colors are mixed they are placed in large cans, which are labeled and set aside ready for use. A large steel cabinet is also placed near the rear wall, in which are stored all sample cans of paints, varnishes, driers, etc.

The oil house has now been in use nearly one year and is giving entire satisfaction. In building and equipping this installation the company felt that no amount of trouble and expense should be spared in the construction of a building for storing such a dangerous combustible as oil or those products in which the use of oil plays an important part.

The entire building is steam-heated from the main steam plant contained in one of the group of shop buildings.

The Massachusetts Institute of Technology has issued a bulletin of its summer technical course to be offered during the months of June, July, August and September, 1914. These courses are open to persons not students in the Institute, if they possess the necessary qualifications, and are of particular advantage to persons planning to enter the Institute whether with or without advanced standing. A course on the principles of electrical engineering will be given if enough applications are received to indicate that the plan will be successful.

THE FUTURE OF PUBLIC UTILITIES

At a meeting of the Finance Forum held under the auspices of the Y. M. C. A. in New York City on April 14 Thomas N. McCarter, president of the Public Service Corporation of New Jersey, delivered a vigorous and frank statement of the public service companies' point of view on their duties and rights. Before taking up the subject proper the speaker outlined the present political situation in this country as he understands it. This has much to do with the public utility situation and with the present temper of the people with relation thereto.

In the first place the people distrust the public utility official. Mr. McCarter said that at one time he had occupied political positions of importance, but he realized that he has now and forever barred himself from political preferment by occupying his present position. Two years ago, when president of the American Electric Railway Association, he, in company with other railway men, had visited many of the important electric railway centers throughout the country, explaining the present situation. While he felt that the trip was well worth while, he humorously referred to the fact that the present disposition of the people toward electric railways showed no evidence of conviction produced as a result of his labors.

Referring to his appreciation of the opportunity to present the public utility's side of the question to an audience like that before him, the speaker recalled to his hearers' minds the famous mission of Henry Ward Beecher to England at the time of the Civil War. On one occasion Mr. Beecher addressed an audience inherently hostile but won an appreciative hearing for his cause by concentrating his attention upon a single hearer. Although the "forum" audience was not hostile in the sense of that of Mr. Beecher, the inference was clear that, as typical of the American public generally, it was not naturally in sympathy with the speaker's point of view. He registered a vigorous protest against the seemingly prevalent opinion that a public utility official cannot be as honest and as patriotic as other citizens. History disproves this, as was illustrated during the Civil War when the railroads were operated first for the welfare of the country, afterward for the owners' benefit.

Continuing his introduction, Mr. McCarter said that the political parties of the country had largely outlived their fundamental principles. While he personally was by tradition and choice a Republican he really would have trouble in defending his position, so uncertain are the present tenets of that as well as the other parties. It appears that what has occurred politically in England and Germany must eventually come about in this country, namely, a reclassification of the population politically into radicals and conservatives, old party demarcations being eliminated. The fate of public utilities is involved in this political situation as the new parties will disagree radically as to the management of these properties.

Coming now to the subject proper Mr. McCarter outlined the fundamentals of the political economy of electric railway administration under four heads as follows: Regulation; allowable rates of fare; character of future franchises, and municipal ownership.

The principle of regulation is now accepted generally as desirable, but the practical application of the principle involves many problems. Regulation as practiced is expensive, as evident from the annual expenditure of $3,000,000 in New York State. Regulation may also have a depressing effect on the value of securities. Since the provisions of the Hepburn bill went into effect railroad securities have depreciated in value by $3,000,000,000 and this is partly, at least, due to government regulation. To be successful commissions must be composed of men of the highest character and best experience. Moreover, they must be restricted to their real functions. The exercise of plenary powers is municipal ownership without responsibility.

The allowable rate of return is a vital element of successful regulation. The conservative view is that a fair rate of return on a reasonable valuation should be provided for. This view has the support of President Wilson. Radical leaders like Senator La Follette would depreciate capitalization to a mere present physical valuation and limit the rate of return on the residue to 6 per cent, no more than can be secured from mortgages and other safe investments. As Senator Dryden stated, to follow this plan and eliminate by fiat $7,000,000,000 of "water" would precipitate the greatest calamity of history. Assuming that the stock had been watered to the above extent, which Mr. McCarter did not believe, the proposed action would not punish the real culprit who long ago disposed of his holdings. The public must realize that public utilities are important assets to them as well as to the owners, and if improvements are to be made capital must be attracted to the investments. Mr. McCarter cited the Hudson & Manhattan tunnels as an example and called attention to their great benefit to the residents of New York and its vicinity, yet the investment is not a profitable one. There would obviously be no incentive to capitalists to put their money into such hazardous undertakings if rates were kept down without due regard to all factors involved. Just what is an average fair return the speaker was not prepared to state, but it should certainly not be less than 8 per cent.

In valuing property for the purpose of determining rates of fare, due allowance must be made for franchises, depreciation, etc., but the tendency is against this. Commissioner Daniels, formerly of the New Jersey Public Utilities Commission and now of the Interstate Commerce Commission, was publicly criticized and the confirmation of his appointment to the latter position was jeopardized because he was willing to make an allowance for intangible values in rate making.

There are many wrong impressions in the public mind as to the value of franchises. Existing franchises were in most cases granted to induce capital to build railways on the same principle as the federal government gave vast acreage of public land to the Union Pacific Railroad to induce it to extend its lines. Franchises should not be capitalized unless an 8 per cent return is assured, and franchises should not be limited in term. A limited-term franchise is like a limited-term lease of a lot upon which a valuable house is built. The only way in which such an investment is feasible is a sinking fund allowance which will cover the value of the house during the leasehold. An expiring franchise is a distressing spectacle, as seen in a few recent examples. During the last five years of such the property is allowed to run down and service is poor. There is now no valid objection to a perpetual franchise in view of the regulating tendency of the times. Such franchises should contain provision for periodical review to insure compliance with their provisions. If a limited term is insisted upon it should be long enough so that sinking fund payments will be reasonable. Obviously the shorter the term the higher will be the rate.

The chief objection to municipal ownership is furnished by the unsatisfactory results of municipal administration in this country. Our theories of federal and state government have worked out well, but not so our city government. Here graft, incompetent selection of officials and other evils have been conspicuous. When one considers the responsibilities already on the shoulders of municipal officials he concludes that they are enough. Schools, sewers, public health, water supply, highways, police, in addition to minor divisions of administrative work, are surely sufficient in view of our lack of success in city government. Can the city fathers handle any more?

Another serious item is that of financing. Our cities now labor under serious financial burdens. If the electric railways of the country were purchased under a fair condemnation process the burden would be enormously augmented. No one claims that cities could operate railways more cheaply than individual companies, but it is supposed that they can borrow money at a lower rate. The fact is that if the cities were to go into public utility work on a large scale they could not get the money much more cheaply than individuals, and even if they did the losses due to less efficient operation would more than wipe out the difference. The only theoretical saving by municipal ownership is the difference between interest rate and the existing dividend rate which would soon vanish in graft and mismanagement.

In conclusion Mr. McCarter called attention to the efforts being made by public utilities for the welfare of employees. His own company has gone to the limit in this direction, and a loyal spirit has been developed. Old age pensions, sick and death benefits, participation in profits and other items of extra compensation are in effect. All of this is good but after all real manhood is at the bottom of success and the future of the public utility depends on this.

CHANGES IN THE SEVENTY-FOURTH STREET POWER STATION IN NEW YORK

An account was published in the ELECTRIC RAILWAY JOURNAL for Aug. 23, 1913, of the new 30,000-kw turbogenerator sets ordered by the Interborough Rapid Transit Company for its Seventy-fourth Street power station. Each set consists of a 15,000-kw, high-pressure, 1500-r.p.m. turbine and a low-pressure, 750-r.p.m. turbine of the same capacity. The construction of the new units has progressed rapidly. To make room for the new units four engines of 7500-kw capacity each are to be removed and will be scrapped. The first of these 7500-kw units was put out of commission on March 16 and is now being dismantled.

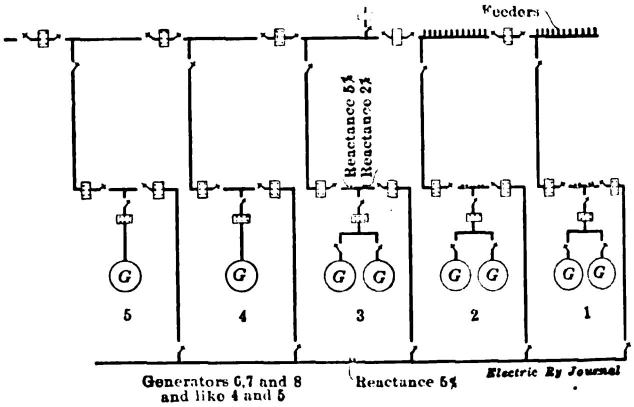
Two separate Worthington condensers each with 25,000 sq. ft. of cooling surface will be used with each turbine set. Each set will also have two circulating pumps of 35,000 gal. per minute capacity each, two turbine-driven centrifugal hot-well pumps and one large reciprocating-type air pump. Each air pump will have a capacity for carrying two turbine units and will be cross-connected between units.

The foundations of the present engine will be removed and special steel and concrete foundations for the turbines substituted. A new motor tunnel is now being excavated and will have a capacity for circulating water sufficient for eight 30,000-kw units.

Stokers of the underfeed type will be installed in one-half the plant and new superheaters will be installed in the present boilers designed to give 200 deg. superheat at maximum load, 300 per cent of the normal rating. Feed-water heaters of the open type will also be employed.

In the electrical equipment of the remodeled station all switching apparatus throughout the plant will be new. Some of the cables to be used are of the three-conductor, sector type paper insulated and assigned for 19,000 volts working pressure. The manufacturers as well as the company's engineers are gratified to find that the cables as designed test up to about 100,000 volts pressure, which is higher than would probably be obtained with cables of the round conductor type and with the same thickness of insulation.

In the discussion of reactances in power stations at the recent midwinter meeting of the American Institute of Electrical Engineers, H. G. Stott, superintendent of motor power of the Interborough Rapid Transit Company, described the new system of reactance-coil arrangement which will be used in the remodeled Seventy-fourth Street power station. It is shown in the accompanying illustration. The diagram shows the three new units and two of the five older units which will remain. The new units are connected to the main busbar through reactance coils containing 5 per cent reactance. Each is also connected to an auxiliary or transfer busbar through a coil having 2 per cent reactance. The new part of the transfer busbar is connected to the old through 5 per cent reactance. The arrangement of reactance coils is designed for protection of the cables primarily, rather than of the generator. It is a modification of the feeder reactance plan, accomplishing somewhat the same purpose at far less cost. The 2 per cent reactance coils, which were called by a speaker at the recent Institute meeting "synchronizing reactances," assist in steadying the operation of the generators in parallel and supplement the internal reactance of the generators in case of a generator short-circuit.



Interborough Rapid Transit Company—Diagram of Electrical Connections in Power House

By the changes outlined above the company is able to get into the same space now occupied by 30,000 kw a capacity of 90,000-kw. The floor space previously required for a 7500-kw engine now suffices for a 30,000-kw turbine. Forced firing of the boilers, together with the use of superheating devices and the low water rate of the new turbines, permits the rating of the boilers on the same floor space to be increased to correspond approximately to the increase in the engine room. The changes now under way will provide for immediate requirements, and by the time that the subway construction has proceeded far enough to demand additional power further changes will be made in the Seventy-fourth Street plant and also in the Fifty-ninth Street plant.

Feeders are shown connected only to the two right hand sections but they will, of course, be connected to all sections. The plan is to divide the substations into two parts and to supply one-half of the feeders to a substation from one section of the power-house switchboard and the other half of the feeders to that same substation from another section of the board. There may be three substations connected to each section of the bus, but the bus sections will not be connected together through the substation, as the substation bus will be cleared so as to prevent this, there being always at least four feeders to each substation.

Development of Time-tables

At the Regular Monthly Meeting of the Public Service Railway Section of the American Electric Railway Association, Alexander Jackson, Head of the Time-table Department, Presented a Paper Describing the Make-up of Time-tables — An Address by Prof. H. H. Norris Prefaced the Technical Paper

Two interesting subjects, one on "Present Tendencies in Self-Improvement" and the other on the "Development of Time-tables," were the features of the regular monthly meeting of the Public Service Railway section of the American Electric Railway Association held at Newark, N. J., on Thursday evening, April 16. About 100 members of the section were present.

PRESENT TENDENCIES IN SELF-IMPROVEMENT

H. H. Norris, chairman of the educational committee of the American Electric Railway Association and also associate editor ELECTRIC RAILWAY JOURNAL, was the first speaker. His topic was "Present Tendencies in Self-Improvement." After calling attention to the encouragement which the educational committee had received in the past from the Public Service Railway Company he complimented the men present on the activity of their employers in looking after their welfare.

Professor Norris then plunged into the midst of his subject, which he stated could be divided into two main topics: the tendency of the times to specialize in all manual and mental operations necessary in industrial life, together with the considerable tendency away from individual initiative and inventiveness and the reaction therefrom; and the necessity for and possibility of normal mental development under any conditions, assuming that the desire for it exists.

Now the individual's first duty to himself and to society is to know what he is aiming at, what he wants to accomplish. Like a marksman he must first select his target, which must, of course, be within range of his rifle. Having fixed his eye firmly on his target, or to change the figure, on his goal, the most difficult part of the task is done. Ideals are simply targets or goals. The accomplishments which inspire us most are the direct results of careful selection of ideals.

Having focused attention on the object of one's efforts, ideas follow inevitably. A story is told of a certain clerk in a New York store who thought he deserved promotion and went to his chief to ask for it. In order to fortify his request while awaiting an audience, he pondered the reasons which he should give. The more he thought the weaker his arguments seemed until he finally convinced himself that he was getting all that he earned. He then slipped out and back to his desk determined to be worth more. As he was simply under clerk there did not seem to be much chance, but he determined to be his ideal of a clerk. The sequel is just as natural as the happy finale of a popular novel. The fact that he is one of the leading merchants in New York at the present day surprises us less than that he had the sense to think the situation over while waiting in that ante-room. Of course, one might argue that if everyone had his ideals clearly in view there would be vigorous competition for all important positions and the condition of the worker would not be any better than at present. Well, this need not worry us, for there is no great evidence of such a tendency.

The present is an age of specialization. The old-fashioned "handy" man or mechanic who could do almost anything in the construction line is disappearing. Competition is so keen that we must work more efficiently than the old-time craftsman did.

Specialization tends to mental apathy because as actions become automatic they are taken care of by the sub-consciousness. The hand performs its work accurately, perhaps, while the mind is free. If it is not exercised when thus liberated it becomes lazy and tends to lose strength and ability to generate ideas.

It is a reaction against the condition mentioned that there is such a widespread interest in extension education—night schools. Success or failure in such work depends upon the definiteness of the aim of the individual and the strength of his purpose. Just to take some course in a night school or correspondence school because it is a good thing on general principles will not bring the results desired. The individual must put some brain work into the planning of his course with all of the suggestions that he can get. But practically it is entirely up to him.

Now there is a wrong notion abroad that study has something to do with youth. As a matter of fact when study stops progress stops at any age. This does not mean necessarily book study, although books are the source of unlimited information. But the study principle must be applied in every detail. Here is a boy soldering up commutator leads. Is he content to make a merely passable job while his mind soars all over the universe or is he learning from his work everything that it will teach him, and using that as a basis for the study of commutators and everything that goes with them? Is he becoming the commutator expert of the shop? If not his progress will be slow.

If the conditions have been correctly delineated in the outline given, the American Electric Railway Association desires to assist in stimulating the employees of the member companies to make the most of themselves. The past and present plans are designed for no other purpose.

THE DEVELOPMENT OF TIME-TABLES

The importance of the time-table may be said to be three-fold: First, because it is, practically, the medium through which the character of the service rendered molds the public feeling for or against the railway company; second, because it influences the attitude of the employee, through the division of car hours; third, because it is the foundation upon which the whole financial structure is built.

DEFINITIONS

In my remarks I will use definitions of the terms used in conjunction with a time-table, as adopted by the American Electric Railway Association, in order that all may understand them.

Run—A group of trips shown on a time-table which constitute a day's work for a car crew.

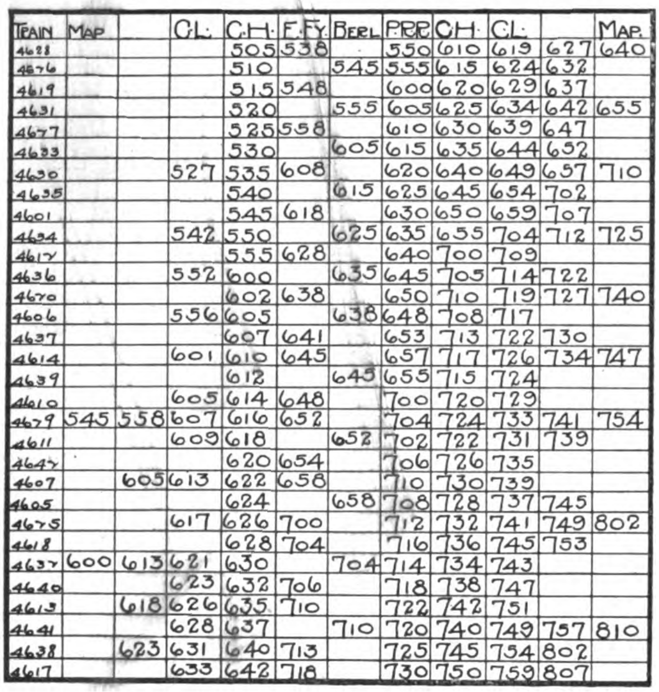
Run Number—An arbitrary number assigned to a run.

Run Guide—An index of the "on" and "off time," and the total working time of each run.

Train—A car or cars operating as a unit making one or more trips.

Train Number—An arbitrary number or symbol used to designate one trip or a group of trips.

Patch—A substitute for a portion of a time-table in effect, applied in such a way as to cover parts of the table for the purpose of increasing or decreasing the service.



TRAIN	MAP		C.L.	C.H.	E.FY.	BERL	P.R.R.	C.H.	C.L.		MAP.
4628				505	538		550	610	619	627	640
4676				510		545	555	615	624	632	
4619				515	548		600	620	629	637	
4631				520		555	605	625	634	642	655
4677				525	558		610	630	639	647	
4633				530		605	615	635	644	652	
4630			527	535	608		620	640	649	657	710
4635				540		615	625	645	654	702	
4601				545	618		630	650	659	707	
4634			542	550		625	635	655	704	712	725
4612				555	628		640	700	709		
4636			552	600		635	645	705	714	722	
4670				602	638		650	710	719	727	740
4606			556	605		638	648	708	717		
4637				607	641		653	713	722	730	
4614			601	610	645		657	717	726	734	747
4639				612		645	655	715	724		
4610			605	614	648		700	720	729		
4679	545	558	607	616	652		704	724	733	741	754
4611			609	618		652	702	722	731	739	
4642				620	654		706	726	735		
4607		605	613	622	658		710	730	739		
4605				624		658	708	728	737	745	
4675			617	626	700		712	732	741	749	802
4618				628	704		716	736	745	753	
4632	600	613	621	630		704	714	734	743		
4640			623	632	706		718	738	747		
4613		618	626	635	710		722	742	751		
4641			628	637		710	720	740	749	757	810
4638		623	631	640	713		725	745	754	802	
4617			633	642	718		730	750	759	807	

Headway Portion of Typical Week-day Table No. 2639

Tripper—One trip or a group of trips shown on the time-table for regular operation, but not assigned to regular crews.

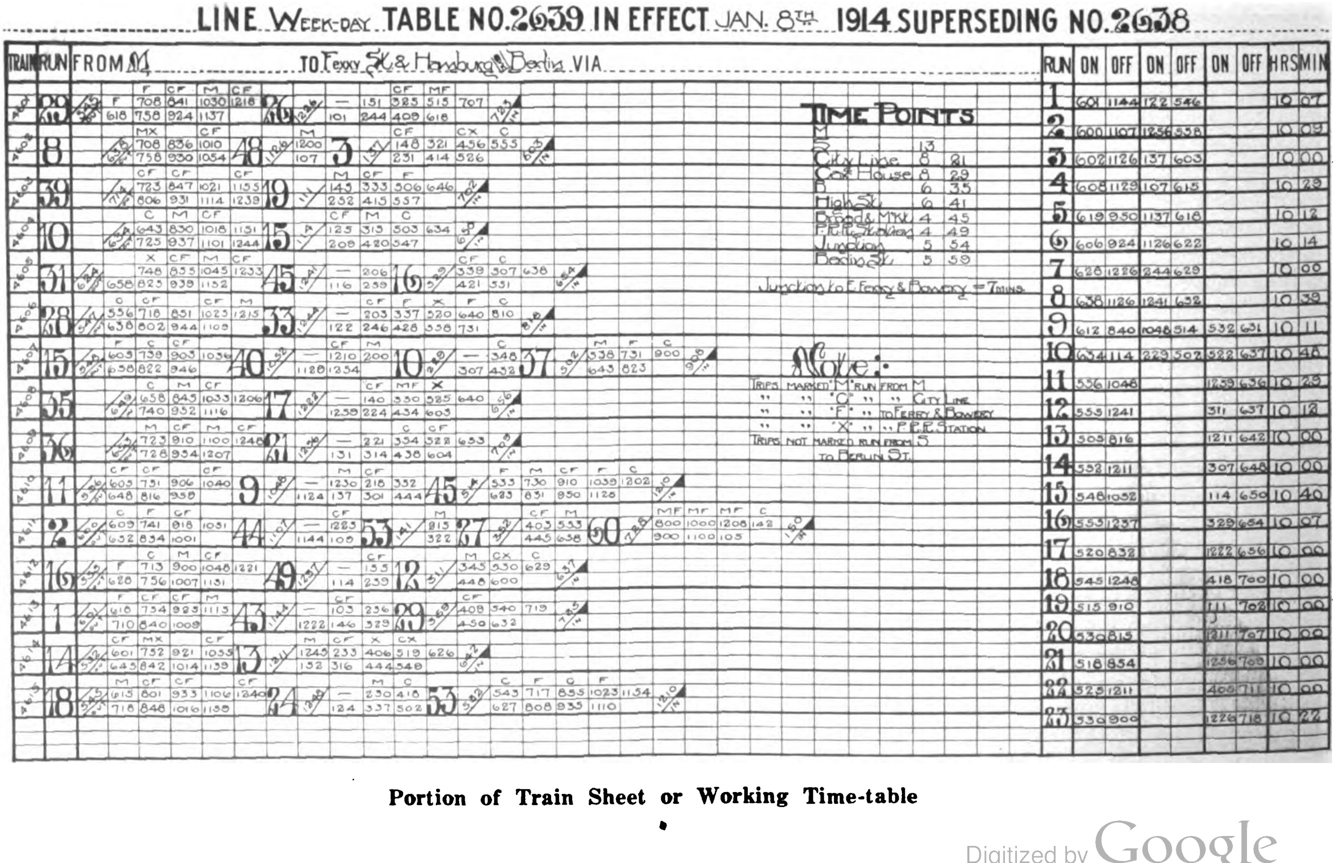
Extra—A trip or group of trips, put out to supplement existing service, as required, but not shown on time-table.

DETERMINING RUNNING TIME AND LAYING-OUT HEADWAY SHEET

In making up time-tables the question of running time involves a distinct study of the system as a whole. Many points must be taken into consideration, such as franchise requirements, speed and stop ordinances, intersections, good crossings, width of streets. In fact, to construct a time-table properly one must be thoroughly familiar with the section served, its business pursuits and hours of labor. A clear conception must also be had of the physical characteristics of the different municipalities, the location of the manufacturing industries and business districts, together with a full understanding of the operating difficulties such as the hours of pedestrian and vehicular congestion.

To illustrate the general principles of time-table construction, let us take a specific case; for instance, the "S" table, No. 2639.

The first step in the development of this time-table, having all the foregoing facts in mind, is the laying out of the headway sheet. We commence by taking a point nearest the end of the line which all cars must pass, in this case the carhouse, and put down the trips in sequence in the column under the heading "Carhouse." This will give the required main line headway. After the interval between cars, eastbound, is laid out, then schedule the trips needed to handle the business from the western terminals, using the carhouse time and setting the trips back the necessary number of minutes as per running time to cover the distance between the carhouse and the terminals from which cars are to be operated. As an example, a car is scheduled to pass the carhouse east-bound at 6:30 a. m. This car must leave the town of "M" at 6 a. m. according to the time points, that is to say, thirty minutes must be allowed between these points to maintain the headway. The same must be done with trips from the stop "S" and those from "F" Street, city line. When this portion has been completed follow each trip from the carhouse, eastbound, to the Pennsylvania loop on Market Street. A certain headway of cars is required to turn the loop, the rest operating east on Market and Ferry Streets to the junction of Hamburg Place and East Ferry Street, where the rest of the cars alternate, one trip going to the Hamburg Place terminal and the other to the end of East Ferry Street. To maintain an equalized headway, west-bound, the Pensylvania loop is taken as the point from which to govern the interval between cars. As the cars turning the loop cannot be allowed



LINE Week-day TABLE NO. 2639 IN EFFECT JAN. 8TH 1914 SUPERSEDING NO. 2638

FROM M TO Ferry St. & Hamburg Pl. & Berlin VIA

TIME POINTS

M		
S	13	
City Line	8	21
Car House	8	29
B	6	35
High St.	6	41
Broad & M'K't	4	45
P.R.R. Station	4	49
Junction	5	54
Berlin St.	5	59

Junction to E. Ferry & Bowery = 7 mins.

Note:

TRIPS MARKED "M" RUN FROM M

" " "C" " " CITY LINE

" " "F" " TO FERRY & BOWERY

" " "X" " " P.R.R. STATION

TRIPS NOT MARKED RUN FROM S TO BERLIN ST.

RUN	ON	OFF	ON	OFF	ON	OFF	HRS	MIN
1	601	1144	122	546			10	07
2	600	1107	1256	538			10	09
3	602	1126	137	603			10	00
4	608	1129	107	615			10	29
5	619	950	1137	618			10	12
6	606	924	1126	622			10	14
7	628	1226	244	629			10	00
8	638	1126	1241	632			10	39
9	612	840	1048	514	532	631	10	11
10	634	114	229	502	522	637	10	48
11	536	1048			1259	636	10	29
12	555	1241			311	637	10	12
13	503	816			1211	642	10	00
14	552	1211			307	648	10	00
15	548	1052			114	650	10	40
16	553	1237			329	654	10	07
17	520	832			1222	656	10	00
18	545	1248			418	700	10	00
19	515	910			111	702	10	00
20	530	815			1211	707	10	00
21	518	854			1236	709	10	00
22	525	1211			405	711	10	00
23	530	900			1226	718	10	22

Portion of Train Sheet or Working Time-table

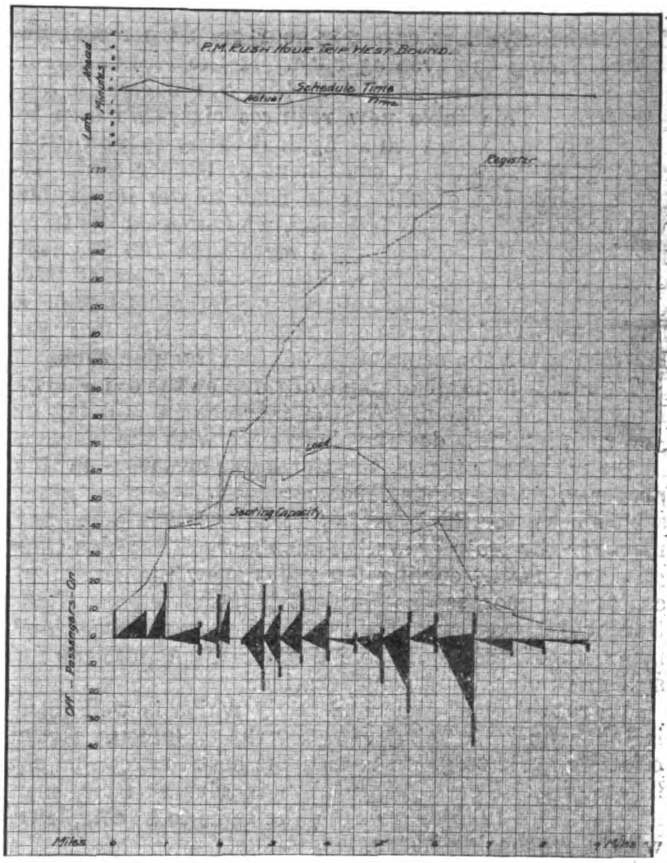
lay-over time, it becomes necessary to use whatever stand time may be required to have the cars operated on an even headway, west, from the Pennsylvania loop, at the East Ferry Street and Hamburg Place terminals. When this part of the work is completed, show the time all trips pass the carhouse and the time of arrival at the city line, sending enough cars through the town of "S" and the town of "M" to take care of the headway that is required to maintain the interval from each of these terminals. This is one of the points where careful figuring must be done to avoid having too much lay-over, as the same conditions will prevail at each of the three westerly terminals and needless expense might be incurred. Since the trips are now shown at all the points on the line the headway sheet is completed.

MAKING UP TRAIN SHEET

Next the train sheet is made up from the completed headway sheet. This train sheet shows the performance of each car or train during the entire day, also the division of platform time to train crews. All the many details to be taken into consideration in making up the train sheet and assignment of runs cannot be explained in a brief paper on the subject, as no two men go about making up a train sheet into runs in the same manner. No hard and fast rule can be followed, for no two lines will have the same lay-out or the same operating conditions.

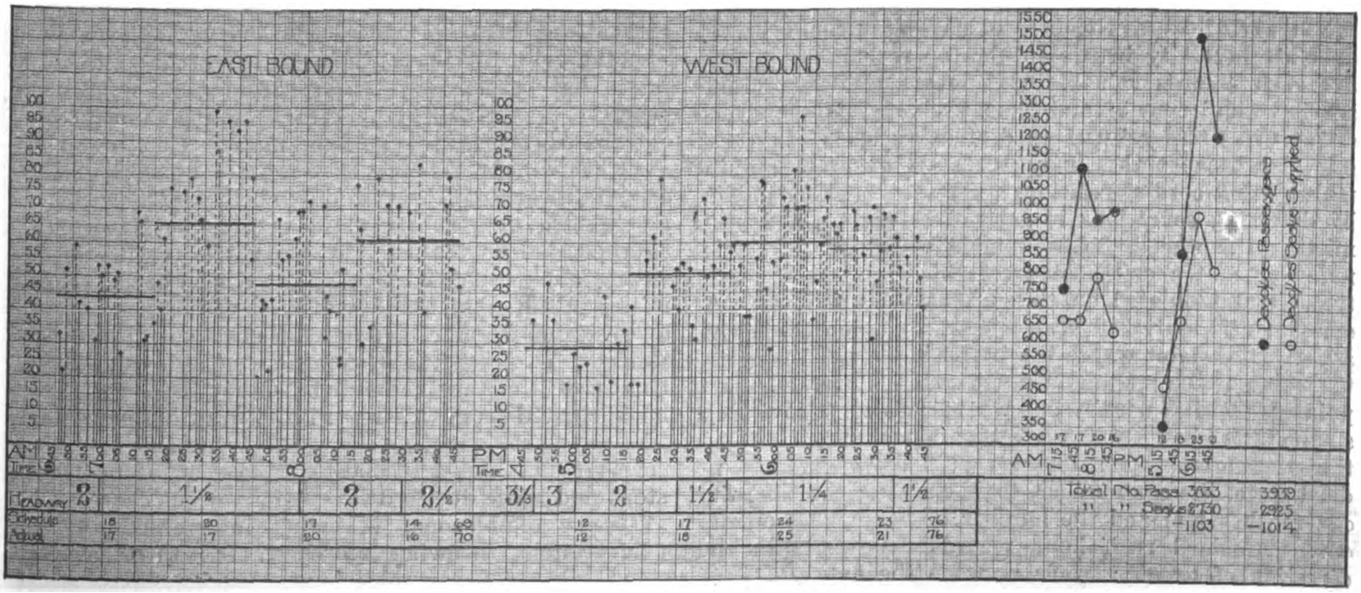
To give an idea of the amount of work involved in the making of this time-table, the line known as "S" operates from seven terminals, four from the west, namely, "M," "S," City Line and Carhouse and three from the east, East Ferry Street and Bowery Street, Hamburg Place and Berlin Street and the Pennsylvania Loop on Market Street. We operate 360 trips on this line. They are shown on the headway sheet at eleven points as follows herewith: From "M," 88; from "S," 181; from City Line, 307; from Carhouse, 350. Returning trips run are as follows: From East Ferry Street, 167; from Hamburg Place, 161; from Pennsylvania loop, 360; to Carhouse, 360; to City Line, 342; to "S," 208; to "M," 86.

This means that the 360 trips when shown at these eleven points have been put down 2620 times, making a total of 9851 figures written if no erasures have to be made. In making a pencil copy a great many erasures will be made in the manipulation of the trips to equalize the headways from the different terminals. In copying from the headway sheet to the train sheet and making the trains into day's work for the trainmen 6816 more figures are added, making a total of 16,667. The work thus far has been in the rough pencil sketch. It is now turned over to the clerks to copy. When finished and ready for blueprinting the completed time-table has required the writing of more than 33,334 figures and letters. To do justice to a table of this size a week should be consumed in its development.



Sample of Distribution Chart

During the year 1903 the headway between cars on the line designated "S" was four minutes throughout the day. At present there is a two-minute headway for the a. m. rush, three and three-quarter minutes during the day, and one-minute headway during the p. m. peak. In 1903 the number of trips throughout the day was fifteen per hour. At present we run thirty trips per hour or a 100 per cent increase in the a. m. rush, one trip per hour more or 6 per cent during the



Typical Passenger Count Taken in Directions of Maximum Traffic for A. M. and P. M. Hours Respectively day, and forty-three cars per hour or 186 per cent increase during the evening rush. If the second car of the train is counted, as it should be, the increase is 202 per cent. This table now requires sixty-two cars to operate in the p. m. rush as against thirty-four in 1913, making an increase in equipment of 82 per cent. In the construction of this table next to the impossible was accomplished, that is to say, we increased the trips per hour in the evening rush more than 100 per cent over mid-day operation, without placing a great burden on our trainmen or supervising force, by having a large number of trippers operated by extras or by regular men after the completion of their regular runs.

This table is a fair example of those on the other large lines of this system. As the increase in mid-day or non-rush business does not keep pace with the increase in the rush-hour travel, the time-table situation on this property, as on other large systems, is one of great seriousness, for the breaking up of trains into full-pay runs for the train crews becomes more difficult as time goes on. If the coming ten years show the same percentage of increase as the last ten, the tripper situation will be one that will give the management and members of the time-table department a problem for still more study and consideration.

A great deal of time and study which is well spent is taken up in forming runs for the trainmen. Every effort is made to give the men the best that can be obtained, special care being taken to give as many men as possible a full day's wages, the same to be completed within reasonable hours.

During the year 1913 347 time-tables and eighteen patches were made, making a total of 365 turned out and placed in operation. In addition, about thirty were made that were not used.

ADHERENCE TO SCHEDULE AND PASSENGER COUNTS

Nothing will undo all the good work and time consumed in turning out a new time-table more quickly than poor headways and the failure of impressing upon trainmen the importance of observing their time points. Bad headway will upset the best made time-table by causing an unequal distribution of passengers carried. Too much attention cannot be given to maintaining regularity. Those who are responsible for the failure to maintain the schedule headway and for the haphazard running of cars are doing a gross injustice to the company. If two cars are running over the line close together, the second car, in nine cases out of ten, could just as well have been left in the carhouse for the first car has done all the work.

The periodical development of passenger counts is an absolute necessity in present-day operation. Not only are such records valuable as a means of determining service requirements and thus probably effecting increases in gross returns on decreasing operating cost, but also because they may be found of great aid in maintaining cordial relations with the traveling public by detecting conditions in need of correction and permitting the remedy to be applied before complaint is made or public criticism aroused. These counts are taken and tabulated on this property as follows: A car timer is stationed on the line "to be observed" at a particular point where the traffic is heaviest, namely, the point of the maximum number of passengers. The point selected is usually one where cars come to a stop so that the observer has a better opportunity to count the passengers. The observer puts down, on a standard form, the car number, train number, the time the car reaches him and the number of passengers on the car. Standard rush hour records are taken in the direction of greater traffic between the hours of 6:45 and 8:45 in the morning and between 4:45 and 6:45 in the evening. In many cases these hours are changed to cover peculiar conditions on certain lines, but they will cover the heavy rush period for most of our lines. Counts are also taken on a line at other than peak-load points. For instance, at a point where short-time service is turned back, to show the travel on through cars, or at an intersection where two branches of a line separate to run to different terminals; also in sections where complaints may originate regarding lack of sufficient service. A great many eighteen-hour records are also taken from 6 a. m. to 12 midnight. After the count is completed the observer comes into the office and makes a chart of his record on cross-section paper. This chart, when completed, shows the number of passengers on each car and the time the car passed him, the scheduled and operated headway, the number of cars scheduled to pass and the number operated in half-hourly periods, the average number of passengers carried per car in half-hourly periods and the number of seats supplied. The finished chart will show whether the schedule has been maintained as to headways and the number of cars operated; also if sufficient service is being given to take care of the business properly. Passenger counts during the past year were taken at 278 points on the system, and the 2446 charts tabulated show that the various lines were checked that number of times.

DISTRIBUTION CHARTS

Another form of chart used extensively by the time-table department is that which has been termed the "traffic distribution chart." This chart shows the performance of an individual car taken throughout a certain trip. Two men are used to take this test. One man is stationed at the rear platform of the car, where he records the name of the street at which each stop is made and the number of passengers boarding and alighting from the car at each stop. The other man, who is stationed near the front door of the car, keeps a record of each street at which the car stops, the number of passengers leaving the car from the front platform at each stop, the time of arrival at each time point along the line, and, with a stop watch, the time in seconds for each stop. This joint record is brought into the office and profiled. It is charted showing passengers on the vertical scale and the length of the line in miles on the horizontal scale. The chart will show where traffic originates and how it is distributed. A load curve is then developed from the continuous sum of passengers on and off. This curve starts at zero at the beginning of the trip and returns to zero when all passengers leave the car at the end of the trip, thus forming with the base line a closed area. The area, which has passengers for an altitude, and miles as a base, may be obtained by means of a planimeter and may be expressed in passenger miles. Then, by dividing the passenger miles by the total number of passengers boarding the car during the trip, the average length of ride per passenger is obtained. The average load on the car for the trip is reached by dividing the passenger miles by the length of the trip in miles. From the total number of passengers carried, and the stop-watch record of length of stops, the average time per passenger interchanged and also the average length of stop are computed. Other data which can be calculated from this record are, first, the percentage of passengers alighting from the front and rear platforms respectively; second, a separation of passenger stops and those due to delays from various causes, such as traffic regulations, vehicular interference, trolley pole trouble, throwing switches, etc.; third, average number of stops per mile; fourth, the actual trip speed, and its relation to schedule speed, also the trip speed with stop time excluded, which with braking and acceleration time excluded will show free running speed. All of these data are very valuable from a traffic point of view, and they are used as a basis for changes in running time or any contemplated re-routing. Sometimes on these tests observations are made of the position of the controller handle. If a motorman is continually running on series position when not interrupted by traffic, it is clear that he has too much time for his trip. If this kind of operation is found to be general among the motormen on the line, it is safe to make a cut in the running time and to speed up the line.

I will now demonstrate some of the various cases in which the foregoing type of test is absolutely necessary. Suppose that short-line service is about to be inaugurated on a certain line, and there is a question as to the point on the line where the short service should be turned back. A series of distribution charts are taken to show where most of the short riders board and leave the cars, that is to say, the distance of short haul. The turn-back point can then be arranged to be just outside this short-haul district, thus giving the greatest amount of service at the smallest cost without any waste mileage. This practice increases the operating efficiency of the line, as the short service takes care of the short riders while the through service is still adequate for residents outside of this zone. On a line with two or more fare zones a question arises concerning the exact location of these zones, namely, how far should the passenger be carried for each nickel. These zones are usually defined carefully by franchise regulations, but if the franchises have left any flexibility as to their location, the distribution chart will show the average length of ride per passenger on the line in question. With this length of ride known and used as a basis, fare zones of equal and reasonable length can be established.

These charts were used in just this type of case, about three years ago, when the residents of a certain section appealed to the Public Utility Commission to have the first fare zone on a certain line extended ½ mile. These distribution charts showed the average distance that the passengers on the line were riding per fare paid, and the Commission ruled that it would be unreasonable to ask the company to extend the ride. This study has also been made useful in determining the operating speed and efficiency of different types of cars. Thus our 2400 type has shown itself much faster in handling passengers than the older types. This is largely due to their double exit door at the front which enables two passengers to leave the front platform at the same time, instead of alighting in single file, as from the older type of car. The average time per passenger interchanged for the 2400 type is sometimes as low as 1.3 seconds, while the older type of cars do well if they are less than 2 seconds. Seven-tenths of a second may seem a very small item to consider, but when it is remembered that if a car carries 100 passengers on a trip it will mean 200 interchanges, and if seven-tenths seconds is saved per interchange per passenger, 140 seconds or two minutes and twenty seconds will be saved per trip. If this amount of time could be saved on each trip of the 360 runs on the South Orange table already described, 840 minutes, or fourteen hours per day would represent the total saving in time. I mention this item to show that little things like this can amount to very much and should be given the closest supervision.

VARYING SPEED IN PASSENGER MOVEMENT

It is interesting to note the difference in the class of traffic handled at different times of the day. The rush-hour riders are always much faster than those during the non-rush period. During these rush hours most of the passengers are men who are in a hurry to get to their place of business to to get back home at night. They board a car as quickly as possible, and are usually unencumbered by bundles. There are few children, old or infirm persons. Now consider the non-rush period. We have the women shoppers, and with arms loaded with bundles, they cannot board a car in a hurry. If they are not loaded down with bundles they are generally accompanied by children, who must be helped on and off the car. Elderly and infirm persons do most of their traveling in this period, and they cannot be hurried. It is often argued that more running time should be allowed cars during the rush hour, because of the congestion coincident with the rush, but a study of the difference in the type of people traveling at different hours of the day shows that the rush-hour crowds are faster per passenger. Therefore, except in isolated cases, extra running time for rush-hour operation is not necessary.

Public Utility Commission hearings have brought up the question of the ratio of seating capacity to the number of passengers during rush hours, and inquiries have been made as to the distance passengers were compelled to stand before seats would be available. This can be shown immediately by distribution charts. Simply draw a horizontal line above the base line showing the rated seated capacity of the car, and the position of the curve above this line will show the exact distance that the last standee was compelled to stand. It will also show that enforced standing is of short duration because of the constant interchange of passengers at various points on the line.

CONDITIONS IN NEW TERRITORY—CONCLUSION

In undertaking the development of a time-table in new territory it is necessary to canvass the district to be served with a view of obtaining an estimate of the number of passengers expected as patrons, making a study of the location of the section, its business and manufacturing districts and of its railroad station. Data obtained in this manner are of material assistance in the development of the headways to be inaugurated. After the line is opened to traffic, passenger counts must be taken at different points on the line and a study made of them, so that the interval between cars can be adjusted to give the proper service where and when needed to those offering themselves for transportation. The time points and speed to be maintained by the cars will be governed to a great extent, at the beginning, by local conditions in the section through which they operate. Speed and headways are frequently limited by franchises.

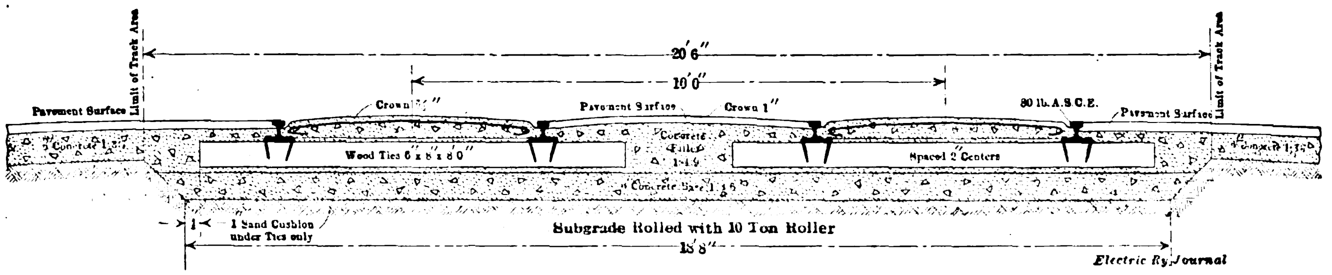
In conclusion I would state that the duties of the members of the time-table department do not consist simply in the making of time-tables, but also involve the development of a great deal of statistical information for use in verifying or disproving various complaints made by municipal bodies, improvement associations and others regarding the service rendered. Their data are also used in hearings before the Public Utility Commissioners, and much data used by the various operating officials must be compiled by the time-table men.

Mr. Jackson's paper was followed by written discussion as contributed by Elmer L. Williams, division superintendent Hudson division, and D. H. Herflicker, supervisor Southern division. Informal discussions were also contributed by W. B. Graham, superintendent Essex division, and D. C. McDougall, division engineer. At the next meeting of the section, which will be held on May 21, Charles H. Coe will read a paper on "Training the Trainmen."

TRACK CONSTRUCTION IN EDMONTON, ALBERTA

BY H. C. SAUNDERS, ENGINEER EDMONTON RADIAL RAILWAY

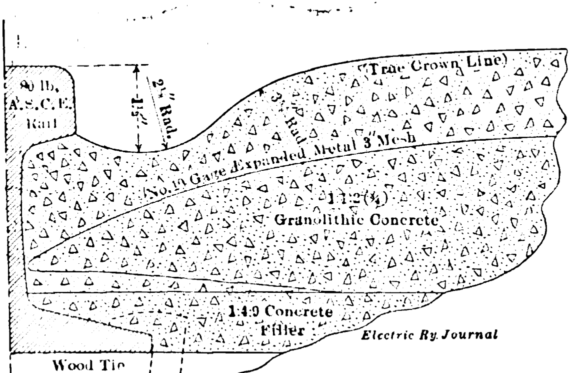
Edmonton lies in the center of a rich farming country, and the nature of the soil has proven a very serious obstacle to the proper maintenance of street-car tracks in the city. The surface is composed almost entirely of a heavy clay, practically free from sand or stone. Under the sun's rays the surface will bake so hard that a pick cannot be sunk more than an inch or two into it, but a very slight rain softens it to a veritable bog. Ballast tamped in place over such a sub-grade disappears with the first day's rain. To illustrate this condition it is only necessary to state that during the rainy season two years ago the average number of derailments on the Edmonton Radial Railway was three and four per day over the unpaved tracks then in use.


20' 6"
10' 0"
Limit of Track Area
Pavement Surface
Crown 1½"
Pavement Surface
Crown 1"
80 lb. A.S.C.E.
Pavement Surface
Limit of Track Area
Concrete 1:3:7
Wood Ties 6" x 8" x 8' 0"
Concrete Filler 1:4:9
Spaced 2' Centers
Concrete 1:3:7
Concrete Base 1:3:6
1" Sand Cushion under Ties only
Subgrade Rolled with 10 Ton Roller
18' 8"
Electric Ry. Journal

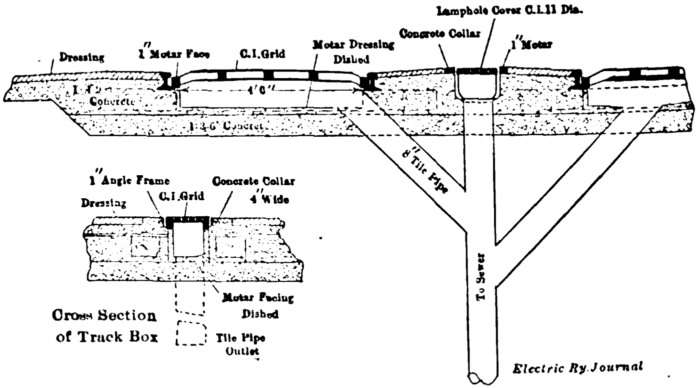
Edmonton Permanent Track Construction—Cross Section, Double-Track, 10-Ft. Centers

In view of these conditions it was considered essential by the present management that as much as possible of the ballasted track be replaced by some form of permanent construction and that all future construction be built on a permanent basis. During the past year 21.71 miles of permanent track were laid in accordance with this program, replacing 8.17 miles of ballasted track of the former type.

In view of the extensive program contemplated, it was thought advisable to study the type of construction carefully, particularly as the former types of so-called permanent construction had given very poor satisfaction. These comprised all varieties of girder construction and consisted essentially of concrete girders lying longitudinally under the rails, connected under the ties with cross-girders of concrete. In practice, it was found that the vibration of the rail directly against the concrete caused a gradual crumbling away of the top and sides of the girder, so that the rails were ultimately balanced upon a knife edge of concrete. The same vibration destroyed any existing bond between the track construction and the adjoining pavement, and in from three to five years after laying, cases were noted where the rail had settled 4 in. and 5 in. below the paving, necessitating constant repair and expensive shimming. In view of this experience the base type of construction was adopted with ties sufficiently numerous to bond the track firmly, reducing the vibratory effects to a minimum.


80 lb. A.S.C.E. Rail
1½"
2¼" Rad.
3" Rad.
(True Crown Line)
No. 10 Gage Expanded Metal 3" Mesh
1:1:2(¾)
Granolithic Concrete
1:4:9 Concrete Filler
Wood Tie 6" x 8" x 8' 0"
Electric Ry. Journal

Edmonton Permanent Track Construction—Detail of Flange Way Construction


Lamphole Cover C.I.11 Dia.
Concrete Collar
1" Motar
Dressing
1" Motar Face
C.I. Grid
Motar Dressing Dished
1:1:2 Concrete
4' 0"
1:3:6 Concrete
8" Tile Pipe
To Sewer
1" Angle Frame
Dressing
C.I. Grid
Concrete Collar 4" Wide
Motar Facing Dished
Cross Section of Track Box
Tile Pipe Outlet
Electric Ry. Journal

Edmonton Permanent Track Construction—Detail of Track Box and Outlet Connection to Main Sewer

The sub-grade was first excavated to a depth of 18 in. below the finished grade and thoroughly rolled with a 10-ton roller to reduce settlement under service. A 6-in. layer of 1:3:6 concrete was poured on this and allowed to set two or three days before the track was laid. Fir ties 6 in. x 8 in. x 8 ft. were spaced 2 ft between centers, and 80-lb., A. S. C. E. rail in 60 ft. lengths was laid. A 22-in., four-hole continuous joint was used to approximate as closely as possible the stiffness of the rail section. The track was then surfaced and lined, and a 1-in. sand cushion was tamped firmly under the ties. The sand cushion served the double purpose of insuring accurate surfacing and absorbing to a large extent the vibrations which had previously proved so troublesome.

With the sand cushion in place, a weak filler of concrete mixed in the proportion of 1:4:9 was poured between the ties and brought to a level, 4 in. below the final surface, care being taken to spade the filler well between the ties. The final surface used was a granolithic concrete, composed of one part of cement, one part of sand and two parts of broken granite to pass through a ¾-in. ring. In this was laid No. 10 gage expanded metal of 3-in, mesh, as previous surfaces of this type had shown a tendency to break away under traffic. It was believed that the reinforcing would counteract this.

This surface was only adopted after considerable discussion, but it was finally selected for the following reasons. It could be easily finished to the required surface contour, it permitted the use of the 5-in. rail, and it was very much cheaper to construct in Edmonton than any type of block paving and at the same time it would stand up well under heavy traffic.

Special attention was paid to the design of the flangeway, it being desired to secure a self-clearing flangeway, which would cause the minimum of pounding from wagon wheels crossing the track. The contour shown in the accompanying figure was finally adopted and has given very good satisfaction.

The paving adopted by the city for the streets not paved with cement concrete has been either sheet asphalt, asphalt concrete or bitulithic. These were carried right up to the outside of the rail, but were finished ¼ in. below the top to prevent cutting from worn car wheels.

Grooved girder rails were used throughout on special work, and in consequence it was possible to use the same sheet paving as on the rest of the streets, instead of carrying the more expensive granolithic finish over this area. This resulted in a much quieter intersection, besides reducing the cost, and so far the construction has stood up very well.

Provision for surface drainage was made by locating track boxes at all profile sags as shown in one of the accompanying diagrams. These boxes were installed in place in the concrete filler by the use of a removable form and were very readily and cheaply constructed. No provision was made for underground drainage, as it was considered that the well-rolled sub-grade would undergo no further appreciable settlement, and the ties were so thoroughly embedded in concrete that there was no danger of rot.

In our opinion the chief enemy to the life of permanent street railway construction is excessive vibration, and the type outlined above has been designed throughout to minimize it. Cheapness of replacement was also considered. As the ties are completely surrounded by concrete, vibration is practically non-existent in the base, and hence the life of the construction should be limited only by the life of the rail. When the time comes for replacement, the excavation of the old concrete should not have to go much below the rail, and that part of the construction below them should be practically everlasting.

Practically all the concrete work for the past season was done by contract, the street railway doing the track-laying and overhead work.

ILLUMINATING ENGINEERS DISCUSS SIGNAL ILLUMINATION

At a joint meeting of the Railway Signal Association and the Illuminating Engineering Society of Chicago papers discussing illumination of railway signals, signal lenses and the physiology of the eye in its relation to railway signaling were presented. Papers were read by T. S. Stevens, signal engineer Atchison, Topeka & Santa Fé Railroad; Dr. H. T. Gage, Corning, N. Y., and Dr. Nelson M. Black, of Milwaukee, Wis. The discussion of these brought out the fact that only 4 per cent or 5 per cent of all the railway signals now in operation in the United States were electrically illuminated. The discussion centered around the type of oil lamp known as the "Long Time Burner," although it was generally agreed that electrical illumination was more to be desired and was bound to become prevalent in the future. The opinion was generally expressed that the future signal would be given by means of transmitted light in day as well as night, although some engineers thought that it would probably take the form of some type of illuminated semaphore.

The Carbon Transit Company, Mauch Chunk, Pa., is building a new large dancing pavilion at Flagstaff Point overlooking the park, 800 ft. below. This pavilion will replace a similar one destroyed by fire last spring. The new building will be approximately 85 ft. x 150 ft. and is to be completed by May 1.

CENTRAL ELECTRIC COMMITTEES

The annual "Brown Book" of the Central Electric Railway Association has just been issued. It shows the officers for the ensuing year elected at the annual meeting of the association on Feb. 25 and already published in this paper. The book contains a list of the member companies of the association, including interurban roads with 4107 miles of track and two city lines, those in Cleveland and Toledo. It also shows the committees appointed by the new administration. The names of the members of these committees and of the new committees of the Central Electric Railway Traffic Association are published below. The "Brown Book" also shows charges for interchange and equipment and other information of association interest.

STANDING AUDITING COMMITTEE—Walter Shroyer (chairman), Union Traction Company of Indiana; L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, Ohio Electric Railway.

ANNUAL TRANSPORTATION—H. A. Nicholl (chairman), Union Traction Company of Indiana; S. W. Greenland, Ft. Wayne & Northern Indiana Railway; C. J. Laney, Cleveland, Southwestern & Columbus Railway; C. P. Wilson, Interstate Public Service Company; C. O. Sullivan, Western Ohio Railroad.

CONSTITUTION AND BY-LAWS—A. W. Brady (chairman), Union Traction Company of Indiana; C. N. Wilcoxon, Western Ohio Railroad; C. L. Henry, Indianapolis & Cincinnati Traction Company; C. A. Floyd, Grand Rapids, Holland & Chicago Railway; G. O. Nagle, Wheeling Traction Company.

CLAIMS COMMITTEE—Wm. Tichenor (chairman), Terre Haute, Indianapolis & Eastern Traction Company; J. H. Shaw, Cleveland, Painesville & Eastern Railroad; J. E. Rankin, Detroit, Monroe & Toledo Short Line Railway; H. Rimmelspach, Lake Shore Electric Railway; C. P. Wilson, Louisville & Northern Railway & Lighting Company; S. W. Reynolds, Danville, Urbana & Champaign Railway; E. E. Slick, Union Traction Company of Indiana.

FINANCE COMMITTEE—F. D. Carpenter, (chairman), Western Ohio Railroad; W. H. Forse, Union Traction Company of Indiana; A. Benham, Ohio Electric Railway; H. E. Vordermark, Ft. Wayne & Northern Indiana Traction Company; C. N. Hawley, Northwestern Ohio Railway & Power Company; F. J. Green, Springfield, Troy & Piqua Railway.

HOTEL AND ARRANGEMENT COMMITTEE—L. J. Drake, Jr., (chairman), Galena Signal Oil Company; S. D. Hutchins, Westinghouse Traction Brake Company; W. H. Bloss, Ohio Brass Company; L. G. Parker, Cleveland Frog & Crossing Company; T. H. Henkle, Electric Service Supply Company; Thomas Ryan, General Electric Company; J. G. McMichael, Atlas Railway Supply Company.

INSURANCE COMMITTEE—F. W. Coen (chairman), Lake Shore Electric Railway; F. A. Healy, Ohio Electric Railway; W. H. Forse, Union Traction Company of Indiana.

COMMITTEE ON COMPENSATION FOR HANDLING UNITED STATES MAIL—E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; R. A. Crume, Dayton & Troy Electric Railway; W. A. Carson, Evansville Railways Company; Geo. Whysall, Columbus, Marion & Bucyrus Railroad.

PUBLICITY COMMITTEE—E. M. Haas (chairman), ELECTRIC RAILWAY JOURNAL; H. F. Kenfield, *Electric Traction;* E. H. Farr, A. H. Pugh Printing Company.

STANDARDIZATION COMMITTEE—R. N. Hemming (chairman), Union Traction Company of Indiana; H. H. Buckman, Louisville & Northern Railway & Light

Company; F. J. Foote, Ohio Electric Railway; L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company; Charles Sigler, Winona Interurban Railway; F. J. Stevens, Ft. Wayne & Northern Indiana Traction Company; J. R. Fairchild, Western Ohio Railroad; E. Heydon, Terre Haute, Indianapolis & Eastern Traction Company; A. F. Rolston, Columbus, Delaware & Marion Railway.

SUBJECT COMMITTEE—E. B. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; W. S. Whitney, Ohio Electric Railway; J. Jordan, Cleveland, Painesville & Eastern Railroad; C. D. Emmons, Chicago, South Bend & Northern Indiana Railway; G. W. Parker, Detroit, Monroe & Toledo Short Line Railway; F. D. Carpenter, Western Ohio Railroad; Will H. Bloss, Ohio Brass Company.

RULES GOVERNING THE INTERCHANGE OF EQUIPMENT—H. A. Nicholl (chairman), Union Traction Company of Indiana; C. D. Emmons, Chicago, South Bend & Northern Indiana Railway; A. Benham, Ohio Electric Railway; E. L. Kasemeier, Ohio Electric Railway.

SUPPLY MEN'S COMMITTEE.—S. D. Hutchins (chairman), Westinghouse Traction Brake Company; L. G. Parker, Cleveland Frog & Crossing Company; John F. Ohmer, Ohmer Fare Register Company; L. J. Drake, Jr., Galena Signal Oil Company; W. H. Bloss, Ohio Brass Company; J. H. Drew, Drew Electric & Manufacturing Company; John Benham, International Register Company; M. B. Lambert, Westinghouse Electric & Manufacturing Company; G. F. Allen, Railway Materials Company; A. G. Olberding, American Brake Shoe & Foundry Company; Thomas Ryan, General Electric Company; T. H. Henkle, Electric Service Supplies Company.

TRANSPORTATION COMMITTEE G. K. Jeffries (chairman), Terre Haute, Indianapolis & Eastern Traction Company; H. C. Warren, Toledo & Indiana Railroad; E. Smith, Toledo, Fostoria & Findlay Railway; Frank Smith, Interstate Public Service Company; J. F. Keys, Detroit, Monroe & Toledo Short Line Railway; A. Benham, Ohio Electric Railway; C. F. Franklin, Winona Interurban Railway; H. C. Mason, Benton Harbor-St. Joe Railway & Light Company.

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WOOD PRESERVATION COMMITTEE—F. P. Smith (chairman), Interstate Public Service Company; T. B. McMath, Indianapolis Traction & Terminal Company; L. A. Mitchell, Union Traction Company of Indiana.

COMMITTEE ON JOINT WEIGHT AND INSPECTION BUREAU—J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company; R. A. Crume, Dayton & Troy Electric Railway; W. S. Whitney, Ohio Electric Railway.

JOINT FOLDER COMMITTEE—E. D. Peck (chairman), Terre Haute, Indianapolis & Eastern Traction Company; C. N. Wilcoxon, Chicago, Lake Shore & South Bend Railway; C. G. Taylor, Sandusky, Norwalk & Mansfield Electric Railway.

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STANDING AUDITING—Walter Shroyer (chairman), Union Traction Company of Indiana; L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, Ohio Electric Railway.

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CONSTITUTION AND BY-LAWS—C. J. Laney (chairman), Cleveland, Southwestern & Columbus Railway; Bert Weedon, Interstate Public Service Commission; E. Hamprecht, Toledo, Bowling Green & Southern Traction Company; B. E. Parker, Public Utilities Company; W. O. Woodard, Chicago, Lake Shore & South Bend Railway.

INTERCHANGEABLE MILEAGE TICKET—F. D. Norviel (chairman), Union Traction Company of Indiana; W. S. Whitney, Ohio Electric Railway; O. H. Murlin, Dayton & Troy Electric Railway.

INTERLINE BAGGAGE—O. H. Murlin (chairman), Dayton & Troy Electric Railway; C. O. Sullivan, Western Ohio Railroad; J. A. Greenland, Ft. Wayne & Northern Indiana & Columbus Railway.

JOINT PASSENGER TARIFFS—W. S. Whitney (chairman), Ohio Electric Railway; F. D. Norviel, Union Traction Company of Indiana; C. J. Laney, Cleveland, Southwestern & Columbus Railway.

JOINT FREIGHT TARIFFS—J. H. Pounds (chairman), Benton Harbor-St. Joe Railway & Light Company; C. O. Warfel, Indianapolis & Cincinnati Traction Company; C. B. Kleinhans, Toledo & Indiana Railroad; W. D. Stansifer, Winona Interurban Railway; J. C. Bradfield, Scioto Valley Traction Company.

OFFICIAL INTERURBAN MAP—G. M. Patterson (chairman), Ft. Wayne & Northeastern Railway; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company; O. H. Murlin, Dayton & Troy Electric Railway; W. S. Whitney, Ohio Electric Railway; C. C. Trees, Indianapolis Railways & Light Company.

OFFICIAL INTERURBAN GUIDE—C. O. Sullivan (chairman), Western Ohio Railroad; J. M. Brick, Springfield, Troy & Piqua Railway; F. D. Norviel, Union Traction Company of Indiana; J. F. Starkey, Lake Shore Electric Railway; J. A. Greenland, Ft. Wayne & Northern Indiana Traction Company.

JOINT EXCEPTION SHEET—C. O. Sullivan (chairman), Western Ohio Railroad; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company; C. O. Warfel, Indianapolis & Cincinnati Traction Company; G. M. Patterson, Ft. Wayne & Northwestern Railway; J. H. Pounds, Benton Harbor & St. Joseph Railway & Light Company; W. S. Whitney, Ohio Electric Railway; F. D. Norviel, Union Traction Company of Indiana.

RULES GOVERNING SETTLEMENT OF FREIGHT CLAIMS—F. D. Norviel (chairman), Union Traction Company of Indiana; F. I. Hardy, Chicago, South Bend & Northern Indiana Railway; J. S. Clark, Marion, Bluffton & Eastern Traction Company; C. B. Kleinhans, Toledo & Indianapolis Railroad; C. O. Sullivan, Western Ohio Railroad.

JOINT WEIGHT AND INSPECTION BUREAN—J. H. Crall (chairman), Terre Haute, Indianapolis & Eastern Traction Company; F. D. Norviel, Union Traction Company of Indiana; W. S. Whitney, Ohio Electric Railway; F. I. Hardy, Chicago, South Bend & Northern Indiana Railway; O. H. Murlin, Dayton & Troy Electric Railway.

The electric road connecting Junction City and Manhattan, Kan., is likely to derive a good deal of revenue from students at the Agricultural College at Manhattan. The monthly round-trip rate is $13.

COMMUNICATIONS

MAINTENANCE AND DEPRECIATION

NEW YORK CITY, April 10, 1914.

To the Editors:

In your issue of March 28, Col. T. S. Williams has pointed out some of the vital conditions pertaining to the present methods of accounting for "maintenance and depreciation" and requests that other opinions be expressed. In the examination of many properties I have found that depreciation, deterioration, obsolescence and amortization are terms that have been used without a clear and definite understanding of just what each classification covers. It is generally accepted that depreciation and deterioration are synonymous terms; but take as an example a new car: after one year of service it has a depreciated value, and there is also some deterioration to its various wearing parts, but the depreciation and deterioration have a widely varying ratio in computing duplication values of property.

Depreciation can be estimated and some standard accepted, but deterioration is so dependent upon whether the car is operated under a careful management and efficient maintenance during each year of its operation that it is extremely difficult to work out any standard that could be accepted. After depreciation and deterioration have reached a certain point—that is, when the real value of the car has depreciated by 75 per cent and the deterioration has gone so far that the maintenance becomes excessive, the investment in a new car would be warranted by the saving in operation. This should be taken care of by an amortization fund, created to insure the going value of the property. The life of each item of installation can be clearly estimated and a rate worked out for that item which would determine the percentage of value to be set aside each year to insure the going value of the installation. In case a twenty-foot car, for example, was replaced by a thirty-six foot car, the value of the twenty-foot car should be obtained from the amortization fund and the excess cost of the larger car, over and above the value of the twenty-foot car, charged to improvements and betterments.

The term obsolescence has been made to cover a multitude of sins, but should in reality cover what might be termed an unproductive account. A car in operation may be entirely adequate in seating capacity and equipment to meet the actual demand of the service, but there is a public demand to be met that calls for a car with lower steps and a new design of equipment. While this installation has an intangible value in increasing business and possibly in decreasing operating expenses, yet the investment could not justly be charged to improvements and betterments. On the other hand, under such conditions the equipment displaced has not served its full life so that the amortization fund could be charged with the account. Obsolescence seems to be an item that is generally provided for by a contingent expense, but it is a term that can be clearly defined when used in the classification of expenditures. It should have a classification entirely distinct from the improvement and betterment account, as in many cases it is an expenditure that is not warranted in dollars and cents by any return on the capital invested.

I believe it is possible to obtain an agreement upon standards of depreciation which, used in conjunction with the amortization fund, will take care of deterioration in a practical way. It is practically impossible to create any fund that would take care of obsolescence, as it is a contingency that is effected by new inventions, esthetic tastes and demands of the public.

W. W. COLE, Consulting Engineer.

DETROIT, MICH., April 9, 1914.

To the Editors:

The editorial on the subject of "Maintenance and Depreciation" in the March 21 issue is certainly timely, and the writer agrees with President Williams, of the Brooklyn Rapid Transit Company, that if by fair discussion a consensus of intelligent and practical opinion could be obtained, a great public service would be thereby rendered.

In a broad discussion of the subject it would seem that the following elements must necessarily be given consideration:—

(1) Insured earnings—these are absolutely essential to the continued existence of a public service utility in this day of an ever-increasing cost of furnishing service to the public, and at the same time an ever-decreasing rate for such service.

(2) The percentage of cost new at which a public service utility shall be maintained to afford the best and most economical service to the public.

(3) The amount necessary to be expended annually to maintain the utility at this established percentage of condition.

(4) The amount necessary to be provided annually to replace property used up in service—depreciation.

(5) The amount of insured earnings necessary to provide for such maintenance and depreciation, other operating expenses, taxes, interest and a fair profit on the investment devoted to the service so rendered.

Those who are familiar with the great problem under discussion believe that the legislative and regulating governmental bodies of the country have gone hastily, unadvisedly and ill-advisedly in the direction of an attempt at regulation of these matters. It is apparent, of course, that under the so-called regulations and practices of these governmental bodies, a serious situation has been brought about, jeopardizing even the continued existence of the properties affected and the welfare of the public to be served. These regulating bodies admit their inability to establish a rate of depreciation, and well they may. Certainly it is not possible to establish either a uniform rate of depreciation or a uniform rate of maintenance to apply alike to all transportation undertakings.

Take for example the case of tracks. When it is considered that a mile of track, in one of our larger cities, is subjected in a given time to greater usage than a mile of track in a smaller city, the question arises as to what are the elements to be considered in determining the relative depreciation. Perhaps we should first consider the relative condition as to the sub-foundation and main foundation, drainage, character of track construction, weight and character of equipment, speed operated and frequency of stops, relative live load carried and other causes contributing directly to depreciation.

A sharp line should be drawn here between depreciation and maintenance. The construction may be maintained as an item of expense until it is no longer serviceable, and when that condition is reached replacement must follow, and the cost thereof is depreciation. This, however, should not be confused with replacement growing out of obsolescence or occasioned by reason of the necessity of replacing a light structure with a heavier one to meet a condition which is the result of heavier traffic.

It may be practicable, if the date of beginning can be determined upon, to inaugurate a method of providing for depreciation on a car mileage basis. Under such a method it might be possible to determine the life of that part of the structure which is affected by atmospheric and other like conditions, and the life of that part of the structure which is affected by wear.

The problem is a difficult one to solve, and the writer would like to see a full, dispassionate discussion looking to that end, and for the purpose of inviting such a discussion the above suggestion of five elements to be considered has been made. Only by means of a thorough discussion will it be possible to reach a definite and universal conclusion on the subject of maintenance and depreciation by which the confusion "as to the best accounting treatment to be used" will be clarified, simplified and standardized.

R. B. Rifenberick, Consulting Engineer.

International Railway Company
Buffalo, N. Y., April 14, 1914.

To the Editors:

All property subject to wear and tear and the elements will depreciate in value. When it has to be replaced for any reason, the cost thereof is an operating expense. The cost of maintaining it up to the time it is replaced is, of course, an operating charge also.

The best method of maintaining and equalizing the average charge for maintenance and renewals is to set aside each month a percentage of gross income to the credit of renewals and maintenance fund, sufficient to take care of current requirements, with a surplus to provide for exigencies and peaks in the cost of renewals. All expenditures for maintenance and renewal of property should be charged against this fund.

For a period of eight years ending Dec. 31, 1913, the International Railway Company expended for renewals and maintenance 14.90 per cent of its gross income. The property has been fairly well maintained, but in order to provide the depreciation fund with a sufficient surplus to take care of extraordinary charges in the way of renewals, it was determined that 16½ per cent of the gross income should be credited to the depreciation fund each month, which it is believed will be ample to provide for all current depreciation charges and take care of peaks in the cost of renewals.

During the winter months, when very little work is being done, the fund necessarily increases, whereas during the summer months the expenditures for renewals and maintenance generally exceed the amount set aside for this purpose; but on the average it is expected that this percentage will yield a surplus which may be applied to the credit of accrued depreciation.

E. G. Connette, President.

DEPRECIATION FROM A CERTIFIED ACCOUNTANT'S POINT OF VIEW

New York University
New York, April 15, 1914.

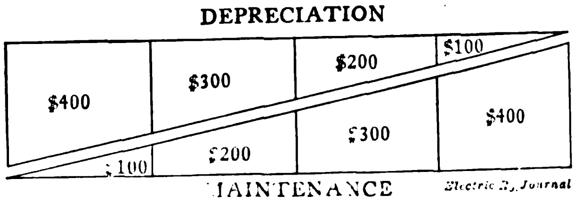
To the Editors:

In view of the discussion appearing in your columns regarding the subject of "Maintenance and Depreciation," a résumé of this topic from the public accountant's point of view may not be inappropriate.

The value of all physical property tends to decrease, owing to such causes as use, abuse, oxidation, deterioration, disintegration, inadequacy, obsolescence and even change of ownership. Since the passing of physical property is inevitable, provision for its loss should be made from time to time out of profits. The accounting term used to denote this charge against profits is "depreciation."

Depreciation is usually defined in substance as "the decrease in the value of an asset due to wear and tear, deterioration, inadequacy or obsolescence." Such a definition is perhaps somewhat inappropriate in that it uses the words "wear and tear," which the operating man usually associates with maintenance. Immediately the argument arises that if the property is adequately maintained a charge for depreciation is not necessary. Even if wear and tear were synonymous with maintenance (which it is probably not intended to be) there would still be going silently on that subtle deterioration which is accomplished by time and results ultimately in a condition wherein repairs and maintenance will not avail. It would seem, therefore, that the operating man must admit the necessity of a charge in excess of mere maintenance as he knows it, and the extent of the charge becomes the next question of interest.

The life of the property is primarily the basis for determining the duration of the value or better perhaps the rapidity with which the asset shall be written down. The value of the residue or scrap value must be taken into consideration and deducted before the amount to be written off is determined. With the amount to be written off and the estimated life determined, it is apparent that the next step should be to spread the amount equitably over the period covered by the life. To determine the life of railway property is in most cases almost as difficult as to determine the life of a human being. Tables bearing on physical property have been constructed by engineers and appraisers in the same way that tables of life probabilities have been worked out by mortuary experts. Unlike human beings, however, physical property assumes so many different forms and exists under so many different conditions that it is almost impossible to classify it with sufficient exhaustion to make such a classification dependable. Past experience of our own and that of others as compiled in tables dealing in generalities are all that we have available. The best estimate must at all odds be somewhat arbitrary.



To determine the amount to be written off annually there are several methods at hand, namely, the fixed percentage, fractional method with weighted years, declining balance unscientific, declining balance scientific, sinking fund and revaluation. Without question the fixed percentage (wherein the amount to be written off is ascertained by dividing the value by the life) is most frequently used. The effect of this method is to charge an equal amount to operations yearly and will be objected to usually because of the fact that maintenance expenses are generally conceded to increase with the age of the property. Thus when the two charges of maintenance and depreciation are combined the burden falls in the later years. In view of this fact probably the most satisfactory method is that which computes the depreciation charge by applying the scientific percentage to the declining balance. This has the effect of charging to operation an amount gradually decreasing as time passes. The charge for depreciation is heaviest in the earlier years at the time when the maintenance expenses are lowest, and is lightest at the end of the period when the maintenance expenses are most burdensome. This combination, therefore, is thought to result in a well-balanced charge to operation. The scheme may be more clearly understood through reference to the accompanying diagram.

Few rules concerning depreciation may be consistently laid down. Of the necessity of providing for it, however, there should be no question, even though the property is adequately maintained. The provision should be linked with that for maintenance in a way that will produce a well-balanced charge to operations annually. Moreover, the property should be classified exhaustively and the life of the constituent parts found. Finally, conservatism should govern, remembering that at best depreciation is only an estimate.

J. R. WILDMAN, Professor of Accounting.

INTERSTATE CLASSIFICATION OF ACCOUNTS

PACIFIC GAS & ELECTRIC COMPANY
SAN FRANCISCO, CAL., April 7, 1914.

To the Editors:

I have given the proposed Interstate Commerce Commission classification of accounts only a cursory examination, but such examination suggests the following:

With reference to detailed accounts under section 3—power: maintenance of dams, canals and pipe lines have been omitted, and it would appear that such account should be inserted in order to provide maintenance accounts similar to road and equipment accounts.

The description of the accounts No. 25—depreciation of way and structures; No. 39—depreciation of equipment, and No. 48—depreciation of power plant, buildings and equipment, does not include an allowance for obsolescence and inadequacy.

I would suggest that the accounts should be changed to read "amortization of way and structures"; "amortization of equipment," and "amortization of power plant, buildings and equipment," and that the description of the charges applicable to such accounts be charged to include an allowance for obsolescence and inadequacy, or that separate accounts be set up to cover such items under each of the above depreciation accounts.

The reason for making special provision for obsolescence and inadequacy is based on past experience of companies with electrical equipment of all kinds, that the type of equipment is constantly changing and that the liability of future changes is just as great owing to the many still unknown factors constituting electricity and electrical operations. The expense of installing apparatus or equipment of larger capacity because of the inadequacy of the original installation is an item of expense not coming under the headings of maintenance, depreciation or obsolescence. Such expense is a very large factor to companies operating over a large and growing territory such as is found in the West.

In presenting the form of income statement on page 49 of the accounting schedule, depreciation or amortization of capital has been included in operating expenses.

Unless the Interstate Commerce Commission will establish uniform rates of depreciation or amortization of capital and insist that each company use the rates applying to its particular territory, it would appear more desirable to have the income statement show the reserves for depreciation or amortization of capital separate from operating expenses in order to have the actual operating expenditures on a comparable basis as between companies.

The above, I believe, is particularly desirable owing to the indifferent attitude of a great many companies and the varied methods followed by them in setting up such allowances.

The form of the general balance sheet statement appearing on page 71 provides for deducting reserves for accrued depreciation from the investment amounts of road and equipment. In line with the growing practice of computing the rate of return of an operating company on its reproduction or service value it would more nearly serve the purposes of the balance sheet to carry reserves for accrued depreciation under corporate surplus, changing, if desirable, the heading to "surplus and reserves."

The above is based on the assumption that the balance sheet statement is presented for the analysis of the operations of a going concern and not for purposes of sale. The fact that depreciation may have accrued on capital does not, I believe, justify the deduction of such accrual from the original value of capital which is still in operation and rendering the service for which it was originally intended.

The argument appears well-founded, that if a structure, facility or unit of equipment is rendering the service for which it was originally installed, it will cost the reproduction value or present market value to install similar capital for the same purposes.

M. H. BRIDGES, Auditor.

SUGGESTION FOR CLASSIFYING SIGNAL FAILURES

ILLINOIS TRACTION SYSTEM
SPRINGFIELD, ILL., April 14, 1914.

To the Editors:

The establishment of a standard definition for a signal failure is, as pointed out in your editorial of last week, a matter which should be given prompt consideration. However, I cannot altogether agree with your opinion as indicated in the last paragraph of the editorial in question.

The term "signal failure" has, itself, caused considerable discussion, the majority of engineers believing that when a signal indicates stop, due to some derangement of the apparatus or line wires, the signal does not really fail but that it does what it is designed to do, namely, to go to the safe indicating position when deranged. Therefore up to the present time no definition has been given by the definition committee of the Signal Association. It has always appeared to me, however, that this argument is a poor one, and I maintain that when a signal goes to stop for some cause other than the presence of a train in the controlling section the signal really does fail.

Railroads are not spending the amount of money that signal installations require in order to have this apparatus, when it is deranged, go to the safe position, but rather they are expecting that the signals will properly indicate to a train the condition of the block governing it, and by the expression "condition of the block" I mean whether or not it is occupied by another train. The side issues of protection from broken rails, open switches, disconnected wires, and other characteristics of this nature are not, in my mind, the primary object for installing signals, and I feel, therefore, that a signal in the stop position for any reason other than an occupied block is a failure.

To go further, when considering the matter in the above light, the term "creditable failure" becomes one full of meaning. I do not think, however, that "creditable failures" should include those due to derangement of apparatus but rather should apply only to those failures that cause the signal to display stop on account of some operating condition that makes unsafe the display of a clear indication. I feel that it might be well to develop a new term for the so-called "failure" when the block is actually occupied by another car, as in my estimation this is the one primary object for installing the signals.

However, on the Illinois Traction System at the present time we charge signal failures whenever a train is stopped improperly, regardless of whether line wires are broken, or whether any of the other multitude of causes exist which may make a signal indicate stop when no train is in the next block.

JOHN LEISENRING, Signal Engineer.

WHAT CONSTITUTES A SIGNAL FAILURE?

PUBLIC SERVICE RAILWAY COMPANY
NEWARK, N. J., April 14, 1914.

To the Editors:

The editorial entitled "What Constitutes a Signal Failure?" in the last issue of your paper brings up a timely and pertinent question for discussion. Whether a signal failure should be charged for every train improperly stopped by a signal seems to hinge upon whether the signal system is viewed from the single point of safeguarding the movement of trains or from the dual point of safety and facilitating train movements. It would appear that the latter is most likely of acceptance. This being the case it seems reasonable to charge a signal failure for every train improperly stopped by a signal.

Just where the signal system ends is not very clearly defined, but it appears fair to put it at the feeder panel where the current supply for signal operation leaves the station, or, if the current is derived from feeders supplying other devices, at the point of leaving such feeders. All interruptions between these points, up to and including the signals themselves, should be charged as failures. This looks to be drastic, as stated in the article, but it gives definiteness to the question and probably would tend towards a higher degree of efficiency in the inspection and maintenance of the signal feeder system.

In order that the Signal Department should be not unfairly charged with failures for which it is in no wise responsible, there should be a subdivision of failures, and signals set to stop by the delinquency of the trainman in failing to close a switch properly or by the carelessness of a sectionman in removing bonds or in short circuiting the tracks, should be charged to the department at fault. The really serious signal failure is the false clear indication which, fortunately, is rapidly becoming a rarity, thanks to the skill of the signal manufacturers, but nevertheless requires its inclusion in any definition of a signal failure. J. W. G. BROWN,
Assistant General Superintendent.

IMPROVEMENTS IN METHOD OF ACCOUNTING FOR FARES

BY W. H. FORSE, JR., SECRETARY AND TREASURER, UNION TRACTION COMPANY OF INDIANA

When the fare of a passenger is not properly accounted for it is the result of failure on the part of a conductor. This may be failure to collect the fare, failure to record its collection, or failure to deliver the fare to its owner, the railway company. These failures, like the failures which produce accidents, are very expensive.

The careful selection of trainmen is one of the greatest "improvements in fare accounting" that can be devised. If division superintendents and others who hire trainmen will select their men with as much regard to honesty and good character as to physical fitness and sobriety, the auditor's responsibilities will be lightened and the company's treasury will be benefited.

There are three methods generally used in accounting for passenger revenue. The plan most frequently adopted by American street railways comprises the use of a fare register with a large indicator and loud gong to attract the attention of the passenger. Some railways dispense with the use of a register and substitute paper slips in the form of receipts which are given to the passenger by the conductor. The third method, which is used by steam railways more commonly than by electric railways, consists of using neither the register nor the receipt, except in the case of cash fares, receipt for which is given by the conductor. With the first plan it is taken for granted that passengers and inspectors detect dishonest conductors by watching the registers and listening for the gong. Railway officials sometimes overlook this, the chief advantage of the fare-register.

The writer had this brought to his attention recently when he saw that the fare-register in a prepayment car in one of our large cities was located at the rear of the car on the inside, where it would not be seen by seated passengers when fares were being rung up. It is not surprising, in view of such seeming oversight on the part of railway companies, that they are taken advantage of by scheming conductors.

Various types of portable registers have been used to good advantage, from the "squeezer" of Providence to the "coffee-pot" of Toronto. But when it comes to collecting fares from a rushing, jostling crowd, there is no mechanical device which can gather in coins quite as quickly and accurately as a man's bare hands. The increasing use of prepayment cars has resulted in great improvement in the construction of fare boxes, and the use of these boxes goes far toward solving the problem of collecting fares in some localities and under some conditions.

The plan of dispensing with the fare register and with the receipt for fare collections can hardly be considered "a plan for safeguarding the revenues" and will, therefore, not be considered in this brief discussion.

The plan embracing the use of receipts to be given by the conductors for cash and ticket collections is subject to abuse. Passengers frequently throw the receipts upon the floor of the car and quite as often do not pay any attention to the receipts when handed to them. The use of these receipts in interurban service is subject to another abuse, whereby the conductor punches or perforates the stub retained by him and handed in to the auditor with a different (less) amount than the receipt portion which is given to the passenger. Lockboxes have been provided, but these have not entirely put an end to the falsification of audit slips by conductors.

The European plan of having an inspector board the car at frequent intervals with the demand that passengers show their receipts for fares paid has its advantages and also has its disadvantages. It would be extremely difficult, for example, to have this practice followed during the rush-hours in the large cities, the times when mistakes or irregularities are particularly apt to occur.

Someone, some day, may discover a burglar-proof plan of safeguarding passenger receipts, but all of the plans now in use have their faults. "Spotters" and inspectors discover some of the irregularities, while careful auditing and comparisons of receipts of the various runs are to be commended. Such inspections and checks should be carefully made and the attention of conductors should be called to irregularities as they occur. There have been instances in which men have become dishonest because attention has not been called to first irregularities. Looseness on the part of the company result in similar looseness on the part of the trainmen.

Conductors as a class are no worse than other men and the ratio of dishonesty among them is not very large, considering the opportunities they have and the temptations to which they are subject. By careful selection and training of men this proportion can be materially reduced.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

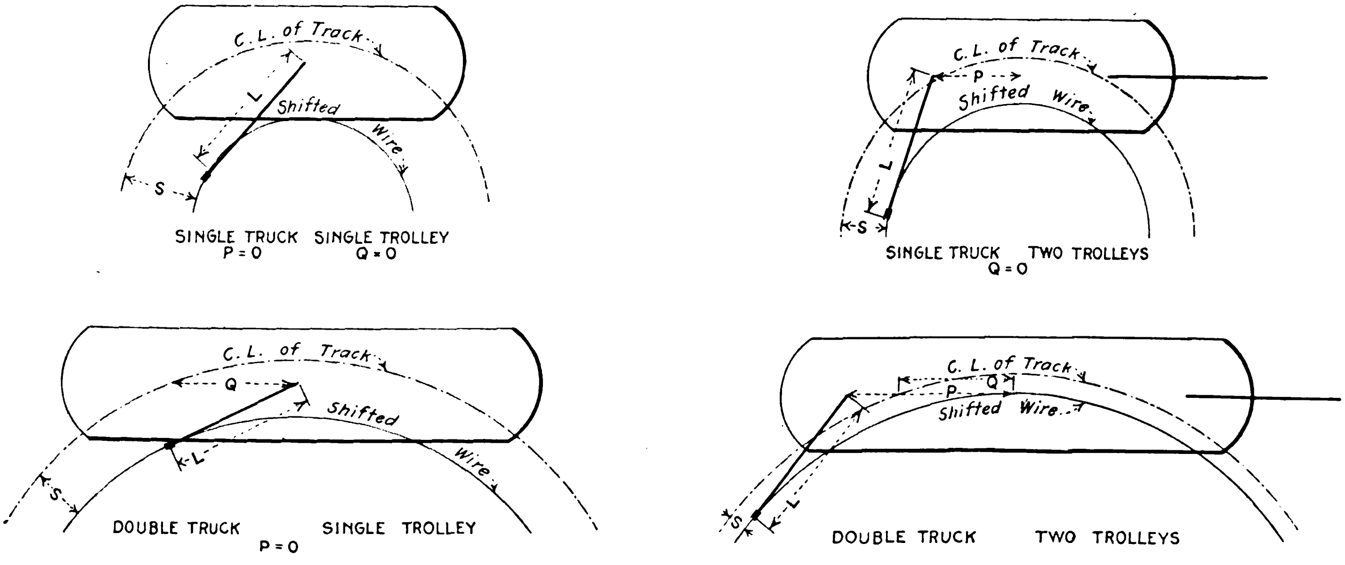
(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

OVERHEAD LINE PROBLEMS—SUSPENSION

BY CHARLES RUFUS HARTE, CONSTRUCTION ENGINEER THE CONNECTICUT COMPANY

The development of the construction of overhead transmission and distribution lines is an interesting example of the employment of cut-and-dry methods rather than scientific analysis. Under such conditions the most economical type is distinguished only by extended comparison of the different forms, and a poor design often persists until some change in the service suddenly brings to light defects not before suspected.

This has been particularly the case with overhead trolley construction. In the early days every road was a law to itself as to both methods and material, for in its capacity as a conductor the trolley wire offers no serious problems; even though heavy service and small area of contact with the collector result in undue current density this area is rapidly shifting, and there is very rarely time for the resultant heating to reach dangerous proportions. Some of the first types of construction early showed their unfitness and were discarded, but many others persisted until the combination of high speed and heavy service forcibly emphasized the fact that the trolley wire is not merely a conductor but is a track as well and that in the latter capacity lies its chief weakness. To-day the maintenance troubles on not a few lines are due to failure to appreciate this fundamental fact.



Trolley Wire Offsets on Curves for Single and Double-Truck Cars

A railroad way, as rigid as can be made with 100-lb. rail and stone ballast, if properly maintained, rides with perfect smoothness; and the same result obtains where bog conditions beneath give a uniformly yielding formation. It is where the wave of bending stress meets a soft spot in the otherwise hard track, or a hard spot in the soft track, the effect being most marked in the latter case, that there result, so to speak, breakers which are injurious to both track and rolling stock. In the case of the overhead trolley the situation is different only in that the collector can, and unhappily does, chatter on the wire at the points of condition change, thus enormously aggravating the troubles.

The ill effect of hard spots was well shown in the early form of the single-phase overhead electrification of the New Haven road, where the No. 0000 copper trolley was carried at the lower corners of triangular frames spaced 10 ft. apart and suspended by the other corners from a pair of messengers. The pressure wave "broke" at each of these supports as on a reef and caused most serious wire failures until E. H. McHenry, then vice-president, hit upon the happy expedient of suspending a second trolley wire from the first by clips located midway between the frames, thereby producing a uniformly flexible condition which completely obviated the difficulty. Similar results have been accomplished both abroad and here by employing hinged or sliding hangers.

For simple suspension Joseph Mayer has suggested (*Transactions* American Society of Civil Engineers, Vol. LXI, page 1) long ears of special shape to dampen out the wave gradually, and believes it would permit spans of 300 ft., but so far as the writer knows no actual test has ever been made. Such treatment might well prove advantageous on the standard 100-ft. span, for even with a properly tight trolley the ears tend to curl up at the ends, while the more rigidly fixed points such as anchors, frogs, section insulators and the like are continually in trouble.

The early practice of attaching anchor half-ears on each side and tying them together over the top of the device still obtains with some companies, and, although they are designed merely to keep up the ends when the periodic break comes, they materially help conditions by dampening the wave before it reaches the critical rigid point. "Flexible approach" material, brought out a few years ago, has not met expectations as to flexibility but more than holds its own in the forms which permit renewal of the ends without serious disturbance of the body. A tight trolley wire helps, but it has the practical disadvantage that the line gang is exceedingly apt to pull it too tight. The result is either a speedy break or wire stretch, with reduction of section at one point and consequent rapid wear at that spot. Opportunity exists for much improvement in respect to this whole matter.

WEAR OF OVERHEAD WIRE

The apparent lack of logic in compelling the soft and costly copper to take the wear of the collector becomes less obvious in most cases when the actual figures are considered. Troubles with brazes, not uncommon a few years ago, have been largely eliminated, thanks to the prompt action of the leading makers. Better attention to the details of drawing has done much to remove the fear that trolley wire making had all but become a lost art, and copper is still easily king of trolley wire material. Extra finishing treatments by drawing or rolling are believed by some to add materially to the life of the wire—as they certainly do to the cost—but a series of laboratory tests made for the writer not long ago showed little physical difference between the special and commercial wire.

Where there is excessive wear phono-electric and the allied bronzes are much the best under wheel operation. Steel, which has been ideal with pantograph service of main-line electrification, has developed a quite unanticipated peculiarity with the wheel collector. The wire rusts, and as the oxide gets between the wheel flanges and the wire it grinds away the latter to an astonishing extent. Further, the rust stains due to rain dripping from the wire are a nuisance, particularly with cars painted a light color.

Not infrequently excessive wear is due to improperly installed wire, and a little roof riding on the various types of car used under the wire in question will point a solution. Such investigation should always be made. The life of a bronze wire is shortened by misplacement just as much proportionately as in the case of commercial copper.

If a tangent to the wire at the point of contact is not parallel to the plane of the trolley wheel the sides of the latter grind against the wire. Unfortunately, however, this condition of parallelism is a function not only of the track elements, which are constant for any given curve, but it is also a function of certain car details as well. Hence if, as is almost invariably the case, more than one type of car is used under it, the shift must be the compromise which best fits all types. And if there is a switch involved the situation is further complicated by the necessity for sufficient "drag" to insure that in facing movements the trolley shall take the proper branch.

Apparently the first expression for the curve offset was worked out by R. E. Wade and the writer and published in the 1911 "Question Box" of the American Electric Railway Engineering Association. As recently simplified by Howard P. Michener this is:

$$S = \frac{EH}{G} + R - \sqrt{R^2 + P^2 - Q^2 - L^2}$$

Where S = radial offset of trolley wire toward center of curve,
E = superelevation of outer rail,
H = height of trolley wire above rail,
G = track gage,
R = radius of curve,
P = distance from center of car to pivot of trolley base,
Q = distance from center of car to center of truck, and
L = horizontal distance from pivot of trolley base to point of contact between trolley wheel and trolley wire.

All expressions are in terms of feet or in terms of inches.

When the trolley pivot is directly over the truck center $Q = P$, and the expression becomes:

$$S = \frac{EH}{G} + R - \sqrt{R^2 - L^2}.$$

This offset should be tapered off from full value at the inside easement point to zero at the outside easement point, or if the curve is not eased the taper should start with full value a certain distance inside the curve and reduce uniformly to zero value the same distance outside the end of the curve. These distances are: Radius up to 100 ft., 20 ft.; from 100 ft. to 500 ft., 40 ft.; from 500 ft. to 1000 ft., 60 ft., and from 1000 ft. or over, 100 ft. The value of $R - \sqrt{R^2 + P^2 - Q^2 - L^2}$ can be graphically determined by employing large scale drawings of the curves and, on the same scale, celluloid templates of the cars with the truck centers marked, and having attached to each (so it can swing) an arm whose center is over the trolley base center and whose length is the horizontal projection of the trolley ("L" in the formula).

A template is needed for each type of car in which there are differences in the elements concerned, but if properly constructed such templates are also of great service in solving problems of clearance, etc. The application to curve offset was described in some detail in a paper by John H. Barnard before the thirty-first annual meeting of the New York Electric Railway Association (ELECTRIC RAILWAY JOURNAL, June 28, 1913, page 1155). At frogs the branch-off wire is necessarily started outside the track center to secure the drag required to insure proper operation, and it should be brought to proper position by the rate of change for easement. Incidentally, no frog should be tied in permanently until its operation has been carefully observed. A little time spent in making the best location at the outset will usually pay large dividends in its effect on later maintenance.

PNEUMATICALLY-OPERATED SAND-CAR EQUIPMENT

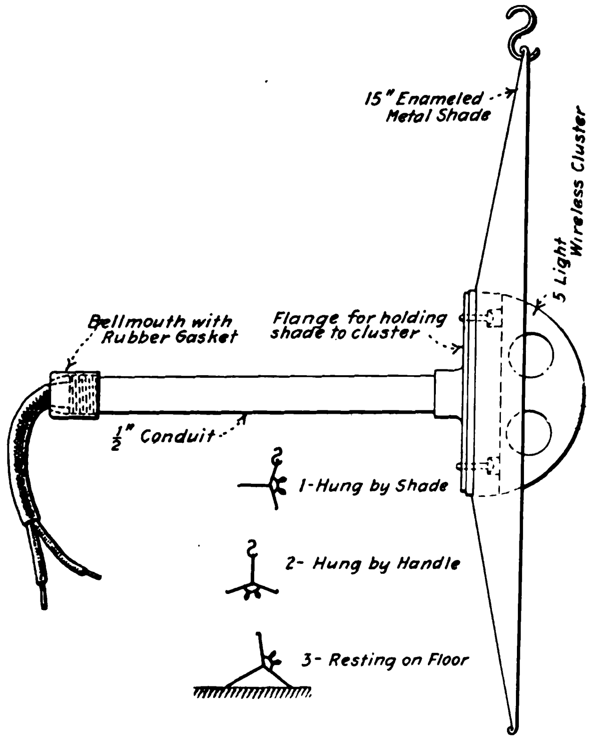
A correspondent who has watched the operation of the ordinary sand car suggests that it would be much more economical to substitute for the present hand-shoveling system means for distributing the sand with compressed air somewhat along the lines followed on many interurban cars. In the first place, the car should be of modern design, strong enough to be operated at the regular speeds and light enough to be hauled as a trailer. The interior would have the usual sand bins, and the sand would be blown against the rails by means of compressed air supplied from the brake equipment on the leading car. The control of the sand could be in charge of one man who would be located in the most convenient position. This scheme would make it unnecessary to have three or four men on the car shoveling at top speed and yet delaying the line. The use of compressed air would also greatly minimize trouble from caked or soggy sand.

The Public Service Section of the American Electric Railway Association, which is composed of employees of the Public Service Railway, Newark, N. J., makes it a point not only to print advance copies of the papers to be presented before each monthly meeting, but also to publish in pamphlet form a reprint of the paper and the complete discussion and minutes, with illustrations.

FLEXIBLE LAMP CLUSTER FOR CONTROLLER AND MOTOR WORK

BY R. H. PARSONS

Most men who work on controllers or under the car will substitute for a single lamp extension light, a five-lamp cluster in order to get more light. If left to their own resources the men usually make up a crude cluster from a board and any available sockets that they can find, the whole being wired up with more or less care. Of course, as better light insures better work there is no good reason why clusters should not be used at times. On the other hand, one of the first trouble-makers sought for by the insurance inspectors is the old wooden cluster, the use of which has been positively forbidden. Another bad feature of such clusters is the breakage of lamps, which is rather expensive and inconvenient.



Details of Connections for Wireless Cluster

The accompanying cut illustrates a cluster which has the entire approval of the insurance inspectors, which is handy and convenient and which is also practically free from the breakage of lamps. It is made and used as follows:

A piece of ½-in. conduit to any length desired is taken, but a length of 12 in. is the most suitable. A bellmouth and gasket are attached at one end. On the other end is screwed a flange to which are fastened a five-light wireless cluster and a 15-in. metal enameled shade. These fittings are standard and are cheap, and are designed to be assembled in this manner. The wire used is No. 14 twin wire, made according to any approved specifications and formed into a cable to fit the ½-in. conduit; the cable is held tightly by the rubber bushing in the bellmouth, two flexible steel wires being woven into the cable to strengthen it. The ends of the conductor wires can be fitted with any appropriate attachments for connecting to the line circuit.

One hook is put into the rim of the shade and another around the pipe handle near the bellmouth so that the cluster can be suspended by the shade with the light reflected horizontally, or by the handle with the light cast downward. Again, if the cluster is set on the floor, resting on the rim of the shade and the handle, the light can be reflected upward at an angle. The cluster is light and strong and if dropped will usually hit on the rim of the shade and the end of the handle rather than on the lamps. These clusters are convenient for use on outside work, where nothing except the trolley wire or conductor rail is accessible, as they are waterproof and therefore safe.

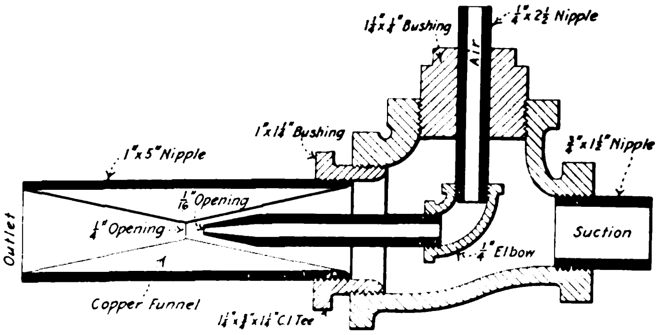
A HOME-MADE SUCTION CLEANER

BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT
ROCKFORD & INTERURBAN RALWAY

About a year ago we contemplated buying a vacuum cleaner for the plush seats, etc., in our interurban cars. For what we required the cost was from $350 to $400, but instead our shop foreman, J. N. Graham, made the device herein described and illustrated, which does as good work as the highest priced vacuum cleaner made. Any mechanic can make this cleaner at a cost of from 75 cents to $1.25, outside of the hose and nozzle.

The body of the cleaner is a 1¼-in. x 3¾-in. x 1¼-in. cast-iron tee. Into this is screwed a ¾-in. x 1½-in. nipple to which is attached 25 ft. of ¾-in. hose with 4-in. suction nozzle. This is the suction end. The air inlet is made up of a 1¼-in. x ¼-in. bushing screwed into the body of the cleaner. A ¼-in. x 2½-in. nipple threaded the full length runs through the bushing. To the nipple is attached a length of ¾-in. hose, which in turn is connected to the air reservoir on the car. Attached to the ¼-in. x 2½-in. nipple in the center of the body is a ¼-in ell with a ¼-in. x 3-in. nipple drawn down to the 1/16-in. opening.

The outlet is made of a piece of 1-in. x 5-in. pipe which is lined with two copper funnels soldered together at the small end in the center, leaving a ¼-in. opening. This is connected to the body of the cleaner with a 1-in. x 1¼-in. bushing. A short piece of 1¼-in hose is attached to the outlet and connected to a small canvas bag into which the dirt is blown.



Section of Home-Made Suction Cleaner

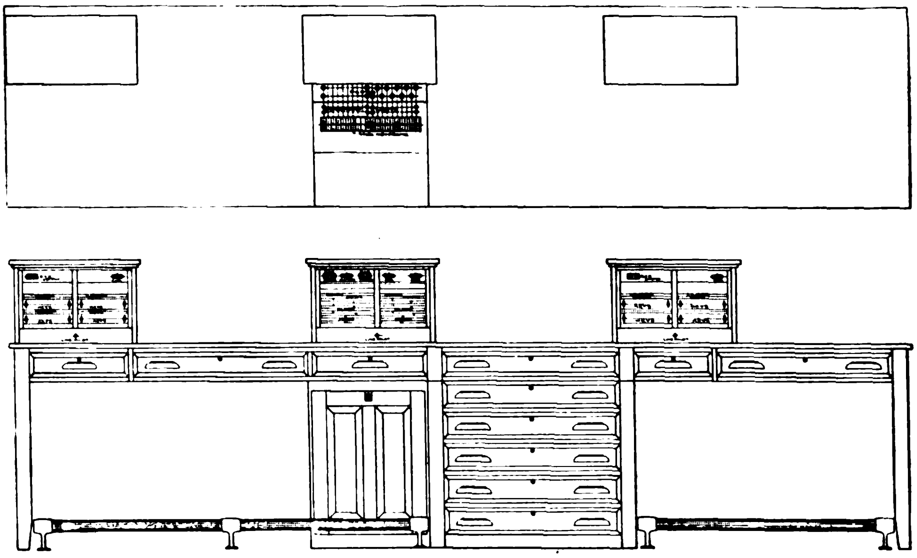
The device requires about 50 lb. to 60 lb. of air, with which it will do excellent work. It should be taken apart frequently and cleaned to prevent clogging and to give dust and dirt a free passage through the body of the cleaner.

F. L. Cranford, contractor for the lower part of the Broadway subway in Manhattan, has notified the Public Service Commission for the First District of New York that he has discovered a subterranean jail, which apparently dates back to the early days of New Amsterdam. The wall of the ancient prison has been cleared away for the width of the subway, although parts of it are still buried on the sides and underneath the floor of the new excavation.

HANDLING CITY STREET RAILWAY TRAFFIC BY TELEPHONE

The problem of handling street railway service in Rochester, is one of unusual complexity, the underlying reason for this being found in the topographical features and in the layout of the streets in the central section of the city. There are two main transfer points, located on either side of the Genesee River, which flows through the heart of the city, dividing it very nearly into halves. Most of the fourteen lines radiate in all directions from these transfer points, like spokes of a wheel. The main street extends through the two main intersections and transfer points and it is on this connecting street that the greatest congestion occurs during rush hours. It naturally follows that the dispatching of the cars during the peak load is a serious problem. During the less busy hours of the day about 150 cars suffice to handle the traffic, but during the noon hour and also between 5.30 and 6.30 p. m. from 300 to 350 cars must be pressed into service. On some lines headways as low as 1¾ minutes are maintained.

The dispatching question has been very nicely worked out by the railway company by the use of a very complete telephone system to augment the work of twelve inspectors and several street aides. The inspectors travel over the lines continually to assist in maintaining the scheduled time of the trains, while the street aides are stationed in the congested districts assisting the traveling public by announcing the destination of approaching cars, answering inquiries and making themselves generally useful.



Rochester Traffic—Plan and Elevation of Dispatchers' Switchboards and Desks

The chief dispatcher and several assistants are stationed at a special dispatching telephone switchboard located in the railway company's office building. This switchboard is connected by means of wires leased from the Rochester Telephone Company to telephone sets located at every line terminal and at main intersections. Telephone sets are also located at canal lift bridges, grade crossings and other points where delays are most liable to occur. One of the accompanying illustrations shows the general appearance of the out-of-door installations.

Each motorman is required to report immediately upon his arrival at a terminal. The act of taking the receiver off the hook at the terminal telephone immediately illuminates the line lamp at the dispatcher's switchboard. The dispatcher answers the call simply by pressing a key corresponding with the lamp, which places him in direct connection with the motorman. After receiving the call the dispatcher gives the motorman the time for his departure from that terminal and any special instructions that may be needed. The system in this way gives the dispatcher the exact location of all cars and advises him of any gaps in the service. In case of gaps he can easily order out "trippers" to fill in until service again becomes normal.

The switchboard used at the dispatcher's office is made up in the form of a flat-top desk having mounted on it three turret-apparatus cabinets. Two turrets include straight dispatching line equipments, while the third is a combination dispatcher's and commercial board. During the rush hours three dispatchers are required, but ordinarily one or two are sufficient. Two of the turrets contain forty dispatching lines each, while the third carries twenty dispatching lines and also a multiple of sixty commercial lines appearing in the railway company's private branch exchange. This arrangement permits the night dispatcher, whose duties are light, to care for the commercial business, thereby eliminating a night operator for the commercial or regular private branch exchange board.

Rochester Traffic—Outdoor Telephone Set

Plenty of space is provided on the top of the desk for schedules, train sheets, etc. A tier of drawers accommodates past records, special schedules and a supply of dispatching stationery. The train sheets, arranged by train number and also in chronological order, are always before each dispatcher so that the whole traffic situation at any moment can be read at a glance.

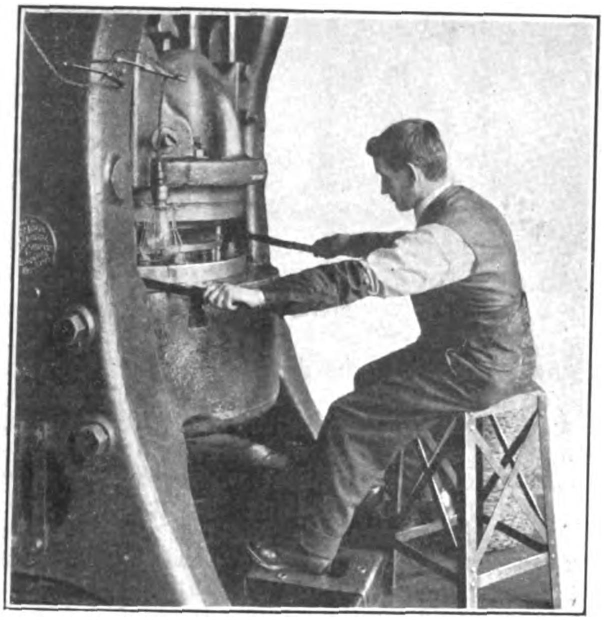
The important benefits of this system are readily apparent. Not only is the best of service under normal operating conditions assured, but a means for rapidly straightening out traffic tangles caused by delays is also provided. The system gives the railway company a permanent record of every train movement, late cars, and times of accidents. There is also available in cases of court actions much exact testimony in damage suits which would otherwise be based upon the inaccurate memory of witnesses. Furthermore, train crews promptly report trouble with cars and give many details which they would not bother to make out in written form.

All of the equipment used on this system was manufactured by the Stromberg-Carlson Telephone Manufacturing Company, and was installed by the Rochester Telephone Company for the Toledo Railways & Light Company.

SAFETY SUCTION DEVICES FOR PUNCH PRESSES

For some time the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., tried mechanical safety devices of various kinds for the punch shop but with unsatisfactory results. The operators found them unsuited because of the fact that they tended to retard the production and consequently their earnings, while the management also objected to them because they afforded only partial protection, as the operator had to place his hand under the press in every instance in order to remove the scrap.

The suction device illustrated herewith was developed to prevent the necessity of the operator approaching the danger point at any time during the operation, as he feeds and clears the press with the same tool. Another advantageous point is that the operator does not take hold of the material with his hands (this applies principally to the smaller sizes) and thereby escapes the numerous small cuts to which he was subjected when inserting the blanks with his fingers.



Suction Device in Use on a Punch Press

The double-handle device used on large work shown in the illustration is absolutely safe. The operator is compelled to use the device owing to the size of the sheets handled, as it is impossible to get hold of the sheets any other way. Before adopting this method the man who was placed at the back of the press to feed in the sheets was the one most frequently injured because his fingers were entirely at the mercy of the operator.

Since the adoption of the suction device not one amputation has occurred on the large presses, and up to the present time no finger has been amputated in the punch shop. This happy result has been due to the operation of the devices and to the rigid enforcement of the shop rules. The suction device was exhibited and received the grand prize at the recent International Exposition of Safety and Sanitation in New York City and it is now on exhibition in the American Museum of Safety in New York City. The Westinghouse company also employs other safety devices such as magnetic lifters, sliding devices, etc., depending upon the kinds of punchings made.

The Auckland (New Zealand) Tramways contemplates putting self-propelled cars in operation on its road. It has not yet been decided whether storage battery or gasoline-electric cars will be used.

AUTOMATIC BLOCK SIGNALS ON PUGET SOUND ELECTRIC RAILWAY

The automatic block signal system which is now being installed on the Puget Sound Electric Railway between Seattle and Tacoma comprises G. R. S. model 2-A semaphore signals operating in three positions in the upper left-hand quadrant and controlled by two-rail track circuits. The installation includes signal indicators to repeat the indications of certain signals, switch indicators at intermediate switches to indicate the condition of the blocks in both directions, and switch circuit controllers at all switches through which the control circuits are broken.

The signal arrangement for each block comprises starting signals located at the passing sidings with one pair of intermediate signals between sidings. The extent of the installation is approximately 31 miles, of which 23 miles is single-track and 8 miles double-track. The absolute-permissive block system will be installed on the single-track line and the usual system of signaling on the double-track line. The passing sidings average about 2½ miles apart and the approximate distance between signals that govern movements in the same direction is 1 mile.

Electrical energy for the operation of the signal system as well as the propulsion current is transmitted from the water-power generating station at Electron, Wash. The signal transmission line is single-phase, sixty cycles, 2200 volts, and the propulsion current is furnished at 600 volts d.c. A third-rail carries the propulsion current through the open country between towns and an overhead trolley is used through towns and cities.

The signal mechanisms are equipped with induction motors arranged for operation on 110 volts, single-phase, sixty cycles. Light for the night indications is supplied by two 12-volt, 5-watt electric bulbs, connected in multiple, mounted in each lamp case and operated on a lower voltage than the normal rating. The signal appliances were furnished by the General Railway Signal Company throughout, the signals, indicators, relays, impedance bonds, transformers and other mechanisms being the standard a.c. apparatus of that company. The signals are being installed by the railway company's forces.

METROPOLITAN STREET RAILWAY, OF KANSAS CITY, INSTALLS FOLDING SEATS

The Metropolitan Street Railway, of Kansas City, has installed a folding seat on one of its cars. If the experiment proves successful the company will bring this arrangement into more general use. The new seat has been installed on the same car on which the folding front step recently was successfully tested. In essentials the seat resembles an ordinary theater chair, the chief differences being in the absence of the arm rest and the hat holder. The folding type apparently has many advantages over the stationary seats, and officers of the Metropolitan Street Railway are inclined to favor the former.

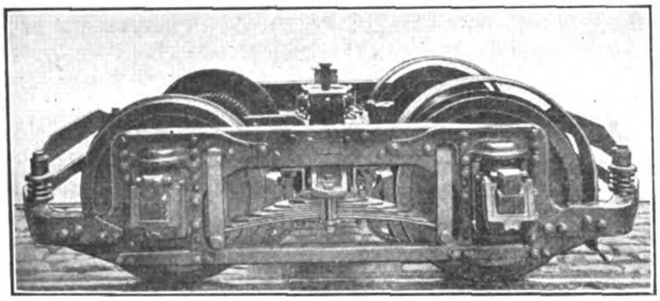
The occupant of an outside seat, with the folding arrangement in use, would not be compelled to move into the aisle to allow his seat-mate to leave the car, but would merely swing the folding seat back and stand for a moment. The folding seats also would facilitate sweeping and similar work. It is probable that the use of the folding sectional seat, as it is designated, also would allow the installation of more seats in a given area of floor space, although this is a phase which has not yet been investigated fully.

MOTOR TRUCKS FOR THE SAN FRANCISCO MUNICIPAL RAILWAYS

The accompanying illustration represents one of 250 motor trucks for city service, which are being built by the Baldwin Locomotive Works for the San Francisco Municipal Railways. The principal dimensions of these trucks are as follows:—Track gage, 4 ft. 8½ in.; truck wheelbase, 4 ft. 10 in.; wheels, Standard rolled steel, 34 in. diameter; journals, 4¼ in. x 8 in., and maximum center-pin load, 27,000 lb.

These trucks are used under cars which have a seating capacity of fifty passengers, but in which 200 passengers may at times be carried. The difficulties in preparing a design suitable for meeting these extreme variations in load were increased by the fact that an unusually light truck was required. The Baldwin Class "L" plate truck was selected to meet these conditions. It is extremely light in proportion to its carrying capacity. The side frame, end reinforcements, pedestals, pedestal ties and frame gusset are all formed from a single piece of flanged steel. The transoms and end frames consist of angle irons. While the resulting structure is light it provides both horizontal and vertical strength and rigidity. The motors are outside hung, with suspension bars supported by the end frames.

This truck is of the pedestal type, and the frames are supported by coiled springs which are mounted over the boxes. The pedestals have removable shoes against which the boxes bear. The bolster is a steel casting and is carried at each end by a half-elliptic spring. The spring hangers are allowed a limited amount of lateral swing. The brakes are inside hung, and the brake shoes are suspended from the transoms. Renewable chafing plates are applied to the bolster and transoms. The construction is simple throughout, and the truck can be easily maintained in any shop with ordinary facilities.



Latest Motor Truck for San Francisco Municipal Railways

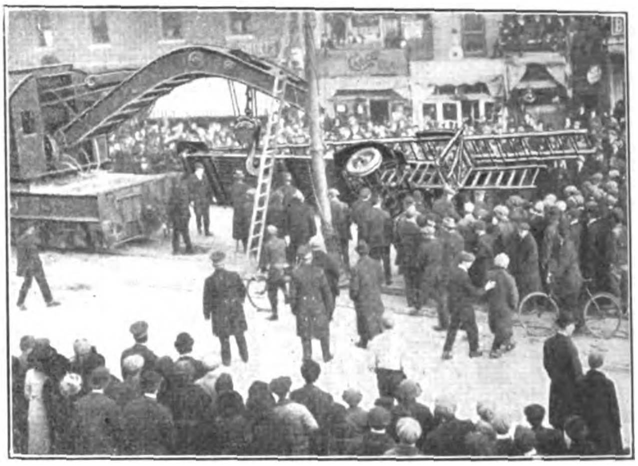
TESTS OF CAR COUPLERS AT THE UNIVERSITY OF ILLINOIS

A series of tests is being conducted by the University of Illinois for the Scullin-Gallagher Iron & Steel Company of St. Louis, on a new style of car coupler. The new coupler eliminates the likelihood of fracture at the face by having a solid face and a new type of tail knuckle. A former test made by the university, showed that when failure of the new style coupler occurred, it was generally at the knuckle. After the first tests, the design was changed so as to add about 15 lb. of metal to the knuckle. The new design is now being tested under the supervision of Prof. J. M. Snodgrass of the railway engineering department.

Four sets of tests are made: the "striking test," the "jerk test," the "guard-arm test," and the "pulling test." In the striking test the coupler is placed in the drop testing machine and a 1640-lb. weight let fall on it from varying heights.

RESCUE BY WEST JERSEY & SEASHORE WRECKER

The accompanying illustration shows a wrecking car belonging to the West Jersey & Seashore Railroad in the act of rescuing a new $12,000, 10-ton automobile ladder truck belonging to the Atlantic City, N. J., fire department. The wrecker responded to a hurry call sent to the railroad company by George S. Faber, general superintendent of the Atlantic City & Shore Railroad Company.



Wrecking Car Rescuing a Hook and Ladder Truck at Atlantic City

In answering a fire-alarm recently on its first service trip, the automobile truck was proceeding swiftly down the main business street of the city, Atlantic Avenue, when at the intersection with Michigan Avenue it hit an opening in the pavement where sewer work had previously been done, causing the driver to lose all control of the apparatus. The truck went wild and struck a trolley pole, breaking a wheel off the axle, doing severe damage to the truck and killing one man and injuring three.

ELECTRICAL DEVELOPMENT IN JERUSALEM

The rapidity with which Jerusalem is growing, owing to the return of the Jews in great numbers to the home of their ancestors, has made revolutionary changes necessary. It has been found imperative to pull down the ancient walls and massive towers of this ancient city in order to provide it with a modern electric street car service, electric light and a much-needed water supply. To the north and west of the old city there have sprung up within the last ten years large Jewish colonies, populous residential sections, as well as convents, institutions, schools and other buildings, with the result that to-day there is a larger Jerusalem without the walls than within.

Four separate tramways are to be constructed. They will start from the Jaffa Gate, the principal entrance into the city, and run outside the city walls through the newer parts of Jerusalem. The first, which will have a length of about 2 miles, will give easy access to what may be termed the business quarter of the city. The second, of similar length, will link up the large Jewish colonies to the north with the city's north gate, that of Damascus. The third will encircle the old city, embracing many of its historic sites, such as the Tomb of the Kings and the Mount of Olives. The fourth line will run from Jaffa Gate to Bethlehem, about 6 miles away, traveling the most sacred thoroughfare in the world. The work of laying the rails is to begin this spring.

News of Electric Railways

Franchise Draft Submitted in Toledo

Henry L. Doherty, representing the Toledo Railways & Light Company, Toledo, Ohio, submitted a plan of settlement to the franchise committee of the City Council on April 9. It is in the form of an ordinance which was prepared by his attorneys and himself. Mr. Doherty explained the proposed ordinance briefly and told the committee that the rate of fare could be tested for one year, after which the City Council could fix the rate to cover the necessities. During the first year, however, the property would be operated under the supervision of a commission. The ordinance provides for a twenty-five-year franchise.

Members of the committee intimated that the operation of the street railway within the city should be placed in the hands of a commissioner so as to divorce the whole question from politics. The form of supervision used in Cleveland seemed to appeal to them as best.

Mr. Doherty suggested that the franchise should be granted before an attempt is made to rearrange the lines in an endeavor to secure an ideal system. This, he said, would prevent opposition from property owners on streets where lines might possibly be eliminated. Some of the members of the committee argued that the lines should be rearranged before the franchise is granted, as property owners could enjoin the elimination of tracks after a franchise had been granted for them. Chairman Hassenzahl objected that everybody affected by the changes would vote against the ordinance at a referendum election, if the changes are announced before the ordinance is passed.

Peter Witt, street railway commissioner at Cleveland, was one of the principal speakers at a mass meeting at Zenobia Hall on April 8, called by the Toledo Commerce Club. Henry L. Doherty was also one of the speakers. Mr. Witt said Toledo would profit by securing an immediate settlement of the question on a basis of transportation at cost, the city to govern the service, rather than to adopt an arbitrary rate of 3 cents or any other amount. He did not attempt to advise the city as to how the question should be settled. Among other things he said:

"Protect your own interests in your streets, but remember that there are other people in the streets. The city cannot exist without transportation facilities."

Mr. Witt contended that under the plan in operation at Cleveland the people were riding in better cars, over better tracks and at a lower fare than in any other city in the United States. The Cleveland plan was based on the idea of Judge R. W. Tayler that the people should be transported at cost. The company was as free to operate as ever, but control of the service still rested with the people. The fare in Cleveland was 3 cents, and about $2,000,000 of the earnings had been put back into the company. The 1 cent charge for transfers may, however, have to be resorted to for a few months. Mr. Witt advised the city to rid itself of the two rates of fare that have existed in Toledo for some time—rates lower at some hours of the day than at others. It costs as much to haul the man in overalls as the millionaire, and the workingman does not want charity. He wants justice. This is a special privilege, and the workingman will have to make up for it in some other way.

Mr. Doherty said that if he had Mr. Witt's patience to work out problems of re-routing, alternating stops and other means of reducing cost of operation, they would do as well in Toledo as in Cleveland. Mr. Doherty was constantly interrupted, but took the matter good naturedly.

F. M. Dotson, secretary of the Council franchise committee, spoke briefly on some of the points at issue. He asserted that the proposal made by Mr. Doherty some days since had furnished the committee a basis for work.

The tentative ordinance as proposed by Mr. Doherty provides that during the first four months a rearrangement of the lines of the company within the city shall be prepared by experts with a view to giving the best service to the public consistent with the highest operating efficiency. The system to be reported upon is to provide for a cross-town line located as the city may require. The company is to pay all compensation and expenses of the experts for the city up to a sum not exceeding $25,000. The company is to charge and receive rates of fare as follows: Children in arms are to be carried free; children under the age of eight years, at 1 cent each; policemen, firemen, sanitary officers whenever in uniform and detectives upon display of their badges are to be carried free. All other passengers are to be carried at a single cash fare of 5 cents each, and for the first twelve months of said term of twenty-five years at the rate of five tickets for 15 cents. The tickets are to be on sale on all passenger cars. Passengers are to be entitled without extra charge to a transfer from the route upon which they paid their fare to any other route except in the substantially opposite direction or a route parallel or substantially parallel to the first route.

The city is to reserve the right to designate from time to time the points of transfer and to regulate reasonably the routes from and to which such transfers are to be issued. The city is to have the right to appoint a commissioner or commissioners with authority during the first twelve months' period to examine the books, receipts, records and maps of the company pertaining to its street railway system and have full opportunity to ascertain the income and operating expense of the railway system, and, if the city so desires, the value of the property used for railway purposes. Such commissioner or commissioners are during the period of twelve months to have the right to direct through the president of the company the operation of the railway system as to routing, re-routing, schedule of cars and general supervision of operation. The commissioners are to report to the city so as to assist in arriving at an equitable rate at which tickets shall be sold by the company for the first five-year period after the expiration of the first twelve months.

Sections 6 and 7 of the proposed ordinance, which relate to the rates of fare for the first five years after the original experimental period of one year, and to the right of the city to purchase, are as follows:

"Section 6. On or before the expiration of the twelve months' period mentioned in Section 3 hereof, the rates of fare at which tickets shall be sold by the company for a period of not less than five years after the expiration of said first twelve months, for the carrying of passengers upon the said street railway system, shall be stated by a resolution or an ordinance which shall be passed or adopted by the Council, or such other board or officers then having the powers now exercised by said Council in that respect, and upon such basis and rates that the company shall then and thereafter, while such rate of fare is in force, receive a gross income from such fares sufficient to pay the cost of operation and maintenance of its street railway system, and the taxes thereon, and a reasonable return upon the reasonable value of the property owned and to be used by the company in its said street railways system. Included in the operating expenses shall be allowed a fair and reasonable price for the electric current used in such operation. And the rate of fare so stated, as aforesaid, shall continue so long as neither party hereto shall ask a revision thereof, but in no event for a period of less than five years; and from time to time during the term hereof, after the expiration of any five-year period, either party may ask in writing for and have a revision of ticket fares, which shall be arrived at in the same manner and upon the basis aforesaid, within sixty days after such request, and any such revised ticket fares shall remain in force for a period of not less than five years, but in no event longer than the term of this ordinance.

"Section 7. The city expressly reserves the right to purchase the street railway property of the company at its appraised value, which shall be determined as hereinafter provided, at any time during the term hereof, upon notice in writing to the company of at least twelve months, or upon the purchase of the company's property being submitted to a referendum vote, and a majority of the qualified voters of Toledo expressing themselves favorable to the purchase of said property, then the right of purchase may be exercised after sixty days from the date on which the result of such an election is determined. The property so to be purchased shall include all property owned by the company which is used in the operation of its electric railroad system, but not including its power station. To arrive at said appraised value, the city shall appoint one arbitrator, and the company shall appoint one arbitrator, and the two arbitrators thus chosen shall appoint a third, and such arbitrators shall make a full and complete inventory and appraisement of said property, and the decision in writing of a majority of said arbitrators shall determine the appraised value of said property."

The ordinance provides for the entrance of interurban railways to the city over the lines of the Toledo Railways & Light Company. The compensation to be paid by the interurban companies for the use of the tracks of the city company is to be agreed upon by the company and the interurban company seeking the entrance. In the event that the companies are unable to agree each company is to appoint an arbitrator, and the compensation determined by these two arbitrators, or by these two arbitrators and an umpire appointed by the city in case an umpire should be necessary. The terms of the compensation to the city company from the interurban company for entrance to the city are to be readjusted every five years. Provision is made for the transportation of freight in suitable cars by the company at night. There is also a provision for the operation of funeral cars, observation cars, express mail service and other special cars. The freight service is to be operated between the hours of 12 midnight and 5 a.m. Provisions in regard to keeping up the paving of the streets in which the company operates are stated in detail.

Decision in St. Louis Transfer Case

Circuit Judge Grimm at St. Louis, Mo., in an opinion handed down recently decided the United Railways of that city must grant a transfer on a transfer on all of its lines. His decision was the result of a mandamus suit brought by the city against the company on Jan. 8, 1912. The writ issued by Judge Grimm commands the company to issue to every passenger, who makes a request, such transfers or successive transfers over intersecting or connecting lines as will transport the passenger by a continuous trip for a single fare from any point he may board the car in the city to any other point in the city by the most direct route practicable. The decision of the court reads in part as follows:

"Ordinance 19,352, under which the United Railways operates, distinctly requires of respondent that transfers shall be given so as to transport passengers by a continuous trip from any point on the system to any other point on the system. While the ordinance has the effect of law it may very properly be viewed as a contract between the city and the respondent. It grants valuable privileges and rights under certain conditions. Respondent accepted those conditions and is enjoying the rights and privileges, and is legally as well as morally bound to discharge fairly the obligations which it assumed.

"It seems quite clear to me that the intention was to require the respondent to carry a passenger from any point on its system to any other point by the most direct route practicable over connecting lines. The respondent has no right to say to a passenger, 'You must be content with a transfer over a single connecting line which will leave you three blocks from your destination,' notwithstanding the fact that by issuing a second transfer it could take him in a more direct route directly to his destination. Nor can it say to the passenger that he must be content to accept a single transfer which will take him to his precise destination, but by an indirect route, when he could be carried directly over several connecting lines.

"On the witness stand, Capt. McCulloch stated that his company objected to the giving of the transfer by a passenger to some other person to be used by the latter, or the passenger calling for transfers in such a way that he could not only reach his point of destination, but also after transacting his business there, return to the point from whence he started, all for one fare. It is quite clear that the ordinance does not contemplate that a passenger should receive a round trip for one fare, or that he should transfer his right to a ride to somebody else, and the court would not think of requiring respondent to accept a transfer attempted to be used by a passenger to make a return trip or one which had been given to another person by the passenger to whom it had been issued. However, the fact that some unscrupulous persons might take advantage of the respondent's very extensive system, to accomplish improper results is no reason or excuse for respondent's refusal to carry a passenger to his destination at a point on one of its lines by a direct route, even though it may require a second transfer.

"If the respondent is justified in refusing a second transfer merely because the passenger might give it to someone else to use, it might be the same logic to refuse the first transfer, for it may, and no doubt does occasionally happen that a person boarding a car will take a transfer when he has no intention of using it, and afterward give it to some other person.

"If the respondent can devise any means of preventing unscrupulous persons from imposing upon it and avoid the illegitimate use of transfers without denying the people of the city their rights, it may, of course, adopt such means for its own protection, but the court is under no obligation to and, as a matter of fact, cannot devise such rules for respondent, any more than it could protect it against the possibility of receiving counterfeit money.

"The court realizes that there may be some practical difficulties of operation resulting from the fact that the traffic on certain lines is much heavier than that on others, but those difficulties must be met by the respondent's operating department and by some method other than that of routing passengers according to the convenience of respondent when that results in loss of time and inconvenience to its passengers."

Former Judge Henry S. Priest, general counsel for the United Railways, is quoted in part as follows in regard to the decision:

"We think we have been complying with the ordinance. In any event we shall insist upon protecting ourselves against the misuse of transfers. We think we ought to have the privilege of routing passengers by the most direct route, and that it is our right to make the routes for the best interests of the traveling public and the United Railways. We are not opposed to a universal transfer system, but feel that there must be reasonable regulations against the fraudulent use of transfers."

New Haven Affairs

The Interstate Commerce Commission has indefinitely adjourned its inquiry into the affairs of the New York, New Haven & Hartford Railroad on account of the refusal to answer on April 10 on the advice of counsel by witness summoned by the commission to tell about the transactions between the company and the Billard Company. Joseph W. Folk, chief counsel for the commission, announced that he would apply to the Supreme Court of the District of Columbia for a mandamus to compel the unwilling witnesses to produce the books of the Billard Company. It is not likely the investigation will be resumed until after the District Court has rendered its decision on this application.

In this connection Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad, said in New York on the same day:

"The Billard Company matters, which are now under investigation by the Commerce Commission, relate to happenings several years ago, before I was connected with the New Haven company. Every facility has been given by the New Haven company to the investigators of the Commerce Commission for the purpose of obtaining information about any transactions with the Billard Company. The New Haven company does not in any way control the Billard Company nor has it control of the books and papers of that company."

In view of the questions to be voted upon by the stockholders of the New York, New Haven & Hartford Railroad at the special meeting to be held in New Haven on April 21, particularly that relating to the proposed agreement with the Attorney-General for the segregation of the properties as recommended by the directors, Mr. Elliott issued on April 11 a very complete statement not only about the proposed agreement but also in regard to the general situation confronting the company at this time.

Judge Walter C. Noyes, New London; William W. Hyde, Hartford; Lyman B. Brainard, Hartford; George E. Hill, Bridgeport, and Charles Cheney, South Manchester, Conn., were named on April 14 as trustees to take over the electric railways in Connecticut owned by the New Haven Railroad. Rathbone Gardner, Theodore F. Green, John O. Ames, John P. Farnsworth and Charles C. Mumford, all of Providence, were chosen to take over the Rhode Island trolleys. The announcement of the names of the trustees was accompanied by a statement of two sentences. In one the Department of Justice said the men had been selected to serve "in case the suggested adjustment of the New Haven transportation problem is carried out," and in the other said "it is believed that the trustees agreed upon will accept."

Middlesex & Boston Arbitration Hearings Begun

Hearings by the arbitration board in the wages dispute on the Middlesex & Boston Street Railway were begun on April 13 in the municipal court room at West Newton, Mass. The board consists of ex-mayor George L. Mayberry, of Waltham, Mass., chairman; Arthur A. Ballantine, of Gaston, Snow & Saltonstall, Boston, for the company; and James H. Vahey, Watertown, Mass., for the employees' union. George M. Cox, general manager, appeared for the company and Joseph Eastman and Fred Fay were present on behalf of the men. In opening it was stated that 302 employees are concerned and that the uniformed men desire an increase from 21 to 27 cents an hour for first-year men, 30 cents for second-year men and 33 cents thereafter, with a 20 per cent increase for other employees. The arbitration agreement provides that the award shall extend three years, terminating in 1916. Prior to opening the hearings the board was taken over important parts of the system, visiting carhouses and substations. Mr. Cox was the first witness called and was on the stand for about three days, testifying as to the detailed operation of the road. The company operates 105 miles of track and the population of the territory served is 174,378. Last year the road paid $37,582 in damage claims. In the early hearings the evidence was confined largely to the duties of trainmen.

Machine Gun Equipment Protects Mexico Plant

The experiences of the Mexican Light & Power Company illustrate the difficulties under which one public utility in Mexico is operating at present. The company operates the largest hydroelectric station in Mexico. Its plant is at Necaxa, about 125 miles from Mexico City. The equipment comprises two 10,000-kw General Electric machines and six 5000-kw Siemens-Schuckert machines, all operating in parallel and feeding into four transmission lines tied together at Necaxa and at Mexico City. The generators are wound for 4400 volts, three-phase and operate at a frequency of fifty cycles. Oil-insulated, water-cooled transformers raise the emf to 88,000 volts.

One of the first troubles experienced by the company was encountered at night by miscreants within the station who tripped the exciter circuit breakers and tampered with important switches. Cement dust was sprinkled on the concrete floor for the purpose of discovering whether the offenders wore shoes, peon sandals or were barefoot. A 30-in. projector is used at night to sweep the surrounding country in search of rebels and bandits. All the employees in the power house are armed with Mauser rifles furnished by the company. The trail to the plant is lighted by a a line of tungsten lamps controlled by a switch at the sentry box overlooking the trail, and from five to eighty-five soldiers are quartered at the station. The defensive equipment of these men at the station includes a Hotchkiss rapid-fire field gun and three Colt machine guns.

The rebels have abandoned the practice which they adopted at first of climbing the transmission towers and attempting to cut the power lines carrying 88,000 volts with machetes. This line of attack proved altogether too hazardous. The insulators are targets for their shots, however. During the New Year's celebration the transmission lines were put out of business and the theaters and dance halls in Mexico City were left in darkness. The street railway system in that city was also tied up until a small steam plant could be started. This was the only time in which the four lines went down at once. Since then the lines have all been constantly patrolled so that trouble from this source has been almost entirely eliminated. There are no wagon roads in the vicinity of the generating station so that no wheeled vehicles are to be found anywhere about the plant. Strategically considered, the power plant is almost impregnable.

The Administration's Legislative Program

It was intimated in anticipation of the return of President Wilson to Washington on April 13 that congressional leaders were seriously discussing whether the effort to pass the proposed administration bills should not be abandoned for the present session. The President promptly let it be known that there was no intention on the part of the administration to abandon or curtail the legislative program. He said that the administration must keep faith with the people; that it had pledged itself to this legislation, and that the country expected it to be passed at this session. He thought the program could be completed in time to enable Congress to adjourn in July.

Closely following this declaration Representative Henry D. Clayton, chairman of the House judiciary committee, made public the revised anti-trust bill. He also introduced the bill in the House and it has been referred to the House judiciary committee. The new bill takes the place of the four measures introduced some time ago, which were the basis of hearings by the judiciary committee. The revised bill prohibits interlocking directorates, holding companies, and certain trade practices, suggests some new Sherman law definitions, and contains new provisions fixing the status of labor unions under the law (Section 6) and limiting the power of federal courts in the issuance of injunctions and providing for jury trials in cases of indirect contempt of court (Sections 12 to 22). The labor features of the bill stand out prominently in the revised measure. The injunction provisions follow the lines of the Clayton bill which passed the House in the Sixty-second Congress. The provision for jury trials in cases of indirect contempt is also based on the Clayton contempt bill, which the House passed in the last Congress. The holding company bill, as originally introduced, has been somewhat modified and incorporated in the new trust bill. In the anti-trust bills as originally presented subsidiary concerns representing the legitimate growth of corporations were prohibited. Under the revised program the holding company prohibition does not apply to subsidiaries of this character.

The section of the bill in regard to investments is not to apply to corporations purchasing stock solely for investment, and not using the same to bring about the lessening of competition. A corporation engaged in commerce will not be prevented from causing the formation of subsidiary corporations to carry on lawful business or be prevented from owning and holding all or a part of the stock of such subsidiary corporations when the effect of such formation is not to eliminate or lessen competition. Any railroad corporation will be permitted to construct branch or short line railroads so located as to become feeders to the main line of the company and will also be permitted to acquire and own all or any part of the stock of a branch or short line railroad constructed by an independent company where there is no substantial competition between the company owning the branch line and the company owning the main line acquiring the property.

From and after two years from the date of the approval of the act no person who is a member of a partnership or is a director or other officer of a corporation that is engaged in the business in whole or in part of producing or selling equipment, materials or supplies to or in the construction or maintenance of railroads or other common carriers engaged in commerce, is to act as a director or other officer or employee of any common carrier engaged in commerce, to which he or such partnership or corporation sells or leases directly or indirectly equipment materials or supplies. There is a somewhat similar provision against any person who is engaged as an individual or as an officer or employee in the conduct of a bank or trust company, acting "as a director or other officer or employee of any common carrier, for which he or such partnership, or bank, or trust company acts, either separately or in connection with others, as agent in the disposal of, or is interested in the underwriting of, or from which he or such partnership, or bank or trust company purchases, either separately or in connection with others issues or parts of issues of securities of such common carrier."

Service Resumed in Hazelton

The Lehigh Traction Company, Hazelton, Pa., the employees of which have been on strike for some time, has resumed practically its full schedule. The company has issued a statement to the effect that it will exhaust every resource at its command to protect those who work for it and that finally it will ask for a receiver to operate the road if that should be deemed necessary to protect its interests. The company has placed its case frankly before the public. It has printed correspondence of the secretary of the local division of the Amalgamated Association of Street Railway Employees giving proof of the effort of that body to compel the company to discriminate in hiring employees. The company cited the case of an Italian-American who applied to it some time ago for work and was assigned to practice duty. This man left the service without complaint to the company. Upon investigation it was learned that secret sessions of the organized men in the employ of the company had been held and a determined effort made not to instruct the man. The letter from the secretary of the local division addressed to A. F. Harger, general superintendent of the company, follows:

"I have been authorized by the division to write you in regard to the Italian who is at present practicing for conductor. The boys are all heartily opposed to it and not one of us are in favor of having him among us. Hoping you will look into the matter seriously and give us due consideration, I remain."

The statement from the company to the public reviewing the entire strike situation was signed by C. D. Houck, vice-president.

Contracts for Equipment for Brooklyn Subway.—The Public Service Commission for the First District is rapidly closing the contracts for the purchase of track materials, including rails, ties, etc., for the equipment of the Fourth Avenue subway in Brooklyn.

Mayor Jost Re-elected in Kansas City.—On April 7 Henry L. Jost was re-elected Mayor of Kansas City, Mo., by an overwhelming majority. Mayor Jost announced he would take up the franchise question in his inaugural address on April 20. The negotiations between the Metropolitan Street Railway and the city were suspended some time ago to remove the issue from politics.

Elevated Railroad Franchise in Havana.—A franchise to build a network of elevated railroads throughout the city of Havana has been granted to Señor Tiburcio Perez Castañeda by the Common Council of the city. During the debate it was pointed out that Havana had a perfect surface car system which covered all sections of the city, and that an elevated structure in the narrow streets of the city was inadvisable.

Consents for Third-Tracking Elevated Secured in Brooklyn.—The New York Municipal Railway Corporation has obtained the consents of property owners needed for the third-tracking of the Broadway elevated line of the Brooklyn Rapid Transit System in Brooklyn from the plaza of the Williamsburg Bridge to Fulton Street. The company previously filed consents for the third-tracking of the Fulton Street elevated railroad in Brooklyn.

Mr. Whitridge's Parting Contribution.—F. W. Whitridge, president of the Third Avenue Railway, New York, N. Y., who sailed for Europe recently, did not disappoint the newspaper men who sought him out at the last minute. His parting contribution included the following: "The Interstate Commerce Commission has proved worse than the Public Service Commission. The only thing to clear the air is one or two great bankruptcies. We will get them. The Third Avenue Railway is virtuous and prosperous."

Accident in New Haven Electric Zone.—The Green Mountain express on the New York, New Haven & Hartford Railroad was derailed at 8:45 a. m. on April 12, half way between Harrison and Rye, N. Y., without serious injury to any of its two hundred passengers. The electric locomotive, followed by two steel mail coaches, a wooden combination baggage and smoking car, and a wooden day coach, left the rails and plunged into an embankment without overturning. The rest of the train, consisting of a wooden chair car, a Pullman, and two wooden day coaches, stayed on the rails.

Lack of Capital Prevents Further New Haven Electrification.—In the statement which has been issued by Howard Elliott, chairman of the board of the New York, New Haven & Hartford Railroad, to the stockholders of that company, mentioned elsewhere in this issue, the following reference is made to future electrification: "The electrification of the road between New York and New Haven has been very costly, and until the work is completed and full electric service is in operation any possible economies cannot be realized. Any further electrification must be postponed because of lack of capital."

Seattle Considering Construction of Rainier Valley Lines.—The City Council of Seattle, Wash., has adopted a resolution authorizing and directing the Board of Public Works to prepare plans and specifications and submit an estimate of the cost of building an electric railway on Rainier Avenue, from Dearborn Street to Hudson Street; on Rainier Avenue from Hudson Street to Ryan Street; on Dearborn Street, Seattle Boulevard and Fourth Avenue South from Rainier Avenue to Jackson Street, and on Fourth Avenue South and Spokane Street from Seattle Boulevard to Iowa Street, to connect with the Lake Burien Line.

Short Strike in Colorado Springs.—The lines of the Colorado Springs & Interurban Railway, Colorado Springs, Col., were tied up on April 14 as a result of a combined lockout and strike. B. M. Lathrop, superintendent of the company, ordered watchmen to lock the carhouse on April 13 should the men vote to go on strike at a meeting called for 1 o'clock on the morning of April 14. The men did not vote in favor of the strike, but the watchmen locked the carhouse and refused to allow the men to go to work when they reported. D. H. Rice, president of the company, promised to pay the men for the time which they lost. The men, however, refused to accept the explanation and would not go to work. An adjustment was reached later in the day and service was resumed.

Patent Decision on Car Doors.—The United States Circuit Court of Appeals, Second Circuit, Judges Lacombe, Coxe and Rodgers, has just handed down a decision affirming the judgment rendered by Judge Veeder of the District Court, Eastern District of New York, in favor of the defendant, the Orange County Traction Company, Newburgh, N. Y. This was a suit for damages for the infringement of patent No. 935,929 granted on Oct. 5, 1909, to Harold Rowntree, and owned by the Prepayment Car Sales Company. The suit was defended by the manufacturer of the car, the McGuire-Cummings Manufacturing Company. The Prepayment Car Sales Company in commenting on the decision says that it does not invalidate the patent but declares that the Newburgh car did not infringe the claims of the patent under which the suit was brought, and that other suits will be brought immediately under other patents which it owns and which cover the same car.

San Francisco Starts Construction of New Municipal Line.—The construction of the new Van Ness Avenue line of the San Francisco Municipal Street Railway was commenced on April 6. The new line begins at Market Street and Van Ness Avenue, follows along the latter for a distance of 2 miles, and on Chestnut Street for 1.3 miles. Its primary purposes is to handle traffic to the exposition grounds. The contract for the construction of the track, laying the conduits and setting concrete poles on Chestnut Street was awarded to Mahoney Brothers for $219,747.50, with the stipulation that the work be completed in 150 days. For completing the work in advance of this limiting time, the contractors are to be allowed a bonus of $500 per day, up to a maximum of thirty days. As soon as the proposed lines on Eleventh and Church Streets have been built, it will be possible for passengers to use municipal cars direct from the Potrero district south of the city to the exposition.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MARYLAND

The Maryland Legislature adjourned on April 6. Among the bills passed at the session were the following: to urge the building of a railroad from Indianhead to Washington; to require locomotives on single-track railroads to be equipped with electric headlights; to repeal the charter of the Southern Maryland Railroad; to provide for the forfeiture of rights, powers and franchises for failure to comply with orders of the Public Service Commission; to incorporate the Salisbury Interurban Railway; to authorize the consolidation of the Edison Electric Illuminating Company and the Cumberland Railways. The bill to confer upon persons riding on the platforms or running-boards of street cars the right of passengers in bringing suit for damages if injured was indefinitely postponed after debate. The House bill to require the segregation of white and colored passengers on street cars was indefinitely postponed.

MASSACHUSETTS

The committee on street railways has voted to report a bill permitting companies to issue bonds to an amount not exceeding 120 per cent of their total outstanding capital stock. The action of the committee was suggested by the Public Service Commission. The bill is designed to afford a measure of relief to many companies in the State whose stock is selling below par, and which, under the present law, cannot issue additional stock. The companies desired the privilege of issuing bonds to twice the amount of their outstanding stock. The Public Service Commission considered the latter limit inadvisable and the bill recommended by the committee is therefore made a compromise measure. The committee has reported leave to withdraw the following bills: a measure granting half fares on street railways to children under fourteen years of age when traveling between their homes and places of employment, such fares to be collected by ticket sales; and a bill requiring street railways in Worcester to place their feed wires underground; but a bill granting half fares on street railways to normal school pupils when en route between school and home has been favorably reported. The committee on metropolitan affairs has reported leave to withdraw the bill abolishing the Boston Transit Commission and transferring its functions and powers to the Public Service Commission.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The next meeting of the New England Street Railway Club will be held at the American House, Boston, on the evening of April 23. The speaker of the evening is to be G. H. Stickney, illuminating engineer of the Incandescent Lamp Works, General Electric Company, Harrison, N. J. His subject will be "Car Lighting," to be illustrated by lantern slides. Mr. Stickney will also touch on illumination in general.

Iowa Street & Interurban Railway Association

The tenth annual convention of the Iowa Street & Interurban Railway Association will be held at the Montrose Hotel, Cedar Rapids, Ia., on April 23 and 24. The address of welcome will be delivered by Louis Roth, Mayor of Cedar Rapids. J. F. Hanlon, Waterloo, president of the association, will respond. The papers to be presented follow:

Paper, "Some Results Obtained from 'Safety First' Campaign," by M. A. Welsh, Jr., of the Waterloo, Cedar Falls & Northern Railway.

Paper, "Shop Practice," by T. E. Wood, master mechanic of the Omaha & Council Bluffs Street Railway.

Paper, "Car Cleaning and Sanitation," by M. M. Lloyd, master mechanic of the Des Moines City Railway.

Paper, "Modern Public Policies of Public Service Corporations," by P. P. Crafts, vice-president and general manager of the Iowa & Illinois Railway.

Financial and Corporate

Stock and Money Markets

April 15, 1914.

In the trading on the New York Stock Exchange to-day net losses were recorded in a majority of the leading issues. Early in the day trading was quite active, but toward the close business was naturally restricted by the attention paid to the city bond sale. Government bonds were unchanged. Railway and other bonds were irregular. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 2¾ per cent @ 3 per cent; six months, 3 per cent @ 3¼ per cent.

In the Philadelphia market the local issues were in more liberal supply. Philadelphia Rapid Transit was offered at 16⅝ and 42½ was bid for Union Traction. At the close Rapid Transit reacted further to 16.

The market for stocks in Chicago to-day was narrow and dull. The transactions totaled only 517 shares. The demand for bonds, however, was fair.

The Boston market to-day was active but irregular in specialties. There were small transactions in Boston Elevated, Massachusetts Electric and West End.

In Baltimore the sales of stock to-day totaled 925 shares. Bond transactions totaled 80,000, par value.

	Apr. 8	Apr. 15
American Brake Shoe & Foundry (com.)	88½	87½
American Brake Shoe & Foundry (pref.)	139	137½
American Cities Company (com.)	35¾	a35½
American Cities Company (pref.)	62	61¼
American Light & Traction Company (com.)	365	348
American Light & Traction Company (pref.)	107	105½
American Railways Company	37½	37¾
Aurora, Elgin & Chicago Railroad (com.)	41	37
Aurora, Elgin & Chicago Railroad (pref.)	77	*77
Boston Elevated Railway	81	80
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company	92⅛	91¼
Capital Traction Company, Washington	101	100
Chicago City Railway	145	170
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	90½	90⅝
Chicago Railways, ptcptg., ctf. 2	32	31¾
Chicago Railways, ptcptg., ctf. 3	6	5
Chicago Railways, ptcptg., ctf. 4	2	1½
Cincinnati Street Railway	105	105
Cleveland Railway	103	103½
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	a23	a23
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*71	*71
Detroit United Railway	a80	a80
General Electric Company	146	144½
Georgia Railway & Electric Company (com.)	120¼	120
Georgia Railway & Electric Company (pref.)	88	86½
Interborough-Metropolitan Company (com.)	15¼	14⅝
Interborough-Metropolitan Company (pref.)	61½	60⅝
International Traction Company (com.)	80	*80
International Traction Company (pref.)	a85	a85
Kansas City Railway & Light Company (com.)	15	*15
Kansas City Railway & Light Company (pref.)	35	*35
Lake Shore Electric Railway (com.)	5	5
Lake Shore Electric Railway (1st pref.)	92	92
Lake Shore Electric Railway (2d pref.)	22	22
Manhattan Railway	130	131⅛
Massachusetts Electric Companies (com.)	11	10½
Massachusetts Electric Companies (pref.)	61	59½
Milwaukee Electric Ry. & Light Co. (pref.)	95	*95
Norfolk Railway & Light Company	25¾	25¾
North American Company	76⅞	75
Northern Ohio Traction & Light Co. (com.)	58	60¾
Northern Ohio Traction & Light Co. (pref.)	101	a101
Philadelphia Company, Pittsburgh (com.)	41⅛	41
Philadelphia Company, Pittsburgh (pref.)	40	40
Philadelphia Rapid Transit Company	16⅝	16½
Portland Railway, Light & Power Company	51	51
Public Service Corporation	113	112
Third Avenue Railway, New York	43½	42½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	70	70
Twin City Rapid Transit Co., Min'apolis (com.)	104	104
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	75	75
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (com.)	18	17
United Rys. Inv. Company (pref.)	44	42
Virginia Railway & Power Company (com.)	51¼	51
Virginia Railway & Power Company (pref.)	96	96
Washington Ry. & Electric Company (com.)	88⅛	87¾
Washington Ry. & Electric Company (pref.)	86½	85½
West End Street Railway, Boston (com.)	70	a70
West End Street Railway, Boston (pref.)	91	90¼
Westinghouse Elec. & Mfg. Company	74⅜	72¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	118	117½

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* Last sale. a Asked.

ANNUAL REPORTS

West Jersey & Seashore Railroad

The eighteenth annual report of the West Jersey & Seashore Railroad, Camden, N. J., for the fiscal year ended Dec. 31, 1913, contains the following statement of income, profit and loss:

Railway Operating Income:	
Rail revenues:	
Freight	$1,814,636
Passenger	4,199,901
Mail	37,209
Express	192,818
Other transportation	107,308
Non-transportation	53,915
	$6,405,787
Rail expenses:	
Maintenance of way and structures	$1,043,324
Maintenance of equipment	1,024,181
Traffic	199,579
Transportation	2,746,119
General	167,092
	$5,180,293
Net revenue—rail operations	$1,225,492
Auxiliary operations:	
Revenue	$175,960
Expenses	219,581
Deficit	$43,621
Net railway operating revenue	$1,181,871
Railway tax accruals	318,965
Railway operating income	$862,906
Other income	$197,162
Gross income	$1,060,068
Deductions from gross income	586,674
Net income	$473,394
Appropriations to sinking and other reserve funds	81,231
Balance transferred to profit and loss	$392,163
Surplus, Dec. 31, 1912	922,507
	$1,314,670
Dividends on common stock, aggregating five per cent	$482,080
Sundry net debits during the year	12,950
	$495,030
Surplus, Dec. 31, 1913	$819,640

The total rail operating revenues of the company increased only $10,531 as compared with the year 1912. Passenger revenue increased $102,152 and there were slight increases in other incomes, but the merchandise freight receipts alone decreased $102,246. The rail operating expenses increased $319,149, or 6.57 per cent. Of this increase, maintenance of way and structures required $115,115 more than in 1912 on account of heavier outlays and increased cost of repairs and renewals, while the maintenance of equipment expenses increased $54,942, chiefly on account of the increased cost of repairs and depreciation charges. Transportation expenses exceeded those of 1912 by $111,359, principally because of increased wages, increased consumption of fuel and extension of the block signal system to branch lines.

Other income decreased $57,043, principally on account of heavier replacements and depreciation charges for the equipment of the Atlantic City and Longport Electric Line, which is leased to the Atlantic City & Shore Railroad. Deductions from gross income increased $25,583, due to larger amounts paid for the ferries and to increased joint facility rent deductions. The net income for the year showed a decrease of $414,485, against which was charged appropriations to sinking and other reserve funds amounting to $81,231. The balance of $392,363 was transferred to the profit and loss account and 5 per cent, aggregating $482,080, was paid therefrom for dividends.

The expenditures during the year for the road and equipment aggregated $464,138, which was divided $163,838 to capital account and $300,300 to reserve for additions and betterments.

The number of pensioners on the rolls of the company was forty-four and the pensions paid during the year amounted to $21,672, which required an increase of $3,672 in the pension appropriation authorized by the board of directors.

The report mentions the fact that the lease of the property of the company to the Pennsylvania Railrad for 999 years, upon the basis of a guaranteed rental of 6 per cent on the common stock, was authorized by both companies during the year, but did not receive the approval of the Board of Public Utility Commissioners of New Jersey. Upon the institution of legal proceedings to test the finding of the commission the Supreme Court declined to set aside the decision, and announcement is made that consideration is now being given as to the possibility of carrying the case to the Court of Errors and Appeals.

The West India Electric Company, Ltd.

The statement of earnings and operating expenses of the West India Electric Company, Ltd., Kingston, Jamaica, for the years ended Dec. 31, 1912 and 1913, follows:

	1913	1912
Earnings:		
Railway	$212,157	$192,193
Electric light	56,864	52,908
Power	9,611	10,741
Miscellaneous	6,209	5,238
Total	$284,841	$261,080
Expenses:		
Transportation	$54,957	$61,616
Maintenance	29,138	23,104
General	63,645	57,711
Total	$147,740	$136,431
Net earnings	$137,101	$124,649
Fixed charges:		
Interest on bonds	$30,000	$30,000
Tax on railway earnings	8,517	7,692
Rental	12,000	12,000
Total	$50,517	$49,692
Net income—surplus for period	$86,584	$74,957

The gross receipts during 1913 showed an increase of 9.1 per cent over 1912, the railway department alone carrying most of this increase. Operating expenses increased 8.29 per cent during 1913, although the operating ratio was lowered from 52.25 per cent to 51.86 per cent during the year. According to the report this decrease was somewhat attributable to the well distributed rainfall and consequent dependable supply of water power, resulting in economy of coal consumption.

The net earnings showed an increase of 9.98 per cent in 1913. The number of passengers carried increased 10.49 per cent. During the year the sum of $16,741 was expended on capital account. Four dividends of 1¼ per cent were paid, and the amount of $42,584 carried to the surplus account increased this to $402,205 as of Dec. 31, 1913.

Honolulu Rapid Transit & Land Company

The condensed income statement of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, for the year ended Dec. 31, 1913, follows:

Gross earnings from operation		$618,144
Operating expenses		371,242
Net earnings from operation		$246,902
Income from other sources		7,578
Gross income		$254,480
Interest on funded debt		$33,960
Taxes—		
Conservation	$2,153	
Corporation	1,829	
Property and income	23,819	
Public Utilities Commission	520	
Specific	82	
Car licenses	550	
		28,955
Total		$62,915
Gross income, less interest and taxes		$191,565
Bond sinking fund reserve 1913	$25,000	
Depreciation of plant 1913	28,697	
Loss and gain account 1913	196	
		53,893
Net income		$137,672
Dividends on common stock		96,600
Balance net income 1913		$41,072
Surplus 1912		223,435
		$264,507
Transferred from bond sinking fund reserve 1913		25,000
		$289,507
Transferred to reserve stock sinking fund	$58,000	
Transferred to dividend suspense account	31,400	
		89,400
Balance carried to 1914		$200,107

The gross earnings from car operations and attractions increased from $564,472 in 1912 to $618,144, 1913, or $43,672, and other income increased from $5,796 to $7,578, or $1,782. On the other hand, there was a material increase in the operating expenses over 1912. For 1913 these were $80,677 in excess of 1912, being chargeable 85.2 per cent to maintenance of way and structures, 2.3 per cent to maintenance of cars, trucks and motors, 6.1 per cent to operation of cars and 6.4 per cent to general expenses. Although there was an increase in the car mileage of 17,897 miles and in the number of passengers transported of 983,037, the power plant expenses decreased about $17.

There was expended on track maintenance, macadamizing and rehabilitation the sum of $92,016. Betterments were made to the extent of $54,989. Fare passengers per car mile increased from 470,889 in 1912 to 510,698 in 1913. Earnings per fare passenger remained the same at 0.0488 cent, while expenses per fare passenger increased from 0.0256 cent in 1912 to 0.0298 cent in 1913. The operating ratio increased from 51.47 per cent in 1912 to 60.06 per cent in 1913.

Indianapolis Street Railway

At the annual meeting of the stockholders of the Indianapolis (Ind.) Street Railway held at Indianapolis on April 8 the following directors were re-elected: Henry Jameson, Harry S. New, Harold B. Hibben, Ferdinand Winter and Joseph A. McGowan, Indianapolis; Marshall S. Morgan, Philadelphia, Pa., and Charles M. Murdock, Lafayette, Ind.

The directors reported to the stockholders that notwithstanding the adverse conditions which prevailed during 1913, on account of the flood in the spring of the year and the strike which occurred in November, the Indianapolis Traction & Terminal Company, as lessee, had expended $602,083 for the maintenance of the property of the Indianapolis Street Railway. A comparison of expenditures for maintenance for 1913 and 1912 follows:

	1913	1912
Maintenance of way and structures	$379,086	$366,240
Maintenance of equipment	222,997	217,228
Total	$602,083	$583,468
Per cent of maintenance to gross earnings	18.15	17.45

The gross earnings of the Indianapolis Traction & Terminal Company (lessee) for 1913 amounted to $3,321,088, as compared with $3,343,640 for 1912, a decrease of $22,551.

A description of the reconstruction work on tracks of the Indianapolis Street Railway during 1913 was placed before the stockholders, and data presented showing that since Dec. 29, 1902, the date of the lease of the street railway to the Indianapolis Traction & Terminal Company, about 50 per cent of the track has been entirely rebuilt by the lessee company, using the latest types of heavy rails on concrete foundation with brick and granite block paving, and that extensive repairs have been made on 20 per cent additional track.

The following officials were elected for 1914: Henry Jameson, president; Harry S. New, first vice-president; Harold B. Hibben, second vice-president; Joseph A. McGowan, secretary and treasurer; W. F. Milholland, assistant secretary and treasurer.

Change in Control of the Lackawanna & Wyoming Valley Railroad

The controlling interest in the Scranton & Wilkes-Barre Traction Corporation, which is the holding company for the Lackawanna & Wyoming Valley Railroad, the third-rail system between Wilkes-Barre and Scranton, Pa., has been purchased by a syndicate composed principally of Senator William C. Sproul, Bioren & Company, Philadelphia, and Ford, Bacon & Davis, New York, all of whom will be represented in the management. Ford, Bacon & Davis, New York, will have general oversight of the management of the company's affairs and will be represented on the board of directors by F. R. Ford and C. F. Ueberlacker. Mr. Sproul will be elected to the presidency of the company.

The Lackawanna & Wyoming Valley Railroad is stated to be doing about 95 per cent of the entire passenger business between Wilkes-Barre and Scranton. Since its financial reorganization about a year ago it has shown substantial progress and is paying dividends on its preferred stock now at the rate of 6 per cent per year. Beginning with 1917 this stock will be entitled to 7 per cent. The capitalization is $3,000,000 of 5 per cent bonds, $1,000,000 of 6 per cent bonds, $700,000 of preferred stock and $1,500,000 of common stock.

The earnings of the Lackawanna & Wyoming Valley Railroad for the calendar year 1913 were $650,330 as compared with $607,271 in 1912, an increase of 7.09 per cent, while the net earnings increased 12.84 per cent during the year. The revenue received for passengers increased 6.32 per cent and that from freight 10.04 per cent, while the express revenue increased 19.89 per cent owing to higher rates. The net income after deductions, including taxes, was $296,676 as compared with $264,245 in 1912. The final surplus, after providing for bond interest and charges against income, including dividends, was $34,856.

American Water Works & Guarantee Company, Pittsburgh, Pa.—The property of the American Water Works & Guarantee Company was sold at Pittsburgh on April 15 for $1,250,000 to H. H. Pierce, New York, N. Y., representing the bondholders' protective committee. The reorganization of the company will be carried out in accordance with the plan reviewed at length in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, page 794.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—Hodenpyl, Hardy & Company, New York, N. Y., are offering for subscription five-year 6 per cent convertible gold bonds of the Commonwealth Power, Railway & Light Company, dated May 1, 1913, and due May 1, 1918. The authorized issue is $10,000,000, all of which is outstanding. The bonds are in denominations of $1,000, $500 and $100. They are coupon bonds with the privilege of registration as to principal only and are convertible at the option of the holder in amounts of $1,000 after May 1, 1916, and before maturity into an equal amount of 6 per cent cumulative preferred stock of the company at par. In addition, upon such conversion the bondholder will receive common stock of the Commonwealth Power, Railway & Light Company at par value equal to 30 per cent of the face amount of the bonds so converted. The properties are under the supervision and management of Hodenpyl, Hardy & Company, New York, N. Y., E. W. Clark & Company, Philadelphia, Pa., and W. A. Foote, Michigan.

Gallipolis & Northern Traction Company, Gallipolis, Ohio.—The Gallipolis & Northern Traction Company has been authorized by the Public Utilities Commission of Ohio to issue its common stock of the par value of $35,000 and its twenty-year 6 per cent mortgage bonds of the total sum of $35,000 to be sold at not less than par, the proceeds arising from the sale of the stock and the bonds to be devoted to pay the full purchase price for the property formerly known as the Kanauga Traction Company. The company has in addition been authorized to issue common stock of the par value of $15,000 and its twenty-year 6 per cent mortgage bonds of the total principal sum of $15,000.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Los Angeles & San Diego Beach Railway has applied to the Railroad Commission of California for authority to issue notes in the sum of $19,000 to refund indebtedness incurred for construction work in 1911 and 1912.

Manchester (N. H.) Street Railway.—Philip L. Saltonstall and Frank S. Streeter have been elected directors of the Manchester Street Railway, succeeding J. B. Smith, resigned, and S. Reed Anthony, deceased. Mr. Smith continues as general manager of the company.

Northern Electric Railway, Chico, Cal.—The Northern Electric Railway has applied to the Railroad Commission of California, for authority to refund existing note indebtedness in the sum of $2,161,575.

Philadelphia Company, Pittsburgh, Pa.—A special meeting of the stockholders of the Philadelphia Company will be held on June 15, 1914, to vote on the plan to reduce the authorized capital stock of the company in connection with the exchange of 5 per cent preferred stock for 6 per cent preferred stock.

Portland Railway, Light & Power Company, Portland, Ore.—E. W. Clark & Company, Philadelphia, Pa., announce the sale of an issue of $5,000,000 one year 5 per cent gold notes of the Portland Railway, Light & Power Company. This issue of notes is dated May 1, 1914, and is due May 1, 1915. They were sold at 99½ and interest to yield about 5½ per cent. The notes are secured by deposit of the entire issue of $5,000,000 of the first mortgage sinking fund thirty year gold bonds of the Mount Hood Railway & Power Company, due in 1937; and of the entire capital stock (excepting only directors' shares) of the Mount Hood Company. The bonds of the Mount Hood Railway & Power Company constitute a first lien on the water power, electric light, power and street railway properties formerly owned by the Mount Hood Railway & Power Company, which are situated in the territory adjacent to Portland.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—The Public Utilities Commission of Ohio has authorized the Portsmouth Street Railroad & Light Company to issue its 6 per cent preferred capital stock of the total par value of $250,000 and its 6 per cent twenty-year mortgage bonds of the total principal sum of $500,000 at the highest price obtainable, but for not less than par. The proceeds arising from the sale of the preferred stock are to be devoted by the company to reimburse its income for expenditures therefrom for the construction of additions, extensions, improvements and betterments and the proceeds arising from the sale of the first mortgage bonds are to be devoted as follows: To extend and equip the Ohio Valley Traction Company's line from Sciotoville to Ironton, Ohio, a distance of about 22 miles, $400,000; to pay and discharge present bonds of the Portsmouth Street Railroad & Light Company, $75,000; to double-track and change 2½ miles of its line, $50,000; to repay borrowed money, $18,000; to construct a subway in Portsmouth under the tracks of the Norfolk & Western Railway, $175,000; and to erect a new carhouse, $25,000.

Rockland, Thomaston & Camden Street Railway, Rockland, Maine.—Maynard S. Bird & Company, Portland, Maine, have secured control of the Rockland, Thomaston & Camden Street Railway through the purchase of the holdings of George E. Macomber and Percy V. Hill in the company. Hugh J. Chisholm and N. J. Neal have been elected to the board of directors to fill vacancies. W. T. Cobb has been elected president of the company to succeed Mr. Macomber.

Sacramento Valley West Side Electric Railway, Willows, Cal.—The Sacramento Valley West Side Electric Railway has applied to the Railroad Commission of California for an order authorizing the execution of a promissory note in the sum of $16,856.70 to the Oakland, Antioch & Eastern Railway with the privilege of pledging certain promissory notes as collateral security.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The stockholders of the San Francisco-Oakland Terminal Railways on April 7 voted to increase the bonded indebtedness of the company from $20,000,000 to $35,000,000, subject to the approval of the State Railroad Commission. Of the $35,000,000, it is announced that $20,000,000 will be set aside to retire securities now outstanding. The new bond issue will be known as "first and refunding thirty-year 5 per cent gold bonds." Part of the $15,000,000 remaining will be used "to acquire property within the purpose of the corporation and for the extension and improvement of its facilities and the improvement and maintenance of its service."

Springfield (Ohio) Railway.—The Springfield Railway has been authorized by the Public Utilities Commission of Ohio to issue its first mortgage 5 per cent bonds of the total principal sum of $1,244,000, and its 6 per cent cumulative preferred capital stock of the total par value of $143,200, the preferred stock to be sold for the highest price obtainable but for not less than par. The first mortgage bonds are to be issued in exchange for the petitioner's present outstanding bonds of the same principal amount. The proceeds arising from the sale of the 6 per cent cumulative preferred stock are to be devoted to, and used in accordance with, the purposes prescribed by the regulating commission.

Southern Iowa Railway & Light Company, Albia, Ia.—The Southern Iowa Railway & Light Company has been incorporated as a consolidation of the Albia Interurban Railway and the Albia Gas Company. The authorized capital stock of the company is $500,000. Of this amount $120,000 has been issued. The officers of the company are C. B. Judd, president; E. C. Manning, secretary, treasurer and general manager; W. J. Read, superintendent and purchasing agent.

Terre Haute Traction & Light Company, Terre Haute, Ind.—The Public Service Commission of Indiana on April 13 granted the petition of the Terre Haute Traction & Light Company for permission to issue $106,000 of bonds on account of improvements and betterments to the property during 1913. A clause in the mortgage of the Terre Haute Traction & Light Company provides that for each $1,250 actually expended there may be issued a bond for $1,000. This issue of $106,000 completes the total authorized bond issue of $5,000,000, of which $1,500,000 is reserved to retire underlying bonds of the Terre Haute Electric Company.

United Railroads, San Francisco, Cal.—The United Railroads, E. H. Rollins and Sons, Boston, and the Union Trust Company, San Francisco, have applied to the Railroad Commission of California for authority to execute a car equipment trust agreement. Under the proposed agreement the United Railroads will purchase sixty-five cars for use in San Francisco at an aggregate sum of $365,000.

Dividends Declared

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Green & Coates Street Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 2½ per cent, common.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
1m., Feb.,	'14	$127,623	*$91,616	$36,007	$35,131	$876
1 " "	'13	123,383	*82,599	40,784	32,454	8,330
8 " "	'14	1,372,187	*868,505	503,682	273,327	230,355
8 " "	'13	1,314,447	*768,212	546,235	256,985	289,250
DETROIT (MICH.) UNITED RAILWAY						
1m., Feb.,	'14	$871,824	$613,000	$258,823	$184,128	$74,695
1 " "	'13	920,166	623,520	296,647	178,603	118,044
2 " "	'14	1,844,199	1,295,844	548,255	360,892	187,362
2 " "	'13	1,925,512	1,301,296	624,217	357,104	267,113
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.						
1m., Jan.,	'14	$160,119	$86,632	$73,487	$52,260	$21,227
1 " "	'13	151,645	77,627	74,016	49,091	24,925
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.						
1m., Jan.,	'14	$66,174	$32,168	$30,493	$17,103	$13,390
1 " "	'13	61,252	30,897	27,618	16,628	10,990
7 " "	'14	701,269	240,019	212,220	117,318	94,902
7 " "	'13	453,888	246,696	189,276	111,334	77,942
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.						
1m., Jan.,	'14	$25,670	*$18,157	$7,513	$7,679	†$166
1 " "	'13	26,666	*17,227	9,439	7,335	2,104
12 " "	'14	295,570	*195,024	100,546	90,306	10,240
12 " "	'13	288,509	*191,589	96,921	86,615	10,306
PENSACOLA (FLA.) ELECTRIC COMPANY						
1m., Jan.,	'14	$23,701	*$14,937	$8,764	$7,268	$1,496
1 " "	'13	26,317	*16,480	9,838	6,301	3,537
12 " "	'14	283,141	*181,195	101,946	82,068	19,878
12 " "	'13	289,485	*177,521	111,965	76,393	35,572
SAVANNAH (GA.) ELECTRIC COMPANY						
1m., Jan.,	'14	$72,461	*$49,038	$23,423	$23,016	$407
1 " "	'13	67,792	*50,077	17,715	17,709	6
12 " "	'14	832,449	*556,883	275,566	267,570	7,996
12 " "	'13	756,491	*558,730	197,762	196,548	1,214
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.						
1m., Jan.,	'14	$448,415	$212,807	$235,608	$135,409	$100,199
1 " "	'13	416,858	213,053	203,806	124,857	78,949
7 " "	'14	3,114,660	1,525,962	1,588,697	938,227	650,470
7 " "	'13	2,905,300	1,421,030	1,484,270	866,650	617,620

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*Includes taxes.
†Deficit.

Traffic and Transportation

Traffic Problem Between Minneapolis and St. Paul

There has been considerable agitation of late in the Twin Cities in regard to the possibility of reducing the running time over the lines of the Twin City Rapid Transit Company between Minneapolis and St. Paul. The present running time from Rice and University Streets, St. Paul, to Seven Corners in Minneapolis is thirty-two minutes. The distance in this intermediate territory is 7.3 miles and the present average speed for this distance is 13.7 m.p.h., and by reducing this time by five minutes in this territory it would increase the speed to 16.2 m.p.h. This is assuming that all cars would have to make all of the intermediate stops on each trip, which would have to be assumed in making schedules. The company estimates that by applying the skip-stop plan this reduction of five minutes in running time could be accomplished. In a statement which it has issued in regard to the proposal to reduce the time between the cities the company says:

"With the growth of the Twin Cities the time will probably come when there will be a sufficient amount of business to warrant the construction of an elevated line, which might make the run in thirty to thirty-five minutes, but the amount of travel at this time is such that it would be impossible to make any return on the large amount of money which would be necessary to finance such a project. The company is in sympathy with any movement which will result in reducing the running time between the two cities, but in the judgment of this company the only practical plan is the 'third stop' method, and the consent of the cities to this action must be obtained by the patrons of the line and not on the company's initiative."

Interurban Railway Development in Iowa

L. S. Cass, president of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., made a very interesting speech before the Des Moines Press Club recently in which he reviewed the past, present and future of interurban electric railways in Iowa, advocating important changes in the law to encourage their promotion and indorsing the proposed general increase in steam railroad rates as essential for the betterment of conditions in all lines of railroad business. In opening his remarks Mr. Cass reviewed briefly the conditions which governed the construction of electric railways in the East as contrasted with those in the West. Speaking more particularly in regard to electric railway development in Iowa Mr. Cass said in part:

"There are a great many reasons why Iowa has not developed a large interurban railway mileage. In the first place Iowa is largely an agricultural state and has no large cities. Its rural population matures and cashes one crop each year, whereas in the states with the large interurban mileage the rural population is devoted largely to mining and manufacturing and depends upon the electric lines for transportation to and from the markets. This statement is supported by statistics showing the average number of rides per inhabitant per annum in various states.

"With a population riding only twenty-eight times per annum it is self-evident that the Iowa electric railroads must be constructed along lines different from the electric railways in New York, in which State the rides per capita per annum total 198. In other words, while the New York electric railroad was built for passenger business almost exclusively, the Iowa interurban railway had to be so constructed as to transact a general railroad business. On this account but few interurbans could be built in Iowa with any prospect of success.

"The principal interurban mileage in Iowa is largely connected with the Chicago Great Western Railroad. I think credit is due A. B. Stickney, builder and formerly president of the Chicago Great Western Railroad, for the interurban railways Iowa now enjoys. When asked if he would make connections with electric lines, Mr. Stickney's answer was: 'I will make connections, form through routes and publish joint tariffs with anyone who will establish any form of continued transportation for the delivery of freight, even though the motive power be only an ox team.' The wisdom of this policy cannot now be questioned. Since the passage in 1910 of the amendment to the Sherman anti-trust law, known as the Wickersham rail rate law, the managements of the trunk lines have come to recognize the electric railroad as an important feeder to their systems as well as a necessity to the best development of a large part of the territory served by their lines and I think it is only fair to say that even though this bill had not become a law the trunk lines would now be forming through routes and publishing joint rates with all the electric lines.

"Another reason why interurban railroads have not been built more largely in Iowa is the fact that our laws have not permitted returns to the promoter as large as have been possible to him elsewhere. It would seem, however, that with the low capitalization of Iowa electric railroads and the possibility of doing a general railroad business the people of the State would be attracted to the securities of the electric railroads within the State. Our funds are, however, used principally in the pursuits of agriculture and in the manufacturing industries of our State. Our people understand perfectly a mortgage on property, but a railroad bond secured by a mortgage is entirely outside of their scope of education and is not looked upon with favor, consequently the money that has gone into the Iowa electric railways has come mostly from outside the State. Some of the people in our own State are commencing to understand the great value of the interurban to their property and are expressing a willingness to invest some of their earnings in electric railroads. This is evidenced by the fact that the people of Cedar Rapids and Waterloo and the country between these two cities have invested nearly $700,000 in the preferred stock of the Waterloo, Cedar Falls & Northern Railway to assist in the building of 60 miles of electric railroad that will be completed this year.

"Franchises limiting the life of the electric railroads upon the streets of municipalities to twenty-five years have been another great drawback to the building of electric railroads in Iowa. We should reserve the right to regulate in our franchises, but should not restrict the life of the corporation, as it is a great handicap to procuring outside funds for the development in which we are all so much interested. Still another reason why Iowa has not enjoyed better growth in interurban railways is the fact that the Iowa distance tariff is made up on a basis of rates too low for the short haul. For instance, it costs just as much to solicit, receive, load, bill, unload, deliver and collect the charges on a piece of freight traveling a short distance that it does a long distance, and the electric railroad being a short railroad, it never has the benefit of the average earnings between long and short hauls in the State. Therefore its costs of operating freight business is too great to admit of a profit sufficient to interest capital in extensions, except in isolated cases. The people of the State are not interested nearly so much in what the rate is as they are in knowing that the rates do not discriminate between competing communities.

"I want to say that I believe one of the strongest agencies in the interest of interurban development in Iowa is the treatment to be accorded trunk lines in the matter of legislation and freight rates. Iowa has just scored a victory in the attempt to adjust rates throughout the State. This attempt at adjustment has brought about the lowering of rates throughout the State on interstate business to a very marked degree. I think this attempted readjustment of interstate rates for Iowa is fair and right. What Iowa was contending for, however, was not the results to be obtained from reductions in rates so much as it was equalization between important commercial centers. Just as soon as this equalization has taken place I believe every commercial body in the State of Iowa should ask the Interstate Commerce Commission to grant the trunk lines a universal horizontal increase in railroad rates to strengthen the credit of the trunk lines in the financial centers. Not only must we assist the credit of the trunk lines by granting them the increase in rates they ask, but we must call a halt on the adverse legislation against the trunk lines. This appeal for advance in rates in the interests of the trunk lines is equally in the interest of the electric lines. If the trunk lines are prosperous confidence will be placed in the electric lines by the investors and funds will be forthcoming for building more electric lines in the State. The trunk lines will find it possible to deal more liberally with the electric lines, thereby adding to the profits of the latter, and furthermore the trunk lines will be in a position to secure funds with which to electrify branches throughout the State that are now of little value to the public.

"An amendment to the constitution of Iowa would aid also materially in the construction of electric railroads. Land for the construction of electric railroads cannot be taken in Iowa without paying the value of the property and any damage accruing to the property, excluding any benefits received by the property. In Nebraska and some other states the value of the land which is taken must be paid, but against the damages one may show the benefits. Therefore if the benefits you bring to the party owning the property which has been condemned and paid for are equal to the damages you do the property, there is no damage and you are merely obliged to pay for the land.

"The future interurban railways in Iowa will come from electrified steam lines and will be built by the various communities becoming interested and putting in large sums of their own money, and I must say that there are a great many communities in the State of Iowa than can well afford to invest their own money in interurban railroads. With some changes in our present laws, those who do invest in the electric railways can hope for a reasonable if not a large profit, to say nothing of the profit in the collateral interests that the road will benefit."

Reduction in Fare Ordered.—The Railroad Commission of California has directed the Los Angeles Railway to reduce its thirty-ride family commutation rate for the transportation of passengers between Lennox and Los Angeles from $3.30 to $2.25.

Complaint Against Service in St. Louis.—The West End Business Men's Association of St. Louis on April 9 filed a complaint against the United Railways, St. Louis, with the Missouri Public Utilities Commission alleging general inefficiency. The railway was cited to file a response within ten days.

Crusade Against Boys Who "Flip" Cars.—The police of St. Louis, Mo., are co-operating with the officers of the United Railways in an effort to stamp out the practice which has increased considerably of late among boys in that city of "flipping" cars while they are in motion. The police are arresting all offenders. Twenty-three arrests were made one day recently.

Ruling in Regard to Free Transportation.—It is the opinion of the Public Service Commission of Pennsylvania that the according to ministers of religion of free intrastate transportation, or such transportation at reduced rates, is discriminatory and illegal, and that the commission is without warrant to otherwise regard it, under the present public policy of Pennsylvania as fixed by law.

Accidents on Maine Railways.—According to the report of the Railroad Commission of Maine for the year ended June 30, 1913, there were four passengers killed and seventy-nine injured, eight employees injured, eight other persons killed and twenty-eight injured, making a total of twelve persons killed and 115 injured. These figures were increases of four in the number killed and nineteen in the number injured over the previous year.

Reduction in Local One-Way Fares.—Effective on May 6, 1914, the New York, Westchester & Boston Railway, New York, N. Y., will establish local one-way fares in both directions between Wykagyl and East Third Street, Columbus Avenue, and East Lincoln Avenue at 5 cents; between Wykagyl and Westchester Avenue (White Plains) at 10 cents; between Quaker Ridge and East Third Street, Columbus Avenue, and East Lincoln Avenue at 10 cents. The reduction in each case is 5 cents.

Trade Trips Near Kansas City.—The Kansas City Commercial Club will utilize the interurban railways running into Kansas City in making short trade extension trips into adjacent territory. The long trip usually made by the commercial organization in the spring has been postponed until fall. Short journeys, however, will be made to encourage residents of near-by territory to take advantage of the interurban and other facilities to trade in Kansas City. The electric railways will place special cars at the service of the junketers.

Special Convention Rates Stimulate Traffic.—The lines of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company carried many visitors from various points in southern Indiana into Louisville during the sessions of the Conference for Education in the South, which were participated in by national authorities on the numerous matters discussed of interest to the farmer and manufacturer. A rate of one fare for the round trip into Louisville and return was offered by the companies, and stimulated passenger traffic during the conference.

Interurban Railway Industrial Pamphlet.—The Chicago, Ottawa & Peoria Railway, Ottawa, Ill., has issued an industrial pamphlet dealing with the famous Illinois Valley. The pamphlet has to do particularly with the possibilities of the territory through which the company operates from an agricultural standpoint. It is profusely illustrated with half-tone reproductions of the products of the territory and the facilities which are afforded by the company for handling passenger traffic and freight. There is a complete time-table of both west-bound and east-bound trains, a map of the line and a list of the steam and electric railroad connections.

The Theoretical Nickel Analyzed.—The Brooklyn (N. Y.) Rapid Transit Company recently published as a paid advertisement in the Brooklyn newspapers chapter six of its continued story "Why We Need the Nickels," to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL. The company analyzed the theoretical nickel, with its depreciation, as received by the company, down to 3.745 cents per passenger. In its conclusion the company said: "The ability to ride is more important to the public than the price paid for that ride. The company's ability to furnish the ride depends upon receiving enough for it to pay the cost of supplying the service."

Two Billion Carried Safely.—The New York Evening *Sun*, commenting editorially on the record of safety of the Interborough Rapid Transit Company, operating the New York subway, said recently: "According to President Shonts of the Interborough the subway has transported in the last nine years, without a single passenger fatality, the astonishing total of 2,198,000,000 individuals. Such a record in transportation, considering speed, regularity and relative efficiency, is undoubtedly not to be excelled anywhere; and the wonder might well be that this enormous number has been handled with comparatively as little inconvenience as they really have suffered. The Interborough Company is certainly to be congratulated for carrying a third more persons than make up the entire population of the earth without the loss of a single life. In no other respect could they have made so commendable a showing. And if the straphanger still feels that he has something coming to him he should remember that his grievances go to make up the reasons why they are building more subways."

Effort to Secure Track Elevation in Suburban Chicago.—A number of complaints have been filed with the Illinois Public Utilities Commission in regard to the condition of certain crossings of the Chicago & Oak Park Elevated Railroad in the suburban territory west of Chicago. It is contended that the crossings are dangerous and that the only way to improve them is to compel the road to elevate its tracks. At the present time the Oak Park Elevated is in the hands of Samuel Insull, receiver. Mr. Insull has expressed a willingness to elevate, but says that funds for the purpose are not available. In anticipation of possible action by the commission to compel the elevation of these tracks, counsel for the receiver presented a petition for an injunction in the United States District Court. This petition was withdrawn temporarily, but will again be filed if an order is issued by the Public Utilities Commission. B. I. Budd, president of the Chicago Elevated Railways, has announced that the Northwestern Elevated Railroad will elevate its tracks between Wilson and Howard Avenues, a distance of approximately 4 miles. When this elevation is completed it is expected that the running time between the Chicago loop and Evanston will be reduced approximately 10 minutes.

Personal Mention

Mr. W. T. Cobb, Rockland, Maine, formerly Governor of that State, has been elected president of the Rockland, Thomaston & Camden Street Railway, Rockland, Maine, to succeed Mr. G. E. Macomber.

Mr. N. J. Neall, consulting engineer, Boston, Mass., has been appointed managing engineer of the Rockland, Thomaston & Camden Street Railway, Rockland, Maine, which has been taken over by a syndicate headed by Mr. Hugh J. Chisholm, Portland, Maine.

Gen. William A. Bancroft, president of the Boston (Mass.) Elevated Railway, was the subject of the fourth interview in the series of the Boston *Post* entitled "Business Builders of New England." General Bancroft reviewed briefly his own experience in business and ventured advice to seekers for jobs. In this connection he is quoted as follows: "While I do not feel capable of offering advice to young men, I have often thought when people applied for employment how many more would get employment if they had some concrete proposition to offer which would be reciprocally advantageous to both employer and the person seeking employment. Ordinarily a man seeking employment has nothing to offer except an intention to serve his employer faithfully and capably. Not always does he have that."

Mr. Newton W. Bolen, general superintendent of the Public Service Railway, Newark, N. J., was tendered a testimonial dinner at Paterson on March 24 by the platform men of the Passaic Division in honor of the tenth anniversary of his connection with the company. Practically all the men who could be spared, 145 in number, attended. The speaker of the evening was Mr. John Bimson, chief of police of Paterson. Other municipal officers were also in attendance. The dinner was in addition to the annual dinners of the Passaic Division which have been an important local event for six years past. A paper-weight with mirror on one side and Mr. Bolen's photograph on the other, inscribed "To Our Friend," was the souvenir of the occasion. The employees of Greenville and Montgomery carhouses propose to tender a dinner to Mr. Bolen on April 20 in the assembly room at the Montgomery carhouse in Jersey City.

Mr. William C. Sproul will be elected president of the Scranton & Wilkes-Barre Traction Corporation, which is the holding company for the Lackawanna & Wyoming Valley Railroad, operating between Wilkes-Barre and Scranton, Pa. Mr. Sproul and a syndicate have purchased control of the company and he will succeed Mr. James C. Bennett as president. Mr. Sproul was born in Octoraro, Pa., in 1870 and was graduated from Swarthmore College in 1891. He purchased an interest in the Chester *Daily Times* in 1892, and in 1898 was elected vice-president of Roach's Ship Yard. In 1900 he organized the Seaboard Steel Casting Company, Chester, of which he is president. He also organized the Chester Shipping Company and is president of that company. He became interested in coal and timber properties in West Virginia in 1901 and is president of the Coal River Railway of West Virginia, the Ohio Valley Electric Railway operating in West Virginia, Kentucky and Ohio, Kanawha Valley Traction Company and the Coal River Land Company. He is also a director of a number of other companies, among them the Commercial Trust Company, Philadelphia, and the Delaware County Trust Company, First National Bank and Delaware County National Bank, all of Chester. Mr. Sproul was elected to the Senate of Pennsylvania in 1896 by the Republicans of the Ninth Senatorial District and was re-elected in 1900, 1904 and 1908.

OBITUARY

DeLancy H. Louderback, formerly associated with Charles T. Yerkes in street railway enterprises, died on April 9, 1914, at his home in Chicago. Mr. Louderback was born in Davenport, Ia., in 1848. He began his railway experience as a telegraph operator and later became a train dispatcher for the New York Central Lines at Buffalo, N. Y. He opened a line of telegraph offices in Philadelphia and other cities in opposition to the Western Union, and in 1873 went to Chicago as receiver of the old Western Union Company. He entered the street railway transportation field in 1890 in Chicago as an associate of Mr. Yerkes. Mr. Louderback was formerly general manager of the Chicago Union Loop and the Chicago & Oak Park Elevated Railroad, and was president of the Northwestern Elevated Railroad. The surface railways in Chicago in which he was interested have since become a part of the Chicago Surface Lines.

David Robison, Jr., chairman of the board of directors of the Ohio Savings Bank & Trust Company, died at Toledo on April 15. Mr. Robison was active in the commercial and financial development of Toledo for forty-three years. He was born at Wooster, Ohio, on Jan. 22, 1830. In 1889, in partnership with his sons, he began to build what was known at the time as the Robison street railway lines. These lines are now part of the system of the Toledo Railways & Light Company. Mr. Robison also organized and assisted in building the Toledo Terminal Railroad.

NEW PUBLICATION

Regulation of Public Service Companies in Great Britain. By Robert H. Whitten, Librarian-Statistician, Public Service Commission for the First District, New York, 1914, 231 pages. (Reprint of appendix G of the annual report of the Public Service Commission for the First District for the year ended Dec. 31, 1913.)

This report is the result of some six months' special investigation and study undertaken by Dr. Robert H. Whitten in behalf of the department on regulation of municipal utilities of the National Civic Federation. The material having served the purposes of the federation, it is now published by the New York Public Service Commission in the hope that it may prove suggestive in the study of a number of the problems in public service regulation. In this report Dr. Whitten has treated phases of the regulation of public service companies in Great Britain that seem to offer most in the way of suggestion in the solution of American problems. In the case of such important questions as the sliding scale of rates and dividends, the sale of premium shares at auction or by public tender and the audit of company accounts, his report presents the general principles underlying these methods of control and of their applicability to American conditions. In connection with the British sliding scale system for the automatic regulation of the rates of charge and dividends of gas companies Dr. Whitten recommends certain changes in the sliding scale system as applied in England and Boston, but on the whole considers that it has important advantages over the American system of occasional rate regulation. He, however, favors "the merit rating method," as superior to either of the above. Under the merit rating method the state commission "will periodically rate the companies on the basis of comparative efficiency in serving the public and allow them to earn dividends varying with such efficiency." Dr. Whitten states that in England the services of the financial middleman are in large measure dispensed with through the sale of new securities at auction or by public tender. Under this method a premium stock is sold at its actual market value and all premium realized is used for betterments and additions to plant. The author discusses at length the advantages and reputed disadvantages of this system of financing.

Dr. Whitten notes the general absence among English public service companies of the holding company and of the intertwining and interlocking of directorships for the purpose of common control. He suggests that the limited voting power of the large shareholder may be responsible for this condition. According to the author effective supervision of public service companies has been promoted more by the enforcement of uniform accounting than by any other single factor. In England the practice has developed of having public service company accounts audited each year by an outside public accountant, elected either by the shareholders or by the Board of Trade. In this country the public service laws often give the state commission authority to audit accounts. The author suggests the advisability of requiring each company to have its accounts audited by a qualified outside accountant. The publication is supplemented with chapters on the Boston sliding scale, Toronto auction sale and maximum dividend plans.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Moultrie & Pelham Railway, Moultrie, Ga.**—Application for a charter has been made by this company to build an electric or steam railway between Moultrie to Pelham, 50 miles. J. L. Hand, Pelham, is interested.

***La Salle (Ill.) Terminal Railway.**—Incorporated in Illinois to build an electric or steam railway from La Salle to Oglesby, Cedar Point and Standard. J. B. McCaffrey, incorporator.

***Southern Iowa Railway & Light Company, Albia, Iowa.**—Incorporated in Iowa as a consolidation of the Albia Interurban Railway and the Albia Gas Company. Capital stock, authorized, $500,000. Capital stock, issued, $120,000. Officers: C. B. Judd, Albia, president; E. W. Manning, Albia, secretary, treasurer and general manager, and W. J. Read, Albia, superintendent and purchasing agent.

Caldwell County & Southern Railway, Kingston, Mo.—Chartered in Kansas to build an electric railway between Hamilton and Kingston, 9½ miles. Capital stock, $100,000. Incorporators: D. Miller, Kansas City; F. L. Bowman, H. C. Shively and S. C. Rogers, Kingston, Mo. [E. R. J., March 7, '14.]

FRANCHISES

***El Centro, Cal.**—Lewis R. Kirby, San Diego, and associates have asked the Council and County Commissioners for two forty-year franchises, one along Main Street to the city limits in El Centro and one over the Dahlia road highway between El Centro and Imperial. This is part of a plan to build an electric line between El Centro, Imperial and Calexico.

Mill Valley, Cal.—The Marin County Electric Railway has received authority from the Railroad Commission to exercise franchise rights in the town of Mill Valley, Marin County, which franchise was granted to the company Jan. 26, 1914, by the local authorities.—[E. R. J., Apr. 11, '14.]

San José, Cal.—The City Council has granted to the San José Terminal Railroad an extension of old franchises made void by failure to complete construction. The extension holds good until Jan. 1, 1915, and the officers of the company, represented by Lee H. Landis of the Tidewater & Southern Railroad, expect to complete construction on schedule time. The company plans to extend the railroad south from San José through the orchard country, giving orchardists shipping facilities to San Francisco.

St. Petersburg, Fla.—C. J. Morrow, St. Petersburg, and associates have asked the Council for a franchise in St. Petersburg. This is part of a plan to build an electric railway between St. Petersburg and Tarpon Springs.

Independence, Kan.—The Independence, Neodesha & Topeka Traction Company has received an extension of time on its franchise until Oct. 1, 1914, in which to begin the construction of its line in Independence. This 17-mile railway will connect Independence, Neodesha, Altoona and Topeka. T. J. Booth, president. [E. R. J., Feb. 14, '14.]

Schenectady, N. Y.—The Schenectady Railway has received a franchise from the Council in Schenectady for an extension of its lines.

Elizabeth City, N. C.—The Council will receive proposals on April 27 for an electric railway franchise in Elizabeth City. D. Guy Brockett, City Clerk.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise to cross the bridges over the Willamette River.

Elwood City, Pa.—The Mahoning & Shenango Railway & Light Company has asked the Council for a franchise on Cedar Street and Todd Avenue in Elwood City so that the line may reach the bridge to be built over the Connoquenessing River to connect Elwood City with Hazel Dell.

***Williamsport, Pa.**—The Muncy Borough Council has granted a franchise to the Trolley Construction Company, Harrisburg, for a trackless trolley line through its streets as a link in a railway to be built between Muncy and Montgomery, 4 miles away.

***Seattle, Wash.**—Stephen A. Carver has asked the Council for a franchise over certain streets in Seattle.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has received a franchise from the County Commissioners along the county roads north of Seattle and east and north of Lake Washington.

Seattle, Wash.—The Washington-Oregon Corporation, Vancouver, has asked the Council for a fifty-year franchise over the interstate bridge to be built between Portland and Vancouver.

***Seattle, Wash.**—The Vashon Electric Company has asked the County Commissioners for a franchise for an electric railway over fifty-eight county roads and twenty-seven plats, covering the entire territory of Vashon and Maury Islands.

La Crosse, Wis.—The Wisconsin Railway, Light & Power Company has asked the Council for a franchise to extend its double tracks on North Third Street from Grove Street to the La Crosse River bridge in La Crosse.

TRACK AND ROADWAY

Birmingham (Ala.) Interurban Railway.—Work will not be begun on the construction of this 14-mile electric line to connect Birmingham, Hale Springs and the coal mines until the fall. Daniel P. Hale, Birmingham, is interested. [E. R. J., Feb. 14, '14.]

Tucson (Ariz.) Rapid Transit Company.—During the next few weeks this company plans to build 1 mile of new track with steel ties and concrete blocks.

Northwest Arkansas Railway, Bentonville, Ark.—Surveys have been completed by this company between Bentonville and Rogers, 8½ miles, and are now being made between Bentonville and Cave Springs, 10 miles. They will then be made to Springtown and Pea Ridge, a total of 38½ miles. Grading has been begun from the depot to the Park Springs Hotel in Bentonville. Contracts for grading and equipment have been awarded. H. L. Cross, Bentonville, secretary. [E. R. J., March 28, '14.]

Pacific Electric Railway, Los Angeles, Cal.—A contract has been awarded by this company for an extension of the Fifth Street line in San Pedro from Bandini Street and La Alameda Street to Santa Cruz Street and Bandini Street. The plans are, it is said, to ultimately extend the line through the property of the Harbor View Land Company and the Palos Verdes ranch to Redondo Beach, paralleling the Western Avenue Boulevard to Lomita.

Fresno (Cal.) Traction Company.—Negotiations are under way between property owners southeast of Fresno and this company for a 3-mile extension to Calwa.

San José (Cal.) Terminal Railway.—A new independent electrical railroad making direct connection between San José and the Panama-Pacific Exposition grounds is promised by Lee H. Landis, the new president of the San José Terminal Railroad Company if the Common Council of San José will grant the renewal of franchises given the company in 1912, when it was controlled by local capital. The company plans to extend the line from its present terminal at First and St. James Street to the country south of San José.

Geary Street Municipal Railway, San Francisco, Cal.—Work has been begun by the Mahoney Brothers on the construction of this railway on Van Ness Avenue in San Francisco.

Connecticut Company, New Haven, Conn.—This company has awarded the contract to install double tracking on some of its lines in Ansonia to the F. T. Ley Company, Springfield, Mass. In connection with the installation of the two-track system the O'Neill Brothers, Hartford, Conn., have the contract for the repaving work for the company.

Deep Lake Company, Fort Myers, Fla.—This company has completed its 14-mile line between Deep Lake and the Everglades. Gasoline motor cars will be used. Henry McCormack, 535 Stock Exchange Building, Chicago, Ill., president. [E. R. J., Nov. 29, '13.]

***Clarkston, Idaho.**—Citizens of Clarkston and Vineland have endorsed the plan to build a 4½-mile electric railway. A committee of members of the Industrial Club and Chamber of Commerce has been named to direct the organization of plans and secure the subscription necessary to build the line. J. E. Doyle, W. O. Bond and J. E. Hoobler, members of the Chamber of Commerce, are interested.

***Wallace, Idaho.**—The Snowstorm Mining Company, Wallace, has surveyed and located a line to build an electric railway from No. 3 tunnel to lower tunnel of Missoula Copper.

Freeport Railway & Light Company, Freeport, Ill.—During the next few weeks this company will award contracts to relay its tracks on Carroll Street between Empire Street and Williams Street in Freeport.

Indianapolis, Linton & Vincennes Traction Company, Linton, Ind.—Surveys have been begun by this company on its line between Indianapolis, Linton, Vincennes, Mooresville, Bicknell, Patoka, Tell City and Jasonville. John A. Schaffer, Indianapolis, chief engineer. [E. R. J., Oct. 25, '13.]

Winona Interurban Railway, Warsaw, Ind.—During the next two months this company will award contracts to build a new steel bridge.

Kansas City, Kan.—The Kansas City Board of Public Works recently adopted a resolution recommending that a temporary viaduct to serve as a connecting link with the high power line bridge south of Nineteenth Street be constructed. The structure will cost $40,000 and will be utilized only until a permanent viaduct, to cost $600,000 is erected. The expense of the latter will be shared by the Metropolitan Street Railway, by the municipality and by the Kansas City Terminal Railway. A public hearing on the proposition will be held on April 24. The temporary structure will be of plank floor, 42 ft. wide, and will extend from the Missouri and Kansas State line to a point 359 ft. south of Nineteenth Street. The construction of the viaduct would mean the elimination of grade crossings.

Manhattan City & Interurban Railway, Manhattan, Kan.—About 10 miles of new track is being built by this company to Fort Riley. Three deck girder steel bridges on the Fort Riley Reservation will also be built. All necessary requirements have been purchased.

Topeka (Kan.) Railway.—This company has replaced the wood poles which formerly supported the trolley wires on Kansas Avenue between Railroad Street and the Melan Bridge by steel posts. The latter are placed between the two tracks, instead of along the side of the street as were the wood supporters.

Maysville Street Railroad & Transfer Company, Maysville, Ky.—During the next few weeks this company expects to complete the construction of an extension and loop at the terminal of its line in Maysville. All material has been ordered, the Lorain Steel Company furnishing the rails and special work.

***Paducah, Ky.**—It is reported that an interurban electric line will be constructed from Mayfield, Ky., to Humboldt, Tenn. R. H. McNeely, Paducah, is at the head of the project, and is said to have brought the matter to a point where actual construction work will begin shortly.

New Orleans Railway & Light Company, New Orleans, La.—It is reported that plans are being made for an extension to Milneburg. An extension of the Claiborne Avenue line in New Orleans is also contemplated.

Eastern & Western Shore Railroad, Annapolis, Md.—This company plans to construct an electric line from Annapolis to Fair Haven on the bay shore of Anne Arundel. From there a ferry will operate across the bay to a point in the Southern part of Dorchester county. An electric railroad will be constructed through Dorchester county to Cambridge, thence eastward to Vienna and southerly to Sharptown, Salisbury and Ocean City, Md., and to Franklin City, Va. From Salisbury or a point near by, a branch line will extend to Crisfield. On the western shore a line will be constructed from Fair Haven to Washington. The line from Fair Haven to Baltimore will connect at Annapolis with the Annapolis Short Line. It is stated that Washington capitalists are largely interested in the enterprise and are ready to undertake financing it. It is provided, however, that the next Legislature must approve the plans. Counties through which the line is to be run may subscribe to the extent of $200,000 each, provided such action is approved by the voters at a referendum. [E. R. J., April 4, '14.]

Holyoke (Mass.) Street Railway.—Plans are being made to begin work at once on the Sheridan Street extension.

Mankato (Minn.) Electric Traction Company.—An extension on Front Street in Mankato to the Mankato Fair grounds is being considered by this company.

Minnesota Northwestern Electric Railway, Minneapolis, Minn.—Surveys have been completed and grading has been begun by this company on its 20-mile line between Thief River Falls and Goodridge. Right-of-way has been secured, all bridges completed, ties, rails, culverts, etc., have been purchased and equipment ordered from the General Electric Company. Contracts call for the completion of this line the later part of August. Daniel Shaw, Thief River Falls, Minn., president. [E. R. J., Nov. 1, '13.]

Minnesota Union Electric Railway, Minneapolis, Minn.—No definite plans have yet been decided upon by this company as to when it will begin the construction of its line between Minneapolis and St. Cloud, via Brooklyn, Corcoran, Burschville, South Haven, Maine Prairie and Luxemburg. Achille D. Pouliot, 302 Plymouth Building, Minneapolis, secretary. [E. R. J., Dec. 27, '13.]

International Traction Company, Buffalo, N. Y.—This company has placed on order with the Carnegie Steel Company for 20,000 steel ties. The company is double tracking its line between North Tonawanda and Rockport.

New York State Railways, Rochester, N. Y.—This company is asked to double track and extend its Euclid Avenue line in Syracuse.

Black River Traction Company, Watertown, N. Y.—This company is asked to extend its lines from the present terminus on State Street to Gifford Street in Watertown.

***Lenoir, N. C.**—Plans are being considered to build an electric railway from Lenoir to Blowing Rock and Boone. It is proposed to use the Lenoir and Blowing Rock turnpike as the roadbed and the development of the waterpower of the Yadkin River, near the foot of the mountains, for securing the necessary electric power. T. H. Coffey, Blowing Rock, is interested.

Goldsboro (N. C.) Street Railway.—During the next few weeks this company will award contracts to build 1 mile of new track through the center of Goldsboro.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—This company plans to spend about $250,000 on improvements of its lines. Among the improvements will be the extension and equipment of the line of the Ohio Valley Traction Company, subsidiary of the company, from Sciotoville to Ironton, Ohio, a distance of 22 miles. The double-tracking and changing of that part of the line of the Portsmouth Street Railroad & Light Company from Young Street in Portsmouth to New Boston, a distance of 2½ miles, and the construction of a subway at Kondall Avenue, Portsmouth, under the tracks of the Norfolk & Western Railway and other railroad tracks.

***Joiner City, Okla.**—Surveys are being made to build an electric railway between Joiner City and the Healdton oil fields. F. B. McElroy Ardmore is interested.

Ottawa, Rideau Lakes & Kingston Railway, Ottawa, Ont.—Surveys have been completed by this company for its 134-mile electric line from Ottawa to Kingston, with a branch to Lanark. Headquarters: Ottawa. N. M. Clougher, Ottawa, president. [E. R. J., March 21, '14.]

West Side Electric Street Railway, Charleroi, Pa.—Plans are being made by this company to place its 11-mile extension between Charleroi and Ellsworth in operation on or about June 1.

Chambersburg & Shippensburg Railway, Shippensburg, Pa.—Work has been resumed by this company on its line between Chambersburg and Shippensburg. Grading has been completed and tracks laid from Chambersburg to the southern approach of the overhead bridge west of Chambersburg. T. M. Mahon, Chambersburg, president. [E. R. J., Nov. 8, '13.]

Montreal & Southern Counties Railway, Montreal, Que—Plans are being made by this company to begin work soon on the extension from St. Cesaire to Granby, a distance of 15 miles.

Regina (Sask.) Municipal Railway.—Bids will be received by this company until April 27 for various supplies and materials to build several extensions of its lines in Regina. Plans and specifications may be obtained from H. Doughty, Regina, superintendent.

Austin (Tex.) Street Railway.—During the next few weeks this company will award a contract to build about 1 mile of new track in Austin.

Eastern Texas Traction Company, Dallas, Tex.—This company has completed 52 out of a total of 53½ miles of grade work, 90 per cent of the concrete work, all of the culverts and about 40 per cent of the bridge work on its line between Greenville and Dallas. It has on hand all the necessary bridge materials for the completion of the line, 140,000 hard oak cross-ties, 2000 40-ft. poles, in addition to other construction material. Present indications are that track laying will not be begun for several months. J. W. Crotty, Greenville, general manager. [E. R. J., March 21, '14.]

Dallas (Tex.) Street Railway.—The double-tracking of this company's line between Cole Avenue and Euclid Avenue in Dallas has been completed and cars will now be run over the double track to the Country Club.

Gainesville, Whitesboro & Sherman Railway, Dallas, Tex.—Surveys have been completed, right-of-way secured and 12 miles graded on this line, but because of inability to secure financial backing it is uncertain when the construction of the line will be begun. J. W. Blanton, Gainesville, attorney. [E. R. J., Sept. 20, '13.]

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Grading has been begun by this company at Denton and also at Fort Worth for this 35-mile line to connect Fort Worth, Keller, Roanoke and Denton. A branch line from Fort Worth to Mineral Wells and Springtown is contemplated. E. E. Baldridge, Fort Worth, president. [E. R. J., April 11, '14.]

Northern Texas Traction Company, Fort Worth, Tex.—Work has been begun by this company in Arlington double-tracking its 35-mile line between Dallas and Fort Worth.

Laredo Electric & Railway Company, Laredo, Tex.—During the next eight weeks this company will award contracts to build 3.5 miles of new track with 60-lb. rails, ties and special work in Laredo.

Janesville & Madison Traction Company, Madison, Wis.—This company will be ready with plans and specifications by May 1 to award contracts to build its 40-mile line to connect Janesville, Indian Ford, Edgerton, Albion, Stoughton, Beloit, Whitewater and Madison. Conditions on application will be forwarded on receipt of contractor's check for $50 for plans, etc., company reserving the right to refuse undesirable bidders, same to be returned to all unsuccessful bidders after letting of contract or contracts. Address all communications to G. Pickhardt, 409 Washington Building, Madison, president.—[E. R. J., Mar. 28, '14.]

Manitowoc & Northern Traction Company, Manitowoc, Wis.—Surveys have been made by this company for an extension north of Two Rivers to and beyond Mishicot. It is reported that this line will be extended north to meet the lines of the Granite City Railway south of Sturgeon Bay. This is part of a plan to build a line through the Green Bay Peninsula.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Plans are being made by this company for an extension in Kenosha, to connect with the Chicago, Milwaukee & St. Paul Railroad lines at the west city limits of Kenosha and also to build a line south from Kenosha.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded a contract to Westinghouse, Church, Kerr & Company, New York, to build its new carhouse in Vancouver. The structure will be 128 ft. x 350 ft. and of reinforced concrete construction. The cost is estimated to be about $450,000. [E. R. J., Dec. 6, '13.]

Champaign Railway, Gas & Electric Company, Champaign, Ill.—This company has installed a new coal elevator at its plant in Urbana. The elevator conveys twenty-eight tons of coal an hour to the bunkers, which have a capacity of 210 tons.

Decatur Railway & Light Company, Decatur, Ill.—This company's office and storeroom in Decatur was completely destroyed by fire recently.

Springfield (Mass.) Street Railway.—This company contemplates the removal of its carhouses from North Main Street and Carew Street, Springfield, to the company's property in Elm Street, West Springfield. Alterations are being made at the company's carhouse in West Springfield.

Worcester (Mass.) Consolidated Street Railway.—This company is asked to consider plans to build a new passenger station in Webster.

Carbon & Stillwater Electric Railway, Red Lodge, Mont.—Plans being considered by this company to build a line of passenger stations between its two terminals, Red Lodge and Columbus. Machine shops will also be built. O. O. Anderson, Absarokee, is interested. [E. R. J., March 28, '14.]

St. John (N. B.) Railway.—Bids are being asked by this company to build an addition to its carhouse on Wentworth Street in St. John.

Goldsboro (N. C.) Street Railway.—During the next few weeks this company will award contracts to build a repair shop and tracks at its carhouse in Goldsboro.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—Among the improvements planned by this company in the near future will be the construction of a new carhouse in Portsmouth. The cost is estimated to be about $25,000.

Nashville (Tenn.) Traction Company.—This company, which plans the construction of an electric railway in and around Nashville, and the Detroit-Nashville Construction Company, a subsidiary corporation which will do the construction work, have leased offices in the building formerly occupied by the Nashville *Democrat*. G. B. Howard, of G. B. Howard & Company, the engineers in charge of the work, is the head of the offices at present.

Dallas (Tex.) Consolidated Electric Street Railway.—This company has completed its new carhouses at Elm and Peak Streets in Dallas. The old carhouses on the opposite side of the street from the new buildings will be used as quarters for the train men.

POWER HOUSES AND SUBSTATIONS

Tucson (Ariz.) Rapid Transit Company.—This company has purchased two 300-kw Fulton Iron Works oil engine generating sets for its power house in Tucson.

Pacific Gas & Electric Company, San Francisco, Cal—This company has awarded to the Westinghouse Electric & Manufacturing Company the contracts for motor generator sets of an aggregate capacity of 6000-kw to be delivered in San Francisco before July 15, 1914, and to be installed for the operation of new municipal street railway lines now under construction. The Pacific Gas & Electric Company is already supplying electric power to the Geary Street Municipal Railway.

Winona Interurban Railway, Warsaw, Ind.—During the next two months this company expects to purchase new stoker equipment and four 300-hp Babcock & Wilcox boilers for its power house in Winona.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company plans to build a new power house at Ogden, Kan.

Spokane & Inland Empire Railroad, Spokane, Wash.—During the next few months this company will award contracts to build a new substation at McGuires, Wash. The structure will be 24 ft. x 45 ft. and of brick and concrete construction. The company has contracted with the General Electric Company for the purchase of one rotary converter to be installed in this new substation.

Charleston (W. Va.) Interurban Railway.—This company has purchased a Westinghouse 300-kw rotary converter and transformers for its power house in Charleston.

Manufactures and Supplies

ROLLING STOCK

Goldsboro (N. C.) Traction Company has recently purchased two cars.

United Traction Company, Albany, N. Y., expects to purchase several new cars.

Topeka (Kan.) Railway has purchased six new cars for use on the Vinewood line.

Shore Line Electric Railway, Saybrook, Conn., expects to purchase five or six cars.

San Angelo (Tex.) Street Car Company may purchase two or three small closed cars.

Salina Street & Interurban Railway, Salina, Kan., expects to purchase one open car.

Tucson (Ariz.) Rapid Transit Company expects to purchase two 30-ft. single-truck cars.

Jersey Central Traction Company, Keyport, N. J., is reported as expecting to purchase five cars.

Empire United Railways, Syracuse, N. Y., is reported as expecting to purchase six interurban cars.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., expects to purchase shortly two or three new cars.

Tri-State Railway & Electric Company, East Liverpool, Ohio, is expecting to purchase twenty-one interurban passenger cars.

Dayton & Troy Electric Railway, Dayton, Ohio, is reported as expecting to purchase six passenger and baggage cars.

Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has ordered fifteen steel hopper cars from the Pressed Steel Car Company.

Southern Public Utilities Company, Charlotte, N. C., expects to purchase in four weeks six 38-ft. passenger cars, complete for city service.

United Railroads of San Francisco, San Francisco, Cal., expects to purchase within the next eight weeks sixty-five California-type four-motor cars.

Freeport Railway & Light Company, Freeport, Ill., has ordered one single-truck closed city car from the McGuire-Cummings Manufacturing Company.

Wellsburg, Bethany & Washington Railroad, Wellsburg, W. Va., expects to purchase during the next few weeks one coal car of about 10 to 12 tons capacity, also one truck and wheels.

Jacksonville (Fla.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 24, 1914, as being in the market for passenger cars, has ordered fifteen double-truck cars from the American Car Company.

Northwestern Pacific Railroad, San Francisco, Cal., has ordered eight GE motors which are to be installed on some of its trailers which are already in operation, and which are to be used on the Sausalito-San Rafael-San Anselmo lines of the company.

Laredo Electric & Railway Company, Laredo, Tex., expects to purchase within the next eight weeks three semi-steel storage-battery type cars, about 24-ft. over all, not to weigh over 12,000 lb. complete, each car to be equipped with one 20-hp motor.

Third Avenue Railway, New York, N. Y., has ordered twenty-three single-truck, low-level, end-entrance pay-within cars from The J. G. Brill Company, of the same type as the sample car which was described in an article in the ELECTRIC RAILWAY JOURNAL of March 28, 1914.

Waterville, Fairfield & Oakland Railway, Oakland, Maine, is thinking of building a work car in its own shops. This company has been investigating center-entrance cars with a view of purchasing, but is not building any in its own shops, as reported in the ELECTRIC RAILWAY JOURNAL of April 11.

Puget Sound Traction, Light & Power Company, Seattle, Wash., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as having ordered twelve single-end closed passenger cars from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity.........60
Bolster centers, length.29 ft.
Length of body...38 ft. 4 in.
Length over vestibule, 48 ft. 4 in.
Width over sills...8 ft. 4 in.
Width over all..8 ft. 7⅜ in.
Height, rails to sills, 33 3/16 in.
Height, sill to trolley base, 8 ft. 8 9/16 in.
Body ....composite
Headlining ....carline finish
Roof..arched, detachable hoods
Underframe ....metal
Bumpers, Hedley anti-climber
Car trimmings.....St. Louis
Conduits and junction boxes, St. Louis
Couplers...........St. Louis
Curtain fixtures, National L. W. Co.
Curtain material..Pantasote
Destination signs....Hunter
Gongs.............St. Louis
Hand brakes...Peacock and St. Louis vertical hand brake
Heaters ....Consol.
Headlights ....Crouse-Hinds
Sanders ....St. Louis
Sash fixtures.O. M. Edwards
Seats, style..Heywood Bros.
Seating material, wood backs and seats
Step treads ....zeralun
Trolley catchers.......Ideal
Trucks.....O-36, Std. Motor Truck Co.
Ventilators....... St. Louis
Special devices, etc., Root snow scraper, Consol. buzzer system

TRADE NOTES

Wendell & MacDuffie Company, New York, N. Y., on May 1 will remove its New York offices to 61 Broadway.

Railway Improvement Company, New York, N. Y., on May 1 will remove its New York offices to 61 Broadway.

Westinghouse, Church, Kerr & Company, New York, N. Y., has elected James C. Boyd, formerly with the United States Engineering Corps, vice-president.

Union Switch & Signal Company, Swissvale, Pa., has appointed Walter D. Upgraff as vice-president in place of Colonel H. G. Prout, who succeeded the late George Westinghouse as president of the company.

Link-Belt Company, Chicago, Ill., has opened an office in Detroit, Mich., room 911, Dime Bank Building. L. W. Longan, formerly connected with the Chicago and Indianapolis works of the company, has been placed in charge.

Carbon Steel Company, Pittsburgh, Pa., has appointed Frederick T. Connor as western railway sales agent, with offices at 819 Railway Exchange Building, Chicago, Ill. Mr. Connor was formerly with the Joliet Railway Supply Company, Chicago, Ill.

National Graphite Lubricator Company, Scranton, Pa., has appointed E. L. Pollock as sales manager. Mr. Pollock was formerly vice-president of the Chicago, Rock Island & Pacific Railroad. He will have offices in the McCormick Building, Chicago, Ill.

Dearborn Chemical Company, Chicago, Ill., has transferred its southeastern branch office from Birmingham, Ala., to Atlanta, Ga., 1407 Candler Building, where C. H. Everett and J. F. Boutelle, representing the company in that territory, will have their headquarters.

Asbestos Protected Metal Company, Beaver Falls, Pa., has removed its Pittsburgh offices to 1611 Bennedum-Trees Building, with H. E. Marks continuing as district manager. Besides its asbestos protected metal for roofing and siding, this company now manufactures a complete line of prepared roofing and shingles to meet the requirements of all kinds of buildings.

Stephen L. Coles has resigned the secretary-treasurership of the Society for Electrical Development, effective April 15. As of the same date he has joined the engineering staff of M. W. Thompson, 111 Broadway, New York City, specialist in litigated engineering matters and in reports on railroad and other large properties. Mr. Coles will devote his attention principally to electrical public utilities having problems of service, policy and competition to solve.

H. W. Johns-Manville Company, New York, N. Y., recently held its annual meeting of the managers of its forty-seven branch electrical departments distributed throughout the United States and Canada. At the close of the meeting a banquet was given by the management of I. P. Frink, for whom the above company is selling agent. G. F. Spencer, manager of I. P. Frink, acted as toastmaster. Speeches were made by J. W. Perry, W. H. Spencer, S. G. Meek, Bassett Jones and others.

American Safety Fender Company, Seattle, Wash., on April 4 held a successful test of its Nelson automatic safety fender on the tracks of the Idaho Traction Company, Boise, Idaho. In the test a stuffed dummy was used, and it was placed in every position a human being could assume when run into by a street car. In practically every instance the fender made a complete and clean pick-up. In no case did any part of the dummy get underneath the fender. The dummy was also tested with a runaway car. In striking it the fender dropped instantly, picked up the dummy and set the brakes, which operate automatically with the movement of the fender.

Sidney Diamant, New York, N. Y., consulting engineer, has opened an office at 15 East Fortieth Street. Mr. Diamant was graduated from Columbia University in 1902. Since that time he has been engaged in the design and erection of steel, timber and reinforced concrete structures, comprising office and loft buildings, warehouses, schools, public buildings, railway structures, carhouses and power plants. He was connected with the Metropolitan Street Railway, New York City, N. Y., and designed for that company carhouses at Sixty-fifth Street and Third Avenue and at Ninety-sixth Street at Second Avenue. He also designed a substation at West Farms, N. Y., and a combined substation and carhouse at Yonkers, N. Y. He was connected with the Pearson interests on the work at the power plant at Necaxa, near Mexico City, Mexico, and was active in the construction of the Canadian power plant at Niagara Falls.

Ford, Bacon & Davis, New York, N. Y., have been engaged as engineers to prepare the design and superintend the construction of the warehouses, terminal trackage and wharves for the proposed system of handling and storing cotton in New Orleans. The object is ultimately to make New Orleans the greatest exporting point for cotton in the world. The Board of Port Commissioners has authorized an issue of $3,000,000 of bonds, to be used in financing the enterprise. This is one of the largest engineering projets undertaken anywhere in the South and involves as a preliminary step a complete study of the existing freight-handling terminal facilities in the important shipping centers of the United States as well as in Europe, based upon which there will be a complete report made to the Board of Port Commissioners setting forth the results of such study. At the time the study of the various terminals is being made, coincidentally there will be begun preparation of the actual preliminary plans and studies for the determination of the capacity, type, design and construction of the terminal plant for New Orleans.

ADVERTISING LITERATURE

Samson Cordage Works, Boston, Mass., have issued a folder describing their trolley cord.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletins Nos. 152, 153, 154 and 172 describing and illustrating, respectively, its gatling, sinker, stopper and plug and feather drills.

Archer & Baldwin, New York, N. Y., have issued a catalog listing their electrical and steam machinery for power-house and car equipment, and also a special stock list of their dynamos and motors.

Macallen Company, Boston, Mass., has issued catalog No. 13, which describes in detail its canopy insulators, bodies and fittings for gas, combination and electric fixtures, electric railway material and electrical specialties.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a folder which describes the quality of its gears and pinions, and which shows illustrations of gears and pinions that have given service for an unusual mileage without having been worn out.

Federal Motor Truck Company, Detroit, Mich., has issued a folder describing its motor trucks for use in repair or trouble service. The folder includes a letter from the Portland Railway, Light & Power Company, Portland, Ore., testifying to the efficiency of one of these trucks in its service.

Trolley Supply Company, Canton, Ohio, has issued a catalog describing and illustrating its Knutson No. 5 and Ideal trolley catchers, Simplex trolley base, pressed steel dash headlights and Peerless check valve, and containing testimonial letters, from electric railways regarding the operation of this equipment.

Thew Automatic Shovel Company, Lorain, Ohio, has issued Catalog No. 9, describing and illustrating its full circle swing shovels with horizontal crowding motion. A special design shovel is adapted for city and interurban electric lines, owing to its ability to handle very shallow trench work encountered in track construction and reconstruction.

Mica Insulator Company, New York, N. Y., has issued a catalog containing a series of its bulletins listing its insulating material. Bulletin No. 78 covers micanite sheets, plates, paper, cloth, washers, discs, spools, tubes, segments, rings and rheostat and commutator insulation. Bulletin No. 79 covers rings and segments for railway and air brake motors and washers and tubes for grid resistances. Bulletin No. 80 describes Empire and linotape insulating materials. Bulletin No. 82 contains a complete list of the insulating products.

McGraw-Hill Book Company, Inc., New York, N. Y., has issued its *Engineering Book Notes* for April, 1914. In the descriptive list of the latest technical books published by this company since November, 1913, those on electrical engineering subjects include "Electrical Engineering Problems," by F. C. Caldwell; "Electrical Engineering," by Clarence V. Christie; "American Electrician's Handbook," by Terrell Croft; "Electric Light Accounts and Their Significance," by H. M. Edwards; "Economics of Interurban Railways," by Louis E. Fischer; "Hand-Book of Electrical Methods," compiled from the *Electrical World;* "Electric Car Maintenance," by Walter Jackson; "Elementary Magnetism and Electricity," by Cyril M. Jansky; "Problems in Alternating Current Machinery," by Lyon V. Waldo, and "Electric Discharges, Waves and Impulses," by Charles P. Steinmetz.

Sangamo Electric Company, Springfield, Ill., has issued an attractive catalog describing and illustrating its Type D-5 mercury motor d.c. watt-hour meters for two or three wire systems. The mercury-motor consists essentially of a copper disc floated in mercury between the poles of a magnet and provided with leads to and from the mercury at diametrically opposite points. The magnetic field of the motor is excited by a winding connected across the circuit in which energy is to be measured; that is, the magnetic field is proportional to the voltage. When connected to an eddy-current damper or generator which requires a driving force directly proportional to the speed of rotation, the mercury motor-generator becomes a meter. The speed of such a meter is a measure of the power or rate of flow of the energy through the motor element, and each revolution of the motor corresponds to a given quantity of energy. By connecting a revolution counter to this motor-generator the total quantity of energy in watt-hours is recorded.

Ohmer Fair Register Company, Dayton, Ohio, has issued a bound, sixty-seven-page booklet, written by John F. Ohmer, president of the company, and entitled "Fare Accounting," which reviews this subject in an unusually comprehensive and interesting manner. The book is divided into five parts and is a compilation of five addresses delivered before various electric railway associations. Part I—"Fares and Fare Protection," an address delivered before the Pennsylvania State Railway Association, calls attention to the increasing importance of the fare collecting problem due to the rapid growth of the electric railway industry, and describes in detail the operation of the Ohmer register in this connection. Part II, an address delivered before the Iowa Street & Interurban Railway Association, analyzes carefully the uses and abuses of transfers and discusses the use of the Ohmergraph as a remedy for transfer abuses. Part III, "Tickets as a Fare Medium for Street and Interurban Railway Traffic," an address delivered before the Central Electric Railway Association, discusses the merits of all kinds and systems of electric railway tickets. Part IV is entitled "The Human Factor in Fare Collection Service." Part V, "Fare Accounting," contains extracts from the symposium on "Fare Accounting" which appeared in the Souvenir Edition of the ELECTRIC RAILWAY JOURNAL of Oct. 4, 1913. This part has already been issued separately in booklet form and was described in the issue of Dec. 27, 1913.

Electric Railway Journal

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STEADY EMPLOYMENT A FACTOR IN WAGES In view of the sweeping lay-offs of employees in the steam railroad field during the past three or four months, the value of continuous work as afforded by substantially all electric railways may well be pondered by officials and subordinates alike. Certainly steadiness of employment is a very real factor in the welfare of employees and should be considered in fixing wages paid for routine work and in setting salaries as well. Compared with the hourly compensation paid metal workers, masons and other industrial wage earners, the pay of a motorman or a conductor often seems small; but it should never be forgotten that the latter are on the whole remarkably free from interrupted income due to weather conditions, the failure of materials to arrive on a job and other business conditions which often lead to days and weeks of enforced idleness on the part of the highly-rated craftsman. It is safe to say that the support of a family can be financed more satisfactorily in most cases where the wage earner's wife knows what she can "count upon" in the weekly pay envelope than where spasmodic high daily earnings are spread over "off" days in which the money flows outward only, assuming the same or approximately an equal total yearly reward for the labor of the breadwinner. We believe that more comparisons of yearly earnings between craftsmen of various kinds and street railway employees will go a long way toward demonstrating that the wages of the latter are relatively much more favorable than has often been realized in arbitration proceedings, apart from the natural differences in skill required which may properly account for a good share of the difference in hourly rates remaining after the factor steadiness is suitably weighed.

COIN HANDLING AND COUNTING Any advance in industrial work is certain to bring its new problems, and the prepayment car is not an exception to this rule. One of the new questions raised by its increasing use, although of comparatively minor importance, is that of the best method of handling the larger number of coins received. Where a railway passenger knows that he must pay his fare while entering a car he is more likely to have a small coin ready than when he could wait for change while in his seat. The result is that a very much larger proportion of the receipts on most roads is coming in coins of all denominations, but particularly the smaller denominations, than in the past. It is consequently more than ever the duty of the cash receiving department to seek economy in the handling of coins. As a rule, the banks require that the coins should be put in wrappers, and one company estimates that the cost of wrapping pennies, nickels and dimes, exclusive of the payment for wrappers, is $6 per $10,000 wrapped. In some cities the local retail merchants are willing to pay par for change in bags and sometimes they are even willing to pay a slight premium if it is wrapped in rolls. The most economical practice for handling coins for a railway of good size is to do the work of sorting and accounting by machinery and then put the coins into bags or other receptacles. All that remains is to tie up the bags and, if desired, to check the contents by weight. The receivers may continue to count by hand the receipts of the individual conductors, but it will be found that they will do so with greater accuracy because they are relieved of the distraction of wrapping the coins.

TOO MANY SEATS IN CARS? An interesting feature of modern car design is the almost frenzied effort which some builders are making to get seats into every nook and cranny. Once upon a time the designer of city cars believed that a longitudinal seat on each side was about the right thing. Then the increasing length of rides and higher acceleration gradually led to various combinations of cross seats and corner seats. Now we find seats on the front platform as a matter of course, while several companies have also placed benches on the devil-strip side of the rear platform. It has even been proposed to install a platform seat in front of the conductor's collection stand. Some center-entrance cars show a still more intensive use of seats. Thus in one case a seat actually is placed at the head of each cross-seat aisle directly in front of the circular seat at the end of the car. This evident desire to seat as many riders as possible is certainly praiseworthy but, after all, cars will have to be designed for easy passenger movement during rush hours until the millenial "seats for everybody" era. Operators do not always appreciate the fact that the real clearances in a car are not the aisle widths shown on the plans or by measurements when the car is empty but the width between the hips and shoulders of seated passengers. For example, when cross seats are only 34 in. wide, the 24-in. aisle of theory is only 18 in. or less in reality. The same fact, of course, applies to other kinds of seating. When the car passages are constricted it is natural that passengers should complain of discomfort and require more time to get off the car. Under the circumstances it would seem well to stick to a seating lay-out which allows for more flexible operation during hours of excessively heavy travel. It may even be found feasible to work out a scheme in which part of the seats could be folded to afford greater clearances when needed.

DEVELOPMENTS IN THE SKIP-STOP IDEA

One of the admirable features of American street railway service as compared with that in European cities is the higher schedule speed despite the fact that the American car has to make more stops per mile on account of the shorter spacing between stops and because of the greater passenger capacity per car. For this superiority, the willingness of American operators to adopt the best in motors, control and brakes is largely responsible. Still, the stop problem on our city lines is one that is growing more serious as the routes are extended and are becoming more densely peopled.

This situation has been brought about largely because of the theory that a car must stop for passengers at every street corner entirely independent of the distance between the cross streets, whether it is 200 ft. or 600 ft. This custom has been followed so long that not only the public but many railway managers themselves believe that it is not only logical but necessary. The absurdity of this contention is shown by the fact that in cities where the blocks are oblong in shape, as in New York, some cars may have to make twenty stops for passengers per mile whereas others are required to stop for passengers only eight or nine times per mile. In other words people do not complain in some cases where the stops are 600 or 700 ft. apart, whereas when there are short blocks they demand stops as often as 200 ft. apart. We might add that in Berlin, which also has a highly congested population, the stopping points for the surface cars average about 800 ft. apart, and the same situation prevails in other European cities.

So far the only practicable solution for this problem is the skip-stop plan in one of its various forms. We do not mean in any way to minimize the difficulties of educating the public so that such a plan may be installed but do wish to call attention again to the fact that railways in several cities have been successful in introducing this method, and one company, the Metropolitan Street Railway of Kansas City, has followed the plan for three years. In this case every other car stops at every other cross street so that while each car has to make only one-half the stops which it formerly did, a prospective passenger knows that every other car will stop at his station. The plan is followed only during the rush-hours so that the question of longer headways is of no importance because at that time the car spacing is short.

The saving in running time, a saving in which both public and company share, has been considerable. The economy in energy, brakeshoes and general maintenance due to the fewer accelerations and brakings is less tangible but must exist nevertheless. These results, which are based on three years' operation over two important lines, prove that it is worth while to try to educate the public to the value and real need of the skip-stop.

HANDLING SCRAP

A prominent consulting engineer recently said that when he inspected a railway system the first thing that he went to see was the scrap heap. It was a place where he could best judge the efficiency of the mechanical department, and even that of the accounting department and purchasing agent. The truth is that the term "scrap" is too often considered synonymous with "trash" or "refuse," but the electric railway manager who is seeking economy in all departments will find that it means a great deal more than that. Scrap really means anything from sound but obsolete and uneconomical equipment to broken odds and ends which find no place even in the best-regulated welding department. In view of the large quantities of scrap that may accumulate on a railway, it is astonishing that more managers do not recall their boyhood trips to the junkman. At any rate, the actual scrap should be sorted into the various grades of iron, steel, brass, etc., because the buyer will not give the best market prices when he is buying a "cat in a bag." Companies which have never tried the plan of scrap segregation do not realize the great difference which it makes in the returns for material sold.

But a careful examination of a good many scrap piles will often reveal some discarded apparatus that ought not to be there, because, with proper effort, it could be worked up for use again. For this reason it is desirable to follow a practice like that at Montreal where all returns come to one shop and where the master mechanic himself decides the fate of all material left by his assistants after the removal of renewable material. Companies that operate a brass foundry are, of course, untroubled by the question of worn-out wheels and the like because they find their way back to the home melting pot. It is always possible to find use for all sizes of round and rectangular bar iron or steel, and motors which have outlived their usefulness under cars can often be rewound and used for intermittent work in the shop.

The assembling of salable scrap is also an important one. Thus, the linemen should be urged to save all copper wire clippings with the idea of boxing and shipping them to a central point when enough have been accumulated. Section crews should also be instructed to collect all kinds of scrap metal at the different section tool houses, and, following a previous notice, a car should be run over the road several times a year to transport these small quantities of scrap to headquarters. It does not look like good business to see discarded wheels, bolts, tubing and other parts rusting along the right-of-way. Some roads go so far as to require the return of the scrapped part for every new part sent out of the storeroom, especially with brass castings. It follows that with such a rule in force slightly defective parts will not be renewed if it is possible to adjust them for further service, because the request for exchange will show that the workman is using poor judgment.

Very few electric roads have occasion to dispose of scrap rail except in very small quantities. The rails taken out of a trunk line are usually transferred to branches or sold as relay rails to other companies at a fair market price. If scrap rail in short lengths, or in condition not satisfactory for further service in the track, is assembled at a central point, the bridge and building department will find innumerable places where it can be used economically, as lintels in brick work, reinforcement or grillage in concrete work, etc. Careful assembling and sorting of scrap offer a double value in that it not only brings a saving in operation but also instils the idea of economy in the minds of those who need it most.

PROPOSED ADOPTION OF THE NEAR-SIDE STOP IN NEW YORK

The revival of the near-side stop agitation in New York City has been opposed during the past week by several of the daily papers, notwithstanding the referendum vote on the Brooklyn Rapid Transit System in which 181,000 passengers were in favor and only 17,000 against the plan. Just why there should be opposition on the part of the press or of anybody to this perfectly rational method of operation is not altogether clear. The principal arguments so far brought against it are that it was once tried and given up on Manhattan Island, and that during a few days in the winter it would be more difficult for passengers under the new plan to reach the rear platform. The latter argument to be valid would require the admission that the streets of New York are kept less clean than those of the many smaller cities where the near-side stop has been successfully introduced.

It would be interesting to know whether any of those who are opposing the near-side stop have considered its advantages in the way of safety and of saving time. As regards the latter, it is certain that even under the best conditions, the retardation of braking plus the acceleration after a stop is made require nine seconds in time and that every stop itself takes about six seconds more. If so, it is easy to see that every time a car made two stops at a cross street, one on the near side on account of traffic and one on the far side to let passengers on and off, there is a loss of fifteen seconds. It is hardly likely that such double stops occur at intervals less frequent than eight per mile under average circumstances, and if that assumption is accepted the minimum loss of time amounts to two minutes per mile. This may not be worthy of consideration by the passengers, although their time ought to be of some value. But to the railway companies such an addition to the running time of their cars, amounting to an average of possibly 15 per cent, is of serious concern, and the fact that it is entirely unnecessary does not decrease its importance to any appreciable extent.

With center-entrance cars the point made in regard to greater ease of access to the car with the far-side stop disappears. With this type of car the distance from the cross-walk to the entrance is the same with either kind of stop, provided the car just clears the cross streets in both cases.

EFFICIENCY IN THE MECHANICAL DEPARTMENT

In this issue we devote a considerable amount of space to the maintenance records of the New York Railways and to a description of the way in which these records are used in the mechanical department to increase the general efficiency. The method of use is of more general interest than the actual figures because the latter will necessarily vary with the equipment used, the facilities for repair, the wages paid and other local conditions. With a modern equipment throughout of motors, trucks, etc., Mr. Doyle could undoubtedly greatly reduce the cost of maintenance on the New York Railways, but it is difficult to imagine any better way of "keeping up the punch" among those responsible for the actual maintenance of equipment than that employed by him.

As on other city roads, but perhaps to a more marked degree than on any other, the reliability of the service and of the equipment is a very essential matter on the New York Railways. The profit lies in the short haul business. If a car ride of four or five blocks will save a few minutes to the busy man of business, he will be perfectly willing to pay a nickel to save this time. But if the car is not there when he wants it, or if the cars on a busy avenue are stopped because of a breakdown on one of the cars, the company's treasury suffers. Under conditions like these there is undoubtedly a very close relation between the number of run-ins and the net receipts, and the latter will increase as the number of run-ins is reduced.

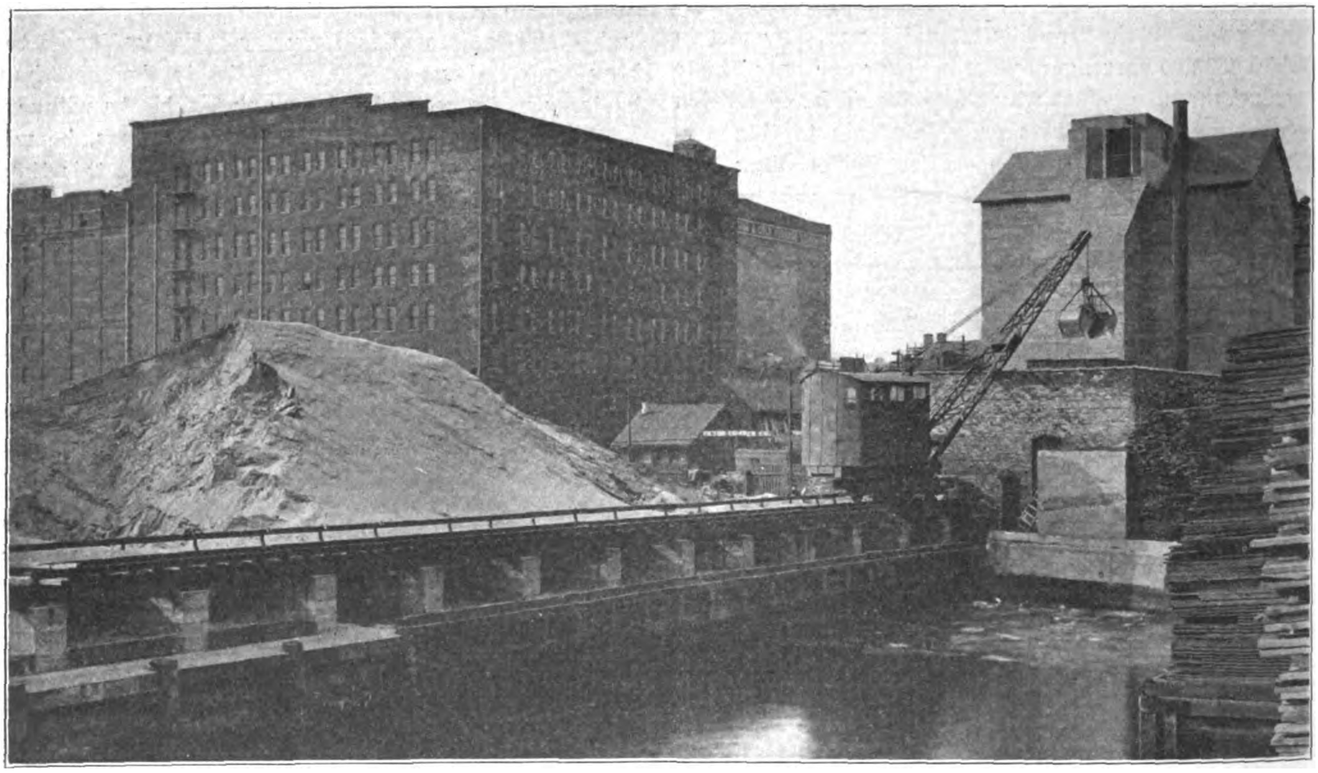
This problem is solved in the mechanical department of the New York Railways by definitely locating the responsibility in the case of failure so promptly that the cause is analyzed and the remedy applied before there can be many, or any, repetitions of the trouble. The keynote of the system is publicity of the records. The foreman of each department not only knows about the defects in the cars and equipment for which he is responsible, but he knows that every other foreman knows about them. This makes him diagnose each trouble as it arises and be prepared at the weekly meetings to explain the remedy which he has applied in his effort to keep the defects down to a minimum. Inevitably the result is a "snap" and a "go" which is reflected clearly in the performance, as the published records show.

The system is one which is not applicable only to large properties. Smaller companies can follow the same plan in perhaps a less elaborate way. If an unusual trouble develops they are not compelled to search for a solution on their own properties. The files of the technical press contain accounts of all kinds of troubles and of the ways in which other companies have solved them. For this reason the weekly meetings or the monthly meetings of the heads of departments need not be confined to a discussion of the troubles directly connected with the property and the remedies found for them, but the experience of other companies, so far as it has been published, can be utilized even on the smallest roads.

Sand-Handling by the Philadelphia Rapid Transit Company

Details of the Very Elaborate Plant for Receiving, Drying, Storing and Distributing Sand Recently Completed by This Company Are Given—Of Special Interest Is the 15-Yd. Tank Car Which Discharges Sand by Means of Compressed Air

The term "sand-handling," in the above caption, is really a misnomer, as the whole purpose of the equipment of the Philadelphia Rapid Transit for receiving, drying, storing and distributing sand is to obviate handling, machinery being utilized to the maximum extent. This company has treated the sand problem as one worthy of the same kind of study given to power houses, rolling stock, track and electrical distribution, and, as a result, dry sand is delivered to the cars at a very low cost in spite of the considerable investment in machinery.



Philadelphia Rapid Transit Company—General View of Sand-Drying and Storage Equipment

GENERAL LAY-OUT OF THE PLANT

The plant consists of a pier on the Delaware River at Beach and Green Streets, near the Beach Street power house, with large space for sand and other storage; a reinforced concrete drying, storing and loading house adjacent to the pier; two large-capacity sand cars of special design, and receiving, storing, distributing and delivering apparatus in the carhouses.

In brief, the route of the sand from barge to rails is this. It is picked up from the barges by a clam-shell bucket operated from a derrick car which travels on a track on one side of the pier. The bucket delivers it in a large, shallow concrete storage which parallels the track. From the storage pile the same crane car delivers it to a hopper in the drier-room roof, from which it falls into cylindrical drier. From the drier it is raised by a bucket elevator to the top of a tower and falls, through rotary screens, into an elevated concrete bin, from which it is delivered by gravity to the cars below.

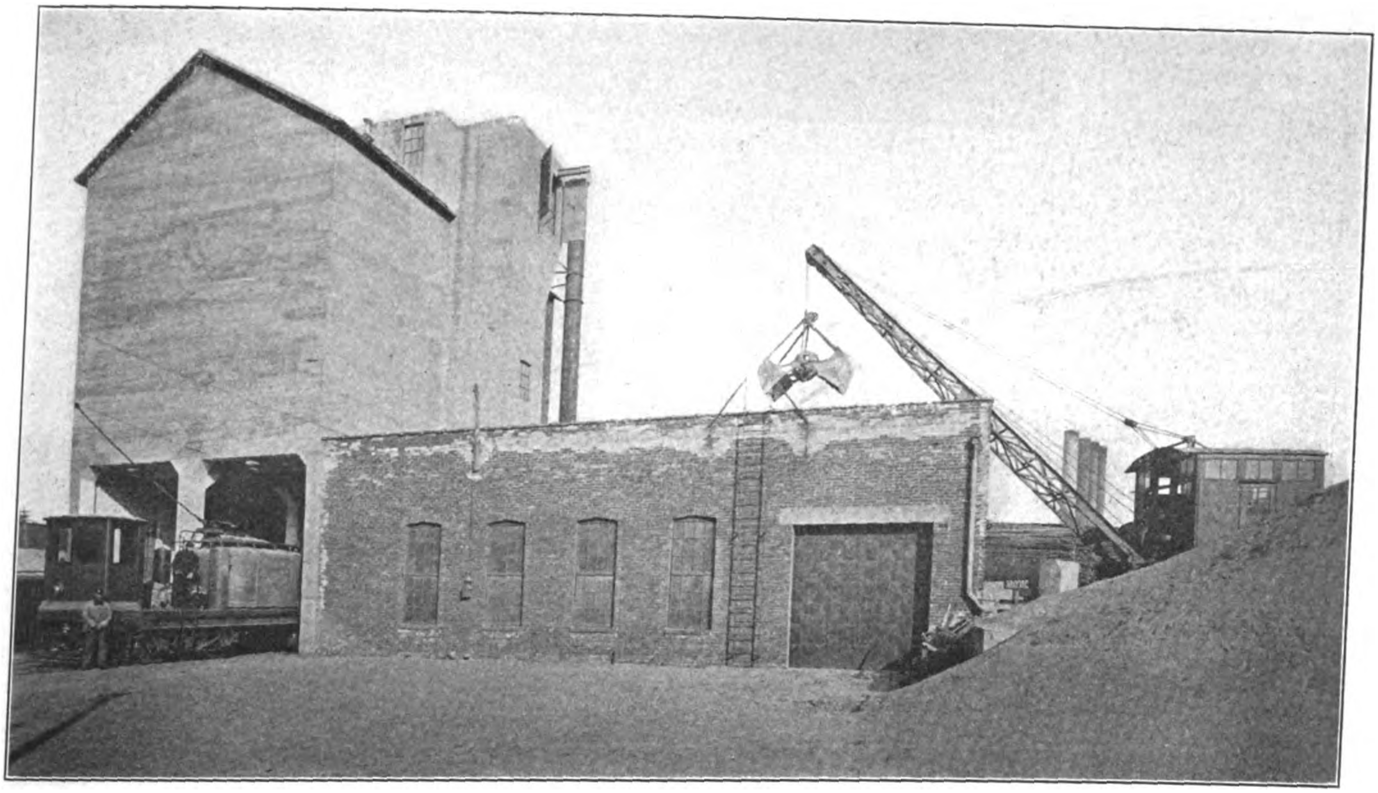
The sand cars, two in number, carry steel tanks and air compressors for putting the sand in the tanks under pressure. The tanks may be emptied, through spouts below, into receiving hoppers such as are provided in the floors of some carhouses, or the sand may be discharged through hose connections to elevated storage bins.

In the most recently constructed carhouses the sand is received in these floor hoppers, hoisted by means of bucket elevators, distributed by belt conveyors to bins located over the carhouse bays, and finally discharged at convenient points in the bays through spouts and valves to the sand pails.

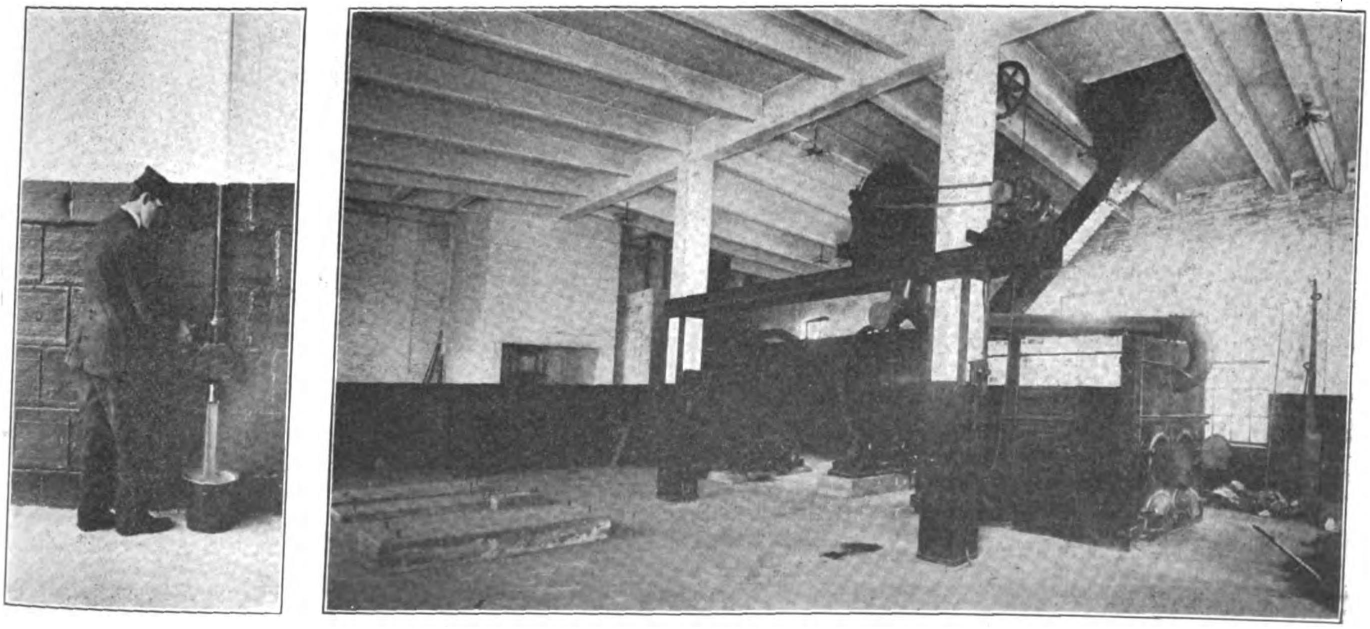
THE PIER AND RECEIVING PLANT

Pier No. 34, at the land end of which the sand-drying plant is situated, is about 600 ft. by 120 ft. in size. It contains, besides the sand-storage bin, spaces for storage of gravel, paving blocks, ties, lumber, stone and conduit. There is a crane runway on the three water sides of the pier, and railway trackage is provided to all parts. The 2000-yd. sand bin is roughly a thick, concrete, reinforced floor, covered with 6-in. planking. The floor is divided into three sections each of which slopes toward a drain in its own center. A reinforced concrete wall, or curb, rises 4½ ft. above the floor and surrounds it on all sides.

The crane runway is carried upon yellow pine stringers which rest upon the outer wall of the bin and upon concrete piers spaced about 10 ft. apart. The runway is a substantial track of the local standard-gage, 5-ft. 2¼-in., with oak ties. A protected third-rail supplies current to the car, which is of a standard type manufactured by the Link Belt Engineering Company. The car is operated by the same man who attends to the drier house. Owing to the location of the house with respect to the sand pile very little time is required to transfer a large quantity of sand from pile to drier.



Philadelphia Rapid Transit Company—Sand Drier House and Storage and Loading House



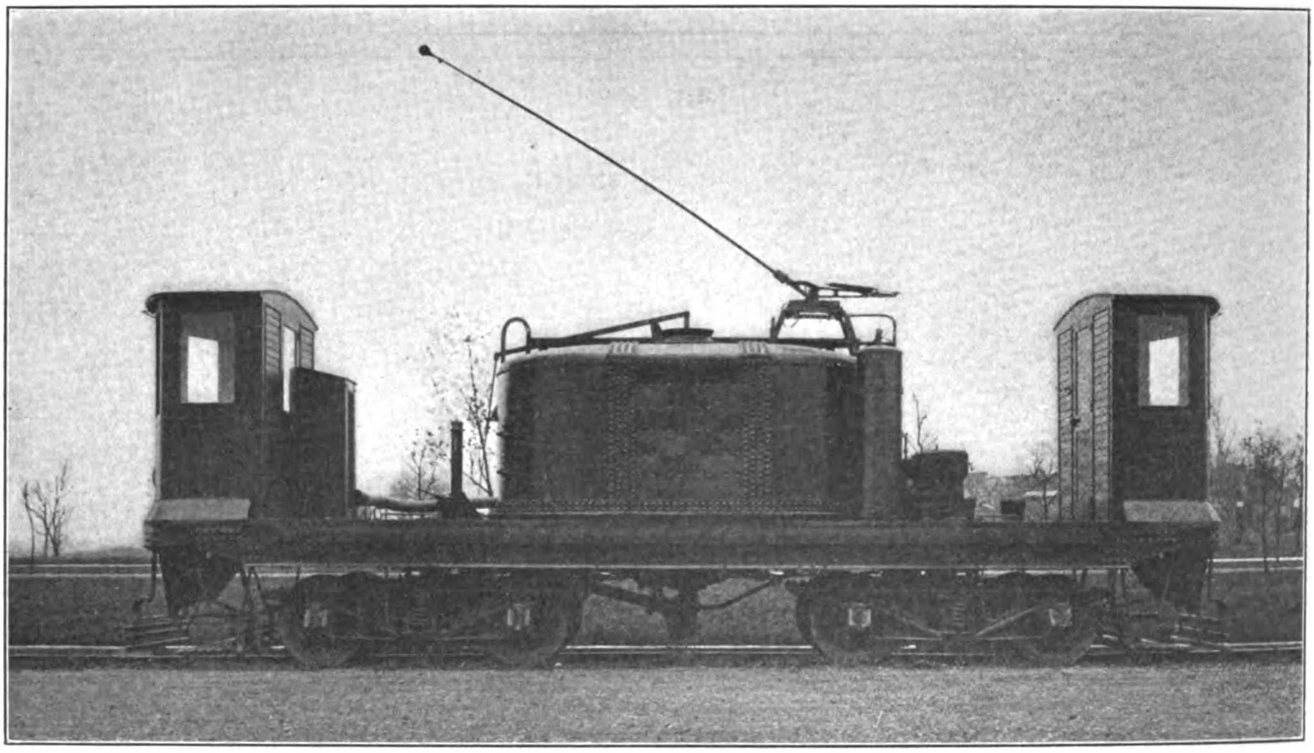
Philadelphia Rapid Transit Company—Sand Valve in Action—View in Sand Drier House

THE DRIER, STORAGE AND LOADING HOUSE

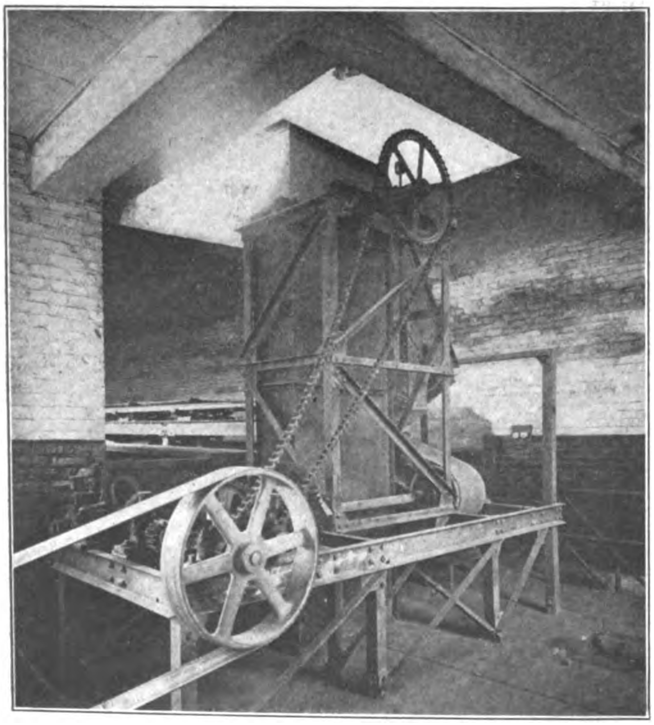
The sand is dried and stored in a large building consisting of two sections, a one-story brick structure to house one present and one prospective drier and a high reinforced concrete structure for the storage bin and auxiliaries.

The drier now in use is of the direct-fire type, constructed by the Coatesville Boiler Works, and is standard except that it discharges at the rear instead of at the front as the manufacturer prefers to have it. It consists of a slightly inclined steel shell approximately 5 ft. x 25 ft. in dimensions, having a number of longitudinal ribs projecting inward. The shell is supported and rotated on two steel tires connected to it by spring steel pieces which allow for expansion and contraction. The tires rotate on rollers and the whole shell is electrically driven. The drive comprises a back-geared 15-hp, 575-volt, 525-r.p.m. Electro-Dynamic motor belted to a countershaft carrying a gear meshing with a large gear surrounding the drier shell. The speed reduction in the drive is about 90 to 1.

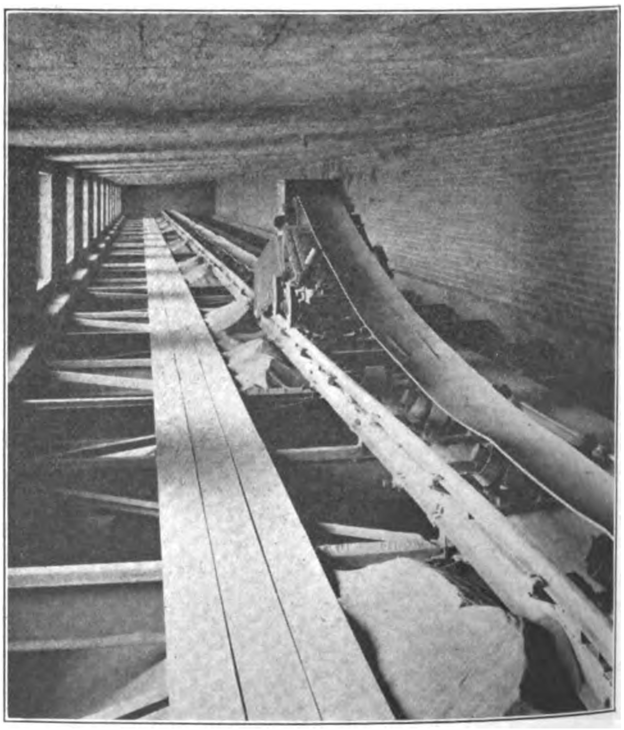
The drier shell conducts the hot gases from a furnace to a receiving chamber at the rear, bringing the sand into intimate contact with them. The furnace is furnished with forced draft from a 5-hp motor-driven Sturtevant blower, with a No. 35 planing-mill exhauster, which has sufficient capacity for two driers. This blower supplies air to the ash pit through a blast gate and to the space above the fire also, where it mixes with the products of combustion, reducing their temperature and increasing the volume of gas. Sand is fed into the end of the shell, above the furnace, from a spout leading from the hopper in the roof. The feed is automatically controlled by an endless apron driven by a More & White cone speed change. This apron speed is changed to conform to the amount of



Philadelphia Rapid Transit Company—Sand Car with Capacity of 15 Cu. Yd.

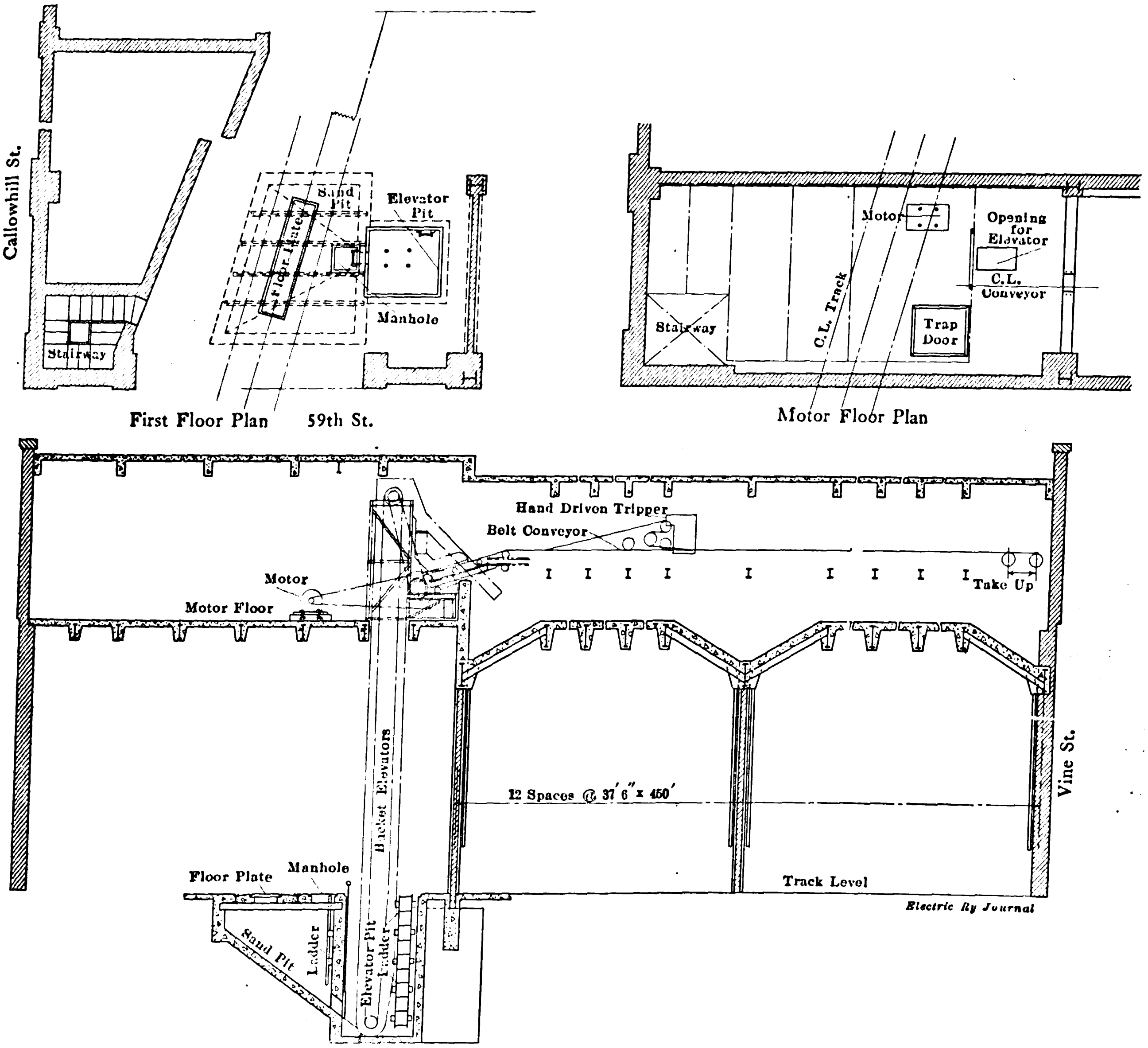


Philadelphia Rapid Transit Company—Sand Elevator in Carhouse



Philadelphia Rapid Transit Company—Belt Conveyor Distributing Sand in Carhouse moisture in the sand to be dried. At the rear of the drier is a brick chamber from the top of which a stack leads above the roof and which furnishes a small storage space. A spout from the bottom of this leads to the hopper of a bucket elevator mounted in an offset from the concrete bin structure. The future drier will also discharge into this elevator.

The bucket elevator raises the sand to a height of about 50 ft., discharging into an inclined screen which separates the fine sand and the gravel. This screen makes about 20 r.p.m. The screen is placed just under the roof of a substantial reinforced concrete bin of about 900 cu. yd. capacity, the storage space being approximately 30 ft. x 40 ft. x 20 ft. A small gravel bin is placed at one side of the main bin. To prevent the heaping of sand in the center of the bin two continuously rotating screw conveyors are placed just under the screen and are driven at about 100 r.p.m. A single motor of 10-hp capacity supplies power for elevator, screen and conveyors.


Callowhill St.
Sand Pit
Elevator Pit
Floor Plate
Manhole
Stairway
First Floor Plan
59th St.
Motor
Opening for Elevator
C.L. Conveyor
C.L. Track
Stairway
Trap Door
Motor Floor Plan
Hand Driven Tripper
Belt Conveyor
Take Up
Motor
Motor Floor
Bucket Elevators
Vine St.
12 Spaces @ 37' 6" x 450'
Floor Plate
Manhole
Sand Pit
Ladder
Elevator Pit
Ladder
Track Level
Electric Ry Journal

Philadelphia Rapid Transit Company—Sand-Handling Apparatus in the Callowhill Street Carhouse

The sides of the large bin are braced by vertical reinforced concrete beams, this being necessary because the dry sand exerts practically the same horizontal pressure as it would if it were a fluid. The method of placing the reinforcing rods is similar to that used in horizontal beams. The bin contains two spouts in the floor through which the sand flows into cars below. The space under the bins forms a neat room for filling and storing the two sand cars which form the present equipment.

THE SAND CARS

The most novel feature of the whole installation is the type of car which has been developed for transporting the sand to the carhouses and filling the bins or hoppers. It was necessary to provide for a variety of carhouses. In some floor hoppers are placed between the tracks, in others the storage bins are elevated. The device finally decided upon is a steel tank car as illustrated in the accompanying engraving. It consists of a steel underframe supporting an air-tight steel tank with a capacity of 15 yd. Cabs on the ends house the control apparatus. The body is mounted on Brill 50-E2 trucks with 16 ft. between bolster centers, and its length over all is 34 ft. The motors are of the GE-210 type.

The tank is furnished with a spout in the bottom, from which sand is delivered to floor hoppers by gravity, and with a bottom connection for a 4-in. hose, through which the sand is forced by air pressure. To provide the latter a motor-driven compressor and storage tank are used.

It is interesting to note that the full load of the sand car can be discharged by gravity through the bottom spout in seven minutes, including the time required to get the car into the carhouse and out again. Recent tests show that it can be emptied in twelve minutes through a 4-in. hose, 40 ft. long, when the hose is vertical and the air pressure about 40 lb. per square inch. The sand will not flow in a horizontal hose unless it is started by means of a blast, as if the flow is stopped in a horizontal, filled hose, the sand binds and refuses to start again.

The two cars now in use have ample capacity for the entire system and provide some reserve for emergency, the storage capacity of the carhouse bins being sufficient in most cases for some weeks' supply.

THE RECEIVING AND DISTRIBUTING APPARATUS

In the older carhouses only the usual slightly elevated bins are provided for storage, and these, as explained, are filled through the hose connection by the sand car. In the most recent two houses, Luzerne and Callowhill Streets, elaborate elevators, conveyors and bins are used, that at the Callowhill Street house being shown diagrammatically in the drawing reproduced herewith. Briefly, the equipment is as follows: Projecting above the roof of the main building on the Fifty-ninth Street side is a long narrow story which is divided into a number of bins corresponding to the bays below. In this story runs a Robins belt conveyor with a hand-operated tripper. At one end of the conveyor is a bucket elevator fed from a track hopper. All of the machinery is driven by a 5½-hp motor installed as shown.

The photographs show the relations of the several parts of the equipment, one being a view across the row of bins and another one of the upper part of the elevator casing and the gearing for driving the conveyor and elevator.

At the bottom of each bin is a pair of hoppers, one on each side of each partition wall separating the bays. A 2-in. pipe leads from the bottom of each hopper to a weighted sand valve at a height above the floor convenient for filling the sand pails. It will be noted that these outlets are near the entrance to the carhouse so that pails can be filled with minimum effort on the part of the motormen.

MR. INSULL DISCUSSES THE CENTRALIZATION OF POWER SUPPLY

At the weekly meeting of the finance forum of the West Side Y. M. C. A., New York, held Monday evening, April 20, Samuel Insull, president Commonwealth Edison Company, Chicago, Ill., discussed the "Centralization of Power Supply." C. A. Coffin, chairman Board of Directors, General Electric Company, presided at the meeting.

In his address Mr. Insull said that the centralization of power supply was essentially a monopoly on purely economic grounds for it conserved capital, labor and the prime sources of power with the best possible results to the user and producer. He stated that the day would come when the great public utility commissions of the nation would question the waste of capital, labor and effort which went with the separate production of energy for separate classes of users. Mr. Insull believed firmly that power generation and distribution should be a monopoly, but also that it should be regulated by the State. If the companies would not run their business with the public on a square basis, the commissions were there to protect the people. On the other hand, the same commissions should protect the investors against unreasonable demands from consumers or communities. In his experience the commissions had proved of great benefit to the industry as a whole.

Mr. Insull discussed at length and in a very interesting way the different classes of customers supplied by the Commonwealth Edison Company and the effect of a diversity factor on the cost of energy production. He explained that in order to obtain a scientific basis for rate making his company had taken watt-meter tape readings at half-hour intervals to find the diversity factor on the circuits of eighty-two industrial customers. Individually each customer showed great variations in demand, but these fluctuations were far less when integrated at the station busbars.

In the Chicago district, centralization has been brought to such an efficient standard that the charges for service compare very favorably with the much-vaunted cheapness of hydroelectric rates. From other curves showing the relative growth of investment and output, it appeared that the Commonwealth Edison Company had increased its business from a sale of 60,000,000 kw-hr. in 1903 to 840,000,000 kw-hr. in 1913. Another proof of the efficiency of centralized supply and of the technical improvements made in recent years was the reduction in the amount of coal required per kw-hr. from 6.93 lb. in 1902 to 2.87 lb. in 1913, with the possibility of another 30 to 35 per cent reduction. The income per dollar invested had increased despite lower rates to the consumer, for while the operating costs had increased, the depreciation and interest charges had decreased in still larger measure on account of better load factors, etc. Mr. Insull referred only incidentally to his company's contracts for railway power supply in Chicago but observed that this business amounted now to 500,000,000 kw-hr. a year.

Mr. Insull also showed a load map for the State of Illinois exclusive of Cook County (Chicago and vicinity). On this map he indicated the large number of towns which still had isolated plants without twenty-four-hour service and also of territory which had no electric service at all. His company is building large power stations and transmission systems in various parts of the State with the idea of giving a twenty-four-hour service everywhere. A beginning is being made in the northeastern part of the State. One of the first consequences of more reliable and continuous power supply has been the settling of manufacturers in small towns and the wider adoption of electrical machinery by the farmer. The charge for energy to these country consumers compares very favorably to that charged in cities of the second and third class. On the whole, group utility management had proved a great success, and the enormous field which still remained for development in one state alone was clear from the fact that less than 45 per cent of the population of Illinois gets electric service to-day.

Steps have been taken by the Metropolitan Street Railway, of Kansas City, to prevent newsboys and others from hanging on the back of cars with or without paying fares by the simple expedient of removing all equipment formerly used as a foothold by such violators of the company's rules, or, in some cases, by merely altering it. The drawbar which has extended underneath the car at the back has always been a friend of the impecunious or miserly passenger. The mechanical department of the Metropolitan has placed the drawbar on a pivot, and it is now swung far around and underneath the car, where it is hung on a hook when not in use. The rear bumper, the only other support available for rear-platform passengers, has been covered with a concave, cast-iron plate, effectively preventing anyone from riding without paying a fare, and incidentally reducing the number of accidents on the road.

Statistics on the New York Railways

The Operation of the Rolling Stock of This System Is Followed Up by Comprehensive Records and Charts, by Which Those Responsible for the Condition of the Equipment Are Kept Informed as to the Results of Their Work

The New York Railways have developed an effective system of compiling and utilizing statistics of car defects which has proved most helpful in reducing road delays and run-ins. These statistics are generally prepared in the form of curves which are sent each month to all heads of departments and serve as a basis for discussion at all staff meetings. At the staff meetings, which are held at frequent intervals in the office of the superintendent of equipment, J. S. Doyle, the various foremen come prepared to analyze the curves, and if any foreman is unable to explain the causes for results for which he is responsible some other foreman is usually able to do so. In fact, by this system of watching apparatus and diagnosing causes for failures it has become possible to operate the old equipment on the system in a most satisfactory manner.

The most important result that has been effected by this plan is found in a reduction of 75 per cent in the number of "run-ins." Much of the traffic in New York is of the "short-ride" variety, and obviously, where delays occur from failures of equipment the direct loss in fares is heavy because short-riders will not wait for cars. With approximately 1300 cars on the system, each averaging 2000 miles per month, the "run-ins" have been reduced in two years from 1300 per month to about 300 per month.

To attain this result, even such an apparently small item as broken bell cords has been subjected to close analysis with the result that they have been almost eliminated. In the same way controller fingers have been given special attention, and in order to avoid the flash-overs and controller troubles which were found to be characteristic of a lot of old No. 1000 motors on open cars, the line voltage is reduced during the summer from 585 to 550.

GENERAL MAINTENANCE COSTS

The curve shown in Fig. 1 gives the total cost per car mile for the maintenance of equipment in accordance with the uniform system of accounts of the Public Service Commission of New York, First District. This includes the cost of all repairs made in shops and carhouses but does not include inspection, car cleaning, lubrication or replacements of carbon brushes, lamps, etc. The average car to which the costs apply is a 40-ft. city car, weighing 30,000 lb. This curve is based on the monthly figures for the past two years, but another is shown in Fig. 2 which gives the annual cost per car mile and extends over a considerable period of years. In the latter curve, the high cost shown in 1908 was due to the fact that every car on the system received an overhauling within the twelve months, this being the first year of the receivership of the old Metropolitan Street Railway. The average car in 1908 was, of course, considerably smaller than that of the past year, 128 large pay-as-you-enter cars having been purchased since 1908, and 273 long closed cars have been converted to the pay-as-you-enter type.

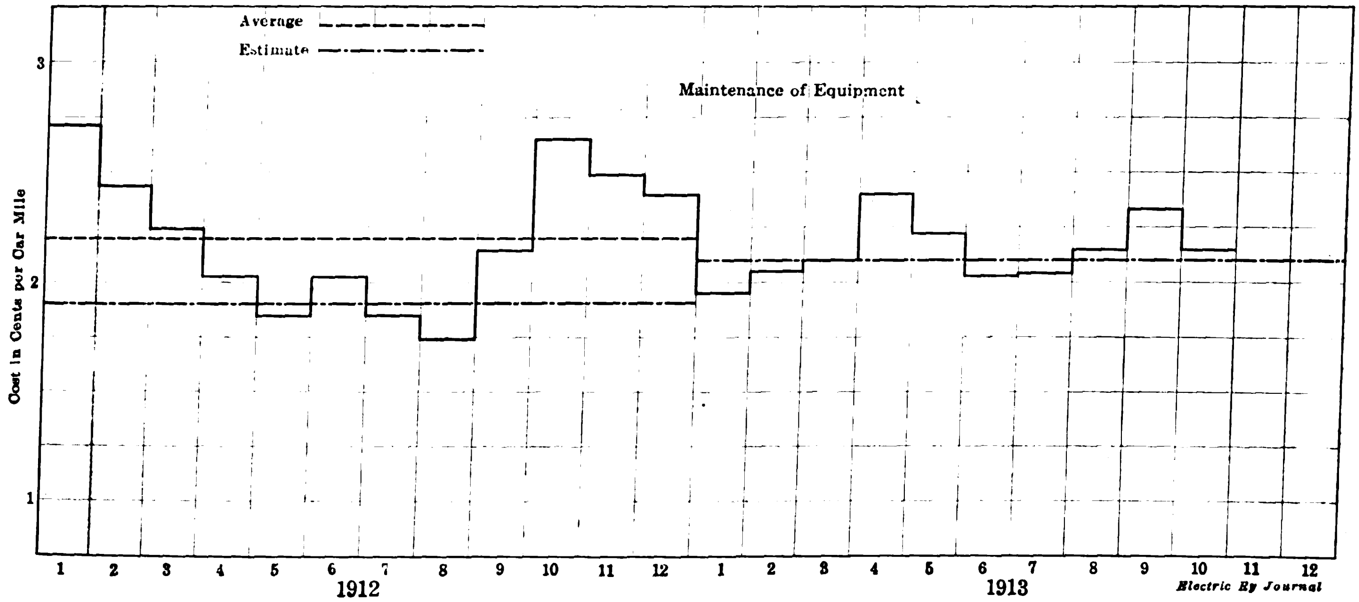


Fig. 1—Cost of Maintenance of Car Equipment Exclusive of Car Cleaning, Inspection, Lubricant and Minor Replacements, New York Railways

The curve reproduced in Fig. 3 shows the labor costs in the carhouse on a basis of 1000 ton-mile units. Another curve, which is not reproduced, shows that the material costs for the carhouse work run close to an average of 15 cents per 1000 ton miles. The carhouse labor and material costs do not cover the cost of overhauling in the shops but do include all work done at carhouses, such as running repairs, car cleaning, inspection and small replacements, so that they overlap to some extent on the maintenance-of-equipment costs already given. Fig. 4, covering carhouse labor, shows a comparison of the costs obtained at different carhouses on the lines of the New York Railways. These comparisons of costs at different carhouses are made in a number of cases, although only this curve and one other are reproduced in this article, serving merely as examples. By this means, the different carhouse foremen are shown clearly where they stand, and they are stimulated by the competition to keep their costs at proper figures.

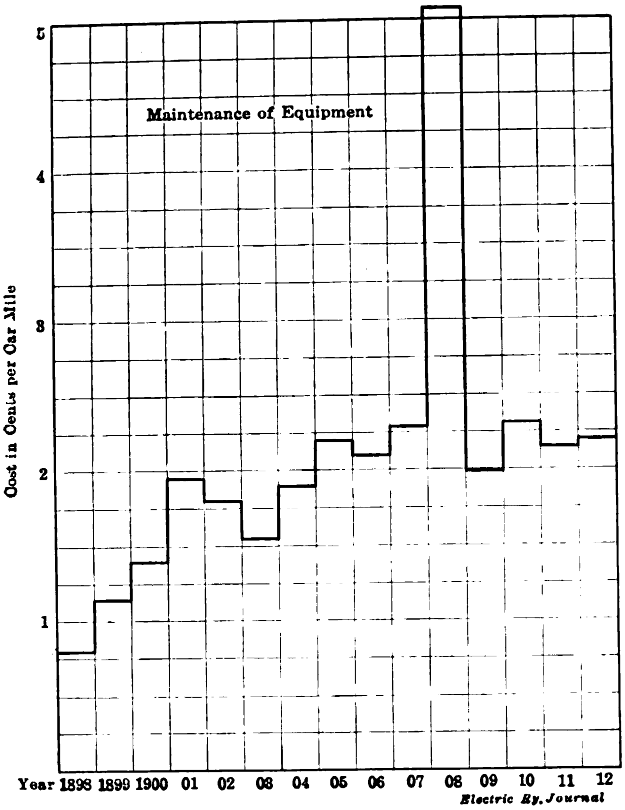


Fig. 2—Average Annual Cost of Maintenance

The shop organization, it should be said, is divided into electrical, mechanical, carpenter and paint departments. There are three shops, respectively called the Sixth Avenue Shop, the Lexington Avenue Shop and the Lenox Avenue Shop. The major portion of the machine, electrical and carpenter work is done at the Sixth Avenue Shop, the painting and some carpenter work at the Lexington Avenue Shop and the armature work and some machine shop work at the Lenox Avenue Shop. There are eleven carhouses, divided into six inspection districts, all of which comprise a department entirely separate from the shops where general overhauling is done.

MISCELLANEOUS COSTS

Fig. 5, covering the cost of material for lubrication, is self-explanatory, and another similar curve, not reproduced, is kept up by the statistical department to show the cost of brakeshoe material. The latter averages about 4.5 cents per 1000 ton miles. Wheel and axle cost was $1.50 per 1000 car miles in 1912 and about 90 cents in 1913. The principal cause of this large difference is due to the fact that a large number of the original installation of rolled steel wheels required their first renewal in 1912.

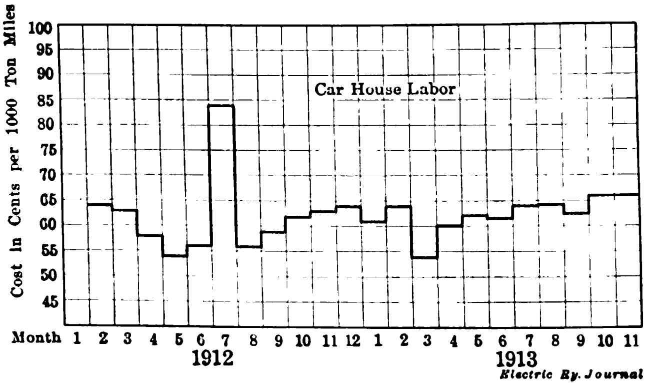


Fig. 3—Labor Costs in Carhouses for All Purposes

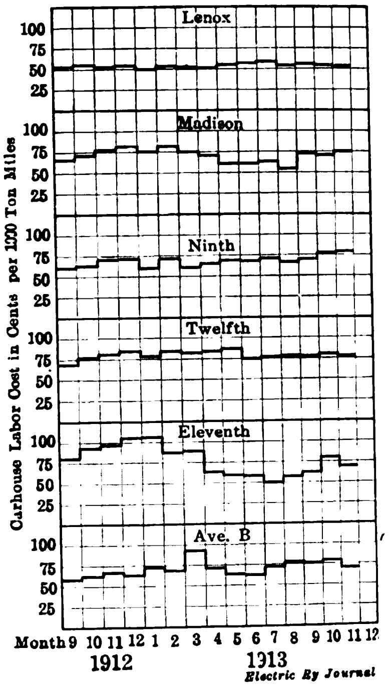


Fig. 4—Comparative Cost of Carhouse Labor

Other curves not reproduced here owing to lack of space, cover sand-drying cost at carhouses, which ranges between 50 cents per 1000 car miles in winter and 20 cents per 1000 car miles in summer owing to the greater use of sand in cold weather; also the cost of labor and material for replacing glass. The summer cost of glass replacement, exclusive of that installed at the repair shops, amounts to about 15 cents per 1000 car miles, but in March this rises to about 60 cents per 1000 car miles and in December to about 45 cents per 1000 car miles on account of the changeable weather, which requires the windows to be opened and closed more frequently, thus causing more glass to be broken. Still another curve shows the cost of labor and material for replacing incandescent lamps for lighting, this cost amounting to about 15 cents per 1000 car miles.

In the curve, reproduced in Fig. 6, showing cost of car cleaning labor, the increase indicated in the early part of 1913 is due to the fact that the management decided that the cars should be kept at the highest possible degree of cleanliness.

Still other curves, which are not reproduced, show that the wheel-guard cost averaged 40 cents per 1000 car miles in 1912 and rose to about 55 cents per 1000 car miles in 1913. This is one of the few items which has shown an increase and is due to the large amount of subway construction and street repair work now going on in New York. Other curves, not reproduced, show the labor and material costs of general repairs, subdivided between the electrical, mechanical, carpenter and paint departments. There have also been prepared a number of curves which compare the efficiency of different types of apparatus on both a cost and a failure basis.

DEFECTS CHARGEABLE TO EQUIPMENT

Grouped under the general heading of delays and defects are a number of curves among which the one reproduced in Fig. 7 shows the number of cars removed from service on account of defects chargeable to the

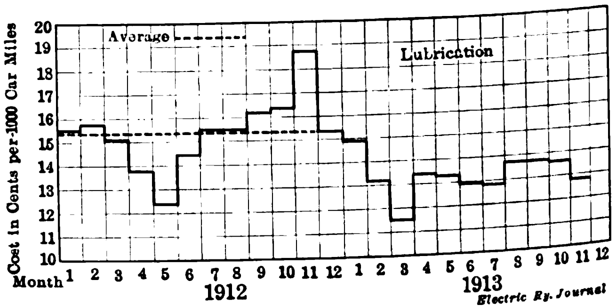


Fig. 5—Cost of Lubrication—Material Only

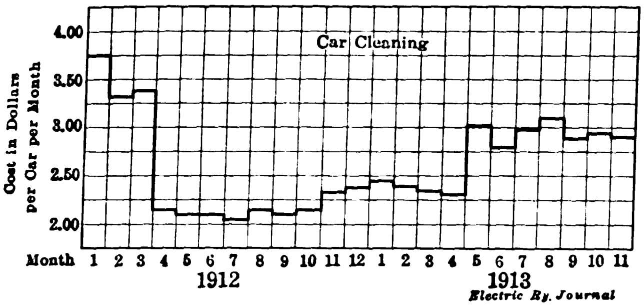


Fig. 6—Cost of Car Cleaning—Labor Only

car equipment department and indicates the effect of the attention which has been devoted to the reduction of car failures. Fig. 8 shows the cars removed from service as chargeable to each one of the different carhouses and is another example of the competitive system. It also shows the various carhouse foremen the results of their work in comparison with those of other carhouses. These curves, it should be said, include only cars which are taken off the road on account of actual defects chargeable to the car equipment department and do not include cars on which defective equipment is reported but not found, and cars which have been removed from service for examination after accidents, collisions, etc.

The curves showing the records of defects as reported by the transportation department and found to be properly charged to the car equipment department are made up from what are called "door-sheets," each motorman reporting the condition of his car at the end of his run on a sheet at the door of the carhouse for this purpose. These are supplemented by a "defective car report" made by the carhouse foreman each day. Motormen are not allowed to turn in cars on their own initiative, but have to obtain what are called "run-in slips" from a transportation department inspector on the road, who examines the defect as reported by the motorman.

DEFECTS REPORTED IN SERVICE

The curve of Fig. 9, showing the number of car-body defects reported, includes the figures for defective bodies, register, signal circuits, signs, gongs and sand boxes, defects in any of these items being listed under this head and showing in the curve. Reports of wet sand by the transportation department are shown by Fig. 10, the remarkable decrease which appeared during the fall of 1913 being due to the fact that through the experience of the previous year the sand boxes were inspected and tested nightly in order to insure operation. The curve of Fig. 11, covering broken door chains reported by the transportation department, is another case where trouble was practically eliminated by special attention to the cause. In this case the design of the door and operating mechanism was improved, and the inspection of the door and its slide was made very much more thorough.

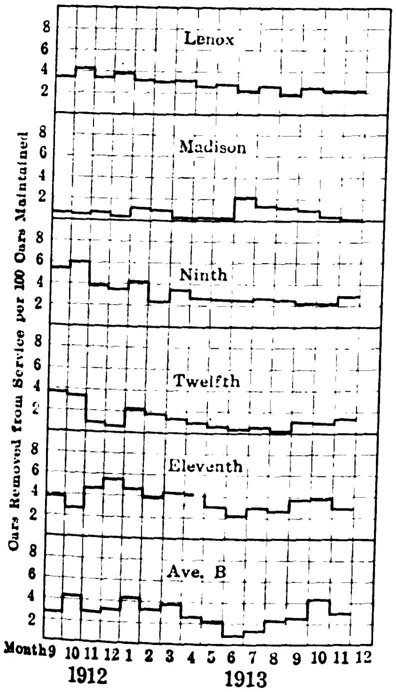


Fig. 8—Comparison of Pull-Ins Charged to Various Carhouses

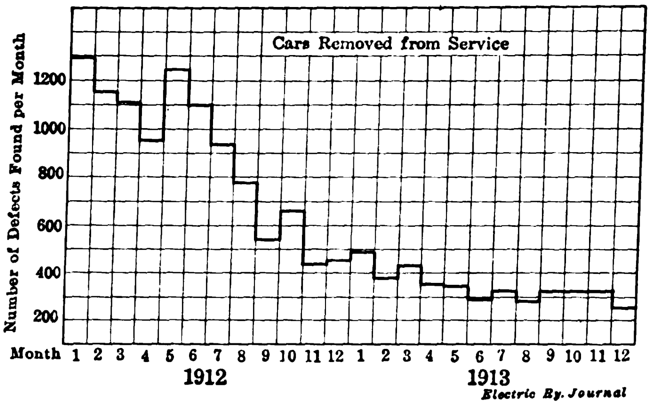


Fig. 7—Cars Removed from Service on Account of Defects Chargeable to Car Equipment Department

On the curve of Fig. 12, showing register clocks reported defective by the transportation department, the figures do not apply to the operating levers but to the works behind the face of the register. By means of a redesigned spring a reduction in the number of defective mechanisms was effected as shown. With reference to the curve of Fig. 13, showing breakage of signal bell cords, it should be said that the old method of handling bell cords was to wait until the cord broke before applying a new one, but owing to the large number of cars reported on this account the equipment department began to give the matter special attention. The cords were examined very closely when the cars were brought in for inspection at the regular 700-mile

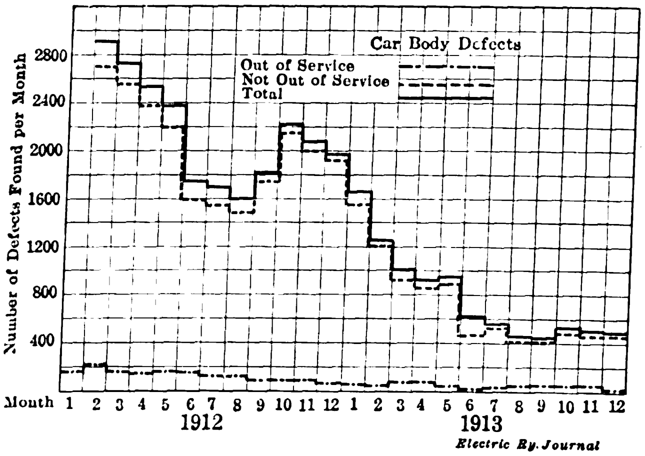


Fig. 9—Defective Car Bodies Reported

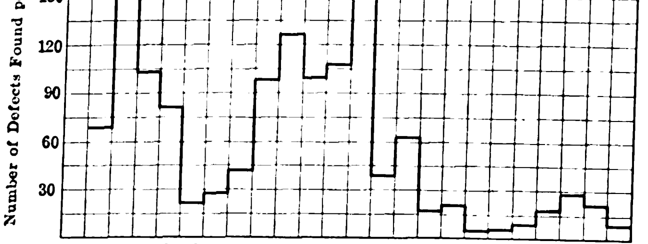


Fig. 10—Cars with Wet Sand Reported

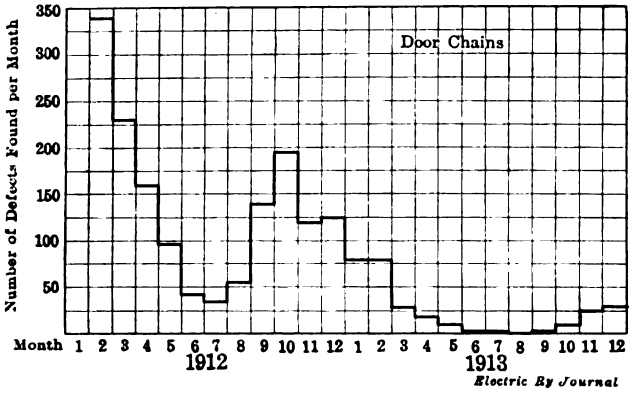


Fig. 11—Defective Door Operating Chains Reported

intervals, and they were removed before the failure took place. In addition, a change was made in the design and location of the bushing in the hole in the bulkhead where the cord passed through. This eliminated much of the fraying and eventual breakage of cords. With regard to Fig. 14, showing the number of broken gong hammers reported by the transportation department, it should be said that steel hammers were installed in place of cast-iron ones, and as these came into use the number of failures from this cause rapidly decreased.

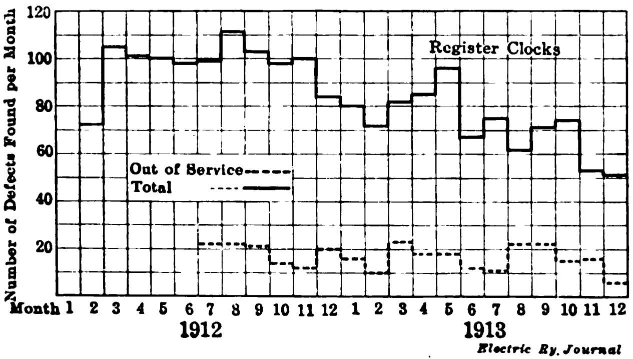


Fig. 12—Defective Registers Reported

In the curve of Fig. 15, showing the total number of truck defects reported chargeable to the car equipment department, the figures include defects of trucks, journals, wheels, axles and wheel guards. The reduction shown by this curve was effected by more thorough overhauling when the cars were in the shop and by more thorough inspection in the carhouses. The same decrease was secured in brake defects, as the inspection was made more complete, brake guides were installed, and, in addition, 640 cars were equipped with air brakes.

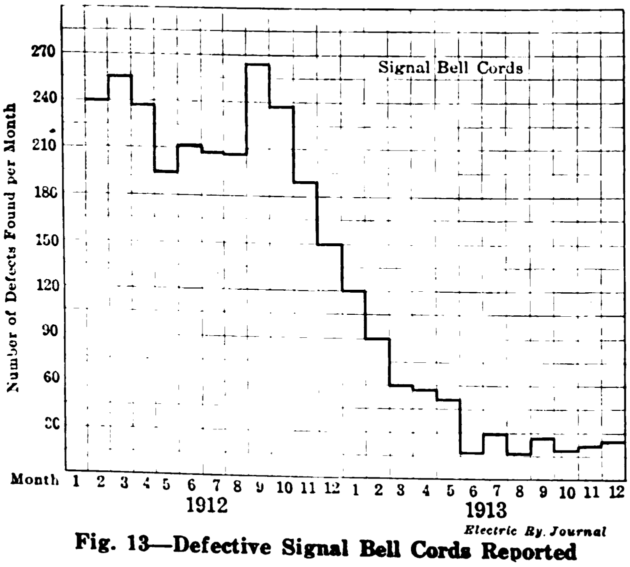


Fig. 13—Defective Signal Bell Cords Reported

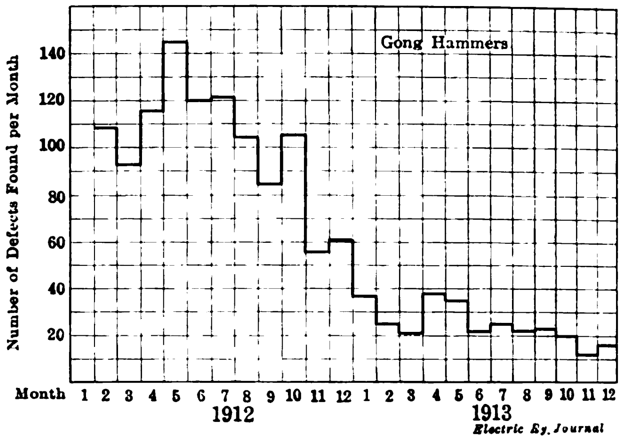


Fig. 14—Defective or Broken Gong Hammers Reported

In the curve of Fig. 16, showing the record of electrical defects, the figures include the control, the motor, the underground trolley plow, heat, light and miscellaneous electrical apparatus. Other curves, which are not reproduced, show that the controller drum defects were steadily reduced from a figure of approximately 120 per month early in 1912 to about 30 per month in the late part of 1913. This also was accomplished through more thorough overhauling, through the installation of an insulator block to prevent short circuiting in the controller drum, and through more careful inspection. In the same way the controller fingers defective went down from about 200 per month early in 1912

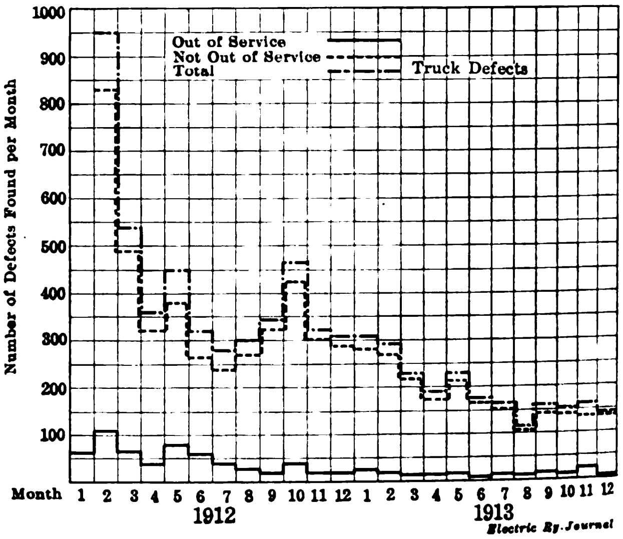


Fig. 15—Defects in Trucks Reported

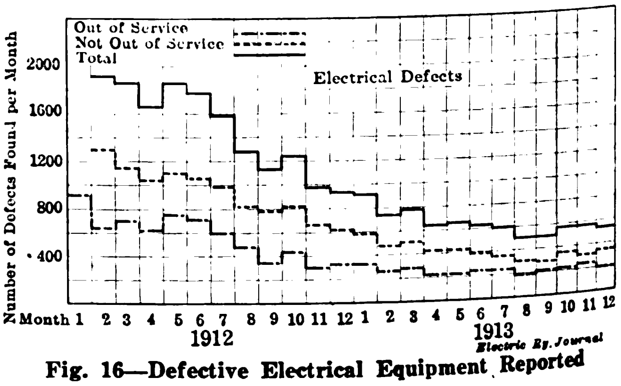


Fig. 16—Defective Electrical Equipment Reported

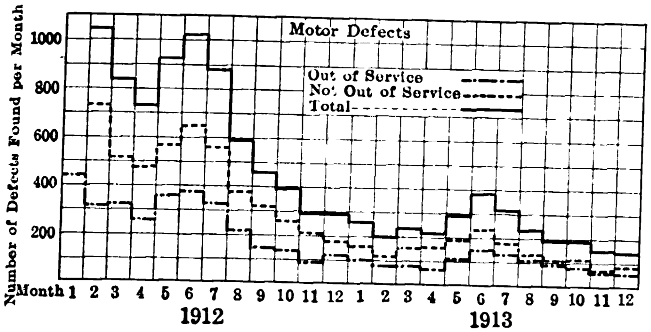


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Fig. 17—Defective Motors Reported

to a fairly steady average of about 15 defects per month for the last six months of 1913. A large part of this reduction was effected through a new design controller finger.

The reduction in the number of motor defects, as shown by Fig. 17, was effected by a redesigned field on the GE-57 motors. The GE-1000 motors had the fields impregnated throughout and also had the commutators slotted. Improved methods for insulating field and armature coils and for banding armatures were also introduced into the shops with the result shown by the graphical record.

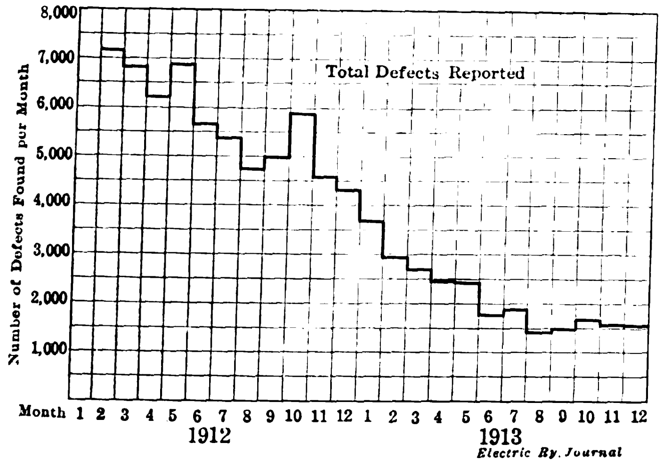

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Fig. 18—Defects of All Kinds Reported as Chargeable to Car Equipment Department

On other curves, not reproduced, covering electrical defects, the brush holder spring failures are shown to have been reduced from about 700 per month early in 1912 to a steady average of twenty per month late in 1913, this being the result of an improved brush holder spring and more careful inspection. The underground trolley plow failures were reduced from 300 per month to seventy per month during the same period on account of a new type of plow.

The record of the total number of defects reported by the transportation department is shown in Fig. 18. This includes all of the foregoing records as well as those for which no curves have been reproduced.

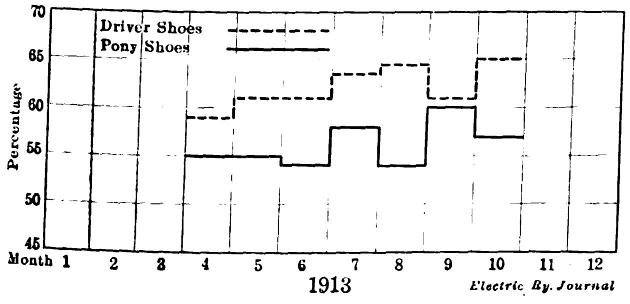

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Fig. 19—Percentage of Brake Shoe Weight Worn Away in Service

Another group of curves covers such records as the number of wheels turned out of the wheel shop and the number of armatures put through the shop, the average of the latter for 1912 being 570 and for 1913, 510. In 1912, 830 wheels per month were put through the shop on an average, and during 1913, 750 per month were put through. The percentage of brake-shoe material actually worn away in service is also shown by a curve which is reproduced in Fig. 19.

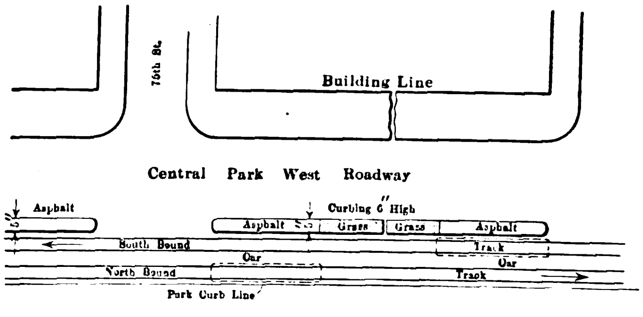
In addition to the graphic charts, each foreman also receives detailed statements of labor and material distribution, cars removed from service and total defects reported.

SAFETY ISLANDS ON WIDE AVENUES

BY S. STRIEZHEFF

At this time much agitation is going on in New York relative to the relocation of the street railway tracks of Central Park West, which now run close to the eastern curb. It has been proposed that these tracks should be shifted to the center of the street so that passengers who alight from southbound cars will not be exposed to danger from automobiles when crossing the wide distance to the western curb. This plan, which is favored by the city authorities, would cost nearly $100,000.

The writer believes that a much simpler, less costly and really more efficient way is available by providing safety islands for the full length of each block. As shown in the accompanying sketch, a strip 5 ft. wide and furnished with a 6-in. curb would be ample. As the cars on this street are stopped at the far side, one car length (about 45 ft.) at each end of the island could be asphalted while the intervening area could be covered with turf or flowers. Such a scheme is perfectly feasible on a 100-ft. street like Central Park West. Under the present conditions a passenger is discharged in the street; his danger, while decreased, would not be eliminated if he should be discharged from tracks located in the middle of the roadway, as proposed by the city. If islands are used, however, a northbound passenger would be discharged at the eastern curb line along the park while a southbound passenger would be discharged on an island. In either case the passenger would have plenty of time to get his bearings and could wait until it was safe to cross the street. As the island would be 6 in. above the regular pavement level, it would also reduce the step height on end-platform cars from, say, 15 in. to the more comfortable figure of 9 in. This plan would cost much less than any other suggested, would provide the greatest possible safety and would have the further merit of adding to the beauty of the avenue. As previously indicated, such islands are applicable to any wide streets. The city and traction officials can hardly afford to disregard this means of obtaining the ideal trinity of safety, economy and beauty.



Electric Ry. Journal

Plan of Proposed Safety Island for Wide Streets

Electrolysis Prevention in Edmonton, Alta.

The Author Discusses the General Theory of Electrolysis Mitigation as Covered by the British Board of Trade and Their Application to Conditions in Alberta—He Also Describes Several Plans from the Economic Standpoint

BY W. T. WOODROOFE, FORMER SUPERINTENDENT EDMONTON RADIAL RAILWAY

In view of the article printed in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 3, 1914, dealing with methods of eradicating electrolysis on street railway systems, it may be of interest to describe the scheme drawn up by the Edmonton Street Railway Department to overcome troubles from electrolysis which have occurred in connection with the water mains in the city.

RULES FOR THE PREVENTION OF ELECTROLYSIS

In approaching this subject, it was considered that the British government had drawn up a very adequate set of rules controlling street railway systems in the United Kingdom. It was thought expedient to remodel the system of negative feeders in Edmonton so that they would conform to British Board of Trade rules. The principal features contained in the British regulations consist in limiting the emf drop in any section of the track to 7 volts and, further, in providing that in no instance shall the water mains approach within 3 ft. of the track. Experiments with earth plates have shown that increasing the distance between plates to more than 3 ft. does not greatly increase the resistance between them. Where the above two conditions have been fulfilled experience has shown that there has been no trouble from electrolysis. Other important points contained in the British rule are:

(1) The system shall be earthed by means of two earth plates spaced not less than 20 ft. Four volts applied across the two earth plates shall produce a current of not less than 2 amp.

(2) The leakage current from the track to the earth, through the earth plates, shall not exceed 2 amp per mile of single track, or 5 per cent of the total current, suitable instruments being provided in the earth connection to record the leakage of current which actually occurs.

(3) Where the rails are positive to the water mains, it should be possible to reverse the current by connecting three Laclanché cells in series between rails and pipes. Where the water mains are positive to the rails, it should be possible to reverse the current by inserting one Laclanché cell in circuit. The insulation resistance of continuously insulated cables should not fall below 10 megohms.

METHODS OF PROCEDURE

In the design of the new system of negative feeders the following method was followed: The average distributed current for the various routes was worked out for a given schedule of cars running. The average current was calculated for average and peak loads as follows:

The unit energy consumption in kw-hr. per car mile, W, having been determined from consumption curves or from actual meter tests on the cars, the current was determined from this and the line voltage, $I = W \div E$.

The energy consumption in this case was calculated from the time-speed curves and checked by tests. On level track the current consumption was found to be about 1½ amp per ton, the total for double-truck cars ranging from 35 amp to 50 amp as a practical working range.

Having the average current per car the total average current was determined for the peak and regular loads, the duration of which were five and thirteen hours respectively.

Let I_1 = average current for the peak load.
L_1 = length of the section of track in miles,
s = speed of car in miles per hour,
n = number of cars passing over the section per hour,
I = average current per car,
$2I$ = average current, for the double track, per car on each track.

$$I_1 = \frac{L_1}{s} \times n \times 2I$$

The current, I_2, for the regular load, is calculated in the same manner, substituting the corresponding number of cars per hour.

The combined average or "effective" value of the current is obtained from

$$I_3 = \sqrt{\frac{(I_1^2 \times 5) + (I_2^2 \times 13)}{18}}$$

the effective value being equal to the square root of the mean square current.

LAYING OUT THE FEEDING SECTIONS[*]

The average current for the several routes having been determined, it is now necessary to divide it among the negative feeding sections, each of such length that its own current, flowing to its selected feed point shall split it up into two subsections having equal rail drops. Assuming two sections of track L and l, Fig. 1, joining at X, the currents flowing toward X are as indicated.

Let e = permissible voltage drop in either section,
R = specific resistance of track in ohms per mile,[†]
I_m = current per mile in section L,
i_m = current per mile in section l.

Then

Total current in section $L = LI_m$
Total current in section $l = li_m$
Resistance of section $L = LR$
Resistance of section $l = lR$

The voltage drop in section l is then

$$e = \frac{li_m \times lR}{2} = \frac{i_m \times Rl^2}{2}.$$

Similarly in section L,

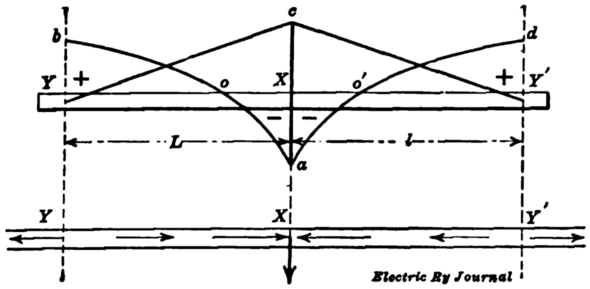
$$e = \frac{I_m RL^2}{2}.$$

For the purpose of determining the voltage drop in a section of track it may be assumed that the current is concentrated at the center of the section and flows to

---

[*] This method of studying the distribution of current and voltage drop is due to J. G. and R. G. Cunliffe (See Proc. Institution of Electrical Engineers, of Great Britain, Vol. 50, pp. 692, 727.

[†] In the case of Edmonton we allowed the following values:
2 rails 80 lb. = .035 ohm per mile
4 rails 80 lb. = .0175 ohm per mile
2 rails 60 lb. = .0233 ohm per mile
2 rails 60 lb. = .0467 ohm per mile
The above values include the resistance of the bonds.


b
c
d
Y
+
o
X
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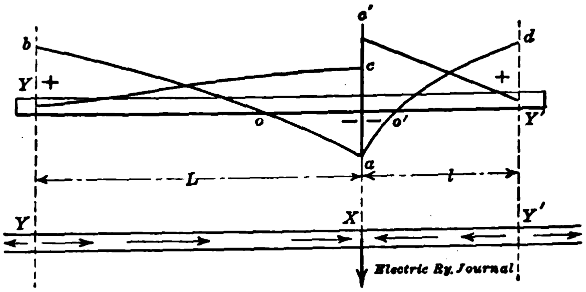
Electric Ry Journal

Fig. 1—Edmonton Radial Railway—Voltage Drop Diagram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Electric Ry. Journal

Fig. 2—Edmonton Radial Railway—Voltage Drop Diagram

the negative feeder tap point through half the resistance of the particular section of the track as shown in the above formulæ.

Transposing the above equations

$$l = \sqrt{\frac{2e}{i_m R}} \text{ and } L = \sqrt{\frac{2e}{I_m R}}$$

or

$$\frac{L}{l} = \sqrt{\frac{i_m}{I_m}}. \text{ That is, } L : l = \sqrt{i_m} : \sqrt{I_m}.$$

This distribution of current and of voltage drop is as shown in Figs. 1 and 2. In Fig. 1 are illustrated the conditions for equal sub-section lengths and equal intensity of loading, while Fig. 2 is for unequal loading. In the lower parts of the figures the directions of the currents are shown by the arrows. Point X is the tapping point for the negative feeder and Y and Y' are the artificial dividing points where the direction of current reverses. The following keys will be useful in interpreting the figures.

Fig. 1 X = negative feeding point,
Xa = potential at feeding point,
Y, Y' = artificial dividing points,
O, O' = neutral or zero potential points,
$Yc, Y'c$ = loading or current distribution,
$Yb = Y'd$ = potential at dividing points,
L, l = lengths of subsections.

Fig. 2 as in Fig. 1 excepting that
Xc, Xc' = respective sub-section loadings.
In both figures
$Yb + Xa = Y'd + Xa$ = section voltage drop, e.

By the above method we obtained a number of points on the system corresponding to X in the diagrams, which should constitute tapping points on the rails for the negative feeders. The voltage midway between these points should be seven with equal loading intensity. After the best points for the taps were found theoretically they were readjusted, where necessary, to fit junction points on the track, to keep the current density in the rails at a minimum value. For the present scheme a density of 13 amp to 14 amp per square inch was arranged for. The rails are all bonded together at junction points and the respective rails are bonded together for 55 yd. and cross-bonded for 110 yd. The tapping points thus determined for the Edmonton system were as shown in Fig. 3, the tapping points being lettered T-1 to T-8.

NEGATIVE FEEDER CALCULATIONS

The next step was to decide upon the voltage drop to be allowed in the negative feeders. As in the present case, the question of capital expenditure was of importance, two estimates were made, one based on a 15-volt drop and the other on a 30-volt drop. In the latter case, an over-all drop on the system of 100 volts was allowed, including the drop in the feeders and the 7-volt drop in the rails, this being a practical value for city work.

When determining the cross-section of negative feeders, the following points were observed:

(1) The ohmic resistances of all negative feeders should be identical, unless negative boosters are employed.

(2) The currents returning by all feeders to the generating station should have the same value.

(3) The currents returning by all feeders to respective substations should be the same.

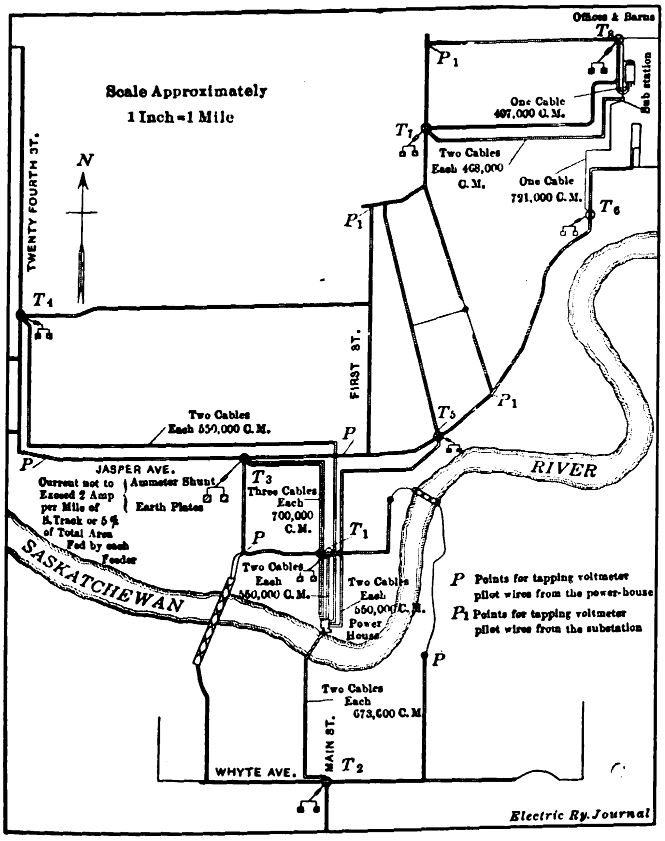

Offices & Barns
T_8
P_1
Sub station
Scale Approximately
1 Inch = 1 Mile
One Cable
407,000 C.M.
T_7
Two Cables
Each 468,000
C.M.
One Cable
791,000 C.M.
T_6
N
TWENTY FOURTH ST.
P_1
T_4
FIRST ST.
P_1
T_5
Two Cables
Each 550,000 C.M.
P
P
JASPER AVE.
Current not to Exceed 2 Amp per Mile of S.Track or 5% of Total Area Fed by each Feeder
Ammeter Shunt
Earth Plates
T_3
Three Cables
Each
700,000
C.M.
RIVER
P
T_1
SASKATCHEWAN
Two Cables
Each
550,000 C.M.
Two Cables
Each
550,000 C.M.
Power
House
P Points for tapping voltmeter pilot wires from the power-house
P_1 Points for tapping voltmeter pilot wires from the substation
P
Two Cables
Each
673,600 C.M.
MAIN ST.
WHYTE AVE.
T_2
Electric Ry. Journal

Fig. 3—Edmonton Radial Railway—Proposed Layout of Negative Feeders

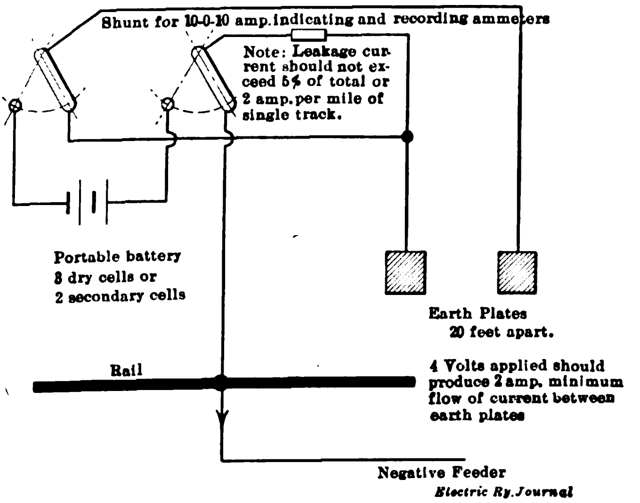

Shunt for 10-0-10 amp. indicating and recording ammeters
Note: Leakage current should not exceed 5% of total or 2 amp. per mile of single track.
Portable battery
3 dry cells or
2 secondary cells
Earth Plates
20 feet apart.
Rail
4 Volts applied should produce 2 amp. minimum flow of current between earth plates
Negative Feeder
Electric Ry. Journal

Fig. 4—Edmonton Radial Railway—Diagram of Earth Plate Connections

(4) The over-all drops in all feeders, either to the power house or to the substations should have the same value.

With the insulated system of returns as adopted in this instance, two earth plates were provided at each point where a negative feeder taps onto the rails, the two earth plates at each point being situated 20 ft. apart. Provision was made at an adjacent cast-iron pillar for locating change-over links and leakage detectors, as shown diagrammatically in Fig. 4. It is important to note that no connection is made to earth, either at the power house or the substations. This insures that the track shall be maintained uniformly at earth potential, with the exception of the 7-volt potential peaks in the rails between the feeder tapping points. As mentioned above, two general schemes were developed, one based on a 15-volt and the other on a 30-volt drop. The figures giving the approximate costs are shown below.

Schemes 1 and 2 are based upon a drop of 15 volts. Scheme 1 provides for copper feeders throughout, from which it will be noted that the cross-sections are particularly heavy, and the cost of copper is high, while in Scheme 2 is indicated the reduction effected in the cost of feeders should negative boosters be employed for feeders *T*-2 to *T*-7. Schemes 3 and 4 are based upon a drop of approximately 30 volts. In Scheme 3 negative boosters are not employed, while in Scheme 4 negative boosters are provided for feeders *T*-4 and *T*-5, and cast-iron resistors are inserted in feeders *T*-1 and *T*-8.

It will be noted from the tables that by employing negative boosters the cross-section of copper in one negative feeder, *i.e.* *T*-4, was reduced from 4.55 sq. in. to 0.867. The resulting drop in volts in the feeder, with full current, would be 141 so that, in order to make the over-all drop equal to 30 volts, a negative booster was inserted in series with the feeder which provides approximately 111 volts, the algebraic sum of the volts being equal to 30.

With regard to the use of resistances in negative feeders it will be seen, in the case of feeders *T*-1 and *T*-8, that, if the voltage drop is to be maintained at 30 the cross-section of copper in the feeders would have to be made so small that the current density in the feeders would be prohibitive. In order to augment the drop in potential, therefore, cast-iron resistors are inserted in series with them. It will be seen that the whole object of employing negative boosters and resis-

SCHEME 1

Feeders	Current in Amperes	Length of Feeders in Feet	Resistance of Feeders in Ohms	Resistance per 1000 Feet	Cross-section of Feeders in Square Inches	Current Density in Amperes per Square Inch	Voltage Drop in Feeders	Weight of Copper in Feeders, in Pounds	Cost of Feeders at 22 Cents per Pound
T_1........	867	1,800	.01732	.00964	.867	1,000	15.02	6,050	$1,330
T_2........	867	1,960	.01732	.0035	2.385	363	15.02	18,100	3,960
T_3........	867	6,800	.01732	.00255	3.273	264	15.02	86,400	19,000
T_4........	867	16,750	.01732	.00103	8.11	107	15.02	526,000	115,300
T_5........	867	8,357	.01732	.00207	4.04	214	15.02	131,000	28,800
T_6........	447	5,160	.0336	.00652	1.278	349	15.02	25,500	5,600
T_7........	447	6,690	.0336	.00503	1.658	269	15.02	42,000	9,220
T_8........	447	1,450	.0336	.02315	0.361	1,236	15.02	2,020	443
							Total..................	837,070	$183,653

SCHEME 2

Feeders*	Cross-section of Feeders at 1000 Amperes per Square Inch in Square Inches	Corresponding Voltage Drop	Booster Volts	Booster Amperes	Booster Kilowatts	Cost of Booster	Cost of Switch Gear and Wiring	Weight of Copper in Feeders, Pounds	Cost of Copper in Feeders
T_1........	.867	15.02	......	......	......	......	......	6,050	$1,330
T_2........	.867	41.3	27	867	23.4	$16,000	$4,770	6,580	1,445
T_3........	.867	57	42	867	36.2			22,800	5,030
T_4........	.867	141	126	867	108.4			56,250	12,380
T_5........	.867	70.2	55.2	867	47.8			28,100	6,180
T_6........	.447	43	28	447	12.1			8,910	1,960
T_7........	.447	55.3	41	447	18.4			11,400	2,520
T_8........	.361	15.02	......	......	......	......	......	2,020	443
	Density here 1236								
							Total..................	142,140	$31,288

*Lengths of feeder same as Scheme 1.

SCHEME 3

Feeders	Current in Amperes	Length of Feeders in Feet	Feeder Resistance in Ohm	Feeder Resistance per 1000 Feet Ohm	Cross-section of Feeder, in Square Inches	Current Density in Feeders, Amperes per Square Inches	Voltage Drop in Feeders	Weight of Copper in Feeders, Pounds	Cost of Copper in Feeders
T_1........	867	1,800	.03464	.01928	.4335	2,000	30.04	3,025	$665
T_2........	867	1,960	.03464	.007	1.1925	726	30.04	9,050	1,980
T_3........	867	6,800	.03464	.0051	1.636	528	30.04	43,200	9,500
T_4........	867	16,750	.03464	.00206	4.55	214	30.04	263,000	57,650
T_5........	867	8,357	.03464	.00414	2.02	428	30.04	60,500	14,400
T_6........	447	5,160	.0672	.01304	.639	698	30.04	12,750	2,800
T_7........	447	6,690	.0672	.01006	.829	538	30.04	21,000	4,610
T_8........	447	1,450	.0672	.04630	.1805	2,472	30.04	1,010	221
							Total..................	418,535	$91,827

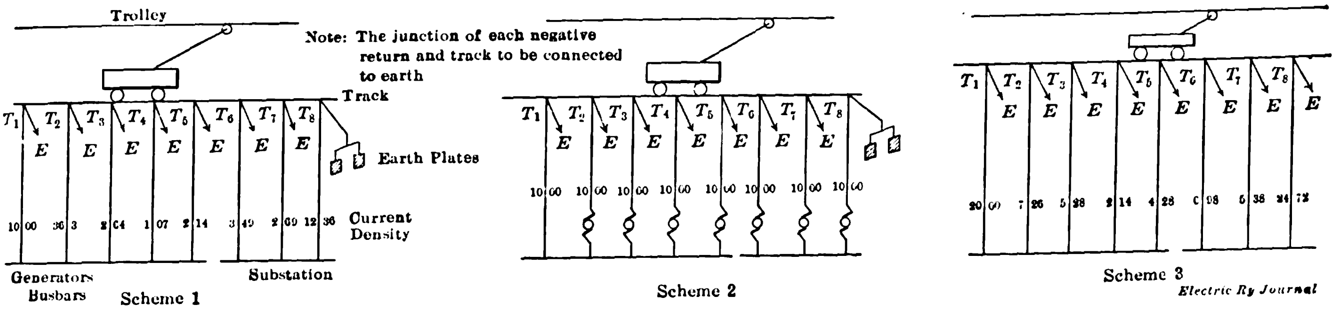
SCHEME 4*

Feeders†	Cross-section of Feeders at 1000 Amperes, per Square Inch in Square Inches	Corresponding Voltage Drop	Booster Volts	Booster Amperes	Booster Kilowatts	Cost of Resistor or Booster	Cost of Switch Gear and Wiring	Weight of Copper in Feeders, Pounds	Cost of Copper in Feeders
			Resistance						
T_1........	.867	15.02	15	867	13	$30	......	6,050	$1,330
T_2........	......	......	......	......	......	......	......	9,050	1,980
T_3........	......	......	......	......	......	......	......	43,200	9,500
T_4........	.867	141	111	867	95	7,776	$1,800	56,250	12,380
T_5........	.867	70.2	40	867	34.68			28,100	6,180
T_6........	......	......	......	......	......	......	......	12,750	2,800
T_7........	......	......	......	......	......	......	......	21,000	4,610
			Resistance						
T_8........	.361	......	15	447	6.7	20	......	2,020	443
							Totals..................	178,420	$39,323

*Same as 3, with exceptions as given.
†Length of feeders as in Scheme 1.

COMPARISON OF COST BETWEEN SCHEMES 1, 2, 3 AND 4, INCLUDING POSITIVE FEEDERS, BOOSTERS AND LABOR

Item	SCHEME 1 Quantity	SCHEME 1 Rate	SCHEME 1 Cost	SCHEME 2 Quantity	SCHEME 2 Rate	SCHEME 2 Cost	SCHEME 3 Quantity	SCHEME 3 Rate	SCHEME 3 Cost	SCHEME 4 Quantity	SCHEME 4 Rate	SCHEME 4 Cost
Negative cables	837,070	22c per lb.	$183,653	142,140	22c per lb.	$31,288	179,870	22c per lb.	$91,827	178,420	22c per lb.	$39,223
Labor and insulators................	......	......	6,775	......	......	6,775	......	......	6,775	......	......	6,775
Negative boosters................	......	......	......	1	23.4 kw	16,000	......	......	......	1	95 kw	7,779
Negative boosters................	......	......	......	1	36.2 kw		......	......	......	1	34.6 kw	
Negative boosters................	......	......	......	1	108.4 kw		......	......	......	......	......	......
Negative boosters................	......	......	......	1	47.8 kw		......	......	......	......	......	......
Negative boosters................	......	......	......	1	12 kw		......	......	......	......	......	......
Negative boosters................	......	......	......	1	18.4 kw		......	......	......	2	Feeder resistance	50
Booster switch-gear................	......	......	......	4	867 amp	1,600	......	......	......	2	867 amp	800
Panels................	......	......	......	2	447 amp	800	......	......	......	2	Motor panel	500
Panels switch-gear................	......	......	......	6	Motor panels	1,500	......	......	......	......	......	......
Cable connections for boosters................	......	......	......	......	......	150	......	......	......	......	......	50
Erection of boosters and switch-gear................	......	......	......	......	......	720	......	......	......	......	......	400
Test panel................	1	......	200	1	......	200	1	......	200	1	......	200
Voltage pilot wire................	50,000 ft.	......	800	50,000 ft.	......	800	50,000 ft.	......	800	50,000 ft.	......	800
Earth plates................	16	40	640	16	40	640	16	40	640	16	40	640
Positive cables................	268,524	22c per lb.	59,000	......	......	59,000	......	......	59,000	......	......	59,000
Labor and insulators................	......	......	18,636	......	......	18,636	......	......	18,636	......	......	18,636
Totals................			$269,704			$138,109			$177,878			$134,850


Trolley
Track
T1 T2 T3 T4 T5 T6 T7 T8
E
Earth Plates
10 00 36 3 2 C4 1 07 2 14 3 49 2 09 12 36
Current Density
Generators Busbars
Substation
10 00 10 00 10 00 10 00 10 00 10 00 10 00
20 00 7 26 5 28 2 14 4 28 C 98 6 38 24 72
Electric Ry Journal

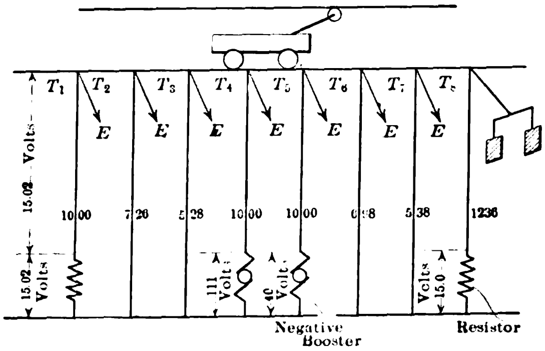
Note: The junction of each negative return and track to be connected to earth

Scheme 1 Scheme 2 Scheme 3

Figs. 5, 6 and 7—Edmonton Radial Railway—Diagrams of Different Plans for Controlling Rail Voltage Drop

tors is to effect economy in the amount of money to be invested in cables. Without the adoption of resistances in short feeders, the voltage drop would be purely determined by the length of the shortest feeder. This would mean a very large section of copper for the long feeders, in order to keep down the resistance.

Under some circumstances by a little adjustment it may be possible to do away with negative boosters and use resistors for equalizing the potential drop in the negative feeders. Such an arrangement depends on the form of the network and the position of the station relative to it. Where negative boosters are employed it is important that the positive feeders shall supply current to areas corresponding to those which deliver current to the particular negative feeder in which the boosters are inserted. The diagram in Fig. 9 shows the connections for the negative booster to be inserted in feeders *T*-4; in this instance the corresponding area is supplied with current by positive feeders *J*, *K*, *L* and *M*, so that, the booster being series wound with the field connected in circuit with the positive feeders, the voltage added by the booster is in proportion to the load. The sum of over-all drop in the feeder and the booster voltage is proportionate to the current, the same as in an unboosted feeder.


T1 T2 T3 T4 T5 T6 T7 T8
E
15.02 Volts
10 00 7 26 5 28 10 00 10 00 6 98 5 38 1236
15.02 Volts
111 Volts
40 Volts
Volts 15.0
Negative Booster
Resistor
Electric Ry Journal

Note: As alternative to booster for T_1 and T_8 prices for resistances are given in the schedule of costs

Scheme 4

Fig. 8—Edmonton Radial Railway—Diagram of Plan for Controlling Rail Voltage Drop

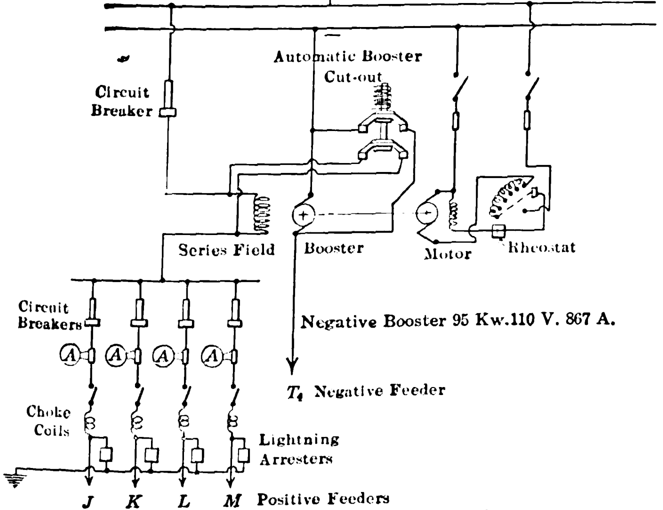

550 Volt Traction Busbars
+
−
Automatic Booster Cut-out
Circuit Breaker
Series Field
Booster
Motor
Rheostat
Circuit Breakers
A A A A
Negative Booster 95 Kw.110 V. 867 A.
T4 Negative Feeder
Choke Coils
Lightning Arresters
J K L M Positive Feeders
Electric Ry Journal

Fig. 9—Edmonton Radial Railway—Diagram of Booster Connections

Incidentally, it should be noted that provision should be made for preventing the racing of the booster in the event of the motor fuses blowing or the motor ceasing to operate through some cause or other. This racing may be prevented by providing an automatic switch which will short-circuit, consecutively, the booster field and booster armature.

Fig. 3 shows the new system of positive and negative feeders, laid out from the study described above. This study showed that with the adoption of Scheme 4, or of this scheme with a substation in the northwest, the efficiency of distribution will be approximately 15 per cent better than with the present system, and since the present power charges are approximately $16,000 per month the saving in this direction will be $28,800 per annum.

MEETING OF THE MANGANESE STEEL SOCIETIES

On April 14 a meeting was held in New York of the Manganese Track Society and the Manganese Steel Founders' Society—two open-price organizations of companies engaged in the manufacture of manganese steel. The members of the Manganese Track Society present at the meeting were representatives from the Pennsylvania Steel Company, Cleveland Frog & Crossing Company, Morden Frog & Crossing Company, Pettibone Mulliken Company, and William Wharton, Jr., & Company, Inc. The other members of the track society are the Elliot Frog & Switch Company and the Ramapo Iron Works.

The members of the Manganese Steel Founders' Society in attendance at the meeting were the Edgar Allen American Manganese Steel Company, Taylor-Wharton Iron & Steel Company, St. Louis Steel Foundry Company, Pettibone Mulliken Company and Pennsylvania Steel Company. The general plan of these societies was described in an interview with Arthur J. Eddy which appeared on page 984 of the issue of this paper for Nov. 1, 1913. Mr. Eddy is counsel for the associations and is usually present at the monthly meetings, which alternate in New York and Chicago.

Previous to the regular meeting, the standardization committee, of which Victor Angerer, of William Wharton, Jr., & Company, is chairman, held a meeting April 13. Mr. Angerer reported progress along the lines of standardization, principally of steam railroad special work, with which the committee is working with a committee of the American Railway Engineering Association. The meeting of April 14 was devoted principally to a discussion of steam railroad matters.

Traffic Statistics in Pittsburgh

A Department for the Collection of Data Regarding the Loading, Routing and Operation of Cars on This System Is Maintained so That the Service Is Always Adequate to Meet the Changing Requirements of Traffic—An Outline of the Methods Followed by the Pittsburgh Railways Is Published

For some years past the Pittsburgh Railways have maintained a department of traffic statistics which has been organized for the purpose of collecting data regarding the loading, routing and operation of passenger cars on the system. The work is kept going continuously, every line in the system being placed under observation at least once in six months.

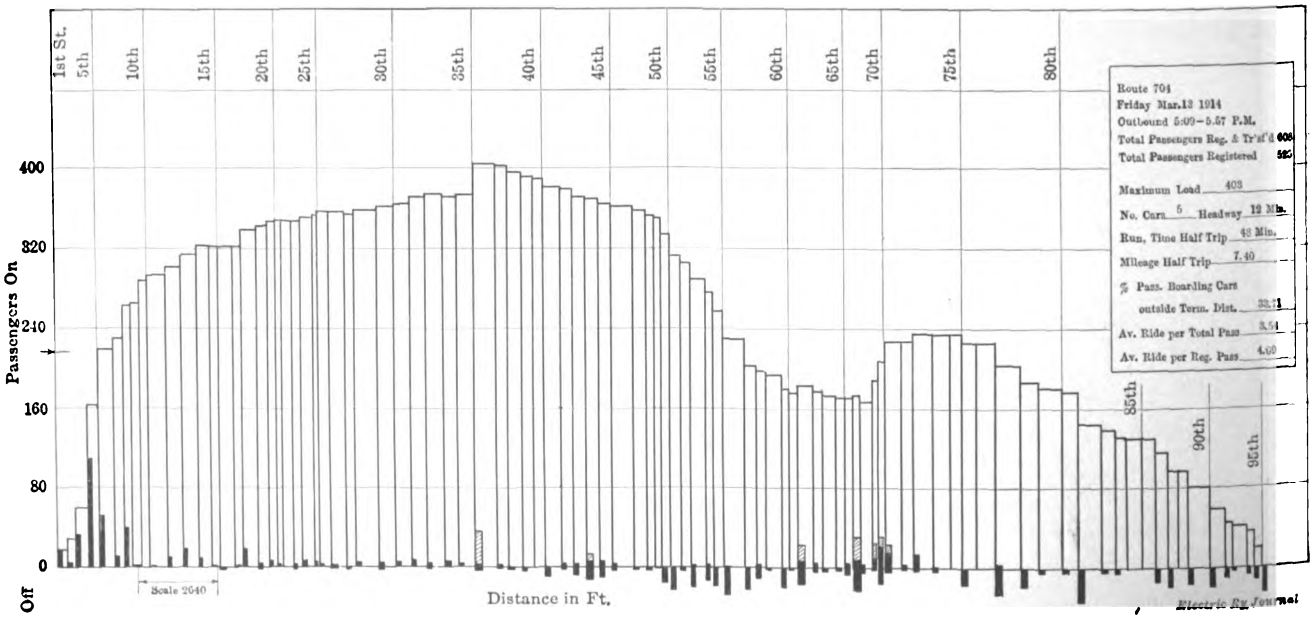
The department consists of eight men who work in the office up to 4:30 p. m. of each day and spend their time from 4:30 to 6:30 p. m. either riding on the cars or checking the operation at various points along the lines. This force reports to a traffic agent whose duties are largely supervisory, the title now being held by J. W. Welsh, electrical engineer of the company. The eight observers, when they are on the cars, observe and record the number of passengers on and off at each stop. Each one also records the time of arrival at certain fixed time-points for the purpose of showing whether the car is ahead of or behind its regular schedule. The total running time for the trip is also recorded and notes are made to cover any unusual delays which may be experienced during the course of the run.

The results of these observations are entered in a "checker's report." The form for this report contains a space for the routing, generally given by number as well as destination, time of starting the trip, the number of the car, the date, the direction, the train number and the weather conditions. The body of the report contains a list of all of the names of street crossings or other points where stops are made. These names are entered by typewriter because only a comparatively few records are made on any one route. Certain stops are permanently established as time-points, and these are indicated in the report by asterisks, the checker putting down the time of arrival whenever the car reaches one of these points. In the report are columns headed "Passengers On" and "Passengers Off," the latter column being divided in half to provide space for the passengers getting off the front of the car and for those leaving by the rear exit. Transfers are not registered on the Pittsburgh Railways so that in order to obtain the check from the register reading at the end of a trip the passengers who present transfers are reported separately, and the number is circled.

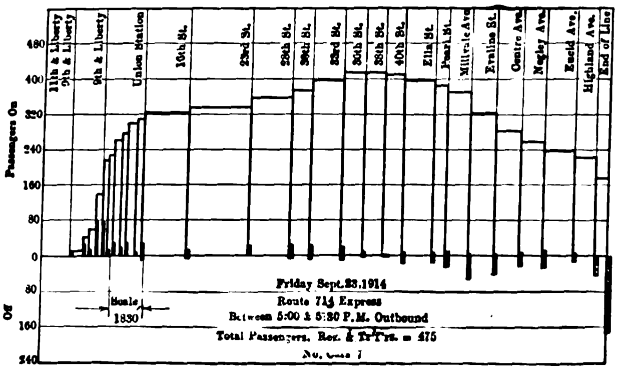
At the end of the line the figures are totaled to show the number of passengers boarding the car, the number leaving by the front exit and the number leaving at the rear. The total number of fares as shown by the cash register is then entered and the number of transfers added to this, the result affording a check against the total number of boarding passengers. Spaces are also provided at the end of the report for the scheduled time and actual time of leaving the city and also for the time when the car is due at the end of the line and when it actually arrives.

On the reverse side of the checker's report the various time-points are written in, and the running time between each successive pair is calculated and entered in a column paralleled by the scheduled running time between the time-points. In addition space is provided for comment regarding the matter of maintenance of headway, whether the service appears to be sufficient, whether the car carried the proper signs, whether the train number is correct and in proper place and whether the car carries proper markers. There is also a space for general remarks by the checker.

From the average of the eight checkers' reports that are turned in each day, the "characteristic curve" of the route under observation is made up. The area inclosed by this curve is obtained by running over it with a planimeter, and then by dividing the area by the height that would be represented by the total number of passengers riding during the trip, as obtained from the conductor's register, the mean length of ride per passenger is calculated. The average of the results obtained from the reports of each of the eight observers riding on different cars during the rush hour on the same route has been found to give a figure which is thoroughly representative of conditions existing on all



Pittsburgh Traffic—"Characteristic Curve" of a Typical City Line Showing Total Results for Five Cars



Electric Ry. Journal

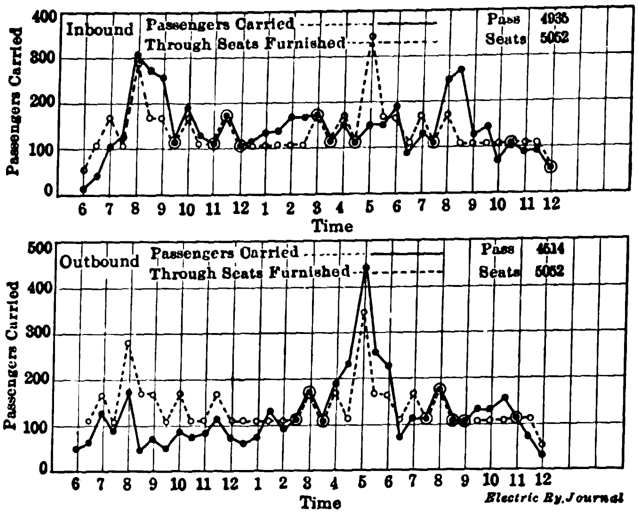
Pittsburgh Traffic—"Characteristic Curve" for Suburban Express Run Showing Total Results for Seven Cars

cars on the route in question and which, in consequence, may be used with confidence.

The "characteristic curve" is also used to establish the relation between the total number of passengers carried during any trip and the maximum load on the car at any one time. This figure is obtained in the form of a percentage by dividing the maximum number of passengers on the car at one time, as shown by the high point in the "characteristic curve," by the total number of passengers boarding the car, as shown by the number of fares and transfers indicated on the conductor's trip sheet. It has been found by experience that this relation between total passengers carried and maximum load at one time is approximately constant for all cars on any particular route. In other words, the percentage of short-riders varies but little on any given route.

Two of the "characteristic curves" are reproduced herewith, one showing the curve for a suburban run with a limited number of stops and the other showing a typical city run. It will be noticed that the curves are made up in accordance with a fixed horizontal scale representing distance so that the mean length of ride may be accurately fixed by the method outlined above.

From the "characteristic curves" for the lines on any one street a "combined characteristic curve" for all lines on the street may be obtained. One of these "combined characteristic curves" is reproduced herewith, and this shows the conditions existing for inbound traffic on Smithfield Street, one of the main lines entering the business district of the city. From this it will be seen that less than 30 per cent of the passengers entering the city on all of the lines on this street ride past Fifth Avenue and that only about 5 per cent ride past Seventh Avenue. Obviously, this curve is an unanswerable argument in case complaint is made about infrequent service on through lines past the latter street, as the convenience of only 5 per cent of the riders should not



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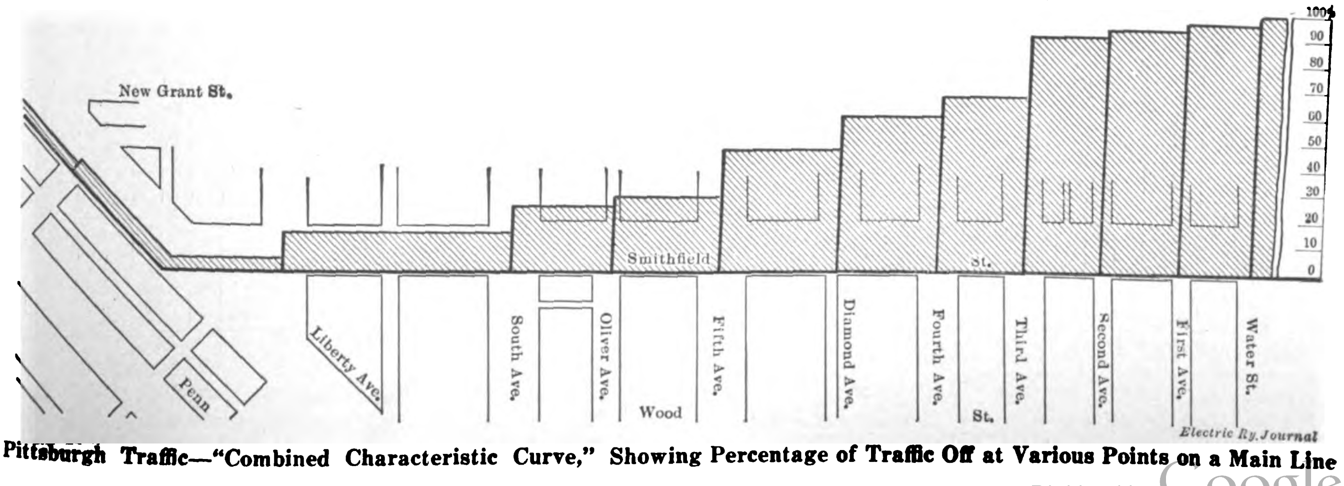
Pittsburgh Traffic—"Half Hourly Load Curve" for Typical Suburban Line

reasonably necessitate the running of all cars that enter the city on Smithfield Street through to Liberty Avenue.

From time to time the characteristic curves on each route are checked by placing men at points of change in the rate of loading, as indicated by a general change in the direction of the "characteristic curve." This work is done only occasionally and not as a matter of routine. Generally, it is undertaken when conditions are changed owing to re-routing or when some other outside influence has been introduced. These checks of the "characteristic curve" for any route are made by having the observers report the number of passengers on every car that passes the point at which they are stationed. When the results of their observations are averaged, a curve is plotted which resembles the "characteristic curve" for the route except that it shows diagonal lines extending between points of observation instead of the broken line of the exact records of the "characteristic curve." The difference between the two is that the check curve applies to every car on the route and is exact only in so far as it applies to the points of observation. The "characteristic curve" is exact with regard to the particular cars upon which observations are taken, but the curves naturally apply to every car on the route only upon the assumption that the records of the cars that are observed are typical of all. As mentioned before, this is a close approximation only.

Observations by men stationed at fixed points are also taken to determine whether the service on any line is ample. Such observers are placed at the point of maximum load indicated by the "characteristic curve" for the route. The observers record the total number



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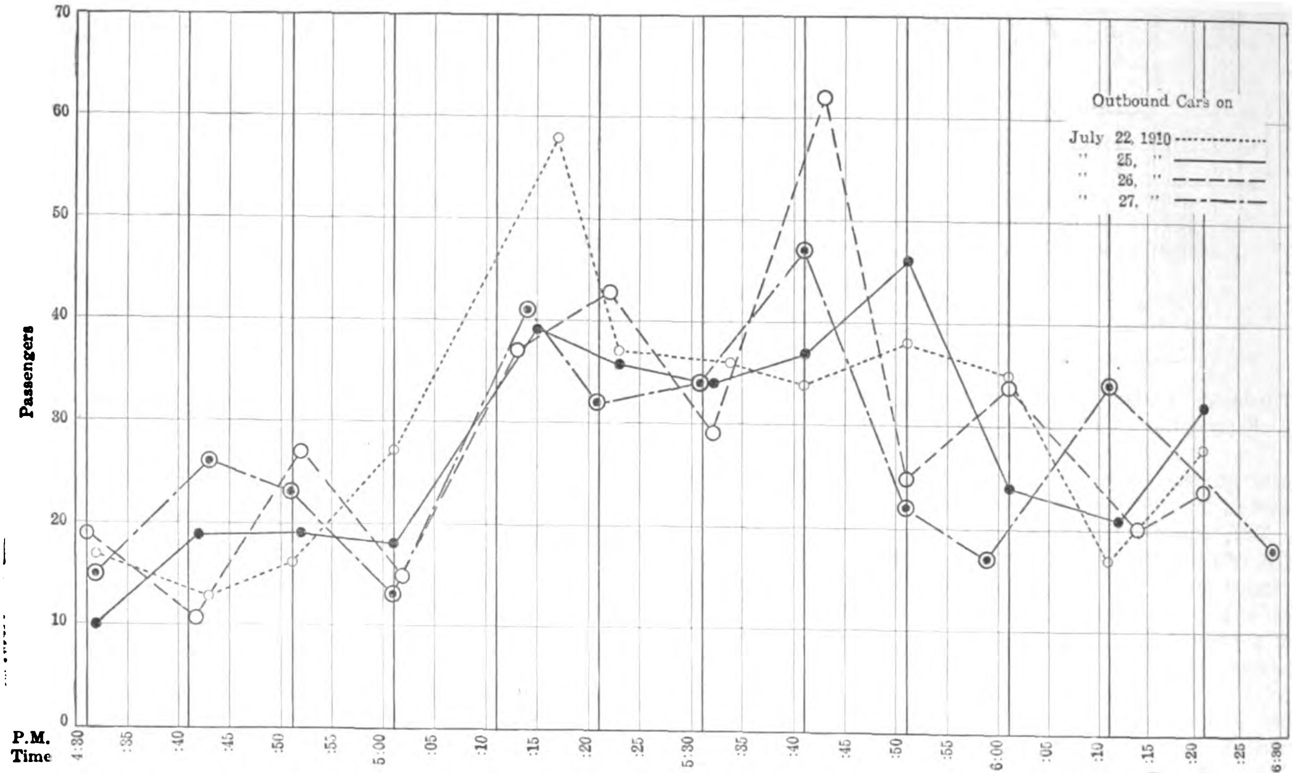
Pittsburgh Traffic—"Combined Characteristic Curve," Showing Percentage of Traffic Off at Various Points on a Main Line



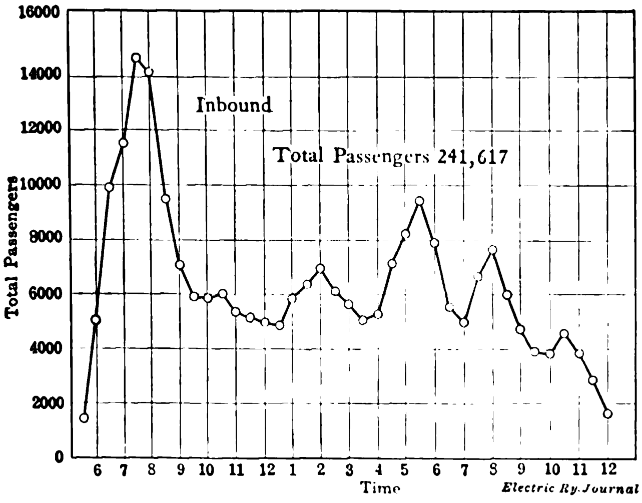
Electric Ry. Journal

Pittsburgh Traffic—"Time-Load Curve" for Four Days at Typical Times Point in City

of passengers on each car passing the observation points during the evening rush hour, and, as it has been found that they become extremely accurate in their estimates of loads after a comparatively short period of training, they are able to determine very closely the number of passengers on cars which do not even make a stop at the point of observation.

The traffic department also prepares what is called a "half-hourly load curve" for the individual routes by totaling the number of passengers riding on each car on the route as indicated by the conductor's trip report or day card. The points on the curve show the number of passengers riding on all inbound cars leaving the outer terminal of the line during each half hour and on all outbound cars leaving the business district of the city during each half hour. The figures for outbound and inbound cars are separately summarized and plotted. Typical results are shown in the curve reproduced herewith. From time to time the results obtained on the different routes are summarized and shown in a "half-hourly load curve" for all routes. Two of these curves are reproduced herewith, one for outbound cars and one for inbound cars. These show the total number of passengers carried on the sixty-six routes entering the business section of the city for one day, based on a five-day average.

In some cases the total number of through seats furnished is determined from the number of cars in service during the different half-hour intervals, and the results are plotted on the same sheet to show the rela-



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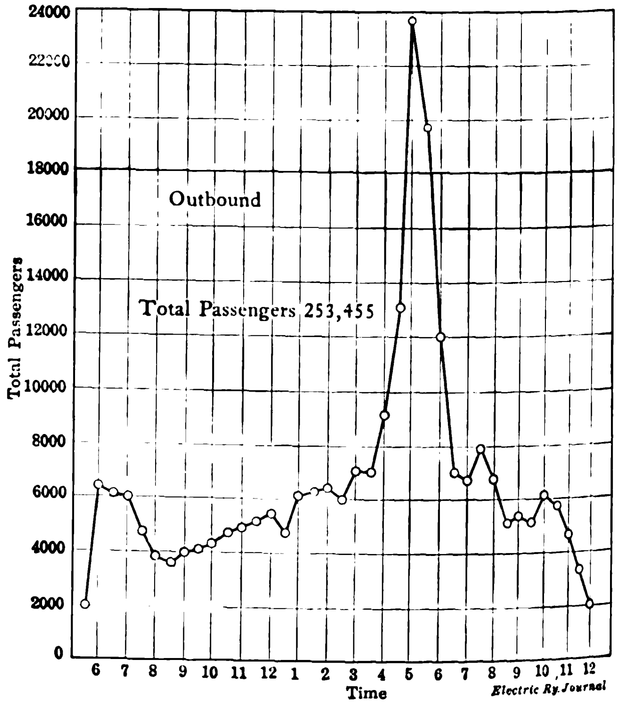
Pittsburgh Traffic — Inbound "Half-Hourly Load Curve" Summarized for Sixty-six Routes Entering Terminal District



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Pittsburgh Traffic—Outbound "Half-Hourly Load Curve" Summarized for Sixty-six Routes Entering Terminal District tion between the two figures during the different hours. Of course, the number of passengers carried does not serve as a measure of the maximum number of passengers on the cars at any one time, but this, as previously explained, has been found to be a reasonably constant percentage of the total number of fares paid and transfers turned in on any particular route. As a result this figure may be obtained directly from the curve and plotted below it, thus showing the number of standees, if any, during the rush hour.

Another curve which is made up by the traffic department is called a "time-load curve." This shows whether each car passing a fixed point of observation is ahead or behind its schedule and also shows the load on the car. The point of observation is generally taken at the point of maximum load for the route as indicated from the "characteristic curve." One of these "time-load curves" is reproduced herewith. The vertical lines indicate the times when successive cars are due at the point of observation. The circles indicate the time when the cars actually pass the point of observation. When the circles lie at the right of the vertical lines it shows that the car in question was behind its schedule. When the circle falls to the left of the vertical line, it shows that the car in question was ahead of its schedule. In general the results from three or four successive days are shown on the same sheet so that conclusions may be drawn without depending upon a single set of results. The "time-load curve" indicates the sufficiency of service and naturally permits the elimination of cases where a car is delayed and thereby carries more than its share of the load.

A limit of fifteen minutes' headway is set for all lines within the various communities served by the system, and when the schedule is not close to this limit cars may be taken off or added, if the service is found to warrant the change. However, the needs of the rush-hour traffic on the various routes, as they change from time to time, are generally supplied by putting on or taking off trailers and leaving the schedules unchanged.

OLD AND NEW FEATURES AT SACANDAGA PARK

BY R. M. COLT, GENERAL PASSENGER AGENT FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD COMPANY

Sacandaga Park, in the Adirondack foothills of New York State, is almost unique as a resort with a dual personality. Its resident population during the summer is about 3000 persons, who enjoy our two large hotels and some 300 cottages. In addition to this seasonal summer resort feature we solicit and secure a one-day excursion patronage of about 100,000.

The tastes and demands of the long term summer resorters, who come to us for periods varying from two weeks to a season, call for the concerts which are given three times a day by a first-class eight-piece orchestra stationed on the veranda of our large hotel. We also maintain a standard nine-hole 3090-yd. golf course which has grass tees and regulation circular greens 50 ft. in diameter. The course abounds with natural and artificial hazards, and is in charge of a competent professional, who teaches and has general charge of the links and club house. We consider that a golf course is absolutely essential to a successful summer resort, and because of this belief we have spent thousands of dollars in maintaining a standard. In addition to golf the summer resort patrons demand tennis courts, which are largely patronized.

The one-day excursion business, like the general run of amusement enterprises, is the hardest feature to handle, because this business requires changes and innovations from season to season. Last year we eliminated the flat charge of 25 cents for dancing and ran what is known as the "5-cent dance." This allowed people who desire to dance but two or three times to do so for a nominal charge, as the 5 cents includes the dancing of a couple. This change brought about an increase in the dancing revenue of about $1,000 for the season.

In years past we have tried with varying experiences the playing of vaudeville, dramatic, farce comedy and musical shows. This year we intend to run nothing but moving pictures. Because Sacandaga Park attracts an unusually intelligent class of patrons, as explained above, the vistors coming from New York, Brooklyn, Boston, Chicago, St. Louis and other large cities, we expect to secure the best possible service and first-run pictures. Thus, when a reel is shown for the first time in New York City, for instance, it will appear also at our theater at Sacandaga. This service costs us 50 per cent less than we have been paying for our shows in the past.

As everyone knows, the sentiment among the dancers has changed to such an extent that the waltz and two-step are but rarely danced, and the popular demand is for music suitable for the tango and other dances now popular. Aside from this, I know of no particular change in the sentiment of the public other than the necessity of novelty and innovation in the line of entertainment.

WAR DEPARTMENT GRANTS REVOCABLE PERMIT FOR STREET RAILWAY

In the laying out of San Francisco's municipal street railways one of the lines to the exposition was located across the Fort Mason military reservation, which lies just to the east of the exposition grounds. There was some delay in securing the permit, but it is now in the hands of the city board of supervisors. The time limitations of the permit, which is dated March 30, 1914, are that construction of the railway shall commence within 30 days, and that cars shall be operated on it before Oct. 15, 1914.

Other conditions set forth by the military authorities are that the construction and maintenance of the road through the reservation shall be subject to the commanding general's direction and supervision. Within three months after being notified of the revocation of the license, the city is to remove the railway and restore the grounds to their original condition. Any street railway company that wishes to run its cars over the city's tracks is to be allowed to do so, sharing the expense of operation and installation under such an agreement as may be approved by the Secretary of War. Finally, it is provided that any sum which may have to be expended by the United States in putting the premises in proper condition after the revocation of the license shall be repaid by the city.

The Pennsylvania Railroad has recently issued a record showing the length of tracks as of Dec. 31, 1913, and the increase or decrease during the year 1913, for all the transportation lines owned and operated by or associated in interest with itself. The statistics are compiled from official data on file in the office of the engineer of maintenance of way. The length of tracks in miles of the Long Island Railroad as of Dec. 31, 1913, was as follows: First track, 394.66; second track, 148.29 third track, 29.36; fourth track, 18.58; company's sidings, 233.69; total track, 824.58. The increases in miles for 1913 were as follows: First track, 0.36; second track, 1.19; third track, 3.08; fourth track, 1.44; company's sidings, 4.95; total track, 10.3.

Meeting of Iowa Association

An Abstract of the Technical Discussion at the Eleventh Annual Convention, Held at Cedar Rapids This Week—Abstracts of Two of the Papers Are Presented

There were 120 attendants at the convention at Cedar Rapids this week of the Iowa Street & Interurban Railway Association. It was the eleventh annual meeting of that organization and was held at the Montrose Hotel. Like all previous conventions, it was characterized by great enthusiasm and interest in the work and readiness to exchange experiences to the fullest degree on the transportation matters which came up for consideration. This ideal condition is brought about largely because of the fact that most of those at the convention have attended regularly for a number of years and realize the benefits of association discussions and are well acquainted with each other.

Frank J. Hanlon, president of the Mason City & Clear Lake Railroad and vice-president of the association, presided because President Cass was detained at Waterloo on account of sickness in his family.

At the opening session on Thursday, April 23, the delegates were welcomed to the city in an appropriate address by Louis Roth, Mayor of Cedar Rapids. Mr. Hanlon replied to this address and then called upon M. A. Welsh, Jr., of the Waterloo, Cedar Falls & Northern Railway, who spoke on "Some Results Obtained From the 'Safety First' Campaign."

After the completion of this paper, which described the work being conducted on the Waterloo, Cedar Falls & Northern Railway, R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, complimented the author on both the paper and the work which had been done in Waterloo. He said that his own road had also engaged extensively in "safety first" work and had obtained similarly good results. He believed, however, that such a campaign must be carried on continuously or the good results would fall off because of the tendency of the public to become careless and forget the importance of caring for their own safety. E. C. Allen, general manager Cedar Rapids & Marion City Railway, said that that company had obtained good results from issuing "safety first" notices to the employees. These were delivered to the employees with their pay checks. This insured attention to the folders. Mr. Welsh stated that the cost of the publicity part of their safety campaign alone had been between $2,000 and $3,000.

T. E. Wood, of the Omaha & Council Bluffs Street Railway Company, read his paper on "Shop Practice," and the discussion was opened by John Sutherland, master mechanic of the Tri-City Railway Company. This company is planning new shops at present. O. S. Lamb, Waterloo, stated that he considered it cheaper to buy gear cases than to make them, and that the purchased cases gave longer service than home-made ones.

Walter Evans, of the Edgar Allen Manganese Company, Chicago, referred to the new shops in Detroit and C. M. Feist, of the Sioux City Service Company, took up the building of cars by railway companies. The latter stated that the costs of such work were higher in Sioux City than in Omaha on account of the smaller number of cars constructed. He also described the very successful work of the company in reducing brush consumption from 7000 to 500 per year. This was accomplished by utilizing the results of systematic tests, by more careful inspection and by using a lower acceleration rate on the cars.

In the afternoon, by courtesy of the Iowa Railway & Light Company, Cedar Rapids, the attendants at the convention were taken on a two-car vestibule train to the State University at Iowa City. Here Prof. A. H. Ford lectured on "High-Tension Lightning Protection" and gave demonstrations of lightning arresters, arcing rings and similar devices. These experiments conveyed a vivid impression of the effect of high voltages and disruptive discharges.

On Thursday evening the Sons of Jove initiated sixty new members at a big rejuvenation and afterward the railway men attended a theater party given through the courtesy of the Iowa Railway & Light Company and the Cedar Rapids & Marion City Railway Company.

On Friday morning M. M. Lloyd, master mechanic of the Des Moines City Railway, delivered his paper on "The Cleaning and Disinfecting of Street and Interurban Cars." This paper and Mr. Wood's are given in abstract below. The technical portion of the program was followed by an executive session.

The convention was a most successful one and the papers and discussions showed the value of concentrating attention on the subjects which are of practical importance in every-day work.

THE CLEANING AND DISINFECTING OF STREET AND INTERURBAN CARS

BY M. M. LLOYD, MASTER MECHANIC DES MOINES CITY RAILWAY

The cleaning and disinfecting of cars is a matter that it has not received the care and thought it should. All kinds of diseases are carried into cars by passengers and from there into homes. Any car which has been used by a passenger suffering from a contagious disease should be taken in at once, and disinfected either by the health department or by properly instructed shopmen.

Cars should be swept out nightly. After the dust has settled it should be wiped off of seats, window rails and all other places where it lodges with a clean rag moistened with "O'Cedar" oil, "Yucca Birch Spray" or some good dust allayer. Care should be used not to apply enough oil on the cloth to leave streaks or spots on varnish. Cars will be cleaned more easily if they are housed in a warm shed beforehand. After cars are cleaned and scrubbed they should be left in a warm room where they will be thoroughly dried out before being put in service. Dampness around seat legs and baseboards not only breeds disease, but rots the floor and causes loose seats. Cars should be thoroughly cleaned every six days, scrubbed and disinfected. Ceilings should be scrubbed once between painting periods or every six months. Before sweeping, cars should be sprayed with some dust settler and disinfected to keep the dust on the floor. We use "Chloro-Naptholeum," three tablespoons to 1 gal. of water for sprinkling floors and cuspidors, and on woodwork one tablespoonful to 1 gal. of water. This compound does not injure the varnish or paint nor does it leave an unpleasant odor.

If there is a toilet on the car, a can of disinfectant should be located above the seat and kept in good order all the time. The toilet should be cleaned and disinfected nightly. The inside of toilets should be kept well coated with lead paint to keep out vermin, and to prevent lodging places for germs from saliva expectorated on the walls. It is good practice to line the interior of toilet with metal. Cuspidors should be thoroughly cleaned and disinfected nightly. The smoking compartment should also be disinfected nightly so that the car will go out in the morning free from the smell of tobacco smoke. Too much attention cannot be given to cleaning the express and smoker compartments.

We find that clear water applied with a brush is the best method to clean the outside of a car. In summer we use the water direct from the hydrant; in winter, it is heated to about 100 deg. Fahr. If the water is too hot it will turn the varnish white and injure it. If there is anything on the outside of the car that clear water will not remove, we have it taken off by a painter, for if the use of "Gold Dust," "Snow Boy," lye or any strong potash soap or powder is allowed, too much of it may be used to the detriment of the varnish.

Nearly all car cleaning preparations contain a large percentage of potash or soda. When they are strong enough to cut the grease or oil they will attack the varnish. The hose is the quickest and most effective and cheapest way of getting dirt out from around the side post, under the windows and around the seat legs. A long-handled brush with a hose connected through the handle with a ⅛-in. stream of water through the center of the brush gives a cheap and quick way of washing the outside of cars. The brush is prevented from scratching the varnish by commencing at the top and washing down to soften and wash off the dirt. A separate compartment should be provided for regular car cleaning and scrubbing. I would recommend a building with plenty of light, air and heat. The tracks of such a building should have enough elevation to permit the water to drain off readily while the car is being washed. Some danger exists in using hose on the inside of the car if the car wiring is not in good condition, as short circuits might occur on account of defective insulation.

SHOP PRACTICE

BY THOMAS E. WOOD, MASTER MECHANIC, OMAHA & COUNCIL BLUFFS STREET RAILWAY

It will be my object to present briefly some of the practices in the shops of the Omaha & Council Bluffs Street Railway Company. We have earnestly endeavored to expedite repair work and at the same time reduce its cost, and to accomplish these results we have installed labor-saving appliances wherever possible and have arranged for a careful routing of the work through the shop.

Among the labor-saving appliances worthy of mention, probably the most important are those for lifting. These include cranes, jacks, air hoists, etc. We have equipped every machine which handles parts too heavy for one man to lift, with an I-beam jib crane and air hoist. The repair pit is equipped with a power-driven jack for lifting cars to remove trucks and with hand-operated hydraulic jack for the removal of wheels and motors. The use of templets wherever a number of identical parts are required also saves much time which would otherwise be wasted in measuring and fitting.

To prevent needless travel between the different parts of the shop we have carefully grouped all machines employed in each of the principal operations. For instance, in the wheel department, we have grouped the wheel press, the wheel lathe and the boring machine, and have placed a jib crane in such a position that it can serve all three machines. Wheels and axles are delivered here and assembled. Wheels are then ground and taken directly to the storage tracks near the pits where they can be easily reached when wanted. However, since the same machines may be used in different classes of work, it is not always possible so to group them that all extra travel is avoided. In such cases, they should be arranged to serve the heavier pieces, and trucks should be provided so that the parts which have to travel any distance can be moved easily and quickly.

We have also done a great deal of experimenting during the last few years to find out how we could maintain machinery adequate for profitable repair work and also to maintain a competent repair force. The result is that we build all of our car bodies, and have been able so far to do this work at less initial cost. The time required to turn out a given number of cars, however, is somewhat uncertain, as we are frequently compelled to transfer the mechanics from new construction work to repair work, which receives the preference at all times.

LIGHTING

Both of our shop buildings have large window areas. The original building, erected in 1905, is lighted from above by means of ordinary skylights, which allow the sun's rays to shine directly into the building, but as this was uncomfortable for the men the skylights have to be covered with curtains, which, during long periods of the day, cut off light needed in adjacent parts of the building. In our new building, erected in 1912, we have used saw-tooth roof construction with skylight windows facing north and have found the lighting from them very satisfactory in every way. Artificial light is provided by incandescent lamps throughout the building, with arc lamps or incandescent clusters over machines or other places where more intense illumination is required. We have recently installed a number of large tungsten lamps for general illumination of the shop floor, and have found them a great help.

SAFETY

The "safety first" spirit is promoted by the fitting of all machines with guards and other safety appliances so far as possible, for we believe that "safety first" pays us, not only by decreasing the number of injuries to workmen but also by increasing the output of the shop. A man will do more and better work when he knows that he is safeguarded in every possible way than when he feels that danger is always near and that he must divide his attention between the work and avoiding the danger.

MACHINE SHOP AND BLACKSMITH SHOP

The shops have many features in each department which I will cover briefly in their respective order.

The blacksmith shop has a small power-driven trip hammer, which has paid for itself many times. Furthermore, a great deal of blacksmith work is saved by the use of our wheel press fitted with dies shaped to press forgings to desired form.

The machine shop is located in the same room with the truck shop in order to avoid unnecessary transfer of heavy parts. All machines, so far as possible, are arranged with this point in view. In most cases, a jib crane with an air hoist serve three machines. In this shop special attention is given to the artificial lighting of each machine. The wheel press, besides being used for wheel work, is also used as a "bulldozer" for all work which is too heavy to be done in the punch and shear. This class of work includes bolsters, platform knees, the straightening and reinforcing of iron poles, etc. Our experience has been that this machine is amply large for our requirements. All wheels, whether new or old, when pressed on the axle are ground with a Springfield grinder. We have recently installed an "oxy-aceteylene" welding machine which generates its own gas. Broken repair parts, which were formerly thrown into the scrap pile, are now welded for a small part of their original cost. We are also using the thermit process for heavy welding, such as motor frames and truck frames. Truck frames are welded without taking the truck apart.

Another feature worthy of mention in the machine shop is the gear case manufacturing department, which represents a very small investment and has proved very profitable. The cases are made of No. 18 sheet steel, double seamed and reinforced where necessary with ¼-in. iron. The front end bracket is forged steel, and the rear bracket is crucible cast steel. When completed this case weighs about 40 lb. up to and including cases for 50-hp motors. The cost of these cases is about one-third of the cost of those purchased in the market, and the life is about the same.

The pits in this shop are of our standard design—the open type—concrete pier construction; well lighted, naturally and artificially. Two pits are equipped with, and two others are arranged for, the Pittsburgh car hoist for body removal. Two pits are equipped with the swing-rail wheel-removing feature. For this work, as well as for the removal of motors, air compressors, etc., hydraulic jacks, mounted on wheels, are employed. Air hoists are also employed when necessary for removal to other parts of the shop.

ARMATURE AND ELECTRICAL REPAIRS

The requirements of this department have been arranged to suit our local conditions and might not be desirable for other properties. The armatures and bearings are received from the truck shop on trucks and handled in the armature room by a jib crane arranged to reach all machines. The armatures are tested, then distributed to the winders' stands. After completion they are sent to the turning lathe, where they are turned and undercut and also receive transformer test for short circuits. Our transformer is mounted on the wall directly back of the lathe, so that it takes only a minute or two to make the test. From here they are delivered to the banding lathe, which also has an undercutting device. All armatures are tested first with a d.c. bar test and then with a high voltage breakdown test. When completed they are delivered to the store room.

All bearings are rebabbitted in this room and are fitted to the armatures on the same machine that turns and undercuts commutators. The field coils are also taken care of in this room. First they have a transformer test, after insulating they are dipped and then sent to the store room. The controllers, circuit breakers, resistance and all minor electrical repairs are performed by one man of this department, assuring efficient and effective work. All circuit breakers are calibrated before they leave this department. We have found this work to be very essential, as many breakers vary either way as high as 20 per cent of their setting. All electrical apparatus is given a breakdown voltage test before leaving.

PAINT SHOP

During the past few years many new and quick methods of painting cars have been brought out. We, however, require ten days for finishing a new car. This assures us a job that will last from six to eight years, if revarnished every sixteen or eighteen months with a good grade of varnish. New work is brought up to the last coat of color in the building shop and finished in the varnish room.

We have a wash rack for cleaning old cars which come in for a general clean-up and varnishing. On a job of this kind, it takes about six days to put a car through the shop. In this room we also have a power sewing machine, used for curtains and destination signs. Our standard glass for transom is chipped. Most of it is cut from scrap, and we do the chipping ourselves. It is nearly all done during the winter months and at times when our regular work is slack.

OTHER DEPARTMENTS

The building containing the erection, cabinet shops and mill room is opposite the old shops, with a transfer table between, and accommodates twenty-seven cars. The cabinet shop is of the gallery type and has a material elevator, electrically operated. We also have a well equipped and conveniently located drafting room.

DIESEL ENGINE ECONOMIES

In a book recently issued by the Busch-Sulzer Brothers-Diesel Engine Company there is a great deal of information regarding the economies to be secured by the use of this type of engine. The following table gives in concrete form a bird's-eye view of the situation from the thermodynamic and mechanical efficiency standpoint.

PRIME MOVER EFFICIENCIES

Type of Plant	B.t.u. per Bhp Hour*	Efficiency, per Cent
Non-condensing steam engine	30,000-38,000	8.4-6.6
Condensing steam engines and turbines using superheated steam at 150 lb. per sq. in.	17,000-25,000	15-10
Diesel engines	7,500- 8,000	35-32

*One hp-hour $= \frac{33,000 \times 60}{778 \text{ b.t.u.}} = 2545$ b.t.u. per hour.

The type of stationary Diesel engine built by this company belongs to the four-stroke-cycle type of internal combustion engine, the cycle of each cylinder being completed in two revolutions of the crank or four strokes of the piston. On the first stroke pure air is drawn in or induced. During the second stroke this air is compressed. Oil is sprayed into the compressed air through an atomizer by means of an air blast on the third stroke, entering the combustion space of the cylinder at the point of highest compression, when the air previously drawn in has been compressed to 460 lbs. per sq. in. pressure. At the same time the compression has raised the air temperature to 1000 deg. Fahr., a magnitude three to eight times as great as that required for ignition. Meanwhile the products of combustion are allowed to expand, producing mechanical power. Finally, in the fourth stroke, the exhaust gases are expelled. The engine does not contain an explosive mixture at any time, no explosion occurring in any part of the cycle of operation. On account of the method of burning the fuel oil no carburetor, vaporizer, hot bulb, plane or electrical ignition is necessary. The period of spraying the oil into the cylinder covers from 10 per cent to 12 per cent of the combustion stroke, during which the burning is gradual, continuing for a considerable time after all the fuel has been injected. This combustion then occurs in an incandescent atmosphere under conditions calculated to insure perfect combustion, smokeless exhaust and high thermal efficiency.

Under the old method of ventilating the tunnels of the Underground Railways, London, England, the air was withdrawn by means of an exhaust fan. By the device now being installed at Edgware Road, Euston and the new Embankment stations air will be pumped into the tunnels throughout the day and night. Ordinary air is passed through a washing screen which extracts all impurities, the requisite humidity is next imparted, a proportion of ozone added, and it is then sent into the stations at the rate of 25,000 cu. ft. per minute.

SNOW REMOVAL CONFERENCE IN PHILADELPHIA

Half a hundred municipal and traction company officials met in Philadelphia April 16 and 17 to formulate methods of snow removal. This, the first session of its kind, was inspired by the embarrassment caused many large cities in the East by the unusually heavy snowfalls of the last winter. The trend of the discussion is indicated in the report tentatively submitted at the close of the conference by Capt. Mark Brooke, Corps of Engineers, U. S. A., assistant to engineer commissioner, Washington, D. C., who was chairman of the committee on resolutions. This committee, which was completed by J. L. O'Toole, superintendent bureau of highways and sewers of Pittsburgh; William H. Connell, chief bureau of highways and street cleaning of Philadelphia; William H. Lynch, superintendent department of highways and public improvements, Harrisburg, Pa., and R. B. Hamilton, vice-president Philadelphia Rapid Transit Company, offered the following recommendations:

First—The city should determine zones within which complete or partial snow removal is to be made.

Second—The approved policy is to "fight" the snowfall as soon as it begins.

Third—Studies leading to the utilization of sewers should be made, involving the special location and design of special types of manholes.

Fourth—The co-operation of traction companies and of property owners should be secured, in order that the former may clear a wider section of the street and the latter adopt a uniform system of cleaning sidewalks.

Fifth—Another conference should be held in the autumn of the present year to carry forward the work begun at this time.

In Boston, according to a paper sent by Louis K. Rourke, commissioner of public works, the city is districted into 270 miles of suburban streets and 100 miles in the city proper, from which the snow is promptly removed. In a light fall, machine sweepers are used to sweep the snow to the gutters, where it is loaded into carts by hand. When the snow becomes heavier, road scrapers are called into use, and for exceptional storms the work is turned over to contractors, operating in six so-called snow districts. Each driver is provided with a ticket, divided into quarter hours, which is punched both at point of loading and at the dump. Tally sheets are also kept by inspectors at each point and these are used to check the amount claimed by the contractor, as shown by the punched tickets. Although it is not required to do so, the Boston Elevated Railway removes the snow from a large part of the street, using carts and sleighs through the day and gondola cars at night. The gondolas are hauled to one of the many bridges, where the snow is unloaded into the water—a method recommended by Mr. Rourke as most efficient. Sewers are used to a limited extent.

John W. Doherty, Belmont Construction Company, Philadelphia, was strongly in favor of using large scoops—say, of 1-cu. yd. capacity—and stated that the ordinary cost may be cut in half by means of scoops, ploughing, and the use of sewers.

J. L. O'Toole, superintendent of the bureau of highways and sewers of Pittsburgh, inquired whether it had been proved that autos could get sufficient traction for operating snow plows, but unfortunately no one present was able to give any information on this point.

The side of the traction company was presented by Martin Schreiber, engineer maintenance of way, Public Service Railway Company of New Jersey. He explained that the company operated some 865 miles of single track, through 140 municipalities, having a population of about 2,000,000. The territory was divided into six divisions, extending from Jersey City to Camden, N. J., with an approximate area of 1100 square miles. The procedure in each division varied somewhat on account of local conditions, but generally the principles were the same, as the property was operated from a central office through a departmental organization. No special supervisory organization was required in handling snow, but the regular force of employees was enlarged. The snow-fighting equipment consisted of seventy-six snow sweepers, twenty-one shear plows, two rotary plows and seven work cars equipped with levelers. Early in the fall all of the plows and sweeper assigned to particular trackage were actually operated on those lines on trial trips and all troubles were promptly remedied.

As soon as a storm set in, all of the departments marshalled their crews and extra men at the various yards and carhouses in each division. Ordinarily one trackman inspected 10 miles of track, but during a storm at least six men were kept busy, cleaning switches and special work on a section of this length. The crews for the plows and sweepers were kept on waiting orders at full pay, so that no time would be lost in getting into action. As soon as the snow reached a depth of about 2 in., the sweepers were brought out and operated continuously during the entire storm.

As soon as the snow collected on the sides of the tracks, through the plows and sweepers being operated over the roadway, it was forced away from the tracks, if the storm continued, by means of levelers attached to the side of the sweepers and plows, or special work cars. Depending on the severity of the storm, two or more track laborers were assigned to each plow or sweeper for the purpose of digging out snow and ice by hand shovels whenever drifts were encountered. The rotary plows were reserved for handling the extra heavy drifts which occurred more frequently on outlying districts or suburban lines. When the snow began to collect faster than it could be handled with the snow-removing apparatus, the outlying lines were abandoned first and the apparatus concentrated on the city service.

As soon as the snow was piled in any quantities along the side of the tracks, the work of removing it was started. The largest part was hauled away by teams and dumped into sewers, rivers or meadows; and in one community a great quantity was dumped into a canal. Definite schedules were mapped out so that the railway company removed all the snow on certain highways between building lines, and the city all the snow on other streets. Some municipalities removed all the snow themselves and the railway company was billed for its portion of the cost on streets having car tracks. One of the customs of the company is to follow up the men on snow removal with special provision car, so that the men are supplied with hot coffee and sandwiches.

Mr. Schreiber thought that it was doubtful, under present conditions, if the railway company could make many more improvements for cleaning track and roadway of snow. It might be considered possible to haul snow to established dumps with work cars at least on streets where tracks exist, as it could be done much cheaper than with teams, but no one would finance an investment for established dumps and equipments to use for hauling snow only, and the possibility of the snow-fighting equipment being used for so short a time would always be the cause of strong argument against the development of any special machine for melting or removing snow. Improvement was possible through further co-operation of the railway company and municipality. Stations and dumps could be established and the railway company could contract with the municipality for hauling all the garbage and refuse. In the winter, in case it was required to haul snow, all the equipment for garbage disposal, including the stations and dumps could be pressed into service for disposal of the snow without any extra investment expense. Another plan would be to design streets and roadways with special gutters equipped with flushing apparatus, which could be used for cleaning and draining streets as well as getting rid of the snow.

The intelligent use of large sewers was advocated by F. H. Clark, superintendent of streets, Springfield, Mass., who had found great success in this method. George S. Webster, chief engineer bureau of surveys of Philadelphia, also added his approval of the use of sewers, if care was not taken to admit dirt or ice.

The conference was presided over by Morris L. Cooke, director of the department of public works, of Philadelphia.

WORK OF COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

At the meeting of the American Society of Civil Engineers on April 2, reported in the issue of this paper for April 11, Martin Schreiber, Public Service Railway, Newark, N. J., co-chairman of the joint committee on the life of railway physical property of the Engineering and Accountants' associations, described the history and work of that committee. The following is a more extended abstract of Mr. Schreiber's remarks than was published in the issue of April 11.

About three years ago the American Electric Railway Association, appreciating the importance of depreciation, through its allied associations (American Electric Railway Engineering Association and American Electric Railway Accountants' Association) appointed a joint committee of six members, comprising three accountants and three engineers, to investigate the subject. This committee is still in existence and is known as the joint committee on life of railway physical property. The subject was taken up with serious thought and energy, using sincere and earnest endeavors to comply with its purpose. The data secured from the properties with which the individual members were connected were not only examined, but the committee got in touch with qualified representatives of most all of the large electric railway companies in the United States. Amplified inquiry forms were sent out and personal solicitations made, in an attempt to get figures expressing the life of railway physical property or definite tables which would accomplish the same results.

In general, it was found from those having practical experience and, in many instances, the responsibility of a particular item of railway property which was under investigation, felt that any attempt at present to express the life of railway property explicitly was at best a guess.

After three years of study of the life of railway physical property, from every source obtainable, including the accumulation of a more or less complete bibliography of the subject, this joint committee reached the following conclusions:

1. That the basic elements which determine the life of railway physical property which affect its usefulness are: *a*, use; *b*, climatic and soil conditions; *c*, maintenance; *d*, inadequacy; *e*, obsolescence; *f*, the human element; *g*, the public demand; *h*, earnings.
2. That it is not practical or even theoretically possible compositely to assemble these several elements into any form of a logical "life table" that will apply equally in Maine and in California, in Minnesota and in Louisiana, or on different routes or lines of the same system embracing such physical property.
3. That the ultimate solution of depreciation of railway physical property is insured earnings.

Anyone interested may find a full report of the committee, with discussions, in the 1912 and 1913 annual proceedings.

It has happened that a great many of the points covered in the conclusions above have practically been acquiesced in this afternoon. It seems that the only way to consider depreciation, if at all, is as suggested by Professor Swain—to designate or set apart a certain portion of the earnings each year to be used for that purpose. Depreciation is an operating problem and is simply deferred maintenance, and, generally, if the amount is proper, allowing for reasonable contingencies, it is used up year by year. This is because the railway physical property does not have to be replaced all at one time, but on a piecemeal basis, as it were.

Now, as to the important subject of proper general methods for valuation for the purpose of rate-making, it is the speaker's firm opinion that there is only one consistent method to follow, and that is, the cost of reproduction new, and that depreciation should not be taken into account. All the user is concerned about is proper service, and he doesn't care a whit about depreciation if the service is not impaired. My attention has just been called to a recent decision of one of the commissions which I think is pertinent in connection with the report before us. It is contained in the sixth annual report of the Public Service Commission of Montana for 1912 and 1913, in the case of J. F. Edwards vs. the Helena Light & Railway Company, in which the commission says:

"Assuming that rates were being made for a new plant, it would be the total capital that must be considered as entitled to bear interest, as there would be no accrued depreciation. Depreciation is a liability against the property which must be accounted for, but in making allowance for future depreciation it is not the intention to provide for accrued depreciation which, it is assumed, has been taken care of. To simplify the matter, let us assume that an investment is made in 1903 of $100,000 under a twenty-year franchise, rate of interest allowable 10 per cent per annum, and figuring 5 per cent per annum depreciation. At the end of ten years, or in 1913, the property will have depreciated $50,000 and has a remaining value of a like amount. Then, if rates are made, based on the depreciated value, they must be one-half of the original rates, although the service may be just as efficient as it ever was, and in ten years more, the physical value of the plant would be nil, and likewise upon the same basis of reasoning, the utility would not be permitted to charge anything."

In conclusion, the speaker thoroughly appreciates the great task which the committee on valuation for the purpose of rate-making has undertaken. He thinks that this committee deserves a great deal of credit, and he agrees with a considerable portion of the report. He is quite sure that the committee of the American Electric Railway Association will be very glad to co-operate in every way with the committee of the American Society of Civil Engineers and will furnish any information and data on the particular subject of depreciation which it has at its disposal. The National Electric Light Association would also probably have pertinent data which it would be willing to furnish on the subject. Certainly no conclusions on the whole report should be accepted until the utilities, which are so vitally interested in the question, could at least have an opportunity properly to present their views.

A dynamometer car which has been designed for the Imperial Government Railways of Japan by Prof. E. C. Schmidt, of the railway department of the University of Illinois, is expected to be received at Urbana, Ill., this month, when the final assembling will be done.

COMMUNICATIONS

LIMITED DEFINITION FOR SIGNAL FAILURE ADVOCATED

MADISON, WIS., April 21, 1914.

To the Editors:

The question of "What constitutes a signal failure?" should certainly be "thrashed out," and all roads should use the same standard in preparing their signal reports.

Signals are installed to indicate the condition of the block, and if the block is not safe for a train to proceed according to schedule it is proper for the signal to indicate stop. Primarily signals indicate the presence or absence of a train on the main track within the block. A train on a siding, fouling the main track, may cause just as serious an accident as though it were on the main line. So also may an open switch or broken rail cause just as serious an accident as a collision. Therefore it does not appear to be proper to say that a signal has failed when it does indicate stop for any of the above reasons. Neither is it proper to call such stop indication "creditable failures," as is done in some cases.

Webster says that to fail is to come short; to miss. Surely a signal does not come short or miss when it does the very thing it is designed to do. Signal apparatus is manufactured and installed according to specifications which require that the failure of any essential part, or the loss of power, shall cause it to give a stop indication. It therefore follows that a broken wire must cause the signal to indicate stop. The feeder panels, transformers and line wires are a part of the signal system, and their failure is as much a failure of the signal system as would be the failure of a relay or signal mechanism. Comparative reports are, of course, highly desirable, but to be of any value they must be made up on a comparative basis, and in view of the wide differences of opinion that now exist the question should be put up to the signal committee of the American Electric Railway Association for a decision.

M. H. HOVEY, Consulting Signal Engineer.

ELECTROLYSIS MITIGATION

STEVENS INSTITUTE OF TECHNOLOGY
HOBOKEN, N. J., April 20, 1914.

To the Editors:

I have read with interest the articles which have recently appeared in your valued journal relating to electrolysis mitigating systems and would like to call attention to a number of points referred to in these articles in regard to which there is frequently considerable misunderstanding.

It is often not realized that all voltage drop which exists in the tracks must likewise exist in the earth in contact with these tracks. The insulated track return feeder system, as described in previous articles of your journal, has for its purpose the minimizing of the voltage drop which can occur in the tracks in contact with the earth, so that the stray currents through earth from these tracks are reduced to such low values that they are not sources of serious danger to underground metallic structures. This reduction in earth voltage drop is accomplished, (1) by making the track network a conductor of the lowest possible electrical resistance by means of adequate track and cross bonding and by interconnection of neighboring tracks, and (2) by removing current from the tracks at selected points on the track network and returning this current to the power supply station by means of insulated return feeders. The voltage drop in these return feeders cannot produce stray currents through earth because these feeders are not in contact with earth. By installing a sufficient number of properly proportioned insulated feeders, the voltage drop in the tracks, and consequently also the stray currents through earth, can be reduced to any desired minimum values. The effectiveness of this method of reducing earth currents is independent of the amount of copper used above that actually required to carry the current, but the economy depends on the copper losses. The amount of copper to be used in the insulated return feeders is determined in the usual manner by making the fixed charges plus the cost of the energy losses in the feeders a minimum.

This system of insulated track return feeders is frequently confused with the method of paralleling the tracks with uninsulated return feeders, which latter method has been most commonly used in American electric railways. From the standpoint of reducing track voltage drop the two systems are however totally different. With copper feeders paralleling the tracks, the voltage drop in the tracks is reduced only in the proportion that the conductivity of the track circuit is increased. For example, an amount of copper paralleling the tracks equal in conductivity to the tracks could at best only reduce the drop in these tracks to one-half. It is therefore evident that where the voltage drop in tracks is high, this method would require a prohibitive amount of copper to reduce their voltage drop to reasonably low values. With insulated track return feeders, on the other hand, the voltage drop in the insulated feeders is removed from contact with earth and therefore this drop in the return feeders may be made as high as economy dictates. It should be emphasized that with insulated feeders, the tracks in the immediate neighborhood of the power supply station should be connected to the negative bus-bar only through a suitable resistance, as a direct connection at this point would practically convert the insulated feeders into uninsulated feeders, because both ends of these feeders would then be in contact with earth.

Many also believe that with insulated return feeders the conductivity of the tracks is practically lost. This is not so, because by properly selecting the voltage drops in the various return feeders, the tracks are used as return conductors, but the voltage drops in the tracks are not allowed to become excessive. In other words, the insulated feeders are used to remove the excessive current from the tracks, and the tracks themselves are used to return as much current to the station as they can carry without producing excessive voltage drop in the earth.

Since voltage drop in the tracks is the direct cause of stray currents through earth, and since the insulated track return feeder system aims to mitigate electrolysis by reducing the voltage drop in the tracks, it is desirable to watch the track voltage conditions, and for this purpose it is essential to measure periodically the over-all voltage drops in the tracks. Such measurements may advantageously be made between the point of lowest potential and the points of highest potential in the track network. For these measurements it is most convenient to have specially installed pilot wires extending from the tracks to some central point and so terminated that suitable voltmeters may be readily connected to these wires to indicate the voltage drop in each of the track lines. Such pilot wires can in most cases consist of No. 14 bare copper-clad steel wire, supported by insulators on poles or suspended with insulators from the span wires. These pilot wires need not cost more than $25 per mile installed, so that the installation of the required pilot wires does not generally involve a large expense. In some cases existing telephone or other line wires can advantageously be used for these tests instead of special pilot wires. With such pilot wires or other available wires, periodic tests of the voltage drops on each of the track lines should be made. The results of these tests are the best possible indication of the condition of the track work and of the entire return circuit. In England, such pilot wires are generally installed on electric railways, and recording voltmeters are employed to obtain records of the track voltage drop.

The writer feels confident that if the above matters have careful consideration it will be found that practically all serious cases of electrolysis trouble can be satisfactorily taken care of by proper track bonding and by adequate insulated return feeders. Periodic tests of track voltage drop made by means of pilot or other test wires and voltmeters also furnish a valuable and useful indication of the maintenance of the track bonding and of the distribution of currents in the return feeders, and, in fact, will furnish an indication at all times of the condition of the return circuit and of the track work.

ALBERT F. GANZ,
Professor of Electrical Engineering.

THE ACCIDENT PREVENTION ENGINEER

BY WALLACE WATT FULLER, CHIEF ENGINEER AND GENERAL SUPERINTENDENT OF THE CHARLESTON-ISLE OF PALMS TRACTION COMPANY

Accident prevention and the work of the accident prevention engineer should not be confused with the present "safety first" movement. The latter is largely, if not entirely, dependent upon agents, the public, moving picture shows and lecturers for its success, and, as a result, it has inherent weaknesses and limitations. Real accident prevention is based upon the knowledge and experience of men who are really trained and experienced in real safety work—the engineers—and upon this fact depends the true value of such work. A number of the larger electric railways are aware of the importance of this work and are already making some headway. Thus far, however, the results are generally indirect, and there still is a large opportunity for the use of an engineer who does not specialize in everything not pertaining to safety.

Boiler insurance, the parent of modern fire insurance, is perhaps the oldest and most successful form of well established accident prevention work. Accidents from boiler explosions were at one time very common; in fact, hazard from this source was accepted commonly as a necessary evil. A few saw that possibilities existed in the correction of this evil and that considerable profit could be made in making a legitimate sale of a little specialized knowledge where there had been lack of knowledge. The same may be said of modern fire insurance with its innumerable specialists, engineers, inspectors and others, searching out the weak spots for the purpose of correcting them. Such men as these are doing important work and are the forerunners of that real accident prevention work which will eventually become a large part of our economic system.

To get efficient results accident prevention work should be carefully planned to fit requirements and should be properly organized, especially in large work. It should be in charge of an experienced engineer, assisted by two or three student engineers, who could be trained in the work and otherwise made specialists in this field. There should be, in addition, two combination clerks and stenographers who could soon be trained in all the work of the office, such as the making and keeping of records and files and the performance of other routine clerical duties.

The chief engineer would investigate all safety requirements and improvements in safety appliances and would approve or disapprove of their value for his use. Tests would be conducted by this department in the work of promoting safety, in sanitary conditions and in meeting certain special requirements arising in safety work. The chief engineer should make reports and recommendations direct to the vice-president or the president of the company, and copies of all resulting orders should be forwarded to the official heads of the operating, construction and maintenance forces. A department so arranged would quickly eliminate a large percentage of all avoidable accidents, and eventually these would become things of the past. The work would meet a popular demand, and in many instances would bring immediate benefit and relief to the interests served.

The education of employees should necessarily be an important factor of accident prevention work. This feature would eliminate the mentally, morally, physically and socially unfit and at the same time advantageously serve the fittest and effectively raise the general standard of men and service. The instruction should be given in regard to all weaknesses pertaining to the operation and maintenance of the property and the proper methods for the correction of these weaknesses.

The instruction should apply to all employees, whether in machine shops, repair shops, freight or passenger depots, or track or operating forces. In fact, the work would provide sensible safety in all respects and would extend to fixed inspections of bridges, trestles and special work, with a complete and accurate record of all, together with suggestions for improvements. The work should be subdivided as to the results to be obtained from each department, and booklets or pamphlets along educational lines should be compiled in simplified and attractive forms. In general the work should aim toward increased system, order and regularity in all aspects of the daily work of protecting employees and the public.

One of the many features in connection with such work would be the establishment of a bureau of safety suggestions, to which all employees and the public would be encouraged to send in suggestions on safety. Prizes might be offered to good advantage for the best and most acceptable ideas and suggestions.

The saving effected by such a department at the close of the first year's service should approximate $50,000 for a large railway system. This would be followed by a large annual increase. In addition to the savings in actual property, there would be an increase in revenue that would more than offset the expense of installing and maintaining the department.

In the railway as well as the industrial fields, there is practically no limit to the application or scope of usefulness of real accident prevention. The benefits of such work can well be summed up as follows:

1. It would stop wastefulness and useless destruction of millions of dollars of property yearly.
2. It would possess almost illimitable value as a humane agency.
3. It would at once fulfill and meet a proper popular demand for real safety.
4. It would eventually eliminate the enactment of safety laws that might prove ruinous or hurtful.
5. It would be the safest, surest and most efficient form of insurance to cover all.

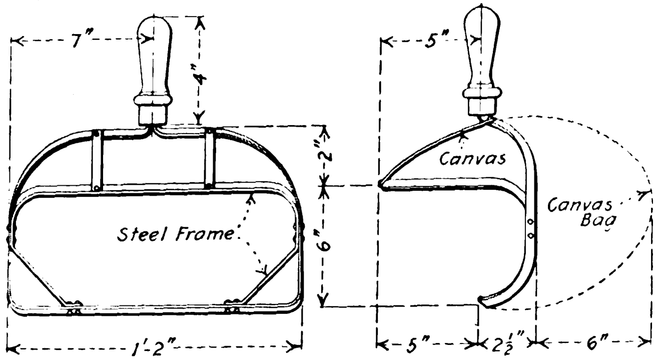
Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

A PAINTER'S RUST CATCH-ALL

The way and structure department of the Brooklyn Rapid Transit System has developed the rust catch-all shown in the accompanying sketches. This outfit is used by the painters to prevent rust or dirt from falling into the street after it is scraped from the elevated railway columns. The painter holds the bag with one hand and brushes the rust off with the other. The materials of the bag are canvas and a steel frame, the whole being made for 50 to 60 cents.



Painter's "Catch-All" Bag

MAINTENANCE OF CARS AT ROME, GA.

BY A. WADE, MASTER MECHANIC ROME RAILWAY & LIGHT COMPANY

This company has 11 miles of single track with a number of 5½ per cent grades and many curves, some of which have 35 ft. radii.

In the table given below car maintenance includes inspection, oiling, cleaning, repairing, rebuilding and painting old and rebuilt cars, and all material used for car bodies, electrical equipment and trucks in all the work done and also includes the replacement of all derailed cars and taking cars out of service for trouble.

	1912	1913
Total car miles	548,966	607,100
Total cost of maintenance of cars	$7,816.83	$8,892.78
Total cost of oil for cars and track curves	159.88	153.61
Cost of oil per 1000 car miles (cents)	29.12	25.31
Total maintenance of cars per car mile (cents)	1.424	1.465
Average mileage made by 33-in. chilled iron car wheels	no record	46,700
Average power required to operate cars per ton mile (watts)	179.2	182.9
Derailments	78	56
Car failures	14	10

The item "car failures" includes only the failures that delayed service for 10 minutes or more.

To obtain the energy required to operate the cars, meters were installed on the high tension side of the transformer for the converter; therefore, the figures given in the table as average energy required for operating cars per ton mile include the entire losses in the transformers and converters and the d.c. circuit and also the energy used in heating and lighting the cars.

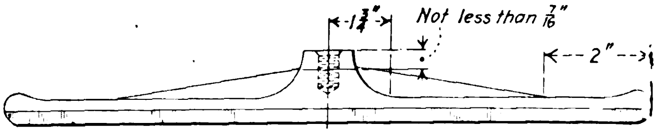
All cars are mounted on single trucks and have geared hand brakes only.

OVERHEAD LINE PROBLEMS—SPLICES, EARS, CLIPS, HANGERS AND ANCHORS

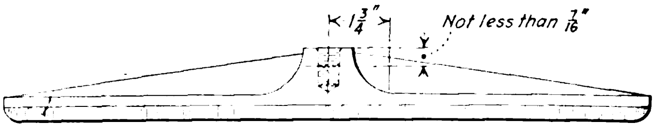
BY CHARLES RUFUS HARTE, CONSTRUCTION ENGINEER THE CONNECTICUT COMPANY

The splicing sleeve has always been an important—and aggravating—element in both construction and operation. The Philadelphia sleeve is admirable in all respects except one, but to a large and growing body of distribution men the necessity for soldering is the best of reasons for putting it in the obsolescent class, for the old-time lineman who could pour a sleeve without on the one hand annealing the wire, or on the other hand freezing without holding, has either taken up plumbing or has been bodily translated. Mechanical types of sleeve there are in many forms, but the lopsided ones are apt to twist over, while strength considerations practically prevent symmetrical forms. The splicing of ears at the outset involves waste of trolley except in the rare cases where the end of the wire falls at a span, and the thoughtless tendency of breaks to occur away from a span makes them of little value in maintenance.

The perfect splice must add the least possible weight and size increase to the lines; must develop full strength of wire; must have no tendency to weaken the wire; must give indication of any slip; must be easily applied to worn as well as to new wire, and at any point; must permit sag adjustment without the necessity of cutting the wire; and there must be no small parts to lose at a critical moment. So far the devices are like the Italian's business: What he made on the peanut he lost on "da damn banan'."



FLEXIBLE TYPE TROLLEY WIRE EAR



RIBBED TYPE TROLLEY WIRE EAR

Two Types of Trolley Ears

THE EAR

To one not familiar with the facts the ear would seem to offer little field or occasion for inventive effort, but the number of types extant is only exceeded by the kinds of trouble they develop. Overheating and annealing difficulties have largely excluded the soldered ear from all service except for feed and anchorage. The weakness of the bell-type boss has been met by making the boss wedge shaped, extending it down to the runner and sweeping it out with generous curves, but the tendency of the ends to turn up from the wire is still unpleasantly apparent on many lines; this, however, is undoubtedly less due to ear design than to line conditions. Slack trolley, heavy load at the ear, tight span wire preventing the ear from rocking—all these translate the stress wave from the collector into harmful blows, while improper trolley locations or faulty collector equipments grind down the sides of the runner and cause a maximum of injury. In the attempt to overcome this upturning two types of ear have been developed, one having the rib extended to the end of the runner, the other with the rib meeting the runner about 2 in. from the end and being thickened by a lump of metal on top. Logic would appear to be with the first type, but while a circular letter recently sent out developed strong partisans of each, practically no one answering had had actual comparative experience. The Connecticut Company has since installed a series of each under conditions which should insure equality of service, but sufficient time has not yet elapsed to warrant any conclusions of value.

The installation referred to includes several extruded ears, which are apparently gaining in favor. A new type of hub casting has materially relieved the stubby appearance of the first forms, and the uniform size and character of the extruded portion promise ease of installation and smoothness of wear that is said to be fully realized where such ears have been in use for any length of time.

In the matter of length there is the usual difference of opinion, with 14 in. for general choice on the three larger sizes of trolley, and 9 in. or 10 in. for No. 0. At least one company, however, installs first a 9-in. ear, and when it requires replacement uses the 14-in. size. Theoretically there is everything to commend this, and the user is confident.

CLIPS AND HANGERS

As yet there is no mechanical clip for round wire, but on grooved wire the 7-in. single clip with four screws is almost standard for straight line work, as is the three-screw-per-jaw double clip for curves. Early types gave much trouble by working loose, but by employing screws which project a trifle beyond the back plate when the wire is clamped and by lightly heading these projecting ends this trouble is obviated without seriously interfering with later removal of screw if desired. An exceedingly aggravating feature of the mechanical ear has been the fact that until recently practically every maker used a screw just enough different from his competitors to prevent interchange, and this nuisance still persists to a considerable extent.

For straight line support of the ear the single piece round top hanger is rapidly forcing the multipart cap and cone into the background, although the ability of the latter to grip the ear tightly at the proper angle to the lugs is a strong point. The threads on the round-top stud almost invariably start at the wrong point. Hence the ear, when home, does not make the same angle with the lugs that the trolley wire does with the span, and it is customary to carry on the tower thin steel washers in several thicknesses to be used on the stud as may be necessary. Two or three special types of round type have swiveling studs to obviate the necessity for such liners, but they are of doubtful value.

As turned out by most manufacturers the round top is highly satisfactory, although some types otherwise excellent are much too heavy. There have been, however, instances of poor composition which in hot weather soften sufficiently to let the studs pull out, while the ear seat is sometimes sufficiently above the plane of the rim to permit an ear with high rib to touch the hanger shell or come so close that the gap is easily bridged. The requirements that the rim of the hanger be not over 1/16 in. below the plane of the stud face plate, and that the rib of the ear, at a distance of 1¾ in. from the center be at least 7/16 in. below the plane of the top of the boss, insure the necessary clearance. These requirements are met by the commercial products of most makers.

ANCHORAGE

What to do with regard to the end-on pull of the trolley is a moot question. Where the line is much broken by curves the latter absorb any unbalanced pull even though no special provision be made. Many companies install a special anchor at both ends of each curve and about every 2000 ft. on long tangents, while others use anchors only on bracket work, and still others rely on the line ears and their regular support to do all necessary holding. In the last case each span takes a part of the pull. So long as this portion of the total strain is small the practice works well. However, if the trolley wire tends to "creep" the spans pull sideways and the ear tilts, bending the wire at the lowered rear end so that it receives a heavier blow from the passing trolley wheel, while at the raised forward end the wire tends to pull out of the lips.

Where anchors are employed the double hub ear, soldered to the line with a Metropolitan-type strain plate to guy from, makes the best construction, although the necessary soldering is unfortunate. The half-ears extensively used a few years ago could not be installed without kinking the wire in the vertical plane, and have very largely disappeared; the strain plate is less subject to this trouble, but care must be taken that the guys pull equally or a kink in the horizontal plane will result.

SPLICING BROKEN TROLLEY POLES

BY CHARLES A. INGLE, ASSISTANT PURCHASING AGENT
ROCKFORD & INTERURBAN RAILWAY

A very large economy is effected on the Rockford & Interurban Railway by splicing broken trolley poles in the following manner:

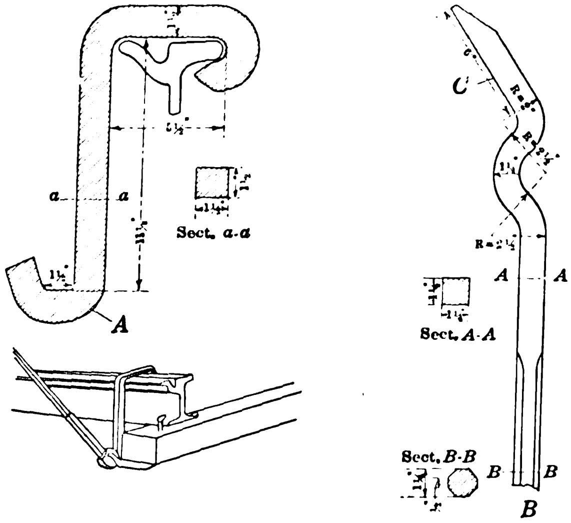
The broken poles are sawed off square at each side of the break, a piece of 1-in. steel tubing is inserted and the ends are heated and shrunk over this tubing, care being taken to cool as quickly as possible to prevent the material from becoming soft. The pole is then drilled on each side of the joint and riveted with a ¼-in. rivet. The cost is very small, about 6 cents for labor and 6 cents for material, making 12 cents in all. Not more than 3 per cent of these reclaimed poles break at the splice. In general, this practice has cut trolley pole cost on the Rockford & Interurban Railway from 50 per cent to 60 per cent.

The Wisconsin Electrical Association has reprinted in pamphlet form the papers presented at the sixth annual convention of the association held at the Hotel Pfister, Milwaukee, on Jan. 15 and 16, 1914. The contents of the pamphlet include "Some Facts Relating to Depreciation and Rate Making," by Halford Erickson, member of the Wisconsin Railroad Commission; "Voltage Regulation, Its Necessity and How Accomplished," by G. G. Post, electrical engineer of The Milwaukee Electric Railway & Light Company; "Report of the Committee on Standards of Inspection for Overhead Distribution Systems," by S. B. Way, Peter Valier and C. R. Phenicie, and "An Accounting System for Small Central Stations," by H. G. D. Nutting, assistant to the president of the Clement C. Smith properties.

TIE-HOLDER FOR SPIKING NEW TIES

BY WALTER K. TAYLOR

To facilitate the spiking of new ties to the rail, the way and structure department of the Brooklyn Rapid Transit System has been experimenting with the tie-holding bar and fulcrum which is illustrated in the accompanying sketch. This contrivance embodies part "A," an "old man" which is patterned to fit the section of the rail to be laid, the bottom being low enough to be level with the bottom of the tie. The second part, "B," acts as a lever which engages in the lower hook of part "A" to give a fulcrum. To operate, part "A" is put over the head of the rail and the tie is lifted into place with the face "C" engaging the bottom of the tie. The leverage on a 3-ft. arm, as applied by a laborer of average strength, is sufficient to hold the tie in place while it is being spiked. The labor economy due to the application of this tie-holder is quite important, as only two men are required to operate it. It also greatly expedites the work of spiking. The simple arrangement precludes the necessity of repair or the possibility of breakdown. Another attractive feature of this tie-holder is that the cost does not exceed $1.50.



Electric Ry Journal

Tie-Holder for Spiking New Ties

PROGRESS IN TRUCK DESIGN

A recent publication of the Standard Motor Truck Company, Pittsburgh, Pa., shows the variety of trucks which this company builds for cars ranging from 35,000 lb. to 120,000 lb. capacity. Probably the heaviest electric truck built by the company is the Type C-100-A with quill suspension motors, used on the single-phase motor cars of the New York, New Haven & Hartford. The frame of this truck has a carrying capacity at the king pin of 65,000 lb. Pressed steel channel-shape sections are used for the side and end frames to secure sufficient lateral stiffness, to provide the necessary strength to resist the stresses tending to put the truck out of square and to maintain the principle of a single pedestal. The transoms are also of pressed steel channel-shaped sections.

Type C-80-P is a favorite pressed-steel design for high-speed interurban service. It is used on such lines as the Detroit United Railway and the Terre Haute, Indianapolis & Eastern Traction Company. The total carrying capacity at the king pins is 80,000 lb., or 40,000 lb. per truck. Type C-60-P, which is known as the "Interborough," is a medium-weight truck also for interurban service. These trucks are for car bodies weighing from 35,000 lb. to 45,000 lb., with a maximum capacity of 60,000 lb. per pair of trucks. The maximum computed operating fiber stress in all parts of this truck, allowing 20 per cent for shocks, is 12,000 lb. per sq. in. of metal. This truck is used on the Seattle, Pittsburgh and other systems. Type C-50-P is a pressed-steel frame motor truck for city and suburban service under car bodies weighing from 18,000 lb. to 30,000 lb.

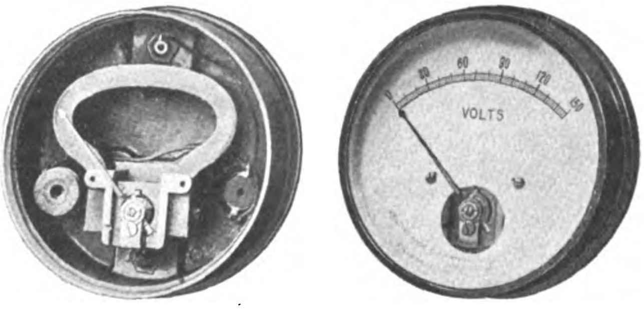
The solid frame short wheel-base double truck known as Type 0-50 is too widely used to require any description. The company also builds solid forged maximum traction trucks such as Type 0-36 for car bodies of 16,000 lb. to 22,000 lb., with a maximum load at king pins of 36,000 lb. per pair of trucks. As a maximum traction truck this design is notable for the use of equalizer bars.

Type AT-22-30 arch-bar, trail-car double truck was especially designed for the Pittsburgh Railways for use with 22-in. driving wheels. These trucks are of arch-bar construction with channel top arch-bars and transoms and with rectangular bottom arch-bars and tie-bars. Roller side bearings are used. Complete with wheels and axles the truck weighs 3900 lb., or 7800 lb. per pair, and has a carrying capacity of 40,000 lb. per pair of trucks. This truck is readily convertible to motor service. Other arch-bar trailer trucks are built for carrying capacities of 50,000 lb., 60,000 lb., 80,000 lb. and 100,000 lb.

D.C. METERS OF 5-IN. DIAMETER

A line of 5-in. d.c. ammeters and voltmeters, known as the type FW, has just been brought out by the Westinghouse Electric & Manufacturing Company. These are indicating meters suitable for battery-charging panels, small isolated plants and other places where a high-grade low-price polarized instrument is required. The meters operate on the D'Arsonval principle, having a moving coil and a permanent magnet. As they are of the permanent-magnet type, they possess many points of superiority to the moving-iron type construction found in the usual lower-priced meters.

The complete movement is mounted in the case as a unit. A unique feature is that the moving element can be taken from the movement simply by removing two screws on the side and of the pole-piece support. The entire moving element and bearings can then be lifted out as a unit and can be replaced in exact position. This makes it possible to repair the meter without disturbing the alignment of the magnetic circuit. Owing to the use of an aluminum pointer, a light counterweight is possible, resulting in a light movement and small wear on the pivot jewels. In proportion to the light weight the high torque insures great accuracy for so small a size. The scales are 4 in. long, which is practically the same length as the scales of many of the 7-in. meters. The full length of the pointer shows on the dial, thus making the meter as easy to read as a clock. The movement is damped to secure dead-beat readings.

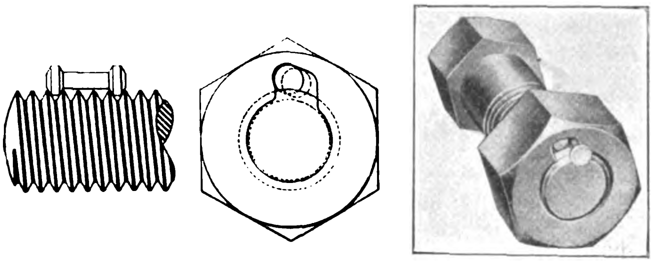


D.C. Meter of 5-In. Diameter, With and Without Dial

AN ABSOLUTE LOCK NUT

A new lock nut, which is said to have been thoroughly tested by several electric railways, is the "Absolute" type of the American Lock Nut Company, Chicago, Ill. The locking principle is quite simple and may be applied successfully to nuts of any size, either hexagon or square, or it may be used on ordinary track bolts or the finest quality machine bolts. The manufacturers either purchase the bolts and add the locking feature to the nuts, or the purchaser may consign the bolts to the American Lock Nut Company, paying only for the application of the locking device.

In principle, the lock is somewhat similar to that of a roller clutch, consisting of a tapered recess machined on the inside of a nut so that one side of it is closed by the bolt when the nut is in place. A small bobbin-shaped pin is set in this recess, and the direction of the flare in the recess depends on whether the threading is right or left hand. If right hand, the forward motion of the nut carries the locking pin along with it into the deeper portion of the recess where it revolves free. Movement in the opposite direction causes the pin to move toward the shallower portion of the recess where the angle is so designed that it automatically wedges the locking pin into the thread of the bolt. An attempt to force the nut in the process of removing it only clamps the locking pin tighter into the threads of the bolt.



Lock Nut, Showing Locking Pin and Release Nail

To remove the nut from the bolt it is necessary to insert a nail or wire, of approximately the same diameter as the locking pin, into the shallow portion of the recess. This fixes the position of the locking pin so that in moving the nut the pin cannot reach a point in the recess where the clamping action begins. In order to meet possible objection to this method of locking because of the difficulty an ordinary trackman might experience in placing the locking pin in the recess at the time the nut is applied to the bolt, small spring clips have been provided to hold the pin in place.

Results of a five months' test of the absolute lock nut on the Springfield Consolidated Railway, Springfield, Ill., at a busy steam railroad crossing were very satisfactory. Twenty-four lock nuts were placed in one rail of a crossing and twenty-four ordinary bolts in the other rail. After three months the crossing had received attention twice. At the end of the five months all the ordinary bolts had been replaced, while the "Absolute" lock-nut bolts were still in perfect condition. Experience has also shown that after two years' service in a steam road crossing, the locking feature has not lost its effectiveness, but is easily removed in the proper way and may be used elsewhere if the bolt has not corroded too badly.

The Duquesne Light Company, Pittsburgh, has transformed the old street railway carhouse at Fifth Avenue and Atwood Street into a testing laboratory, where tests will be made of meters, incandescent bulbs, arc carbons and other electrical apparatus.

NEW LOW-FLOOR MOTOR FOR PITTSBURGH

The motors for the 100 low-floor cars recently purchased by the Pittsburgh Railway and described in the ELECTRIC RAILWAY JOURNAL for April 11, have been ordered from the General Electric Company. These are of an entirely new design which will be known as the GE-247. They are of the box-frame commutating-pole type and have a nominal rating of 30 hp on 500 volts. They are so small that they can be easily used upon wheels of 24-in. diameter. The motors, however, are to be in no way radically different from generally accepted principles of design. They will follow the well-tested and recognized standards of the General Electric Company both in mechanical and electrical detail. In addition to the modifications in mechanical design necessary for adaptation to 24-in. wheels, there has been incorporated a new and still more efficient scheme of ventilation than the method now used in the ventilated motors of this maker.

The field coils are to be asbestos insulated and then impregnated, thus providing a solid structure practically indestructible and absolutely moisture-proof. They are to be supported on spring-metal seats and will be securely held for movement in any direction by spring flanges, resulting in evenly distributed pressure and preventing abrasion of the insulation. The armature shaft will be removable without disturbing the commutator connections or windings and the bearing shafts as usual are to be ground and rolled. The armature will be hot-banded to insure permanently fixed and tight coils. The armature bearing liners are made up of a bronze shell with a thin layer of babbitt. The oil-well covers have deep lips and fit upon machined seats so that water is prevented from entering and flooding the wells. The brush-holders are adjustable and are supported by mica-insulated studs. The motors have a gear ratio of 58:15.

The car axles between the motor axle bearings are entirely inclosed with sheet-steel dust guards. The gear cases are of steel, each upper and lower half being pressed out in a single integral piece. The steel supports for the top and bottom halves of the cases are fastened by means of welding. Both the gears and pinions are made from heat-treated, rolled steel, having an elastic limit between 140,000 lb. and 150,000 lb.

NEW YORK COMMISSION ISSUES BULLETIN

On April 16 the Public Service Commission for the State of New York, Second District, at Albany, issued Bulletin No. 131 containing the statement of the chairman in regard to the volume of cases pending on April 16. The last official statement of unfinished business on March 16 last showed the following cases pending: Grade crossing cases (active), 50; capitalization cases, 93; all other cases, 247; total cases pending, 390; on April 15 the statement is as follows: grade crossing cases, 45; capitalization cases, 88; all other cases, 240; total cases pending, 373, showing 17 less cases in the aggregate than were pending one month ago. From March 16 to April 16 final orders were entered as follows: grade crossing cases, 5; capitalization cases, 11; all other cases, 55; total orders issued for the month, 71.

In the same interval there were filed additional cases as follows: capitalization cases, 6; all other cases, 48; total new cases for the month, 54. On March 16 there were pending informal complaints 1303, to which have been added during the past month 155. Of these informal complaints, 311 have been disposed of during the month, leaving undisposed of on April 16, 1147.

News of Electric Railways

Modifications of Toledo Ordinance Provisions Suggested by City Solicitor

The ordinance submitted to the City Council of Toledo, Ohio, by Henry L. Doherty recently on behalf of the Toledo Railways & Light Company has been redrafted by City Solicitor Thurstin and referred to the franchise committee. The revised ordinance provides for the surrender of all existing franchises and covers all the present lines with the exception of those known as the Maumee Avenue and Huron Street lines. No franchise value is to be included in the appraisement in case the city purchases the property, and the city reserves the right to take over the property by condemnation proceedings. Under the ordinance as modified by Mr. Thurstin the valuation, if the property is purchased by the city, is to include only the power station and the other physical property used in the operation of cars. The city is to regulate interurban traffic within its limits and is to receive 10 per cent of the rentals paid by the interurban companies for the use of the city company's tracks. All interurban cars are to issue transfers to city cars. The company is to pay for the use of tracks on bridges owned by the city and is also to pay one-third of the cost of the removal of snow and ice from the streets in the business district.

Mr. Thurstin's revised ordinance tentatively provides for the sale of five tickets for 15 cents and a 5-cent cash fare for the period covered by the ordinance, but this matter was to be left to the judgment of the franchise committee, which had not decided upon the rate at that time. The term of the franchise was left at twenty-five years, as fixed by Mr. Doherty. The city solicitor favors a flat 3-cent fare.

The ordinance proposed by Mr. Doherty provided for the determination of the value of the property by arbitration, in case the city decided to purchase it, but made no mention of condemnation proceedings. Mr. Doherty did not include the power house as part of the property the city should have a right to purchase. Changes were also made in the provisions for rentals paid by the interurban railways. The new ordinance also extends city supervision over the interurban railways so far as their operation within the city limits is concerned.

Mr. Thurstin did not mention the proposition for the appointment of a commissioner to control the service in behalf of the city during the test year. Neither did he refer to the provision in the Doherty grant to authorize the Council to revise the rate of fare at the end of each five-year period. These matters will be held in abeyance until the franchise committee decides upon the rate of fare which in its opinion will best apply to the situation.

Peter Witt, street railway commissioner at Cleveland, spoke at a mass meeting in Memorial Hall, Toledo, on the evening of April 16. This was the second time he has addressed the people of Toledo within a few days. According to his views neither the plan of Henry L. Doherty nor that of the city was the proper method of settlement of the franchise question. He expressed the opinion that the rate of fare should be made elastic as provided in the sliding scale of fare in Cleveland, to compensate the company for the service demands as made by the city. With a fixed rate of fare the city could not control the service. If the people desired service they must pay for it. Mr. Witt said that the Doherty plan of trial 3-cent fares and periodic revisions meant a postponed settlement or franchise litigation. Mr. Witt said that the Toledo Railways & Light Company was correct in its statement that it could not operate on a fare of 3 cents with its present system. He based his observations of the system on information in the report of Carl Nau.

Mr. Witt stated that the present method of charging a 3-cent fare during the rush hours was vicious. The expense of carrying passengers during the rush hours was higher than in the middle of the day. There was no reason for carrying policemen, firemen and sanitary officers free. Valuation of the physical property was the first step to be taken in securing a settlement. It would be better to allow the company a few hundred thousand dollars more than might be considered the true value of the property than to prolong negotiations. Mr. Witt said the Cleveland franchise was based on the principles of security of investment, certainty of return and transportation at cost.

On April 21 Mr. Doherty withdrew from the franchise negotiations temporarily until the Council committee has decided on the question of possible competitive franchise bids. Mr. Thurstin so modified the ordinance proposed by Mr. Doherty as to provide for a new franchise instead of for "renewals and extensions" as Mr. Doherty stipulated. Counsel for the company maintained that a new franchise cannot be granted except by the legal formality of advertising for bids and obtaining consent of property owners, but that franchises may be renewed for all its lines and extensions granted without advertising so long as the franchise for any one of its present lines is unexpired. Mr. Thurstin said that the change was made to conform to the decision of the committee to treat the situation from the standpoint of making a new grant. He and the committee doubted whether the franchises could be renewed without advertising. He suggested that negotiations and temporary agreements between the city and the company be construed as continuing the status of the expired franchise so that the limitation would not apply. Mr. Doherty said that until the question is settled it would be a waste of time to continue the negotiations, and he and his counsel withdrew to permit the solicitor and his assistants to investigate the subject.

Favorable Report on Bill for Municipal Ownership in District of Columbia

The Commissioners of the District of Columbia have reported favorably on Representative Crosser's bill providing for the acquisition, ownership and operation by the commissioners of all the street railways located in the district. The report says in part:

"This bill is an important one, having for its object, as its title indicates, the acquisition, ownership and operation by the municipal government of all the street railroads located and operating wholly within the district and those partly within and partly without the District of Columbia; in the latter case, of the part located and operating within the district. To leave to private individuals, as a source of private profit, the performance of such a public function, resting, by necessity, as it does, upon special privileges, is to insure the maintenance of a struggle between public duty and public needs on the one hand and private interest and profit on the other, that in the nature of things grows sharper with the passing years, and in the opinion of the commissioners no amount of 'regulation' by public authorities, accomplished only after the law's delays are over, will end the irrepressible conflict that necessarily arises when the avarice of man is set against a public duty that is laid upon him to perform.

"The management of a street railroad privately owned and operated is chiefly concerned in collecting as many fares and at as low a cost to the company as possible, and this for the obvious purpose of making the largest dividend returns for its stockholders—that is, private profit.

"The passengers are chiefly concerned in securing the largest number of rides and the best service for the least amount of money—that is, the most efficient public service. If this public service is performed by public authorities they can have no other motive than to do those things that the traveling public demands. They have but to maintain a proper relation between efficient service and the cost thereof.

"It may be urged in opposition to this bill that regulation of such public utilities should first be tried under the law, enacted a year ago, creating a public utilities commission for the District of Columbia. But it should be pointed out, in addition to what has already been said in this connection, that there exist in the district two street railroad systems which for considerable distances parallel each other and needlessly duplicate much of the service each system renders. This condition will undoubtedly render more difficult and perplexing such regulation as the commission may be able to effect, and increase the complexity of the problems involved in dealing with the subject, and it forms, in the judgment of the commissioners, an additional reason for the enactment of the bill into law.

"Referring briefly to the structure of the bill, it may be said that it has the merit of brevity and clearness. Perhaps the requirement in section 2, that the commissioners shall institute, by petition, before the Utilities Commission a proceedings of condemnation, is unnecessary, and the matter might be simplified by directing the commission to proceed to a condemnation of the railroads for the purpose of their acquisition by the municipal government.

"It is suggested also that authority should be given to the commissioners to raise sufficient money, by the sale of bonds as proposed, in addition to the amount required to pay for the properties acquired, to provide a fund available for current expenditures during the first months of municipal operation."

Despite the fact that the railway system in New Orleans is privately owned, the report of the commissioners contained the following statement:

"The municipal ownership and operation of street railroads is no longer in the experimental stage. The old world has long since demonstrated the wisdom and great practical advantages of the municipalization of these public utilities, and at least one large city in this country, New Orleans, has for a number of years shown with what notable success it can be accomplished."

Commenting upon the report sent by the commissioners to Congress, Conrad H. Syme, corporation counsel of the district and legal adviser of the Public Utilities Commission, said:

"Municipal ownership is coming in the District of Columbia, because of all cities Washington is the one in which it is most practicable, where it involves the least risk and where it can be established without injustice."

Akron's Proposed New Terminal

Charles Currie, general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, said recently that the date for beginning the construction of the proposed new terminal station on North Main Street, Akron, depends entirely on the action of the City Council with respect to the extensions which the company proposes to build. The company's proposition was made six weeks ago and is now before the street railway committee. The company asked that it be allowed to extend its lines on Federal Street from North Main Street to Howard Street, in order to secure an outlet to the north. It owns the right-of-way for a direct line between what is known as the gorge and North High Street. This would necessitate the construction of a viaduct across a deep ravine in order to enter the city. Several sets of plans for the terminal building are now in the hands of the company. Mr. Currie said the building would not exceed four stories in height at first, but would be constructed so that other floors can be added as needed.

Delos F. Wilcox, New York, said in his report on the inspection of the Northern Ohio Traction & Light Company's properties that some of the equipment was of the most modern type in use, while some was antiquated. In his opinion limited service was badly needed between Kent and Ravenna. Shelter houses should also be built at certain points. He recommended that the cities connected by the company formulate uniform franchises for all of them. Court action was recommended as a last resort to secure better service.

Dean Cooley as Counsel to Detroit Commission

Dean Mortimer E. Cooley of the University of Michigan has been asked by the Detroit Municipal Street Railway Commission to act as chief counsel for the commission in the appraisal of the property of the Detroit United Railway within the city of Detroit. The commission's proposal is that Dean Cooley will supervise the entire work and advise the commission in all matters connected therewith.

Mayor Marx has approved the resolution of the Detroit Common Council providing for the construction of a new east and west "workingmen's" belt line, by the Detroit United Railway. The line will be built instead of the Mack-Myrtle line agreed to in the lower-fare agreement of Aug. 7. It involves the construction of some 6 miles of track and is planned to connect on the east side with the existing Harper line and on the west side with the proposed Junction Avenue line, at present held up through injunction proceedings in the Supreme Court brought by residents of the affected district. The new line will be built practically 3 miles north of the center of the city and is expected to relieve a tremendous amount of present downtown congestion.

The Detroit Department of Public Works has filed with the Municipal Railway Commission its report on the cost of the loop built by the Detroit United Railway to connect the Michigan line with the new Michigan Central depot. The line is 4449 ft. long and the department's cost estimate is $49,096, exclusive of office work and other overhead charges. The company has not as yet filed its figures of the complete cost of the loop.

W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees, has resigned as a member of the Detroit Street Railway Commission, the resignation to take effect at once. In his letter to Mayor Marx, who appointed him, Mr. Mahon does not give any reason for his resignation.

New York Subway Section Contracts Awarded

The Public Service Commission for the First District of New York during the week ended April 18 opened bids for the construction of two sections of the new rapid transit railroads; awarded the contract to the lowest bidder for one of these sections; began advertising for bids for the construction of another section; and sent the contracts for two more sections to the Interborough Rapid Transit Company for criticism and suggestions. Bids for the construction of Section No. 1 of Route No. 33 were received on April 14, and on April 17, the contract for this section was awarded to Booth & Flinn, Ltd., the lowest bidders, for $2,059,182. Section No. 1 connects the new Broadway subway with the proposed East River tunnel to Montague Street, Brooklyn, and runs from Trinity Place and Morris Street mainly through Whitehall Street to South Street, Manhattan. It will be a two-track line, with a station in Whitehall Street extending from State Street to Bridge Street. It will be operated by the New York Municipal Railway Corporation.

On April 17 the commission opened bids for the construction of Section No. 1 of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan, for operation by the Interborough Rapid Transit Company. Section No. 1 begins under Battery Park and extends northerly to Greenwich Street and Vesey Street, where it will connect with Section No. 2. This section will be a two-track line, and at the Battery Park end it will connect with the existing subway. The commission also advertised for bids, to be received May 12, for the construction of Section No. 2 of Route No. 20, the Canal Street crosstown subway in Manhattan, for operation by the New York Municipal Railway Corporation. This subway will connect the tracks coming over the Manhattan Bridge from the Fourth Avenue subway and the Brighton Beach line with the Broadway subway in Manhattan. This line will be the key of the whole Brooklyn rapid transit system. There will only be one station, which will extend from Centre Street to near Broadway. This will be a general transfer point, where passengers coming from lines crossing the Williamsburg Bridge may transfer to the Broadway subway, and vice versa. The station will also have stairway communication with the Canal Street station of the Centre Street Loop subway.

Two additional contracts have been approved as to form by the commission and sent to the Interborough Rapid Transit Company, the operating company, for criticism and suggestions. One is for Section No. 1-A of Routes Nos. 4 and 38. This section covers the connection between the proposed Seventh Avenue subway and the existing subway at the Battery. The other is for Section No. 7 of Route No. 5, the Lexington Avenue subway in Manhattan. Section No. 7 extends from about Forty-third Street north to Fifty-third Street, but will not include the proposed connection between the Lexington Avenue line and the existing subway, which will be let as a separate contract.

Appropriation Requested for Audit in Philadelphia

On April 16 Mayor Blankenburg of Philadelphia sent to Councils a message requesting an appropriation of $10,000 by transfer to provide for an audit of the books of the Philadelphia Rapid Transit Company before closing any negotiations with the company for the construction and operation of the proposed new rapid transit lines. The Mayor's request was referred to the finance committee. The proposal made by the company to the city in connection with the construction of rapid transit lines includes an indemnification of the company from loss of net earnings resulting from the operation of the rapid transit lines. Transit Director Taylor said that on this account it was reasonable that such loss of revenue to the company should be considered in the negotiations, but that the city should have full and impartial information as to exactly what the net earnings of the company are prior to closing any negotiations for the construction or operation of the recommended rapid transit lines.

On April 20 the directors of the company issued a statement saying that the corporation would welcome an audit of its accounts by the city, as suggested by Mr. Taylor, of the Transit Department. The statement of the directors follows:

"In order to correct any wrong impression that may have been created by the recent agitation in connection with transit matters, this management will welcome an additional audit by the City Comptroller of the accounts of the Philadelphia Rapid Transit Company, in accordance with the terms of the city contract of 1907; this audit to not only include the last year, but to cover the entire period of the Stotesbury management, from Jan. 1, 1911, up to and including the present fiscal year, closing June 30, 1914. Every facility will be afforded the Comptroller for the purposes of such an examination."

Decision Affecting Authority of California Commission

Justice Lucien Shaw of the State Supreme Court of California has reversed the decree of the State Railroad Commission of April, 1913, refusing the Oro Electric Corporation permission to enter the city of Stockton. The court rules that the power granted to the commission by the public utilities act to grant certificates of public convenience and necessity is unconstitutional as applied to municipalities. The decision was the outgrowth of proceedings in certiorari brought by the Oro Electric Corporation under the public utilities act to annul an order of the State Railroad Commission.

On Dec. 20, 1912, the city of Stockton granted to the Oro Electric Corporation a franchise to furnish electricity to the city. The Western States Gas & Electric Company was supplying power at that time. On April 29, 1913, the Railroad Commission instructed the last-named utility to reconstruct its system to the commission's satisfaction, agreeing to refuse the rival concern a certificate of public convenience and necessity. In August, 1913, the commission approved the action of the Western States company in conformity to its stipulations, and refused the application of the Oro Electric Corporation. Suit was then begun.

Justice Shaw held that if the State had empowered a city to grant a franchise, it also empowered the grantee to exercise his privilege. The court held that there was nothing to support the contention of the Railroad Commission that the amendment limiting its powers deals only with utilities already in operation, and that if such construction were true it would create a dual system of control never contemplated, and two utilities could operate, one under city control and the other under the control of the Railroad Commission, with different rates and methods. The decision also held that cities have control of their utilities regardless of whether or not they were in operation when the Railroad Commission was created, and, therefore, that the order denying the Oro Electric Corporation the right to exercise its franchise was in excess of jurisdiction of the commission, and that "the order is null and void, and must be vacated."

Work But No Workers

The Pacific Electric Railway, Los Angeles, Cal., found it necessary to apply to the Board of Public Works of Los Angeles recently for an extension of time in which to complete track work that it has under way, the company being unable to secure the help necessary to enable it to finish the work within the time specified by the board. In regard to the labor situation as it confronts the company with which he is connected, J. McMillan, general manager, commented in part as follows:

"Work for those who want work is plentiful, but there is an increasing scarcity of those who want work. They want money, they want social revolution, but bring the work to them and they flee in haste. It makes an employer tired to see this unemployed problem constantly flaunted before the public, when he knows that the problem that should give us pause is the I-won't-work problem. We need some huskies. We also need men for other kinds of work. For instance, we are always needing skilled mechanics, carpenters, machinists and electricians.

"The Pacific Electric hires Mexicans only because it has to. The Mexican will work, barring a week or so right after pay day, when he must spend his money. Now the Mexican gets $1.25 a day and we furnish him provisions and bunkhouses, or bunk cars, wherein to sleep. If we could get Americans or husky foreigners, we would pay them twice as much. For instance, when we can get Slavonians we given them $2.50 and $3 a day, because they are worth it. We would give Americans the same, because they are also worth it. But your free-born American citizens will no longer demean themselves by doing track work. They won't live in bunkhouses and they won't go away from home. At least your Angelenos won't. I know they won't because the company combed every employment agency in Los Angeles and the Plaza right after the storm trouble. Did we get any Americans? We did not. I pity an industrious man out of work, but I feel that for everybody's good someone should take a club and compel every man jack of these ranters and Kelly followers to go to work or get out."

Change in Secretary's Office.—After May 1 the office of George Allison, secretary of the Wisconsin Electrical Association, will be located in Room 1410, First National Bank Building, East Water and Mason Streets, Milwaukee, Wis.

Not to Electrify Line at Berlin.—E. J. Chamberlin, president of the Grand Trunk Railway System, Montreal, Que., has notified Mayor Euler of Berlin, Ont., that the company will not electrify the Galt and Elmira branches out of Berlin.

Pennsylvania Utilities Must File Tariffs.—Orders have been issued by the Public Service Commission of Pennsylvania that all public utility companies in Pennsylvania file not later than June 1 all tariffs issued by them and in effect on Jan. 1. The corporations must also file all amendments thereto.

New Haven Dissolution Ratified.—At a special meeting held on April 21 the stockholders of the New York, New Haven & Hartford Railroad ratified the agreement between Howard Elliott, chairman of the board, and the government for the segregation of the various properties of the company in accordance with the terms published in the ELECTRIC RAILWAY JOURNAL of March 28, 1914, page 735.

Power Contract Closed by New Jersey Line.—A ten-year contract has just been closed by the Jersey Power Company, one of the affiliated companies of the Atlantic Gas & Electric Company, to furnish electric power to the lines of the Morris County Traction Company, extending from Boonton to Lake Hopatcong and from Denville southeasterly to Morris Plains, N. J., a total distance of about 25 miles.

Injunction in Omaha Fare Case.—Judge Spears in the District Court at Omaha, Neb., has granted a temporary injunction on the application of the Omaha & Council Bluffs Street Railway restraining the city from enforcing the ordinance to require the company to sell seven tickets for 25 cents. The steps leading up to the passage of the ordinance were reviewed in the ELECTRIC RAILWAY JOURNAL of March 28, 1914, page 738.

Electric Ferry at Lafayette, Ind.—The Fort Wayne & Northern Indiana Traction Company has been authorized by the county commissioners to establish an electric ferry on the Wabash River between Lafayette and West Lafayette. The floods in the Wabash River Valley of a year ago last March carried away the bridge over which the company operated, and this spring a temporary structure which was serving until a new one could be built was also washed out.

Reduction of Assessment Asked.—The Metropolitan Street Railway, Kansas City, Mo., has asked the Kansas City, Kan., tax commission for a reduction of $1,000,000 in its valuation on the Kansas side. The property of the company, including the elevated road, in Kansas City, Kan., is valued at $3,574,000. The franchise under which the company is operating on the Kansas side provides that the company shall pay 8 per cent of its earnings to the city, and the latter shall pay all taxes out of this amount.

Agreement for Interurban Entrance to New Orleans.—It is reported that an understanding so mutually satisfactory that only minor details remain for negotiation has been reached by Harry K. Johnson, engineer of the Orleans-Kenner Interurban Railway, and J. S. Pevear, vice-president and general manager of the New Orleans Railway & Light Company. The route of the interurban railroad within the city is understood to provide for a terminal in University Place. Johnson & Company, Inc., are building the Orleans-Kenner Electric Railway.

F. S. Pearson on Mexico.—F. S. Pearson, president of the Mexico Tramways and the Mexican Light & Power Company, is reported to have said in an interview which appeared in a financial paper that war with Mexico would last ten years and cost the United States $1,000,000,000. He is quoted as follows: "I have always thought President Wilson was wrong at the beginning in the way he treated Huerta. It looks to me very much as though Mr. Wilson is ignorant of foreign affairs and of Mexico in particular. He doesn't understand the intense pride of the Latin-American race."

Mr. Mellen as Head of Railway Workers.—It is stated that Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, will be offered the presidency of the Federated Railroad Employees, representatives of which are to organize in Boston shortly. Mr. Mellen is reported to have said in this connection: "If the great body of railroad union labor men with whom I had been associated for years as railroad president should regard me as a worthy man to lead them as their chief executive in their federation, I should regard it as the greatest honor that had ever come to me."

Mr. Busby on Chicago's Problems.—Leonard A. Busby, president of the Chicago Surface Lines, says: "I stated several months ago that there are several steps involved in the solution of our transportation problem. First is the unification of the surface lines, second the construction of the initial subways for the relief of congestion in the downtown district, and, third, the unified operation of the surface and elevated lines. My opinion is not only unchanged, but strengthened, by the recent vote on the subway matter. The city voted against a comprehensive $130,000,000 subway system, but can construct a downtown subway loop."

Penstock Bursts at Spiers Falls.—As a result of the bursting of a penstock at the electric plant at Spiers Falls near Troy, N. Y., on the evening of April 21, the entire city and adjoining towns were plunged into darkness and the lines of the United Traction Company tied up. The waters of the Hudson River were still rising on April 23 and part of the United Traction Company's tracks on the west side of the Hudson was said to be inundated. At Fort Edward, Glens Falls and Corinth the water reached on April 21 a point almost as high as that of last year. The State road at Corinth was inundated to the depth of 12 in. and the tracks of the Hudson Valley Railway were under water, upsetting service.

Subway Ordinance Competition in Pittsburgh.—A. A. Fording, counsel for the Pittsburgh (Pa.) Subway Company, declines to enter into competition with other companies for a franchise to construct a subway in Pittsburgh. In a letter to S. S. Woodburn, chairman of the Council committee on public service and surveys, Mr. Fording says in part: "The Pittsburgh Subway Company is still willing to co-operate with the city in finding a way in which a subway can be built to the advantage of the city and with profit to the company, but my clients are not interested in anything resembling an auction. When it is finally found that competition will defeat its own object the Pittsburgh Subway Company will willingly take up the matter as a business proposition."

Pennsylvania Commission Against Duplication of Facilities.—In the matter of the application of the Schuylkill Light, Heat & Power Company to furnish service to Ashland, Schuylkill County, the commission held that the district had been well served for twenty-nine years by the Eastern Pennsylvania Light, Heat & Power Company, and the entrance of a competing utility would be of very doubtful benefit to the public. On this showing the commission dismissed the application of the competing company to enter the territory. In the case of the Harmony Electric Company, which asked for the right to compete with the company at Ellwood City, similar action was taken, the commission holding that vested rights and investments made in good faith must be protected.

United States Civil Service Examinations.—The United States Civil Service Commission announces an open competitive examination for junior structural engineer, junior electrical engineer, junior mechanical engineer and junior railway signal engineer, for men only, on May 20. From the register of eligibles resulting from these examinations certification will be made to fill vacancies as they may occur in this position in the Interstate Commerce Commission, under the act providing for the valution of the property of common carriers, at salaries ranging from $1,080 to $1,500 per annum. Appointments to these positions will be principally for duty in the field, but some appointments will be made for duty in the general office in Washington, D. C. Persons who desire to take the examination should apply for application form 2039 to the United States Civil Service Commission, Washington, D. C.

Electrification of Erie Branch.—The Northwestern Pennsylvania Railways is preparing to take over and electrify the old main line track of the Erie Railroad between Meadville and Cambridge Springs, Pa. This line offers a short route and good grade between these two points, and when electrified will permit a reduction in the running time from three hours to an hour and forty-five minutes. The Meadville property has been thoroughly overhauled, and it is planned to install a parlor car service on the line. A new high tension transmission line has been installed from Erie to Meadville, and a new freight and passenger station has been built at Edinboro. The company connects with the Pennsylvania Railroad at Linesville for the transfer of passengers and it also meets the Erie Railroad at Cambridge Springs, where it will take over the Erie freight trains under its own motive power. It is expected that the new electrified service over the Erie will be in operation late next fall.

Authority of Illinois Utilities Commission Questioned.—The opportunity to test the Illinois public utilities law, for which the city of Chicago has been waiting, was presented when the commission appointed by the Governor made the city a party to a petition for the revision in street-car fare between Berwyn and Chicago. Corporation Counsel Sexton of Chicago declared that the commission is without power of any kind and that any ruling it may make in this particular case is null and void. The corporation counsel's answer also contains a statement in regard to the law as a whole, declaring that the act violates the constitution of the United States. The situation demanding answer on the part of the corporation counsel was brought about by the city of Berwyn demanding a reduction of fare to the city of Chicago from 10 cents to 5 cents. It was asserted that the Chicago & West Towns Railway was discriminating against Berwyn because certain other points equally distant from Chicago were accessible for a 5-cent fare.

Financial and Corporate

Stock and Money Markets

April 22, 1914.

Although much interest was manifested in the Mexican situation to-day on the New York Stock Exchange, this was not an important market factor. General recessions occurred in the morning, but the final prices were only slightly below those of the day before. Delaware & Hudson sustained an early loss, but recovered vigorously. Rates in the money market to-day were: Call, 2 per cent; sixty days, 3@3¼ per cent; four months, 3¼ per cent; six months, 3¼@3½ per cent.

The changes on the Philadelphia Stock Exchange to-day were irregular. Final prices were 14⅞@15 for Philadelphia Rapid Transit and 42½@43 for United Traction.

The Chicago market exhibited a generally easier tendency to-day. The bond market was steady and sales were fair.

On the Boston market to-day there were losses of a point or more. Mining and industrial securities headed the list of sales.

In Baltimore a fair degree of activity prevailed on the Stock Exchange. Sales totaled 1890 shares and bonds $65,600, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Apr. 15	Apr. 22
American Brake Shoe & Foundry (com.)	87½	84½
American Brake Shoe & Foundry (pref.)	137½	134½
American Cities Company (com.)	a35½	35½
American Cities Company (pref.)	61¼	60¾
American Light & Traction Company (com.)	348	342
American Light & Traction Company (pref.)	105½	105½
American Railways Company	37¾	37
Aurora, Elgin & Chicago Railroad (com.)	37	36
Aurora, Elgin & Chicago Railroad (pref.)	*77	37
Boston Elevated Railway	80	78½
Boston Suburban Electric Companies' (com.)	7	7
Boston Suburban Electric Companies (pref.)	*63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company	91¼	89⅝
Capital Traction Company, Washington	100	100
Chicago City Railway	170	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	90⅝	90
Chicago Railways, ptcptg., ctf. 2	31¾	31½
Chicago Railways, ptcptg., ctf. 3	5	6
Chicago Railways, ptcptg., ctf. 4	1½	2
Cincinnati Street Railway	105	103
Cleveland Railway	103½	103¾
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	a23	*2
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*71	*71
Detroit United Railway	a80	a80
General Electric Company	144½	143
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14⅝	14
Interborough-Metropolitan Company (pref.)	60⅝	60⅜
International Traction Company (com.)	*80	*80
International Traction Company (pref.)	a85	*85
Kansas City Railway & Light Company (com.)	*15	*15
Kansas City Railway & Light Company (pref.)	*35	*35
Lake Shore Electric Railway (com.)	5	*5
Lake Shore Electric Railway (1st pref.)	92	*92
Lake Shore Electric Railway (2d pref.)	22	22
Manhattan Railway	131⅛	131
Massachusetts Electric Companies (com.)	10½	9
Massachusetts Electric Companies (pref.)	59½	59
Milwaukee Electric Ry. & Light Co. (pref.)	*95	*95
Norfolk Railway & Light Company	25¾	25¾
North American Company	75	74
Northern Ohio Traction & Light Co. (com.)	60¾	70
Northern Ohio Traction & Light Co. (pref.)	a101	101
Philadelphia Company, Pittsburgh (com.)	41	40
Philadelphia Company, Pittsburgh (pref.)	40	38
Philadelphia Rapid Transit Company	16½	14¾
Portland Railway, Light & Power Company	51	51
Public Service Corporation	112	112
Third Avenue Railway, New York	42½	40
Toledo Traction, Light & Power Co. (com.)	20	a20
Toledo Traction, Light & Power Co. (pref.)	70	a70
Twin City Rapid Transit Co., Min'apolis (com.)	104	103
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	75	75
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	27	26½
United Rys. Inv. Company (com.)	17	15
United Rys. Inv. Company (pref.)	42	43
Virginia Railway & Power Company (com.)	51	50⅜
Virginia Railway & Power Company (pref.)	96	96
Washington Ry. & Electric Company (com.)	87¾	87¾
Washington Ry. & Electric Company (pref.)	85½	85½
West End Street Railway, Boston (com.)	a70	68
West End Street Railway, Boston (pref.)	90¼	90
Westinghouse Elec. & Mfg. Company	72¼	73
Westinghouse Elec. & Mfg. Co. (1st pref.)	117½	117

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* Last sale. a Asked.

ANNUAL REPORTS

United Railways & Electric Company

The income statement of the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1913, follows:

Gross earnings:	
Revenue from transportation	$8,912,986
Revenue from operations other than transportation	133,506
Total	$9,046,492
Operating expenses:	
Maintenance of way and structures	$456,033
Maintenance of equipment	417,482
Traffic expenses	8,722
Conducting transportation	2,557,695
General and miscellaneous	706,499
Total	$4,146,431
Net earnings from operation	$4,900,061
Income from other sources	6,945
Total net income	$4,907,006
Fixed charges, etc.:	
Interest on bonds	$2,050,305
Park and other taxes	866,229
Ground rents and other rentals	7,734
Interest on car trust certificates, Series "A"	3,062
Interest and discount	138
Total	$2,927,468
Balance	$1,979,538
Deduction from income—rental account—1½ per cent sinking fund, Maryland Electric Railways 5 per cent bonds	60,000
	$1,919,538
Extinguishment of discount on securities	37,950
	$1,881,588
Interest on income bonds, dividend on preferred stock	560,000
Surplus	$1,321,588
Dividends paid on the common stock in 1913	791,362
Balance carried to the credit of depreciation reserve	$530,226

The increase in gross earnings during 1913 was $475,003, or 5.5 per cent, while the increase in operating expenses was $277,555, or 7.2 per cent. The decrease in fixed charges was $16,947, or 0.58 per cent. The operating ratio was 45.83 per cent, as compared with 45.14 per cent in 1912. If the charges for depreciation were included in the operating expenses the operating ratio would be 51.7 per cent.

For maintenance of way, structures and equipment the company expended during the year $873,516. During the year there was also credited to depreciation reserve $530,226, or nearly 6 per cent of the gross earnings. Of this amount there was expended $499,898 and the balance of $30,327 was carried to the existing reserve, making the depreciation balance of Dec. 31, 1913, $79,786.

The total taxes and public charges for 1913 were $1,065,168, an increase of $72,772, or 11.77 per cent of the gross revenue and 21.74 per cent of the net income. The 1913 tax payments represent the total net earnings (after paying costs of operation only) of about one car in every five. After exchanging its stock for convertible notes, the company during 1913 reduced its bond interest $83,655. The net reduction in fixed charges during the year was $16,947.

The current assets as of Dec. 31, 1913, were $2,844,913 in excess of the current liabilities, an increase over 1912 of $1,312,102. The accounts payable increased $3,185 and cash on hand decreased $36,683. The average earnings per car mile were 29.95 cents, an increase of 0.87 cent, and the cost of service (exclusive of depreciation) was 13.73 cents, an increase of 0.60 cent. The car miles run during the year were 30,203,185, an increase of 730,648. The total number of revenue passengers carried was 182,180,767, an increase of 9,947,426. The number of transfers used was 74,634,030, an increase of 5,289,202. The company now operates 403.3 miles of single track. The report states that during 1913 sixty double-truck semi-convertible pay-as-you-enter cars were placed in service.

An interesting feature of the report is the detailed analysis by a certified public accountant which is appended. Another important part is the declaration of the company in regard to dividends. It is stated that during the past fourteen years the company has expended approximately $20,440,000 in improving its property. Before inaugurating the declaration of dividends the directors required that the company should be in fine physical condition, that it should be entirely free from floating debt and that the wages of employees should be increased. When these conditions had been complied with in 1912 the directors began paying dividends with a feeling that they were based upon a sound and conservative foundation. During 1913 the dividends amounted to 4 per cent of the common stock.

General Electric Company

In the year 1913 the business of the General Electric Company exceeded in volume the record of any previous year. The value of orders received was $111,819,142. The amount of sales billed was $106,477,438. The profits from sales and the income from other sources amounted to $14,065,789. The interest and discount on debentures and notes payable amounted to $1,007,910, and the dividends paid to $8,149,204, leaving $4,908,674 to be carried to surplus account.

The condensed profit and loss account of the company for the year ended Dec. 31, 1913, follows:

Sales billed			$106,477,438
Less: Cost of sales, including all operating, maintenance and depreciation charges			96,207,833
			$10,269,605
Interest and discount, royalties and sundry profits		$1,478,721	
Income from securities owned		1,281,462	
Increase in value of securities of companies owned, due to additions to the surplus of those companies		1,036,000	
		$3,796,184	
Less:			
Interest on debenture bonds	$576,432		
Balance of discount on debenture bonds issued in 1912	37,438		
Discount and expenses on note issue	394,039	1,007,910	
			2,788,273
			$13,057,879
Dividends paid			8,149,204
Net surplus for the year			$4,908,674
Surplus at Jan. 1, 1913			12,031,144
Surplus at Dec. 31, 1913			$16,939,819

The condensed balance sheet as of Dec. 31, 1913, follows:

ASSETS

Patents, franchises and good-will			$1
Cash			$14,844,210
Stocks and bonds		$25,964,317	
Notes and accounts receivable		26,210,459	
Due from subsidiary companies		6,817,563	
Installation work in progress		2,012,514	
		$61,004,853	
Merchandise inventories:			
At factories	$31,697,055		
At district offices, in transit, etc.	4,010,538		
Consignments	2,083,145		
		37,790,738	
			98,795,592
Manufacturing plants (including all lands, buildings and machinery)		$29,427,168	
Real estate, buildings, warehouses, etc. (other than manufacturing plants)		1,058,386	
Furniture and appliances (other than in factories)		2	
			30,485,557
			$144,125,360

LIABILITIES

Debenture bonds:		
5 per cent series of 1892	$16,000	
3½ per cent series of 1902	2,047,000	
5 per cent series of 1907	88,500	
5 per cent series of 1912	10,000,000	
		$12,151,500
Notes payable, due on April 16, 1914	$8,000,000	
Accounts payable	2,846,656	
Accrued taxes	302,133	
Advance payments on contracts	279,561	
Accrued interest on debentures	197,016	
Dividend payable on Jan. 15, 1914	2,027,472	
		13,652,840
Capital stock issued		101,381,200
Surplus:		
At Jan. 1, 1913	$12,031,144	
Added during year	4,908,674	16,939,819
		$144,125,360

C. A. Coffin, chairman of the board, says in part:

"The tendency toward an increase in the number of orders and a reduction in their average value has continued during the past year, more than 600,000 orders having been received. This feature of the business, together with increased competition, has caused an unavoidable addition to the expense of securing and filling orders.

"The number of employees engaged in factories, offices and subsidiary companies on Dec. 31, 1913, exceeded 65,000. As heretofore, the expenditure for the purchase of patents, for applications and licenses under patents and for miscellaneous expenses in connection therewith, amounting to $662,925 for the year, has been charged to income account, and the patent account is carried at $1. Stocks and bonds are carried at a valuation of $25,964,316, of which $17,574,843 represents stocks of subsidiary companies and $8,389,473 the stocks and bonds of public utility and other companies.

"The current accounts and notes receivable have been carefully reviewed and conservatively valued and are carried at $26,210,458. The total amount due from subsidiaries is now $6,817,563.44, making the aggregate balances of all accounts and notes receivable $33,028,022.

"During the year additional manufacturing floor space to the amount of 1,740,000 sq. ft. was provided. The expenditures during the year for additions and improvements to manufacturing plants aggregated $11,373,118, and the amount written off was $6,502,060."

In July, 1913, an issue of $8,000,000 of nine-months notes maturing on April 16, 1914, was sold at a discount rate of 6¼ per cent per annum, for the purpose of meeting demands due to a large increase in business during the first half of the year and other burdens incident to the very unsettled financial conditions then existing. Money was deposited for the payment of these notes at maturity out of current funds. The company has no other note payable, nor is there any paper outstanding bearing its endorsement.

Hudson & Manhattan Railroad

The comparative income statement of the Hudson & Manhattan Railroad, New York, N. Y., for the eleven months ended Dec. 31, 1912 and 1913, is as follows:

	1913	1912
Gross revenue—passenger fares	$3,168,727	$3,103,697
Miscellaneous revenue from railroad operations	244,606	207,665
Total railroad revenue	$3,413,222	$3,311,362
Operating expenses of railroad	1,337,160	1,183,820
Net operating revenue from railroad	$2,076,173	$2,127,542
Taxes on railroad operating properties	245,484	249,237
Net income from railroad operation	$1,830,689	$1,878,305
Total net income from outside operations	860,177	875,619
Total net income from all operating sources	$2,690,867	$2,753,924
Non-operating income	31,665	29,626
Gross income	$2,722,532	$2,783,550
Income deductions other than bond interest	245,078	210,409
Net income applicable to bond interest	$2,477,454	$2,573,141
Deductions on bond interest	1,857,678	
Balance of net income for the period, available for interest on adjustment income bonds	$619,776	

The above statement is given for eleven months for the reason that the provisions of the readjustment plan with respect to bond interest became effective on Feb. 1, 1913, and the results of prior periods are not fairly comparable with the subsequent operations.

The income statement of the company contained various details of the miscellaneous revenue from railroad operations as follows: Advertising, for 1913, $150,040; for 1912, $139,573; other car and station privileges, for 1913, $60,034; for 1912, $54,872; sale of power, for 1913, $6,980; for 1912, $8,310; miscellaneous transportation revenue, for 1913, $2,194; for 1912, $13; other miscellaneous revenue, for 1913, $25,358; for 1912, $4,898.

The operating expenses of the railroad were also itemized in the statement, as follows: Maintenance of way and structures, for 1913, actual expenditures, $204,227, reserve, $56,600; for 1912, actual expenditures, $175,621, reserve, $9,685; maintenance of equipment, for 1913, actual expenditures, $138,467, reserve, $57,999; for 1912, actual expenditures, $82,864, reserve, $4,934; traffic expenses, for 1913, $1,754; for 1912, $9,639; transportation expenses, for 1913, $726,282; for 1912, $765,492; general expense, for 1913, $151,831; for 1912, $135,587.

The gross revenues from passenger fares showed an increase of $65,030 over 1912, while the total railroad revenue increased $101,971. The operating expenses increased $153,-

340. In connection with the operating expenses it should be noted that beginning with February, 1913, a new plan for the amortization of capital was inaugurated. This plan necessitates setting aside in actual cash each year a sum which invested at 4 per cent interest compounded annually will provide sufficient funds for the replacements of the various property units at the end of their anticipated lives. In 1912 only $31,928 for amortization reserves was charged to operating expenses, while in 1913 these charges amounted to $148,391, an increase of $116,463. This fact must be borne in mind in making comparisons of the operating expenses for the two years.

Owing to the increased provision for amortization, the total net income from all operating sources decreased $63,057. The non-operating income, however, increased $2,039, therefore reducing the gross income decrease to $61,028. The income deductions showed an increase of $34,669 owing to increases in the interest on real estate mortgages and loans payable and the federal income tax on bond interest. The net income applicable to bond interest showed a decrease of $95,687 as compared with 1912.

The report states that the readjustment plan has fully rehabilitated the company's finances. The net income available for interest on the first lien and refunding first mortgage 5 per cent bonds for the eleven months ended Dec. 31, 1913, was approximately 40 per cent in excess of the amount required for that purpose. The report calls attention to the fact that the first mortgage 5 per cent thirty-year bonds of the New York & New Jersey Railroad, the first lien and refunding first mortgage 5 per cent bonds, series A, and the adjustment income first mortgage 5 per cent bonds have been listed on the New York Stock Exchange, and the statement is made that an application will also be made to list these issues on the London Stock Exchange.

The report contains a table of outstanding bonds and outstanding equipment obligations as well as a completely detailed account of the operating revenues and operating expenses for 1912 and 1913 and analyses for the different months of the year. According to the table of traffic statistics, the number of passengers increased from 58,079,194 in 1912 to 59,434,152 in 1913. The revenue car miles operated increased from 7,950,153 in 1912 to 7,991,953 in 1913, giving an increase from 7.31 to 7.44 in the number of passengers per revenue car mile. The passenger revenue per revenue car mile increased from $0.4282 in 1912 to $0.4352 in 1913; the gross railroad operating revenue per car mile advanced from $0.4566 in 1912 to $0.4684 in 1913. The operating expenses (excluding taxes) per revenue car mile increased from $0.1645 in 1912 to $0.1820 in 1913, giving a decrease in the net railroad operating revenue per revenue car mile from $0.2921 in 1912 to $0.2864 in 1913. According to an income statement for the Hudson & Manhattan terminal buildings, the net income for 1913 amounted to $920,754 as compared with $946,370 in 1912.

New Officers of West Penn Traction Company

At a meeting held on April 18 Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, was elected president of the West Penn Traction Company. At the same time the following board of directors was chosen: Guy E. Tripp; Samuel Insull, president of the Commonwealth Edison Company and Middle West Utilities Company; J. D. Mortimer, president of the North American Company; William B. Schiller, president of the National Tube Company; J. F. Finley, president of the Colonial Steel Company; A. H. Wiggin, president of the Chase National Bank, New York; H. Hobart Porter, member of the firm of Sanderson & Porter and president of the American Water Works & Electric Company; Henry R. Platt, Chicago, and George T. Wood, Louisville, Ky.

The election of this board represents the first step in the active development of the West Penn properties following the reorganization of the old American Water Works & Guarantee Company. Mr. Tripp will at once assume active management of the company and he is expected soon to make his first official inspection of the property. When this is completed a plan for the future development of the properties will be submitted to the board of directors. W. E. Moore will continue in immediate charge of the operating department as general manager of the West Penn Traction Company.

A. B. Leach & Company, New York, N. Y., and the Continental Commercial Trust & Savings Bank, Chicago, Ill., are heading a syndicate that has purchased $6,000,000 of three-year 6 per cent tax exempt notes of the West Penn Traction Company. It is expected that at least $4,000,000 of the proceeds of these notes will be spent for betterments, improvements and new construction. Each note is secured by $1,250 of West Penn Traction Company first mortgage bonds. The sale of the notes is conditioned upon certain covenants insuring the closest supervision of the property and its management by the bankers represented by the syndicate managers. One of these covenants says: "The management of the West Penn Traction Company shall be placed in the hands of officers and directors satisfactory to the bankers, and the bankers through the syndicate managers are to have such representation on the board of directors of the company, including if desired a majority of the executive committee, as will enable them effectually to supervise the expenditures of the note issue."

The sale of the notes is also conditioned upon the procuring by the West Penn Traction Company of a valid and binding agreement on the part of the West Penn Traction & Water Power Company, the holding company, that it will, while any notes are outstanding, cause such directors to be elected to the board of directors of the West Penn Traction Company as will at all times conform to the requirements embodied in the syndicate agreement.

New York, New Haven & Hartford Railroad Short-Term Notes

The New York, New Haven & Hartford Railroad is said to have arranged with its bankers for an issue of three series of new short-term notes for $60,000,000. Of this amount $40,000,000 is to run for a single year and pay 5 per cent. The remaining $20,000,000 will run for three years and will bear interest at 6 per cent. They are to net the railroad 98, and will be offered to the public at 99. Of the three issues, $20,000,000 is to consist of New Haven one-year 5 per cent notes, which will be secured by collateral. Another $20,000,000 will be in one-year 5 per cent notes of the Harlem River & Port Chester Railroad indorsed by the New Haven. The balance are to be three-year 6 per cent notes of the New Haven Navigation Company, secured by collateral. The proceeds will be about $5,000,000 above the present cash needs of the company. The financing is being handled by J. P. Morgan & Company, the National City Bank, the First National Bank, Kidder, Peabody & Company and Lee, Higginson & Company.

As referred to elsewhere in this issue, at a special meeting held on April 21 the stockholders of the New York, New Haven & Hartford Railroad ratified the agreement between Howard Elliott, chairman of the board, and the government for the segregation of the various properties of the company.

The announcement of the appointment of trustees for the several properties of the company in accordance with the dissolution plan was made in the ELECTRIC RAILWAY JOURNAL recently.

Bangor Railway & Electric Company, Bangor, Maine.—An initial dividend of one-half of 1 per cent has been declared on the $2,000,000 of common stock of the Bangor Railway & Electric Company, payable on May 1 to stockholders of record of April 20.

Calumet & South Chicago Railway, Chicago, Ill.—The Merchants' Loan & Trust Company, Chicago, Ill., is placing at 95 and interest first mortgage 5 per cent gold bonds of the Calumet & South Chicago Railway of 1908, due on Feb. 1, 1927, of which $5,175,000 are now outstanding.

Cities Service Company, New York, N. Y.—The stockholders of the Cities Service Company have voted to increase the authorized capital stock of the company from $50,000,000 to $65,000,000. The $50,000,000 of stock was divided into $30,000,000 of preferred and $20,000,000 of common. The $65,000,000 of stock will be divided into $40,000,000 of preferred and $25,000,000 of common.

Boston (Mass.) Elevated Railway.—The Public Service Commission of Massachusetts has approved an issue of $600,000 of thirty-year bonds by the West End Street Railway and 5600 additional shares of common stock, the proceeds to reimburse the Boston Elevated Railway for improvements made in accordance with the terms of the lease between the companies. Additional common stock is to be sold at auction. The commission has also approved the application of $24,888, realized as part of the proceeds of bonds issued in February, 1913, by the West End Street Railway, toward the cost of additions and improvements on property made under terms of the lease to the Boston Elevated Railway.

Bowling Green (Ky.) Railway.—The Bowling Green Railway, the property of which was sold under foreclosure as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914, page 57, has been succeeded by the Southern Traction Company, Inc. The officers of the Southern Traction Company, Inc., are: Charles Roemer, president; P. C. Jessee, vice-president and general manager; J. S. Lewis, second vice-president; J. W. Ford, treasurer; Lon D. Hanes, secretary; C. G. Cox, superintendent; A. T. Kinnaman, Charles Roemer, P. C. Jessee, B. H. Dalton, H. L. Davis, J. S. Lewis, J. W. Ford and L. D. Hanes, directors.

Brooklyn (N. Y.) Rapid Transit Company.—The Brooklyn *Eagle* says: "According to the records of the office of the secretary of the Brooklyn Rapid Transit Company the amount of 4 per cent convertible bonds of the company now outstanding is only $15,334,000. The amount authorized under the terms of the mortgage was $150,000,000, but only $50,199,000 have been issued, of which something like $15,360,000 had been held in the company's treasury. These bonds are convertible into stock of the same par value up to July 1 next. The capital stock of the company has been commensurately increased of late, the amount now outstanding being $64,406,000. This stock pays 6 per cent against only 4 per cent paid on the convertible bonds, and at the close of the market on April 17 there was a difference in the price of only one point in favor of the stock. At 90 the bonds yield 4.4 per cent and at 91 the stock yields 6.6 per cent, so that there is adequate incentive for the rapid conversion of the bonds before the expiration of the conversion privilege."

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—The Public Utilities Commission of Ohio has denied the amended application of the Chardon, Jefferson & Meadville Interurban Railroad for permission to issue $250,000 of capital stock and $575,000 of thirty-year first mortgage bonds to the Stanley Construction Company. The commission held that the amount of stock and bonds sought to be issued was in excess of the cost of constructing and equipping the road. The company plans to build a 30-mile line to connect Chardon, Hampton, Fontville, Rock Creek and Jefferson, Ohio, with Linesville, Pa.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—The Public Utilities Commission of Ohio has authorized the Cleveland, Painesville & Eastern Railroad to issue its forty-year 5 per cent refunding and extension mortgage gold bonds of the total principal sum of $54,000, said bonds to be sold for not less than 80 and accrued interest. The proceeds arising from a sale of the bonds are to be devoted to reimburse the income account of the company for money expended therefrom during 1913, aggregating the sum of $54,671, for additions, extensions and improvements.

Columbus, Marion & Bucyrus Railway, Marion, Ohio.—A first mortgage deed of trust for $100,000, bearing 6 per cent and made to the Guardian Savings & Trust Company of Cleveland, was filed at Marion and Bucyrus on April 9. The proceeds are to be used for defraying the expense of the bondholders' committee in operating the road from the time it was brought into court until a reorganization was effected. On April 10 a second deed of trust for $350,000, in favor of the Knickerbocker Trust Company, New York, was filed. It is due January 2, 1944.

Delta Electric Light, Power & Manufacturing Company, Greenville, Miss.—It is understood that negotiations are pending for the transfer of the property of the Delta Electric Light, Power & Manufacturing Company to the Delta Light & Traction Company, recently incorporated by N. B. Claggett, S. J. Lenz and F. N. Robertshaw.

Denver (Col.) Tramway.—Forty-eight first mortgage 5 per cent gold bonds of the Denver Tramway Power Company have been called for payment at 105 and interest at the office of the International Trust Company, Denver, on May 11.

Grafton Light & Power Company, Grafton, W. Va.—The Grafton Traction Company and the Grafton Gas & Electric Light Company have been consolidated as the Grafton Light & Power Company. Both companies have been controlled by the same interests.

Jackson Light & Traction Company, Jackson, Miss.—The Chicago Savings Bank & Trust Company, Chicago, Ill., is offering at 97 and interest a block of the original issue of $700,000 of first mortgage 5 per cent bonds of the Jackson Light & Traction Company of 1902, due on April 1, 1922.

Lake Shore Electric Railway, Cleveland, Ohio.—The Lake Shore Electric Railway has been authorized by the Public Utilities Commission of Ohio to pledge its 5 per cent general mortgage bonds of the principal sum of $70,000 as collateral for a loan of not less than $42,000. The company recently notified the commission that it had been unable to sell at 85 the $70,000 of bonds recently authorized by the commission.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The Railroad Commission of California has authorized the Los Angeles & San Diego Beach Railway to issue refunding promissory notes, the first in the sum of $15,000 bearing interest at the rate of 6 per cent, and the second in the sum of $19,000, bearing interest at the rate of 7 per cent, both due in four months. The notes are to be sold at their face value.

Mesaba Railway, Virginia, Minn.—W. H. Newbold's Son & Company and Graham & Company, Philadelphia, Pa., are offering the unsold balance of Mesaba Railway first mortgage sinking fund 5 per cent gold bonds at 94 and interest, yielding over 5½ per cent. The bonds are dated March 1, 1912, and are due on March 1, 1932. Interest is payable March and September. The bonds are redeemable at the option of the company as a whole on any interest date by lot for account of sinking fund at 105 and interest.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Public Utilities Commission of Ohio has authorized the Northern Ohio Traction & Light Company to issue $481,600 of its 6 per cent cumulative preferred stock to be sold for not less than 95, the proceeds from the sale to be devoted to reimburse the income account of the company for money expended during 1913 for reconstruction, additions, extensions and improvements. The commission has also authorized the Canton & Akron Consolidated Railway and the Northern Ohio Traction & Light Company to issue general consolidated 5 per cent bonds of the Canton & Akron Consolidated Railway to the amount of $58,000, the bonds to be sold at not less than 80. The proceeds of the sale of the bonds are to be devoted to reimburse the Northern Ohio Traction & Light Company for 85 per cent of the cost of additions, extensions and improvements made by that company to the property of the Canton & Akron Consolidated Railway during 1913.

Pittsburgh & Butler Street Railway, Pittsburgh, Pa.—A special meeting of the stockholders of the Pittsburgh & Butler Street Railway will be held on June 12, to vote on a proposed increase in the bonded indebtedness of the company from $2,000,000 to $4,000,000.

Washington Railway & Electric Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia has approved the application of the Washington Railway & Electric Company for authority to issue $1,000,000 of bonds under a mortgage to the United States Mortgage & Trust Company, New York, N. Y., bearing the date of March 1, 1902. The bonds will be used to retire $500,000 of first mortgage gold bonds and $500,000 of extension mortgage bonds of the Columbia Railway, falling due on Oct. 1, 1914. The new issue will bear interest at 4 per cent, while the bonds which are to be replaced bear 6 per cent.

Dividends Declared

Bangor Railway & Electric Company, Bangor, Maine, one-half of 1 per cent.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, ordinary.

Cape Breton (N. S.) Electric Company, Ltd., $3, preferred; $3, common.

Commonwealth Railway, Power & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Cumberland County Power & Light Company, Portland, Maine, quarterly, 1½ per cent, preferred.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred.

Railways Company General, Philadelphia, Pa., quarterly, 1 per cent.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Mar.,	'14	$23,196	$20,519	$2,676	$674	$2,002
1 "	"	'13	25,674	19,409	6,266	466	5,800

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$67,918	*$63,623	$4,295	$15,977	†$11,682
1 "	"	'13	63,919	*64,707	789	12,960	†13,749
8 "	"	'14	685,852	*598,367	87,486	122,331	†34,845
8 "	"	'13	653,878	*588,754	65,124	100,546	†35,122

CONNECTICUT COMPANY, NEW HAVEN, CONN.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$556,533	*$458,789	$97,744	$88,366	$9,378
1 "	"	'13	540,536	*407,224	133,312	86,484	46,828
8 "	"	'14	5,584,045	*4,032,557	1,551,488	713,893	837,595
8 "	"	'13	5,227,659	*3,586,308	1,641,351	692,376	948,975

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$168,062	*$114,456	$53,606	$63,465	$9,859
1 "	"	'13	157,324	*94,399	62,925	56,714	6,211
12 "	"	'14	2,377,457	*1,351,056	1,026,401	727,867	298,534
12 "	"	'13	2,161,772	*1,214,293	947,479	657,376	290,103

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$19,761	*$22,235	$2,475	$7,801	†$10,276
1 "	"	'13	20,743	*21,170	427	7,436	†7,860
8 "	"	'14	252,791	*201,958	50,834	61,694	†10,860
8 "	"	'13	250,201	*224,880	25,320	56,827	†31,507

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$27,647	*$45,180	$17,533	$11,124	†$28,657
1 "	"	'13	25,395	*43,273	17,877	13,992	†31,869
8 "	"	'14	283,863	*391,052	107,189	75,991	†183,180
8 "	"	'13	201,263	*371,959	170,696	101,933	†272,629

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Mar.,	'14	$1,949,519	$1,187,592	$761,927	$802,946	†$41,019
1 "	"	'13	2,009,443	1,219,268	790,175	765,093	25,082
9 "	"	'14	17,974,593	10,622,574	7,352,020	7,204,020	148,000
9 "	"	'13	17,712,793	10,638,715	7,074,078	6,862,519	211,559

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$538,236	*$259,989	$278,247	$174,880	$103,367
1 "	"	'13	530,071	*247,357	282,714	152,509	130,205
12 "	"	'14	6,760,919	*3,318,019	3,442,900	2,051,234	1,391,666
12 "	"	'13	6,675,837	*3,304,478	3,371,359	1,791,038	1,580,321

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$359,139	*$321,680	$37,459	$110,314	†$72,855
1 "	"	'13	361,504	*266,799	94,705	102,056	†7,351
8 "	"	'14	3,685,585	*2,693,768	991,817	858,171	133,646
8 "	"	'13	3,627,693	*2,344,631	1,283,061	816,446	466,615

WESTCHESTER STREET RAILWAY, MOUNT VERNON, N. Y.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Feb.,	'14	$14,922	*$20,435	$5,514	$1,164	†$6,678
1 "	"	'13	14,618	*18,816	4,199	958	†5,157
8 "	"	'14	169,505	*170,127	522	8,744	†9,266
8 "	"	'13	160,500	*168,143	7,643	6,727	†14,370

* Includes taxes. † Deficit.

Traffic and Transportation

Public Relations in Baltimore

In the report of the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1913, William A. House, president of the company, discusses the subject of public relations in part as follows:

"There is perhaps at this time no one subject of more importance to the company than its relations with the people it serves, or what might be designated the public relations of the company. The question of public relations to those not directly interested in the company's affairs may be presumed to be a matter for occasional consideration, but those in the company's employ have been taught to realize that if there is one subject that is paramount with respect to the aims and purposes of the company, it is covered by the term public relations.

"The public relations of a corporation of the character of the United Railways are many-sided and complex. To be able to render to the public the most efficient service possible, the company's affairs must be managed economically and yet liberally. This statement may seem somewhat paradoxical; however, money must be saved that costly improvements may be effected, and at the same time money must be freely spent in producing a higher grade of the commodity it has for sale, namely, transportation.

"The company has learned as a consequence of this condition to subject every suggestion that comes to it, from whatever source, to the test: What will be its effect on the general service? It is believed that this policy has resulted in establishing a more cordial relationship between the company and its patrons than is usual under like conditions. It is also believed that the public is willing to express its appreciation of what the railways company is endeavoring to do for it and for the city, realizing that their interests are interdependent. Naturally, the stockholders of the company are desirous of the continuance of this friendly feeling. That intangible something which is known as the 'good will' of a concern is with most business enterprises treated as a valuable asset. A public service comporation that has the good will of practically all the people can still be placed in a false position by the unfriendly attacks and ill-advised criticisms, often anonymously, of a few dissatisfied citizens. To paraphrase a well-known saying of President Lincoln, we can please all the people some of the time, we can please some of the people all the time, but we cannot please all the people all the time. Anyone who took the trouble to watch the dispute which arose and continued for years between the 'near-side' and the 'far-side' advocates in a situation in which the company offered to submit itself to public opinion will know what is meant. Again, the more recent Callow Avenue dispute and the disagreement as to heated cars evidence the difficulty the company has in discovering at times what is really public opinion.

"Beneath the figures and details of much of this report evidence will be found of a constant striving to give the people as perfect a transportation service as is practicable. Capital backed by confidence, enterprise and judgment has been the chief factor in this upbuilding, and these four elements constitute a partnership that will always succeed with the co-operation of the people. As a result of this striving, there has, it is believed, been a steady growth in the cordiality of the public relations of the company.

"To maintain this condition the company is bending every effort, realizing that from the people it obtains its income—that it is their servant—and there is no better investment than a satisfied public."

Brief Filed in Lawrence, Mass., Fare Case

The Bay State Street Railway, Boston, Mass., through James F. Jackson, its general counsel, has filed a brief with the Massachusetts Public Service Commission setting forth the company's reasons for opposing a recently heard petition of the Lawrence Chamber of Commerce asking for the establishment of free transfer privileges in that city to and from the Haverhill-Lawrence line. The company points out that although there is a difference in the transfer privileges given in Haverhill and those given in Lawrence in connection with travel between the two cities, no unjust discrimination exists against Lawrence. A comparison of fares in Lawrence with those in other cities shows that Lawrence receives more liberal treatment. Lawrence and Methuen now have the longest ride for one fare in eastern Massachusetts, a maximum of 9.74 miles throughout the day, compared with a maximum of 9.44 miles in Haverhill.

Quoting similar cases, the brief points out that the distance between Lawrence and Reading is 13.08 miles and the fare 15 cents, transfers being given in Lawrence and none in Reading. The distance between Lawrence and Haverhill via Methuen is 9.53 miles and the fare is 10 cents, transfers being issued in Haverhill only. From Lowell, Mass., to Nashua, N. H., 15 miles, the fare is 20 cents, with transfers in Nashua, but none in Lowell. From Lawrence to Malden, 21 miles, the fare is 25 cents, with transfers in Lawrence only. No transfer is issued in either city in connection with the 21-mile, 25-cent ride between Lawrence and Salem. Other lines between cities without transfer in either are those connecting Gloucester and Beverly, Lowell and Malden, Reading and Lynn. Travel between Lawrence and Lowell is accompanied with transfer at each end, but the fare is 15 cents, while that between Lawrence and Haverhill, practically the same distance, is only 10 cents. A petition for an extension of transfer on this line was denied in the order of the former Railroad Commission on July 25, 1910. A petition before that board for extension of fare on that line between Lawrence and Lowell was denied on July 19, 1909. With the exception of Brockton and Lynn, Lawrence has more advantages in the way of street railway fares than any other municipality upon the Bay State Company's system of nearly 1000 miles of track. If the transfer requested were granted it would create upon the Lawrence Division a ride of 10.36 miles for 5 cents, a fare in the company's view utterly unreasonable in face of present operating costs. In nine out of twelve cities compared by the company, the maximum distance which can be covered by a single fare and transfer is less than at Lawrence, ranging from 2.77 miles at Newport, R. I., to 9.45 miles at Haverhill. The petition has been taken under advisement by the board.

The Menace of the Motorist

The important question of safety in travel was discussed recently by Paul Shoup, president of the Pacific Electric Railway, at the Sierra Madre Club, Los Angeles, Cal. After explaining the precautions taken by the company to prevent accidents, he cited figures to show how careless the public is in disregarding warnings and failing to co-operate in the "safety first" movement. The company has thus far spent $40,000 for crossing signals, he said, but motorists persist in disregarding the warnings. In one month there were 1100 accidents in the United States resulting from motorists attempting to cross in front of moving trains. Recently a careful check was made at the Pacific Electric Railway crossings chiefly used by motorists, and it was found that in twenty hours there were 400 cases in which drivers disregarded the moving signals. Mr. Shoup continued in part:

"We try to take every precaution to provide safety, and we train our men carefully before they are entrusted with the responsibility of operating cars. Prospective motormen are taken over their runs as students for three weeks. Then they are examined with respect to 600 questions the answers to which they have been required to study. They receive their final examination at the end of sixty days.

"There are 239 rules with which the men must be familiar before they are entrusted with the management of trains. They are instructed by means of moving pictures and otherwise impressed with the fact that the violation of a rule may result in a tragedy. Lest the men forget, they are examined every three years.

"We use surprise signal tests to learn how well our men are trained. Last year 10,000 such tests were conducted by the superintendent, assistant superintendent and train masters. The tests consist of flagging trains, placing torpedos on the track and otherwise learning how well the men know the rules.

"When a man fails, demerits are charged against him. If he continues to be negligent he automatically discharges himself when he has received seventy-five demerits. The men receive merit marks for close observation of the rules and these marks are taken into consideration when promotions are made."

Operating Problems in Columbus

H. W. Clapp, general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, in an address to the members of the East Long Street Improvement Association on April 9 made a number of very frank statements in regard to plans for improvements decided upon by the company, and to the burdens imposed upon the company by the ordinance under which it operates. He predicted that the city would grow tired of the franchise awarded the company before it expires in 1926 and would make an attempt to secure the adoption of a new grant less onerous in its conditions. The company is giving the best service possible under the low fares prescribed by its operating grant. It is planning to reduce the congestion on High Street between State and Chestnut streets about 25 per cent by removing cars from this section except during rush hours. According to Mr. Clapp the new routing will not prove profitable to the company for several years, as the cost of the work involved will be $60,000. In addition 110 cars have been reconstructed into cars of the pay-as-you-enter type. Wages have been readjusted, a co-operative beneficiary association has been established and the equipment has been rehabilitated as a preface to more extensive development.

Interborough Rapid Transit Loan Fund

According to announcement made by H. H. Vreeland, director of welfare, a loan fund similar to that which has been in use for many years on the New York Railways has been inaugurated by the Interborough Rapid Transit Company. This installation is in line with the present policy of systematizing the welfare work of the companies.

The fund is to be administered through the volunteer relief department under regulations prescribed by the welfare department. Applications for loans not to exceed $50 may be made by the employees to the superintendent of the relief department, and money will be loaned without interest or other charge in accordance with certain regulations. In the first place, the applicant must secure from the head of his department an official application blank, which, when properly filled out, must be approved by the head of the department. After the loan is granted, a weekly deduction of 10 per cent, commencing with the week following, is to be made from the payroll of the employee, provided the amount payable to the employee after the deduction of all charges shall not fall below $8. In such cases deductions of less than 10 per cent may be made. Provision is also made for a temporary extension of the time of payment in extreme or exceptional cases. Employees desirous of having their payments omitted at any time must apply to the department head who originally approved the loan. If the latter approves, the application is submitted to the relief department superintendent for action according to the merits of the case.

This fund has been inaugurated by the company in the realization that at certain times there arises a need for money which cannot be foreseen and for which an employee cannot always provide from his regular wages, such as heavy expenses caused by sickness or death. The loan department in the New York Railways during 1913 dispensed $1800 to the employees to meet such emergencies.

Employee Charged With Embezzlement.—The Owensboro (Ky.) City Railway has undertaken the prosecution of an employee accused of systematic "knocking down." Instead of alleging larceny, the company swore out a warrant charging Charles T. Able with embezzlement. Able has been in the company's employ for eleven years as a motorman and as a conductor and in that time, according to the charges made by officials of the company, has embezzled $3,500 from his employer.

New Agreement in Albany.—The agreement which was entered into in 1912 between the United Traction Company, Albany, N. Y., and its employees in regard to wages and other terms of service expires on June 30, 1914. The representatives of the men are preparing a modification of the present agreement in which it is said they will ask among other things an increase in wages, time and one-half for Sunday work, seats for motormen on all double-truck cars and protection of motormen on open cars.

New York Employees Entertain.—H. H. Vreeland, director of welfare work of the Interborough Rapid Transit Company, New York, N. Y., secured the use of Carnegie Hall, Seventh Avenue and Fifty-seventh Street, for the evening of April 24, on which date the employees of the company gave a minstrel and vaudeville show for the entertainment of themselves and families. The talent was all drawn from the ranks of the subway and elevated division. The sale of tickets was restricted to employees and members of their immediate families. The company assumed all the expense of the entertainment.

Injunction Against Curtailment of Through Service.—Common Pleas Judge A. J. Pearson has granted a temporary injunction to prevent the Cleveland (Ohio) Railway from discontinuing through car service to Euclid village. The company announced that through cars would be discontinued and that a shuttle service would be installed between the city limits and the village. An effort is being made to have a cross-town line built near 123d Street, between Superior and St. Clair Avenues. Peter Witt, street railway commissioner, favors this plan, but opposition to it has developed in Council.

Remarkable Accident Record.—Reports to the Public Service Commission for the First District of New York show that in three days eleven persons were run down by street cars, and ten of them were saved by the operation of the wheel guards. It is not often that so many accidents occur within such a short space of time. To make the incident further remarkable one of the accidents involved two boys who were picked up together, and another a man forty-five years old who escaped with nothing worse than bruises. The accidents occurred in various parts of the city on April 4, April 6 and April 7.

Boston-Worcester Limited Service Increased.—The Boston & Worcester Street Railway has increased its limited service between the City Hall, Worcester, and Park Square, Boston. The new schedule went into effect on April 18. Under the previous schedule the limited service began at 8 a. m. and ceased at 5 p. m., an hourly headway being maintained in each direction by express passenger cars, with local intermediate service. The new schedule provides half-hourly limiteds from 6:30 a. m. to 5 p. m. The company has been particularly successful in competing with the steam railroad service between the two cities, which are 45 miles apart.

Recommendation for Near-Side Stop Likely in New York.—President McAneny of the Board of Aldermen, Alderman Bedell, chairman of the Aldermanic committee on public thoroughfares, and Ernest P. Goodrich, chairman of the advisory street traffic commission of New York, have received opinions from the police officials of the chief cities of the United States as to the relative advantage of the near-side and the far-side stop of cars at street crossings. It is expected that the advisory commission in making its report to the Board of Aldermen will recommend that the rules of the road be changed to provide for near-side stops at all crossings for surface cars.

Train Robbers Overpowered.—Two bandits who attempted to hold up a car of the Puget Sound Electric Railway between Seattle and Tacoma, Wash., recently were overpowered and beaten into insensibility. The bandits, stationed one at each end of the car, ordered the passengers to gather in the center. While some of the passengers were preparing to obey one of the passengers leaped on the nearest bandit and threw him to the floor. This was a signal for the other passengers to attack the other bandit. This they promptly did with probable dire consequences to their victim. In the scrimmage one of the non-combatant passengers was shot and will probably die. Little hope is entertained for the recovery of either of the robbers.

Hearing on Rates Between Seattle and Tacoma.—Hearings are now being held before the Public Service Commission of Washington on the application of the Puget Sound Electric Railway for an increase in passenger rates between Seattle and Tacoma, Wash. James B. Howe, general counsel for the company, says that the company is asking that the order of the old commission, which fixed the present rates, be cancelled and that the company be allowed to put in new rates. Mr. Howe says: "In 1909 the company was compelled to raise its rates and it established a uniform rate of 2 cents a mile and commutation of 1.4 cents a mile, with the exception that from Seattle to Tacoma the round-trip rate was fixed at $1.25. The commission ordered the rates cut, and it is on this action that a rehearing is asked."

Safety Bureau, Chicago Surface Lines.—At a luncheon of the City Club of Chicago on April 15, H. L. Brownell, superintendent of the safety committee of the Chicago Surface Lines, lectured on how moving pictures are being used to educate street railway employees, passengers and school children toward greater safety. Mr. Brownell displayed moving pictures of accidents and the conditions which led to them. These films included views of boarding and alighting accidents, collisions with teams, splitting switches, over-hang on curves, starting cars with men under them in shops, and others illustrating the dangers arising from having refuse lying about the pits in the shop and carhouses. Mr. Brownell stated that the "safety first" crusade of the last year had reduced the fatal street car accidents to employees by 60 per cent and to children by 75 per cent.

Appeal Against I. C. C. Verdict.—The International Railway, Buffalo, N. Y., will appeal from the verdict in favor of the government in the action brought by the Interstate Commerce Commission against the company, for alleged violation of the federal safety appliance laws which provides that cars in interstate commerce shall be equipped with automatic couplers and grab irons. A fine of $100 was imposed upon the company by the court for each of the nine offenses named in the action brought by the commission. The government charged that the International Railway was a common carrier in interstate commerce because it honors tickets over the Erie Railroad and transports freight for that company and that for these reasons it is subject to the same laws that govern the Erie Railroad. The company maintained that its cars were strictly street cars and carried city passengers.

Electric Lines in Connection with the Lehigh Valley Railroad.—The Lehigh Valley Railroad, New York, N. Y., has issued a special twelve-page booklet dealing with the electric railways which connect with it. The information is for the accommodation of parties who may wish to reach by electric railway some point contiguous to but not directly on the Lehigh Valley Railroad. It is compiled from information specially furnished by the officials of the lines named. The towns are arranged by states and then alphabetically by cities. There is a key number after each town which serves to identify the connecting electric railway by reference to the key at the back of the book. The fares by electric railway from each town to the principal connecting Lehigh Valley station are given, as are also details in regard to the frequency of the electric railway service and the baggage accommodations which are afforded by these lines.

Proposed Buffalo Terminal.—Plans are being made by the International Railway, Buffalo, N. Y., for the construction on the site of the present Garden Theatre of a twelve-story building with an arcade running through it from Pearl to Franklin Streets. The property was recently purchased by the company for $375,000. The new building will cost approximately $1,000,000. The arcade will have four tracks and two broad sidewalks. All of the cars of the following interurban railways operating out of Buffalo will use the arcade as a terminal: Buffalo & Niagara Falls Electric Railway, Buffalo & Lockport Electric Railway; Buffalo, Lockport & Rochester Railway, Buffalo & Lake Erie Traction Company and Buffalo & Lancaster Electric Railway. The second floor will be used as the general offices of the International Railway Company. The offices of the company are now located on the eighth floor of the Ellicott Square Building.

Personal Mention

Gen. George H. Harries, past-president American Electric Railway Association, was among those ordered to report to the War Department at Washington on April 21, in connection with the Mexican trouble.

Mr. W. S. Murray, of the firm of McHenry & Murray, New Haven, Conn., delivered a lecture before the engineering students of Yale University on April 22. His topic was "The Electrification of the New Haven Railroad." The lecture was particularly timely in view of the approaching completion of the electrification of the railroad from Stamford to New Haven.

Mr. Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has been elected president of the West Penn Traction Company, Pittsburgh, Pa. The West Penn Traction is controlled by the West Penn Traction & Water Power Company, which in turn is controlled by the reorganized American Water Works & Electric Company.

Mr. C. C. Chappelle has resigned as vice-president and general manager of the Federal Light & Traction Company, New York, N. Y., to take effect on May 1, 1914, in order to devote his whole time to private business. Mr. Chappelle has been executive officer of the company since early in 1911. He was previously with the Westinghouse Machine Company as Western sales manager, with headquarters at Chicago. Since his graduation from Purdue University in 1895 most of his association has been with the Westinghouse interests. Mr. Chappelle remains as one of the three members of the executive committee of the Kansas City, Clay County & St. Joseph Railway.

Mr. George A. Gaston has been elected president of the Northwestern Pennsylvania Railways, Meadville, Pa., to succeed Mr. H. W. Thornton, formerly with the Long Island Railroad, who has become general manager of the Great Eastern Railway of England. Mr. Gaston was born in Cleveland, Ohio, and was graduated from Washington and Jefferson College in 1899 and later from the Western Reserve Law School. For some time he was connected with the law firm of Fauver, Thomsen & Gaston, but for the last three years or more his attention has been devoted almost entirely to transportation work. He is president of the Ashtabula Steamship Company and director in the American Transportation Company, the Shawmut Steamship Company and the Philadelphia & New Orleans Transportation Company. Prior to his election as president of the Northwestern Pennsylvania Railways Mr. Gaston had served on the board of directors of the company.

Mr. S. B. Way, vice-president and assistant general manager in charge of the lighting department of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been elected vice-president and general manager, or the company's ranking officer in the absence of Mr. J. D. Mortimer, recently elected president of the North American Company, New York. Mr. Way was the senior vice-president in point of service with the North American Company, having served as vice-president and assistant manager at Milwaukee since 1911. He was born in 1875. After he was graduated from Drexel Institute, Philadelphia, he began his business career with the Electric Storage Battery Company, Philadelphia, as draftsman. Later he was promoted to the position of erecting engineer. He resigned from the Electric Storage Battery Company in 1898 to become electrical superintendent with what later became the Union Electric Light & Power Company, St. Louis. Mr. Way went to the Milwaukee company as assistant general manager in charge of the lighting department, and in May, 1912, was also elected vice-president. In all he has been identified with public utility properties for nearly sixteen years, practically all of which time he has been associated with the North American Company.

Mr. Fred W. Ranno, recently appointed senior civil engineer, for service in the Eastern District, Division of Valuation, Interstate Commerce Commission, with office in Washington, D. C., was born at Washington, Vt., and was graduated from the Massachusetts Institute of Technology in 1889. His first experience was with the Pennsylvania lines where he was employed immediately after graduation as a member of the engineering corps. After a few months with the Pennsylvania lines, he entered the service of the Lake Shore & Michigan Southern Railway as instrumentman on the Michigan Division, being later promoted to resident engineer in charge of construction of second track and changes of line and track elevation work in and around Chicago. In October, 1897, he entered the service of the Southern Indiana Railway, now the Chicago, Terre Haute & Southeastern, as assistant engineer in charge of reconstruction. He was promoted to engineer of maintenance of way in January, 1900. From October, 1905, to February, 1907, he engaged in manufacturing at Manchester, N. H. From February, 1907, to January, 1911, he was assistant engineer of the Union Pacific Railroad, in charge of second track and other construction work in western Wyoming and Colorado. From April, 1911, to January, 1913, Mr. Ranno was principal assistant engineer of the Missouri, Oklahoma & Gulf Railway, and chief engineer of the company from Wagoner, Okla., to Baxter, Kan., which was constructed during the above period. From January, 1913, to his recent appointment in the Interstate Commerce Commission he was superintendent for Kilpatrick Brothers, general contractors on track elevation and construction for the Wichita (Kan.) Union Terminal Railway. Mr. Ranno is a member of the American Railway Engineering Association.

Mr. Milan V. Ayres, recently appointed senior electrical engineer for the Eastern District, Division of Valuation, Interstate Commerce Commission, with office in Washington, D. C., was born at Hamlin, Kan., on Feb. 14, 1875. Mr. Ayres was graduated from the electrical course of the Massachusetts Institute of Technology in 1898. After graduation he entered the service of the General Electric Company at Schenectady, N. Y., being employed in the testing department and later in the design of alternating current machinery. In 1902 he became electrical and mechanical engineer for the Boston & Worcester Street Railway, South Framingham, Mass., continuing in this position until July, 1911. From July, 1911, to November, 1911, he was assistant to the general manager of the Rockland Light & Power Company, Nyack-on-Hudson, N. Y. In November, 1911, he became chief engineer of the Mobile Light & Railroad Company, Mobile, Ala., but resigned from that company in 1912 to accept a position with Ford, Bacon & Davis, consulting engineers, New York City, in which position he continued until his recent appointment with the Interstate Commerce Commission. While employed with the Boston & Worcester Street Railway, Mr. Ayres was admitted to the Massachusetts bar. Mr. Ayres is a member of the American Institute of Electrical Engineers, the American Electric Railway Association, and the American Statistical Association. He was for several years a member of the publication committee of the New England Street Railway Club, and in 1911 he became a member of the executive committee of the New England Street Railway Club. In 1910-1911 he was chairman of the equipment committee of the American Electric Railway Engineering Association, and a member of the executive committee of the Boston Section of the American Institute of Electrical Engineers.

Mr. John J. Treacy, who was recently appointed by Governor Fielder as a member of the Board of Public Utility Commissioners of New Jersey, was sworn in by Secretary of State Carter on April 14. Mr. Treacy succeeds Mr. Winthrop M. Daniels, who was recently appointed by President Wilson as a member of the Interstate Commerce commission. Mr. Treacy was born in Jersey City about forty-one years ago. He received his early education in St. Bridget's Parochial School, Jersey City, and was graduated from St. Peter's College that city in 1891. In 1894 he was graduated from the New York Law School with the degree of Bachelor of Laws. He was admitted to the New York Bar and became associated with the law firm of Reed, Simpson, Thacher & Barnum, of which concern the late Speaker Thomas B. Reed was the head. He was admitted to the New Jersey Bar in 1901 and has practiced his profession ever since in Jersey City. Mr. Treacy was a member of the House of Assembly in 1902 and 1903 and in the latter year he served as the leader of the democratic minority. In the year 1911 the Legislature legislated out of office the commission that was engaged in the construction of the new court house in Jersey City and authorized the justice of the Supreme Court presiding in Hudson County to select a new commission to complete its construction. Mr. Treacy was appointed by Justice Swayze as a member of this commission. He was appointed a judge of the Court of Errors and Appeals by Governor Wilson on Dec. 8, 1911. On Jan. 29, 1912, he was nominated for a full term of office and was confirmed by the Senate. For several years he was president of the Mercantile Trust Company, Jersey City, but resigned as president of that institution and as judge of the Court of Errors and Appeals in March, 1913, to take up the active practice of law. On April 1, 1913, he formed a law partnership with Mr. John Milton, the present corporation counsel of Jersey City, which partnership is still in existence.

Mr. Ernest Gonzenbach has been appointed general manager of the Empire United Railways, Inc., Syracuse, N. Y., a consolidation of the Rochester, Syracuse & Eastern Railway, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad. The company controls 138.6 miles of line. Affiliated with the Empire United Railways, Inc., are the Syracuse, Watertown & St. Lawrence River Railroad, the Newark & Marion Railway, the Sagamore Navigation Company and the Skaneateles Lake Transportation Company. The lines of the Empire United Railways, Inc., extend from Syracuse on the East to Lockport on the West, where connection is made for Buffalo and Niagara Falls, and also extend from Syracuse north to Oswego on Lake Ontario. Mr. Gonzenbach was formerly président and general manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis., from which company he retired in January, 1914, following the sale of the controlling interest in the company to local interests in Sheboygan. He took charge of the property at Sheboygan on Jan. 1, 1905, as general manager. Later he was elected treasurer of the company and subsequently vice-president and general manager. Mr. Gonzenbach is Swiss by birth and education, but came to this country immediately after leaving school. After an electrical experience in power-house work in Chicago he completed the Thomson-Houston expert course at Lynn, Mass. In 1895, as electrical engineer in St. Johnsbury, Vt., he constructed several electric light and transmission plants in that vicinity. In 1898 he entered the employ of the Westinghouse Electric & Manufacturing Company, and in 1900 became electrical engineer of the Albany & Hudson Railroad, one of the early third-rail roads. Subsequently he accepted a similar position with the Aurora, Elgin & Chicago Railroad, then under construction, after which he was engaged for two years as consulting engineer, principally in the construction of the Youngstown & Southern Railway. In 1909 Mr. Gonzenbach was elected president of the Wisconsin Electrical Association. Owing to the increased passenger traffic and the rapidly growing package freight and express business, President C. D. Beebe and the directors of the Empire United Railways, Inc., considered it desirable to secure a general manager of the railroads of that company who would devote himself exclusively to their operation independent of the other lines of the Beebe syndicate.

Ernest Gonzenbach

OBITUARY

Alfred Noble, a widely known civil engineer and prominent from his connection with the St. Mary's River improvements, the construction of the Pennsylvania Railroad tunnels in New York City, and the Panama Canal advisory board, died at New York, April 19, following an operation for organic trouble. Mr. Noble had received the John Fritz medal for his work on the Pennsylvania tunnels, and he was a past-president of the American Society of Civil Engineers.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Pekin (Ill.) Street Railway.**—Incorporated in Illinois to build an electric railway in Pekin. Capital stock, $15,000. Incorporators: W. E. Lautz, D. D. Volde and W. P. Herget.

***Kingston-Ellenville Trackless Trolley Company, Albany, N. Y.**—Incorporated in New York to build a trackless trolley line. Capital stock, $5,000. Incorporators: John Purce, 427 East Twenty-first Street, Paterson, N. J.; George J. Giger and Frank Leonard, Paterson, N. J.

***Belmont Electric Company, Dallas, Tex.**—Incorporated in Texas to build electric railways in and near Dallas. Capital stock, $5,000. Incorporators: J. A. Sanders, H. W. Brouse and E. W. Morton, Jr.

***San Antonio, San José & Medina Interurban Railway, San Antonio, Tex.**—Incorporated in Texas to build an interurban railway from San José to Kirk on the Artesian Belt Railroad. The company will operate gasoline motor cars on this line with freight trailers in connection. Capital stock, $100,000. Officers: A. D. Powers, president; C. A. Newton, secretary; A. J. Bell, general counsel, and L. S. Powers, managing director.

FRANCHISES

***Globe, Ariz.**—The Globe & Miami Traction Company has asked the Board of Supervisors of Gila County for a right-of-way along county highways, upon the route reserved by the Miami Copper Company for railroad purposes, to build an electric railway in and between the towns of Globe and Miami in Gila County, Ariz. Richard West, Miami, president.

Fresno, Cal.—Following the filing of a petition by this company the Board of Supervisors have given notice that on May 5 it will sell to the highest bidder a fifty-year franchise for an electric railway along the county road on Fresno Avenue for a distance of ½ mile, or from the city corporate line to the boulevard.

Rialto, Cal.—The Crescent City Railway has received authority from the Railroad Commission to transfer to William G. Henshaw certain franchise rights granted by the city of Rialto to this company. Mr. Henshaw has received from the Railroad Commission a certificate of public convenience and necessity permitting him to build and operate an electric line in accordance with a franchise granted by the city of Rialto.

Sacramento, Cal.—The Pacific Gas & Electric Company has received a franchise from the Council to double-track its Tenth Street line in Sacramento.

Santa Barbara, Cal.—The Santa Barbara & Suburban Railway has received authority from the Railroad Commission for certificate of public convenience and necessity to exercise certain rights granted under a franchise from the city of Santa Barbara, permitting it to extend its line in Santa Barbara to the State Normal School.

***St. Petersburg, Fla.**—C. J. Morrow, St. Petersburg, has asked the Council for a franchise in St. Petersburg. This is part of a plan to build an electric line between St. Petersburg and Tarpon Springs.

Brunswick, Md.—The Frederick & Brunswick Railroad has received an eighteen months' extension of time on its franchise in which to build its line in Brunswick. This line will connect Brunswick, Frederick and Jefferson. Oscar B. Coblentz is interested. [E. R. J., June 1, '12.]

Detroit, Mich.—The Detroit United Railway has received a franchise from the Council to build the workingmen's belt line in Detroit.

Moberly, Mo.—The Moberly, Huntsville & Randolph Springs Railway has applied to the State Public Service Commission for authority to cross a number of streets and highways in Moberly, Huntsville and Randolph County at grade. This company proposes to construct an electric line from Moberly to Randolph Springs and Huntsville. Charles H. Dameron, Huntsville, president. [E. R. J., Feb. 7, '14.]

St. Louis, Mo.—The St. Louis & Jennings Railway has received a franchise from the Council to extend its tracks from Florissant Avenue and Helen Avenue south on Helen Avenue to Melrose Avenue in St. Louis.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to rebuild the roadbed of the Buffalo, Kenmore & Gratwick line using a concrete bed with new 60-ft. rails.

Lewiston, N. Y.—The Niagara Gorge Railroad has asked the Council for a franchise to extend its tracks on Water Street in Lewiston.

Hamilton, Ont.—The Wentworth County Council has passed a by-law giving authority to build an electric railway on Main Street between Ottawa Street and Kenilworth Avenue in Hamilton.

Portland, Ore.—The Portland & Oregon City Railway has asked the Council for a franchise to extend its lines into districts not now covered by the Portland Railway, Light & Power Company in Portland. In the franchise the company asks for the common use with the Portland Railway, Light & Power Company of the tracks on streets covered by the franchise.

Portland, Ore.—Isaac W. Anderson, president of the Washington-Oregon Corporation, has asked the Council for a franchise across the new Columbia River bridge and approaches in Portland. This is part of a plan to extend the line from Vancouver to Portland via the Columbia River bridge when the bridge is completed.

Graham, Va.—The Appalachian Power Company, Bluefield, has received a twenty-year franchise from the Council in Graham to extend its lines to West Graham, a distance of 1 mile, and also to use Norton Street to the southern town limits for the belt line around by the Bluefield-Graham fair grounds.

Racine, Wis.—The Milwaukee Electric Railway & Light Company has asked the Council for a franchise to extend its lines 2 miles south, 2 miles southwest and 4 miles to the north of Racine.

TRACK AND ROADWAY

***Globe & Miami Traction Company, Globe, Ariz.**—This company has been formed to build an electric railway between Globe and Miami. The route has not been definitely decided, three being under consideration. Richard West, Miami, president.

Glendale & Eagle Rock Railway, Glendale, Cal.—This company will improve its lines.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to double track its line from San Bernardino through Lordsburg to Los Angeles.

San Francisco-Oakland Terminal Railway, Oakland, Cal.—A new line is to be established by this company between Alameda and Oakland, making three lines to connect the two cities. The new line is to be known as the San Jose Avenue line and will be operated from Fifteenth Street and San Pablo Avenue in Oakland, down Broadway to Water Street and along Webster Street, Santa Clara Avenue, Ninth Street, San Antonio Avenue and San Jose Avenue to High Street.

United Railroads, San Francisco, Cal.—Work has been begun by this company on the extension of its Polk and Larkin Streets cross-town line to North Point Street, a distance of ½ mile. The North Point terminus will enable patrons to reach the Van Ness Avenue entrance to the exposition with a walk of a short block.

***Jacksonville, Fla.**—Right-of-way has been secured and surveys completed for an electric railway to connect Jacksonville, Mandarin and St. Augustine.

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—Plans are being considered for the immediate elevation of this company's tracks from Laramie Avenue to the western terminus in Oak Park.

Chicago & Joliet Electric Railway, Joliet, Ill.—Improvements, costing over $50,000 will be made in the equipment of this company within the next few months.

Oil Belt Railway, Martinsville, Ill.—It is reported that this company plans to build soon an extension from Bridgeport to Vincennes, Ind.

Fort Scott & Pittsburgh Railway, Fort Scott, Kan.—The Kansas Public Utilities Commission has authorized this company to issue bonds in the sum of $950,000 for construction and equipment of its proposed electric line from Pittsburgh to Fort Scott. The promoters intend ultimately to connect Kansas City and the lines in the Joplin-Pittsburgh mining district. Surveys have been made and a charter obtained for a line from Fort Scott to Kansas City. Residents along the route are subscribing liberally for this proposed Kansas City connection. A. B. Dickman, Fort Scott, president. [E. R. J., April 11, '14.]

Southern Traction Company, Bowling Green, Ky.—This company, which has succeeded the Bowling Green Railway, plans to improve and extend its lines in Bowling Green. L. D. Haines, Bowling Green, secretary. [E. R. J., Jan. 24, '14.]

Orleans-Kenner Electric Railway, New Orleans, La.—Negotiations are proceeding between this company and the New Orleans Railway & Light Company so that this company may use the tracks of the New Orleans Railway & Light Company over certain streets in New Orleans. This line will connect New Orleans, Kenner and Hanson City. A. S. Bowman, New Orleans, president. [E. R. J., April 4, '14.]

Electric Short Line Railroad, Minneapolis, Minn.—This company has completed 18 miles of its line from Minneapolis to Watertown, S. D., and 26 miles are now under construction. A contract will be awarded within the next sixty days for grading 22 miles to be completed this season.

Minnesota Northwestern Electric Railway, Minneapolis, Minn.—This company has awarded the contract to John Moberg, Bemidji, to construct the roadbed for 20 miles of its line extending east from Thief River to Goodridge. Daniel Shaw, Thief River, Minn., president. [E. R. J., April 18, '14.]

United Railways, St. Louis, Mo.—Work has been begun by this company on the extension of two of its lines in St. Louis County. The Kirkwood-Ferguson line is being lengthened so that its southern terminus will be a point near Woodbine Avenue and Geyer Road, about 1 mile west of Kirkwood. Filling and grading for the construction of a new loop terminal are under way. The Market Street line, which now ends at West End Heights, will also be lengthened to extend through Brentwood and connect with the Kirkwood-Ferguson line.

Ismay, Ekalaka & Southern Electric Railway, Ismay, Mont.—Preliminary arrangements are being made by this company to construct an electric line from Ismay, on the Chicago, Milwaukee & St. Paul Railroad, to Ekalaka, about 44 miles distant, and thence to Camp Cook, S. D. Ekalaka is an inland town without railroad connections, but it is the county seat of the new county of Fallon, and it is the desire of the incorporators and promoters of the railway, who have extensive interests in Ismay and Ekalaka, to provide this means of communication. The railway will be built from a sale of bonds and from popular subscription. J. E. Prindle, general manager. [E. R. J., April 11, '14.]

Reno (Nev.) Traction Company.—Work has been begun by this company laying new ties and improving its lines on Fourth Street and Second Street in Reno.

International Traction Company, Buffalo, N. Y.—It is reported that this company is contemplating an expenditure of more than $2,000,000 for improvements in general equipment on its lines. The greater part of this construction work will be done this spring and summer. The company plans to lay new tracks to replace the lighter-weight rails on many of its lines, which item will total about $1,500,000. Improvements at various grade crossings are to be made and more than $75,000 will be expended for new trolley wires, new poles, ties, and other material to be used by the company in this work.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—Preliminary surveys have been completed by this company for the extension from Seneca Falls to Auburn.

Dayton, Middletown & Cincinnati Railway, Middletown, Ohio.—Right-of-way has been secured by this company for its line from Dayton via the old "Dummy line" to the Soldiers' Home, from there through Miamisburg, Carlisle and

Middletown, then north to Monroe, Bethany, Westchester, Sharonville, Hartwell and Arlington Heights to Cincinnati. E. H. McKnight, Middletown, general manager. [E. R. J., Jan. 10, '13.]

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—Bids will be received by this company until May 15 to build and furnish material for 22 miles of new track. Plans and specifications may be obtained upon application to the company, for which a deposit of $10 will be required, to be refunded upon return of plans.

Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.—Plans are being considered by this company to extend its lines from Toledo Beach to Monroe, Mich., this season.

***Washington C. H., Ohio.**—Plans are being considered to build an electric line from Washington C. H. to Hillsboro and east to Columbus. A. M. Fisher, Indianapolis, is interested.

***Oil Traction Belt Line Company, Stilwell, Okla.**—This company has been formed at Stilwell, Okla., to build an electric railway from Stilwell to Blackwell and north to Miami from Stilwell. From Miami, the proposed line will extend back to Blackwell, forming a triangle.

Hamilton, Ont.—It is reported that the Hydro-Electric authorities in Toronto have agreed to construct a hydroelectric line on the mountain as a branch of the road from Georgian Bay, provided the township of Barton can show that the railway would be a paying proposition.

Peterboro (Ont.) Radial Railway.—This company plans to spend $40,000 to provide for new trackage, sidings, etc., on its lines in Peterboro.

St. Thomas (Ont.) Municipal Railway.—Negotiations are proceeding between the city of St. Thomas and the officials of the London & Lake Erie Railway & Transportation Company looking to the operation of the municipal system by the company for a term of years.

Williamette Valley Southern Railway, Oregon City, Ore.—Immediate completion of this railway from Oregon City, via Beaver Creek, Mulino and Molalla to Mount Angel, about 32 miles, and the actual operation of the railway before the end of the present year was recently assured when the Portland Railway, Light & Power Company agreed to guarantee a $700,000 bond issue necessary to finance the project. In consideration for the arrangement the Williamette Valley Southern Railway will purchase its electric power from the Portland Railway, Light & Power Company and will interchange its traffic with the railway at Oregon City. Approximately 7 miles of track have been laid and more than two-thirds of the building completed. In January, 1914, the Portland Railway, Light & Power Company acquired the majority of the stock and has obligated itself to complete the line by January, 1915.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company is asked to extend its lines down the River Road as far as Junction City.

Portland & Oregon City Railway, Portland, Ore.—An extensive system of interurban electric lines is proposed by S. Carver, promotor of the Portland & Oregon City Railway. If carried out, this new system will connect Portland with several well-settled districts that have been asking for car connections with Portland for many years, including Damascus, via Happy Valley, and Stone and Logan, via Harmony, Clackamas and Clear Creek. The general route of these interurban lines tentatively starts at Division and East Twenty-first Streets, and extends south to Powell Street, and thence eastward to about East Twenty-fifth street, when a turn will be made to the Damascus country.

Metolius, Prineville & Eastern Railway, Prineville, Ore.—This company recently announced that bids for the construction of the line from Metolius to Prineville, a distance of 30 miles, will be received in the immediate future. The money to build the line has been raised and active construction will begin next month. H. B. Scheel, Prineville, Ore., president. [E. R. J., Nov. 8, '13.]

Utah Light & Railway Company, Salt Lake City, Utah.—Work will soon be begun by this company to extend the Holliday line to Big Cottonwood Canyon, the Wandamere line to Fourteenth South and west to State Street, and the Davis County line from Centerville to Farmington.

Spokane & Inland Empire Railroad, Spokane, Wash.—This company is asked to consider plans to extend its lines from Recreation Park by East Hillyard to the Morgan Acre Tracts and the Minnehaha Districts.

Southern Wisconsin Railway, Madison, Wis.—This company is asked to consider plans for an extension between Madison and Middleton.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—It is reported that this company and the Chicago, Milwaukee & St. Paul Railway will build joint terminals in Sumas. The Chicago, Milwaukee & St. Paul Railway is now engaged in the construction of a belt line around Sumas to connect with the lines of the Briitsh Columbia Electric Railway, and when the belt line is completed direct connections will be made between the two railways.

International Railway, Buffalo, N. Y.—Plans are being made by this company to build a twelve-story building penetrated by an arcade running through it from Pearl Street to Franklin Street on the site of the present Garden Theatre in Buffalo. The arcade will have four tracks and two sidewalks. The second floor will be used as the general offices of the company. The new structure will cost approximately $1,000,000.

Empire United Railways, Inc., Syracuse, N. Y.—This company and the Buffalo, Lockport & Rochester Railway will move their passenger station in Rochester from the Court Street and Exchange Street office to the Erie Station in Court Street, Rochester. The waiting room of this passenger station has been enlarged to meet the additional passenger requirements of the two other railways.

Toronto (Ont.) & York Radial Railway, Toronto, Ont.—This company has begun to rebuild its new carhouses which were destroyed by fire a short time ago.

Johnstown (Pa.) Traction Company.—Preliminary arrangements are being made by this company to begin work soon on its new passenger station in Johnstown. The structure will cost about $4,000.

POWER HOUSES AND SUBSTATIONS

Georgia Railway & Electric Company, Atlanta, Ga.—This company has placed in operation its new substation at Cartersville.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—This company has placed in operation its new addition at the Spy Run power plant.

Southern Traction Company, Inc., Bowling Green, Ky.—This company plans to build a new power plant in Bowling Green in the near future.

Bangor Railway & Electric Company, Bangor, Maine.—The Bar Harbor & Union River Power Company, one of the subsidiaries of the Bangor Railway & Electric Company, will construct an extension of its distribution service line in Ellsworth, to Blue Hill, Maine, a distance of 18 miles. The line will involve many new features and is expected to be put into operation in the early fall.

Morris County Traction Company, Morristown, N. J.—This company has ordered from the General Electric Company seven 300-kw rotary converters together with transformers and switchboard equipment, to be installed in substations at Wharton, Morristown, Millburn and Boonton.

Southern Power Company, Charlotte, N. C.—This company has awarded the contract to the Allis-Chalmers Company for the water-wheels, governors, generators, exciters and transformers, required to generate approximately 26,000 hp at the new power plant that is to be erected at Lookout Shoals on the Catawba River between Iredell and Catawba Counties. The amount of the contract will approximate $225,000.

Ottawa (Ont.) Electric Railway.—This company will shortly open a new steam auxiliary power plant on Middle Street, near the Chaudiere Falls. This plant will be equipped with a 4000-hp steam turbine, manufactured by the Westinghouse Electric & Manufacturing Company, also three Babcock & Wilcox water tube boilers, marine type, to which will be attached chain-feed stokers. The equipment is now being installed.

Manufactures and Supplies

ROLLING STOCK

Southern Traction Company, Dallas, Tex., is reported to have ordered six double-truck passenger cars.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y., is expecting to purchase two passenger cars.

Yakima Valley Transportation Company, North Yakima, Wash., expects to purchase two city passenger cars and four trailers.

Erie Railroad, Rochester, N. Y., has issued inquiries on prices for seven interurban cars for operation on its Rochester suburban electric division.

Butte, Anaconda & Pacific Railroad, Anaconda, Mont., has ordered four additional eighty-ton electric locomotives from the General Electric Company.

Jersey Central Traction Company, Keyport, N. J., noted in the ELECTRIC RAILWAY JOURNAL of April 18, 1914, as expecting to purchase five cars, has ordered these cars from The J. G. Brill Company.

Memphis (Tenn.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of Mar. 28, 1914, as having ordered twenty-five closed pay-as-you-enter motor cars and ten trailers from The J. G. Brill Company, has specified the details for this equipment, as shown below.

Motor cars:	
Seating capacity	48
Weight (car body only)	17,500 lb.
Bolster centers, length	22 ft.
Length of body	31 ft. 6 in.
Length over vestibule,	44 ft. 8 in.
Width over sills	7 ft. 5½ in.
Width over all	8 ft. 5⅜ in.
Height, rail to sills	27½ in.
Height, sill to trolley base,	8 ft. 9¾ in.
Headlining	Agasote
Roof	arched
Underframe	metal
Couplers	Van Dorn
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Hand brakes	drop handle
Heaters	Consol.
Headlights	Crouse-Hinds
Paint	Sherwin-Williams
Registers	International
Sash fixtures	O. M. Edwards
Seats	Hale & Kil. No. 199-A
Seating material	rattan
Step treads	Feralun
Trolley catchers,	Trolley Supply Co.
Trucks	Brill, 39-E
Varnish	Hildreth
Ventilators	Garland
Wheels	Southern Wheel Co.

Trailers:	
Seating capacity	56
Weight (car body only)	14,100 lb.
Bolster centers, length	22 ft. 7 in.
Length of body	30 ft. 3 in.
Length over vestibule,	39 ft. 10 in.
Width over sills	7 ft. 5½ in.
Width over all	8 ft. 5 in.
Height, rail to sills,	21 ft. ⅝ in.
Height, sill to trolley base,	8 ft. 5⅞ in.
Headlining	Agasote
Roof	single arch
Underframe	metal
Air brakes,	National Brake & Elec. Co.
Couplers	Van Dorn
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Hand brakes	Peacock
Heaters	Consol.
Paint	Sherwin-Williams
Registers	International
Seats	Brill, stationary
Seating material	rattan
Step treads	Feralun
Trucks	Brill, 53-D
Varnish	Hildreth
Ventilators	Garland
Wheels	Southern Wheel Co.

TRADE NOTES

Transportation Utilities Company, New York, N. Y., has acquired the entire business of the General Railway Supply Company.

Pantasote Company, Chicago, Ill., has removed its Chicago office from the Fisher Building to the People's Gas Building, 122 South Michigan Avenue.

Fonger Fender Company, Chicago, Ill., has received an order to equip all the cars of the Escanaba (Mich.) Traction Company with its tip-tilting automatic fenders.

Charles P. Williams, who has represented the National Lock Washer Company of Newark, N. J., in Chicago and the West for several years, has left the service of that company.

Gary Screw & Bolt Company, Chicago, Ill., has moved its office from 72 West Adams Street, Chicago, to 1887-1889 Continental & Commercial National Bank Building, Adams and La Salle Streets.

United Gas & Electric Corporation and the **United Gas & Electric Engineering Corporation, New York, N. Y.,** have removed their offices from 40 Wall Street to the new Adams Express Building, 61 Broadway.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has been awarded an order for 340 gears and pinions to be used on the eighty-five recently ordered cars of the United Railway & Electric Company, Baltimore, Md.

Lumen Bearing Company, Buffalo, N. Y., announces the return of E. P. Sharp, manager of its street-railway department, from an extended tour, during which he visited all the principal street-railway systems of the South.

Titan Storage Battery Company, Newark, N. J., has been established to take over the business of the Baltimore Storage Battery Company of Baltimore, Md. The new company will continue under the same ownership and management as its predecessor.

L. S. Brach Supply Company, New York, N. Y., has recently concluded arrangements with the Railroad Signal Supply Company, Hackney Building, St. Paul, Minn., whereby the latter will handle the Brach automatic flagmen, lightning arresters, etc., in St. Paul, Minneapolis, Duluth and Winnipeg. The former company has moved its Chicago office from the Karpen Building to the Lytton Building.

General Electric Company, Schenectady, N. Y., received the order for 400 motors for the 100 new cars which are being built for the Pittsburgh (Pa.) Railways. These motors are of a new type for use with 24 in. wheels, the new design being called GE-247. This company also received an order for 340 GE-200 motors for the eighty-five cars recently ordered by the United Railways & Electric Company, Baltimore, Md., from The J. G. Brill Company.

Hunter Illuminated Car Sign Company, Flushing, N. Y., has received the order for the destination signs on the 125 new cars which the Jewett Car Company is building for the Municipal Railways of San Francisco. These cars were mentioned in this column last week. The equipment will consist of four signs per car, two hood signs with indicating devices and two side-window signs. These signs will be used instead of the signs originally specified and mentioned in the previous note.

United States Steel Corporation, Chicago, Ill., and its subsidiaries in Chicago has removed from its quarters at 72 West Adams street to the new Continental & Commercial National Bank Building, Adams and LaSalle streets, occupying the eleventh, thirteenth, fourteenth, fifteenth, sixteenth and seventeenth floors. The offices removed include those of the Illinois Steel Company, Indiana Steel Company, Universal Portland Cement Company, American Bridge Company, Gary Land Company, Bunsen Coal Company, Elgin, Joliet & Eastern Railway, American Steel & Wire Company, National Tube Company, American Sheet & Tin Plate Company and the Carnegie Steel Company.

Westinghouse, Church, Kerr Company, New York, N. Y., has been awarded a contract by the Taylor-Wharton Iron & Steel Company for the erection of a 25-acre plant in Easton, Pa., and for enlargements to its present plant in High Bridge, N. J. The contract aggregates $2,000,000, of which more than $1,500,000 is to be the initial outlay for the new Easton works. On the day that the company begins work the Board of Trade will begin the erection of 100 dwelling houses in the vicinity of the works as part of its agreement with the Taylor-Wharton Company and the Jersey Central Railroad will start construction of its new industrial spur from Hope to the site to be occupied by the new plant.

ADVERTISING LITERATURE

Calculagraph Company, New York, N. Y., has issued a folder describing its working time recording calculagraph.

Buckeye Jack Manufacturing Company, Alliance, Ohio, has issued a catalog describing its compound-lever track and automatic lowering jacks.

Wiener Machinery Company, New York, N. Y., has issued a catalog describing its Hercules bending machines for bending angles, beams, channels, rails and other shapes.

Ford Chain Block & Manufacturing Company, Philadelphia, Pa., has issued a catalog describing its tribloc screw gear hoists, differential hoists and plain and geared trolleys.

Electric Railway Journal

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"SAFETY FIRST" NEWSPAPER PUBLICITY

"Safety first" campaigns are pretty numerous these days among progressive electric railways. In every case the object is the same, but usually there is something characteristic about each movement. In this instance an example is offered by the Montreal Tramways which may well be envied by other railways for the splendid publicity it is receiving from both the French and English newspapers of Montreal. Long before the railway had inserted a single "safety" advertisement, all of the newspapers had published many columns of favorable news and editorial comment on the campaign to be undertaken by the company. In fact, one paper has already devoted the complete front page of its Sunday magazine supplement to "safety first" pictures, even going voluntarily to the expense of posing its own subjects. This evidence of good-will from the press clearly is the result of safe operation in the past, for during the year 1913 the accident account of the Montreal Tramways was only 1.74 per cent of the gross earnings. The present campaign is therefore simply a proof of the company's desire to bring accidents to the irreducible minimum by inculcating the public with the same degree of caution which has already been shown by the railway employees. The educational methods used or in contemplation by the Montreal Tramways are detailed elsewhere in this issue. While they embody such recognized features as moving pictures, the practices which will be taken to interest the public in the accident campaign are unusual enough to warrant the thoughtful study of other railways.

CENTRALIZED POWER FOR LONDON?

A timely reinforcement of Samuel Insull's recent plea for the centralization of power supply, as noted in the ELECTRIC RAILWAY JOURNAL for April 25, is afforded by the report rendered on April 16 by Messrs. Merz and McLellan to the London County Council on "London Electricity Supply." According to their investigations, the replacement of all of the existing stations in a territory of 100 square miles by eight or ten plants farther down the Thames River would save 18 per cent, or approximately $850,000, a year in operating expenses. This saving means that after allowing all capital and sinking fund charges on the new equipment the entire cost of the old plants would be written off by 1931. It may seem odd that a scheme of centralizing power supply should call for eight to ten stations. The consulting engineers believe, however, that if each station is large enough to use the biggest economical unit it would be unwise to put all of them in one plant, especially when such separate plants would have more favorable fuel and water conditions. These new plants with three-phase, high-tension, fifty-cycle transmission and a 500-volt, three-wire system for the d.c. distribution would replace the forty-nine different installations of to-day. A striking feature of the report is the reference to the fact that several railways (presumably the London & South Western and the London & North Western Railways) are building their own stations for electrified suburban lines because of the present inadequate energy supply. Certainly the load factor of such lines is not one which should encourage the building of separate plants if a whole battery of centralized interconnected plants is available. While the consulting engineers suggest several ways to carry out the scheme of centralization they appear to favor partial or complete municipal ownership with private operation on a profit-sharing basis.

RUSH-HOUR AND NORMAL RUNNING TIME

At first sight many operating men would take issue with the statement that the time taken to make a round trip during rush hours need not exceed that during normal hours of traffic. Yet this is the paradox offered in a recent article in this paper describing the make-up of a time-table. Naturally, cars do make more stops during the rush hours than at other times, but partial compensation is afforded by the fact that the time of passenger interchange tends to be less then than it is during normal hours when the greater proportion of the passengers are children, elderly persons and shoppers who are carrying bundles. A broader explanation of the paradox is the fact that while the car may lose time outbound it can make up for the loss on its trip inbound. In other words, comparisons of rush-hour and normal-hour running times should be made on the basis of round trips instead of half trips, because the same car that stops at every corner on its outbound trip when loaded may not have to stop more than three or four times on its return when empty. The total number of stops per round trip, therefore, may actually be less than the total number of stops made by a car during the normal hours when a fairly good load is carried in each direction. The possibility of maintaining normal running time during the rush hour is affected, of course, by the type of cars in use. The possible saving in the return run may be, and too often is, offset by the longer interval which outward-bound passengers necessarily require for alighting when they are obliged to work their way through a heavily loaded car with narrow aisles.

THE OPPORTUNITY OF THE SMALL COMPANY

A recent glance over the list of members of the American Electric Railway Association discloses the somewhat anomalous fact that the proportion of companies which are members of the association among the smaller roads is nowhere near as large as the proportion of the larger roads. This seems strange because the schedule of dues is arranged so as to be particularly favorable to the smaller companies; they secure all of the privileges of the larger properties and have equal opportunity of representation at the convention and of calling upon the secretary's office for special information of any kind. The latter advantage is one whose importance those companies which are not members of the association do not always realize. Under Secretary Burritt this department of the activities of the association has been greatly developed. While more could undoubtedly be done with the greater facilities which a larger membership would warrant, the facilities possessed for gathering information of all kinds are even now so great that if a company made but one inquiry a year it would be repaid far more than its membership fees. As an instance, the association recently received a request for data in regard to the conditions under which city railway companies were required to make fire stops. The member company making the inquiry considered the number of fire stops which it was required to make was excessive. In reply a 35-page compilation was sent on the subject, showing the practices in a large number of cities, quotations from many municipal ordinances and the number of voluntary stops made by certain companies. From Feb. 1 to Nov. 15 of last year more than fifty such special original reports and compilations were prepared by the association, independent of all work of this kind done by committees, and the information thus secured is kept up to date so that it can be available for any company which desires it. Since Nov. 15 about twenty such compilations have been prepared on such subjects as the decisions of commissions on the height of car steps and the character of waiting rooms to be furnished, typical organization charts, and even on such comparatively minor matters as the use and cost of different types of vending machines. In fact, nearly every mail brings an inquiry which can generally be answered by the data at hand but occasionally requires a special report, which is available for other companies later.

We have touched somewhat at length upon this phase of association work partly because it has not been as thoroughly understood or has not been so conspicuous as other phases and partly because it is one which seems particularly to appeal to the smaller companies and is provided without charge to the members. To assist in this work the association can and does call upon the transportation, legal and engineering experts of the larger companies, whose services are thus made available for the good of the industry to companies which otherwise could not afford to seek their advice.

A single inquiry of this kind from a small company may cost the association more in clerical work than the company's annual dues, so that on its face it would look as if the undertaking is a losing proposition. This, however, is not the case, partly because every additional member secured by this service means added strength to the association and partly because the data obtained from any special inquiry is retained for use in case the inquiry is repeated by another member. The association is now endeavoring to include practically every company in the country, and there is logically no reason why it should not be successful in so doing in view of the benefits which it offers to member companies.

PUBLIC RELATIONS OF PUBLIC UTILITIES

The important questions under this general subject pressing for solution are many. Are these enterprises to be conducted in the future under government or municipal ownership, or are they still to be under private control closely regulated by representatives of the public? Will public utility franchises be perpetual or indeterminate, or shall they be for definite periods of time? If the latter, what is to be done when these franchises expire? If private ownership is to be the rule, what rate of return shall be allowed on the investment? What returns shall be allowed on the capital now represented by the properties? What allowances shall be made because of the effect of obsolescence on apparatus otherwise good? What participation will labor have in the management of these properties or in their earnings from operation? If the railway companies expect a satisfactory answer to these questions they must at least agree upon what they consider a proper solution. They will make no progress if they vainly hope for a return of the old conditions under which the public had no voice in the control of the public service corporations. Whether for better or for worse, that time has passed never to return, and the sooner this fact is recognized the better.

A very helpful contribution toward a better understanding of this subject by electric railway companies, written by the secretary of the Pacific Coast Electric Railway Association, appears in this issue. In some respects the railway corporations in the Far West have had a better opportunity to judge the sentiment of the times than those in the East. More has been actually done there, for instance, in municipal ownership and operation of electric railways than in the older parts of the country. Other problems, which have appeared in only vague form in the East, have become acute in the states on the Pacific Coast. Mr. Hazzard's plea is, first, for a recognition by all the companies of the necessity for some action; second, a definite policy and, third, co-operation in this policy by all. He compares the company which has not felt the need for relief to the highlander who sees his neighbors on lower ground inundated by a flood but thinks that it will not rise to him, and he represents the feelings of the great majority of the railway companies who appreciate the situation and look to the American Electric Railway Association and its committee on public relations for some definite statement of policy.

We share his belief that the work of this committee will be of great assistance to the industry. To be of the greatest assistance, however, it must recognize the conditions as they exist, not as they have been or might have been. The position to take is that the true interests of the public and the public utility are the same, that the claim of the public utility for fair treatment is based solely on the equally good treatment in the way of service which it gives the public, and that this service is better and cheaper when provided by a private company than would be possible under municipal ownership. It will be impossible to carry conviction under any other standard.

MUNICIPAL OWNERSHIP FOR THE CAPITAL CITY?

Glib is the only word that properly characterizes the communication of the commissioners of the District of Columbia to the chairman of the House District committee, advocating the immediate passage of a bill providing for the "acquisition, ownership and operation" of all the Washington street railroads. Reference was made to this communication in our news columns last week.

In less than four typewritten pages the commissioners dispose once and for all of the whole subject of municipal ownership and operation of electric railways. It is really a very simple proposition—the commissioners say so themselves. As they put the case it reminds one of the simple syllogisms that are given to beginners in logic. Urban transportation is vital to the life of a city. "The furnishing of such transportation is as essentially the performance of a public function as is the supplying of water or lights." To "leave to private individuals . . . the performance of such a public function . . . is to insure the maintenance of a struggle between public duty and public needs on the one hand and private interest and profit on the other," while "if this public service is performed by public authorities they can have no other motive than to do those things that the traveling public demands. They have but to maintain a proper relation between efficient service and the cost thereof."

See how easy it is. After reading the last two sentences just quoted one wonders why there has been all the argument about municipal ownership and operation, when it is so plain that this policy solves the whole problem of giving the public what it wants while maintaining the proper relation between efficient service and its cost! To clinch their argument the commissioners refer to the "notable success" of municipal electric railways in New Orleans, where no such things exist. The commissioners could not have meant San Francisco, for it is stated that this "notable success" has been going on for a number of years.

Anticipating the argument that regulation under the commission law that went into effect in February, 1913, should be tried before resort is had to municipal ownership and operation, the commissioners (who form the Public Service Commission of the District of Columbia) say that there are two railways in Washington and that this would make regulation "perplexing." Here is another new idea, namely, that where there is more than one utility to be regulated the work is really too complicated for a public service commission to attempt, especially in view of the greater simplicity and promise of public ownership, as exemplified in New Orleans!

Throughout the commissioners' recommendation there is the implication that the Washington railways have been derelict in the performance of their duty in supplying good transportation and that their scramble to make "private profits" has resulted in failure to provide facilities to which the public is entitled. This is not true, nor is it true that excessive profits have been earned or paid to stockholders. The Washington railways have not only given good and satisfactory service but have extended their lines to such points as Chevy Chase and Takoma Park, Montgomery County, Maryland, where the prospect for profit was remote, so far as the railway was concerned, but immediately effective in enlarging the residential area and increasing real estate values.

Of the two Washington systems, one reports a cost of property of $17,706,393 and capital stock and funded debt of $17,639,500. This, the Capital Traction system, pays a 6 per cent dividend on $12,000,000 capital stock. The Washington Railway & Electric Company reports its cost of road equipment and real estate at $28,182,972, and has outstanding capital stock and funded debt of almost exactly the same amount. It pays 5 per cent on $8,500,000 of preferred stock, and in the past five years has paid from 1 per cent to 3 per cent on $6,500,000 of common.

The idea that the commissioners of the District of Columbia, changed as they are every four years and sometimes after shorter terms, could take over the transportation problem of the District of Columbia and handle it more efficiently than the existing companies are handling it at the present time, is of course an assumption entirely unjustified by general experience or the facts of this particular case. Although the conduct of the present House committee of the District of Columbia has been somewhat erratic, it is very much to be doubted whether serious attention will be paid to the commissioners' recommendations. These, however, were no doubt sought by several members of the District committee who are known to be advocates of municipal ownership and operation. The proposition is, however, sure to receive critical examination from the House as a whole, and if the recommendations of the commissioners of the District are the best that can be said for the bill to provide for municipal ownership and operation of the Washington electric railways, it is fairly safe to say that this measure will have rough sledding in Congress.

When the public service commission law went into effect in the District of Columbia a year ago last February, it could not be executed because there was a squabble over the appointment of the commissioners, and for several weeks there was no one to put the law into operation. This in itself is suggestive as to how Washington railroads would be operated by the District government. The commissioners have found the regulation of electric railways "perplexing" and "complex," but this does not seem to have suggested to them that ownership and operation would be at least as perplexing and complex as mere regulation. Moreover there is nothing in the management of government or municipal enterprises which shows evidence of notable efficiency or absence of politics or gives ground for belief that any different plan would be followed if the operation of the public utilities was under the same direction. Until it has been shown that post-office affairs, or the police departments of our cities, or the building operations in which municipalities are engaged, are conducted with greater regard for economy and efficiency than is now shown, it would be the height of recklessness to confide other large enterprises to the same control.

PROGRESS IN ELIMINATING INDUCTIVE INTERFERENCE

When the New Haven Railroad was electrified from Woodlawn to Stamford seven years ago there was much apprehension as to the effects upon neighboring telegraph and telephone lines of the alternating magnetic field which would surround the track in the electrified zone. Preliminary calculations showed that voltages of considerable magnitude would be induced in the lines with the system of railway distribution as planned and that the telegraph and telephone circuits could not be operated without some compensating scheme. A plan for using transformers or compensators which would introduce into the disturbed lines emfs proportional to the disturbance was adopted and has been in use ever since. This method of attack on the problem was one involving cure rather than prevention. That it has not been altogether successful is indicated by the recent expenditure of large sums of money on preventive rather than curative measures. The details of the plan have been mentioned from time to time by those competent to explain them but the whole story of the development has not been available. The ELECTRIC RAILWAY JOURNAL has, therefore, gathered the facts from various sources and has arranged them in convenient form for reference. The result is seen in the article appearing in this issue.

The method finally adopted by the railroad was worked out by the three companies most vitally concerned, the American Telephone & Telegraph Company, the Western Union Telegraph Company and the railroad company. By this co-operation the interests of all are conserved, while each party is brought to realize the standpoint of the others. While the auto-transformer plan thus developed may not be the best for all cases it has effected a very great reduction in this disturbing magnetic field.

Meanwhile some very important experiments are being made on the New Canaan branch of the New Haven line. In this the railroad, long distance telephone, local telephone, and manufacturing interests are co-operating. Data are being collected on a large and systematic scale and a theory of preventing interference which is apparently cheaper than the auto-transformer plan is being tried out. At present the results are still incomplete and not altogether classified, but it is evident that the whole subject will be placed on a much more scientific basis, for experimental data will be available to serve as a check on the theory.

The old adage "Prevention is better than cure" is illustrated in the present instance. Telephone and telegraph currents are small, and the apparatus used on such lines is sensitive and complicated. Telephone currents in particular are liable to interference on account of the minute fluctuations upon which successful speech transmission depends. Telephone circuits are fortunately of the metallic variety so that they can be transposed without difficulty, but even if the disturbing emfs between wires are practically neutralized there is still the difference of potential between lines and ground to contend with. Even if the emfs between wires are balanced out under normal conditions there still remain the effects of overloads and short-circuits which are particularly difficult to neutralize. Telegraph lines with grounded circuits and superimposed telegraph and telephone lines with ground return are much more liable to be affected by stray fields than lines used for telephone purposes only and cannot, of course, be transposed. The introduction of compensating devices into the weak-current circuits adds new sources of disturbance while removing others. The compensators must carry the direct current of the telegraph circuits while performing their function as transformers. The direct current may affect the permeability of the cores and so reduce the degree of compensation. The transformers further increase the power consumption in the line and thus reduce the efficiency of transmission. All of this indicates the importance of stopping the disturbing cause at its source if possible.

The cost of the auto-transformer installation has often been considered excessive. That the cost is high is true but it must be remembered that the work was done upon an operating road which had to be kept in operation. The track mileage in the electrified zone also is very large. The cost of the Stamford-New Haven section is very much less per mile, as the transformers are being installed with the transmission system; in fact, the cost per mile of route is said to be much less than that of the original section which had fewer switches and no transformers. The doubling of the transmission voltage, in addition to the application of the experience gained on the older section of the road, have combined to bring about this very satisfactory result. In the new division the inductive interference will be kept down at very reasonable cost. In all of this work the railroad management deserves great credit for going to such expense to eliminate a trouble inherent in an important advance in the art. Each new development in an art is liable to involve temporary trespass upon the rights of others, but a spirit of fairness with arbitration of conflicting interests will always bring ultimate harmony.

The meagerness of the data on inductive interference makes each contribution doubly welcome. Reference has been made in these columns to the investigations which have been going on for more than a year under the auspices of the California Railroad Commission. As was to be expected, the California test committee soon discovered that the subject under investigation is a complicated one. This fact was clearly shown in the paper presented by John B. Taylor before the American Institute of Electrical Engineers in October, 1909, which, with the accompanying discussion, still forms one of the best reference texts on the subject. The experimental data being compiled by co-operative committees such as the two mentioned will greatly augment our present small store of information on a vital subject.

IS MANGANESE STEEL A FAILURE IN CHICAGO?

The article on Chicago's manganese steel experience in another part of this issue may lead many engineers to believe that manganese steel is an absolute failure in track special work. This conclusion is unfounded despite the number of failures, and the good service given by a considerable percentage of the installations seems to warrant the statement that manganese steel properly manufactured offers the best solution of track special-work difficulties at the present time. The article describes many of the types of failures observed, and it is hoped that both engineers and manufacturers will contribute their experience to these columns so that a more uniform manganese steel may be had in future.

The reasons for describing the experience with special work in Chicago are: first, because of the great number of pieces of various types installed four years ago, as well as the fact that the dense traffic has brought about results before they could be obtained elsewhere; second, because it is believed the percentage as well as the character of failures are representative; and third, because many engineers have looked to Chicago for service results before making extensive purchases of solid manganese steel special work. Chicago, in a way, was a pioneer in the extensive use of manganese steel special work in its various forms, and the extensive rehabilitation of the surface tracks there between 1907 and 1911 necessitated the purchase of more than 1000 special-work installations. These included first, solid manganese and, later, three types of manganese insert work. All special-work installations were laid on approximately the same type of foundation, and, in but a very few instances, may the failure be attributed to faulty foundations rather than the inherent characteristics of the manganese steel furnished or the manner of setting and fastening inserts.

As shown in the article, manganese steel failed in three ways, namely, by chipping at the intersecting flangeways, by cupping at the joints or intersecting flangeways, and by cold rolling. The causes of these failures are discussed in the article. On the other hand, those installations that have stood up under the Chicago service, some of which now have been in for more than five years, began early to take on a glassy polish, which they have maintained to date, and they show little or no evidence of wear or any of the forms of failure. It is interesting in this connection to note that cupping and cold rolling did not appear in the manganese inserts, which, when they did fail, were either broken in several pieces or chipped at the intersecting flangeways or failed because of faulty setting and fastening. This varied record indicates faulty foundry practice or tempering of the pieces which failed, but from a discussion of the problem with engineers and manufacturers we believe that a uniform manganese steel can be produced at a reasonable price for the service it can render. The fact that the insert pieces supplied were more uniformly good in quality may be accounted for by the ease with which smaller castings may be treated properly as well as by the fact that a greater number of such pieces may be rejected without an undue increase in the manufacturing cost.

As the problem presents itself at this time, it resolves into one of changing the design, refining the foundry practice and the tempering process to a point where a more uniform product can be produced. Our investigations lead us to believe that this can be done without an undue increase in the cost of manufacture. The chemical analysis of the switch points showed a considerable variation in the percentage of manganese used in the different castings tested, and certainly there can be no question about the practicability of refining the process of manufacture to a point where the variation would be much smaller than 15 per cent. It is probable also that the metal in the wearing surface of each casting might be made more dense, either by increasing the thickness of the supporting web so that the molten metal will flow more freely to the wearing surface or bottom of the mold, or by providing more and larger gates and risers. With this improvement might be combined a careful inspection of all the heats to insure a uniform chemical analysis and extra care in the annealing and quenching process to insure a uniform toughness and hardness.

If the tempering of large manganese castings as well as the foundry practice cannot be refined, Chicago's experience points to the insert types of special work for maximum economy except for switches and mates. The principal objection to the insert construction at the present seems to be the difficulty of fastening the insert permanently in the casting. It has been suggested that solid manganese crossings with renewable inserts might be a good solution for chipping. But this does not appear advisable, because such excellent results have been obtained from the cast-steel arm and the iron-bound insert frogs that nothing would be gained by such a change. In any event the solution of the problem is largely in the hands of the manufacturers. They must be able to furnish a more uniform quality of manganese steel special work than that in Chicago before confidence in the general use of solid manganese steel frogs and crossings will be established.

Reduction of Inductive Interference from the Power Lines of the New Haven Railroad

On Jan. 25, 1914, the New Haven Railroad Put Into Operation the Auto-Transformer Plan for Minimizing Inductive Interference in Telegraph and Telephone Wires and at the Same Time Improving Transmission Economy. Details of the Plan and of the Circumstances Leading to Its Adoption Are Given

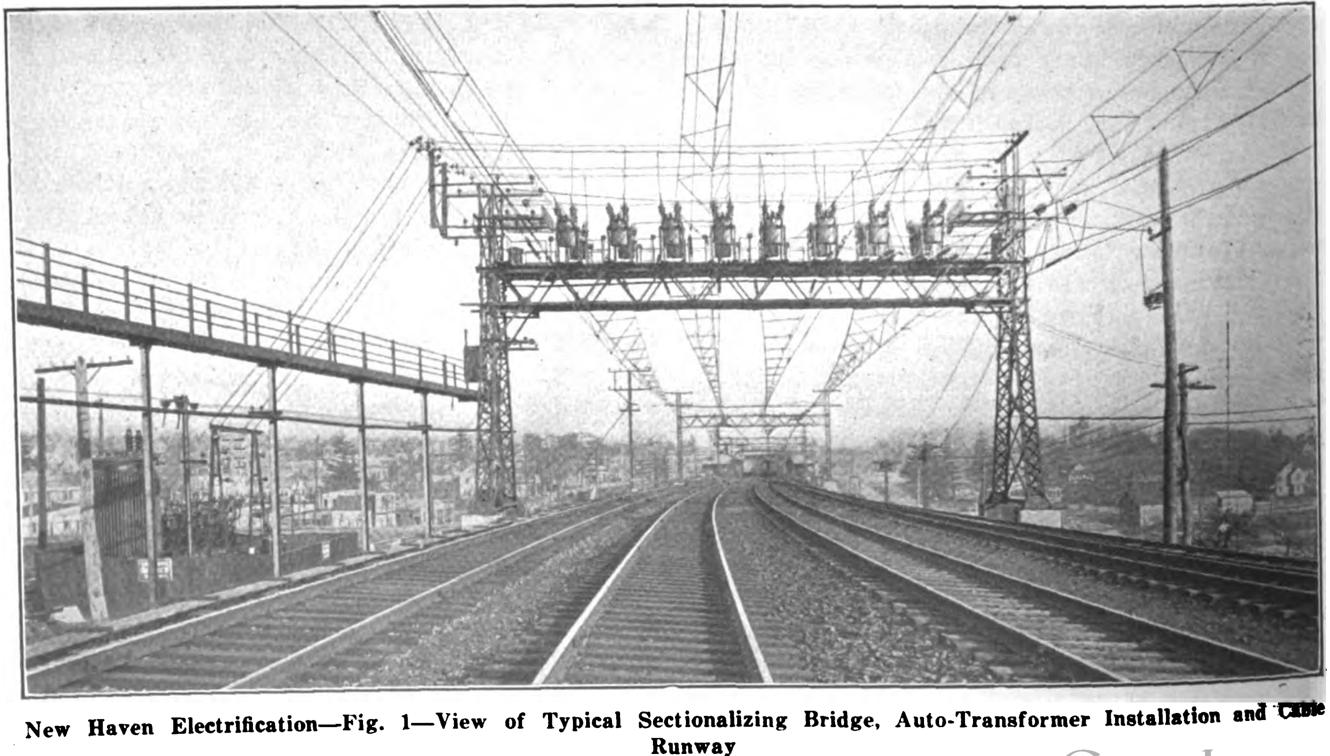
One of the chief objections alleged against the single-phase railway system has been the serious interference with the operation of telephone and telegraph lines within a considerable zone surrounding the electrified railway. That such disturbances have, in the past, been very serious cannot be denied and there is still much to be done before all problems connected with the elimination of inductive interference are solved. Ever since the electrified division of the New Haven road commenced operations, the matter of interference has been under consideration by the electrical engineers of the company, and on Jan. 25 of this year a new system of power transmission was put in service by which the company expects that these troubles will be very much reduced. Short accounts of the general principles upon which this system is based have been published in this paper, but it is believed that a fuller statement of the methods employed and of the circumstances leading up to their adoption will be of interest. The extent of the interference can be judged from the fact that telegraph lines paralleling the New Haven railroad at a distance of 4 to 6 miles could not be operated without compensating transformers before the railroad put the new plan into operation. P. J. Howe of the Western Union Telegraph Company at a meeting a year ago said that if the troubles continued that company would have to move its pole line, formerly on the right-of-way, entirely out of the zone of distribution, partly on account of interference with transmission and partly on account of the hazards to operators introduced by the nearness of the high-voltage lines.

Before taking up the general discussion of the New Haven Railroad problem, it may be well to review briefly the causes of inductive interference from power transmission lines and the general methods available for preventing and overcoming it. Induction is of two kinds—magnetic and electric; the former is produced by the magnetomotive force of a conductor carrying a current and the latter by the electromotive force between two conductors separated by dielectric.

MAGNETIC INDUCTION

For the purpose of illustration it is convenient to compare the action of, say, an alternating-current railway having overhead conductor with ground-return, inducing electromotive forces in neighboring conductors, with the a.c. transformer. The railway circuit sets up a magnetic field which links with the loop formed by the trolley wire and the return, corresponding to the primary winding of the transformer. The density of the magnetic flux is greatest within the loop and falls off rapidly in all directions. If the return current were confined entirely to the rails, the density of the magnetic field at various points corresponding to assumed values of current could be calculated with a fair degree of approximation. As a matter of fact, however, the return current spreads out over a large area, and its magnetic effect is somewhat uncertain. This magnetic flux produces disturbing electromotive forces in all loops with which it links.

As the total quantity of magnetic flux produced by the primary circuit depends upon the area of the loop producing it, its quantity can be reduced by having the two sides of the loop as near together as possible. Thus



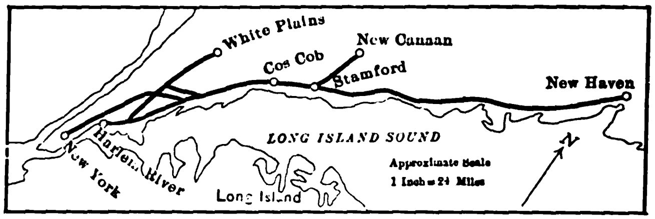
New Haven Electrification—Fig. 1—View of Typical Sectionalizing Bridge, Auto-Transformer Installation and Cable Runway a conductor doubled back on itself would produce practically no magnetic flux. What is true in the primary circuit also applies in the secondary, for the total quantity of magnetic flux linking with a loop depends upon the loop area. As the secondary electromotive force produced, at the same frequency, is proportional to the linking flux, keeping the two sides of the secondary circuit close together will also minimize the disturbance, as far as the loop is concerned. The flux which passes between the ground and the conductors, however, will induce electromotive forces in a loop of which the overhead conductors and the ground form parts.

ELECTRIC INDUCTION

Electrostatic disturbances are due to differences of potential between conductors, for when such difference of potential exists, one conductor tends to charge the other by induction. The quantity of this induction depends upon the difference of potential, or electromotive force, between the conductors and upon their capacities. When this induced charge is produced by an alternating difference of potential, a charging current flows in the circuit in which the induction takes place.

Conductors having potentials negative with respect to the disturbed circuit induce positive charges thereon and vice versa; so that two similar conductors equidistant from a third would induce no charge in the last-named if the differences of potential between it and the others respectively were equal and opposite in sign. In the a.c. railway the rails are at ground potential and the charging currents in telegraph and telephone lines are induced from the trolley wires and feeders. It is theoretically possible to balance out the induction as explained above.

In the case of the New Haven Railroad there is practically no trouble from electrostatic induction because the lead sheaths of the underground cables act as shields for them, as do also the overhead steel structures and all grounded telegraph and telephone circuits.



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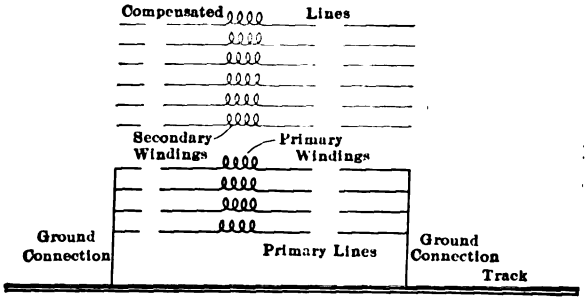
New Haven Electrification—Fig. 2—Map of Electrified Line



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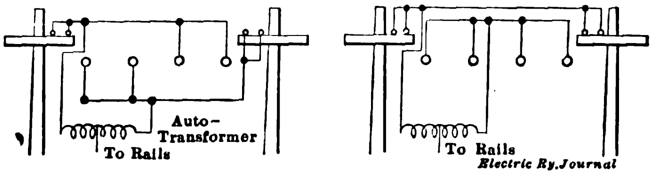
New Haven Electrification—Fig. 3—Diagram of Line Compensator Connections



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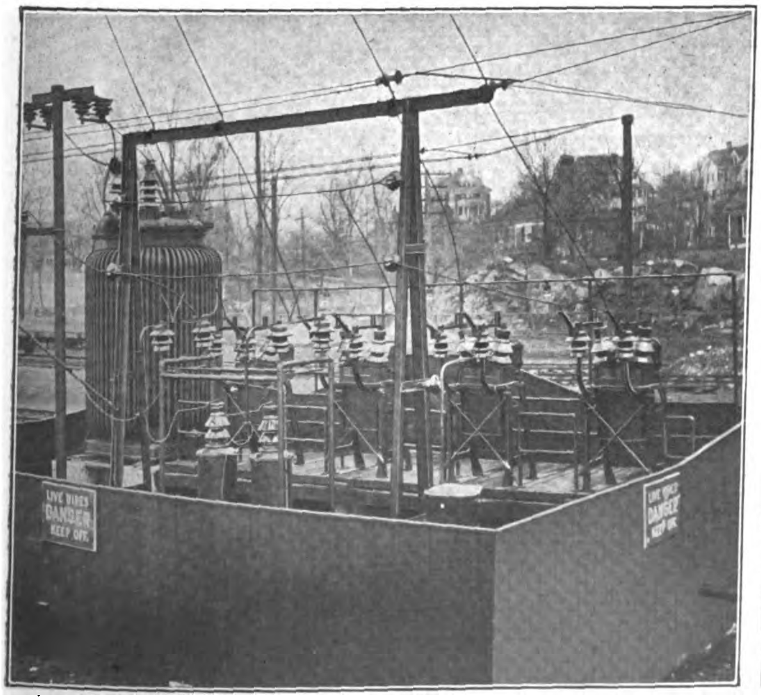
New Haven Electrification—Figs. 4 and 5—Diagram of Balanced and Auto-Transformer Schemes

COMPENSATION IN TELEGRAPH AND TELEPHONE LINES

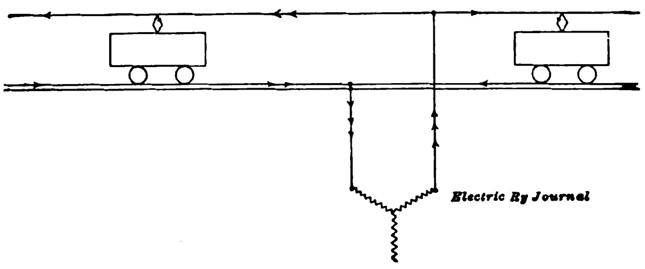
In telegraph and telephone circuits which run inside the zone of possible interference from a.c. power lines it is necessary to take precautions to compensate for interference. As the disturbance takes either the form of an induced emf or a charging current, or both, the curative methods must be designed to compensate for the induced emfs or to "drain" away the extra current.

In two-wire lines, such as telephone and some telegraph lines, the neutralization of emfs in the circuit can be accomplished by means of transposition of the wires. By this means emfs in different parts of the circuit have different directions. Transposition does not prevent the development of emfs between conductors and ground.

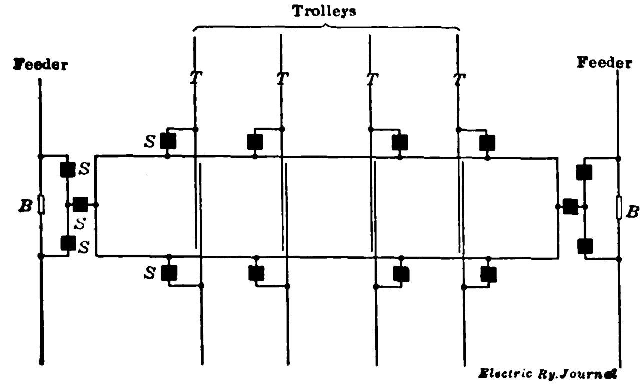


New Haven Electrification—Fig. 6—Typical Line Auto-Transformer Installation

New Haven Electrification—Fig. 7—Self-Cooling Line Auto-Transformer



New Haven Electrification—Fig. 8—Diagram of Former Distribution



New Haven Electrification—Fig. 9—Diagram of Former Sectionalizing Bridge Wiring

Drainage of two-wire lines is accomplished by shunting the lines with choke coils grounded in the middle. These present high impedance from wire to wire but little from both wires to ground. This plan is used principally on private lines.

The most satisfactory means of neutralizing disturbing emfs is by means of transformers which introduce into the affected lines compensating emfs proportional to the disturbance. These transformers, or compensators, have primary windings connected in one or more lines paralleling the disturbing circuit and grounded at both ends. The secondary windings are connected in series with the affected lines, the values of the compensating emfs being adjusted by selecting the proper ratio of turns in the transformer windings. The arrangement of such a compensating transformer is shown in Fig. 3. This is the method employed by the American Telephone & Telegraph Company on its New York-Boston lines paralleling the New Haven. This company has an underground conduit along the line of the New Haven at an average distance of about 2000 ft. from the track.

The compensator arrangement is obviously expensive, requiring, as it does, not only the addition of the transformers to the equipment but the setting aside of certain wires for the primary circuits and a reduction in the efficiency of all circuits due to transmission losses in the transformers. The primaries are not lost entirely for transmission purposes as they can be used telephonically as parts of other circuits, although not for superposed telegraph.

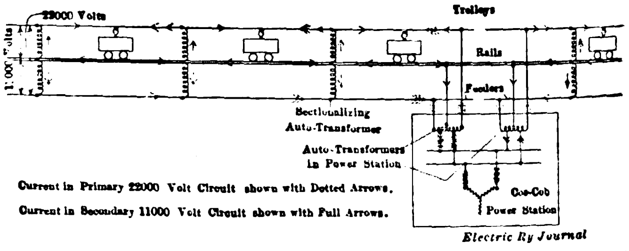
In a grounded circuit some such compensation as described is absolutely essential. It is valuable also in metallic circuits, in preventing a difference of potential between lines and ground, which is disagreeable for operators and may become dangerous.

In the telegraph lines operated by the New Haven Railroad itself for signal and other purposes, it was found necessary to do away with the grounded circuit on one of the most important lines between New York and Boston, as it was impossible to overcome the induced voltages at all times. In a discussion on the subject at the last meeting of the Association of Railway Telegraph Superintendents, N. E. Smith, superintendent of telegraphs of the New Haven Company, stated that considerable improvement was secured by using voltages much higher than those induced in the line by interference. In this way the interference could be made negligible in many cases as compared with the working current. The railroad company operates telephone wires on a pole line located near the track, and by keeping up the insulation and by frequent transpositions, at every fifth pole, it is able to get satisfactory speech transmission. In order to protect users of the telephone from high voltage induced in the line, transformers were installed for each telephone, thus electrically insulating the instruments from the line. Drainage coils were found unsatisfactory in this case.

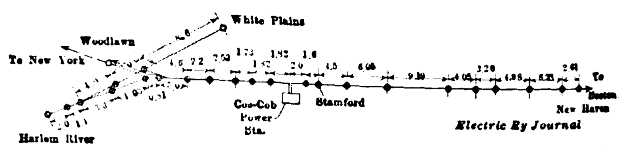
EVOLUTION OF THE PLAN USED AT PRESENT BY THE NEW HAVEN RAILROAD

The adoption of the auto-transformer plan, which will be described in detail later, was the outcome of a number of conferences held by representatives of the conflicting interests in the early part of the year 1912. At the suggestion of the engineers of the New Haven Railroad, representatives of the American Telephone & Telegraph Company and the Western Union Telegraph Company were appointed to confer with the railroad company's engineers with a view to preparing a plan for correcting the evils which existed in the zone between Stamford and New York. W. S. Murray was appointed to represent the railroad company, H. S. Warren, the American Telephone & Telegraph Company, and G. M. Yorke, the Western Union Telegraph Company. This committee held eight or more conferences, to which were also invited experts from manufacturing companies and others able to give the committee first-hand information on the subject under discussion. Prof. Charles F. Scott, of Yale University, was employed as consulting engineer for the railroad company, and in this capacity he made studies of the existing interference and outlined several plans for reducing it. Three plans were given careful study by the committee, not only from the standpoint of the reduction of interference but also of the cost involved. These may be called, for convenience, the balanced plan, the semi-balanced plan and the island plan. The general principles of these are as follows:

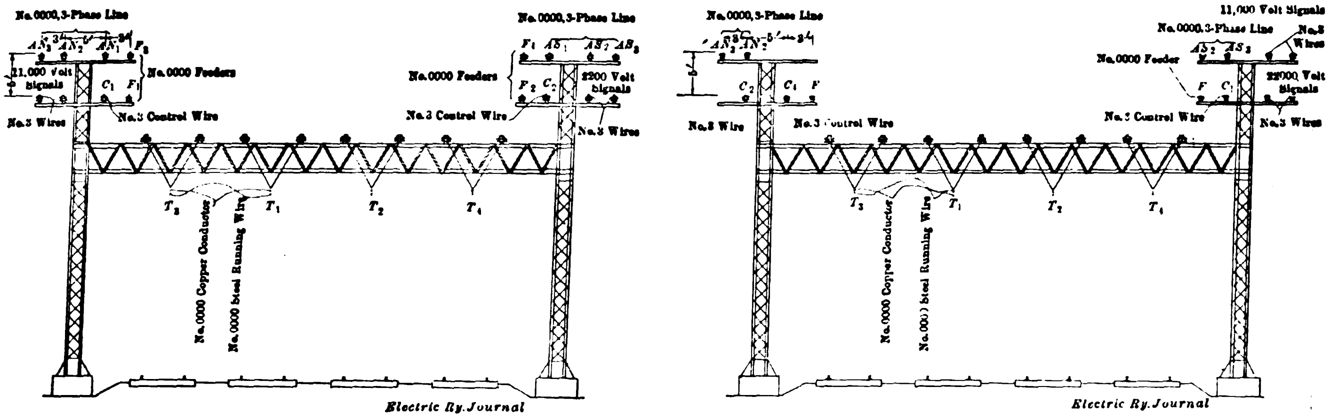
The balanced plan comprised a three-wire transmission with auto-transformers distributed along the line. These transformers were to be connected across two pairs of feeder wires with 22,000 volts between the two. The mid-points of the transformer windings were to be connected to the track. Two feeders were to be placed on each side of the track and for convenience may be


22000 Volts
11000 Volts
Trolleys
Rails
Feeders
Sectionalizing Auto-Transformer
Auto-Transformers in Power Station
Cos-Cob Power Station
Current in Primary 22000 Volt Circuit shown with Dotted Arrows.
Current in Secondary 11000 Volt Circuit shown with Full Arrows.
Electric Ry Journal

New Haven Electrification—Fig. 10—Diagram of Present Distribution



New Haven Electrification—Fig. 11—Diagram of Sectionalizing Bridge and Transformer Spacing


No. 0000, 3-Phase Line
AN_3 AN_2 AN_1 F_3
11,000 Volt Signals
C_1 F_1
No. 0000 Feeders
No. 3 Wires
No. 3 Control Wire
No. 0000, 3-Phase Line
F_1 AS_1 AS_2 AS_3
No. 0000 Feeders
F_2 C_2
2200 Volt Signals
No. 3 Control Wire
No. 3 Wires
T_3 T_1 T_2 T_4
No. 0000 Copper Conductor
No. 0000 Steel Running Wire
Electric Ry. Journal
No. 0000, 3-Phase Line
AN_3 AN_2
C_2 C_1 F
No. 3 Wire
No. 3 Control Wire
11,000 Volt Signals
No. 0000, 3-Phase Line
AS_2 AS_3
No. 3 Wires
No. 0000 Feeder
F C_1
22000 Volt Signals
No. 3 Control Wire
No. 3 Wires
T_3 T_1 T_2 T_4
No. 0000 Copper Conductor
No. 0000 Steel Running Wire
Electric Ry. Journal

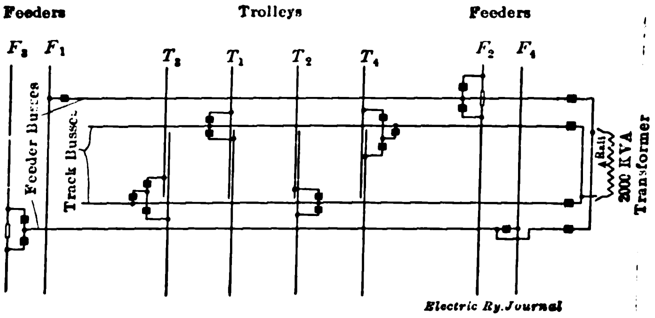
New Haven Electrification—Fig. 12—Cross-Sections of Present and Former Line at Bridge

referred to as the north and south feeders respectively. The generator voltage of 11,000 was to be raised to 22,000 for the line by means of auto-transformers, with their mid-points grounded, located in the power station.

For the purpose of producing electromagnetic and electrostatic neutralization the north feeder wires were to feed the south trolley wires and vice versa, as shown in Fig. 4. This plan was ideal from the standpoint of transmission economy and of non-interference with foreign lines, but it was felt to be impracticable on account of the difference of potential between the trolley wires, which obviously would be 22,000 volts. This feature would have made the overhead construction difficult, particularly at track switches.

The second plan considered, the one finally adopted, may be called a semi-balanced system. In this plan the trolley wires are all at the same potential, 11,000 volts above the rails. The transmission system and auto-transformer arrangement are as in the first plan except that the trolley wires are all connected together and to one terminal of the transformers, while the feeders, in parallel, are connected to the other. This plan will be taken up more in detail later in this article. Fig. 5 shows by way of contrast with Fig. 4 the general features of the auto-transformer plan.

The third plan considered was one in which the line was divided into a number of sections, insulated from each other, each fed from one or two transformers. By this means the current drawn by a train in any one section could be confined to that section, and the inductive disturbance would be largely balanced out. This plan was not adopted, because in the opinion of the railroad company's engineers, the large expense involved for first cost and annual charges was not warranted by the result to be secured.


Feeders
Trolleys
Feeders
F_3 F_1
T_3 T_1 T_2 T_4
F_2 F_4
Feeder Busses
Track Busses
Rail
2000 KVA Transformer
Electric Ry. Journal

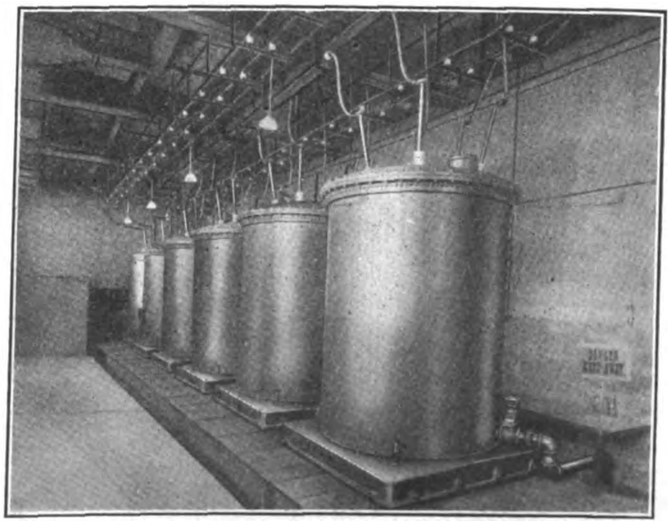
New Haven Electrification—Fig. 13—Diagram of Present Bridge Wiring

DETAILS OF THE AUTO-TRANSFORMER PLAN

In Fig. 8 are represented diagrammatically the elements of the electric circuit under the arrangement used previous to Jan. 25. The current for each car flowed from the power house through the overhead feeders and conductor wires and back through the rails and ground. The loop thus formed had considerable area, and at times of short-circuit, in particular, the magnetomotive forces produced were very great. The line was capable of being sectionalized by means of circuit breakers at the bridges, but this was merely for convenience in disconnecting defective line sections and not for the reduction of inductive interference. Fig. 9 shows the old switching arrangements at a typical four-track bridge. Here the trolley wires were interrupted and overlapped to prevent the breaking of a circuit under ordinary conditions. Provision was made for connecting and disconnecting feeders by means of circuit breakers, marked *S* in the diagram. These were controlled from adjacent signal towers. The feeder sections were separated electrically by insulators, such as *B*, *B*.

Fig. 10 is a simplified diagram of the new arrangement. This is evidently similar to the Edison three-wire system except that the direct load is on one side of the circuit, the other receiving its share through the auto-transformers which perform the same function as balancer sets in a d.c. distribution.

The diagram shows the Cos Cob power station, which contains 11,000-volt three-phase generators, used single-phase for the railroad electrification but three-phase for the other power transmission. By means of auto-transformers installed at the power house connected as shown the voltage is raised to 22,000, and the middle points of the transformers are connected to the rails. Line auto-transformers are arranged along the track



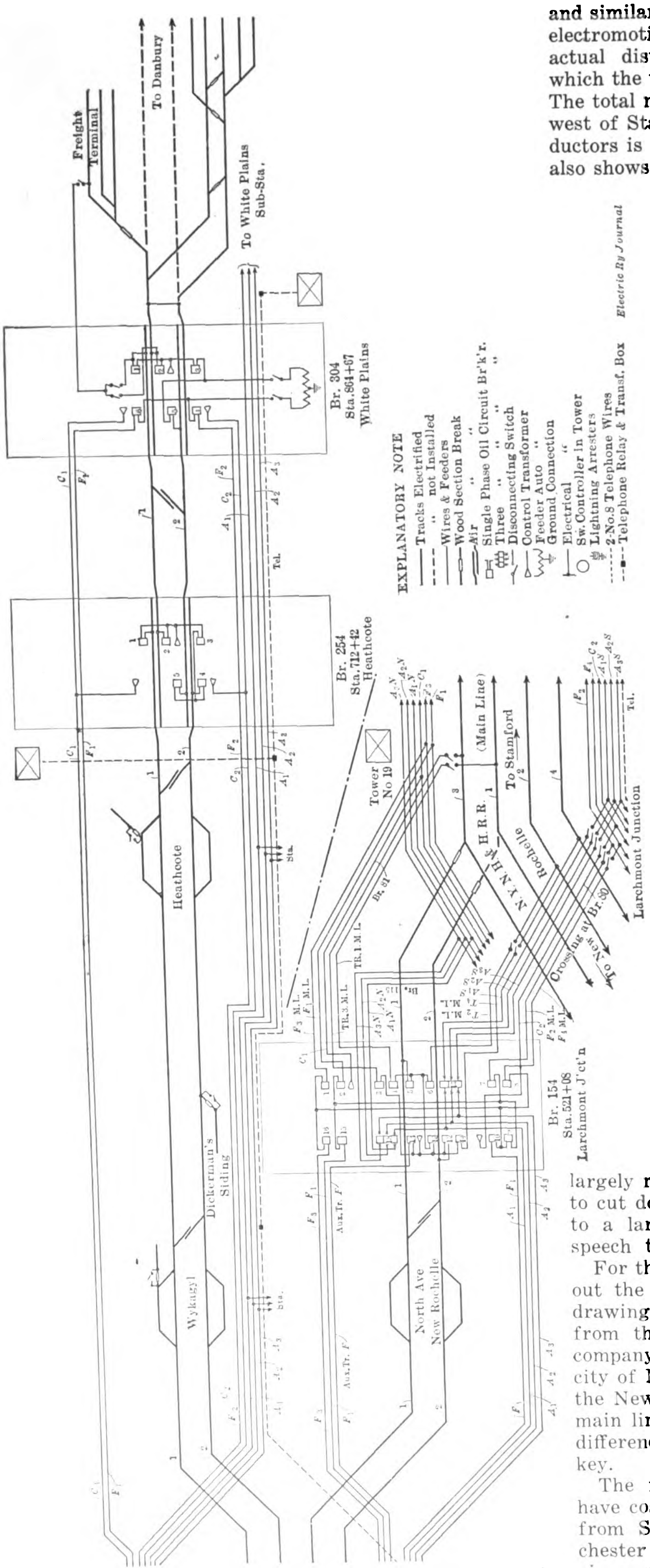
New Haven Electrification—Fig. 14—7200-Kva Auto-Transformers in Cos Cob Power Station and similarly connected for the purpose of reducing the electromotive force to 11,000 volts for the trains. The actual distribution of the sectionalizing bridges at which the transformers are located is shown in Fig. 11. The total number is twenty-five, of which seventeen are west of Stamford. The actual arrangement of the conductors is shown in Fig. 12, which, by way of contrast, also shows the old arrangement. On the left-hand pole top are seen a set of three-phase wires used for power transmission purposes, having nothing to do with the present study; two feeders, F_1 and F_2; a control wire for switch operation and a pair of signal wires. The right-hand pole top contains a second set of transmission wires, two feeders, F_3 and F_4, a second control wire, and a pair of signal wires. Fig. 13 shows in diagrammatic plan the connections at the sectionalizing bridge. Feeders F_1, F_2, F_3 and F_4 are all normally connected to one end of the autotransformer, the center of which goes to the rail. The trolley wires are connected through the track buses to the transformer terminal opposite to that to which the feeders are connected.

By the above arrangement approximation is made to ideal conditions for eliminating inductive interference. While data are not yet available to show the exact extent of the neutralization, a very large part of the interference has been eliminated. The reduction of interference is not quite as great as it would be with a completely sectionalized line on account of the general tendency for some current to flow back to the power station through the track. That is to say, the magneto-motive forces produced do not quite balance out. This is due to the impedance of the transformers. The effect is similar to the flow of current in the neutral of a d.c. three-wire system. The magnetic effect could in some cases be reduced by disconnecting the track return at the power station, but this would introduce a hazard to the line transformers if a break should occur in one of the line wires. It would be possible in this case that the nearest line transformer would become a raising transformer for the line beyond the break and might be thus heavily overloaded.

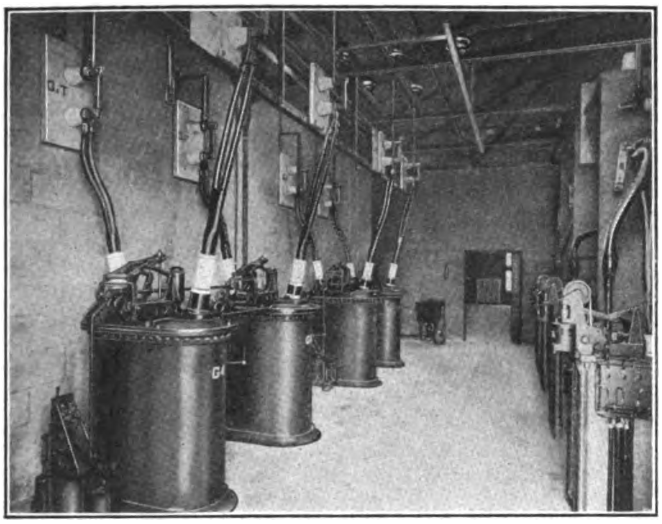
The general return of current toward the power plant is actually not very great, and the disturbance in adjacent lines has been largely removed. The telephone company has been able to cut down the number of compensating transformers to a larger extent, thus improving the efficiency of speech transmission.

For the benefit of those who are interested in tracing out the circuits in more detail than is given in the drawing already presented, Fig. 15 has been reproduced from the standard circuit diagrams of the railroad company. The section selected for illustration is in the city of New Rochelle and includes the junction between the New York, Westchester & Boston Railroad and the main line of the New Haven. The significance of the difference symbols is explained by the accompanying key.

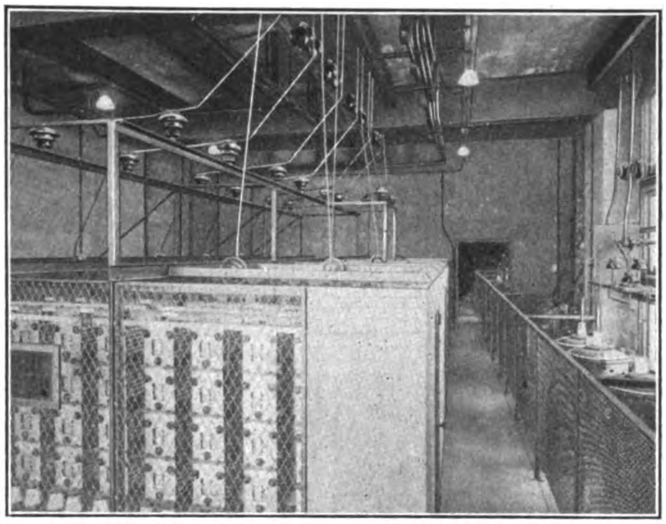
The improvements on the lines west of Stamford have cost about $750,000. This includes the main line from Stamford to Woodlawn, the New York, Westchester & Boston Railway and the Harlem River Division comprising altogether 222 miles of single track, exclusive of yards. This cost was higher than it would


Freight Terminal
To Danbury
To White Plains Sub-Sta.
Br. 304 Sta. 864+67 White Plains
Br. 254 Sta. 712+42 Heathcote
Br. 154 Sta. 521+08 Larchmont J'ct'n
Heathcote
Dickerman's Siding
Wykagyl
North Ave New Rochelle
Tower No 19
(Main Line)
To Stamford
N.Y.N.H. & H.R.R.
Rochelle
Crossing at Br. 80
To N.Y.
Larchmont Junction
Tel.
EXPLANATORY NOTE
Tracks Electrified
" not Installed
Wires & Feeders
Wood Section Break
Air " "
Single Phase Oil Circuit Br'k'r.
Three " " "
Disconnecting Switch
Control Transformer
Feeder Auto "
Ground Connection
Electrical "
Sw. Controller in Tower
Lightning Arresters
2-No.8 Telephone Wires
Telephone Relay & Transf. Box
Electric Ry Journal

New Haven Electrification—Fig. 15—Typical Section of the Distribution System



New Haven Electrification—Fig. 16—New Oil Circuit Breakers in Cos Cob Power Station



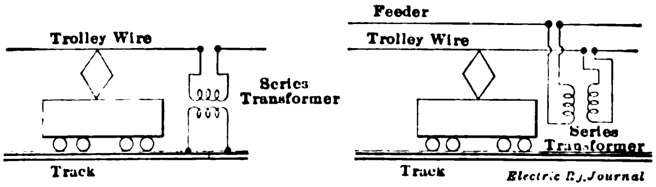
New Haven Electrification—Fig. 17—Resistance Grids Used in Limiing Short Circuit Currents at Cos Cob

otherwise have been owing to the necessity for making all changes without interfering with operation, one sectionalizing bridge being changed at a time. On the line east of Stamford, the electrification of which will be completed within a few weeks, a different condition exists. There the auto-transformer system and the 22,000-volt transmission system are being installed on a new line. The result is that the cost is greatly reduced, being roughly, for the entire overhead system including bridges, feeders, catenary and transformers, $40,000 per mile of route or $10,000 per mile of track. This is only about 60 per cent of the cost of the overhead system west of Stamford without the auto-transformer system.

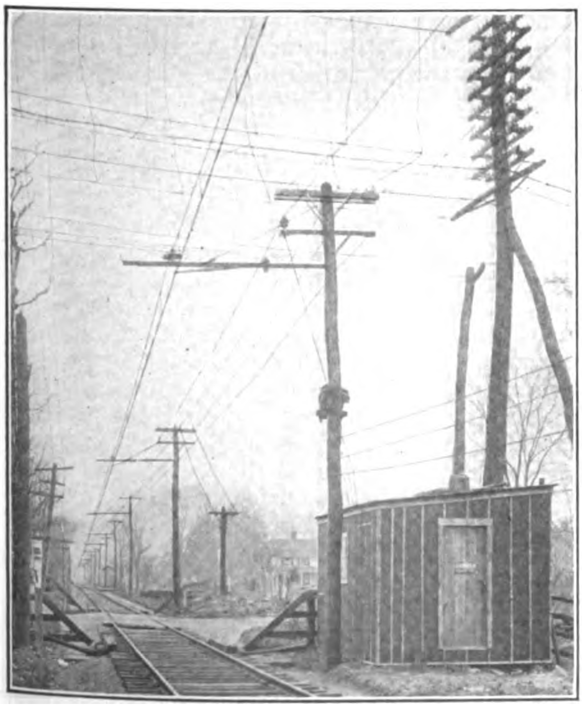
CHANGING OVER FROM THE OLD SYSTEM TO THE NEW

The change-over from the old system to the new involved very careful planning as it had to be made without any interruption of train service. It involved the putting into operation of the raising transformers in the power house and of seventeen lowering transformers on the line of an aggregate capacity of 34,000 kva, with all the necessary switch gear and auxiliaries. Moreover, this work had to be done during the dark early morning hours. Sunday morning was selected for the purpose on account of the very light traffic at this time. During the four hours from 2 a. m. to 6 a. m. the few trains scheduled were operated by steam locomotives.

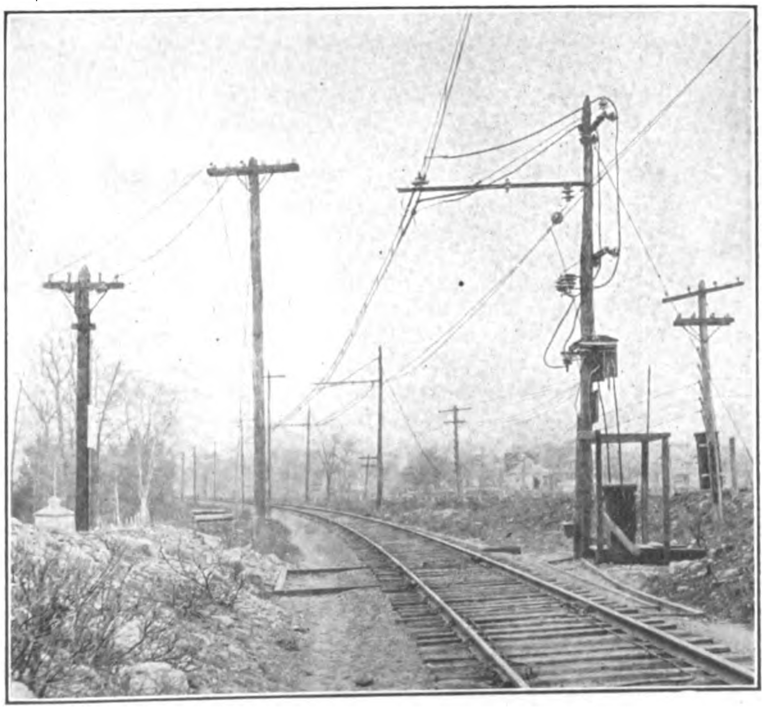
For the change-over operations the power plant was shut down at 2 a. m., and within seventy minutes all necessary line changes had been made, and reports to this effect had been filed with the load dispatcher. The



New Haven Electrification—Fig. 18—Diagram of Experimental Circuits on New Canaan Branch



New Haven Electrification—Fig. 19—Instrument House on New Canaan Branch



New Haven Electrification—Fig. 20—Track-Feeder Transformer on New Canaan Branch changes in the power house required a total of slightly over eighty minutes. Within eighty-three minutes of the time of shutting down, the turbo-generators were started and in twenty minutes more the control and three-phase circuits had been tested out. By 4:30 a. m. full voltage had been applied to the line, having been built up gradually, and at 4:45 the entire system was pronounced ready for load. Before 5:30 two trains were operating electrically again, and it only remained to test out the protective devices designed to operate in the case of grounds or short-circuits on the line. Fortunately for this purpose a defective insulator grounded during the trying-out period, and the circuit-breakers were given a severe test which they withstood in a satisfactory manner. By 5:31 the operating department was advised that full normal service might be resumed.

The changes described were made under the personal supervision of W. S. Murray, of the firm of McHenry & Murray, acting in his official capacity as consulting engineer to the railroad company. All matters pertaining to the 350 miles of track were delegated to H. Gilliam, who was assisted by Messrs. Tyree and MacKay. E. J. Amberg, of the engineering staff of McHenry & Murray, was responsible for the general preparatory work and for the internal changes in power-house circuits, being assisted in the latter by B. Wheeler.

EXPERIMENTS ON THE NEW CANAAN BRANCH

Some very interesting and useful experiments are now being made on the New Canaan branch of the New Haven Railroad in order to secure a scientific basis for the elimination of inductive disturbances. These tests are being co-operated in by the New Haven Railroad, the Westinghouse Electric & Manufacturing Company, the American Telephone & Telegraph Company, the Western Union Telegraph Company, the Southern New England Telephone Company and other interests.

The tests were begun on account of a series of disturbances which occurred in the New Canaan office of the Southern New England Telephone & Telegraph Company. The program of the tests was laid out with a view not only to correcting the local difficulties but also to yield data of reference value in the solution of larger problems. The New Canaan branch is well adapted to these tests as it is off the main line and is not supplied with the auto-transformers like the main line. In fact it is not suited for this method of compensation, being a stub-end line.

The plans under test consist of two parts and involve a track and line compensator plan, somewhat similar in principle to the scheme already described for the telegraph line. A series of compensating transformers, about one to the mile, are distributed along the line, which is between 6 and 7 miles long. These tie together either the trolley wire and the track or the trolley wire and the feeder. The transformers have a one-to-one ratio. The general idea can be seen by inspection of Fig. 18. The currents in the primaries and secondaries of the transformers must be substantially equal, hence at the points where the transformers are applied the currents are confined to the circuit in which the transformers are connected. The transformers obviously neutralize return drop.

The tests are being made with and without the transformers and under all conditions of weather and other variables. To make conditions perfectly definite a current of 200 amp is sent through the line for night tests, and during the day measurements are taken under regular operating conditions. The measurements are made on lines in the vicinity of the track and at different distances therefrom. In these lines measurements of voltage, current and phase positions are made.

The New Canaan tests are probably the most elaborate which have yet been made on induction interference from single-phase railway currents, and the results will be awaited with great interest. The mass of data being accumulated is so great that some time will be required to edit and digest it. It is understood that the results are to be published as soon as available.

PASSENGER SHELTER BUILT BY CITY IN CIVIC CENTER

An attractive shelter for electric railway passengers has recently been completed by the city of Hartford, Conn., at a cost of $2,100, and it is illustrated in the accompanying half-tone. The shelter is located on State Street, opposite the City Hall, and is about 90 ft. long and 14 ft. wide, with removable wooden sides, windows and a Spanish tile roof. The platform is of concrete, being raised 5 in. above the street surface, and the roof is supported on wooden posts and trusses carrying five 60-watt lamps at a height of 8 ft. above the platform. The latter is somewhat larger than the shelter proper, which is 40 ft. long inside. Three cars can be loaded at the shelter without congestion. The local street railway service is furnished by the Connecticut Company, and the lighting circuit is supplied by the Hartford Electric Light Company, the wiring being in conduit, with a key switch and fuse box mounted on the outside post, as shown in the illustration.

Passenger Shelter in Hartford, Conn.

ARRANGEMENT FOR CENTRAL STATION ENERGY

Under the terms of the contract with the Philadelphia Electric Company which will supply the energy to operate the Pennsylvania's electric trains, the initial minimum of 3750 kw is to be ready in September of this year. The railroad will erect its own substation at a point opposite the Christian Street plant of the electric company and will purchase twenty-five-cycle energy at 13,200 volts. Although at first this demand will be chiefly for single-phase service, the other two phases will be required with further extension of the electrification, special provision being made for variations on any leg of the circuit. A minimum load factor of 25 per cent is specified.

The rate for this railroad service will be made up of a stand-by charge for kilowatts of demand and an energy charge per kw-hr. consumed. The rates will be increased proportionately if the power factor is less than 70 per cent. When the railroad company can guarantee a maximum demand of 15,000 kw and 35 per cent load factor the rate will be proportionately reduced.

Lowlanders and Highlanders—The Problem of Co-operative Publicity

The Need Is Expressed of a Direct and United Presentation of the Case of the Public Utility Companies but This Must Be Preceded by a Recognition by the Companies Themselves of the Necessity for Such Action

BY HENRY C. HAZZARD, SECRETARY PACIFIC COAST ELECTRIC RAILWAY ASSOCIATION

The purpose of publicity is to correct misconceptions which have come to exist in the public mind regarding public utilities, and to create and maintain a more favorable public sentiment toward the industry.

It is not my intention to discuss the need of public utilities engaging in publicity work. The subject has been too often and too ably analyzed to call for further exposition at this time. And among those who have at heart the best interests of public utilities and of the communities they serve, there is no disagreement on the question of necessity. It is the consensus of opinion that the time has come in the great trial of the people vs. public utilities when the defendants should not permit judgment to be taken against them by default but should marshal their facts and present their arguments vigorously and with the utmost candor.

Rather is it my purpose to attempt a statement of the difficulties in the way of the public utilities presenting their case, for, upon the question of procedure, there is far from being a unanimity of opinion. In fact, the problem of ways and means is so involved with conflicting considerations that it has not as yet met with satisfactory solution. Nor is it reasonable to expect that an effective solution may be reached until there is a clearer conception of the general causes which have contributed to the existence of the sentiment with which the public utilities must cope and at least an approximate measurement made of the depth and breadth of the public temper, so that the public utilities may be guided thereby in the required scope and extent of their publicity efforts.

In every walk of life, whether the significance of the trend of events is of real concern or not depends upon the individual's judgment as to the proximity of effects upon his interests. The public utility industry is no exception. The public utility official who has been singularly fortunate in operating the properties in his charge with a minimum of expressed public dissatisfaction naturally is apt to regard the talk of widespread and underlying public antagonism toward privately owned plants largely as an abstract matter. Such antagonism in his opinion may be, and probably is, very greatly exaggerated. But even if it is not, what bearing has it upon his interests that it should require a departure from the conservative policy which he has followed? He does not disbelieve in publicity. In fact, his company employs a publicity agent and pursues with more or less consistency the practice of keeping the public informed upon matters pertaining to the business which he believes should be of interest to the public. He and his associates are identified with every worthy movement for the betterment of civic conditions, and favorable opportunities are not neglected by them to impress upon the community, in public talks, the dependence of its prosperity and welfare upon the continued prosperity of the public service corporation. Furthermore, the company's employees are held to rigid accountability for lack of courtesy in dealing with the public, and in all respects the laudable endeavor constantly is made to please the public and to let the public know of the desire to please. Then, why should he jeopardize this favorable situation in anticipation of a change in local sentiment, and launch aggressively into a publicity campaign for the correction of conditions which are not directly associated with his properties? Other public utilities might be urging him to join with them in an associated publicity movement to be conducted through a central agency and to be carried on throughout a wide area. More than likely most of the participants in such plan occupy a much less favorable position in the public esteem than does his company. Should he then, for a doubtful gain, incur the risk of weakening the prestige of his position that the situation of less fortunate associates might be improved? What means of publicity would be employed? What would be the scope and extent of the movement and what the expense? Who would guide and direct the policies? Would not his responsibility for the integrity of large interests, so far as the integrity could be jeopardized by wrong public relations, be placed beyond his control?

On the other hand, there is the public utility executive who, confronted at every turn with public distrust and hostility, is ready to abandon the policy of dignified silence or the indirect, spasmodic and ineffectual publicity efforts which have been made in the past, and is willing and anxious to enter upon a direct and comprehensive publicity campaign, either locally or in alliance with other public utilities, if practicable ways and means, offering reasonable promise of relief from oppressive conditions, can be formulated.

Like lowlanders and highlanders, there seems to be no meeting ground upon which these divergent views may be brought together for the common good of all. The highlanders may see the steady rush of ever-rising waters, may view with alarm the inundations of hitherto prosperous properties and the partial impairment of other properties, but they have faith that the flood will subside and leave undamaged the holdings over which they are standing guard. The lowlanders, slowly becoming submerged, are casting about for ways and means to erect safeguards. New embankments of considerable proportions are being constructed to surround several scattered properties; about others the same old low dikes are being maintained; the protection of other properties is being wholly neglected except for occasional efforts which are made as danger may, for the moment, seem imminent. Nowhere is there unity of action. Yet, it is apparent that the course of the flood waters may not be directed and kept confined to their proper channel without the construction of a continuous and substantial levee and that, except as supplementary thereto, disjointed and in most part superficial and inadequate barriers, which may be erected by separate efforts, are ineffectual and economically wasteful.

Is the above analagous to the public utility situation? Are the flood waters of public sentiment steadily rising? How high will they go? Are all properties likely to be affected? These are questions upon which intelligent judgment cannot be expressed without an investigation into the sources from which the flood waters emanate.

COMPARISON OF PAST AND PRESENT CONDITIONS

Until very recent years, municipalities, states and the federal government pursued the open door policy toward public utilities of every kind. The utmost liberality was shown. Interstate carriers received substantial bonuses from the government to facilitate construction; the use of streets and highways for distribution systems was but a formality of possession; restrictions upon corporate practices and conduct were minimized in state and local franchises, or loosely enforced; communities vied with communities, and states with other states in their endeavor to direct and encourage the investment of capital in the furnishing of light and power and transportation, all indispensable requisites to the comfort, prosperity and general welfare of the people and to the development of the country, and private capital responded to the call.

These things were typical of the intense commercialism of the nineteenth century. During this period the energies of the entire nation were concentrated in material development. Not the public utility industry alone but industrial activities of every kind, aided by the sympathies and co-operation of the people, moved forward with tremendous strides. Inventions tending to annihilate time and space broke down state boundaries and welded the country into one large community; commercial pursuits broadened; individual enterprises gave way to co-partnerships and associate efforts, and these in turn were succeeded by corporations and eventually by combinations of corporations. The very magnitude of the field of operations made these changes a natural evolution. And with this evolution, bringing as it undeniably did, the concentration of financial and industrial power, came a growing fear among the masses, encouraged by the occasional voice of the statesman and the prophet that we were becoming a government by oligarchy.

This sentiment, segregated at first, has been spreading and cementing. It has been facilitated in so doing by the very agencies of invention that have made possible the cohesion of forces in other respects, until now it has burst forth in collective strength and is seeking the realization of profound political, industrial and ethical reforms. It is being voiced in the columns of the press, in legislative halls, by executives and in all forums of the people. And it is finding tangible expression in augmented duties of government toward the people, in the popularization of government, in the disruption of existing political parties and in the trend of legislative and judicial decisions. As a movement which grew out of the worst tendencies of a commercialized age, it is going to the other extreme to correct these tendencies, to establish new ideas and ideals, or re-establish old ones, to democratize our institutions and forms of government. As a movement, which has assumed in the brief period of a dozen years the proportions of a revolution, it is characterized as much by determinedness of purpose as by impatience and impetuosity in the accomplishment of its altogether too indefinite aims.

And yet the present is but a period of experimentation and assimilation. Radical progressivism is competitive between individuals and in the exercise of government functions—municipal and state. New ideas are being advanced and, without general acceptance, are being tried out. Notions at first received with incredulity are ending by becoming dogmas. For these reasons a movement of this kind renders imperative the need of counteracting agencies to combat the impracticable theories of idealists and extremists, and to arouse the sober second thought of the people.

THE PROBLEM IS NATIONAL

It is to this task that public utilities desire to direct their energies. The problem which confronts them is less local than it is territorial or national in its essential characteristics. The government's assumption of control over all classes of public utilities, the rapid succession of drastic regulatory laws, the gradual encroachment under the new order of things of costs upon earnings, the enforced dissolution of corporations, the steady verging toward governmental ownership, the occasional actual and frequently threatened indirect confiscation of properties in the process of establishing governmental ownership—these are some of the gages with which measurement may be made of the task. That here and there are to be found steam roads, electric railways, power companies and other public utilities urgently upon the defensive are but instances of specific expressions of widespread and deeply rooted unrest; and, while the exigencies of each particular situation requires the application of local remedies, permanent relief and assurance of continued immunity may be found only in corrective measures which are addressed to the broad underlying causes.

In other words, local publicity efforts of separate companies must become subordinated to co-operative efforts, sectionally over wide areas or nationally. Only through co-operation may the publicity means employed measure up to the conditions sought to be corrected.

And yet, in co-operation lies the fundamental difficulty to successful publicity—first that of bringing together, and then of holding together, the lowlanders and the highlanders in a comprehensive publicity campaign. For, publicity ways and means that may be acceptable to the one as none too adequate, are quite certain to be rejected by the other as extreme.

Assuming that the necessity of united action becomes generally recognized and that a sectional or national organization undertakes to put into practice the theory of co-operation in publicity, there at once is presented the unsolved and complex problem of how to proceed.

METHODS OF PUBLICITY

Broadly speaking, there are three methods of publicity: *a*, indirect; *b*, direct, and *c*, direct supplemented with indirect.

By "indirect" is meant the avoidance of argument and appeal. The means most largely employed in such methods—the columns of the daily press—compel indirectness. While such means present the advantage of economy through the use of established agencies, they are uncontrolled and non-dependable agencies. It is well known that the columns of the press are not freely open to propagandism and that contributions of whatsoever character are subject to editorial modification or rejection. The real purpose of advancing a cause cannot find expression by these means, except under the restricted guise of "news items," and the press that would be most likely to give space to the public utility cause is the press least likely to be of the greatest service in that cause. At best, the indirect method is a halfway measure serving the sole purpose of intermittently directing the public attention to the public utility industry.

By "direct" is meant, of course, the converse—argument and appeal, supported by facts.

Between these two methods, the indirect and direct, there is no longer a choice. If the indirect ever was effective, it now largely has ceased to be so. To be effective it must be employed frequently. To employ it frequently is to destroy its effectiveness. The public has come to recognize the handiwork of the press agent, to look for it and to discount it, and the newspaper manager is intolerant of it. Regarded complacently as legitimately resorted to in certain callings, its ineffectiveness in the public utility field lies in the very fact of its indirectness; for, however laudable the motives behind such methods, indirection is identified with the methods of "big business" and public opinion disapproves. Nor can we lose sight of the fact that hostile public sentiment has grown up with the work of the press agent—in spite of it—nor avoid the conclusion that reliance no longer can be placed upon indirect methods, except to the extent that they may usefully supplement the direct.

Co-operation having been decided upon, the first step toward the solution of the problem of ways and means is to recognize the fact that old methods should be discarded for new, that public utilities must adopt a perfectly frank attitude toward the public and endeavor to inform the public openly and frankly. And that a campaign with such an end in view must be straight to the point, artless, candid and unreserved. It should be accepted as a matter of fact that the cause is worthy of being expounded and that the best interests of the public demands plain speaking even more urgently than the best interests of the public utilities. For who may deny that the public utilities, if permitted to prosper, are just as necessary to the state as the state is to the public utilities.

The next step is to determine upon the new and direct method of co-operative publicity that is to take the place of the old indirect methods of individual companies.

COMMITTEE ON PUBLIC RELATIONS

That this question is receiving painstaking consideration is indicated in the recent action of the American Electric Railway Association in appointing to quote its president, "a committee on public relations, consisting of the ablest men in the industry, together with leading representatives from the principal manufacturing and banking interests which are closely allied with the electric railway companies. It is expected that this committee will formulate not only some comprehensive and effective publicity campaign but also a financial plan for carrying it out successfully."

There is little doubt that the perplexing problem of ways and means will be satisfactorily solved in this manner and that the hearty and active support of electric railways generally may be depended upon in carrying out the program.

CO-OPERATION NECESSARY

It should be said, however, in closing, that the fundamental difficulties in the way of co-operation in publicity, as pointed out in this paper, were disclosed as the results of a pioneer effort along these lines which progressed beyond the point of formulating plans. On the Pacific coast an association of electric railway companies, operating in the states of California, Oregon and Washington, was organized in the summer of 1913 in expectation that ways and means of engaging in publicity would be devised, and that the union of efforts would enable the campaign to be carried on throughout this logical publicity area.

A specific plan of procedure was evolved based upon the fundamental considerations which have been discussed:

First—That, unless the means employed measure up to the conditions sought to be corrected, publicity efforts to eradicate adverse public sentiment had best not be undertaken.

Second—That the conditions sought to be corrected are broadly territorial as well as local in their characteristics; that fundamentally, they are of equal concern to all public utilities, and that the means of solution should be in accordance with these characteristics.

Third—That all public utilities should unite in the attainment of a single aim of common advantage. As consolidations of companies are effected to secure conomies in operation and to avoid competition and wastefulness, so it should be commercially and economically expedient and desirable through union of efforts to avoid overlapping activities in the broad field of public policy.

The plan provided for direct means of presenting the public utilities' case to all classes of the people periodically and regularly, and it contemplated that degree of co-operation which would make practicable, through the support of public utilities of every class, the carrying on of a campaign within the large territory of the three Pacific coast states in a manner extensive enough to impress the public with the seriousness of the cause, and with such continuity as to promise attainment of the aims desired to be accomplished. That this plan failed of formal adoption, though generally indorsed as offering an effective, comprehensive and financially practicable solution, is significant only because of the concrete illustration thus given of the one real big obstacle in the way of successful co-operation in publicity—the difficulty of securing unity of action upon commensurate corrective measures. Until this difficulty is removed, inadequate and comparatively ineffective means will continue to be employed. From which we conclude, and without criticism of either, that the lowlanders must educate the highlanders and the highlanders must educate the lowlanders, before they may hope to co-operate in successfully educating the public.

JOINT COMMITTEE ON JOINT USE OF POLES

A meeting of the joint committee on the joint use of poles of the American Electric Railway Association will be held at association headquarters on May 4. The A. E. R. A. committee comprises W. J. Harvie, A. S. Richey, C. L. Henry, W. S. Twining and E. G. Allen. The following members of the committee represent other associations or interests as follows: Farley Osgood, P. H. Thomas and F. B. H. Paine, representing the A. I. E. E., W. T. Oviatt and Thomas Sproule, representing the N. E. L. A., and F. H. Bethell, representing the A. T & T. Co.

The present-day successful co-operation between the electrical engineer and the banker is set forth as an efficient object lesson for the future of chemistry, according to Arthur D. Little in a reprint entitled "Industrial Research in America" from a presidential address delivered before the American Chemical Society. The great industrial applications of the sciences involved in the electrical and other established engineering professions are shown by the author to have been in a large part due to the activities of firms or organizations like Stone & Webster, J. G. White & Company and other firms which have logically evolved themselves from the status of engineers to that of engineers and bankers. Such an evolution, Mr. Little believes, as the close alliance between chemistry and banking is a fundamental prerequisite if the results of industrial research are to find their full fruition in America.

Chicago's Experience with Solid and Insert Manganese Special Track Work

A History of the Exhaustive Experience in the Use of Manganese Special Work in Chicago with Detailed Accounts of Individual Installations

In probably no other city has manganese steel special work received a more thorough and exhaustive test than on the surface lines of Chicago. Experience with the three types of special work, namely, solid manganese, cast-iron bound manganese insert, and cast-steel manganese insert, began in 1908. Since that time more than 1000 installations, including more than 10,000 pieces, have been laid down. This large number of installations, as well as the wide divergence in the character of traffic, namely, from a density of a few seconds' headway in the downtown district to several minutes' headway as found on outlying cross-town lines, makes this test exhaustive in scope and convincing in results. Moreover, installations were furnished by practically all of the large manganese track special work manufacturers in this country; consequently it should be representative of what may be expected of various designs of this material as installed in Chicago. Experience there under all classes of traffic has demonstrated clearly the advantages and disadvantages of the different types in a much shorter time than could be possible in any other city where the traffic is lighter.

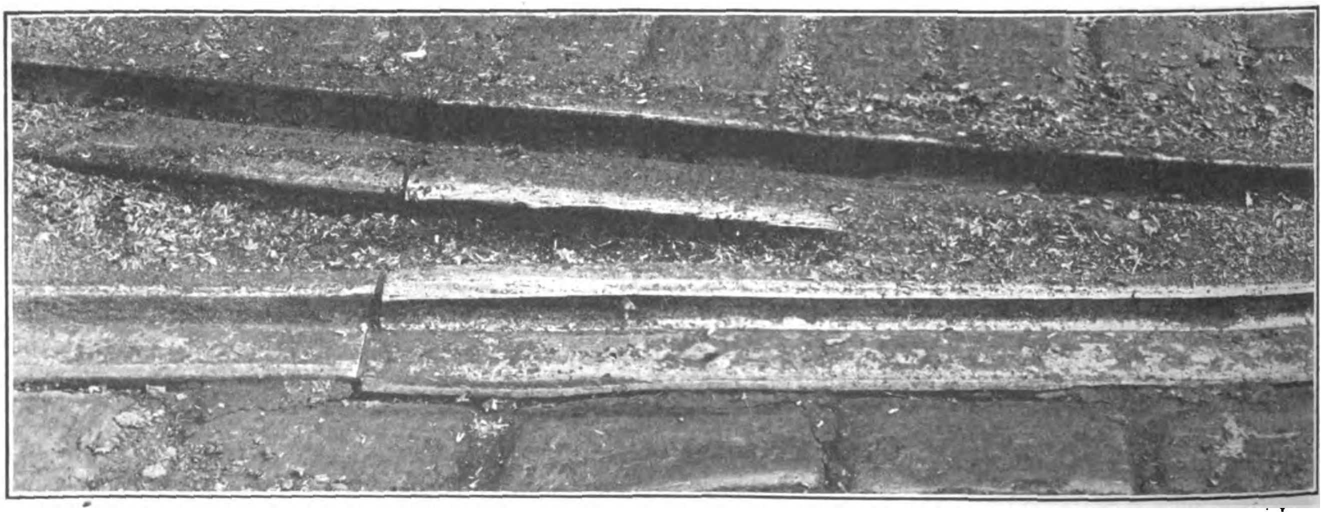
It may be well first to consider the conditions under which this manganese special work was purchased. In 1907 and 1908 ordinances were passed granting franchises to the four surface railways operating within the corporate limits of Chicago. Among other things they provided for a comprehensive reconstruction of all the tracks inside the city. This work was done under the direction of the Board of Supervising Engineers. In the board's endeavor to make the rehabilitated work as permanent as possible, it thoroughly investigated many of the different types of track construction and track materials in general use at that time and consulted with the manufacturers. Specifications under which the manufacturers were willing to bid with a three-year guarantee were then adopted. The specifications issued at that time for the manufacture of track special work were the first general specifications for that kind of material to be prepared by anyone.

The clauses in the ordinances which referred to special work merely required that at all track intersections suitable steel special work of ample strength and weight, to correspond with the structure to which it connected, should be provided and that frogs, switches and mates should be furnished with wearing plates of hardened steel. Investigation by the board developed the fact that special work manufactured of hardened steel or manganese steel designed to withstand extraordinary wear could be purchased with a three-year guarantee. This made it desirable from an economy standpoint, and at that time it was believed that solid manganese would give a maximum wearing life at the minimum cost of operation. It should be noted, however, that the guarantee clause was eliminated from the specifications about February, 1910.

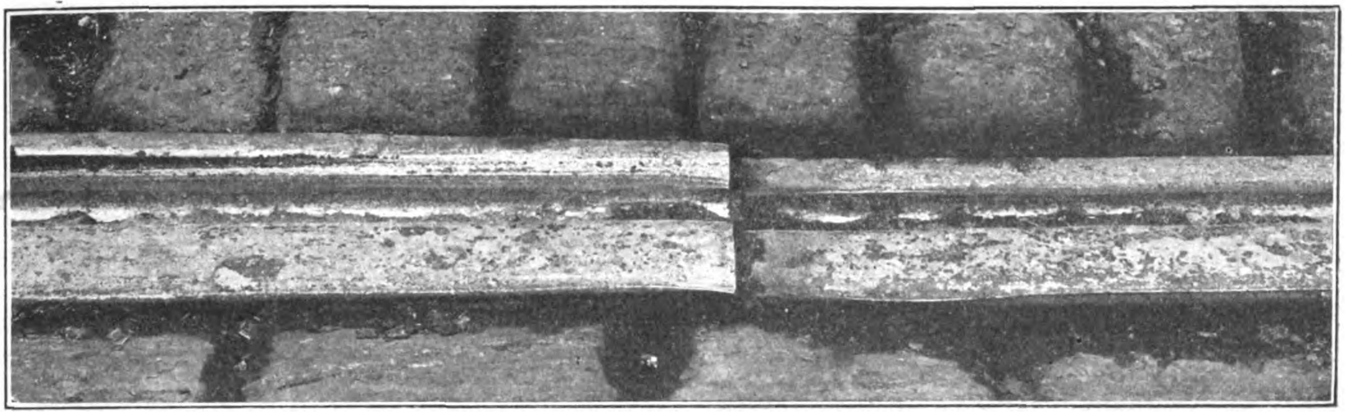
SPECIAL WORK SPECIFICATIONS

The specifications governing the manufacture of track special work were made to cover four types, namely, A, B, C and D, and each type was specified in 7-in. and 9-in. rail depths. Type A was made with a solid-steel casting for running rails, with manganese steel plates inserted at the wear points. Type B was made of solid manganese castings, arranged to fish with abutting rails. Type C was a cast-steel bound or cast-iron bound construction, using standard Chicago rail with manganese steel plates inserted at the points of greatest wear. Type D was ordinary built-up track special work composed of rolled Chicago rail sections and mechanical joints. Other portions of these specifications provided for over-all dimensions, tolerances, drilling and inspection.

All special work was built to a gage of 4 ft. 8½ in. on straight track and on curves having a radius greater than 80 ft. On curves sharper than an 80-ft. radius, the gage was increased ¼ in. In all special work, however, a maximum variation of ⅛ in. greater than standard gage was allowed. All switches, mates and frogs were designed for 3½-in. wheel-tread clearance, a 1$\frac{3}{16}$-in. throat and a tongue throw of 1¼ in. All exterior frog arms were required to be of sufficient length to



Chicago Special Work—Fig. 1—Showing Cupping of Manganese Mate at Run-off from Chicago Rail, Installed October, 1903; Traffic, 80 Wheels Per Hour



Chicago Special Work—Fig. 2—Showing Slight Cupping of Chicago Rail at Run-off from Manganese Mate, Installed October, 1908; Traffic, 80 Wheels Per Hour

permit easy access for placing the joint plates. In all cases it was required that the over-all length should not be greater than these specified dimensions or more than 1/8 in. less than the same. Ninety-degree crossing frogs were considered in a separate class, and the exterior arms were required to be of a length equal to one-half the distance between the gage lines of the inside rails of parallel tracks, with an allowance of 1/16 in. for joints. The object of these limit dimensions in 90-deg. crossings was to make them interchangeable.

At the time the special work specifications were adopted there was considerable discussion among the members of the board as to the proper depth of groove. It was agreed that the shallow groove would tend to reduce noise. After a discussion of the various types, it was finally decided that all points involved could best be served by making the groove depth 11/16 in. It was thought that this depth would provide entire safety for the passage of cars and at the same time reduce noise, or at least that it would determine the effect of depth of groove upon the elimination of noise at crossings. This was in 1909, and since that time the 11/16-in. depth has remained the standard.

Some time during 1906 the 129-lb. Chicago girder-grooved rail section was adopted. The specifications for the manufacture of this rail were drawn in such a way as to provide rails that would give a maximum wearing life under heavy street railway service. The specifications also provided for a chemical composition for rail production as follows:

	Percentage
Carbon	0.50 to 0.60
Sulphur not to exceed	0.08
Phosphorus not to exceed	0.10
Silicon not to exceed	0.20
Manganese	0.80 to 1.10

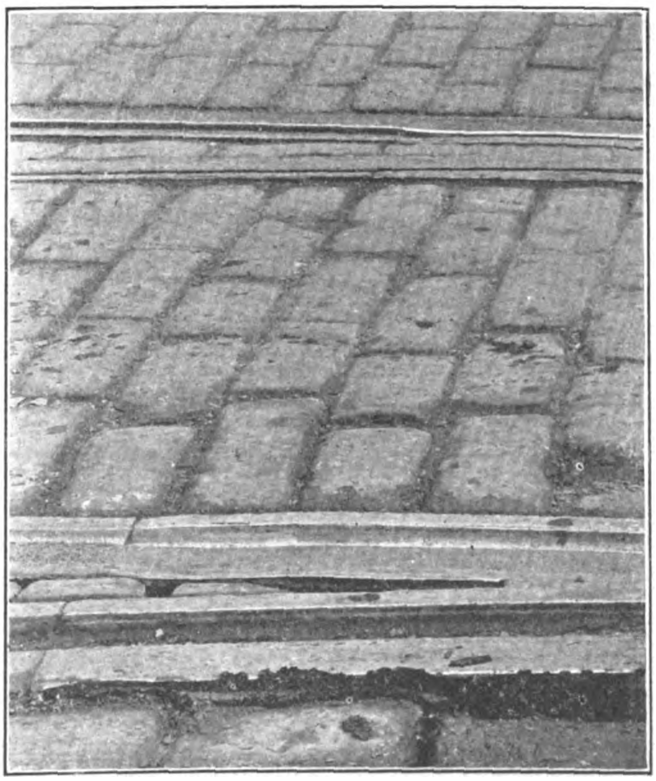
TESTS TO DETERMINE CHARACTERISTICS OF MANGANESE STEEL

The specification did not call for any particular chemical composition in the manganese steel used in the solid and insert track special work, it being left to the manufacturers to furnish material that would meet the three-year guarantee. In 1909, however, after considerable solid manganese work had been installed, it was thought desirable to obtain information as to the character of manganese steel placed in the track special work. Accordingly, a number of switch tongues were purchased from the manufacturers supplying the special work for Chicago, and these pieces were tested for physical characteristics by a firm of inspecting engineers.

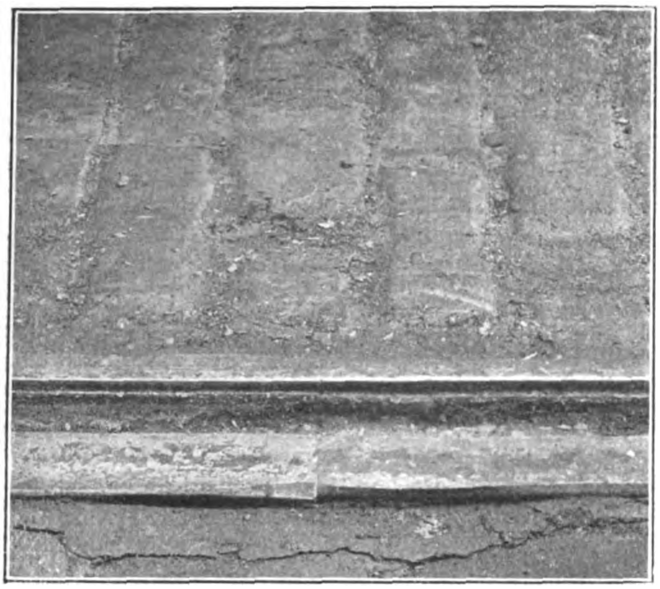
The tests to which the manganese switch points were subjected were of three kinds, namely, drill tests, ball impression tests and transverse bending tests. In the first tests, the drill was used for a period of two minutes, then resharpened, and the operation repeated four times. It was found that all of the samples were practically undrillable. The depth of the holes, after the completion of the tests, were measured to the nearest 0.001 in., and the average for the three was 0.0327 in.

In the ball impression test a steel ball 7/16 in. in diameter was set on the faces of the three tongue-switch specimens and subjected to a load of 35,000 lb. Upon removal the diameter of the impression in the surface of the manganese tongue was measured, and in each case it was found to be 0.32 in. This indicated that the surface hardness averaged approximately the same in the three sample switch tongues tested.

In the transverse bending tests of manganese tongue switches, great care was exercised in applying the load to the three samples so that the test conditions for each might be the same. Each tongue was laid on supports



Chicago Special Work—Fig. 3—Showing Cupping of Manganese Switch and Mate at Run-off from Chicago Rail, Installed January, 1911; Traffic, 221 Wheels Per Hour



Chicago Special Work—Fig. 4—Showing Slight Cupping of Chicago Rail at Run-off from Manganese Switch, Installed January, 1911; Traffic, 221 Wheels Per Hour

exactly 3 ft. apart, and the load was applied at the lug, the tongue resting on these supports in an inverted position. In each case it was found that the elastic limit was reached when the load was approximately 14,000 lb.

CHEMICAL ANALYSIS OF THREE MANGANESE TONGUES, CHICAGO

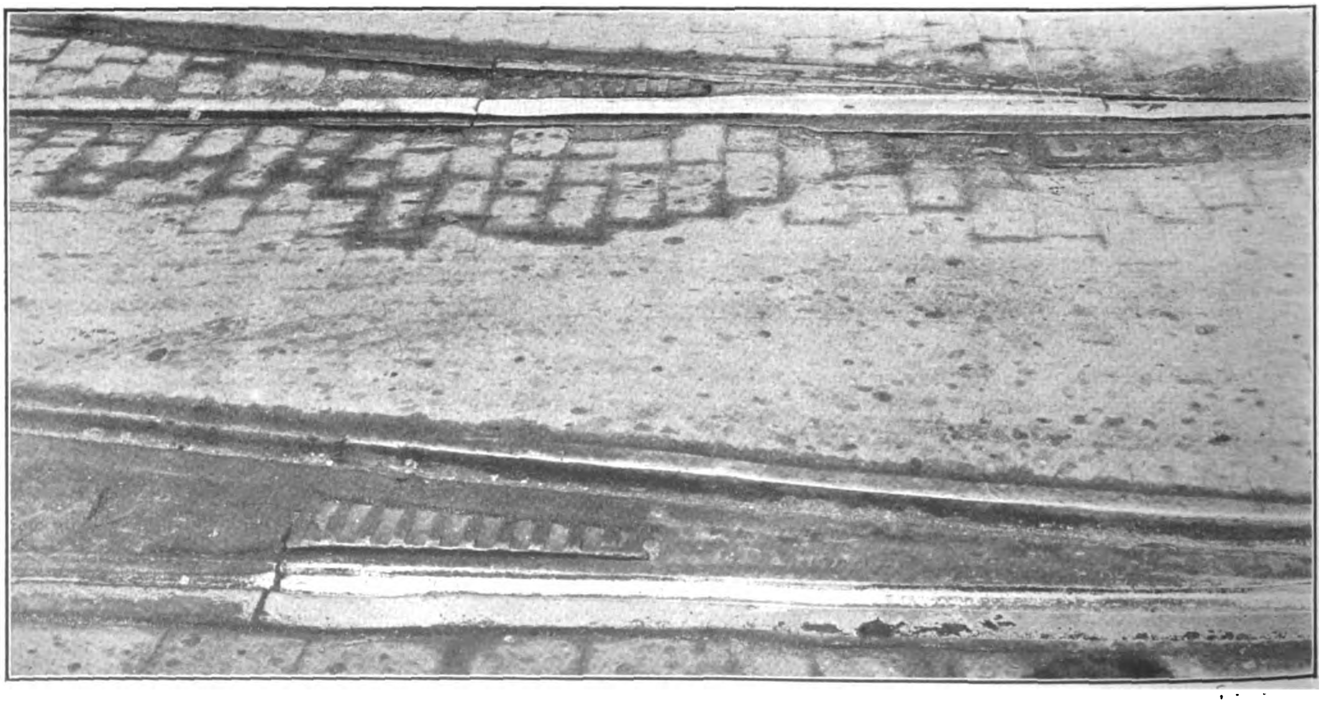
	"A" per cent.	"B" per cent.	"C" per cent.
Carbon (combustion)	1.100	1.260	1.240
Carbon (color)	1.010	1.150	1.190
Silicon	0.470	0.260	0.350
Manganese	11.440	10.880	12.480
Manganese (check)	11.280	10.960	12.560
Phosphorus	0.067	0.056	0.084
Sulphur	0.021	0.036	0.033
Copper	None	0.340	0.090

In addition to the physical tests a chemical analysis was made of three sample tongues by two representative analytical chemists. While there was some variation in the results of the chemical analyses made by the two chemists, the relative proportions of the constituent elements in the three samples were approximately the same.

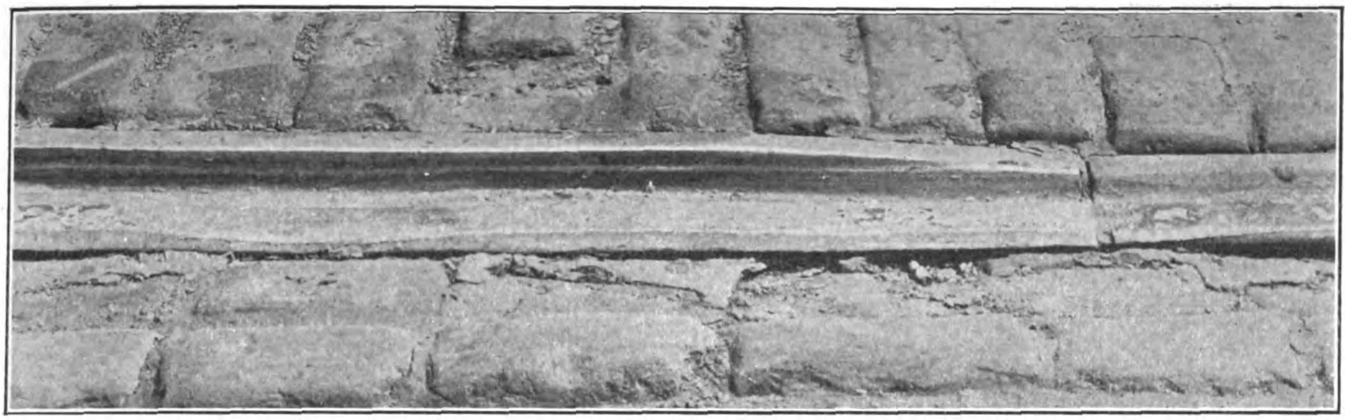
As an additional precaution in the board's endeavor to secure special work pieces equal to the specification and containing no mechanical defects, all work was inspected at the point of manufacture. Besides the inspection for correct dimensions, evidences of cold shot, fractures or segregation of the metal in the head or wearing part of any special-work casting were considered sufficient cause for rejection. Other fractures or cracks appearing in the base of the casting which, in the judgment of the inspector, did not extend into the web or strain a bearing part of the casting, sufficiently to impair its usefulness, were not considered cause for rejection.

Cracks were permitted in the web of the rail at the end, provided they did not extend beyond the first bolt hole in either the upper or lower row. Cracks in the end of the web of the rail which did not terminate in the bolt holes were considered sufficient cause to reject a piece, provided these cracks extended more than 1½ in. in from the end of the rail. Fractures or cracks in switch pieces near the box which did not affect the strength of the switch piece, in the judgment of the inspector, did not cause rejection of the piece.

The foregoing information is to give the reader an idea of the extent to which the Board of Supervising Engineers went into the design and manufacture of all special work. This information is a summary of all the work done by the board, and from it one may draw the conclusion that the process of manufacture as well as the chemical composition of the manganese in the solid castings and insert pieces rested entirely with the manufacturers. The results of the three tests made on manganese switch tongues indicated that manganese had a high abrasive value but showed a low elastic limit under transverse bending strains. The ball impression tests brought out quite clearly the results that might be expected under cold rolling. The steel ball with a 7/16-in. or 0.4375-in. diameter was embedded so that the diam-



Chicago Special Work—Fig. 5—Showing Cupping of Manganese Switch and Mate at Run-off from Chicago Rail, Installed June, 1910; Traffic, 150 Wheels Per Hour



Chicago Special Work—Fig. 6—Showing Equal Cupping in Manganese Mate and Chicago Rail at Run-off from Mate, Installed September, 1909; Traffic, 221 Wheels Per Hour

eter of the impression in the manganese surface was 0.32 in.

SPECIAL WORK INSTALLATIONS

To give one an idea of the immense amount of special work used in laying out the surface railways of Chicago, the accompanying table was taken from the annual report of the Board of Supervising Engineers showing the number of lay-outs, both new and old, up to Feb. 1, 1911. Since that time, however, many new lay-outs have replaced other old ones, but the total number remains approximately the same with a possible addition of a few lay-outs made necessary by track extensions.

NUMBER OF SPECIAL WORK LAY-OUTS IN CHICAGO UP TO FEB. 1, 1911

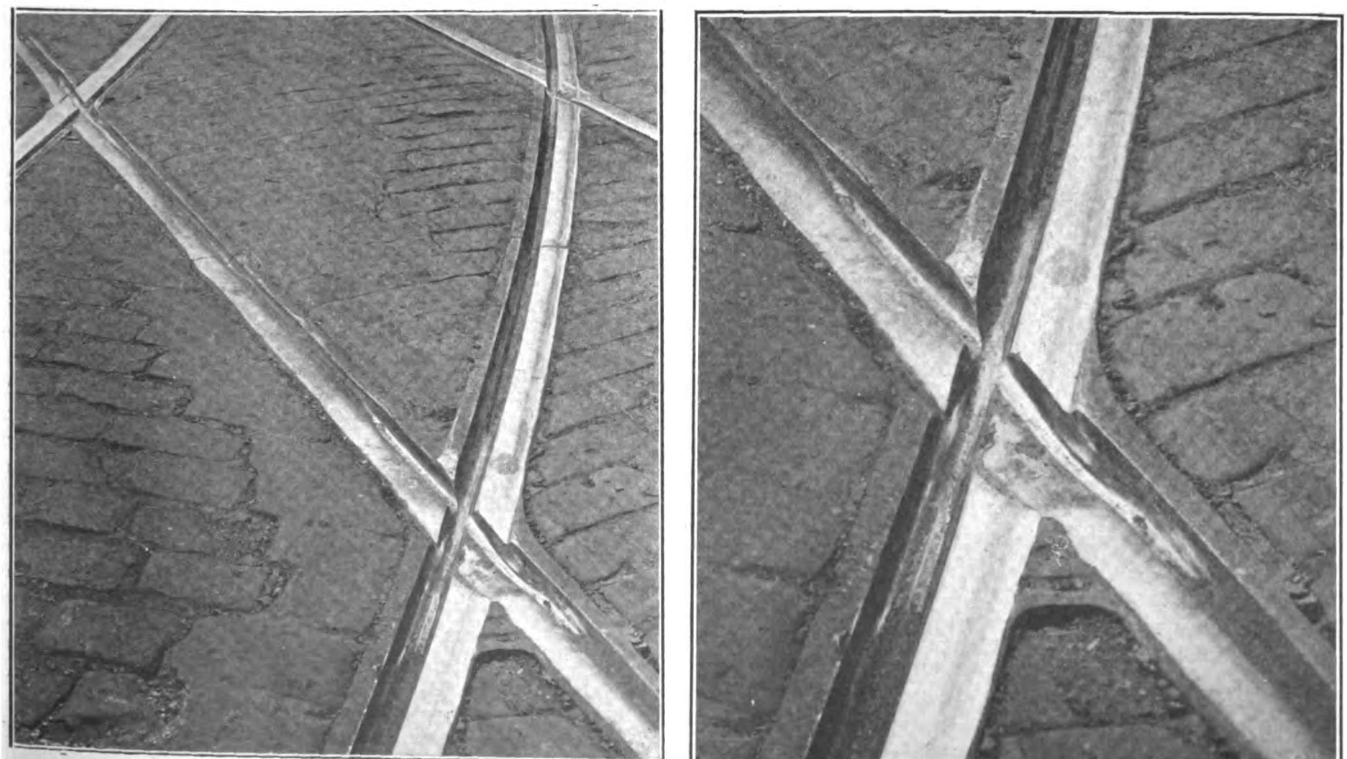
	C. C. Ry.	C. Rys.	S. S. Ry.	C. & S. C. Ry.	Joint Property	Total
New	307	551	30	142	19	1049
Old	200	384	16	120	14	734
Total	507	935	46	262	33	1783

MANNER OF INSTALLING SPECIAL WORK

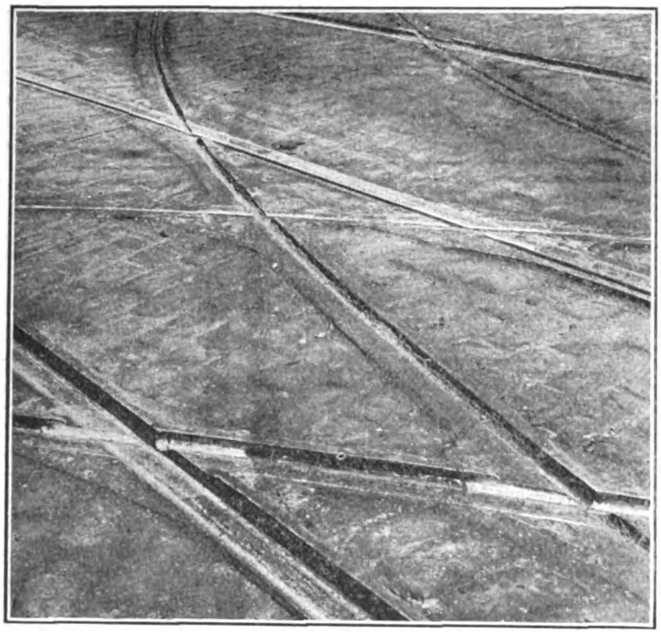
In practically all cases the method of installing track special work in Chicago has been the same. This includes an 8-in. crushed-stone ballast foundation, 7-in. x 9-in. white oak ties on 2-ft. centers, cut to special lengths to fit each crossing. In most instances it was impossible to roll the crushed-stone foundation under these crossings because intersecting traffic could not be interrupted. This made it necessary to leave out the paving for a certain period so that the crossing could be retamped repeatedly until a thoroughly compact bearing was secured. As will be noted in the illustrations, the character of foundation has not been the cause of crossing failures except in a very few instances. In fact, the failures at points where the foundation has given way are no worse than those where the foundation has stood up. All complicated crossings were purchased built of several pieces so that renewals could be made by replacing only the failed or worn-out portions. Simple right-angle intersections as a rule were purchased in a solid piece for each track crossing. In order to allow for expansion and contraction as well as to preserve the temper of solid manganese special work, all connections were made with mechanical joints.

SOLID MANGANESE STEEL SERVICE RESULTS

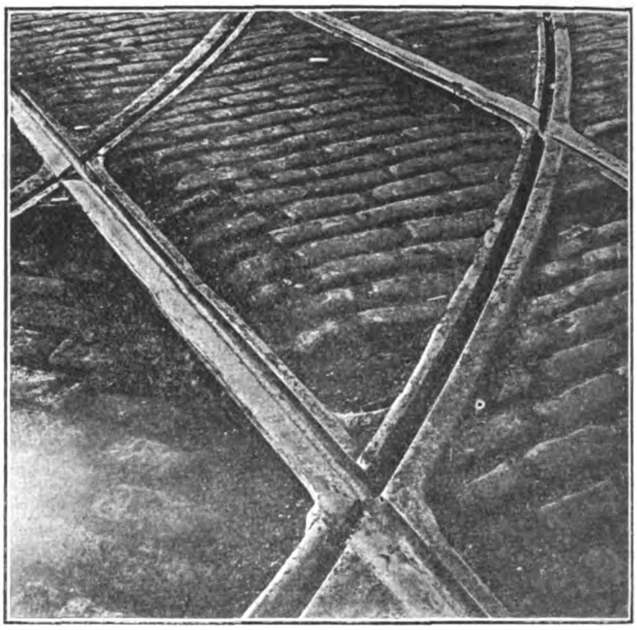
A most careful and impartial inspection of a great number of special-work installations shows all too plainly what effect traffic has had on the three types of special work used in Chicago. With the possible exception of switches and mates, it is said that more than 50 per



Chicago Special Work—Fig. 7—Showing Cupping and Cold Rolling in Manganese Angle Crossing, Installed July, 1911; Traffic, 325 Wheels Per Hour—The Right-Hand Illustration Is an Enlarged View of the Flangeway Intersection



Chicago Special Work—Fig. 8—Showing Cast Steel Arm Manganese Insert Crossing, Installed February, 1911; Traffic, 221 Wheels Per Hour



Chicago Special Work—Fig. 9—Showing Cupping, Chipping and Cold Rolling in Manganese Angle Crossing, Installed January, 1911; Traffic, 221 Wheels Per Hour

cent of the solid manganese pieces have failed before the end of the three-year guarantee period. Those remaining were in excellent condition at the time of inspection and represent what was expected of the solid manganese when it was adopted for track special work.

Inspections beginning in 1908, soon after the first pieces were installed, and continued to date, show that the solid manganese began to fail by "chipping" at the wear-points soon after the first year. The number of points chipped, however, reached a maximum at the end of two and one-half years regardless of the density of traffic, and in many instances renewals were necessary to provide safe operation. The character of the chipping in most instances was much the same and indicated that the piece was improperly tempered, or that there was a segregation of the metal at the points of failure. In practically all cases, as might be expected, the first pieces were broken from the receiving rail corners. Usually the broken piece took the form of a triangular prism which feathered out in the ball of the running rails and was thickest at the point of intersecting flangeways. One explanation of the failure is that it was the termination of life due to the low elastic limit of the material. According to this explanation the comparatively small area receiving the blow from the narrow tread wheels is stretched and pulled beyond the elastic limit of the material, the great tenacity of the material preventing rupture until the material finally parts in prismatic portions as described. In this respect, the effect differs from chipping which occurs from too hard material with high elastic limit and ultimate strength not much larger than the elastic limit.

Another class of failure in the solid-manganese crossings took the form of cupping or cold rolling. As in the case of "chipping" no definite rule could be drawn, because pieces failed both ways, again indicating that the tempering process or the inherent qualities of the metal made it unsuitable to withstand repeated impact blows. The cupping or cold rolling usually followed the chipping, and in no case was it confined to the intersecting flangeways but was quite evident the full length of the manganese running rails. Some of the solid manganese right-angle crossings were bought in one piece and some in halves. At the present time the tendency among the manufacturers is not to supply the crossing in one piece, in the belief that this plan is not conducive to long life.

One of the most prominent evidences of cold rolling was found where dense traffic moves over one line and little or no traffic passes over the intersecting line. In many instances the metal has flowed until the intersecting flangeway is practically closed where it crosses the heavy traffic running rail. In other instances the effect of cold rolling is to flatten the ball of the manganese rail. This may be noted in the illustrations, where the tread-wear area on manganese rail is apparently much wider than on the standard Chicago rail. This effect was also quite marked at the points where the standard unbroken main-line frogs were installed in which the floor of the throatway is level with the unbroken main-line running rail. Where traffic was heavy on the main line, as much as ½-in. wear, resulting in this difference in the elevation of the top of the main-line running rail and the branch-off throatway-floor, was noted in several instances.

In connection with the cold rolling or cupping it may be of interest to note that in most instances the metal flows to both sides of the ball of the rail. That flowing to the flangeway side is sheared off by the wheel flanges, and that on the opposite side forms a lip over the lower portion of the ball similar to low-carbon steel rails under heavy traffic. It may also be of interest to state that the cupping does not appear to depend on the character of support. To substantiate this, the cupping at joints represents the supported form over a single web. That in acute angle flangeway intersections was where the points receiving greatest impact were suspended between two web supports. The 90-deg. crossings usually have one supported and one suspended point of impact. As a general rule it might be stated, however, that chipping predominates in the 90-deg. intersections and cupping at the acute-angle intersections.

Cupping at the manganese receiving rail is found invariably, but it is seldom at the run-off from the manganese to the Chicago rail. In angle crossings or switch pieces cupping in one manganese rail also reflects a cup in the opposite rail. Cupping takes place regardless of the condition of the joint, and in many instances it was found most prominent where there was no appreciable difference in the elevation of the two abutting rails. In other cases where there was considerable offset and the receiving rail was the Chicago section, the cupping was slight.

The tests made on the sample switch tongues indicated that the best quality of manganese steel for track work was its ability to resist abrasion. In order to check this a number of points were inspected, and invariably the result was the same, namely, there was no appreciable difference between this quality of manganese steel and that of the Chicago rail. The slow movement of traffic around the curves caused the running rail to wear and show the effect of cold rolling to a far greater degree than the abrasive wear on the guard. For this reason it is believed that renewals will have to be made for running-rail wear rather than for guard-rail wear.

SERVICE RESULTS OF MANGANESE INSERT SPECIAL WORK

A similar study of cast-steel and iron-bound renewable manganese insert special work under the various classes of traffic and for various life periods was made. While the inspections indicated that the manganese inserts failed by chipping there was little or no evidence of cold rolling. These inspections also indicated that the chipping of inserts began after the first year in most instances but was the worst after two and one-half years' service. Again this appears to be a problem in tempering, but the failures of inserts are fewer, and, on the other hand, many of the faulty inserts may be renewed without any disturbance to the pavement. In contrast with the solid manganese special work, however, very little evidence of cold rolling or cupping was found in the cast steel or Chicago rail arms in the crossing frogs. In fact, many insert pieces were inspected which had been under more severe traffic conditions than the solid manganese, yet the common forms of failure in the latter were not found.

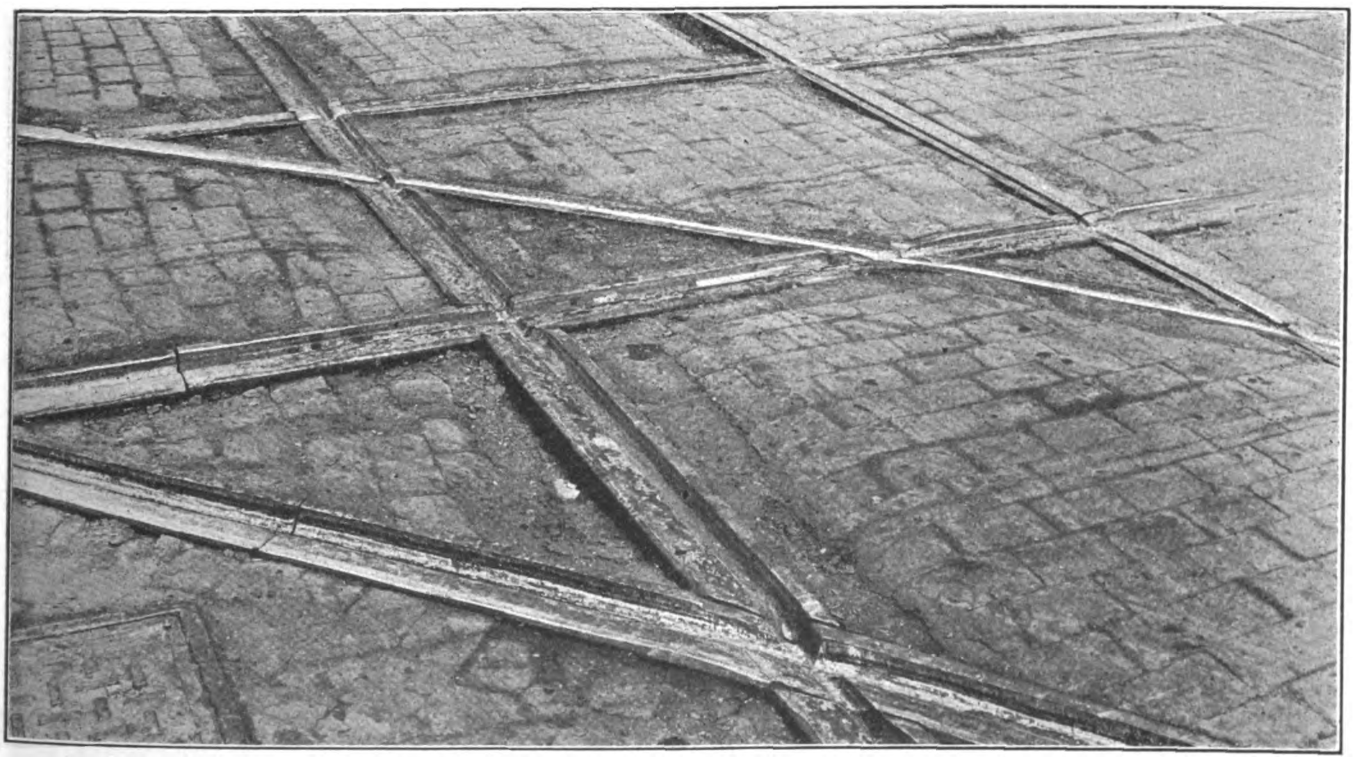
Experience with renewable insert special work in Chicago demonstrates that it is possible to maintain some forms tight in the spelter bed. Although some of these renewable inserts have become loose, a few probably because they were improperly set and fastened by the manufacturers, others indicate that the manner of fastening was not of sufficient mechanical strength to withstand the severe impact blows. As a rule inspections tended to bring out the fact that most loose inserts occurred at the 90-deg. crossings and that at angles of less than 90 deg. intersection the loose inserts were seldom found. When these renewable insert pieces did not fail mechanically and were under very heavy traffic, the service results were far superior to solid manganese. This is shown in some of the illustrations. It was also found that, as a rule, cast-steel arms with manganese inserts stood up better under all classes of traffic than the cast-steel or cast-iron bound frogs. In the cast-steel arm type, however, the same problem arose at times as with manganese steel, namely, there was a lack of uniformity in the quality of the cast-steel furnished by the same or different manufacturers. The cupping and cold rolling are also held to be evidences of the quality of the material mentioned in the previous paragraph.

MANGANESE SWITCHES AND MATES

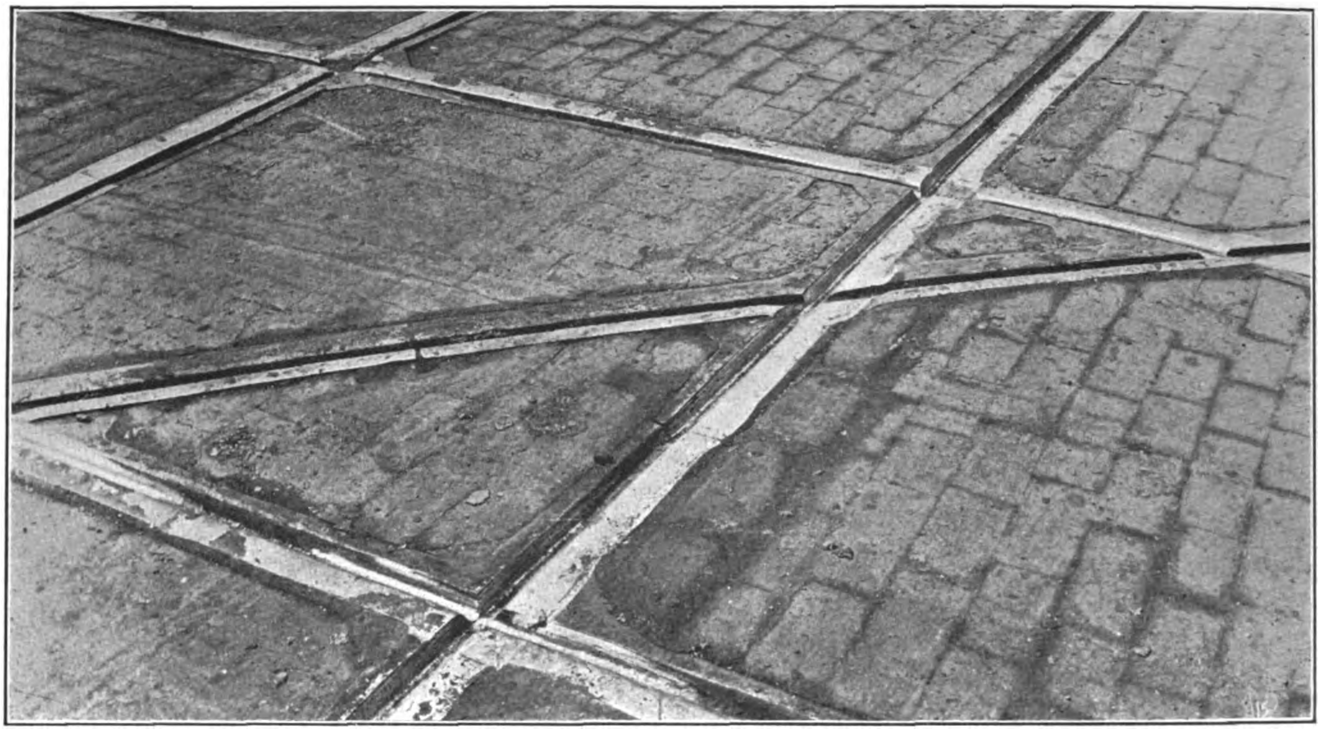
The Chicago standard switches and mates are shown in the illustrations. These, generally speaking, have stood up better than the frogs and crossings, yet under heavy traffic cupping at the receiving end of the manganese piece, as well as at the heel of the tongue, was quite pronounced. Where traffic was heavy through the branch-off, the tongue indicates unusual wearing qualities. Where traffic was heavy along the straight track, cupping and cold rolling throughout the manganese piece was quite evident.

REPAIRING MANGANESE STEEL WITH ELECTRIC WELDER

Another point which may be of interest in connection with solid manganese is the experience accompanying attempts to repair it by electric welding. Tests have been made to build up broken points and cupped joints in solid manganese steel special work in some cases with satisfactory results, though in some others with failures. Here again the peculiar characteristics of the metal make difficult the process of repair with an elec-

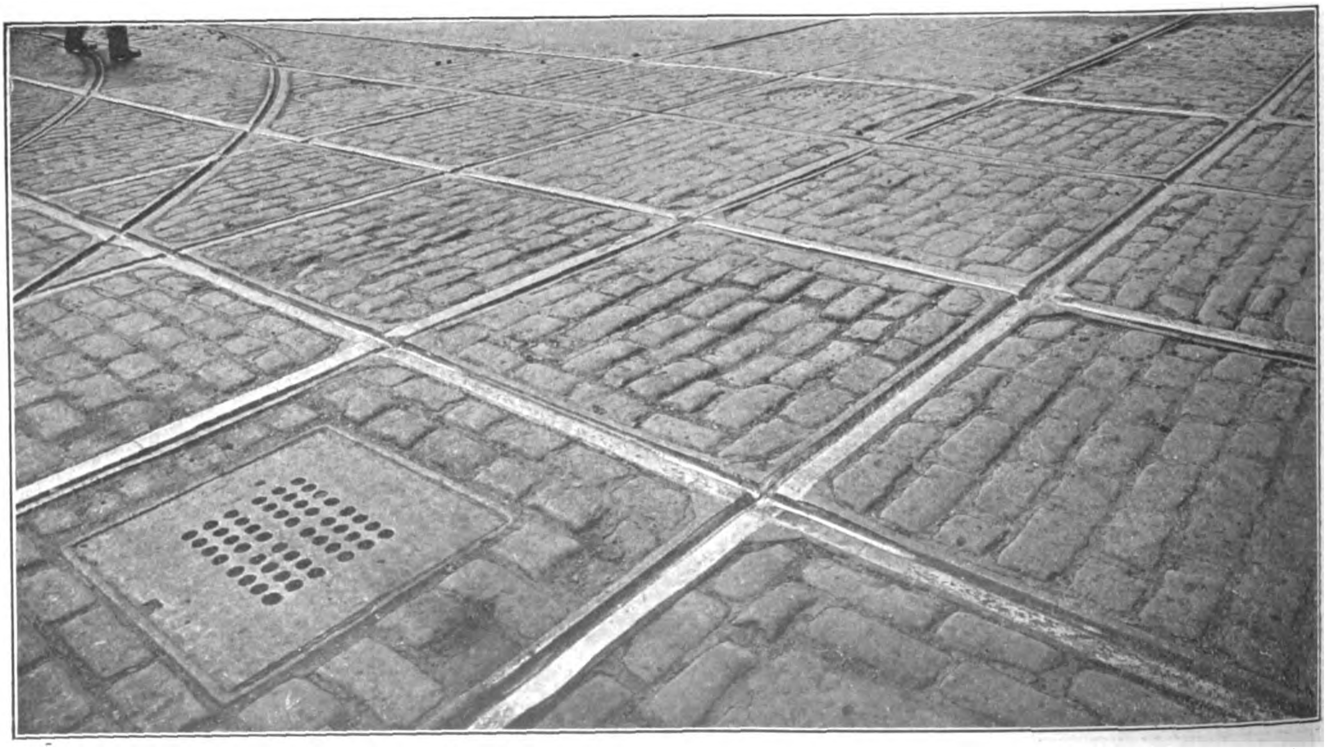


Chicago Special Work—Fig. 10—Showing Condition of Built-up Chicago Rail Crossing, Installed November, 1911; Traffic, 309 Wheels Per Hour

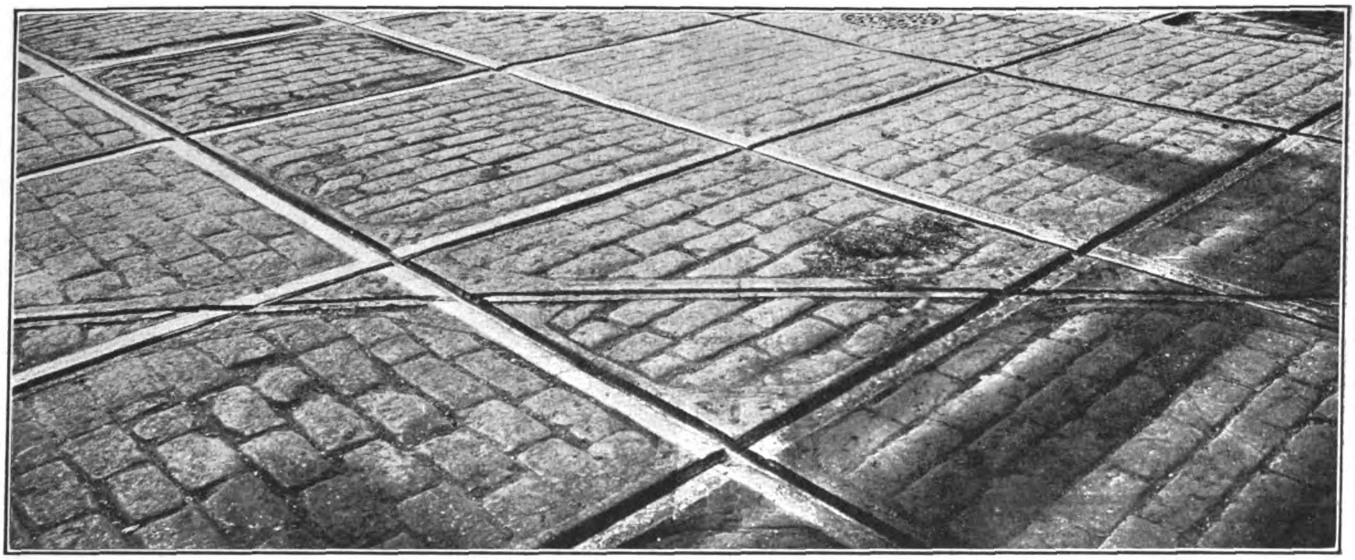


Chicago Special Work—Fig. 11—Showing Chipping and Cupping in Manganese Crossing in Same Location as Fig. 10, Installed June, 1910; Traffic, 326 Wheels Per Hour

tric welder. With manganese alloy in steel the usual tempering process has to be reversed, that is to say, gradual cooling makes a casting hard and brittle. Consequently as the piece comes from the mold it is hard and brittle and the heating or annealing process is followed by quenching which brings about the desired toughness. During the process of welding new metal onto broken points in manganese steel special work, a portion of the old manganese casting becomes heated to a welding temperature. This results in a hardening of a portion of the old casting, which in many cases becomes quite brittle, and new breaks occur. Fig. 15 is an example of a weld failure in the original casting. Undoubtedly the reason for the success of welds of this kind in those cases where it has proved successful is that the portion of the old casting heated was confined to a very small area. It may be possible to overcome this difficulty, but even under present conditions 50 per cent of the castings thus repaired have stood up under service for a time, and as the cost of making the repair is small the use of the welding outfit seems worth while.



Chicago Special Work—Fig. 12—Showing Chipped Points and Cold Rolling in 90 Deg. Manganese Crossing, Installed February, 1911; Traffic, 345 Wheels Per Hour



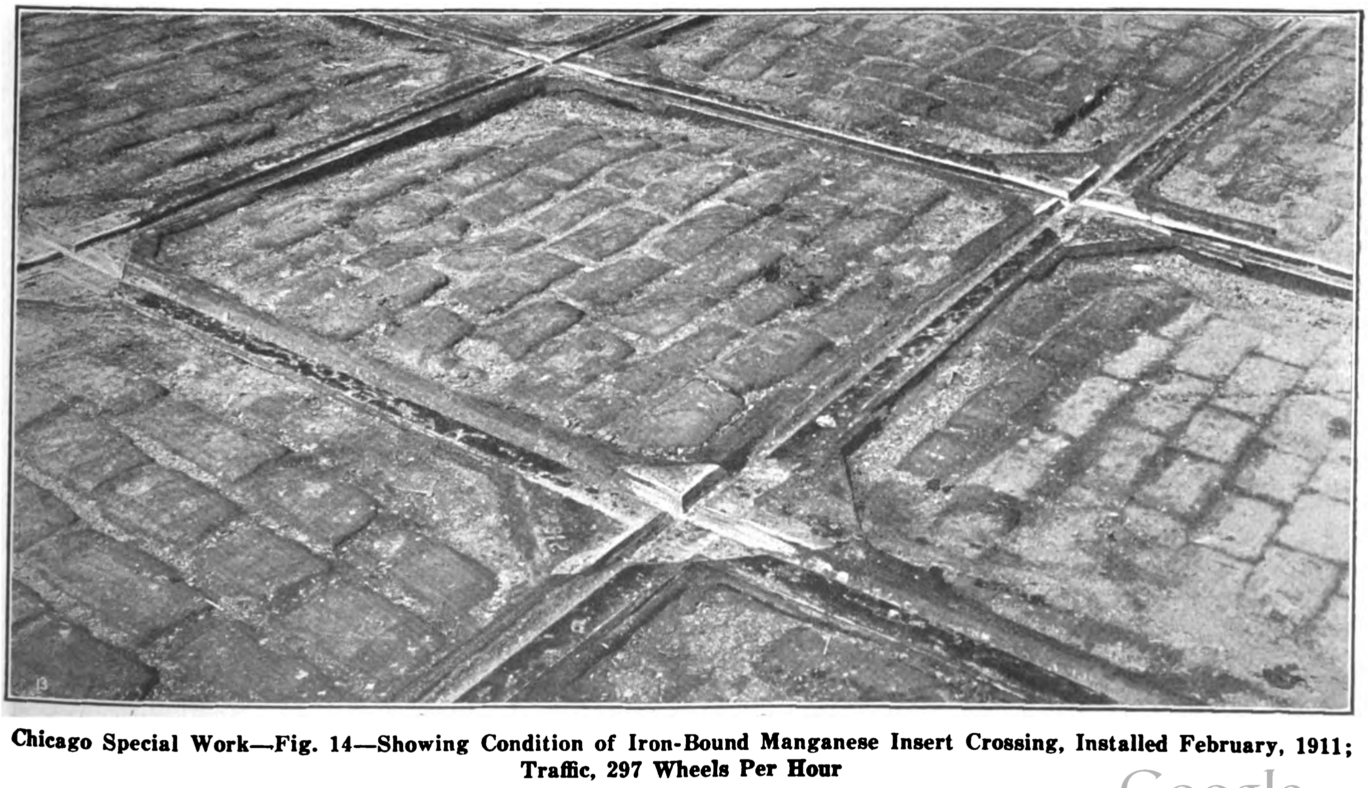
Chicago Special Work—Fig. 13—Showing Condition of Cast-Steel Arm Manganese Insert Crossing, Installed February, 1911; Traffic, 226 Wheels Per Hour

TYPICAL FAILURES OF MANGANESE STEEL

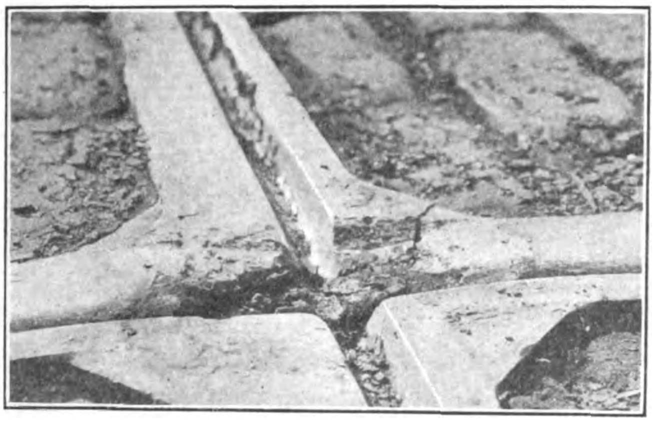
An examination of the solid manganese failures under varying traffic conditions brought out the fact that cupping and cold rolling predominated. It may be stated generally that the Chicago rail laid on various types of foundations has developed little or no cupping up to the present time. There are a number of instances where rail corrugation has developed, but this may be attributed to causes other than that bringing about cupping at the rail joints. On the other hand cupping and cold rolling were largely confined to the manganese steel special work and especially in the solid manganese. Almost invariably where the manganese steel piece was the receiving rail, cupping developed regardless of the density of traffic or the condition of the joint.

In order that accurate comparisons could be made of the various special work installations, it was necessary to reduce the traffic and tonnage over each point discussed to a unit basis. This was accomplished by computing the total number of cars in all directions, passing over a particular crossing in a twenty-four-hour week-day and a twenty-four-hour Sunday. From these the average number of cars per hour and then the average number of wheels were computed, four wheels being taken for each double-track car as the number passing over any given point. To arrive at the unit tonnage figure, it was estimated that the average double-truck car in Chicago weighed 50,000 lb. and that the average passenger load was 10,000 lb. This total, or 60,000 lb., was divided by eight for the unit load per wheel and was multiplied by the number of wheels passing over a given point per hour.

Fig. 1 illustrates a comparatively light traffic condition where eighty wheels per hour, or 300 tons per hour, pass from the standard Chicago rail to a solid manganese switch and mate. In this illustration it will be noted that cupping of the manganese has developed to a marked degree. An inspection on the ground also shows that both the switch and mate have been affected



Chicago Special Work—Fig. 14—Showing Condition of Iron-Bound Manganese Insert Crossing, Installed February, 1911; Traffic, 297 Wheels Per Hour



Chicago Special Work—Fig. 15—Showing a Case of Manganese Failure After Repair by Electric Welding

and that cupping has also begun at the heel of the switch tongue.

In contrast with Fig. 1, Fig. 2 shows a run-off from solid manganese to the Chicago section under exactly the same traffic and tonnage-per-hour conditions, and both pieces have been in service since October, 1908. In this instance the offset from the manganese rail to the Chicago section is approximately ½ in., hence resulting in a heavy impact on the Chicago rail which has barely started to cup. It will also be noted that the solid manganese rail has begun to round over at the joint to meet the difference in elevation between it and the Chicago rail. At this same point it is also interesting to note that the joint in the opposite rail of this track is in comparatively good condition. The slight cupping shown in the illustration has not been reflected in the opposite rail as might be expected.

To substantiate the statement that cupping seems to develop on the solid manganese pieces regardless of the traffic, Fig. 3 illustrates the point. Here the solid manganese switch and mate are the receiving rails, and cupping has developed to a slight degree, although the traffic is approximately three times greater than in Figs. 1 and 2, or averages 221 wheels per hour, which is equal to 829 tons per hour. At this point cupping has also developed in both the switch and mate, as well as at the heel of the switch point, and these two pieces have been in service since January, 1911.

In contrast with the foregoing Fig. 3, Fig. 4 is shown to illustrate the cupping in the run-off from manganese to Chicago rail at the opposite end of this solid manganese switch. As shown in the illustration, the cupping is just beginning on the Chicago rail, although cold rolling throughout this manganese piece was evident in a careful examination on the ground.

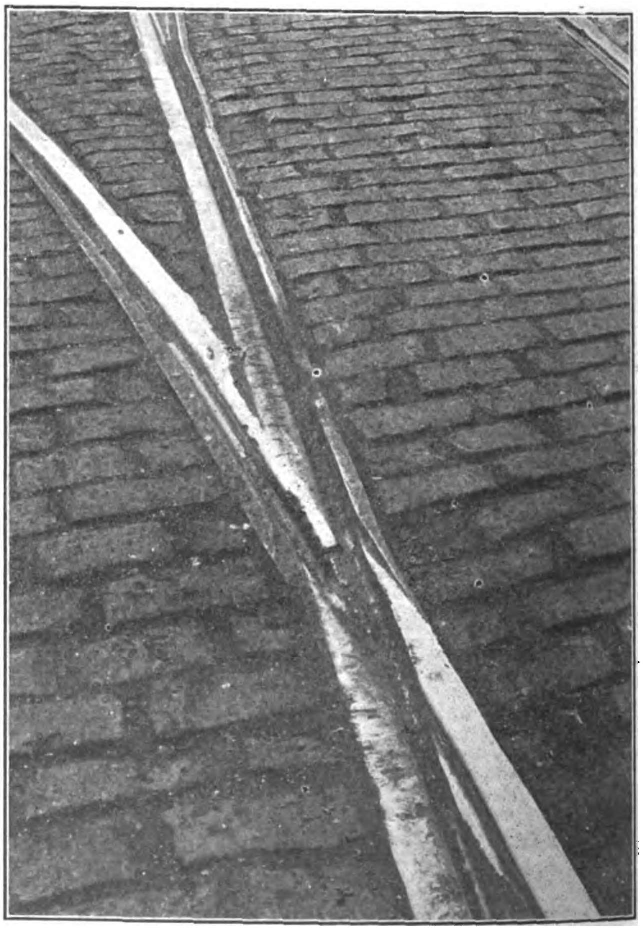
Fig. 6 shows the run-off from a solid manganese mate to a Chicago rail, both of which have been in service since September, 1909. The traffic over this joint is 221 wheels per hour, or 829 tons per hour. Probably the most interesting point of connection with this illustration is found in the fact that the manganese rail had been carried down with the Chicago rail, although the Chicago rail is the receiving one and should show all the cupping. A careful inspection on the ground also shows that cupping has developed at the point of the switch as well as the heel, and both have been reflected in the mate in the opposite track.

Fig. 5 is shown to illustrate an instance where cupping has developed on the manganese piece, regardless of the condition of the joint or the supporting foundation. Here a straight edge laid over the cup showed that the Chicago rail and the solid manganese rail were approximately at the same elevation, and the maximum depth of the cup was approximately ½ inch. In this same illustration the effect of cold rolling throughout the piece may be noted by the slight wave in the edge of the opposite rail, as also may be the cupping at the heel of the switch point. This particular switch and mate have been in service since June, 1910, under heavy traffic averaging approximately 219 wheels per hour, or 721 tons per hour.

In the foregoing paragraphs describing failures in switches and mates, it must be borne in mind that all switches and mates have not failed in this manner, but these merely illustrate the character of some failures under heavy traffic conditions. In some instances these solid manganese pieces have stood up beautifully under varying traffic conditions, thus the failures recorded indicate that there is a lack of uniformity in the product.

As might be expected most failures have occurred in frogs and crossings, but as mentioned heretofore these too have in a large measure become defective regardless of the density of traffic. On the other hand it must be stated that all solid manganese pieces have not failed in the manner illustrated, but it has been estimated that more than 50 per cent of them have been found defective in one form or another.

Fig. 9 illustrates an angle crossing over which traffic moved exclusively on the straight track. This solid manganese piece of special work was installed in January, 1911. The average traffic over it was approximately 221 wheels per hour, or 829 tons per hour. The movement of traffic was from left to right, and the cupping on the receiving rails may be noted as well as that reflected in the opposite rail. This piece is typical of the effect of cold rolling throughout the solid manganese running rail, and the marked cupping at the intersection of the flangeways in angle crossings of this type is also typical. This piece has also failed by chipping at



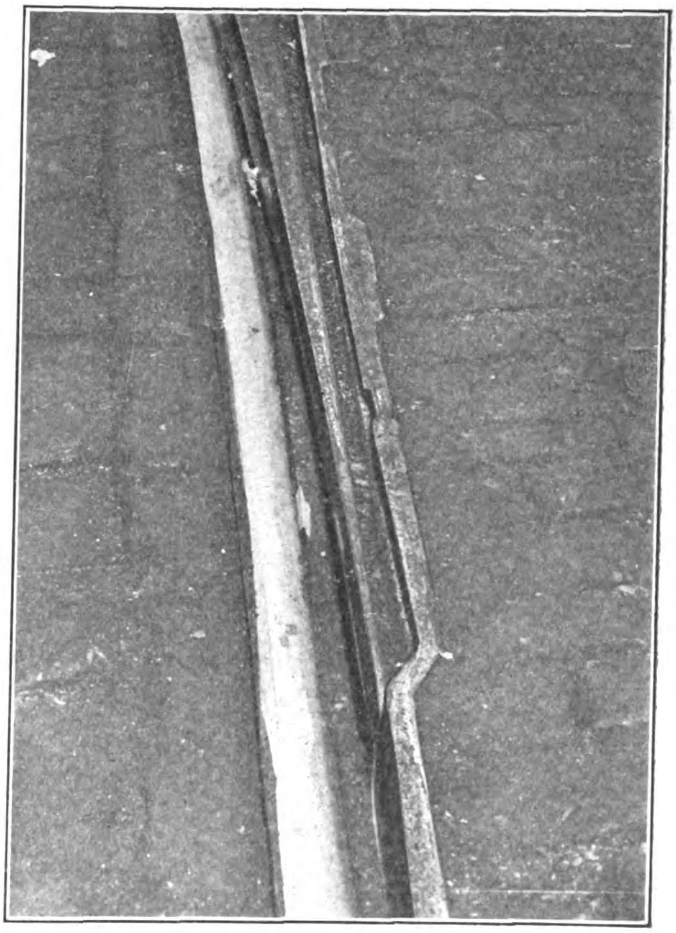
Chicago Special Work—Fig. 16—Showing Extreme Case of Crumbling in Manganese Frog, Installed April, 1909; Traffic, 176 Wheels Per Hour one of the angle points, as well as on one of the arms midway between the intersecting flangeways and the joint. Deep cupping has occurred at the intersecting flangeways, following which the running rail has usually begun to spall off, indicating either an imperfect casting or a change in the temper of the running rail under the repeated impact blows.

In contrast with Fig. 9, Fig. 8 is shown, being a cast-steel arm, renewable manganese-insert lay-out with angle crossings, also similar to Fig. 9. This lay-out was installed in February, 1911, one month after the solid manganese piece in Fig. 9, and exactly the same traffic moved over it. As shown in the illustration this lay-out is in perfect condition, and neither cold rolling nor chipping have occurred in any of the manganese inserts.

Similarly, Fig. 13, which is a cast-steel arm renewable insert right-angle crossing installed in February, 1911, is apparently in good condition. The traffic moving over this right-angle crossing is approximately 226 wheels per hour, or 848 tons per hour. The condition of the inserts, however, is not as good as that in Fig. 8, nine of the sixteen points being broken, but in no instance is the break large enough to affect the safety of operation, and all inserts are otherwise in excellent condition. Attention is also directed to the fact that no cupping or cold rolling has developed throughout the arms of the two cast-steel insert installations. This probably accounts, in a large measure, for the condition of the paving, which in Fig. 9, around the solid manganese piece, is badly in need of repairs.

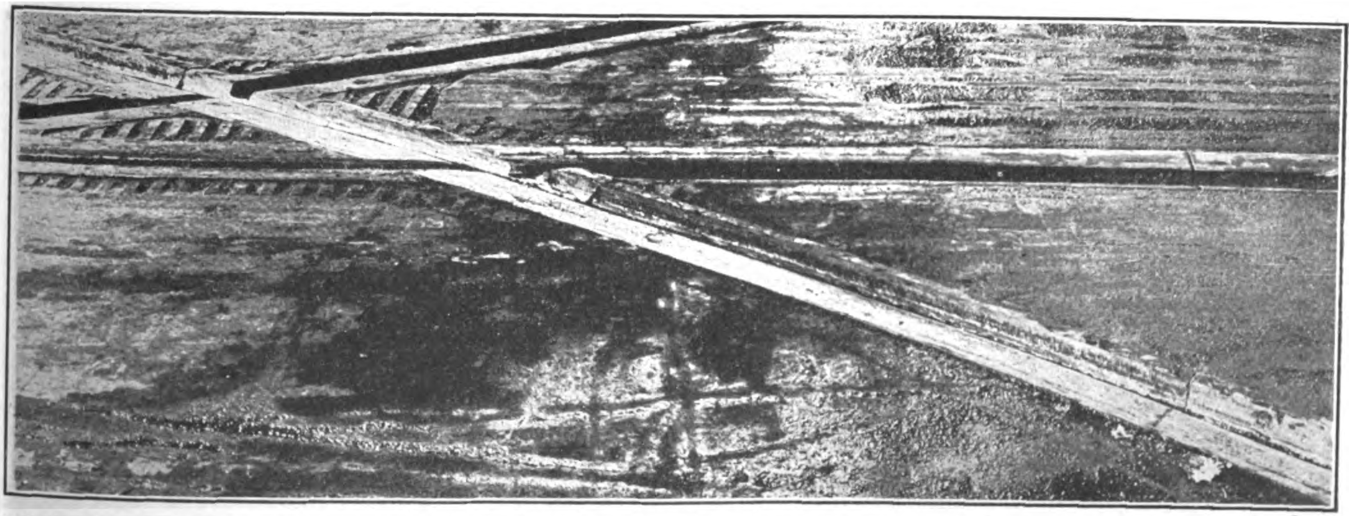
An example of what occurs to the solid manganese special work and how it compares with the insert work under extremely heavy traffic is illustrated in Figs. 7, 12 and 14. Each of these installations has approximately the same density of traffic moving over it. The solid manganese angle crossing in Fig. 7 was installed in July, 1911, and the average traffic is 325 wheels per hour, or 1217 tons per hour. The cast-iron bound manganese insert right-angle crossing shown in Fig. 14 was installed in February, 1911, five months prior to the lay-out installed in Fig. 7. From a service standpoint the wear on these two lay-outs should be approximately the same.

Traffic moves over the solid manganese angle crossing two ways, namely, from left to right on the straight track and from the foreground to the background on the curved track. In this installation, similar to the other angle crossing shown, serious cupping has developed at the intersection of one of the flangeways followed by a spalling off of the metal in the running rail. This is illustrated in the right-hand engraving in Fig. 7. As has been mentioned in connection with other solid-manganese pieces, the cupping at the joints as well as cold rolling throughout the solid manganese pieces also may be observed in this illustration.



Chicago Special Work—Fig. 17—Showing Tread Wear on Manganese Switch Running Rail, Installed July, 1911; Traffic, 15 Wheels Per Hour

In contrast with Fig. 7, Fig. 14 is shown, being a cast-iron bound manganese insert right-angle crossing. Traffic moves over this crossing in two directions, the average wheels throughout the year being 297, or 1114 tons per hour. These four crossings were purchased in single pieces with standard Chicago rail forming the running rails. Here the manganese inserts are giving extraordinary wear, although some of them indicate that they have begun to loosen on the spelter bed. This lay-out is in a heavy vehicular traffic district, which accounts for the defective paving rather than the condi-



Chicago Special Work—Fig. 18—Showing Equal Wear on Chicago and Manganese Guard Rail, Installed September, 1911; Traffic, 53 Wheels Per Hour tion of the track foundation, which appears to be in excellent condition.

Extraordinary failure under especially heavy traffic is shown in the solid manganese right-angle crossing in Fig. 12. Here the traffic moves both ways, averaging 345 wheels per hour, or 1294 tons per hour. In the sixteen intersecting flangeways, fourteen have chipped and the cold rolling and cupping may be observed throughout the piece. This lay-out was installed in February, 1911, and unless it can be successfully repaired by electric welding and grinding, it will have to be renewed within a short time.

In these illustrations and comparisons it might be interesting to note the results of heavy traffic on the ordinary built-up, mechanical joint crossings as compared with the solid manganese. This is clearly shown in Figs. 10 and 11. The built-up installation shown in Fig. 10 was installed in November, 1911, and the traffic moving over the right-angle section is approximately 309 wheels per hour, or 1160 tons per hour. The solid manganese pieces in the same lay-out were installed in June, 1910, and the traffic over them averages approximately 326 wheels per hour, or 1223 tons per hour.

In this comparison the built-up piece has been in service two and one-half years under approximately the same density of traffic as the solid manganese piece which has now been in approximately four years. In the illustrations it will be noted that in the built-up piece there is no cupping at the joints, and, if anything, the running rails are in perfect condition except for the loosening of the mechanical joints. One disadvantage of this type of construction is clearly illustrated, namely, that from a pavement maintenance standpoint the one-piece special work is much more to be desired than that held together by mechanical joints. The pumping of the mechanical joints in the built-up work has carried the granite block paving surface with it. In Fig. 11 the pavement around the solid manganese piece is in fairly good condition. Similar to other right-angle solid-manganese special-work installations, the one shown in Fig. 11 has failed by chipping at the intersecting running rails. Cupping and cold rolling may be noted throughout the lay-out.

An extreme case of apparent segregation of the metal, as well as a lower percentage of manganese in the steel, is shown in Fig. 16. This is a standard 100-ft. radius Chicago turn-out frog installed in April, 1909, with a traffic density of 176 wheels per hour, or 660 tons per hour. This is an unusual type of failure and is shown to illustrate clearly what might occur if the foundry practice is faulty or the tempering has not been properly done.

The solid-manganese standard Chicago tongue switch shown in Fig. 17 clearly illustrates the effect of cold rolling and flange wear under comparatively light traffic. This piece was installed in July, 1911, and the average traffic equals fifteen wheels per hour, or 56 tons per hour. A careful examination on the ground shows the effect of cold rolling throughout the solid-manganese running rail, although the piece has given excellent results from an abrasive resistance standpoint. Where the solid manganese rails join the Chicago rail section there is no evidence of cold rolling and the high-carbon guard rail appears to be withstanding the abrasive wear about as well as the manganese guard.

A comparison of manganese steel and the Chicago guard rail under abrasive wear is shown in Fig. 18. Here a cast-iron bound renewable manganese insert layout was installed in September, 1911, and the average traffic over it is approximately fifty-three wheels per hour, or 198 tons per hour. While this traffic is comparatively light the illustration serves to bring out the point that the Chicago guard-rail section wears about as well as the manganese guard rail in the insert pieces. As already mentioned, the advantage of the manganese guard rail under the slow-moving traffic through special work in Chicago is offset by the excessive running-rail wear, which observations to date indicate will govern the life of the piece.

COMMUNICATIONS

INTERSTATE CLASSIFICATION OF ACCOUNTS

CHICAGO ELEVATED RAILWAYS
CHICAGO, ILL., April 22, 1914.

To the Editors:

I am of the opinion that the new tentative classification of electric railway accounts, issued by the Interstate Commerce Commission, effective July 1, 1914, will probably meet with the approval of most accounting officers. Your general discussion of the subject, participated in by various accounting and other railway officials, has covered the subject in a very comprehensive way, but there are a few points that have not been threshed out sufficiently from the railway companies' standpoint.

One of them is the discount on bonds, notes and other evidences of indebtedness, which, according to the Interstate Commerce Commission ruling, are not properly chargeable to road and equipment accounts, excepting that portion of the discount which is equitably assignable to the period between the date of the actual issuance of securities and the time when the property acquired or the improvement made becomes available for the service for which it is intended. Under the present classification of accounts now used by the Interstate Commerce Commission, which it is contemplated to revise this year, the following note appears in general road and equipment expenditures in reference to the charges to construction for interest:

"Discounts and commissions on securities issued for construction purposes or to raise funds for construction should not be charged to this account or considered as a proper charge against construction."

The new system of accounts goes a step in the right direction when it is allowable to charge capital accounts with a certain proportion of the discount on securities. To cover practical methods of financing, this should go a step further and include *all* the discount which is allowed as a brokerage to the banker or investor taking the securities of a new company which has not yet proved its success.

When a railway is built, to the ordinary charges for material and labor used in the construction of the various classifications of property and equipment are added certain overhead charges such as law expenses, interest during construction, taxes levied on the property belonging to the company while under construction, injuries and damages and miscellaneous organization expenses, and these constitute the property or capital account. The brokerage or, as it is usually termed, discount on securities is likewise a charge toward the cost of setting up the railway as a going concern, and may be termed the overhead charges of financing. It should not be considered in the nature of an interest charge to be pro-rated over the life of the bonds, but rather ought to be considered as it is, in effect, a bonus of bonds given to the bondholder to offset the possible loss of value of the securities selling in a market alongside of seasoned securities of demonstrated value.

The electric railway industry is only about twenty years old. To promote its progress the fixed charges should be minimized; hence the above theory, it seems to me, should be utilized even further and the capital account of the railway or, for that matter, any enterprise which depends upon the building up of the territory through which it runs should include the estimated loss in operation, after paying fixed charges during the first three years of its existence. National and State railway commissions have not seen fit to adopt this view as yet, but the history of a great many of the new enterprises such as hotels, some tunnel systems and others, particularly railway enterprises, show the necessity for providing for this contingency in the original volume of capital required to float them.

During the rehabilitation period of the surface lines in the city of Chicago a plan was adopted of providing a certain stipulated percentage, namely 70 per cent, which would be charged against the income account as the cost of operation, and certain charges in excess of that for a period of three years were added to the capital account. This would be one way of providing for this deficit in the early years of operation; furthermore, this plan would be agreeable to the investor by safeguarding the payment of his interest during the first unprofitable years rather than be objected to by such investor, who accepted the securities of such company. The subsequent investment would be taken care of by a physical valuation of the property which should also include a percentage for brokerage that could not be judged excessive.

Of course this would only be allowed in the case of an entirely new enterprise as discount on refunding bonds should always be amortized out of earnings during the life of the bonds. The result of excess valuation of the property over the cash cost of same, by including the losses of early years of operation, would not be objected to by the public on account of the impetus which would be given to the development of electric railways in localities where they are very much needed, but are at the moment unable to support the capital expenditures. Giving a fighting chance to every new enterprise, until a reasonable time expires when it can justify its existence, would not be against public policy, but would stimulate the building of many miles of facilities not now in existence. These items, viz., discount and losses of early years of operation included in the capital account, should also be included in the valuation of the property shown in the depreciated cost to reproduce and should also be taken into consideration in the basis for rate-making.

The step of the new classification, providing for the discount of securities during the period of construction, is only one in the right direction, but should be changed to include the entire discount on bonds. Otherwise this discount will be included possibly in organization expenses under account No. 549 instead of under account No. 546 where it can be clearly earmarked.

One of the principal changes in the new classification of accounts for electric railways about to be adopted consists in the segregation of the power maintenance and operation accounts. From this it is hoped to disclose the net cost of power. Maintenance in total is thereby decreased, but a corresponding benefit is obtained for the investor who only uses the main subdivisions of operating expenses in his calculations; by providing a means of obtaining a fair comparison of conducting transportation, this enables him to determine a better basis of operating efficiency.

In a comparison of the cost of power between companies which purchase current and those which have their own power-producing plants, consideration must be given to the fact that the primary charge of purchased power includes depreciation and interest on the capital investment, items appearing only in the fixed charges, or deductions from net income in the income accounts of companies producing their own power. This segregation of the power into a fifth division of operating expenses has been in use on the Metropolitan West Side Elevated Railway Company of Chicago for some years, and at the time of the unification of the elevated lines of Chicago in 1911 was adopted by all the other companies. It has always proved beneficial to the operating departments as well as satisfactory to those using financial statements.

EDW. A. BRION, Comptroller.

DEFINITION OF FAILURE FOR SIGNALS OF THE CONTACT TYPE

STREET RAILWAY SIGNAL COMPANY
PHILADELPHIA, PA., April 28, 1914.

To the Editors:

As a part of the discussion as to what constitutes a signal failure, we should like to see this subject considered by the users of both track- and trolley-contact signals, because the method of operation is somewhat different to that involved by track-circuit control.

When the writer was a repairman some ten years ago, on a steam road, a failure was charged against a signal for every train that reported it out of order. We repairmen always considered this rather hard on us because there was quite a rivalry among us which was made more keen by a monthly report that started from one end of the division and went to the other, being shown to each repairman. I do not know whether or not this rule is still in vogue, but if it is, and if it was applied to the contactor types of signal, there would be each month an appalling list of signal failures on some roads. Therefore I think that a signal failure should be classed as one failure (I refer to contactor type) from the time the signal is reported out of order until it is O.K.'d, it being understood that the car crews should report to the dispatcher, or the proper official, whenever they found a signal out of order.

A signal is placed on a line to protect a train or car. If any part of its mechanism fails to perform its duties the signal is at fault. But, if the signal goes to a "stop" position—we are not discussing "clear" failures as they are obviously failures and need no discussion—because of an open switch or a broken rail, a gang working, or an improper car movement, it is performing its proper duties and should not be charged with improper operation.

To my way of thinking signal failures are divided into but two classes: blamable and unblamable, a blamable failure being one caused by defect of any part of the signal apparatus, lamps being included. All other failures, such as "work-train in block," "switch open," "broken rail," "gang at work" are unblamable failures.

H. R. STADELMAN.

At the recent hearing before the Interstate Commerce Commission, J. T. Wallis, general superintendent of motive power of the Pennsylvania Railroad Company, testified concerning the increased maintenance of equipment expenses incidental to the operation of the Pennsylvania Railroad System. Mr. Wallis said: "At the present time the Pennsylvania Railroad Company charges depreciation on the following bases: locomotives and passenger cars on a basis of 4 per cent of the original cost of the equipment, and on freight cars on a basis of 3 per cent on such cost, for the reason that we believe a locomotive will last about twenty years, and based on the final value of the scrap being 20 per cent. of the original value, the depreciation plus the salvage will equal the original cost. On passenger cars we believe that our wooden cars will last twenty years. As far as steel cars are concerned, we do not know how long they will last, but in order to provide for the replacing of our wooden with steel cars in a reasonable time, and for the steel cars when they shall have to be retired, the best figure we have been able to arrive at is 4 per cent."

Concluding Session of Iowa Association

A Report of the Meeting on April 24 at Cedar Rapids—Abstracts of Papers on Public Policies and "Safety First"—Election of Officers

The proceedings of the first day's session of the annual meeting of the Iowa Street & Interurban Railway Association were reported on page 928 of last week's issue. The closing session was attended by about 75 delegates. The paper on car cleaning and sanitation by M. M. Lloyd, master mechanic, Des Moines City Railway, was read by the author and discussed in detail by several railway men, including R. A. Leussler and William Musgrave of Omaha, O. S. Lamb of Waterloo and C. M. Feist of Sioux City. They urged that too much attention could not be given to keeping cars in a clean, sanitary condition. The appearance of the car has much to do with the public relations question in any community. At Sioux City it is a practice to clean cars, car bodies and interiors in the daytime and to wash windows at night. The ceilings are cleaned once every six months. The railroad company does not disinfect the cars, but whenever there is any knowledge of a possibility of contagion, it calls upon the city health authorities to do so.

C. M. Feist related that until about a year ago his company had had good results with the varnish used on car exteriors, but since then the life of the varnish has been remarkably short. This rapid deterioration of varnish was attributed to the new concrete pavement, 30 or 40 miles of which had been installed within the last two years. These pavements have a concrete surface, and when the dust from this settles on the cars it mixes with the washing water and produces a chemical action on the varnish. No remedy has yet been found to prevent this.

A paper entitled "Modern Public Policies of Public Service Corporations" by P. P. Crafts, general manager Iowa & Illinois Railway Company and Davenport & Muscatine Railway Company, was then read by the author. This paper will be found in abstract below.

In discussing Mr. Crafts' paper, Mr. Leussler summarized the public sentiment of Omaha and told of the work which the Omaha company had been doing for a number of years, regretfully pointing out some of the results. Notwithstanding strong efforts on the part of the railway to meet every reasonable demand, ordinances including such features as seven fares for a quarter had been placed before the voters. The latest ordinance voted upon won by a majority of but 700 votes, only 8700 votes out of a possible 25,000 being cast. The court has granted the company a restraining order. E. G. Schmidt, of Des Moines, expressed his belief in the fairness of the public. He thought it wanted good service rather than low fares. In Des Moines the problem now is to reach an agreement with the city as to the value of the railway property. The mayor thinks that a reasonable investment included only the property at its depreciated value. F. V. Hanlon told of recent occurrences in Mason City when the city officials prepared an ordinance for a new municipal lighting plant. This ordinance was defeated three to one in general election, and since that time the local public service company had filed a petition for a new ordinance for its own company. H. E. Weeks described how the gas and electric lighting companies in Rock Island, Moline and Davenport had used the newspaper advertising space to inform the public that they would be glad to receive complaints.

Mr. Crafts said that every public service company frequently got letters of unjust complaint. He thought that these should have full answer and that, wherever necessary, a thorough investigation should be made. The policy of giving the complainant full particulars of the results of the investigation and even going so far as to furnish him with inter-department reports has a great deal to do with building up good-will for the local public service corporations. E. C. Allen of Cedar Rapids said that it often became desirable for the manager to make a personal investigation and help in the settlements. He felt that courtesy on the part of the employees was the biggest asset which an electric railway could have. One slogan that he used was "treat the passengers as you would like to have your own family treated." J. D. Wardle, Cedar Rapids, said that he had found that the public intended to be fair if it had the information on which to base its judgment.

At the conclusion of the discussions of the paper on public policy, the association went into executive discussion. Later it was announced that the next annual convention would be at Keokuk in the spring of 1915.

The following officers were elected and installed for the coming year: President, R. A. Leussler, Omaha & Council Bluffs Street Railway; vice-president, J. F. Porter, Tri-City Railway & Light Company; secretary and treasurer, H. E. Weeks, Tri-City Railway & Light Company.

At the conclusion of the meeting on the last day, J. A. Wardle entertained several of the delegates with a trip in a special car over the new Mount Vernon extension of the Cedar Rapids & Iowa City Railway.

MODERN PUBLIC POLICIES OF PUBLIC SERVICE CORPORATIONS

BY P. P. CRAFTS, GENERAL MANAGER IOWA & ILLINOIS RAILWAY AND DAVENPORT & MUSCATINE RAILWAY

It can safely be asserted that a considerable change has been wrought in the public policies of the public service corporations, and it is the purpose of this paper to analyze and briefly discuss the modern policies, with the reasons therefor and the results thereof.

There seems to be no reason for much comment of the old policies now conceded to be archaic, unless it is to excuse Commodore Vanderbilt for having uttered his famous expression, if indeed he ever made it, on the ground that he might have been unduly irritated by a caustic complaint of some patron; something which occasionally upsets the highly developed mental balance of even the present up-to-date public utility official.

For many years it was the ruling policy of the public service corporations to conduct their business with a great show of secrecy and to impress upon their patrons the futility of raising objections to their methods or service. It is true that the state of the art did not then permit of giving such reliable service as is now demanded and can generally be given, but that weakness was too strongly featured when dealing with service complaints, and too little attention was given to prompt and efficient correction of the real causes. Federal, state and municipal bodies and individual patrons were too frequently led to believe wrongly that the functions and service of the utilities were peculiar and could not be conducted along the same lines as those of private corporations.

FUNDAMENTAL PRINCIPLES

A public service corporation whose activities are confined to one community or to a correlated group of communities should be a monopoly so far as the particular class of service which it renders is concerned. It is entitled to protection from destructive competition; it should not be unduly restricted in the conduct of its business; and it is as much entitled to a reasonable profit, based on something besides the replacement value of its physical property, as any private business. But to attain these very desirable results, private business must be distanced, if anything, in square and above-board dealing with governmental bodies and with patrons, in service rendered and in courtesy and attention accorded to all. Rates too low to be commensurate with good service will not attract business. Although low rates are demanded, many instances can be cited indicating that the public is as willing to pay reasonable rates for good service rendered by public service corporations as it is to pay reasonable prices for good butter, eggs, shoes and other necessities of life. But it is necessary to give good service *first*.

GOOD SERVICE

The public cares nothing about shops, barns, power houses and gas works, their condition or the methods used in operating them. It wants, however, to ride in clean, comfortable cars which are run on time, over reasonably smooth track; to have its electric lights steady and the service reliable, and to have its gas contain the proper number of heat units and delivered at fairly even pressure.

Good service also demands alert, clean and courteous employees from the officials down and the rendering of prompt and efficient service by those employees, no matter what it may be. This brings us to the matter of courtesy, one of the most important factors in maintaining pleasant and profitable relations with the public. What can offset the effect of a clean, comfortable car on a bright morning any more than a surly or unkempt train crew, or what can spread more ill feeling in the neighborhood toward the company than to have a front porch conference develop the fact that complaints of low gas pressure by two or three neighbors had been curtly received at the office and apparently no attention given them? The facial expression of an employee when conversing with patrons, the inflections of the voice when talking over the telephone; his attitude toward his fellows, his superiors and the company; his general appearance, habits and conduct, all have a great tendency to influence the public for or against the public utility company.

Every employee comes in contact with the public either in business or in private life, and it is essential to avoid as far as possible the employment of men who drink to excess or whose private life is such as to render them objectionable to the majority of their fellow citizens. Such men are always likely to be exceptionally slack in their personal appearance and are generally inclined to waste their own and the company's time discussing the acts of their superior officers and the company's methods, often in a derogatory manner.

DEALING WITH COMPLAINTS

Complaints should be handled promptly and efficiently, and to that end care must be taken that the full address of the complainant be taken, that he be told that an investigation will be made promptly of the result of which he will be duly advised, and without question he should be promptly informed of the result.

The writer frequently follows the practice of forwarding a letter setting forth the results of an investigation and attaching thereto all of the inter-department correspondence in order that the patron may know exactly what has been done. Sometimes it is necessary to inform the patron that he is at fault, and although most patrons dislike to be so informed, I believe that this can be done so diplomatically as to avoid offense and thereby make a complete settlement of the complaint without leaving the patron to feel that the company has not given it proper attention. One of the greatest errors which can be made is for a company to assume a responsibility which rests with the patron. Settlements of this character establish one precedent after another until the company is expected to bear the brunt of every complaint, no matter how unjust it may be.

Another error which nullifies respect for the company and its methods is to have complaints accepted in a cringing manner. It is far better to accept a complaint in a quiet, dignified manner. This often has a decided effect upon people who may be inclined to lodge unjust claims, and in all cases such a manner promotes respect. Another error is the use of the "Oh! Be joyful" or "back-slapping" method of receiving complaints. Generally a complaint is made because the complainant feels he has a real grievance, and he is not in a mood to do or accept much "jollying." Consequently he feels that the attitude of the company is not sincere, and he is therefore distrustful. Reserve your "Hello Ike, what's the matter now?" attitude for your intimate personal friends, and even then, be prepared to "square" yourself occasionally when "Ike" happens to be in deadly earnest and takes offense at your breezy manner. But the greatest mistake of all is to receive complaints in a manner indicating displeasure or with an intimation that the company's service is considered perfect. The first creates antagonism immediately, and the second creates distrust of the ability and intention of the company to maintain good service.

All employees should be taught to be keenly on the lookout for adverse comments or criticisms made in their presence or repeated to them by friends, and promptly to report such to the proper officials. Many of our patrons seem to abhor making complaints to the company, and frequently there is no knowledge by the company officials of anything radically wrong until the accumulated trouble bursts like a thunderclap upon the management. Often an employee may have casually heard of the trouble in its early stages, and a prompt report from him would have prevented serious ill feeling on the part of a large and rapidly increasing number of dissatisfied patrons.

It is astonishing to realize how many patrons, unassisted by the newspapers, will learn, remember and circulate adverse criticism of service while few will be equally diligent to advertise a good feature. Perhaps this is human nature. The floor managers of the best department stores and the managers or clerks of the best hotels frequently ask their patrons if they are being properly served, in fact, they invite criticism. They do this because experience has taught that it is one of the best methods to detect inefficiencies in the service. There can be no effective argument against the use of the same method by public service corporations. Such inquiries do more good for the cause than can be easily appreciated provided, of course, that merited criticisms so elicited are given due attention.

Complaints made after office hours should not be neglected. What is more irritating than to have the electric lights go out, the gas pressure drop, or the street cars stop, and, then, upon telephoning for information, to be told by the operator "The office is closed," or "They do not answer." The telephone directory, at least, should indicate some department or individual who can be called after office hours if the revenues do not permit the expense of keeping a man on duty under pay. The organization should be such that this feature of the service is not handled in a slipshod manner, as is too often the case. The one appointed to this duty should not leave his telephone unattended without arranging to have calls transferred to a substitute selected for that particular purpose.

PUBLIC UTILITIES AND POLITICS

In conclusion, I desire to say a word regarding the relations between the public service corporations and governmental bodies. I fully believe that honest, businesslike and dignified dealing, without fear or favor, will eventually overcome any prejudice which may exist, with the final result that both parties concerned will approach each negotiation with open minds and each will gain by the transaction. Any self-seeking politicians, members of such a body, whether or not they constitute a majority, must eventually cease persecution of any corporation if the latter earns a reputation for square dealing, good service, and a desire to please its patrons. The constituents of such politicians must eventually enforce justice.

It is gratifying to be able to say that public service corporations are, and have been for several years, conducting their affairs along the lines indicated in this paper, but there is still room for improvement, and no doubt, future improvement will be rapid as advanced methods are suggested and invented.

SOME RESULTS OBTAINED FROM A "SAFETY FIRST" MOVEMENT

BY M. A. WELSH, JR., WATERLOO, CEDAR FALLS & NORTHERN RAILWAY

The "safety first" movement on electric railways was inaugurated through a genuine desire to eliminate as far as possible the hazards to all men engaged in the use and operation of the lines. The movement was planted upon the propositions that everything must be subordinate to safety, and that success in reducing accidents to a minimum depended upon the co-operation of the three classes whose interests are involved—namely, the railway management, the employee and the public.

This movement exacts from the railway management, as regards the employees, a full compliance with the rule of master and servant, in that the company must furnish a safe place in which to work, safe tools and a sufficient number of competent workmen to assist in carrying on the work. The railway's obligation to the public necessitates the highest degree of care, in that it must furnish safe and suitable equipment, a safe roadway, safe employees and safe methods and practices. In connection with the obligations of the employees and their relation to the "safety first" movement, it may be said that the employee owes it to himself and to those dependent upon him to guard well his own safety and not to expose himself to unnecessary hazards. He also owes a duty to his fellow workmen to guard their safety at all times. Furthermore, he owes it to the railway and the public to comply with the established rules and regulations and to refrain from practices that expose to hazard those entrusted to his care. The public for its part should exercise care for its own safety while in and around trains. Simply reasonable care by it will cause a decided decrease in the number of accidents.

The Waterloo, Cedar Falls & Northern Railway, in inaugurating the "safety first" movement, first conducted a campaign with the management, then with the employees and finally with the public. By the company carrying on a campaign with the management is meant the sanctioning of safety methods and appliances and the authorizing of the necessary expenditures for their adoption. Some of the following examples of what the management has caused to be done will show that the "safety first" movement is something more than a literary effort.

The interurban cars on regular schedules are relieved every third day and sent to the shops for a general complete inspection and correction of any defects. This is in addition to the regular daily inspection at the carhouse. The foot gongs on the interurban cars have been supplanted by the air bell ringer, and the valve controlling this bell ringer has been placed so that it is in the most convenient place for the motorman's foot.

In one of the interurban districts, where the curvature is especially sharp at two or three curves, and no block signals have been provided, safety stops have been installed for all trains in both directions as a protection against the danger of collision. The company believes that its trainmen are just as careful and just as qualified to handle trains as any other trainmen, but it recognizes that the "human factor" enters into the execution of train orders. There are also eleven safety stops on the local lines, most of them having been put in on account of heavy vehicular traffic.

Mirrors have been placed on both sides of the exterior of the forward end of interurban and package cars, which are single-end operation. These mirrors enable the motorman at all times to command a view of the rear step while the car is standing or in motion, and also give him a view of any person or object in close proximity to the car as it is swinging around a city corner. The accidents formerly caused by the car body (58 ft.) or the rear step of the car striking a person or object at corners have been nearly eliminated.

On local city cars, which are double-end operation, we have a motorman's mirror at each end of the car, on reverse sides. The mirror has practically eliminated the boarding or "premature start" accident, and has reduced the danger of the alighting accidents. We still have about the same number of alighting accidents, but they seem to be attended with less severe injuries and most of them with no injuries, for if a person appears on the step as the car starts, the motorman very often notices it in the mirror and stops the car. On the other hand, in the operation of the cars without the mirrors the motorman was in ignorance of what was occurring on the rear step, and probably increased the speed of the car just as the person was about to step off, thereby aggravating the accident.

In connection with the alighting accident, it was found that our car steps were too high, and arrangements were at once made to lower them to a more suitable position. Moreover, spring switches have been installed on city lines wherever practicable, to obviate the necessity of conductors absenting themselves from the platform while handling switches, thereby reducing the number of alighting as well as boarding accidents.

Concerning the matter of accidents that occur where autos, buggies and farm wagons are struck by trains at highway grade crossings in the rural districts, it seems that one "Danger, Look Out for the Cars" sign close to the track, such as is used in many cases, is not sufficient to protect the approaches to the track from both directions. Travelers on the highway, especially at night, encounter the track first and then the warning, provided they have not in the meantime encountered the train. The railways themselves recognize as an absolute necessity, wherever their tracks cross another railway at grade, that signs be maintained at both approaches to this grade crossing 800 ft. back to call it to the engineer's attention every time he passes over that section of track, that he will encounter the railway crossing within the 800 ft. If such a precaution is necessary as far as their own trains are concerned, it should also be necessary as regards autos and vehicles traveling on the highway. We have erected at rural highway crossings and also at outlying street crossings in the city limits, crossing signs at both approaches and have supplemented these with other signs located 300 ft. back on the highway in both directions. These signs read, "Danger—Railroad Crossing 300 ft." We have not had a highway grade-crossing accident since their installation.

At the ends of all of our local lines, where arc lights are not maintained by the city, the company has installed electric light clusters. Semaphores, train order signals, switches, shop yards, station platforms, carhouses and yards, as well as most of the wayside stops, are electrically lighted.

All buildings and structures on the waylands of the company that did not permit of sufficient clearance have been moved back, with the possible exception of stock chutes. On new construction of overhead lines, sufficient clearance is provided to permit a trainman to go over a train in safety.

Sub-station operators are forbidden to attempt to do any work on machinery other than that in connection with their duties of starting and stopping their machines, all other work being done by traveling electricians.

Guards have been placed on all machinery at the shops and arrangements are being made to furnish goggles to all employees in different departments whose duties require them to do work or be in and around work that exposes the eyes to injury.

We have formerly had some accidents on account of cars striking pedestrians who were trespassing on our bridges. To overcome these accidents, sidewalks, protected by railings, have been constructed on each side.

This company carries on semi-monthly safety meetings and business meetings with its trainmen. A plan was worked out by the management about two years ago, whereby the company and the trainmen contribute equal amounts for the maintenance of a sick benefit fund. The men pay 50 cents a month for the maintenance of the association. Under this arrangement, every man in our train service department is a member of the association, and if disability through illness necessitates his absence from service he is paid $9 per week during such disability, the payments continuing through a period of thirty-six weeks. Claims are paid for sickness as well as for accidents.

One illustration will suffice to show how the trainmen are interested in the safety movement. Some few months ago a conductor employed in one of our districts was fairly popular with the men. He became lax, however, in the reading of his train orders, the handling of blocks, flagging of crossings, etc., and some of the trainmen called his attention to this. Finally, when no improvement was made, a committee of three motormen signed a joint letter addressed to the superintendent, asking that he dismiss this man, as they did not feel that he was a safe man for the company's service.

We have carried on an extensive safety campaign with the general public and also with the school children. During this campaign we circulated 120,000 blotters to the business houses, residences and schools at all stations on our line. There were eleven different series of these blotters, each containing a different illustration of how accidents occur and suggestions for preventing them. We had large cards containing illustrations and suggestions posted in all of the local and interurban cars on the line and in conspicuous places in the waiting stations, heavy traffic points, etc. We made a contract with one of the prominent morning newspapers whereby it was to handle 10-in. cuts and copy on the first page every other morning. We also had attractive slides made containing illustrations of accidents. These were exhibited for ten weeks at moving picture theaters at different points along the line, a slide of a different series being furnished every week. In order to make these slides most effective, we used a short, snappy phrase that could be instantaneously grasped.

All public and parochial schools on the line were visited every week and the matter of safety was taken up with the principals and the teachers. We succeeded in securing the co-operation of every teacher in every town along the line. In some schools the principal, attracted by the idea of safety, had the pupils write compositions on that subject.

As the campaign with the public and school children was nearing an end, we offered prizes to the school children who would write the best twenty rules which, if followed by the public, would prevent accidents and injuries. The contestants were divided into three groups, as follows: Group 1 consisted of the pupils in the seventh and eighth grades; Group 2 of the pupils in the fifth and sixth grades, and Group 3 of the pupils in the third and fourth grades. Three prizes were given for each group, as follows: First prize, $15; second prize, $10 and third prize, $5.

We issued circulars through the principals of the schools to all school children, advising them of the rules of the contest. One was that the papers were not to be prepared in school or during school hours, but at home. The reason for this was that we did not wish to take the children's minds away from their studies and thereby lose the co-operation of the school officials. Furthermore, in this way there would be a general discussion by all members of the family which would not only bring home to the child the things to be done to avoid danger, but would also impress them upon the other members.

At the close of this campaign we received 199 compositions. Some showed a great deal of thought, and some offered suggestions which we ourselves possibly had not thought of in conducting the campaign. About 90 per cent of the rules submitted were the ones we had originally suggested in the campaign. At the close of the campaign, we requested that the parents bring in the photographs of the successful contestants and we contracted for a full page in the daily papers and published all of the photographs, together with the rules submitted.

The delight of a tort lawyer has always been to tell a jury how little railways care whether there are accidents or not, so long as they are not financially responsible for them. The inaugurating of a safety campaign such as described, however, convinces the public that electric railways do really care whether accidents happen. It is something to the public to know that the companies are making an honest effort to cut down the accidents regardless of the financial proposition. Public opinion is a thing that can become either an asset or a liability with a railway or public service corporation, and a properly conducted safety campaign can do much toward capitalizing it as an asset.

Car Lighting and Track Construction Discussion at Boston

The New England Street Railway Club Has an Extended Discussion of Car Lighting Progress and an Informal Interchange of Ideas Regarding Maintenance of Way Practice

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, Mass., on April 23, with President John T. Conway in the chair. After the usual dinner ten new members were elected. The subject for the evening was "Recent Progress in Car Lighting," the principal speaker being George H. Stickney, illuminating engineer, Harrison Works, General Electric Company.

Mr. Stickney said that the need of better illumination in street cars had been recognized for nearly a decade, pointing out that an editorial in the STREET RAILWAY JOURNAL of Dec. 10, 1904, called attention to the defects of car lighting practice at that time and sketched the advance of high efficiency lamps into the field. The reasons for installing better lighting are based upon safety, comfort and advertising value. New cars can be provided with good illumination at a lower operating cost than by the older methods of lighting, and it pays gradually to rewire old cars. The 23-watt lamp gave 10 per cent more light than the old 64-watt carbon lamp, unit for unit. Many companies have used the 36-watt lamp. The cost of renewals was at first high in the case of the 23-watt lamps, but with decreasing prices the cost of lighting will soon be on a par with the expense of using carbon lamps. The evils of glare in car lighting are less than in residential lighting on account of the shielding effects of hats. The speaker described the experiments of the Bay State Street Railway in applying 60-watt and 56-watt lamps with prismatic reflectors to 28-ft. and 34-ft. cars, and referred to the illustrated article upon this subject which appeared in the ELECTRIC RAILWAY JOURNAL of Sept. 28, 1912. Since this installation was made no reason has been seen to change its illumination characteristics, although much study has been given to reflector and holder design for railway service, and the manufacturers have improved the lamps mechanically.

The latest design of holder, which is the result of exhaustive study and conferences participated in by the Bay State Street Railway and the manufacturers, consists of a four-part metal device in which the reflector is clamped in place and locked against becoming loose by a bayonet joint. A flange hanging down below the reflector guards against dropping, and an extra ring is provided which reinforces the bayonet joint and holds the reflector snug, preventing rattling. A marine screw thread is also used in the socket, which gives the lamp a slight amount of play and softens the jar of the running car. The advantages of the new holder are that it supports the shade from below independently of the lip of the latter, that the glass cannot fall unless broken in pieces, that the shade is held rigidly in place, that it is convenient and safe to wire, and that it is easy to remove for cleaning and affords ample space for the use of a strong, well-designed socket. Mr. Stickney also briefly described the experimental installations of high-efficiency lamps in Cleveland, Athol, Mass., Washington, D. C., Portland, Me., and elsewhere. He figured a saving in initial cost of about $7 per car by using 56-watt lamps, compared with one circuit each of 94-watt and 23-watt lamps, with a saving of about 10 per cent in operating expense. Closing, he urged the importance of regular cleaning and the use of light finishes in the upper portions of cars as aids to better illumination. Reflectors left unclean often absorb 50 per cent of the light flux.

DISCUSSION

C. O. Bond, Philadelphia, president of the Illuminating Engineering Society, contended that an intensity of illumination of 2 ft.-candles is high enough for railway service on the reading plane. He advocated designing reflectors for use in cars giving a light distribution about halfway between the intensive and extensive curves. Preston S. Millar, Electrical Testing Laboratories, New York, advocated testing all lamps new to railway service before putting them on the cars. He believed that the tungsten lamp has been improved in strength until it is nearly of the same order of ruggedness as the carbon lamp. More attention should be paid to studying the principles of scientific illumination, with particular reference to the psychology of contrast.

J. Walter Allen, acting electrical engineer, Boston Elevated Railway, said that 23-watt lamps have been generally substituted for 64-watt carbon lamps on the Boston system, but that the life of the former was not as great as anticipated. Tungsten lamps are not adapted at present to the hard service of pit lighting by portable units. The speaker suggested the desirability of manufacturing tungsten lamps for air-gage lighting to be run in series with the other lamps.

L. C. Doane, chief engineer Holophane Works, Cleveland, Ohio, presented curves of light distribution for different types of reflectors, including clear prismatic glass, heavy, medium and light-density opals. The first-named has a total light efficiency of 57.4 per cent in the useful zone, and the other types run lower. Reflectors should be designed for railway service so that as much light as possible is cut off from the eye between the angles of 0 deg. and 22 deg. in the line of sight. Cleaning is easier with opal reflectors than with the prismatic type, although the latter is the more efficient. The speaker gave the following figures of relative cost for three designs adapted to a car with a 28-ft. body and an inside width of 7 ft. 6 in., the intensity of illumination being the same in each case.

	Yearly Costs,		
Car Equipped with	Energy for Lighting	Lighting Service Maintenance	Investment per Car
50-watt Gem lamps	$26.10	$6.87	$26.76
23-watt Mazda lamps, heavy density opal reflector	12.00	5.75	47.97
Five 56-watt Mazdas, prismatic reflector	10.17	3.34	26.86

Estimates prepared for illuminating 1000 elevated railway cars in Chicago with 56-watt lamps used bare, with heavy density opal reflectors, and with prismatic reflectors, show that the use of opal reflectors saves $11,438 per year as compared with the bare lamp, and that the prismatic reflector will save $18,318 per year over the first-named.

S. G. Hibben, Macbeth-Evans Glass Company, Pittsburgh, Pa., pointed out that two years ago about 3 per cent of the 200,000 cars in service were regularly equipped with tungsten lamps and any form of reflectors. A year ago carbon-filament lamps were in use on 60 per cent of the cars; bare graphitized lamps on 10 per cent, and tantalum and tungstens together on 28 per cent. To-day it is estimated that at least fifty companies are using the most highly developed system of tungsten lamps and glass reflectors, while 100 companies are experimenting with such units and more than a majority have discontinued carbon lamps. The campaigns of railway companies also operating central-station lighting systems cannot have their full effect nor their best returns when such companies themselves maintain inefficient and optically unhygienic car-lighting installations. In Cleveland the use of tungsten lamps with Alba reflectors in place of bare carbon lamps increased the light on the reading plane from 2.2 ft.-candles to 4.1 ft.-candles, cutting down the energy expended from 3.91 watts to 1.31 watts per square foot of car floor. In another test the available illumination was increased 62 per cent. The following table is also typical:

	Carbon Lamps, No Reflectors	Tungsten Lamps, Alba Reflectors
Lamps used, body and rear platform	25 64-watt	5 94-watt
Lamps used, signs, headlight, front platform	5 64-watt	5 23-watt
Energy consumed, body and rear platform	1600 watts	470 watts
Energy consumed, signs, headlight, front platform	320 watts	115 watts
Cost of lamps, body and rear platform	$2.68	$2.56
Cost of lamps, signs, headlights, front platform	$0.54	$1.10
Cost of energy, body and rear platform, year	$48.00	$14.10
Cost of energy, signs, headlight, front platform	$9.60	$3.45
Total, energy and renewals, 2000 hours	$60.82	$21.21

Lamp cost figured as renewal cost for 2000 hours' life for tungstens, 800 hours to carbons. Energy cost at car, 1.5 cents per kw-hr.

The estimated cost of dusting reflectors is 60 cents per car per month, and of washing, $1.25 per car per month, the latter being done every two weeks.

L. C. Porter, Harrison, N. J., said that tests in Chicago showed that a change in car ceiling decoration from pea green to light buff increased the utility of the illumination 50 per cent. E. G. Haynes, Bay State Street Railway, Boston, said that 110-volt fittings are satisfactory for series circuits in car lighting and that the cost of wiring for a modernized illumination service is liable to vary from $2 to $30 per car. The total cost of equipment with the most efficient lamps sometimes rises to $50 per car.

E. W. Holst, superintendent of equipment, Bay State Street Railway, said that the most difficult features of the lighting modernization work in his charge were the short life of the lamps and the design of a safe reflector. The cost of providing a new car with modern illumination need not exceed the expense of the older type of lighting, but the total cost of changing over old rolling stock runs from $10 up per car. The "1909" type of Bay State cars was designed to meet the demands of modern lighting, so that the cost of changing over has been nominal here. On older cars wired with three circuits of 16-cp lamps and two of 8-cp lamps, the cost has been heavier. The 56-watt lamp gives better life results than the 23-watt unit, and saves in the number of lamps needed. Substituting ten tungsten lamps for twenty-five carbons saves in a representative calculation 720 watts per car, or $32 per car per year in energy, burning the lamps seven hours daily in winter and four hours in summer. The average life to be expected from the 56-watt lamp is 1400 hours against about 400 hours with the 23-watt unit. The entire Bay State system is gradually being changed to the 56-watt standard.

Concluding the discussion, Mr. Stickney said that it is not necessary to provide the maximum illumination close to the side of the car as reading matter is seldom held less than a foot away from the side. In a stationary position the 23-watt and 56-watt lamps are rated for the same life. The relative efficiencies are 1.3 watts and 1.16 watts per cp. Regarding gage lights, it is possible that a low-voltage lamp designed to run in series with the other lamps of the car could be designed if there is a sufficient demand for these. Where a company has a large number of car types in service the lamp size should be a compromise to avoid duplicating stocks. So far the demand for 94-watt lamps has been small, the 56-watt lamp meeting a wide range of conditions. Further reductions in the cost of tungsten lamps are likely to be made in the near future.

MAINTENANCE OF WAY MEETING

A "Question Box" meeting at which maintenance of way matters were aired preceded the regular club dinner, this being an innovation in the club procedure which was much appreciated. H. M. Steward, chief engineer maintenance of way Boston Elevated Railway, and David Curtin, roadmaster Bay State Street Railway, submitted to an informal cross-examination in a half-hour session late in the afternoon, members being privileged to ask questions freely regarding the topic assigned. Under tie treatment, Mr. Steward said that the Boston Elevated Railway is now having all new ties treated at a commercial plant in Florida with from 6 lb. to 10 lb. dead oil of tar per cubic foot of timber, the vacuum process being used. Long-leaf hard pine is employed. Ties are bored and screw spikes are used, the holes being filled with hot creosote at the company's yard. Ties are purchased hewed, and a machine takes care of adsits and boring at the rate of four to six ties per minute. The screw spikes are tapered at the top and hence keep the water out. On all new permanent track screw spikes are employed. Hot creosote is applied where any preservative material has been removed by the machine treatment. The cost of treating is perhaps 15 cents to 20 cents per tie, and while no guarantee of life is obtained, it is hoped to extend the life from 25 per cent to 50 per cent by the treatment. A recent examination of untreated ties which had been imbedded about twelve years in concrete showed that the material was reduced to a dry pulp.

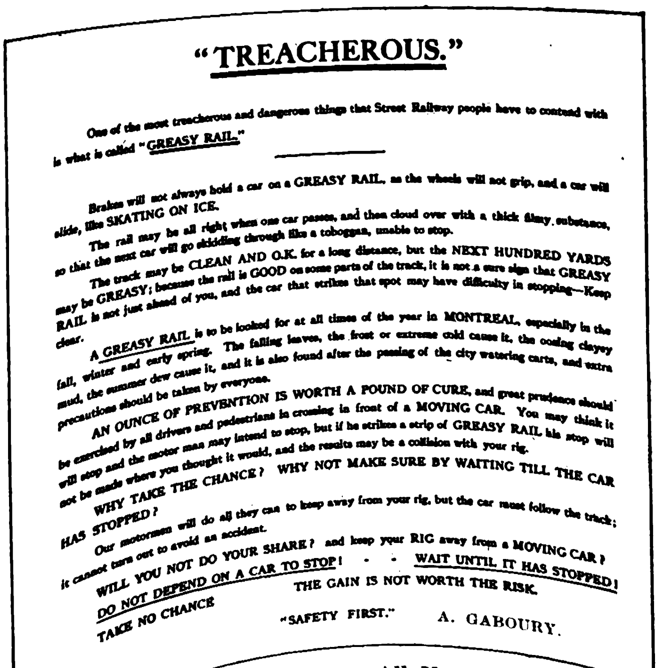
Mr. Curtin said that $3 per foot is a fair figure for the cost of track built of 75-lb. T-rail, laid with 8-ft. ties, 24 in. on centers, with gravel foundation. The Bay State company has never been able to secure records of the life of treated ties. Chestnut ties from Maryland and Virginia costing 60 cents to 65 cents each, f.o.b. Boston, are used extensively by the company, but indigenous ties are preferred. With 9-in. girder rail construction and covered track the tie lasts as long as the rail. Electric welding has proved most satisfactory in the Bay State company's experience. The speaker suggested that a reduction in the price of thermit welding is desirable in view of the 50 per cent lower charges made abroad for this work. The importance of extreme care in handling cast-welding of joints was emphasized by both speakers, especially in setting screws, good results being attained by getting the joint 1/16 in. high and grinding it down. Cupping in continuous joints has been found due to low carbon content in the material. The only remedy in an installation where this occurred was to grind the joint to a slight depression. Mr. Curtin said he had welded a mile of track in a paved street but that breaks occur in unpaved streets. A breakage of 2 per cent to 3 per cent in electric and cast-welded joints may be expected. Failures can be reduced by putting in expansion joints every 1000 ft. or so in unpaved streets where the track is exposed to temperature changes.

"SAFETY FIRST" PUBLICITY AT MONTREAL

The Montreal Tramways has recently inaugurated a "safety first" campaign which is meeting with the most gratifying aid from the local French and English papers and co-operation from the railway's employees and the owners of vehicles. The work is in charge of A. Gaboury, superintendent, who has issued an effective line of literature on the subject. He first prepared a series of notices to the platform men in which emphasis was placed on the connection between "safety first" and obedience to the rules and regulations. This was followed by a personal letter addressed to each employee at his home. The letter announced that an accident prevention campaign was to be inaugurated and asked for the cordial help of the individual addressed. A second letter to the platform men, issued under date of April 13, called attention to the fact that as the household moving season was at hand, special care should be taken to avoid collisions with loaded rigs because projecting furniture could be easily broken through careless sidewipes. (Mr. Gaboury has since suggested that moving vans be furnished with red tail-lights.) This letter was accompanied by a blue folder for motormen or a pink folder for conductors. Each folder contained about twenty pertinent suggestions and was really a miniature rule book.

The first announcement to the outside public was a letter which was sent to all transfer, carriage and express companies and to mercantile concerns employing a large number of drivers. This letter stated that drastic instructions had recently been issued to the motormen to observe special precautions toward vehicles and rigs, but the recipient was asked to show the proper spirit of "give and take" to insure freedom from accidents.

As greasy rails are a common cause of collisions, Mr. Gaboury prepared a special circular on this subject, entitled "Treacherous," and sent it to all vehicle operators together with a bi-lingual folder. Both of these publications are reproduced. A similar letter with the same inclosures was sent to all holders of vehicle license. In all some 30,000 letters have been sent out, and the replies were unanimously in support and encouragement of the movement.



"TREACHEROUS."

One of the most treacherous and dangerous things that Street Railway people have to contend with is what is called "GREASY RAIL."

Brakes will not always hold a car on a GREASY RAIL, as the wheels will not grip, and a car will slide, like SKATING ON ICE.

The rail may be all right when one car passes, and then cloud over with a thick filmy substance, so that the next car will go skidding through like a toboggan, unable to stop.

The track may be CLEAN AND O.K. for a long distance, but the NEXT HUNDRED YARDS may be GREASY; because the rail is GOOD on some parts of the track, it is not a sure sign that GREASY RAIL is not just ahead of you, and the car that strikes that spot may have difficulty in stopping—Keep clear.

A GREASY RAIL is to be looked for at all times of the year in MONTREAL, especially in the fall, winter and early spring. The falling leaves, the frost or extreme cold cause it, the oozing clayey mud, the summer dew cause it, and it is also found after the passing of the city watering carts, and extra precautions should be taken by everyone.

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE, and great prudence should be exercised by all drivers and pedestrians in crossing in front of a MOVING CAR. You may think it will stop and the motor man may intend to stop, but if he strikes a strip of GREASY RAIL his stop will not be made where you thought it would, and the results may be a collision with your rig.

WHY TAKE THE CHANCE? WHY NOT MAKE SURE BY WAITING TILL THE CAR HAS STOPPED?

Our motormen will do all they can to keep away from your rig, but the car must follow the track; it cannot turn out to avoid an accident.

WILL YOU NOT DO YOUR SHARE? and keep your RIG away from a MOVING CAR?

DO NOT DEPEND ON A CAR TO STOP! - - WAIT UNTIL IT HAS STOPPED!

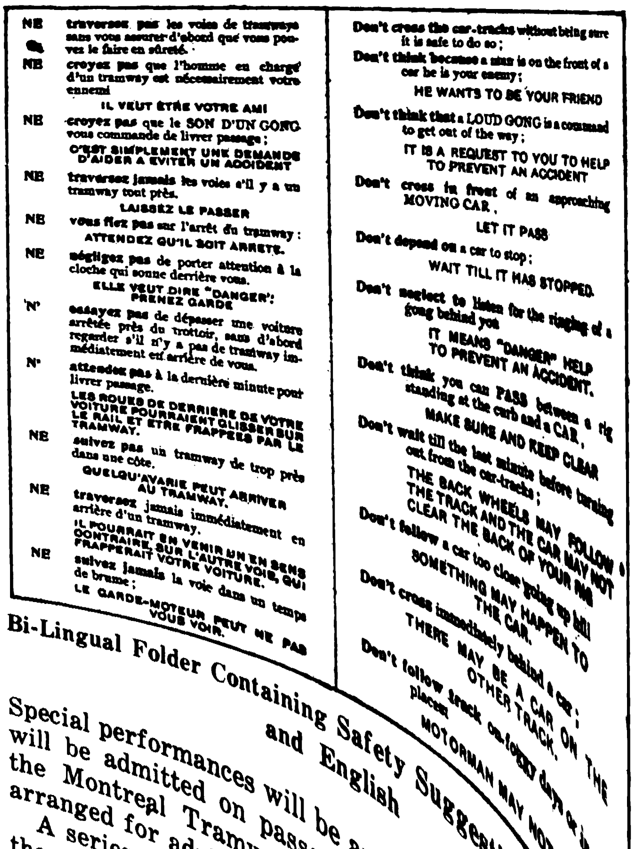
TAKE NO CHANCE THE GAIN IS NOT WORTH THE RISK.

"SAFETY FIRST." A. GABOURY.

Circular on Greasy Rail Sent to All Users and Owners of Vehicles

FUTURE DEVELOPMENTS

The correspondence and general literature distribution just described is only a beginning in the Montreal "safety first" work. The company is planning to display all moving picture films bearing on street accidents and also to have entirely new ones made for the purpose. The pictures will be shown in the club quarters of the tramways employees and in the leading moving picture theaters. The views will be made as realistic as possible but without gruesome details that might repel children. Music and other features will be introduced to prevent the exhibitions from becoming monotonous.



NE traversez pas les voies de tramways sans vous assurer d'abord que vous pouvez le faire en sûreté.

NE croyez pas que l'homme en charge d'un tramway est nécessairement votre ennemi

IL VEUT ÊTRE VOTRE AMI

NE croyez pas que le SON D'UN GONG vous commande de livrer passage;

C'EST SIMPLEMENT UNE DEMANDE D'AIDER A EVITER UN ACCIDENT

NE traversez jamais les voies s'il y a un tramway tout près.

LAISSEZ LE PASSER

NE vous fiez pas sur l'arrêt du tramway:

ATTENDEZ QU'IL SOIT ARRETE.

NE négligez pas de porter attention à la cloche qui sonne derrière vous.

ELLE VEUT DIRE "DANGER": PRENEZ GARDE

N' essayez pas de dépasser une voiture arrêtée près du trottoir, sans d'abord regarder s'il n'y a pas de tramway immédiatement en arrière de vous.

N' attendez pas à la dernière minute pour livrer passage.

LES ROUES DE DERRIERE DE VOTRE VOITURE POURRAIENT GLISSER SUR LE RAIL ET ETRE FRAPPEES PAR LE TRAMWAY.

NE suivez pas un tramway de trop près dans une côte.

QUELQU'AVARIE PEUT ARRIVER AU TRAMWAY.

NE traversez jamais immédiatement en arrière d'un tramway.

IL POURRAIT EN VENIR UN EN SENS CONTRAIRE, SUR L'AUTRE VOIE, QUI FRAPPERAIT VOTRE VOITURE.

NE suivez jamais la voie dans un temps de brume;

LE GARDE-MOTEUR PEUT NE PAS VOUS VOIR.

Don't cross the car-tracks without being sure it is safe to do so;

Don't think because a man is on the front of a car he is your enemy;

HE WANTS TO BE YOUR FRIEND

Don't think that a LOUD GONG is a command to get out of the way;

IT IS A REQUEST TO YOU TO HELP TO PREVENT AN ACCIDENT

Don't cross in front of an approaching MOVING CAR.

LET IT PASS

Don't depend on a car to stop;

WAIT TILL IT HAS STOPPED.

Don't neglect to listen for the ringing of a gong behind you

IT MEANS "DANGER" HELP TO PREVENT AN ACCIDENT.

Don't think you can PASS between a rig standing at the curb and a CAR,

MAKE SURE AND KEEP CLEAR

Don't wait till the last minute before turning out from the car-tracks;

THE BACK WHEELS MAY FOLLOW THE TRACK AND THE CAR MAY NOT CLEAR THE BACK OF YOUR RIG

Don't follow a car too close going up hill

SOMETHING MAY HAPPEN TO THE CAR.

Don't cross immediately behind a car;

THERE MAY BE A CAR ON THE OTHER TRACK.

Don't follow track on foggy days or in damp places;

MOTORMAN MAY NOT SEE YOU.

Bi-Lingual Folder Containing Safety Suggestions in French and English

Special performances will be arranged for chil[illegible] will be admitted on passes supplied to the [illegible] the Montreal Tramways. Performances [illegible] arranged for adults.

A series of weekly meetings is to be [illegible] the employees, at which Mr. Gabou[illegible] lectures on accident prevention. [illegible] competitions for the men in acci[illegible] ures will be instituted, branches [illegible] first-aid society will be established [illegible] will be provided with small [illegible] and French the phrases "Safet[illegible] Garde." Such notices are [illegible] street car, on street pole [illegible] ous company buildings, [illegible] the owners will permit [illegible] and stationery of the [illegible] be supplied with [illegible] will be presented [illegible] ers, erasers, etc., [illegible] possible, illustrating [illegible] lessness. In [illegible] sporadic but [illegible] and made more [illegible] the enthusiasm [illegible]

Fred I. Ra[illegible] Railway, del[illegible] cently in Deli[illegible] latest ty[illegible] local b[illegible]

Valuation and Rate Making Principles and Precedents

Abstract of Brief Presented to the Public Service Commission of Missouri in Valuation Case of the Springfield (Mo.) Gas & Electric Company and the Springfield (Mo.) Traction Company

A case now pending before the Public Service Commission of Missouri between McGregor-Noe Hardware Company et al. and the Springfield (Mo.) Gas & Electric Company and the Springfield (Mo.) Traction Company is of decided interest because in it are involved valuation and rate-making issues that are highly important in the electric light and electric railway fields. The decision in the case will probably take its place as a precedent in these matters for all classes of public utilities in the State.

The case was the result of application by different copartnerships and corporations in Springfield for the relief under the newly passed public utility act against the Springfield Gas & Electric Company. Although the Springfield Traction Company is joined, relief is simply sought from alleged excessive rates for electric service. It is stated that the Springfield Gas & Electric Company does not own any power plant or station for the manufacture of electric current or energy, but that the plant is the property of the traction company and that the lighting company has intermingled its business with that of the traction company and is able to discriminate in favor of certain customers. The company has answered all the issues raised by the complaint and has presented a brief which is an exhaustive résumé of appraisals and previous decisions involved in the subject of valuation and rate-making. Four primary questions are considered in the brief: (1) What value of the property of the company should be used as a basis of reasonable return? (2) What shall be the allowance for depreciation reserve? (3) What is the proper rate of return? (4) What are the proper operating charges? The abstract of the treatment of these points in the brief follows:

BASIS FOR REASONABLE RETURN

The difference between the rights of a quasi-public service corporation and those of private corporations as to the use of their property is simply this. As to the latter, the right of use and hence to a return thereon is not limited as to the amount of such return, it not being the public concern whether it is more or less than is reasonable. As to the former, however, after the point of reasonable return is reached, the limitation upon the property becomes a matter of public concern and subject to regulation and limitations. There seems to be a prevalent notion that a property devoted to public use is to a large extent public property, but such is not the law. As stated in Consolidated Gas Company vs. New York, 157, Fed. 849, "The property under consideration is as much the private property of the complainant as are the belongings of any private citizen." The property of a public utility cannot be taken without just compensation or without due process or in denial of the equal protection of the law, and as the use of the property up to the point of a reasonable return thereon is a property right entitled to a similar protection, it is manifest that any order prescribing rates that do not afford to the utility a reasonable return upon all its property, of whatever nature, that is embarked in the public business would operate as an unconstitutional interference with property rights. Hence the ascertaining of the value of the property of a public utility means the ascertainment of the whole value, intangible elements as well as tangible.

PRESENT VALUE OF THE INVESTMENT

The brief states that the valuation question is not one of original investment or of present investment, using these terms in a sense of capital outlay, although such investment may be a very persuasive evidence of present value. If the actual investment is less than the present value a return upon the investment alone denies the right to the use of the difference between the amount of the investment and the present value and hence impairs the property right to a reasonable return upon the whole. In Smith vs. Ames, 169 U. S. 468, Louisville & Nashville Railroad vs. Railroad Commission, 196 Fed. 800-820, and other decisions the doctrine has been sustained that a fair return must be based on the reasonable value of the property at the time it is being used for the public. The original cost of construction and the amount expended in permanent improvements, the present condition of the plant, the amount and market value of bonds and stocks, the present cost of construction or reproduction, the fact that the plant is a going concern with an established business and actual depreciation of value, may all be considered. These different elements, however, are merely evidences bearing on the ultimate question of present value and have more or less force according to the circumstances of particular cases.

If a plant has just been sold and the purchase was made in good faith by a party dealing at arm's length, doubtless the sale price would be conclusive evidence of present value. If a plant were just completed and had been constructed under normal conditions and lacked any attached business, doubtless the construction cost would be a very controlling evidence of present value. Where, however, such a definite criterion of value is absent, other evidences of value must be resorted to, and there may be properly taken the reproduction cost new of the physical property with additions for such of the above elements as have not been included in the reproduction cost of the physical plant, and with proper deduction for deterioration or existing actual depreciation. The inquiry along the line of reproduction should be limited to the replacement of the present system by one substantially like it—that is, the present value of the present or existing plant should be determined and not the value of some hypothetical, imaginary or phantom plant.

ELEMENTS TO BE INCLUDED

The reproduction cost new obviously furnishes no measure of actual value unless it embodies all legitimate elements of value, whether tangible or intangible. To take from the utility the use of any element of value is to take property itself in violation of property rights. If the property of a utility is taken by condemnation or through purchase by a municipality, no element of value attaching to it can be ignored in fixing the compensation to be paid. Courts and commissions have held, however, that any element of value to be considered in proceedings for condemnation purposes must also be considered in ascertaining value as a basis for rate-making. This is established by such decisions as National Water Works Company vs. Kansas City, 62 Fed. 865; Kennebec Water Works vs. City of Waterville, 54 Atl. 6, and Long Branch vs. Tintern Water Company, 62 Atl. 474.

REPRODUCTION COST NEW OF PHYSICAL PART OF PLANT

A number of witnesses in the present case defined the reproduction cost new of the physical property as follows: "The reproduction cost is based upon the assumed re-creation or substitution of an identical new plant at present prices according to the existing apparatus, specifications, assuming reasonable diligence and methods and a reasonable period of time in construction." The brief discusses the point of whether in applying the reproduction method the appraiser should proceed upon the theory that the work is to be done under wholesale continuous construction. Various authorities, such as Mr. Hayes in his work on public utilities, State Journal Printing Company vs. Madison Gas & Electric Company, 4 W. R. C. R. 501, 548, Hill et al. vs. Antego Water Company, 3 W. R. C. R. 623, 634, recognize that allowance must be made in the unit price for the cost of piecemeal over continuous wholesale construction.

The reproduction method when properly applied by engineers of ability and wide and practical experience furnishes perhaps the most persuasive evidence of the present value of a utility plant, especially one of considerable age. The method is not based upon mere theory and hypothesis. There is little reason why engineers to-day, equally honest and having equal ability and practical experience, should not substantially agree in the appraisal of the physical part of the utility plant.

CONFUSION BETWEEN REPRODUCTION METHOD AND ORIGINAL COST METHOD

Unquestionably the two leading lines of proof to determine the present value of a utility are the reproduction and original cost methods. There is confusion, however, as to whether original cost means the amount of money paid originally for the first unit brought into service or the actual cost of the unit now found in service, which may be a replacing unit performing the same functions as the original unit. The problem seems to be to ascertain the amount actually paid for the particular unit in use. In the reproduction-new method the question is to determine the amount that the particular unit under present prices or average prices for the past five years and present conditions actually costs. Whether the one method or the other shall be applied in any particular case depends upon circumstances, but the reproduction method is mainly used because records of original cost are too often either defective or missing or when in existence contain many irrelevant items.

As regards the trustworthiness of the reproduction method when properly applied by engineers of ability and extensive practical experience, it has been found that the result reached by this method is in many instances practically the same as under the original cost method. When the two costs are far apart, the difference is mainly due to variation in the general price level of the elements which enter into the construction of the plant and the development of its business as between the time when the plant was first built and the time of the reproduction, although contingencies, mistakes of judgment and errors of various kinds may play important parts.

The two methods should be kept separate and distinct. Some engineers are contending that in applying the reproduction method "valuation should be based upon the physical conditions existing at the time the various portions of the property were built but at the prices prevailing at or near the time of valuation." This is an abandonment of the pure reproduction method, for it is a mixture of that method with the original cost method. Under the reproduction method the cost should be figured upon the basis of existing conditions. Against this estimate may be placed the actual original cost, if it can be determined, and other estimates based upon other lines of proof, but there is no logical or legal warrant for determining the cost by basing it on present prices applied to historic conditions.

THREE APPRAISALS OF PHYSICAL PROPERTY

The brief analyzes in detail the three appraisals of the physical property of the company made by W. J. Squires, F. P. Woy, and W. G. Woodfolk, of Sanderson & Porter. These men agreed upon the physical valuation of the buildings and power house and apparatus, except as to piping, as to overhead cost and as to the distribution system. Mr. Woy applied unit prices for piecemeal construction instead of wholesale construction of the distribution system. Instead of using the present market prices for labor and material, however, he used, as far as possible, actual cost to the company arrived at by an average of such cost for a period not exceeding, except in a very few cases, the last five years.

PRESENT VALUE OF LANDS VERSUS ORIGINAL COST

One of the questions that the brief discusses in connection with the appraisals submitted is the recognition of the unearned increment of land in the valuation of public utilities for rate-making purposes. There is a tendency among certain engineers toward the doctrine that land should be valued not at what it is worth at present, but at what it actually costs. It is the unanimous ruling of courts, however, that in determining reproduction cost new, the plant must be figured at its present value, although this may be six times its original cost. The argument that a utility does not expend the amount of money upon which it is now paying the rate of return in securing the land in question, is not determinative, for as a rule the utility does its full share in all matters pertaining to the social and economical growth of the city. There is no definite occasion for depriving it of important increments of appreciation while loading it with increments of depreciation.

OVERHEAD COSTS

The overhead costs supposed to be considered by the appraisers include the following: (a) contractors' services and expenses; (b) engineering and supervision; (c) administration and management; (d) omissions; (e) incidentals and contingencies, and (f) insurance, fire, casualty and builder's risk. The average allowance by Mr. Squires for overhead for the entire plant, exclusive of land, was 10.38 per cent. Mr. Woy allowed an average percentage on all parts of the plant other than land of 15.15 per cent. The average overhead percentage determined by Mr. Woolfolk was 17.13 per cent. These percentages would be correspondingly less if the value of real estate was included, and a comparison of them with percentages used for similar overheads by other engineers and recognized by commissions in their decisions shows that the allowances by Mr. Woy and Mr. Woolfolk are very conservative.

The allowance for general contractor's services and expenses has usually been 10 per cent. In the New York Consolidated Gas case 15 per cent was allowed in the Master's report. The Interborough Rapid Transit Company has recently been allowed 15 per cent for contractors' profits for the third-tracking of the Second, Third and Ninth Avenue elevated roads in New York

City. For engineering and supervision at least 5 per cent should be allowed. Prof. George F. Swain in his report on the valuation of the New York, New Haven & Hartford Railroad cites three cases where the allowance is greater than this, the East Boston Tunnel, 6.5 per cent, the Washington Street Tunnel, 6.1 per cent, and the Metropolitan Water Works 6.2 per cent. In Monheimer vs. Coney Island & Brooklyn Railroad, Commissioner Maltbie of the Public Service Commission for the First District of New York stated that "engineering and administration" were alone often 10 per cent. There is now being paid 7½ per cent for engineering and superintendence in constructing the subways of New York. In the appraisal of the state railways of Massachusetts there was allowed for contingencies 5 per cent. In the appraisal of the Michigan steam roads there was allowed 10.8 per cent; Minnesota steam roads, 5.2 per cent; South Dakota steam roads, 5.7 per cent, and Wisconsin steam roads, 5.5 per cent. The brief concludes that it has been customary to add at least 10 per cent to most careful estimates to cover contingencies, and this is often found to be wholly inadequate. The amount to be allowed for insurance, fire, casualty and builders' risk ranges from one-half of one per cent to 2 per cent.

TOTAL OVERHEAD CHARGES

The total allowance made by Francis Blossom for the overhead cost, including the contractor's fee, was from 26 to 27 per cent. William H. Blood testified that the overhead amounted to a minimum of 25 per cent. A. C. Einstein allowed from 25 to 30 per cent, E. D. Smith 26 per cent and Henry Floy 25 per cent. According to Mortimer E. Cooley, dean of the department of engineering, University of Michigan, the total of overhead charges may vary from 20 or 25 per cent to 50 and 60 per cent of the cost as determined by the inventory, depending upon the items concluded in overhead. This statement is fully supported by a number of well considered decisions of commissions in New York, New Jersey and Wisconsin. In the Queenstown (N. Y.) Gas & Electric Company 25.8 per cent of the cost of all the property, aside from land, before it was depreciated, was allowed for overhead charges, including contractors' services. In Edward G. Boltz vs. Brooklyn Borough Gas Company and Kings County Lighting Company, 24.1 per cent was allowed for general engineering supervision, administration, contingencies, incidentals and general contractors' profit. In John G. Mayhew et al vs. Kings County Lighting Company, 21.8 per cent of the net cost of all tangible property other than land prior to any deduction for depreciation was allowed. In the Passaic Gas case the Public Utilities Board of New Jersey allowed 51.45 per cent of the net cost to reproduce new for all overheads including going value. This was in addition to proper allowances for the contractor in the physical values assume and in addition to $7,500 included in land and plottage.

COST OF PRELIMINARY CONSTRUCTION

The brief next takes up the question of development expenses or preliminary cost and their treatment in various commission and court decisions. In the case of Rochester, Corning & Elmira Traction Company, the Public Service Commission for the Second District of New York allowed 5 per cent upon the estimated cost for promoter's profits. In the case of San Rafael & San Antonio Railway, decided by the California Railroad Commission, from 7 to 10 per cent was allowed, depending upon the par value of the stock. In regard to financing expenses, it is noted that in the contract between the city of Chicago and the traction company there is a clause reciting that 5 per cent "shall be paid for the company's services in procuring funds therefor, including brokerage." Recognition was given to taxes during construction for a period of one-and-one-half years through capitalizing one-half of them. In regard to discount on securities, the only debatable question considered by the brief was whether it should be capitalized or amortized. The New York commission holds the latter view while the Wisconsin commission favors for most cases the former view. The brief favors the capitalization theory. In the matter of interest during construction, the brief states that it is generally conceded that interest should be allowed for one-half of the construction period from the inception of the enterprise until the plant is ready for operation. In regard to working capital, W. H. Blood stated that he had made a thorough study of the average cash working capital carried by electric companies and by combined electric and street companies and that for a period of five years the average monthly cash balance was 12 per cent of the gross earnings. Street railway companies require less for the cash working capital than electric lighting companies for the reason that the receipts of the former company come in daily, whereas the payment of the latter's bills is nearly two months subsequent to the rendering of the service.

GOING VALUE

In re Menominee & Marinette Light & Traction Company, 3 W. R. C. R. 778—an allowance for going value was made of 60 per cent of the remaining depreciated value of the plant and of about 11 per cent of the remaining reproduction cost new. In City of Milwaukee vs. Milwaukee Electric Railway & Light Company, 11 W. R. C. R. 1, $582,050 was allowed for going value. In Superior Commercial Club vs. Superior Street Railway, 12 W. R. C. R. 1, $132,724, or 22 per cent of the remaining value of the plant, was allowed, and in Parsons Railway & Lighting Company vs. the City of Parsons, decided by the Kansas Utility Commission, the going value of the plant was fixed at $13,000, or 12 per cent of the physical value. In all the cases analyzed there are only three where the allowance is as low as 3 per cent, and these are cases where the value of the property amounted to from $7,000,000 to $10,000,000. In many cases it ran as high as 20, 25½, 29 and 30 per cent. H. P. Gillette testified that on the basis of his appraisal of electric railways in Washington a railway is fortunate that can develop a sufficient business to yield a fair return on the cost of physical property without incurring a development expense (a going value expense) of at least 30 per cent of its physical property new.

SUPERSEDED PLANT

Courts and commissions have recognized superseded plant in fixing rates. In Milwaukee Electric Railway & Light Company vs. City of Milwaukee, 87 Fed. 577, 40 per cent of the reproduction value is included as representing cost of plant which had disappeared from the present inventory. In the appraisal of the Chicago Consolidated Traction Company in 1910, 38.4 per cent was allowed for overhead charges and in addition several million were allowed for franchise value of an old cable road which was in disuse and which was immediately thrown away, so that the Chicago property now has about 60 per cent added to it for going cost.

VALUATION RESULTS

The brief presents a summary of thirteen results reached as to the present value of the electric property of the Springfield Gas & Electric Company, among which are included the values based on the actual amount paid by the present owners, the amount of stocks and bonds outstanding, the theory that the plant is worth four times the gross earnings, reproduction cost new, the reproduction new less theoretical depreciation and the reproduction new less observed existing depreciation. The amounts range from $681,329 for reproduction new less theoretical depreciation to $948,500 for the value as based on the amount of stocks and bonds outstanding. It is concluded from these exhibits that the valuation of the commission should not drop below $700,000 and that it would be better for the public and the company if it were fixed between $750,000 and $800,000.

RATE OF RETURN

The brief states that "a reasonable and just rate or service is the highest rate and lowest service which the commission would not be justified in condemning unjust and unreasonable if fixed by the utility itself." The best considered thought on the part of those engaged in the enforcement of public utility laws strongly favors the giving of such a rate of return as will encourage thrift and enterprise. The brief quotes various decisions to show that judicial and also commission sanction has frequently been given to the policy of encouraging investment in public utilities. Various decisions, such as Wilcox vs. Consolidated Gas Company, 212 U. S. 19; Cumberland Telephone & Telegraph Company vs. City of Louisville, 187 Fed. 637; Sheppard vs. Northern Pacific Railroad et al, 185 Fed. 765; Louisville & Nashville Railroad vs. Railroad Commission, 196 Fed. 800; Des Moines Water Company vs. Des Moines, 192 Fed. 1903, are abstracted to show that while a 6 per cent return on a gas monopoly property in New York City may escape constitutional condemnation, yet in Minnesota the net return on railway investments must be not less than 7 per cent. In Alabama it must be 8 per cent, and in Iowa on water plants it must be 8 per cent to escape the condemnation of being confiscatory. The defendant company believes that a return of less than 8 per cent would be declared confiscatory. A suggestion is made to the commission that any order made should state that the company should be permitted to earn not less than the certain rate named. Such a ruling would not bind the commission as a precedent that no higher rate should be allowed and it would leave to the company a chance by good management, by skill and ability, by economy and efficiency to earn more than the rate named.

REPRODUCTION COST NEW AND THE THEORETICAL DEPRECIATION

The United States Supreme Court in the Consolidated Gas case allowed an expenditure of less than 1 per cent for repairs as a deduction from reproduction cost new but refused the contention of the plaintiff that a further deduction of millions should be made for theoretical or accruing depreciation. In the Minnesota rate cases the court said that when the estimate of value is made on the basis of reproduction new the extent of existing depreciation should be shown and deducted. In other words, all that the appraisal considers is the existing physical condition of the property, whereas in the setting up of the depreciation reserve there must be included all kinds and classes of depreciation such as inadequacy, supercession, hazards, contingencies, etc. Various commission decisions also, such as the Passaic Gas case, and the City of Helena vs. the Helena Light & Railway Company, decided by the Public Service Commission of Montana, and the opinions of experts, such as Mr. Floy, James E. Ellison, Halford Ericson, Charles F. Matheson and Alexander C. Humphreys were abstracted to make clear this distinction. It is stated that there is not a decision of the Wisconsin commission (and the same is true of the New York Commission, so far as known) where the rate of return is based on the reproduction cost new of the physical property less theoretical depreciation.

RELATION BETWEEN VALUATION AND RATE OF RETURN

The rate of return which is fair for any plant is largely dependent upon the elements of value included in the appraisal. If the utility must have certain earnings to enable it to raise money and the commission fails to allow properly for intangible values, it is confronted by the practical necessity of granting a rate of return which may be considerably in excess of that which public sentiment may approve. It would be much more important to the future growth and welfare of the utilities that there be established a reasonably liberal valuation upon its property than that it be given what might be considered an excessive rate of return.

PROPER OPERATING CHARGES

The brief concludes with an analysis of the operating expenses of the Springfield Gas & Electric Company, a consideration of the reasonableness of such expenses and a discussion of the reasons why a control through a holding company became necessary and of the advantages of centralized ownership of public utilities. Tables are inserted showing the past and present inadequacy of the company's gross revenue, and it is stated that the rate of return should be 9 per cent and it would not be considered more than fair and reasonable if 10 per cent were granted. A rate of 10 per cent on a valuation of $700,000, 9 per cent on $750,000 and 8 per cent on $800,000 will give an estimated deficit for twelve months of approximately $46,000, but this deficit it is expected would decrease with the growth of the city.

UNIVERSITY OF ILLINOIS INSULATION TESTS FOR STEEL CARS

Some interesting tests are being conducted by the University of Illinois for the purpose of bettering the heat insulating qualities of the walls of railway mail cars. As now constructed, these consist of two plates about 4 in. apart, the outer 1/8 in. and the inner 1/16 in. in thickness. Between them are vertical steel channels which are separated from the plates by 1/4-in. layers of agasote to reduce conduction of heat through them. This is an expensive construction and the tests are designed to provide exact knowledge of its effectiveness. The apparatus used in the tests consists of an insulated box 6-ft. square, with one side removable so that different sections of car-side construction may be substituted. Heat is supplied to the inside of the box by means of a resistance coil, and the heated air is kept in circulation by an electric fan. The heat input to the box, which is all dissipated by convection from the removable side, is figured from the total amount of current supplied to both the coil and the fan. A coefficient of transmission of 0.096 was obtained when using an insulated wooden side. A steel side with a 1/4-in. layer of agasote under the channels gave a coefficient of 0.350. The next test to be made is with a steel side having no insulation whatever. After this, a test will be made on a steel section which has the space between the plates filled with some kind of insulating material.

The New York, New Haven & Hartford Railroad Company has recently established a new system of time inspection for all its lines. Under the new system all clocks and watches in use on the lines must be regularly inspected twice a month by expert watch makers appointed for that purpose. Webb C. Ball is general time inspector for the company.

Equipment and Its Maintenance

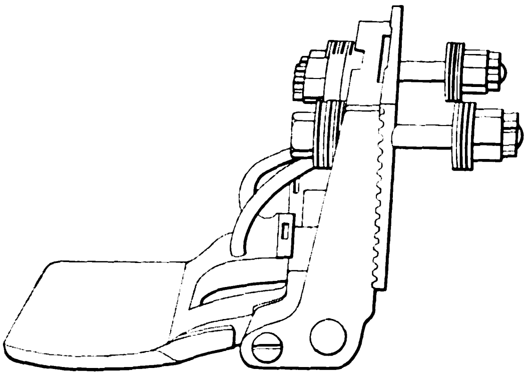
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

EQUIPMENT DEFECTS—CONTACT SHOES

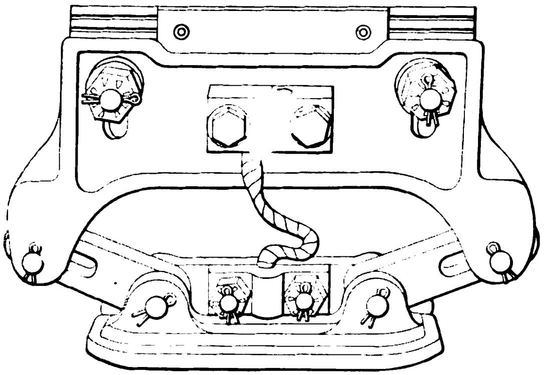
BY C. W. SQUIER, E.E.

Contact shoes may be divided into two types with reference to the class of third-rail used; those used with the under-running and those with the over-running third-rail. The types used with the over-running third-rail may be further subdivided into shoes using gravity alone to provide the necessary pressure for contact with the third-rail and shoes that are pressed against the rail by springs. Shoes for under-runnning third-rails must of necessity be held in contact by spring pressure. On elevated lines and for roads with private right-of-way where a protected third-rail is not needed the gravity shoe is commonly used.


Electric Ry Journal

Side View Under-Running Third-Rail Collector

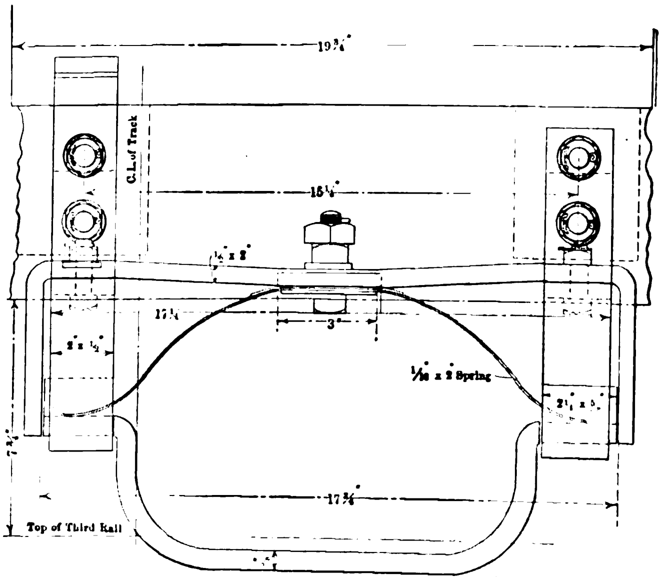
The first third-rail installations were with over-running third-rail and they employed a light cast-iron slipper supported from a frame at either end by links. A flexible copper shunt connected the slipper to the frame so as not to depend on the pins and links for carrying the current. Troubles with this type of shoe consist of broken castings, excessively worn links and pins, broken or burned shunts and burned slippers caused by jumping. On elevated lines the danger from broken castings falling to the street is very great and as a result links and pins have been made large and strong and castings as heavy as possible. On some surface lines, however, the links are made the weakest part of the construction, as it is considered better to have the links break should a shoe strike an obstruction than to run the risk of having the beam torn off. The breakage of shunts can be decreased by keeping these properly tightened and by rounding the supporting edges so that vibration of the shunt does not come on a sharp edge of the casting or washer.


Electric Ry. Journal

Link-Suspended Shoe for Over-Running Third-Rail

While the slipper type of gravity shoe is extensively used with light low-speed equipments, still some roads have found it necessary to redesign their shoes so as to eliminate all links, castings and shunts. Such shoes are of wrought iron supported by a wrought-iron yoke, contact being secured by spring pressure in addition to gravity. The spring also acts as a shunt for conducting current from the shoe to the yoke.

The principle troubles with this type of shoe consist of binding in the hangers, broken springs and burned shoes. They should be lubricated on each inspection by working a thin mixture of oil and grease on the inside of the hangers and then swinging the shoe back and forth to distribute the lubrication. Springs should be inspected for slight cracks or fractures that are liable to cause breakage. The height of the shoes above the running rail should be carefully gaged to prevent burning. The shoes should also be gaged after every truck overhauling, whenever wheels are changed and whenever a beam is replaced or repaired.



Electric Ry Journal

Yoke Type Shoe for Over-Running Third Rail

Shoes that are held in contact by spring pressure commonly consist of a flat casting pivoted at the inside end and projecting out at right angles to the car. Troubles with this type consist principally of broken springs and castings and worn pins and bearings.

On roads that operate their cars both by trolley and third-rail it is desirable to have shoes that fold back, so that the shoes will be out of the way when operating through city streets with the trolley. This is accomplished by folding up the contact slipper on types using spring pressure for their contact, and by turning up the shoe with beam complete for gravity shoes.

Wearing plates riveted to the contact portion of the shoe have been tried by some roads. They are very successful. This avoids the necessity of scrapping an entire slipper when worn. These plates are of soft steel and can be readily replaced when worn through.

In determining the pressure necessary to give proper contact with the third-rail the speed at which the equipment is to operate and the magnitude of the current to be collected are the principal factors. For speeds up to 30 m.p.h. gravity shoes may be used with a weight for the links and slipper of 15 lb. to 20 lb. For speeds above 30 m.p.h. or 40 m.p.h. spring pressure should be used in addition to gravity, otherwise serious arcing will take place due to jumping. With a pressure of 45 lb. or 50 lb. 1500 amp can be handled by a single shoe.

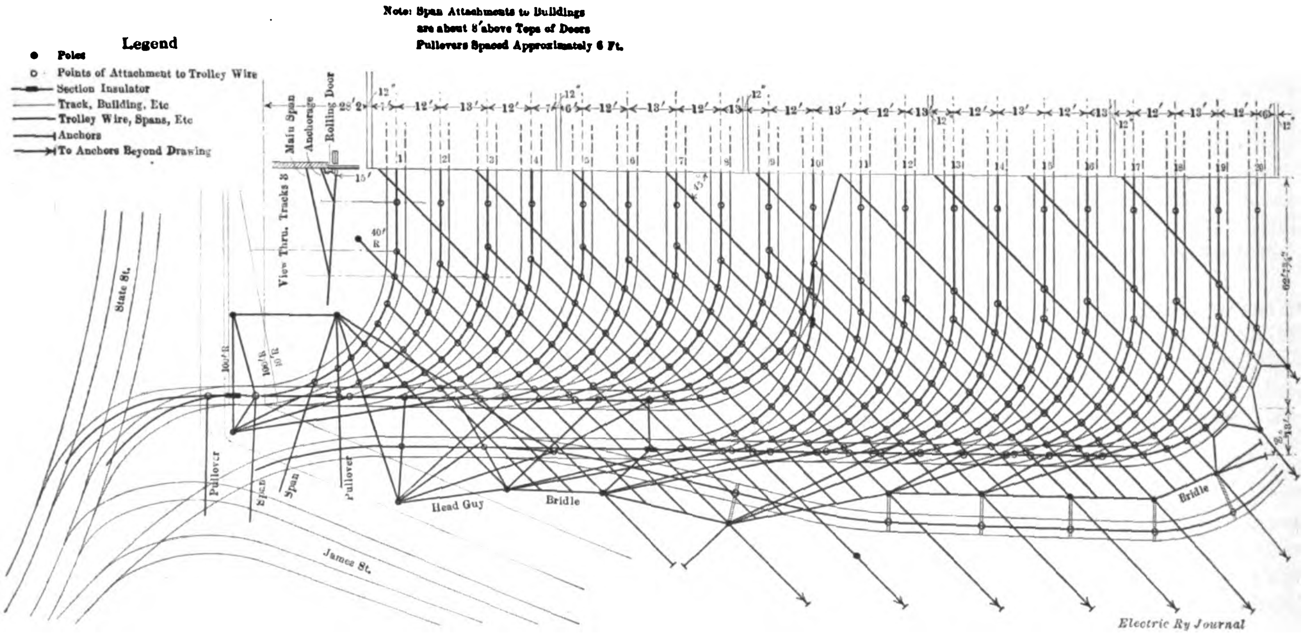
The under-running and the protected over-running types of third-rails have resulted from an endeavor to provide against snow and sleet storms. Various devices are used to cut the sleet on unprotected third-rails. Some roads have steel wire brushes which can be let down by a cam so as to rest on the rail in advance of the contact shoes, and are held in contact by spring pressure. Others consist of crushing rollers and still others of scrapers of various forms. Little trouble is experienced in obtaining a brush or scraper that will remove sleet in extremely cold weather, but it is almost impossible to get one that will work satisfactorily at the time the sleet is falling, for then the ice adheres more firmly to the rail and is more tough and resilient. Crushing rollers followed by scrapers appear to be the most effective, but they also cost more to install and maintain than some sort of steel wire brush. In sections where there are but one or two sleet storms a season, the steel wire brush is most generally used. These are constructed so that they can be readily placed on the shoe beams during the winter season and are firmly secured to crow-foot hangers which can be lowered and raised in guides by means of a cam. To secure satisfactory operation, the hangers must be lubricated at each inspection and the springs must be kept in good condition.

OVERHEAD PROBLEMS—SPANS, BRACKETS AND CURVES

BY CHARLES RUFUS HARTE, CONSTRUCTION ENGINEER CONNECTICUT COMPANY

Disregard of elementary mechanics is often very evident in support work where spans are drawn so tight at installation that the pole tops pull together until there results a sag more nearly equal to that which should have been used at the outset.

An inclination having 1 ft. of drop for 10 ft. of run gives a pull at the pole of ten times the hanger load plus the effect of the weight of the span itself. No. 0000 trolley wire weighs 0.64 lb. per lineal foot; an ice coat ¾ in. thick all around, which is a maximum value for all but phenomenal sleet storms, brings this up to a total of 1.77 lb., and the hanger and ear together weigh about 4 lb. For a span of 100 ft. the total load under these conditions, with span also ice-covered, will be less than the equivalent of 225 lb. at the hanger, resulting in a pull at the pole of 2250 lb., a factor of safety of two for ⅜-in. commercial strand and reasonable stresses under normal conditions for any but the lightest poles. For No. 0 trolley the equivalent hanger load under maximum ice will be less than 175 lb., permitting the use of 5/16-in. strand for the same factor of safety.



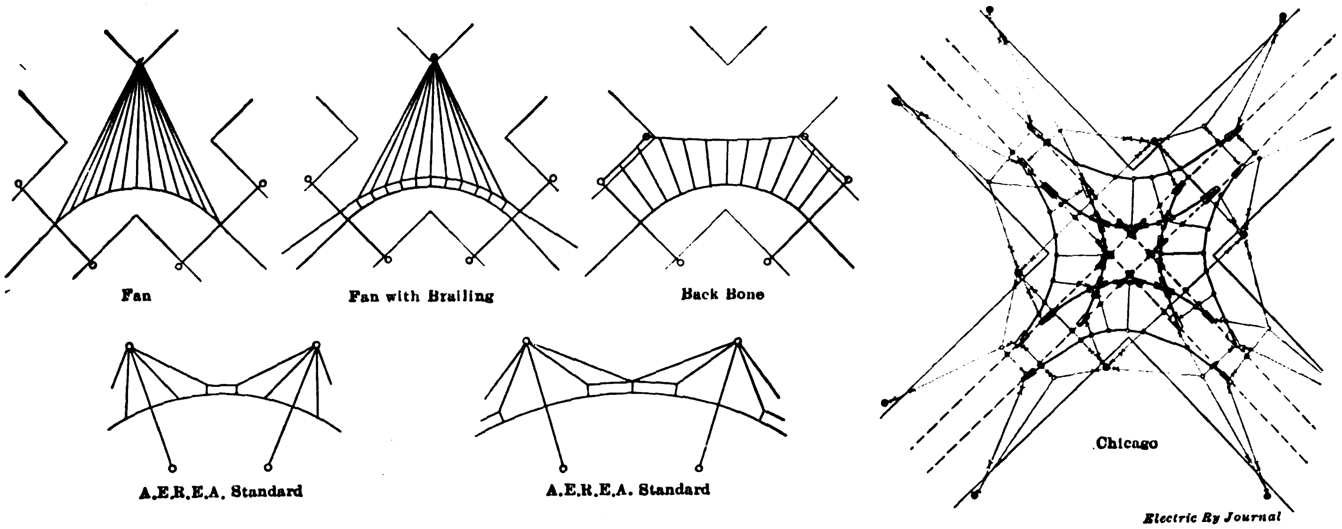
Note: Span Attachments to Buildings are about 8' above Tops of Doors Pullovers Spaced Approximately 6 Ft.

Overhead Construction at West Approach of James Street Carhouse, Connecticut Company, New Haven

It sometimes is urged that a flat span permits the use of a shorter pole, but while this is quite true it will usually be found that the cost of the additional metal needed to meet the increased stress is much greater than the saving due to length reduction. On a 60-ft. street with track center 15 ft. from curb halving the sag will save but 9 in. of pole over a 10 to 1 span and will double the pole pull.

Line foremen, however, often "get away" with this fallacy because a very small pole deflection offers great relief to a tight span. In the case given above the movement of each pole top ⅝ in. nearer the street center would double the sag and bring the pole pull back to its original value. It is this ability through its very weakness, to relieve stress that holds up many a mile of overhead. More than one new man on an old run-down property has brought ruin about his ears by stiffening his pole system before he strengthened his spans.

Brackets for simple suspension are chiefly tubular arms with flexible span for the hanger attachment and an over-support rod attached to the end casting, the early form with under-support to the arm middle bending at the point of attachment on very little provocation. Against punishment from a dewired trolley neither form of support offers any advantages. The tendency of the smaller size to cripple under such conditions is leading to a constantly increasing use of the 2⅜-in. "C" grade tubing with walls 0.159 in. thick.



Methods of Dressing Curves and Double Cross with Full Connections Showing Use of the Trolley as a Bridle

Stinginess as to arm length is a common and fruitful source of maintenance trouble on bracket work. There should be at least 12 in. of free strand between the hanger and the end casting to secure proper cushioning by the strand. On tangents the arm length should be the distance from pole face to track center plus effect of pole rake plus at least 12 in. and better 18 in., making the tube a little over 9 ft. long for the usual pole clearance of 7 ft. 6 in. from track center and taking the commercial length of 9 ft. 6 in. On curves, if the poles are on the outside, this value must be increased by the amount of the trolley wire offset; if the poles are on the inside the length can be reduced by the amount of the offset. The semi-standard length of 11 ft. will meet all usual conditions, and has been adopted by at least several companies.

SAGS FOR DIFFERENT SIZES OF WIRE AT DIFFERENT TEMPERATURES

Size of trolley.	0		00		000		0000	
Temperature, Degrees Fahr.	Sag (In.)	Tension (Lb.)	Sag (In.)	Tension (Lb.)	Sag (In.)	Tension (Lb.)	Sag (In.)	Tension (Lb.)
0	2½	1920	3	2020	2¾	2780	2¾	3500
30	3	1600	3½	1730	3¼	2350	3¼	2960
60	3½	1370	4¼	1420	4¼	1800	4¼	2260
90	4½	1070	5½	1100	5¼	1450	5¼	1830
120	6	800	7¾	760	7¼	1050	7¼	1330

On catenary work structural shapes have been successfully used for brackets, but in simple construction their advantages over the usual steel tube do not warrant the higher cost.

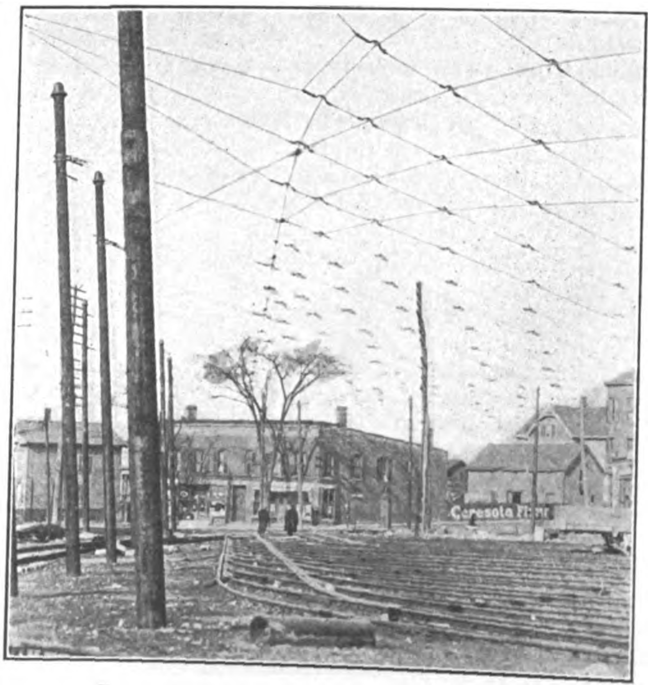
TROLLEY WIRE

For the line itself the usual divergence of opinion prevails. Grooved trolley has a strong following because it does not require the use of solder, but round wire appeals to many others because in the past it has given more uniform and better wear. No. 0000 is practically standard for interurban work and is used to a very large extent in city work, although for the latter work No. 00 is the favorite, as it is for multi-track work. No. 00 has in general a more uniform structure than any other size and per pound gives better wear, the larger sizes losing very rapidly after the polished skin is gone. Whether the longer relative life offsets the longer time the larger stays up without replacement is, however, the real question, and its answer is usually dependent upon local conditions. The odd sizes, Nos. 0 and 000, are very little used, and "figure eight," which at one time promised much, is confined almost exclusively to mine work.

A tight trolley has many advantages but is open to the serious objection that under such circumstances a very small decrease in sag means a great increase in stress, and the average line gang is very apt to "horse up" the wire to a dangerous point. The effect of slight changes in sag is evident from the accompanying table, which gives proper sags for various sizes of wire at various temperatures, all for spans of 100 ft. Other span length values are readily obtained since the sag for the desired span is to the sag of the table as the square of the desired span is to 10,000 (the square of the table span).

CURVES

In the past curves have offered a broad field for individual ideas. The oldest method is the so-called "fan,"



Special Work at James Street Carhouse

a series of pulls radiating from one or more poles on the outside of the curve. The tendency of all but the middle "rib" to pull the wire "on end" rather than radially led to the development of three schemes:

First—A lacing or brailing, anchored at each end to adjacent poles, may be so tied to each rib of the fan as to be parallel to and about 1 ft. from the trolley wire, and to hold radial that portion of the rib between it and the trolley. In its full glory brailing and pulls are cut at each intersection and are tied to bull rings 2 in. or 3 in. diameter, or the radial sections of strand are replaced by wood strains, the outer eyes of which take the places of the bull rings.

Second—In the form recommended by the American Electric Railway Engineering Association not more than five pull-off strands are attached to any one pole. If the angle between the pull and its ear is not less than 60 deg. straight fan construction is followed; if the angle would be less than 60 deg. a short brailing connects it with the corresponding pull from the next pole and holds both radial; if midway between poles, if the adjacent pulls need no lacing, it is tied to both poles.

Third—In the so-called "backbone" method, which is favored by many, a heavy bridle is attached to the poles on the outside of the curve, and from it the pull-off strands are run radially to the trolley wire. Failure to realize the toggle-joint action when the bridle is tight has caused failure, and with some an unwarranted dislike of the construction, but properly installed it is one of the best.

Over special work more or less special overhead must be employed, although the more common forms permit standardization to a considerable degree. By careful study it is usually possible to pull one curve against another, and thus reduce to a minimum the numbers and lengths of pull-off strands. In the case of a cross with full connections the exterior strands can be confined to little more than anchor guys; less symmetrical trackwork requires more. Carhouse entries offer unusual opportunities for skill in laying out the overhead. Advantage frequently can be taken of the ability of the trolley wire to serve also as pullover or support. However, it must be borne in mind that the trolley is much more subject to break and the lay-out should be so arranged that such break will involve the smallest possible area.

Curve pull-over devices are pretty well fixed as to general outline, but vary somewhat in section and in weight. "I's" and "T's" of varying flange and web thicknesses result in weights ranging from 24 oz. to 32 oz. for single bodies and 32 oz. to 56 oz. for double bodies. For the heavier sections there is very little excuse. The increase in strength is not at all proportionate to the increased weight, while the latter greatly increases the wear on the trolley wire; in at least two designs the extra metal apparently has been added solely for weight, with utter disregard of any mechanical principles.

The span insulation is usually effected by attaching the strain insulator directly to the pull-over body. In ordering the latter for such use it is well to specify the opening between the jaws of the clevis, this sometimes being too small to admit the strain insulator eye. With early wood strains, where a heavy black paint successfully concealed the grain, and manufacturers were not always too careful in regard to stock used, a wild trolley pole frequently snapped the wood and dropped the span. A short piece of strand is sometimes cut in between strain and body to guard against this, and some companies use only composition strains. The first treatment adds work and expense, which in view of the reliability of the present-day wood strain—if purchased of reliable makers—does not seem warranted. As between wood and composition there is much opinion on both sides, but really very little actual evidence.

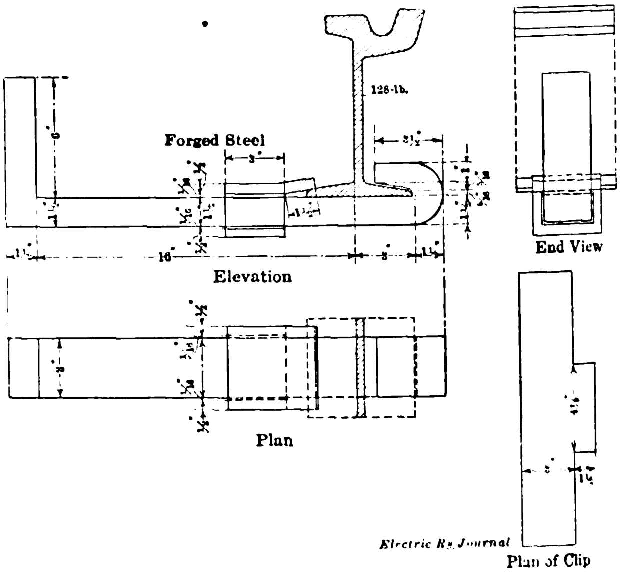
The trolley wheel will operate satisfactorily at moderate speeds if the deflection at the ear does not exceed 12 deg. In the A. E. R. E. A. standard the maximum deflection is 10 deg. This figure is for a curve of 40 ft. radius, the deflection being reduced as the radius increases. For convenience in installing, the distances apart of ears, with one exception, are in even feet; the pole spacing is of necessity a multiple of the ear spacing.

Radius of Curve, Ft.	Deflection at Ear	Spacing of Pull-overs, Ft.	Number of Pulls between Supports	Distance Apart of Poles, Ft.
40	10° 01′	7	4	35
50	9° 10′	8	4	40
60	8° 36′	9	4	45
70	8° 11′	10	4	50
80	7° 52′	11	4	55
90	7° 38′	12	4	60
100	7° 24′	13	4	65
125	6° 25′	14	4	70
150	5° 44′	15	4	75
200-500	5° 44′-2° 17′	20	3	80
750	1° 55′	25	3	100
1000	1° 26′	33⅓	2	100
1500-2000	1° 14′-0° 57′	50	1	100
Above 2000	1° 0′	100	0	100

"OLD MAN" FOR DRILLING

BY WALTER K. TAYLOR

The accompanying sketch shows a very practical "old man" used by the way and structure department of the Brooklyn Rapid Transit System. While the idea is not entirely new, the clip which holds the device in place on the rail has been found to be an effective improvement.



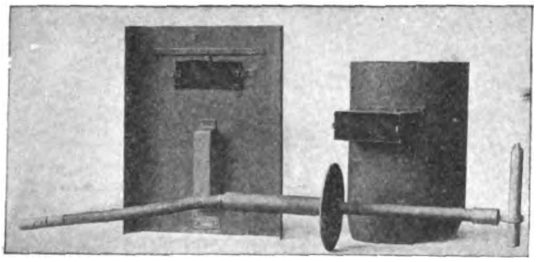
Construction Details of "Old Man" with Special Clip

The clip not only simplifies the setting of the ratchet and drill but also keeps them firmly in the proper position provided the holes are well drilled. The clip can be readily applied to the ordinary "old man" at a trifling cost. The "old man" illustrated is applied and operated by one man.

In order to relieve the congestion at the large main station in Hamburg, Germany, a proposal is to be embodied in the next Prussian railway budget for the electrification on the Hamburg-Altona-Blankenese single-phase system of the suburban line to Bergedorf and Friedrichsruhe. The work is likely to be completed in two or three years, and will form an extension of the lines already electrified.

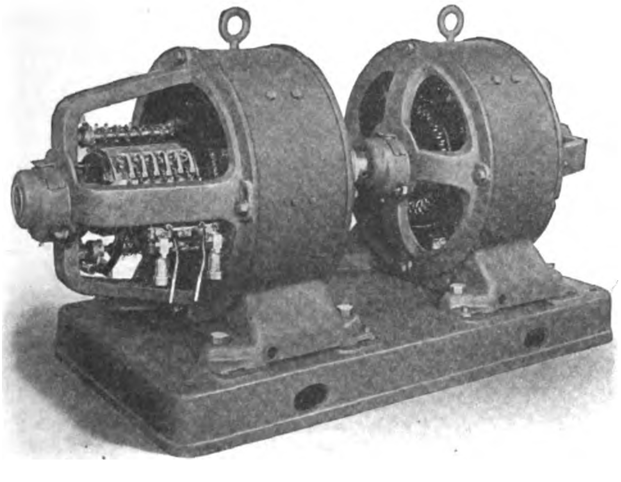
ARC WELDING SETS

Realizing from past experience the practical value of the electric arc for general welding purposes, the Westinghouse Electric & Manufacturing Company has developed a line of electric arc welding equipments based on eight years' experience in its own shops. The equipments comprise standard apparatus. They have no complicated relay schemes for automatically inserting resistances while ample protection is secured by circuit-breakers and special arrangement of the resistance. The outfits are furnished complete in the four following sizes: 200, 300, 500 and 800 amp. Each equipment includes a welding generator, or a welding motor-generator set, switchboard, control and all necessary accessories, such as a carbon holder and a hood for protecting the operator, together with a shield and a metal pencil holder for each welding circuit. The welding generator consists of a special 75-volt, commutating-pole, d.c. machine, either belt or motor-driven.



Shield Hood and Carbon Holder

The instrument and control panels are composed of two sections. The upper section contains the indicating instruments, protective apparatus and switches arranged for regulating the welding current, and the lower section contains the starting and protective equipment for the motor-generator set. It is often desired to have several welding circuits connected to one generator. For this arrangement a control panel is provided for each circuit. Each panel can be located at the most desirable place. Metal or carbon pencil welding can be done from any of these panels and one or more arcs can be operated simultaneously.

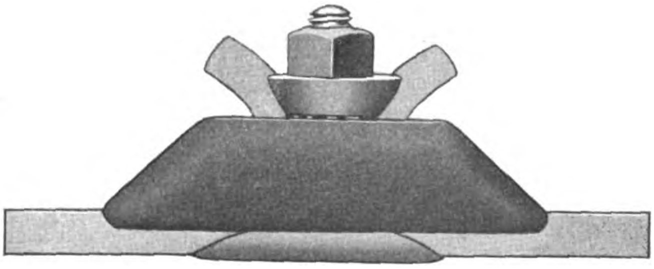


Motor-Generator Set for Arc Welding

The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., expects to purchase moving picture equipment including, a machine and screen for the company's theater at Lake Contrary Park.

TROLLEY SPLICE WITH COPPER WEDGE CLAMP

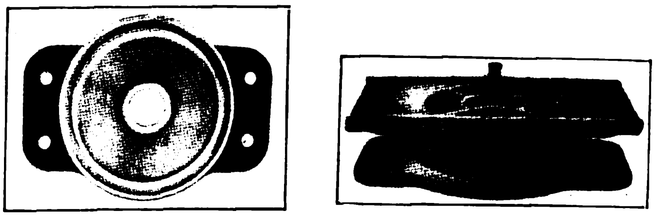
A trolley splice of much tensile strength and low resistance, called the "George" splice, has been put on the market recently by the Holland Trolley Supply Company, Cleveland, Ohio. Comparative tests conducted by the University of Illinois at the request of a large traction system have proved the tensile strength of this splice, which is shown in the accompanying illustration, to exceed that of the original wire. Selected for the tests were a standard and a "George" splice showing resistances of 0.000139 and 0.000044 ohm, respectively, when measured by a Thomson double-bridge with knife edges fastened to the wires at the ends of each splice. The lower resistance of the new splice is due to the copper wedge clamp. The tension tests showed three distinct failures for the standard make: failure No. 1 under a stress of 4800 lb.; No. 2, 4900 lb.; No. 3, 5300 lb. The "George" splice yielded under a stress of 5300 lb. The latter two failures were those of the wires. The wire itself showed a yield point of 6200 lb. and a rupture of 4100 lb. Other features of the new splice are its lightness, shortness and narrowness, which are believed to reduce destructive arcing. It is easy to install, requiring no solder or set screws to weaken the wire. The splice is made for round, grooved and figure "8" wire in the Nos. 0, 00, 000 and 000 sizes.



Splice for Round, Grooved and Fig. 8 Wire

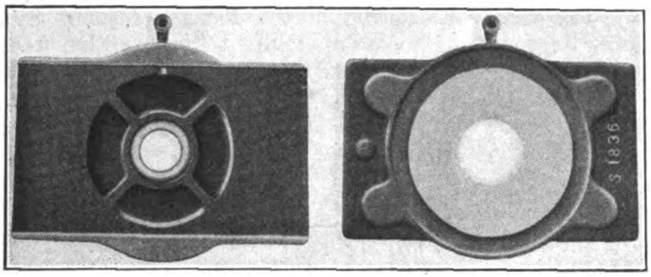
AN OIL-BEARING CENTER PLATE

An oil-bearing center plate suitable for any type of motor truck is shown in the accompanying views. This plate is made by the Steel Car Forge Company, Pittsburgh, Pa., and is known as the "Ideal." It is of oil-bearing design, the oil being fed into a reservoir in the body or top plate by a pipe from the car body outside or inside of car as preferred. The top plate is made of cast steel and the bottom plate is a drop forging, thus insuring freedom from holes through which the oil could otherwise escape. The wear is taken by a removable bronze ring or washer, which is constantly in a bath of oil. All dust is excluded by means of a felt ring which is so fitted in a machined groove in the truck plate that the top and bottom plates may be separated without displacement or injury. The entire plate contains only five pieces and needs no rollers or ball bearings



Truck Plate and Center Plate Complete

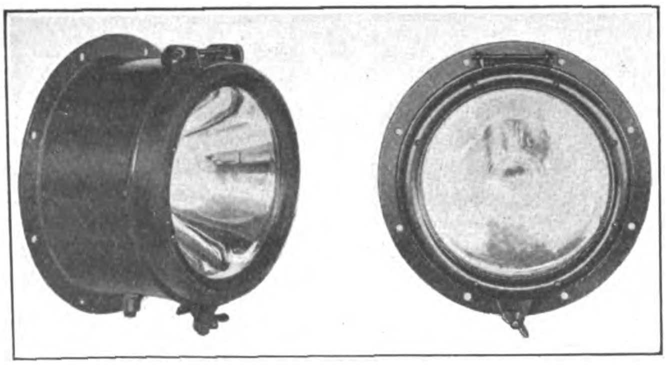
to insure minimum friction. It is machined to within 1/32 in. to get a practically perfect fit between top and bottom plates. Large area of section in the truck plate is provided to resist the propelling action of the motors, and the plates are stated to be of larger diameter than those hitherto used for motor truck work.



Top and Bearing Side of Body Plate

PRESSED STEEL HEADLIGHTS WITH WELDED JOINTS

The Esterline Company, Indianapolis, Ind., has just added to its line two headlights which are designated as SR-95 and SE-95. While these headlights embody the use of the "Golden Glow" glass reflectors which characterize this company's products, they possess several new and important features. The lamp bodies and fronts are made entirely of pressed steel, which materially reduces the weight and improves the appearance of the headlights. The makers have taken advantage of the accuracy with which steel stampings can be made by producing a headlight which is water and dustproof. A metal ring which holds the reflector in place also clamps a heavy gasket over which the front or door presses, making a very tight joint. The hinges and latches have no projecting portions to catch wires or ropes. Another innovation is the use of electric-welded joints and fastenings instead of screws or rivets. The headlights are properly ventilated to prevent sweating and clouding of the reflector and front glass. After assembling, the lamp bodies are given several coats of baked enamel, inside and out, to render them proof against rust. The front glass, which is made extra heavy, is held in place by spring clips to permit expansion and contraction, without cracking the glass. In the construction of the SE-95 and the SR-95 headlights, 9-in. reflectors are used. These give a headlight larger in diameter and deeper than earlier types, allowing sufficient space for lamps up to 60 watts. The SR-95 is made to recess into the dash of the car, while the SE-95 is designed for mounting on the front of the dash.

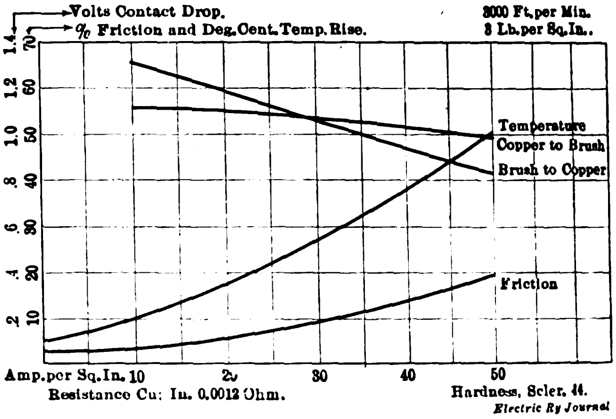


Side and Front View of Pressed Steel Headlight

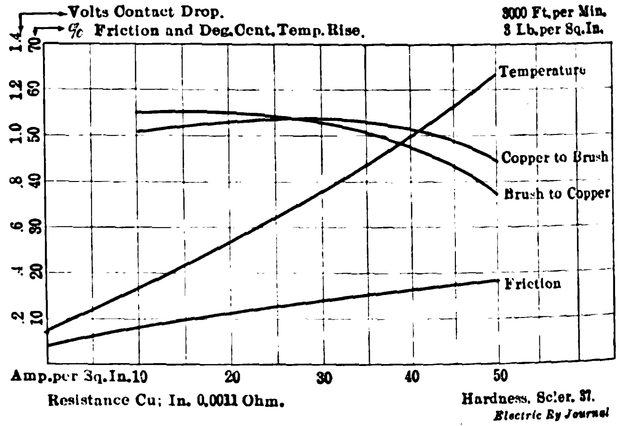
The "Golden Glow" headlights are made to meet the demands of railway men for a headlight which projects a non-blinding light of sufficient intensity to serve as a warning to other kinds of street traffic, under all weather conditions. They also enable motormen to see a car ahead a sufficient distance to prevent collisions, and to see which way track switches are thrown as they approach the switch. Recent tests of the new headlights fitted with a 36-watt bulb on a city street, on a dark clear night, showed that the second hand of a watch can be read at a distance of 600 ft. and that a man lying on the track can be seen from the car further than is possible with an arc lamp. About sixty-nine railways and steamship lines are now using this type of headlight.

LOAD PERFORMANCES OF CARBON BRUSHES

Some interesting load curves showing creditable carbon brush performances have recently been prepared by the Speer Carbon Company, St. Mary's, Pa. Two of these curves relating to the operation of carbon brushes on commutators of railway motors and generators are shown in the accompanying diagrams. Each one of the curve charts represents in degrees Centigrade the heat effect which accompanies the increase of load in amperes per square inch. It also shows the increased coefficient of friction between the brush and commutator and the drop in voltage at the contact between the brush and commutator, both when the current flows from the copper to the brush and when it flows from the brush to the copper. One set of curves shows the performance of the grade "H" brush, which is of a dense, tough structure adapted to commutators with long cut mica suitable for railway motors and generators. These data were taken at a commutator peripheral speed of 3000 ft. per minute with a brush pressure of 3 lb. per square inch. The other set of curves shows the performance under similar conditions of speed and pressure of a grade "H-3" brush. This brush is somewhat harder than grade "H," being sufficiently hard to keep down the mica and strong enough for all but the most severe railway service.



Test Curves of Grade "H-3" Brush



Test Curves of Grade "H" Brush

BALL BEARINGS FOR ELECTRIC RAILWAY CARS

The economy and reliability of anti-friction bearings have been widely demonstrated in their application to storage-battery cars on which any energy-saving device is relatively more important than on ordinary electric cars. The largest user in this country of such bearings is the Third Avenue Railway, New York, and among the types which it has on its storage-battery cars are forty sets of S.K.F. journal ball bearings, a product of Swedish invention. The manufacturer of this bearing, however, also makes a great variety of types for service on standard trolley and third-rail cars, and among recent applications is the adoption of these bearings for a line of standard trolley cars in the New York metropolitan district.

The ordinary ball bearing, consisting simply of an inner and outer race with a single row of balls, forms a rigid unit the durability of which depends upon the precision with which it is put together. The greatest care is required in its manufacture to avoid stresses as well as to prevent the breaking or jamming of the balls. In 1907 the S.K.F Ball Bearing Company, Gothenburg, Sweden, introduced a self-aligning ball bearing in which the disadvantages of a rigid bearing were eliminated by the use of an outer race which is spherically machined on its inner surface. As will be seen from the illustrations, Figs. 1, 2, 3 and 4, the inner race contains two grooves each ground to a radius slightly larger than the radius of the balls, while the outer race is ground in the form of a section of a hollow sphere whose center is the center of the axis of rotation. It may readily be seen from an analysis of the diagram, Fig. 3, that the balls, retainer, and inner race are free at all times to rotate at an angle within this spherical outer race, and will, without subjecting the race to any undue strain, at all times adjust themselves to any possible degree of deflection without binding the balls or introducing any obstacles to immediate and automatic compensation for any shaft springing or deflection.

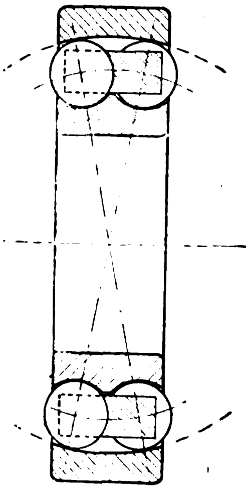


Fig. 1—Normal Position

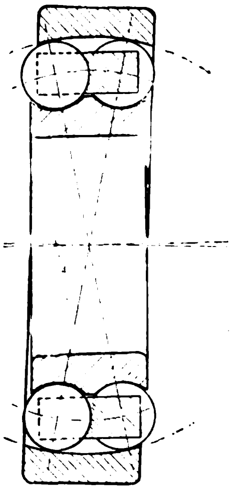


Fig. 2—Deflected Position

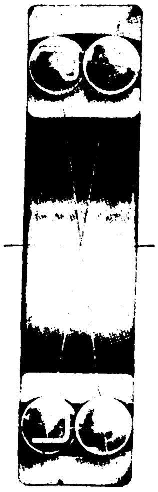


Fig. 3—Cross-Section

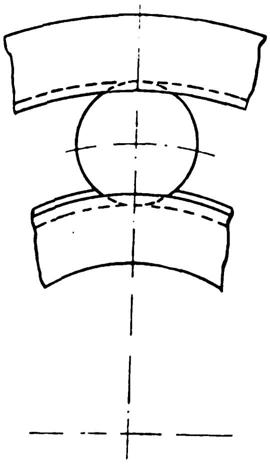


Fig. 4—Position of Ball

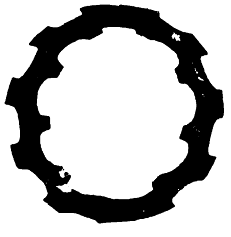


Fig. 5—Solid Retainer

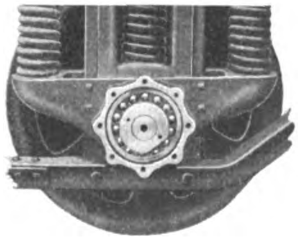


Fig. 6—Bearings Exposed

The ease by which this self-alignment is accomplished will be fully understood when it is pointed out that the balls roll on the surface of a spherically ground outer ball race with a pure rolling motion, without sliding friction. This movement is facilitated by the distribution of the load over a large number of balls, and as the load is automatically and equally divided between two rows of balls, the most favorable working conditions are obtained. The diagram clearly shows that the races are so designed that the tangents of the balls at their points of contact with the races are parallel.

Bearing pressures due to the load are accepted through the pair of oblique lines which pass through both contact points on the races, through the center of the ball, and continue in a straight line to the center of the spherical outer race, i.e., the center of the bearing.

The retainer, Fig. 5, for holding the balls, is made in one piece without rivets, screws or other parts that might get loose. Sheet steel is used for small bearings, and bored iron for larger bearings. This retainer construction practically eliminates bearing friction. The remaining views show the application of this bearing on an 8-ton car of the Third Avenue Railway, where they have been used for three and one-half years with remarkably satisfactory results. S.K.F. bearings are now used for car loads up to 24,000 lb. Extensive experiments abroad, both with self-propelled and standard electric cars, have shown that these bearings can produce energy savings as high as 25 per cent, and that they require lubrication but once every three or four months. The American representative is the S.K.F. Ball Bearing Company, New York.

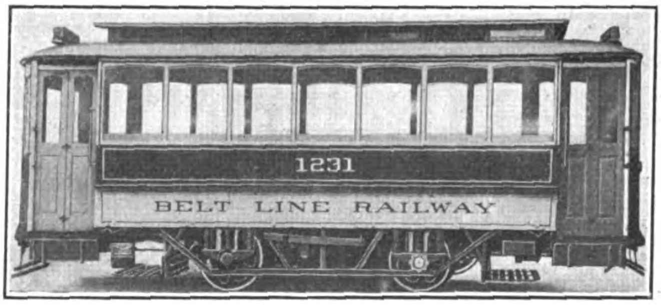


Fig. 7—Belt Line Storage Battery Car of Third Avenue Railway System Equipped with Ball Bearings

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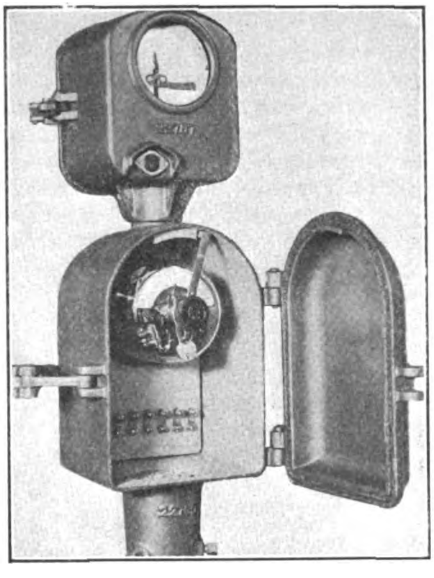
The sixth annual report of the Nebraska State Railroad Commission for the year ended Nov. 30, 1913, contains a general review of complaints and applications filed, and orders issued by the commission during the year. A section of the book is devoted to a tabulation of the officers and directors of the electric railways in Nebraska, as well as of capitalization, financial systems and traffic statistics of the companies.

SWITCH INDICATOR WITH TIME RELEASE AND POWER-SAVING DEVICE

The accompanying illustration shows an improved switch indicator arrangement designed by the Union Switch & Signal Company to save power and to provide an instrument which may be used without track circuit preliminaries. As shown, the switch indicator which is equipped with a push button surmounts an iron box containing the time release, although, if desired, the switch indicator may be used without the time release and its box. The saving of power is due to the fact that only when the button is depressed is the circuit for the indicator closed. The indicator will not clear by the depression of the button unless it is also energized by the external circuit.

In service the indicator is normally de-energized and the blade stands in the horizontal position. Should a trainman desire to use the switch he pushes the button, and if the indicator clears it shows that there is no train approaching and that conditions are proper for leaving the siding. As soon as the switch is opened, the signals leading over the switch and protecting it are set to the stop position, thereby causing the indicator to assume the normal, or stop position, and it cannot again be cleared until conditions in the block are restored to normal.

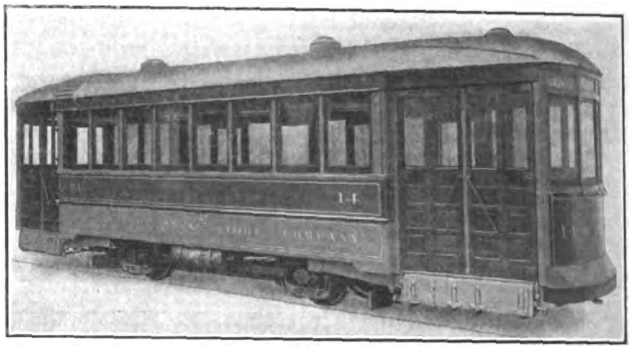

Switch Indicator with Time Release Mechanism

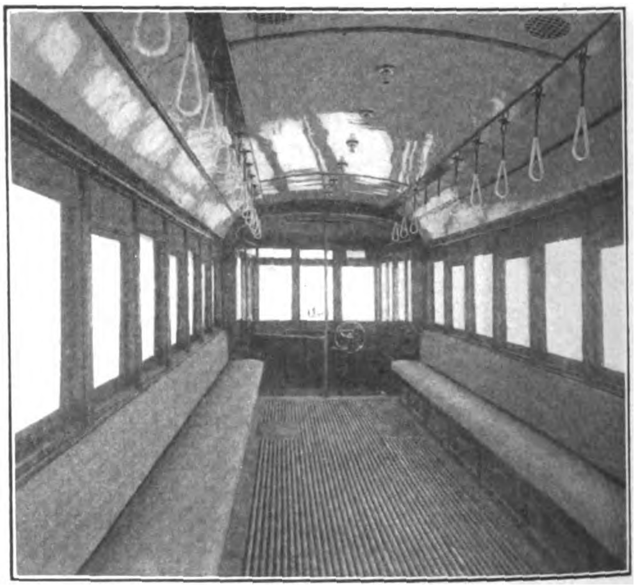
The time release arrangement is employed where it is undesirable to control the switch indicator by track circuit preliminaries, and it provides a time interval equivalent to that taken by a train in passing through a preliminary. The time release is inclosed in an iron box provided with a lock similar to that used on switch stands. The operation is as follows: A trainman desiring to use the switch first unlocks the box containing the time release and starts it by a slight turning of the knob. At the expiration of a predetermined time he depresses the push button, and if the block is free the indicator will clear. If the indicator clears, the switch may be thrown and the train can proceed onto the main line. The first movement of the time release sets all signals leading over this switch to the stop position, and so long as the time release is in other than the normal position the signals are held at stop. The throwing of the switch continues to hold the signals in the stop position and restores the indicator to the normal or stop position. The box cannot be closed and locked unless the time release is restored to the normal position so as to close the signal circuits, this action requiring a small movement of the time-release knob in the reverse direction.

The switch indicator can be operated on either a.c. or d.c. and the time release can be built for any time interval from fifteen seconds to four minutes. As the indicator is clear for only a short time when it is used with the time release arrangement, the push button attachment may be eliminated if desired and the operation by trainmen will then be simplified, although at a slight increase in the amount of power used.

ONE-MAN NEAR-SIDE CAR FOR ASTORIA, ORE.

The advantageous influence of the radial axle truck on the length of single-truck cars is demonstrated by the one-man near-side double-end car ordered by the Pacific Power & Light Company, Astoria, Ore., from The J. G. Brill Company. This car has a body length of 21 ft. and is 34 ft. 3 in. long over the vestibules. The width over the sills is 8 ft. 3 in., the width over-all 8 ft. 6 in. and the height from rail to the trolley base, 10 ft. 8¾ in. The longitudinal seating accommodates thirty-two passengers. The end-frame of the car is of steel, wood being used for the body and the single-arch roof. The headlining is of maple veneer and the interior trim of oxidized bronze. The truck is of the Radiax E-1 type fitted with cast-iron wheels and 3¾-in. x 7-in. heat-treated axles and carrying two GE-58 inside-hung motors. The K-10 controller is used. The air-brakes are of General Electric and the sanders of Nichols-Lintern manufacture. Other specialties on the car are the car builder's gong, channel-iron bumpers and vertical wheel-brakes, Syracuse transferable headlights, Hunter destination signs, Pantasote curtain material and "Rico" sanitary sleeving for straps.


One-Man Car with Radial Axle Truck


The Spacious Interior of One-Man Car for Astoria, Ore.

LONDON LETTER

(From Our Regular Correspondent)

As a result of the renewed agitation for all-night cars a sub-committee of the Glasgow tramways department has recommended that the corporation start an all-night service experimentally in the autumn. A proposal to institute an all-night service which came before the Glasgow Corporation a year ago was defeated, but the supporters of the movement have received fresh encouragement from the success of Manchester's experiment. James Dalrymple, the tramways manager, has submitted a report on the proposal to reduce the fares again by which passengers would be allowed to travel six stages for a penny and three for a halfpenny, instead of four and two stages respectively, as at present. The Glasgow trams are now carrying 340,000,000 passengers per annum, as against 222,000,000 before the change in fares a year ago and are operating fifty additional cars. The corporation is about to manufacture another lot of 150 cars, which will bring the total up to 1000. Unless new arteries of traffic are completed soon there will be intolerable congestion.

Tramway traffic in Manchester is also badly congested. J. M. McElroy, the general manager of the tramways, has issued a report based on his investigations during his recent trip to cities in America and on the Continent, and he makes a strong point of the fact that the greater the facilities afforded the greater becomes the travel. In this connection he says that "in all cities and towns there is an immense potentiality in the riding habits of the people, and everywhere there is a continual growth in the number of journeys per head of population, and the provision of new or improved transit facilities accelerate this to a very marked degree." The main proposals of the report are the construction of certain new arterial routes; the utilization of the vacant site where the Infirmary stood; the opening up of negotiations with the Corporation of Salford for better intercommunication, and the introduction of transfer tickets. Underground subways for tramcars are considered but not advocated on account of the expense. The report also objects to rapid-transit lines on elevated structures, but adds that the time is rapidly drawing near when Manchester will have to be provided with rapid-transit facilities, and the lines should be so laid that they can be worked in conjunction with the surface lines, by providing suitable transfer points from surface to rapid-transit and vice versa. Mr. McElroy concludes that a point will soon be reached when the construction of underground facilities will become an absolute necessity, and states that, while that time has not yet arrived, consideration should be given without delay to the planning of a general scheme to be constructed later on by instalments. Motor buses are also referred to as forming in the future an important part of the surface-transit facilities, chiefly in the suburbs, and as supplementing the several tramway services in many directions.

Liverpool, the third great city of Great Britain, is also intensely interested in the problem of the relief of congestion, and C. W. Mallins, the general manager, has recently issued a report dealing with a belt system of tube railways encircling the city by junctions with the Overhead Railway; radial lines running through the most populous districts; an extension of the Mersey Railway to the Haymarket; and railway and general traffic tubes to Birkenhead and Seacombe forming junctions with the Wirral Railway, so as to connect any part of Liverpool with the whole of Wirral, including Rock Ferry, Birkenhead Park, West Kirby, and Heswall. The cost of the scheme is estimated at £13,000,000. Owing to the fan-like formation of Liverpool, and the rapid rise of the levels inland from the river, the construction of any adequate means of transport other than a tube system seems to be impracticable, while the question of a bridge across the Mersey must also be left to the future.

In addition to this question Liverpool is also face to face with the problem of the conveyance of goods on the tramways to relieve the dock traffic difficulties, and negotiations have been entered into with the Southwest Lancashire tramway companies and other tramway authorities in the vicinity with a view to ascertaining the expenditure necessary to establish such a service. The idea is to inaugurate a tentative service of tramway wagons for the transport of goods between the Liverpool docks and Lancashire towns, such as Bolton, Bury, Rochdale, etc., and Mr. Mallins, in his report, states that if a cheap and expeditious system could be established it would undoubtedly prove of great advantage to the whole community. He also expresses the opinion that if a thoroughly well-organized system of mechanically propelled vehicles was provided to deal with the work now carried out by horse vehicles, the number of vehicles could be reduced one-half. The experiment of goods transport would necessarily be on a very limited scale at first, but if found successful a more elaborate system could be established, providing the dock board and the Bootle Corporation would co-operate. The scheme suggested would involve the electrification of the dock railway or the construction of a line of tramways parallel with that railway.

The alterations at Charing Cross Station, whereby interchange facilities have been made between the District Railway and the Hampstead and Bakerloo tubes, are now completed, and Charing Cross (Embankment) station, as it is now called, has become one of the busiest in the world. It is calculated that the station will handle 15,000,000 passengers annually, nearly half of that number interchanging. The Hampstead line has been carried from the old terminus at Charing Cross by means of a single line in the form of a loop down under the District Station and round under the Thames, back again to the down line at the old Charing Cross station. The loop had not only to pass under the Thames where water-carrying strata were encountered, necessitating the use of the Greathead shield, but it also had to pass under the weighty piers supporting Hungerford Bridge, over which run the main lines of the South Eastern & Chatham Railway. The work has been carried on without interruption to traffic. The Embankment station is now really in four stories. At the top is the booking office, from which stairs lead to the platform of the District Railway. From this platform descend other stairways to a large room immediately underneath the District station, from which, in turn, descend four escalators, two, in one direction, to the Bakerloo tube and two, in the other direction, to the Hampstead tube. There is also a connecting walk between the Hampstead tube and the Bakerloo tube, so that complete interchange facilities have been constructed at a cost of about £200,000. No increase of fare will be made in connection with any of these lines, it being expected that sufficient profit will result from the increased traffics to pay for the cost of the extension.

Much interest attaches to the electrification plans of the London, Brighton & South Coast Railway, but, with the exception of the suburban system, which is being rapidly transformed, a decision as regards the main line has not yet been arrived at. The expectation is that within three or four years electric trains will be running between London and Brighton, a distance of 50½ miles, in less than three-quarters of an hour. Philip Dawson, the company's consulting engineer, has recently spent six months on the Continent and in the United States, and he is of opinion that as much progress is being made with this system of traction on this side of the Atlantic as on the other. The transformation of the London & South-Western Company's suburban service, likewise, is making headway, and the work in connection with the first part of the scheme, from Waterloo, by way of Wimbledon, to Kingston and back to the London terminus by Richmond and Putney, is well advanced. The scope of further extension, naturally, will largely depend upon the results which are achieved with the present installation.

As the City Corporation has refused to sanction plans for taking tramways to the city the London County Council has been forced to abandon schemes for continuing the Farrington Road tramways to Ludgate Circus and the East London tramways to Aldgate. The Council recognizes the danger of the hatpins worn by inconsiderate women, and has put warning notices in the tramcars. The danger, however, is still great, and Mr. Shearman will propose that the Council shall make a by-law dealing with "long, unprotected hatpins and other projecting ornaments" which are a danger and inconvenience to the public.

A. C. S.

News of Electric Railways

Negotiations on Basis of Renewal in Toledo

As stated in the ELECTRIC RAILWAY JOURNAL of April 25 it seemed for a time that negotiations between the city of Toledo, Ohio, and the Toledo Railways & Light Company would be indefinitely suspended because of a difference of opinion as to whether the proposed agreement should be in the form of a renewal of the old franchises, as provided in the draft formulated by Henry L. Doherty and his counsel, or a new franchise, as desired by the committee and City Solicitor Thurstin. At a meeting on April 23 the committee announced its intention of proceeding with the negotiations on the basis of a renewal rather than a new franchise. While franchises on some of the lines expired three years ago, others still exist and this forms one of the grounds for the renewal plan. Unless negotiations are commenced before the end of two years after a franchise has expired, it cannot be renewed, but the members of the committee have taken the view that negotiations have been practically continuous since November, 1910, when the first franchise expired.

City Solicitor Thurstin intimated at the meeting of the committee on April 23 that outside interests desire to bid, if the conditions are made so they can do so. He told the committee that he believed the principals would come to the front after the Toledo Railways & Light Company's proposal has been disposed of.

Mr. Doherty and counsel for the company met with the committee and various points in the amended franchises were taken up. He had previously informed the committee that the company could not consider a rate of 3 cents for the entire term of the franchise and he insists that some plan be adopted to secure information that will lead to the adoption of a rate that will be sufficient to provide good service and yield a proper return on the investment.

An open meeting of the franchise committee was held late on April 25. No progress was made toward fixing rate of fare. Two questions were considered. One was the method of appraisement which should be followed in case the city should decide to take over the street railway system. The other was whether the city would also take the power plant on such a purchase. No agreement was reached on either point. Thomas H. Tracy, attorney for the company, insisted that the franchise should provide that the system be appraised as a going concern. Councilman Dotson proposed that the valuation be provided for according to rules set up by the general code for all property used and useful with no charge for the franchise. Mr. Doherty told the committee that the company was willing to sell or retain the power plant in case municipal ownership should be voted for, but that the company wanted it settled in the franchise now so the company would know how to proceed with building other power plants. If the city did not buy the power plant, the charges for power furnished by the company would be determined by arbitration, Mr. Tracy said.

Provincial Control and Operation of Radial Railways Through Hydro-Electric Power Commission

The minister of power introduced in the Legislature of Ontario on April 20 a radial bill that repeals the legislation of last session and puts the development of the system on an entirely new basis. Under the legislation of a year ago control and operation of radial electric railways, with certain restrictions, was vested in the municipalities. The financial provisions left much to be desired. With the support of the hydro municipalities of the province Adam Beck is asking for legislation that will enable the municipalities to finance radial railways and place no direct burden upon the province or the commission. Under the new bill the railways will be built with money secured by issues of bonds by the Hydro-Electric Power Commission, guaranteed by the province. The commission or Government will in turn be protected by debentures deposited with them by the municipalities, covering the expenditure made. The interest and the sinking fund, together with the deficits, if any, will be met by the municipalities interested. The bonds covering construction will be for fifty years, with a provision not requiring sinking fund charges to be paid during the first ten years. The commission is empowered to enter into a contract with one or more municipalities with the approval of the lieutenant-governor-in-council. The agreement or contract must then be submitted to the electors qualified to vote upon money by-laws.

Franchise Renewal Negotiations in Kansas City

On April 27 Judge William C. Hook in the federal court at Kansas City ordered the receivers for the Metropolitan Street Railway to resume negotiations with the city for a new franchise. The negotiations will be taken up where they were left off at the time the receivers withdrew from the proposition in order to take the issue out of politics.

On the application of Jeremiah Smith, counsel for the Old Colony Trust Company, Boston, which holds more than $7,000,000 in overdue bonds, Judge Hook on the same day appointed Judge Herman Brumback special master to prepare all facts in the foreclosure suit so there will be no delay in foreclosing the property if the franchise negotiations do not materialize.

In the matter of the receivers paying 1 per cent extra interest pending final settlement or renewal of the loans Judge Hook said he would take that under advisement. Judge Hook said:

"This receivership has lasted three years now. That is longer than any receivership should last. The time has come when the bondholders have a right to insist on some sort of a settlement. The application of Mr. Smith to have a master appointed now to prepare for foreclosure proceedings, in case they come, is just. If negotiations fail, no time should be lost in the bondholders getting their money. Therefore I order the receivers to renew negotiations with the city, if the city is willing. I want them to push the negotiations with all the speed the importance of the question warrants. There ought not to be any difficulty in reaching a contract that the majority of voters will accept. If the majority accepts it it must be right."

When Attorney Smith asked that a special master be appointed to facilitate foreclosure proceedings should they come, Alexander New, counsel for the Kansas City Electric Company, expressed the opinion that no move toward foreclosure should be made until the voters have had a chance to express their opinion.

Frank Hagerman, attorney for the receivers of the company, presented on April 27 a long brief outlining the affairs of the company during the nearly three years of receivership and the two different attempts that had been made to secure franchise extensions. He stated that the second negotiations with the city ended on Jan. 6, "when it became apparent that some persons, opposed to the administration, instead of trying to make a contract upon business principles, were endeavoring to interpose obstacles and insert impossible conditions to create political issues for the spring, 1914, election and the receivers formally withdrew from the negotiations."

After reviewing the financial tribulations of the company and the demands made by the trustees for the various bondholders Mr. Hagerman told of immediate conditions. In this connection he said:

"It is to the real interest of the public and of everyone having a claim upon the property that it be kept together as a whole and not segregated or dismembered, as would be the case with foreclosures of the different securities. The purpose of the bill, for a receivership herein, was to permit the property to be maintained and operated as a whole until some plan could be worked out whereby it could be refinanced, foreclosure averted, new money raised to meet the demands of the city for increased service, and the fair value of the property preserved for its owners.

"This cannot be done unless the contractual relations with the city can be rearranged to the end that the company's franchise may be extended, renewed, or put in some modified form. Negotiations, therefore, are useless if the mortgages upon the property are permitted to be foreclosed now. In that case, all reason for the payment of any interest by the receivers would cease, and the situation become simply a scramble among security holders for each parcel upon which they may have a prior lien."

In accordance with the instructions from Judge Hook, Ford Harvey, one of the receivers of the company, wrote on the evening of April 27 to Henry L. Jost, who was recently re-elected Mayor of Kansas City, asking when it would be possible for the receivers to confer with the Mayor regarding a renewal of the franchise negotiations. The Mayor responded at once and conference was arranged for April 30.

In his inaugural address on April 20 Mr. Jost referred to the receivership and to the franchise renewal negotiations of the Metropolitan Street Railway as follows:

"When I became Mayor two years ago, I found that the preceding administration, with the full approval of the Kansas City *Star*, was negotiating with the street railway for a new franchise. The street railway people came to me and wanted to continue negotiations. I declined unless and until I could be satisfied that there was an absolute necessity for such negotiations to continue. After investigating conditions I discovered that the company was in financial difficulties and that it was delinquent in its obligations to Kansas City, and I continued the negotiations that the Brown administration had started with the hope that the matter could be adjusted. These negotiations continued until the middle of January. The receivers of the property then discontinued and withdrew. I want it distinctly understood that I am not soliciting a reopening of these negotiations.

"I am going to make a catalog and a statement of the matters and things in which the Metropolitan Street Railway is in default and insist on the performance of these obligations. The property of the company has been in the hands of receivers since June, 1911, during which time the city has received in the way of street railway transportation and benefits only such things as met with the approval of Federal Judge Hook. I am going to find out whether this kind of a thing can continue indefinitely. Miles of streets about these tracks are in wretched condition. I am going to make a special effort to repair the streets—I mean the part that belongs to the city—and I am going to know the reason why we cannot get streets repaired between and outside these street car lines.

"This street railway matter has got to come to a head. If there is a necessity for a new contract, if it is absolutely necessary there shall be a new agreement, that is another thing, but pending any such new contract or pending the final termination of the problem, there must be some distinctive performance on the part of this company of those things for which it stands indebted to the public. I propose to state promptly the things to which the city is entitled under the contract and I am going to demand personally from Judge Hook that these things be done and performed. This company has not, through its agents or anyone else, intimated any intention of asking for the resumption of these negotiations, and this statement has been inspired on that account."

Kentucky Workman's Compensation Act

The Kentucky workman's compensation act, which was passed at the last session of the State Legislature, has been signed by Governor McCreary and becomes a law on June 15, but does not become effective until Jan. 1, 1915. A maximum rate limit of $1.25 for each $100 of payroll is set out in the bill, though the compensation board, the creation of which is also provided for, will readjust the rates on July 1, 1915, and semi-annually thereafter. The law applies to practically all industries employing more than six persons other than casual employees and excepts domestic and agricultural pursuits.

The compensation board is to collect from employers a certain percentage of their payrolls, according to rates and classes and to distribute the fund it collects among injured employees or their dependents if they should be killed, according to a schedule of benefits which are named in the bill. The board, further, has great latitude with respect to all matters not specifically provided for. Street and interurban railways are included in class sixteen.

All employers subject to the act are required to notify the compensation board within a month after it is organized and must decide for themselves whether they come under its provisions. In like manner the employer must notify the board of accidents and give that body information whenever requested. Employers who elect not to accept the act may, by carrying their own risks and satisfying the board of their solvency, deal directly with their employees, paying the same benefits prescribed by the law. Or the employers may carry liability insurance in any company admitted to the State, the amounts to be paid to be not less than those provided in the act. As to benefits the act provides that 50 per cent of wages up to $12 a week and not less than $5 a week in any case shall be allowed for temporary total disability, not to exceed $3,750 in the aggregate. Compensation otherwise is about on the same level.

Progress of New York Municipal Railway Corporation

The New York Municipal Railway Corporation has made public a detailed progress report covering the work done up to April 1 on each of the construction contracts let by the New York Municipal Railway, in carrying out its part of the construction of new rapid transit lines under the dual plan. The work of reconstructing the Fourth Avenue subway at Thirty-eighth Street to permit a connection with the South Brooklyn lines through the Thirty-eighth Street cut is well under way. An order involving about $200,000 for steel has been placed with the American Bridge Company. The work of excavating the Thirty-eighth Street cut has proceeded to the extent of 50,000 yards of excavation and concrete is being placed as fast as the excavation work permits. This is the section between Fourth and Tenth Avenues, which provides a connection between the Fourth Avenue subway and the New Utrecht and Gravesend Avenue elevated lines.

The steel necessary for the additional reconstruction work now under way in the Centre Street loop has been delivered and the material for track laying is being delivered. The Municipal Railway has let a contract to the Sergeant-Maxwell Company for the construction of a storage yard on Second Avenue between Thirty-seventh and Thirty-ninth Streets, and in connection with this storage yard has contracted with Spearin & Preston for the construction of the pier on the waterfront. The yard will be used for handling track material for the city and for company material generally. It is expected that the yard will be completed some time in May and that the pier will be ready about the first of June. About 1700 tons of rails to be laid in the Fourth Avenue subway have been delivered. On March 20 a contract for the steel necessary for third-tracking the Fulton Street elevated line from Nostrand Avenue to Manhattan Junction was let to Milliken Brothers and the work of preparing plans is well advanced.

On the Liberty Avenue line the construction of foundations has been begun and the steel which was ordered some time ago is now being fabricated in the shops of the contractors. With respect to the physical connection between the Broadway and Myrtle Avenue elevated lines, the contract for which was let on July 8, 1913, to Terry & Tench, the contractors had by April 1 erected practically all the steel work. The track laying has been begun and this, with the installation of the interlocking switches and signal system, will practically complete the job.

George McNulty, Inc., the contractor for the reconstruction of the Sea Beach route reports very satisfactory progress.

On the Lutheran Cemetery extension, the contract for the first section was awarded on Aug. 28, 1913, to Cooper & Evans. On this contract all of the concrete has been placed and 1875 tons of steel, being 53 per cent of the total, had been delivered down to April 1. One thousand two hundred and fifty tons of steel, or 36 per cent of the total, had been erected. During March, 1822 lineal ft. of structure, or 19 per cent of the total extension, was completed. All of the column excavations have been made from Wyckoff Avenue to the end of the first section, and 10 per cent of the column bases were concreted by April 1. Columns have been erected from Cypress Avenue to a point east of Seneca Avenue, being 35 per cent of the total. The cost of the work done to April 1 was $135,331, which represents in general a total of 1585 lineal ft. of structure erected. The contract for the second section of the Lutheran Cemetery line was let to Fred Burnam on Feb. 27, 1914. Work on this contract started on March 2. The work during the month was of a preliminary nature.

Inquiry Into New Haven Finances

The inquiry at Washington into the affairs of the New York, New Haven & Hartford Railroad was directed on April 29 toward learning the details of the transactions between the New York, New Haven & Hartford Railroad and the New York, Westchester & Boston Railway, now operating a high-speed electric railway out of New York, and the New York & Portchester Railway. The principal witness was Oakleigh Thorne, formerly president of the Trust Company of America, who in conjunction with Marsden J. Perry, Providence, conducted the negotiations by which the franchises and other rights of both the New York, Westchester & Boston Railway and the New York & Portchester Railway were acquired by the New Haven Railroad. A feature of the testimony was the introduction of a letter written in October, 1906, by Mr. Thorne to C. S. Mellen, then president of the New Haven Railroad. In this letter Mr. Thorne referred to the possible "nuisance" value of the rights of the two companies previously mentioned and intimated that there was a division of sentiment in political circles in connection with the proposed grants to the two companies and that it would be extremely difficult for either of the roads to get any rights because of this division of sentiment. He said: "The fact is that when anything goes through both sides will have to be taken care of and by eliminating this I can greatly facilitate the matter and reduce cost."

Mr. Thorne did not remember the circumstances under which he had become interested in the negotiations. He explained that he had dealt directly with Dick & Robinson in acquiring the stock of the New York, Westchester & Boston Railway and with W. C. Gotshall, president of the New York & Portchester Railway. These men, he said, acquired the stock which he needed and had turned it over to him. He said that $11,200,000 in all had been expended by the Millbrook Company. Asked for the details of these expenditures he said: "The books of the Milbrook Company were gone over by a firm of auditors and reported to be perfectly satisfactory. I could not make up a detailed account of expenditures because the books were destroyed after everything was settled." Other testimony indicated that the amount paid for the property of the Portchester Railway, chiefly franchises, was more than $1,000,000.

L. S. Miller, president of the New York, Westchester & Boston Railway and the Millbrook Company, was quoted as stating that the books of the latter company would not show the detailed expenditures. C. S. Sweetland, president of the Providence Banking Company, testified that he had been unable to locate the books of the Rhode Island Securities Company and he thought they had been burned, but if they had it was done inadvertently. He simply acted as transfer agent for the company and knew nothing about the details of its business.

New York Rapid Transit Matters Acted Upon Recently

Several important rapid transit matters were acted upon by the Public Service Commission for the First District during the week ended April 25. The commission awarded one contract for the construction of a section of the Seventh Avenue subway in Manhattan, opened bids for the construction of a section of the Broadway subway in Manhattan, rejected all bids and decided to readvertise for proposals for the section covering the junction between the new Seventh Avenue subway and the existing subway at Times Square, and directed the advertisement for bids for the construction of two new tunnels under the East River. The contract awarded covers that portion of the Seventh Avenue subway between Battery Place to a point just south of Vesey Street. The successful bidder was the Rapid Transit Subway Construction Company, at $2,121,077. The road will be a two-track line and must be finished within thirty-three months.

The section upon which bids were opened was Section No. 2 of Routes Nos. 4 and 36, which lies under Broadway between Twenty-sixth and Thirty-eighth Streets. Here the subway will be a four-track line, with a local station at Twenty-eighth Street and an express station at Thirty-fourth Street. On the unofficial figures, reported by representatives of the bidders, the Thomas J. Buckley Engineering Company, New York, had the lowest bid, at $2,450,000. The commission is now considering the award of the contract for this section.

The section upon which all bids were rejected was Section No. 6-A of Routes Nos. 4 and 38. Bids for the construction of this section were opened last March and the lowest bidder was the Oscar Daniels Company, at $304,316. The Interborough Rapid Transit Company, which operates the existing subway, protested against the award of the contract to the Daniels Company on the ground that its bid showed that the company had not the proper conception of the difficulties of the work or the dangers to passengers in the subway. One of the items upon which bidders submitted figures was for the support of the subway and the protection of train service in it. On this item the Oscar Daniels Company bid only $12,000, while the Rapid Transit Subway Construction Company, which is allied with the Interborough Rapid Transit Company, bid $135,000. After conferences with the bidders and with Mayor Mitchel and President McAneny, of the Board of Aldermen, who is chairman of the transit committee of the Board of Estimate and Apportionment, the commission decided to reject all bids and readvertise. Accordingly, the commission will receive bids anew and open the same on May 13.

Bids for the construction of the two new tunnels under the East River from downtown Manhattan will be opened on May 22. The work on these tunnels will be the most difficult and expensive in the whole dual system. One of the tunnels will be operated by the Interborough Rapid Transit Company and will run from Old Slip, Manhattan, to Clark Street, Brooklyn. The other will be operated by the New York Municipal Railway Corporation and will run from Whitehall Street, Manhattan, to Montague Street, Brooklyn. Each tunnel will be built by the shield method, with the aid of compressed air. Each will consist of two circular cast iron tubes, one for each track. Both tunnels will be owned by the city of New York, although the money to pay for the tunnel for operation by the Interborough Company will be mainly supplied by that company under the dual system agreements. The cost of the tunnel for operation by the New York Municipal Railway Corporation will be borne wholly by the city of New York.

Ohio Commission Seeks Additional Authority

Specific legislation giving the Public Utilities Commission of Ohio greater power to supervise rates and to investigate and order changed the "rules, regulations and practices of carriers" is asked by the commission in its annual report, the first since the commission was reorganized in August, 1913. The commission desires authority as follows:

To suspend or postpone the effective date of freight tariff schedules.

Fix a definite time for the payment or assessments levied on railroads and utilities for the maintenance of the commission.

Require notice to and approval by the commission prior to the abandonment of stops, stations and agencies by steam and interurban railroads.

Amend the existing statute specifying the number of trainmen required on passenger trains so the law may be readily understood, applied and interpreted.

Require railroads and public utilities to notify the commission immediately of changes in the personnel of the responsible officers.

Require the installation of block signals on railroads where gross earnings justify such expenditures.

Require railroads to give thirty days' notice of changes in rates unless otherwise ordered by commission.

Require railroad companies to pay the expenses and loss in wages of their employees compelled to appear before the commission in investigations made necessary by the company's neglect or default.

Require all actions which may be brought against the commission in the court of common pleas to be brought in Franklin County.

Order the refunding of illegal or unreasonable charges by railroads and utilities and exempt the members of the commission and all its employees from being compelled to testify in civil actions, when the matter out of which the action grew has been officially investigated by the commission or its employees.

Repeal the law which fixes the fiscal year for railroad companies.

On its own motion to investigate and to make appropriate orders affecting the rules, regulations and practices of carriers.

Reduction in Fare Refused.—The Aldermen have refused the request of the workmen of the city for the sale of eight street car tickets for a quarter, good during the noon hour on the Regina (Sask.) Municipal Railway.

Electrification of Canadian Road.—The work of electrifying the Kerr Lake branch of the Timiskaming & Northern Ontario Railway for the use of the Nipissing Central Railway will probably be begun May 4. Practically all the material is now on the ground.

Terms for Extensions in Seattle.—Members of the franchise committee of the Charter Commission of Seattle, Wash., will endeavor at the meeting of the City Council in June to break the deadlock between the Council and the Puget Sound Traction, Light & Power Company, over street railway extensions. The committee has decided to amend the present charter to provide that the company may be granted permission to build extensions on terms substantially the same as those made for the original lines.

Peculiar Condition in New York Commission.—The term of office of John E. Eustis of the Public Service Commission of the First District of New York expired on Feb. 1, 1914. Understanding that a successor was to be appointed, Mr. Eustis went on vacation on Feb. 7. He arrived in New York recently, after an absence of more than seventy-five days, to find himself still in office, Surrogate Schulz, who was nominated for the office of commissioner by Governor Glynn, having failed to qualify as commissioner. It is not now expected that Mr. Schulz will accept, nor can another be confirmed until after May 4.

Public Service Commission Not Acceptable as Arbitrators.—A committee of the union employees of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., has notified Governor Ralston of Indiana that his proposal that three members of the Public Service Commission act as a permanent board of arbitration would not be acceptable. The letter of the men to the Governor is concluded as follows: "The employees again ask you to use your good offices in prevailing upon the company to accept some fair means of establishing an arbitration board other than the gentlemen of the commission."

Negotiations for Purchase of Seattle, Renton & Southern Railway.—Negotiations looking to the sale of the Seattle, Renton & Southern Railway to the city of Seattle, abandoned several months ago, are to be reopened, and the property offered to the municipality on terms that will permit payment of the purchase price from the earnings. Mayor Gill is known to favor the purchase of the property in order to end the controversy in the Rainier Valley, which has finally resulted in a plan for the city to parallel the line. Harold Preston has been retained by the receivers to represent the company in the new negotiations.

Appointment to Detroit Commission.—James Wilkie, a member of the water commission, has been appointed by Mayor Marx to succeed W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees, on the Detroit Street Railway Commission. Mr. Mahon's reasons for resigning from the commission were read before the Federation of Labor, which backed his appointment to the board. He charged that the commission was not taking the short cut to municipal ownership of the lines of the Detroit United Railway in Detroit and that the issue was being used as a political football by the Marx administration and the commission. The charges are denied by the administration's supporters.

State Constabulary Called in Pennsylvania Strike.—Because the officers of the Webster, Monessen, Belle Vernon & Fayette City Street Railway, Charleroi, Pa., refused to accede to the demand of the employees that the union be recognized in all dealings, the motormen and conductors went out on strike on April 25. The company is operating its cars with men imported from Philadelphia and Pittsburgh. The strikers have put a line of motor buses and hacks into service between Charleroi, Monessen, Fayette City and Belle Vernon. A corps of the State constabulary has been assigned to duty at Charleroi. The company has placed guards on its cars.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MARYLAND

Governor Goldsborough has signed the workmen's compensation act and the bill relating to the tax on corporations.

MASSACHUSETTS

The House has killed the bill reducing the membership of the Boston Transit Commission from five to three, sustaining a recent adverse committee report on the measure. The committee on metropolitan affairs has referred to the next Legislature the petition for an extension of the Boylston Street subway in Boston, and has voted to report a permissive bill allowing the Boston Elevated Railway to build a station in the Boylston Street subway at Arlington Street.

NEW YORK

Finance alone will be considered according to the proclamation of Governon Glynn for the extraordinary session of the Legislature on May 4. The Governor has signed the act to amend the tax law by exempting from the additional franchise tax on transportation and transmission corporations a ferry company operating between any of the boroughs of New York City under a lease granted by the city.

Mayor Mitchell of New York City has vetoed the bill to amend the rapid transit act so as to allow the Public Service Commission, with the approval of the Board of Estimate, to employ persons and purchase machinery to construct subways, and to permit the commission to award contracts not exceeding $25,000 without public letting.

The Governor has vetoed the bill to amend the code of criminal procedure in relation to the payment of expenses of prosecution of crimes committed on railway trains. The Governor has vetoed the bill to amend the business corporations law in relation to proxies and earnings. The purpose of the bill was to amend the co-operative law enacted last year by striking therefrom the provisions for division of profits on the basis of patronage, which is the fundamental principle of co-operative companies. The Governor has approved the bill to amend the labor law by providing that the stipulation for one day of rest in seven shall not apply to employees engaged in any industrial or manufacturing process in which the regular day's work of such employee is not more than eight hours' duration. He has also signed the bill to extend from Dec. 31, 1914, to Dec. 31, 1915, the time within which the International Railway and the Crosstown Street Railway, Buffalo, may complete and begin operation of their roads.

Gov. Glynn has vetoed the bill permitting a company composed of all the trunk line railroads reaching New York to operate a city owned marginal railway along the Brooklyn waterfront from Brooklyn Bridge to Sixty-fifth Street.

The Governor has approved the act amending Section 186 of the railroad law, by providing that a street surface railroad shall not lose its corporate existence if it has completed a portion, instead of the greater portion, as at present, of its route, "or of extension," within ten years of the filing of its certificate and which was operating such portion on March 23, 1912, and had operated such portion continuously for five years prior thereto.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Associations

A meeting of the Central Electric Traffic Association will be held at the Beckle House, Dayton, Ohio, on May 19. The summer meeting of the Central Electric Railway Association will be held at the Secor Hotel, Toledo, Ohio, on June 25 and 26.

Pennsylvania Street Railways Association

The following program has been announced for the meeting of the Pennsylvania Street Railways Association to be held at the Board of Trade Building, Harrisburg, Pa., on May 13:

Address by Edmund James Cattell, city statistician of Philadelphia.

Discussion of problems submitted to the "Question Box."

Paper, "An Analysis of Damage Claims Arising from Street Railway Transportation," by Cecil Rice, superintendent of the claim department of the Pittsburgh Railways.

Informal talks by members, manufacturers and supply men.

Adjournment for luncheon at the Harrisburg Club.

The business session of the association will be held on the evening of May 12.

Southwestern Electrical & Gas Association

H. S. Cooper, secretary of the Southwestern Electrical & Gas Association, Slaughter Building, Dallas, Tex., has issued the preliminary program for the tenth annual convention of the association which is to be held at the Hotel Galvez, Galveston, Tex., on May 20, 21, 22 and 23. Besides the general sessions, at which matters of interest and importance to all the different public utilities represented in the association will be discussed, separate and distinct sessions have been arranged for the gas, railway, electric light and power interests. There will be very few formal papers, the idea being to stimulate discussion, and the papers and addresses which will be delivered will have this object for their end. There will be a special session for the accountants. Among the prominent features will be:

A symposium on "Safety First" by a claim agent, a superintendent of transportation, a master mechanic, an electric light and power manager, a gas superintendent and a member of the general public.

A paper on "Fire Prevention Versus Fire Protection" by the general manager of a combined railway, light, gas and water property.

A paper on "Public Policy of Public Corporations" by the general superintendent of a management association having more than twenty separate properties in the Southwest.

A paper on the practical side of "Commercial Departments" by the general manager of one of the largest light and power properties in the State.

A paper on "Economy in Use of Power in the Operation of Cars" by a superintendent of railways who has given this especial—and successful—attention.

A symposium on rates by several prominent gas and electric men who have made this subject a specialty.

The question box will include the most generally interesting inquiries received by the association office since the last convention, and to this will be appended a digest of all the replies received from circular inquiry made by the secretary of the association. Many of these inquiries were not fully answered, and as many of the replies may not be convincing to others it is anticipated that this type of question box will provoke discussion. The railroads have arranged to give a rate of 1 1-3 fares for the round trip to and from Galveston from any part of Texas. Delegates from the East are advised to address Fred Johnson, district manager of the Wagner Electric Company, 1115 New Bank of Commerce Building, St. Louis. Applications for hotel reservations should be made to the hotel at which the delegate desires to stop or to Marion Douglas, chairman of the hotel committee, Security Building, Galveston.

Financial and Corporate

Stock and Money Markets

April 29, 1914.

The tone of the trading on the New York Stock Exchange to-day was uncertain. At the beginning of business fractional advances were made on demand from Europe. The tone held firm even in the late afternoon, although trading diminished. Reading, Union Pacific and New York, Ontario & Western yielded about a point under small sales. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½@3 per cent; four months, 3¼@3½ per cent. Six months, 3½@3¾ per cent.

In the early trading in Philadelphia to-day Philadelphia Rapid Transit was in supply at 13½. Later it recovered to 14. American Railways sold at 37½.

The market in Chicago was extremely dull to-day. The only railway issue dealt in was Chicago Railway's 2's, sales of which totaled only 150 shares.

The Boston market opened firm. Boston Elevated and West End were the only electric railway issues dealt in.

The market for stocks was broader to-day in Baltimore. The bond transactions totaled $35,700, par value, half of which were in United Railways 4's.

Quotations of traction and manufacturing securities as compared with last week follow:

	Apr. 22	Apr. 29
American Brake Shoe & Foundry (com.)	84½	83
American Brake Shoe & Foundry (pref.)	134½	130
American Cities Company (com.)	35½	35½
American Cities Company (pref.)	60¾	60⅝
American Light & Traction Company (com.)	342	340
American Light & Traction Company (pref.)	105½	105½
American Railways Company	37	37½
Aurora, Elgin & Chicago Railroad (com.)	36	32½
Aurora, Elgin & Chicago Railroad (pref.)	37	37
Boston Elevated Railway	78½	78
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company	89⅝	90
Capital Traction Company, Washington	100	100
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	90	90
Chicago Railways, ptcptg., ctf. 2	31½	30½
Chicago Railways, ptcptg., ctf. 3	6	6
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	103	102½
Cleveland Railway	103¾	103¾
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*2	*2
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*71	*71
Detroit United Railway	a80	a80
General Electric Company	143	144
Georgia Railway & Electric Company (com.)	120	120½
Georgia Railway & Electric Company (pref.)	86½	87
Interborough-Metropolitan Company (com.)	14	14¼
Interborough-Metropolitan Company (pref.)	60⅝	60¼
International Traction Company (com.)	*80	*80
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	*15	*15
Kansas City Railway & Light Company (pref.)	*35	a35
Lake Shore Electric Railway (com.)	*5	*5
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	22	*22
Manhattan Railway	131	131½
Massachusetts Electric Companies (com.)	9	9¼
Massachusetts Electric Companies (pref.)	59	57
Milwaukee Electric Ry. & Light Co. (pref.)	*95	95
Norfolk Railway & Light Company	25¾	25¾
North American Company	74	74
Northern Ohio Traction & Light Co. (com.)	70	70
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	40	38¾
Philadelphia Company, Pittsburgh (pref.)	38	38¼
Philadelphia Rapid Transit Company	14¾	13½
Portland Railway, Light & Power Company	51	51
Public Service Corporation	112	112
Third Avenue Railway, New York	40	39
Toledo Traction, Light & Power Co. (com.)	a20	a20
Toledo Traction, Light & Power Co. (pref.)	a70	a70
Twin City Rapid Transit Co., Min'apolis (com.)	103	103
Union Traction Company of Indiana (com.)	11½	*11½
Union Traction Company of Indiana (1st pref.)	75	*75
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore)	26½	26⅝
United Rys. Inv. Company (com.)	15	15
United Rys. Inv. Company (pref.)	43	43
Virginia Railway & Power Company (com.)	50⅝	56
Virginia Railway & Power Company (pref.)	96	87
Washington Ry. & Electric Company (com.)	87¾	87½
Washington Ry. & Electric Company (pref.)	85½	84½
West End Street Railway, Boston (com.)	68	a68
West End Street Railway, Boston (pref.)	90	82
Westinghouse Elec. & Mfg. Company	73	73
Westinghouse Elec. & Mfg. Co. (1st pref.)	117	118½

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* Last sale. a Asked.

ANNUAL REPORTS

The Delaware & Hudson Company

According to the eighty-fourth annual report of the Delaware & Hudson Company for the year ended Dec. 31, 1913, the increases in the net operating revenues of the allied electric railways were as follows: The United Traction Company, $36,652; Hudson Valley Railway, $10,551; Schenectady Railway, $41,318. The net operating revenues of the Troy & New England Railway and the Plattsburgh Traction Company decreased $378 and $391 respectively. Dividends of 4 per cent for 1913 were declared on the capital stock of the United Traction Company, 6 per cent on that of the Schenectady Railway, 2½ per cent on that of the Troy & New England Railway and 5 per cent on that of the Plattsburgh Traction Company.

The United Traction Company reconstructed and repaved 2.09 miles of single track, resurfaced and realigned 5.34 miles of single track and constructed one mile of additional single track. During the year twelve new double-truck prepayment cars were purchased by the Northern New York Development Company and leased to the United Traction Company.

The high water during March, 1913, caused a loss to the Hudson Valley Railway through a reduction of revenues and an increase in operating expenses of approximately $11,000. Besides the reconstruction and the paving of various sections of track, this company constructed a new bridge at Fort Edward, N. Y., and put into service three new interurban cars on the line between Glen Falls and Troy.

One of the most interesting features of the Delaware & Hudson Company report is the section devoted to a discussion of the causes which during the recent years have added to the operating and financial difficulties encountered by railways. During 1913, on account of wage increases to engineers, firemen, conductors and trainmen and on account of full crew legislation, the railroad paid to its employees $8,508,673, which was $1,122,780, or 15.2 per cent, in excess of the amount that would have been paid for the same services at the rates of compensation that were in force June 30, 1910.

An analysis of the change since 1909 in the prices of materials and supplies showed that while there had been both increases and decreases, the former were in connection with the most important articles and the most extensive purchases. The increased cost on the basis of the 1912 purchases was $326,603, the difference between a total increase of $358,277 in the cost of articles that advanced in prices and a total decrease of $31,673 in the cost of those that were reduced in price. The aggregate sum expended in 1912 was 6.65 per cent in excess of an amount based on 1909 prices.

The operating expenses of the company were also increased through federal and state regulation in the form of laws covering hours of service, full crews, filing of rate schedules, periodical reports, employer's liability, elimination of grade crossings and the like. The expenses necessitated by laws along these lines ranged from $78,716 in 1907 to $325,497 in 1913, a total of $1,525,919 for the entire period.

The greatest increase, however, was in taxes. According to a table compiled, the property investment increased 7.4 per cent between 1910 and 1913, the operating revenues 21.06 per cent, the operating expenses 28.2 per cent and the taxes 46.34 per cent. Stated in amounts, there was an increase from $237,539 in 1903 to $621,190 in 1913, or 162 per cent. According to the report, part of this increase in 1913 was due to the double taxation on corporation dividends under the income tax and the removal of the $5,000 exemption limit. This added about $15,000 to the tax payments of the company, and the assumption of the income tax on the so-called "tax free" bonds from March 1 to Dec. 31, 1913, added another $3,000.

The report also discusses the question of rates as affecting railroad income and in this connection particularly mentions the lack of a thoroughly compensatory basis of payment for the parcel post service now rendered by the railways and also the need of higher freight rates. It is interesting to note that two reasons assigned for difficulties in obtaining necessary railroad capital are the competition of two classes of bonds, municipal and industrial. No mention is made of the increased popularity of electric railway and other public utility securities.

The report states that the sum of $25,217 was expended for the purchase of one gas-electric car.

Public Service Railway

The income statement of the Public Service Railway, Newark, N. J., for the years ended Dec. 31, 1912 and 1913, follows:

	1913	1912
Total revenue from transportation	$15,377,906	$14,602,901
Total revenue from operation other than transportation	156,011	152,484
Total operating revenue	$15,533,917	$14,755,385
Operating revenue deductions:		
Way and structures	$1,428,054	$1,464,636
Maintenance of equipment	1,074,976	976,089
Traffic	3,389	4,219
Conducting transportation	4,896,893	4,736,246
General and miscellaneous	1,278,227	1,205,574
Total	$8,681,539	$8,386,764
Taxes	1,106,490	1,051,716
Total operating revenue deductions	$9,788,029	$9,438,480
Operating income—railway	$5,745,888	$5,316,905
Operating income—other operations	14,343	17,017
Total operating income	$5,760,231	$5,333,922
Non-operating revenue	171,175	195,936
Gross income	$5,931,406	$5,529,858
Income deductions	5,115,408	4,961,302
Net income	$815,996	$568,556
Appropriations (excluding dividends)	180,726	Cr. 1,967
	$635,270	$570,523

According to the above statement the total revenue from transportation increased 5.3 per cent during 1913; total revenue from operations other than transportation, 2.3 per cent, and total operating revenue, 5.28 per cent. The expenditures for the maintenance of way and structures decreased 2.49 per cent, the expenditures for maintenance of equipment increased 10.1 per cent the traffic expenses decreased 19.6 per cent, the passenger transportation increased 3.4 per cent and the general and miscellaneous expenses increased 6.02 per cent. Taxes showed an increase of 5.2 per cent during the period. The railway operating income increased 8.06 per cent, the operating income from other operations decreased 15.7 per cent, the non-operating income decreased 12.1 per cent and the gross income increased 7.25 per cent. Income deductions increased 3.1 per cent and the net income increased 43.5 per cent.

The revenue passengers carried during 1913 numbered 308,619,532 and the transfers and passes 95,377,279, making a total of 402,996,811. The percentage of passengers carried on transfers was 21.1 per cent and the average fare per passenger was 3.8 cents. The car mileage amounted to 49,434,185 and the car hours numbered 5,675,982. Passenger receipts per car mile were 31.066 cents and the passenger receipts per car hour were $2.71.

The balance sheet of the company as of Dec. 31, 1913, follows:

ASSETS:	
Fixed capital installed prior to Jan. 1, 1911	$82,148,463
Fixed capital installed since Dec. 31, 1910	5,325,594
Fixed capital in other departments	40
Materials and supplies	450,476
Cash	195,392
Bills receivable	850
Accounts receivable	127,737
Interest and dividends receivable	27,106
Other current assets	39,625
Other special deposits	7,710
Investments	134,361
Prepayments	153,055
Unamortized debt discount and expense	76,176
	$88,686,585

LIABILITIES:	
Funded debt	$42,070,000
Taxes accrued	183,093
Interest accrued	414,034
Other accrued liabilities	243,120
Advances from other corporations (Public Service Corporation of New Jersey)	6,309,250
Other accounts payable	1,062,533
Other unfunded debt	203,435
Accrued amortization of capital	35,579
Unamortized premium on debt	10,066
Casualty and insurance reserve	51,999
Capital stock	38,000,000
Corporate surplus	103,475
	$88,686,584

Increase In Stock of the Taylor-Wharton Iron & Steel Company

An issue of $500,000 additional common stock of the Taylor-Wharton Iron & Steel Company has been offered for sale by William Morris Imbrie & Company, New York, N. Y., at 110. The subscriptions for the stock were closed on April 27. On that day the issue was oversubscribed about two and one-half times. The proceeds of the stock will provide for a part of the cost of erection of a new plant in Easton, Pa., and for improvements and extensions to the existing plant at High Bridge, N. J. The two points are about 20 miles apart. When the new plant at Easton is completed it is expected that most of the railway material manufactured by the company will be made at that point.

A letter written by Knox Taylor, president of the company, addressed to the bankers who offered the stock, gives detailed information in regard to the plans for development. The new issue of $500,000 of common stock is in addition to the following: $1,600,000 of 7 per cent cumulative preferred stock outstanding out of an authorized issue of $2,000,000; $850,000 of common stock of an authorized issue of $2,000,000; and $1,250,000 of first mortgage sinking fund 6 per cent bonds of an authorized issue of $2,000,000. The expenditures for the new plant will aggregate between $1,800,000 and $2,000,000, which will be provided out of earnings, through the present financing and by the sale of property which the new plant will replace.

Mr. Taylor says that at the new Easton plant, under low production cost conditions, the company will be able materially to increase the business in railway track work where the use of manganese steel is more and more becoming a very important factor. The acquisition of the Wharton company proved a very beneficial arrangement. During the first year of operation the earnings of the Taylor-Wharton Company increased considerably over the average combined earnings of the separate companies for ten years.

Operating earnings of the company for the year ended Dec. 31, 1913, after the deduction of all expenses including administrative and overhead charges, but before the deduction of charges for maintenance and depreciation, were $638,396. From this there were deducted the sums of $159,869 for maintenance and $96,333 for depreciation, or a total of $256,202. This left a balance of $432,194. From this amount $73,165 was deducted for special disbursements and to mark down inventory below cost price to offset a fall in the market price of raw material.

The balance sheet shows that, exclusive of various reserve and special depreciation accounts, the book value of the common stock of the company on Dec. 31, 1913, was over $200 per share in tangible assets, with no value for processes, patents or good-will.

Public Utility Investments

The speaker at the finance forum held under the auspices of the Public Utility section of the West Side Y. M. C. A. in New York City on April 27 was W. H. Gardiner, statistician for Henry L. Doherty & Company, New York. The topic was "Investments in Public Utility and How Held." The speaker called attention to the increase in the volume of outstanding securities of public utilities as compared with those of steam railroads. It appears that during the last decade the volume of the former has increased by 100 per cent while that of the latter has increased only 50 per cent. Public utility service is more difficult than railroad service for the reason that utilities are subject to instant demand for service. Mr. Gardiner quoted Mr. Vanderlip as stating that $400,000,000 per year will be needed during the next few years to keep the electric light business up to the demand. The public utilities are expanding so rapidly that when all are included, $23,000,000 per week will be required for their development. Unless utilities can finance extensions, trouble is bound to follow because the public constantly demands improved service.

The speaker explained the relation of the holding company to the underlying corporations and to their financial needs. In the electric light, gas and traction business some $8,000,000,000 of securities are outstanding, of which about 75 per cent are administered by holding companies. These companies make it possible for small investors to diversify their holdings. Formerly many small companies were financed by a few individuals in each case, and the holdings of these were, on the average, quite large. The present tendency as illustrated for example, in the case of the Doherty company, is to distribute securities among a large number of shareholders. This company has 25,000 shareholders with an average holding of $630 in securities each. This average holding is about one-half that of all steam railroad securities. It is not far from the average holding in the Pennsylvania Railroad and the United States Steel Corporation, which have been very successful in their efforts to distribute their securities widely.

After these introductory remarks Mr. Gardiner discussed some of the recent fundamental changes in financial matters. He called attention to the fact that banks are transferring their holdings from railroad, state, municipal and other bonds to public utility bonds. He stated that authorized issues of bonds are usually too small, due to the fact that when the issues were authorized the increase in business was underestimated. Such a condition is always a clog on the development of a company's business. Regulation gives stability to the earning power of securities and is establishing confidence. Taking up the matter of bonds in detail he called attention to the historical development of the bond which was originally issued against real estate only. At the time when this was the practice special equipment formed but a small part of the investment in the industry. Now the reverse is true. Bonds are therefore issued against this equipment. In practice money has to be obtained when needed at the best price possible. For a regulating body to dictate the terms under which securities may be issued sometimes results in an unpopular bond issue. The speaker called attention to the present peculiar status of public utility securities. In accordance with the data which he showed in tabular form the earning power of public utilities is greater than that of railroads and in many cases greater than that of industrial securities. At the same time the average of quotations for public utility securities is much less than the average for railroad stocks. A diagram exhibited by the speaker showed the relative value of traction and other securities.

Attitude of Investment Bankers' Association on "Blue Sky" Law

The attitude of the Investment Bankers' Association of America toward legislation, particularly as regards "blue sky" laws, is set forth in a statement by the association's president, George B. Caldwell, which follows in part:

"The Investment Bankers' Association is whole-heartedly in sympathy with the aim of the so-called 'blue sky' laws. The Kansas law read well on the surface, though upon analysis it was impossible of operation. As the court has held, it required the State to approve not only the security, but the price at which the security was sold. Intended for the risky investment promoter, it applied also to the dealer in genuine investment securities, buying and selling only secured investment bonds paying less than 6 per cent.

"It very quickly became evident that business could not be done under such laws. There are no States, excepting, possibly, Maine, Wisconsin and Ohio, in which the 'blue sky' laws enacted have been found capable of enforcement. Their provisions are so drastic and unworkable that the officials charged with their enforcement have tried in one way or another to waive the provisions of the law. This does not always help the investment dealer. In Michigan, every violation of the law is made a felony; and in Iowa, every dealer is required to give a bond in the sum of $5,000, conditioned upon a strict compliance with the law.

"The Investment Bankers' Association was compelled to take the lead in attacking the chief laws enacted. I hope our course will influence others to join with us or accept our co-operation in working out an honest and wholesale policy."

American Water Works & Electric Company, Pittsburgh, Pa.—E. C. Converse, former president of the Bankers Trust Company; William Nelson Cromwell of Sullivan & Cromwell; Howland Davis of Blake Brothers & Company, Andrew

Squire of Squire, Sanders & Dempsey, Cleveland, and Albert H. Wiggin, president of the Chase National Bank, have been selected by the reorganization committee of the American Water Works & Guarantee Company to act as voting trustees of the new American Water Works & Electric Company stock. The trust will have the voting power of the three classes of stock for a period of five years. The committee announced that Robert Wetherill of R. Wetherill & Company, Chester, Pa., has agreed to act as a member of the board of directors of the new company in addition to those whose names were published in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, page 794. A charter was issued at Richmond, Va., on April 27 to the American Water & Electric Company, Richmond, with a capital of $25,000,000. H. Hobart Porter is president; Henry H. Pierce, New York, secretary, and Charles L. Scott, Hempstead, N. Y., treasurer.

Bay State Street Railway, Boston, Mass.—The Public Service Commission of Massachusetts has authorized the Bay State Street Railway to issue $230,000 of fifty-year 4 per cent bonds of the Boston & Northern Street Railway and $210,000 of fifty-year 4 per cent bonds of the Old Colony Street Railway. The proceeds will be used to fund floating indebtedness incurred in the construction and improvements made to the properties. The bonds are dated July 1, 1914.

Cape Breton Electric Company, Ltd., Sydney, N. S.—The stockholders of the Cape Breton Electric Company will vote on May 5 on a proposition to increase the authorized capital stock from $250,000 of preferred stock to $500,000 to provide for extensions. There is outstanding a common stock issue of $1,625,000.

Chicago (Ill.) Elevated Railways.—Samuel Insull, Henry A. Blair and Ira M. Cobe, composing the executive board of the Chicago Elevated Railways, have instructed engineers of the elevated and surface lines to prepare new figures looking toward a merger of all of the traction interests of Chicago, both elevated and surface.

Cleveland (Ohio) Railway.—It is announced that of the $2,141,000 of stock of the Cleveland Railway recently offered to stockholders about $2,000,000 has been sold. Stockholders had the right to pay one half on April 1 and one half on July 1 but the majority elected to pay in full on April 1. Up to April 1 checks for $1,500,000 had been received and the company paid off $1,230,000 of floating debt, on which 5 per cent and 6 per cent interest was paid.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—The Columbia Railway, Gas & Electric Company has sold to Redmond & Company $3,000,000 of first mortgage 5 per cent bonds of the Parr Shoals Power Company, a subsidiary, guaranteed principal and interest by the Columbia Railway, Gas & Electric Company. The bonds are being offered at 90 and interest to yield 5⅝ per cent.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Initial dividends of 1¼ per cent have been declared on the preferred stock, Series 3, and the common stock of the Columbus Railway, Power & Light Company, both payable on May 1 to holders of record of April 18.

Grand Valley Railway, Brantford, Ont.—On April 22 Justice Middleton made an order under which J. G. Wallace was to take possession on April 23 of the Woodstock, Thames Valley & Ingersoll Electric Railway from E. B. Stockdale, who has been receiver of the Grand Valley Railway, the parent road, since May 29, 1912. Mr. Wallace was appointed trustee recently to represent certain bondholders under a mortgage by the Woodstock, Thames Valley & Ingersoll Electric Railway to the Harrisburg Trust Company.

Hagerstown & Frederick Railway, Frederick, Md.—The recently elected executive committee of the Hagerstown & Frederick Railway has organized as a board of control. Henry Holzapfel, Jr., was elected chairman. The other members of the committee are: Alexander Armstrong, Jr., Hagerstown; F. Howard Warfield, Baltimore; Emory L. Coblentz, Frederick, and Cyrus Frank Flook, Myersville.

International Railway, Buffalo, N. Y.—Commissioner Hodson of the Public Service Commission of the Second District of New York, was to hold a hearing at Buffalo on May 2, on the application of the International Railway for authority to issue $502,000 of fifty-year 5 per cent bonds under its refunding and improvement mortgage. The petitioner proposes to erect on Franklin and Pearl Streets in Buffalo a building to be used for its offices and as a terminal for its interurban cars. The company has purchased the necessary land, and the present buildings will be torn down. The petition sets forth that the $502,000 requested will be used as follows: To reimburse the treasury of the company for money already paid $10,000; cash still to be paid $42,000; to take up the present mortgage $250,000, and to construct and furnish the new building $200,000.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee representing the holders of the bonds of the Kansas City Railway & Light Company deposited on the agreement date of March 10 has arranged for the payment at the office of the Equitable Trust Company of New York interest due May 1 on these bonds. Owing to the fact that some of the holders of the bonds have been unable to deposit within the time originally fixed, the committee is permitting further deposits to be made, but this permission is subject to withdrawal without notice.

Metropolitan Street Railway, Kansas City, Mo.—On April 27 attorneys for the bondholders of the Metropolitan Street Railway asked the federal court for expedition of the foreclosure proceedings filed against the company in 1911, or an increased rate of interest on overdue obligations. Representatives of the city were present at the hearing, at which Federal Judge Hook presided, to protest against any increase in interest. Overdue obligations of the company aggregate $23,000,000. The holders want their principal or an increase of 1 per cent in addition to the rates of 6 and 7 per cent which have been paid by the company pending a final settlement. The company was represented at the hearing by Frank Hagerman, attorney for the receivers; the city by Judge Andrew F. Evans, city counselor; the Old Colony Trust Company, Boston, which instituted the proceedings that resulted in the receivership, by Jeremiah Smith, Boston, and H. L. McCune, Kansas City, and the New York Trust Company and others by Byrne & McCutcheon, New York.

Pittsburgh & Butler Street Railway, Pittsburgh, Pa.—The plan for increasing the bonded indebtedness of the Pittsburgh & Butler Street Railway from $2,000,000 to $4,000,000 contemplates the creation of $500,000 of general mortgage 5 per cent bonds due in 1936 and $1,500,000 of income bonds due in 1936. As stated in the ELECTRIC RAILWAY JOURNAL of April 25, 1914, page 946, the stockholders will vote on the plan on June 12.

Portland Railway, Light & Power Company, Portland, Ore.—The $1,064,000 of first and refunding mortgage 5 per cent bonds recently purchased by Drexel & Company, Philadelphia, and Lee Higginson & Company, New York, and offered at 93½ and interest have been sold. The proceeds of $964,000 of these bonds are to reimburse the company in part for expenditures for additions and improvements since Jan. 1, 1912, at not exceeding $80 in bonds for each $100 of expenditures. The remaining $100,000 of bonds was used to retire underlying bonds which matured March 1.

Public Service Corporation of New Jersey, Newark, N. J.—The New York Stock Exchange has listed $7,000,000 of additional general mortgage 5 per cent sinking fund fifty-year bonds of the Public Service Corporation of New Jersey, due 1959. This makes the total listed to date $37,000,000. The proceeds cover plant extensions and betterments for the Public Service Gas Company; track extensions, betterments, new bridges, additional equipment and real estate for the Public Service Railway, and new generating stations and transmission and distribution lines for the Public Service Electric Company during 1913. The balance is to be used for similar purposes during 1914.

Warren, Brookfield & Spencer Street Railway, Brookfield, Mass.—The Warren, Brookfield & Spencer Street Railway will be sold at a foreclosure at the power house and station in Brookfield on June 4, by the receiver of the road, Thomas T. Robinson. The road, which runs from West Warren to Spencer, including a branch line from East Brookfield to North Brookfield, has been in the hands of a receiver since May, 1912. No bid under $150,000 will be accepted at the sale, and the sum of $35,000 must be paid in cash.

West End Street Railway, Boston, Mass.—The West End Street Railway has sold to Estabrook & Company, Boston, $539,000 of new thirty-year 5 per cent bonds dated 1914 and maturing in 1944. These bonds are being offered at 106 and interest. At an auction on April 24, 5600 of new common shares at $50 were sold in eighteen lots at prices ranging from $66.125 to $68 and dividends per share, 4775 shares going to G. S. Baldwin and associates.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Light & Power Company, Columbus, Ohio, 1¼ per cent, preferred B; 1¼ per cent, common.

Connecticut Railway & Light Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., 1 per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred; 1½ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
AMERICAN RAILWAYS, PHILADELPHIA, PA.					
1m., Mar., '14	$415,279	......	......	......	......
1 " " '13	399,797	......	......	......	......
9 " " '14	4,136,489	......	......	......	......
9 " " '13	3,854,742	......	......	......	......
BATON ROUGE (LA.) ELECTRIC COMPANY					
1m., Feb., '14	$13,748	*$9,514	$4,234	$2,148	$2,086
1 " " '13	11,835	*7,077	4,758	2,076	2,682
12 " " '14	166,635	*106,576	60,059	25,220	34,839
12 " " '13	149,464	*91,182	58,281	21,117	37,164
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO					
1m., Jan., '14	$272,026	*$171,949	$100,077	$43,771	$56,306
1 " Feb., '14	246,540	*154,066	92,474	43,880	48,594
GRAND RAPIDS (MICH.) RAILWAY					
1m., Feb., '14	$96,747	*$62,638	$34,109	$13,662	$20,447
1 " " '13	93,550	*56,548	37,002	14,821	22,181
12 " " '14	1,302,624	*814,911	487,713	164,352	323,361
12 " " '13	1,247,860	*713,284	534,576	175,265	359,311
COMMONWEALTH POWER RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.					
1m., Feb., '14	$256,180	*$72,315	$183,865	$80,000	$103,865
1 " " '13	114,143	*1,893	112,250	30,000	82,250
12 " " '14	2,658,493	*598,882	2,059,611	860,000	1,199,611
12 " " '13	1,360,167	*148,705	1,211,462	360,000	851,462
JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.					
1m., Mar., '14	$48,762	*$31,773	$16,989	$12,542	$4,447
1 " " '13	46,370	*26,922	19,448	12,542	6,906
12 " " '14	582,593	*356,838	225,955	150,500	75,455
12 " " '13	549,879	*323,555	226,324	151,632	74,692
PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.					
1m., Feb., '14	$26,244	*$15,502	$10,742	$7,639	$3,103
1 " " '13	24,372	*15,490	8,882	7,323	1,559
12 " " '14	297,442	*195,036	102,406	90,622	11,784
12 " " '13	289,952	*190,593	99,359	86,880	12,479
PENSACOLA (FLA.) ELECTRIC COMPANY					
1m., Feb., '14	$22,287	*$14,302	$7,985	$7,169	$816
1 " " '13	22,506	*14,113	8,393	6,369	2,023
12 " " '14	282,923	*181,384	101,539	82,867	18,672
12 " " '13	288,976	*177,557	111,419	76,384	35,035
PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.					
1m., Feb., '14	$691,464	*$405,768	$285,696	$175,510	$110,187
1 " " '13	655,734	*409,552	246,182	169,095	79,087
12 " " '14	8,701,725	*5,001,313	3,700,413	2,079,536	1,620,877
12 " " '13	8,289,230	*4,833,168	3,456,061	1,997,668	1,458,393
SAVANNAH (GA.) ELECTRIC COMPANY					
1m., Feb., '14	$66,654	*$43,838	$22,816	$22,613	$203
1 " " '13	62,404	*45,006	17,398	17,392	6
12 " " '14	836,699	*555,715	280,984	272,791	8,193
12 " " '13	762,456	*563,164	199,292	198,075	1,217
TAMPA (FLA.) ELECTRIC COMPANY					
1m., Feb., '14	$80,357	*$42,018	$38,340	$5,074	$33,266
1 " " '13	62,356	*32,856	29,501	4,759	24,742
12 " " '14	874,942	*484,777	390,164	56,331	333,833
12 " " '13	763,938	*399,173	364,765	54,084	310,681

*Includes taxes.

Traffic and Transportation

Patrick F. Sullivan on Team Work

Patrick F. Sullivan, president of the Bay State Street Railway, which operates more than 940 miles of suburban and city railway in Massachusetts, was on April 19 the subject in the very interesting series "Business Builders of New England" which is being published in the Boston *Post*. Like Gen. William A. Bancroft, president of the Boston Elevated Railway, who was the subject of a previous article in the series, Mr. Sullivan dwelt on the need for concentration among young men, advising them "do the $25 job as though you were getting $35."

Mr. Sullivan began work in the mill when he was seventeen years old. He then went with his brother on the Lowell *Daily News*, and while working on that paper was offered the secretaryship of the Lowell Horse Railroad and the Dracut Street Railway. He says that he doubted his fitness for the office, but took the position determined to apply to it all the energy and knowledge he possessed. Realizing his lack of education he decided to better himself in this respect and studied at night. One of the passages in his early reading which made a great impression on him was the following from Disraeli: "After mature deliberation, I have brought myself to the conviction that a human being with a certain purpose must accomplish it; and that nothing can resist a will that will stake even existence upon its fulfilment."

According to Mr. Sullivan many of the so-called big problems are big for the moment only. When the smoke of battle has cleared it is seen that all problems are very much alike. Speaking of the need for co-operation and team work Mr. Sullivan said:

"The daily story of the baseball game contains the daily story of our life struggle. It is like two individuals or companies trying to get ahead. The live, blood-tingling struggle is always there. It shows a thousand and one things—it shows above all that we cannot go it alone regardless of everybody and everything else—it shows us that team work does count—that every man on the team has got to do his part if the winning run is to come in. Home runs are few in a season—home runs in business are few—but like the man who lifts the ball over the fence, the business man who figuratively does the same is singled out. It isn't necessary to suggest a growing list of 'Home Run Bakers' in the fields of finance, industry and commerce. Every one knows them, and in a measure how they did it. Keep that home run in mind—it will probably be some time before it comes, and much longer before you get the habit—but if you are always on the alert every time you're at bat and swing for the big one, you will in nine cases out of ten reach first—and if you do, you've done well."

Man Efficiency Considered by Safety Committee of the Memphis Street Railway

The regular monthly meeting of the Safety Committee of the Memphis (Tenn.) Street Railway was held on April 9, with 100 members present. Reports showed a gratifying reduction in number of accidents. The meeting was devoted to the discussion of "Safe Operation of the Open Car," and the reading of a paper by J. H. Haylow, chief engineer of way, on "Man Efficiency As Applied to the Employees of this Company, and Our Safety Work." Mr. Haylow said in part:

"Man efficiency means the quality that produces the most effective service, or the possession of adequate skill or knowledge for the proper performance of a duty or calling. Safety is the practice and putting into execution the quality of efficiency; a man can be efficient without being safe, but a man cannot be safe without being efficient. The men we desire in this safety work and the men we desire in this company's organization are the ones who on awakening in the morning jump out of bed, refreshed, speedily wash, shave and neatly dress, get to their work on time, perform their daily duties attentively and safely and have little concern as to when the whistle will blow. Men of this type have some passion for their work.

"In the first place efficiency means the best results from minimum labor and expense. Efficiency is within the reach of all. We have heard and read about how much money a man can live on, but little or nothing about how much time a man can live on. Conserve your time. Time is money. Efficiency results from the combination of qualities such as health, loyalty, concentration, imitation, aspiration, compensation, recreation and many others. I shall confine myself to the first three mentioned:

"I deem health to be one of the most important qualities because great achievements are barred to a man of unsound body or mind. Three things are imperative to a man who would enjoy health, namely, a liberal supply of good wholesome food, a daily bath and an abundance of fresh air in sleeping rooms.

"Loyalty means devoted allegiance to your employer, to your fellow worker and to yourself. Without loyalty there is no effective organization and the higher qualities of service are impossible. There must be co-operation among men in the same department and co-operation among the various departments to secure an organization which will be a credit and a pride to the company and the community it represents.

"Concentration is the focusing of attention on one thing at a time. Great demands are made on one's concentrating capacity by outside distractions. The mind may be compared to rays of light. Light throws its rays in all directions. To focus or bring more light to one point a reflector is used. So with the mind; it is susceptible to its surroundings, taking in a wide range of objects, and the more we concentrate or focus our thoughts on our work the more efficient will be the result achieved. It is difficult at first to concentrate one's thoughts, whether he is reading the books of rules, repairing a rail joint, adding a column of figures or running a car. The effort to concentrate will be well repaid, for after the ability to concentrate has been acquired the work in hand will be made much easier.

"The day is past when a man can expect to wait modestly for others to seek him out and put him forward. Each man must be his own generating plant, as progress depends upon the individual. There are two doors to the temple of efficiency—on one is inscribed 'push' and on the other 'pull.' This means that the man who would be efficient must both push and pull."

Reasons for the Baltimore Employees' Bulletin

T. A. Cross, general manager of the United Railways & Electric Company, Baltimore, Md., says in the employees' bulletin of that company dated April, 1914:

"Did you ever stop and think seriously when this bulletin was handed you, 'the reason for its publication'?

"You realize of course it must take some one's time to prepare it and an expenditure of money to have it printed. The approval of its publication and delivery to you, in view of this time consumed and money expended, must therefore be with the feeling that it has and will be of benefit both to you and to the company.

"The company realizes the difficulties with which you have to deal from day to day, and it is with the idea of lessening, if not preventing, such difficulties that suggestions are given you through the medium of this bulletin.

"The company often has brought to its attention the bad results of an unreported accident and the failure of a crew to secure witnesses to an occurrence happening in connection with their car; the annoyance of a complaint on account of alleged discourtesy on the part of an employee; the financial loss caused by the careless operation of a car, particularly over special work, and many others. It is felt that you too realize these things, but owing to the infrequency with which you are brought in contact with the actual bad results they are not impressed as forcibly upon your mind as might be and you may some time make a 'slip,' which the company has to straighten out. This bulletin is for the purpose of endeavoring to keep these bad results before you so you may be on the lookout and prevent that 'slip.'

"Don't therefore, when the bulletin is handed you, do as one conductor did, hand it to a passenger saying: 'Do you want to read this; it is of no value to me.' Read it carefully and show, by trying to carry out its suggestions, that you have an interest in the welfare of the company of which you are a part."

Chicago Markets Commission Recommends Use of Interurban Freight Service

In a preliminary report to the Chicago City Council, the Municipal Markets Commission, which has been investigating possible savings from rearrangement of the Chicago produce markets, has recommended among other things, the use of electric railways to bring farm products direct to the household or the retail markets. In this connection the report says in part:

"In order to give the producer direct access to the markets of the city, and to furnish the Chicago consumer with a fresher and more varied allotment of farm products, electric railway freight service should be placed in operation over the existing street railway lines, and the interurban railways should receive direct access to the city's market. Rapid and easy access to the new markets by street railways to and from the city will encourage production and result in a vast amount of undeveloped land near the city of Chicago being divided into small truck, poultry, dairy and fruit farms. Urban and interurban street railways should be operated to shorten the route between the producer of farm products and the consumer, but carrying of freight by street railway lines inside the city limits should not be permitted to interfere with the proper handling of the passenger traffic. Freight handled by the interurban railways could be carried over the local Chicago lines between 11 p. m. and 5 a. m. without inconvenience to the public."

The Chicago produce market is concentrated on South Water Street in the downtown district, a point not reached by the steam roads or any transportation system other than wagons. This market is considered inadequate, unsanitary and wasteful. In its recommendation to the City Council, the commission stated that the city should proceed to formulate plans for a comprehensive system of wholesale terminal markets under the control of the city accessible to the city and interurban railways. It was estimated in the report that $51,000,000 a year could easily be saved if the city would take advantage of all the transportation and other facilities now afforded to eliminate waste between the producer and consumer.

Interborough Rapid Transit Company Dramatic Show

On April 24 a minstrel show was given in Carnegie Hall by the employees of the Interborough Rapid Transit Company, New York. One hundred and twenty-five subway guards, motormen, ticket agents, track walkers, ticket choppers, dispatchers and shopmen entertained an audience of 3000 people for three hours with what is said to be the "liveliest amateur show New York has seen in a long time." In place of Mr. Shonts, who was called out of town, an address of welcome was delivered by Frank Hedley, vice-president of the company.

The scene was opened with "The March Lorraine" by the subway band of 117 pieces, and the first part consisted of solos and chorus music on the part of 100 minstrel men, including eight end men. All the suits and furniture used were made by departments of the company. Part 2 consisted of vaudeville, in which the special number was a quartet entitled "The Interborough Rhapsody." There was also a cotton plantation sketch in which a number of specialties were introduced. The costumes, scenery and lighting effects of the cotton plantation sketch were devised and executed in the Interborough shops. Following this there was what was known as the "Interborough Photograph Album" and interesting motion pictures.

The entire production was financed by the company and presented under the auspices of the welfare department, of which H. H. Vreeland is director. The performance was directed by the following employees: Monroe Silver, stage manager; O. C. Belden, musical director; George Eton, interlocutor; R. J. Piggott, organist, and E. Bartz, violin soloist. The entire seating capacity of Carnegie Hall was reserved for the employees of the company and their families, and there were applications for three times as many seats as were available.

Kansas City Trade-Extension Trips.—The first of a series of trade-extension trips to be given by the Kansas City Commercial Club will be made to Liberty, Moseby and Excelsior Springs on May 5. The Kansas City, Clay County & St. Joseph Railway will place special cars at the service of the business men.

"Price of Thoughtlessness" Shown in Toronto.—Nearly 600 school children visited the Strand Theater, Toronto, Ont., on April 14 for the purpose of viewing the special motion picture "The Price of Thoughtlessness." The film portrayed in a striking manner the dangers that lurk on the streets for children. The show was arranged in connection with the campaign of the Ontario Safety League.

Objection to Smoking in Louisville.—A suggestion made recently by one of the women's organizations that a crusade be started against the practice of smoking on the street cars has provoked considerable discussion in Louisville, Ky. The rules of the company permit smoking on the platforms. Since the front-door exit system has been put into operation in Louisville, Ky., the front platform has been made the smokers' own.

Rulings of California Commission.—The Railroad Commission of California has granted the application of the Glendale & Eagle Rock Railway to discontinue the sale of 50-cent twenty-ride commutation tickets except to persons under the age of eighteen and to collect a regular one-way fare of 5 cents. The commission has dismissed the inquiry made on its own initiative looking to the establishment of through routes and joint rates affecting the Glendale & Eagle Rock Railway.

Complaint Closed.—The Public Service Commission of the Second District of New York has closed upon its records in the complaint of the village of Liverpool against New York State Railways, in the matter of service between Liverpool and Syracuse, and as to certain of the cars operated. A conference was held between representatives of the municipality in question and of the New York State Railways, the result of which was a temporary adjustment of the pending issues in a manner satisfactory to both parties.

New Car Placards in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has made a change in the signs in its cars prohibiting passengers from conversing with motormen. The new sign reads, "Patrons, please do not talk to the motorman. It insures safety." Old placards read, "Do not talk to the motorman. It prevents accidents." The new signs conclude with a line instructing passengers to leave cars by the front exits. This admonition formerly was on a separate sign and the new method eliminates one placard.

Suggestion Regarding Large Currency Fare Payments.—The Metropolitan Street Railway, Kansas City, Mo., which uses its transfers as a medium of communication with its patrons, recently suggested that passengers who have no currency of two-dollar denominations or less, leave the bill which they tender in payment of fare with the conductor and call at the offices for their change on the following day. John M. Egan, general manager of the company, stated that the suggestion was made for what it was worth and that the company would make no effort to enforce it.

Consideration of Demands of Municipal Railway Employees Postponed.—The Board of Supervisors of San Francisco, Cal. has postponed indefinitely consideration and action on the request of the employees of the Geary Street Municipal Railway for concession in the agreement covering the wages and other terms of service of the men. T. A. Cashin, superintendent of the company, reported to the Mayor recently on the request of the men and the Mayor transmitted Mr. Cashin's report to the Supervisors without recommendation. The demands of the men were reviewed briefly in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, page 692.

Recent Topeka Advertising.—The recent advertising of the Topeka (Kan.) Railway has confined itself almost exclusively to a promotion of the "safety first" movement. "Safety first," while now a general campaign has in few instances been furthered by the use of paid advertisements. Under the head of "Street Car Hints," the company ran a list of "don'ts," warning the public against getting off cars while in motion; stepping off backwards; dashing for the sidewalks without looking after stepping off a car, etc. The advertisements are concluded with the statement that co-operation by patrons will greatly improve service and prevent accidents.

Pittsburgh Employees Asked to Arbitrate.—Daily conferences have been held since April 1 by the officers of the Pittsburgh (Pa.) Railways Company with representatives of the motormen and conductors regarding wages and working conditions. Because of an apparent inability to agree, the Pittsburgh Railways has asked that the points of difference be submitted to an arbitration committee of five and that the questions be settled for five years. The company addressed the men to this effect in a letter dated April 17. The principal request of the men is for an increase in pay to 35 cents an hour flat from the present sliding scale of 23½ cents an hour for the first six months to 30 cents an hour after four years of service.

Complaint Suspended Indefinitely.—The Public Service Commission of the Second District of New York has suspended indefinitely the complaint of land owners and manufacturers in the Lincoln Park district just west of the city line of Rochester against the New York State Railways, Rochester lines, alleging inadequate transportation facilities. It developed at the hearing held in the matter that the transportation facilities sought by the complainants involved a rearrangement of lines and the elimination of one or more grade crossings. It was agreed at that time that nothing could be done under existing conditions, because of lack of money for crossing elimination, and the commission decided that no further proceedings be had in the case until it has a suitable appropriation which may be devoted to the crossing eliminations and until the parties shall apply for further hearing.

The Beckoning Land.—The Roanoke Railway & Electric Company, Roanoke, Va., and the Lynchburg Traction & Light Company, Lynchburg, Va., have issued a publication, "The Beckoning Land," by E. Alexander Powell, F. R. G. S., author of "The Third Empire," "Masters of Europe," "All Aboard for Bombay," "The Last Frontier," etc. It is printed on heavy coated paper with illuminated head, tail and side pieces done in brown, and also contains a number of full-page illustrations most artistically executed in color. The publication has to do with all Virginia, but more particularly with the territory through which the Roanoke Railway & Electric Company and the Lynchburg Traction & Light Company operate. It contains thirty-four pages exclusive of the cover. As a frontispiece there is a reproduction in color of a sunrise photograph made from the top of Mill Mountain. The title of this is "The Dawn of a New Day."

Decision by Supreme Court of Nebraska in Transfer Case.—In the case of Jones versus the Omaha & Council Bluffs Street Railway, Omaha, Neb., the Supreme Court of Nebraska on appeal held that a street railway has the right to collect and receive fares and fix such reasonable rules concerning the issuance and use of transfers as will prevent it from being defrauded and that as between the conductor and the passenger the transfer produced must be regarded as conclusive as to the rights of the latter. The plaintiff Jones entered a car in South Omaha on July 24, 1909, intending to go north through Omaha to Courtland Beach. He paid his fare. At Thirteenth and Dodge Streets, Omaha, he left the car, walked south on Thirteenth Street to Douglas Street, west on Douglas Street to Fourteenth Street, where he entered a store and, after making a small purchase, walked north along Fourteenth Street, across Douglas and Dodge Streets, and at the intersection of Fourteenth and Dodge Streets he entered a car going north on Fourteenth Street and presented to the conductor in payment of his fare a transfer slip of the day before on the Sherman Avenue line punched "south." He asked for a Cuming transfer at Seventeenth and Cuming Streets, and also said he wanted a transfer on Locust Street to the Beach. On refusal to pay his fare or leave the car, the plaintiff was ejected and brought suit for damages. The Supreme Court ruled that the evidence disclosed by the record failed to sustain a verdict for the plaintiff and that the jury should have been directed to find a verdict for the defendant.

Personal Mention

Mr. James Z. George has resigned as head of the publicity and advertising department of the New Orleans Railway & Light Company, New Orleans, La.

Mr. John Brizzolara has been elected secretary of the Fort Smith Light & Traction Company, Fort Smith, Ark., to succeed his father, the late James Brizzolara.

Mr. John J. Gannon has been elected vice-president of the New Orleans Railway & Light Company, New Orleans, La., to succeed Mr. J. S. Pevear, who has been elected president of the company.

Mr. P. J. Hayes has been appointed general manager and purchasing agent of the Greenville Railway & Light Company, Greenville, Tex., to succeed Mr. F. R. Newman, resigned.

Mr. James S. Gibson, general superintendent of the Metropolitan Street Railway, Kansas City, Mo., has been elected a director of the Missouri Savings Association Bank, Kansas City.

Mr. C. H. Bales, an inspector, has been appointed assistant division superintendent at Tenth and Minnesota Streets by the Metropolitan Street Railway, Kansas City, Mo., succeeding Mr. B. B. Boucher.

Mr. H. G. Hoagland, who has been treasurer, general manager and purchasing agent of the Fort Smith Light & Traction Company, Fort Smith, Ark., has also been elected third vice-president of the company.

Mr. F. E. Smith, who resigned as comptroller of the Chicago (Ill.) Railways after the completion of the consolidation of the surface lines in Chicago, is at Excelsior Springs, Mo., preparatory to a trip to Florida.

Mr. Wallace J. Ivers has resigned as superintendent of car equipment of the Cumberland Light & Power Company, Portland, Maine, which operates the Portland Railroad and the Lewiston, Augusta & Waterville Street Railway.

Mr. W. G. Murrin has been appointed general superintendent of the British Columbia Electric Railway, Vancouver, B. C. Mr. Murrin was formerly mechanical superintendent, to which position is now added the supervision of the company's city and suburban system at Vancouver.

Messrs. Semmler and Dempwolff of the civil engineering department of the Prussian State Railroads, Hanover, are visiting the United States and Canada on a two months' tour. While they are particularly interested in steam railroad construction problems, they will also give a good deal of attention to signaling, including signal practice on electrified steam railroads.

Mr. B. B. Boucher, assistant division superintendent of the Metropolitan Street Railway, Kansas City, Mo., at Tenth and Minnesota Streets, has been appointed assistant division superintendent at Forty-eighth and Harrison Streets, vice Mr. W. C. Comer, who has tendered his resigantion. Mr. Boucher has been with the company since 1907, when he entered its employ as a trainman.

Mr. Andrew S. Macreadie has been appointed superintendent of transportation of the Cumberland County Power & Light Company, Portland, Maine, to succeed Mr. Frank S. Briggs, resigned. Mr. Macreadie was formerly superintendent of the Cape Division of the company. He has been connected with the Cumberland County Power & Light Company and its subsidiaries, the Lewiston, Augusta & Waterville Street Railway and the Portland Railroad, for many years.

Mr. H. J. Jumonville, auditor of the New Orleans Railway & Light Company, New Orleans, La., has been appointed to a similar position with the American Cities Company, with headquarters in New Orleans. Mr. Jumonville has been with the New Orleans Railway & Light Company in the accounting department for many years. In his new position he will have supervision of all books of the American Cities Company. Mr. Jumonville succeeds Mr. S. C. Stivers, resigned.

Mr. R. H. Sperling, general manager of the British Columbia Electric Railway, Vancouver, B. C., has been offered a seat on the London board of the company, carrying with it the appointment of assistant to Mr. R. M. Horne Payne, the chairman of the board. Mr. Sperling became connected with the company in 1896 and in the following year was appointed the electrical expert in charge. He later became general superintendent of the company and when Mr. J. Buntzen, the former general manager of the company, was appointed to a seat on the London board in 1905, Mr. Sperling was chosen as his successor. Mr. Sperling has gone to London to confer with the directors.

Mr. R. A. Leussler, who has been elected president of the Iowa Street & Interurban Railway Association, entered street railway work in 1898, when Mr. F. B. Brownell, the car builder, was appointed receiver of the Peoples Railway, St. Louis. Mr. Leussler was employed by Mr. Brownell as his personal representative in the management of the railway property. Prior to that time he gained experience in the transportation business with the United States Express Company at Chicago as night agent of that company's Grand Central Depot and as chief clerk at its Chicago, Milwaukee & St. Paul Railway depot. When all of the street railways of St. Louis were consolidated in 1899 Mr. Leussler was appointed chief clerk to the secretary and treasurer of the consolidated company, the St. Louis Transit Company. He remained in that position until the street railways of Omaha and Council Bluffs were consolidated in 1903, when he went to Omaha as secretary of the Omaha & Council Bluffs Street Railway, the consolidated company. In 1906 he was appointed assistant general manager of the Omaha & Council Bluffs Street Railway, which position he has since held.

W. B. Brockway

Mr. W. B. Brockway, who has been connected in executive capacities with various Ford, Bacon & Davis properties since 1900, has withdrawn from railway work to become comptroller of the Berlin Mills Company with general offices at Portland, Maine. Mr. Brockway was identified with steam railroad operating and accounting work prior to 1896. From 1896 to 1900 he was secretary and treasurer of the Toledo, Bowling Green & Fremont Railway, Toledo, Ohio. In 1900 he was appointed secretary and auditor of the New Orleans & Carrollton Railroad, Light & Power Company, New Orleans, La., and soon after became general auditor of the various Ford, Bacon & Davis and Newman properties in the South and West. In this responsible position Mr. Brockway acquired a very extensive knowledge of electric railway, lighting and gas accounting problems under different conditions, and his experience on these lines became very valuable. He has also done a great deal of work and occupied executive positions during the past fourteen years with various public utility properties with which Ford, Bacon & Davis were connected, among others that of secretary and treasurer of the Sierra & San Francisco Power Company, which supplies power to the United Railroad, San Francisco. Mr. Brockway has always taken a prominent part in the affairs of the American Electric Railway Accountants' Association from the date of its organization in 1897 under the name of the Street Railway Accountants' Association of America. In that year he was elected secretary and treasurer of the organization and continued in that capacity until 1904. In 1906-7 he served as president of the association. He is now a member of the committee on standard classification of accounts of that association, the committee on accounting definitions and the committee on accounting for variable rates of fare. He represented the receivers of the Knickerbocker Trust Company, New York, N. Y., during the receivership of that company in 1907. He is the author of "Electric Railway Accounting" published in 1906 and has contributed a number of articles on electric railway accounting to the ELECTRIC RAILWAY JOURNAL. The Berlin Mills Company, with which Mr. Brockway becomes connected, is the outgrowth of the business established in 1852. The company manufactures newspaper, sulphite, fiber and timber. It has paper mills at Berlin, N. H., with a capacity of 250 tons a day. Its timber lands are located in Maine and New Hampshire and it has timber rights in Canada.

S. B. Way

Mr. S. B. Way, whose appointment as general manager of The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., was announced in the ELECTRIC RAILWAY JOURNAL of April 25, 1914, is in addition also actively interested in the management of the Wisconsin Gas & Electric Company, operating in Racine and Kenosha; the Watertown Gas & Electric Company, Watertown, Wis., the Burlington Electric Light & Power Company, Burlington, Wis., and the North Milwaukee Light & Power Company. He has been identified with public-utility business for nearly sixteen years, and during practically all that time has been associated with the interests of the North American Company. Mr. Way became assistant general manager of the Milwaukee companies in November, 1911, and early in the year 1912 was elected vice-president. He is now placed in charge of the local management of the companies, his promotion being a deserved recognition of the ability he has demonstrated as a public-utility manager and executive. Mr. Way is thirty-nine years old and received his technical education at Drexel Institute, Philadelphia. He began his business career with the Electric Storage Battery Company of Philadelphia, for which he became erecting engineer. In 1898 he left the service of that company to become electrical superintendent of one of the electric-service companies in St. Louis, which later became the present Union Electric Light & Power Company of that city. Mr. Way remained in the service of the St. Louis company until appointed assistant general manager of the Milwaukee companies.

J. S. Pevear

Mr. J. S. Pevear, who has been vice-president of the New Orleans Railway & Light Company, New Orleans, La., since the fall of 1913, has been elected president of the company, which position has been vacant since the election of Mr. Hugh McCloskey as chairman of the board of directors and president of the American Cities Company. Mr. Pevear was formerly vice-president of the International Railway and vice-president of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y. Mr. Pevear became connected with the Buffalo & Lake Erie Traction Company in 1911 as general superintendent. He had previously been connected with the Twin City Rapid Transit Company, Minneapolis, Minn., and the General Electric Company. He was superintendent of the St. Paul lines of the Twin City Rapid Transit Company. The International Railway system, with which Mr. Pevear was connected as vice-president, is a consolidation into one operating company of various street railways in the United States and Canada, including lines in Buffalo, Niagara Falls, Lockport and Tonawanda, and comprising in all 374 miles. The Twin City Rapid Transit Company controls the entire street railway systems of Minneapolis, St. Paul and Stillwater, and has the exclusive right to operate street cars between St. Paul and Minneapolis. The entire system is 402 miles in length. The New Orleans Railway & Light Company comprises 201 miles of line, all the street railways in New Orleans. Mr. Pevear is also second vice-president of the American Cities Company, which controls the New Orleans Railway & Light Company, Birmingham Railway, Light & Power Company, Memphis Street Railway, Little Rock Railway & Electric Company, Knoxville Railway & Light Company and the Houston Lighting & Power Company. The American Cities Company is in turn controlled through common stock ownership by the United Gas & Electric Corporation.

Mr. Charles J. Griffith, who has been elected president of the Arkansas Association of Public Utility Operators, is treasurer and general manager of the Little Rock Railway & Electric Company, Little Rock, Ark. Mr. Griffith was born in Rochester, N. Y., on Feb. 15, 1865, and was educated in Lafayette, Ind. He engaged in the telegraph business until 1889, when he became associated with the Municipal Light & Power Company, St. Louis, Mo., and the Missouri-Edison Electric Light & Power Company. In 1899 he was associated with the Pine Bluff Water & Light Company, Pine Bluff, Ark. In 1892 he entered the service of the Little Rock Traction & Electric Company, but resigned from that company in August, 1897, to accept a position with the Brown Electric Company, Little Rock, as superintendent of construction. This company constructed an electric light and power plant for the State of Arkansas to light all of the state institutions at Little Rock. Mr. Griffith afterward superintended the installation of the electric light plants in the Peabody and the Cordova Hotels at Memphis, Tenn., and supervised the installation of an electric light plant at Crystal Springs, Miss. In 1899 he became associated with the Southern Engineering Company, St. Louis, Mo., and superintended the installation of the municipal electric light plant at Hastings, Neb., and the electric light and water works in West Plains, Mo. In 1902 he re-entered the service of the Little Rock Railway & Electric Company as master mechanic and was appointed superintendent of the railway department in 1905 and general manager in 1912. A portrait of Mr. Griffith was published in the ELECTRIC RAILWAY JOURNAL of March 23, 1912.

OBITUARY

E. B. Lincoln, general manager of the Muncie & Portland Traction Company, died at Portland, Ind., on April 27, 1914. Mr. Lincoln was general manager of the company for the past seven years. He went to Portland from St. Paul, Minn., having previously been in the banking and harvester business, and connected with several steam railroads in Minnesota and the northwest. Mr. Lincoln was a thirty-second degree mason, being a member of the Ancient Landmark No. 5, A. F. and A. M., St. Paul, Minn., as well as the Zion Commandery and Zuhrah Shrine, Minneapolis, Minn. He was graduated from the Shattuck Military School at Faribault, Minn.

Limited Service Between Chicago and Starved Rock

Effective on May 24, through limited interurban service will be established between Chicago and Starved Rock, a historic State park on the Illinois River below Ottawa, Ill. This service will be furnished in accordance with a traffic agreement which has been entered into between the Chicago & Joliet Electric Railway and the Chicago, Ottawa & Peoria Railway, both of Joliet, Ill. Passengers from Chicago will be picked up on Archer Avenue at a point reached by a trunk line of the Chicago Surface Lines from the loop district. At present it is planned to run only one train each way daily catering to picnic parties. This train will leave Chicago at 8:15 a. m. and arrive at Starved Rock at 11:30 a. m. The return trip will be made between 6 p. m. and 9:30 p. m. The service will be arranged so that direct connections may be made to points south of Starved Rock.

In connection with this service the Chicago, Ottawa & Peoria Railway has issued a handsome folder—"The Famous Illinois Valley—The Garden Spot of the World and Nature's Wonderland"—which was mentioned in a recent issue of ELECTRIC RAILWAY JOURNAL. Replies to requests for circulars, or other inquiries for information concerning points reached by the "Illini Trail" are typed on a special form of stationery. This is in the form of a four-page circular, one outside page of which is printed in letterhead form, the other three pages containing information, descriptive matter and illustrations of the points of interest along this company's line.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Evansville & New Harmony Traction Company, Evansville, Ind.**—Application for a charter has been made by this company to build a 30-mile electric line to connect Evansville and New Harmony. Capital stock, $100,000. Incorporators: W. F. Laubscher, Evansville, N. J. Reping and J. T. Cutler.

***Delta Light & Traction Company, Greenville, Miss.**—Chartered in Mississippi presumably to succeed the Delta Electric Light, Power & Manufacturing Company in Greenville. Capital stock, $200,000. Incorporators: A. R. Turnbull and W. J. Jones, Norfolk, Va.; T. A. Hefty, Bowden, N. C.; L. A. Beasley and H. D. Williams, Kenansville, N. C.

***Atlantic & Carolina Railroad, Warsaw, N. C.**—Chartered in North Carolina to build a 10-mile interurban railway from Warsaw to Kenansville. Capital stock, $50,000. Directors: A. R. Turnbull and W. J. Jones, Norfolk, Va.; T. A. Hefty, Bowden, N. C.; L. A. Beasley and H. D. Williams, Kenansville, N. C.

FRANCHISES

San Francisco, Cal.—The Geary Street Municipal Railway has been authorized by the Board of Supervisors to build the Masonic Avenue extension to the baseball park. It is proposed to have Mahoney Brothers do the work under the present contract for building the Van Ness Avenue and Chestnut Street lines, at the same unit cost.

Santa Clara, Cal.—The Peninsula Railway, San Jose, has asked the Council for a franchise for an extension of the present line in Santa Clara to the Catholic cemetery on condition that the Council grant a withdrawal of the franchise on Saratoga Avenue to the city limits in Santa Clara.

Woodward, Ia.—The Interurban Railway has received a franchise from the Council for an extension to the site selected for the State epileptic colony 5 miles north of Woodward.

Kansas City, Kan.—The Metropolitan Street Railway has received a franchise from the Council to double-track its line on Twenty-fourth Street from Grand Avenue to Main Street in Kansas City.

West Covington, Ky.—The Union Light, Heat & Power Company has received a twenty-year franchise from the Council to build an electric railway from the eastern to the western city limits of West Covington.

Owen Sound, Ont.—The Council is asked to grant a twenty-five year franchise to build an electric railway in Owen Sound. This is part of a plan to build an electric railway between Owen Sound and Meaford.

Sudbury, Ont—The Sudbury-Copper Cliff Suburban Electric Railway has received from the Canadian government an extension of two years on its franchise in which to build its line in Sudbury. L. L. Forest, Sudbury, is interested. [E. R. J., Feb. 7, '14.]

Oregon City, Ore.—The Portland & Oregon City Railway has filed an acceptance of the twenty-five-year franchise granted by the Council three months ago. The franchise gives the company the right to come into Oregon City on Center Street at the northern limits, to extend south on Center Street to Fifteenth Street, west to Water Street, and on Water Street to the southern limits of the city.

Westerly, R. I.—The Norwich & Westerly Railway has received a franchise from the Council for a turnout and siding near the Westerly railroad station.

Dallas, Tex.—John T. Jones and associates have asked the Council for a franchise for an electric railway on Fitzhugh Avenue from Columbia Avenue to Grand Avenue in Dallas.

Terrell, Tex.—The Dallas & Terrell Interurban Railway has received a franchise from the Council in Terrell. This is part of a plan to build a 30-mile electric line between Dallas and Terrell. A. M. Somers, Terrell, is interested. [E. R. J., May 24, '14.]

Spokane, Wash.—The Washington Water Power Company has asked the Council for a franchise over certain streets in Spokane.

Fayetteville, W. Va.—The Fayette Traction Company has received a franchise from the Council in Fayetteville. C. W. Dillon, president. [E. R. J., April 12, '13.]

TRACK AND ROADWAY

***Opelika, Ala.**—Surveys will soon be made for a proposed 7-mile electric railway from Opelika to Auburn, Ala. W. S. Lounbury, Opelika, is interested.

El Centro, Cal.—Surveys are being made to build an electric railway between El Centro, Imperial and Calexico. Lewis R. Kirby, San Diego, is interested. [E. R. J., April 18, '14.]

Marin County Electric Railway, Mill Valley, Cal.—Work has been begun by this company on the first unit of its railway, known as the Throckmorton Avenue branch. This is part of a plan to build an electric line through Mill Valley. [E. R. J., April 18, '14.]

Geary Street Municipal Railway, San Francisco, Cal.—Plans for the extension of the Van Ness Avenue line in San Francisco across Market Street into Eleventh Street and thence to Potrero Avenue are nearing completion and bids will be asked early in June. With Eleventh Street the route for the Van Ness Avenue extension will be from Twenty-fifth Street via Potrero Avenue, Eleventh Street, Van Ness Avenue to the Exposition site and a quick connection between the north side and the south of Market section and Mission districts can be made. A permit for the extension of the Geary Street Municipal Railway through the Fort Mason reservation has been issued by the War Department to the Board of Supervisors and its acceptance recommended by the Public Utilities Committee. The permit requires that work on the proposed extension shall begin within thirty days from the date and that cars shall be operated over the extension on or before Oct. 15, 1914. The construction and operation of the line will be subject to the supervision and direction of the commanding general, and any electric railway desiring to operate its cars over the city's tracks shall have the right to do so.

Pocatello, Idaho.—J. D. Browning, representing an Eastern syndicate, is authority for the statement that active construction of an electric railway in Pocatello will begin at once. The City Council at a recent meeting granted a franchise. The system provides lines for the principal streets and the use of the viaduct now in existence and, owing to the terms imposed by the Public Utilities Commission, there can be no delay. [E. R. J., Jan. 24, '14.]

Twin Falls, Idaho.—C. V. Parks, Twin Falls, is promoting the construction of an electric interurban line from Twin Falls to Albee, on Rock Creek. The proposed line will be 17 miles in length. Citizens of Twin Falls are interested in the movement.

Kewanee, Bradford & Henry Interurban Railway, Kewanee, Ill.—Preliminary arrangements are being made by this company to build the 35-mile electric line from Kewanee southeast via Bradford to Henry. C. G. Lampman, Kewanee, Ill., is interested. [E. R. J., April 4, '14.]

La Salle (Ill.) Terminal Railway.—Preliminary surveys are being made by this company between La Salle, Granville and Oglesby. Robert H. Baldwin, 829 First National Bank Building, Chicago, Ill., engineer. [E. R. J., April 18, '14.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company is asked to build a 1-mile extension on Minnesota Street from Shelby Street to Keystone Avenue, in Indianapolis.

Indianapolis, Linton & Vincennes Traction Company, Linton, Ind.—The taxpayers in Vincennes, Bowling Green and other towns in southern Indiana are pledging money to assist in the construction of this railway between Indianapolis, Linton, Vincennes, Mooresville, Bicknell, Patoka, Tell City and Jasonville. John A. Schaffer, Indianapolis, chief engineer. [E. R. J., April 18, '14.]

Keokuk, Nauvoo & Fort Madison Interurban Railway, Keokuk, Ia.—Preliminary arrangements have been completed and plans are being made to begin work soon on its electric line to connect Keokuk, Nauvoo, Fort Madison, Carthage and Hamilton. H. S. Payne, Fort Madison, is interested. [E. R. J., Dec. 28, '12.]

Union Electric Company, Dubuque, Ia.—Work has been begun by this company on the extension of the West Locust Street line so that it will connect with the West Eighth Street line at Asbury Street in Dubuque.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The entire interurban proposition up the Kaw Valley has been financed. The section of the line between Kansas City and Bonner Springs is nearly completed and will be placed in operation this month. Work will begin at once laying the track to Lawrence. The survey and right-of-way has been obtained up the north side of the Kaw River to Lawrence. At Lawrence the line will cross the Kaw River and extend down Massachusetts Street, turn west near Mount Oread, the site of the State university, and extend up the Wakarusa Valley to Topeka. J. J. Heim, Kansas City, is interested. [E. R. J., March 21, '14.]

Columbus, Kan.—The Century Engineering & Construction Company has been awarded a contract for the construction of a 22-mile interurban electric line from Columbus, Kan., to Miami, Okla., via Hattenville, Okla. Work will be begun at once. Commercial organizations of Columbus are backing the proposition. [E. R. J., April 11, '14.]

***Concordia, Kan.**—The Eakin-Donelan & Company, Concordia plans to build an electric railway from Concordia to Salina. Frederick E. Schornstein is manager of the Kansas interests of the company.

Olathe, Winfield & Arkansas City Railway, Topeka, Kan.—The charter recently secured by this company, which proposes to build an electric line 175 miles in length, provides that the line shall extend through Johnson, Miami, Franklin, Anderson, Coffey, Woodson, Greenwood, Elk, Butler and Cowley counties from Olathe, Kan. W. A. Powell, Enid, is interested. [E. R. J., March 14, '14.]

Topeka (Kan.) Railway.—This company contemplates the extension of its Washburn College terminals on Seventeenth Street west and south to Seabrook.

***Lexington, Ky.**—John G. King, Lexington, and associates are considering plans to build an interurban electric railway from Lexington to Richmond, a distance of 26 miles.

Louisville (Ky.) Railway.—Residents of a section of Louisville in the extreme eastern end adjacent to Cherokee Park have asked the Louisville Railway for the extension of its Oak Street line, to serve their portion of the city. The plan of the citizens is to divert the line at Transit Avenue and Bardstown Road, and extend new tracks out Transit Avenue about 1½ miles to the city limits at Workhouse Road.

Bay State Street Railway, Boston, Mass.—Plans are being made by this company to double-track its line between Lowell and Lawrence.

Hartford & Springfield Street Railway, Springfield, Mass.—Extensive repairs on the roadbed of this company are being planned.

Detroit (Mich.) United Railway.—Plans are being considered by this company for the extension of the Harper Avenue-Centerline line, from Centerline to Utica, in return for the right-of-way. This is part of a plan to extend the interurban lines into the Thumb district in Michigan.

Electric Short Line Railroad, Minneapolis, Minn.—This company has accepted a subscription of $12,000 of the stock of the company from farmers of Butternut Valley, who want this line to extend through Mankato.

Twin City & Lake Superior Railway, Minneapolis, Minn.—The projected electric railroad between Minneapolis, St. Paul, Duluth and West Superior, which was planned by a company incorporated in February, 1907, called the Twin City & Lake Superior Railway, may be built by a California syndicate, which is negotiating for the purchase of the stock. The line has been graded from Irondale, just outside of Minneapolis, 40 miles to Sunrise, and also is in condition for about 10 miles south of Foxboro, Douglas County. It commonly is called the Arrow line, and has a right-of-way 137 miles long, between the Twin Cities and Duluth. This is several miles shorter than any railroad now operating between these cities. The original board of directors included E. W. Farnham, Chicago; W. H. Crossland and S. B. Kidder, Minneapolis; S. O. Carlyle, Wyoming, Minn., and Peter Eimon, Superior.

Mesaba Electric Railway, Virginia, Minn.—Plans are being considered by this company for an extension to Biwabik and another westward from Hibbing.

***Clarksdale, Miss.**—Plans are being considered to build an electric railway between Lyon, Clarksdale and Friars Point, Miss. No names are given of those interested in the project.

Caldwell County & Southern Electric Railway, Kingston, Mo.—This company has purchased the right-of-way for its line between Hamilton and Kingston, Mo., a distance of 10 miles. Extensions of the line to connect with the Kansas City, Clay County & St. Joseph Railway terminal at Excelsior Springs, Mo., are also planned. Most of the stock in the Caldwell County & Southern Railway has been subscribed. S. C. Rogers, Kingston. [E. R. J., April 18, '14.]

Big Horn Canyon Irrigation & Power Company, Billings, Mont.—Surveys are being completed by this company for an electric railway, 65 miles in length, to give traffic facilities to lands which it is proposed to irrigate. Included in plans of the company is the construction of a hydroelectric plant on the Big Horn River to develop 25,000 hp. Power from the generating station will be used for operation of the railroad and for electric pumping for the irrigation of 35,000 acres of land. It is planned to irrigate 100,000 acres by canals in addition to that served by the pumping plants. The railroad is to be constructed first and will be used for transportation of construction materials. J. J. Harris, Hardin, president. [E. R. J., March 28, '14.]

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission, First District, has approved the form of contract submitted by the Brooklyn Rapid Transit Company for the third-tracking of the Fulton Street elevated line from East New York to Nostrand Avenue, for which consents were only recently obtained.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—New track is being laid by this company on State Street from North Park to Twelfth Street in Erie.

Ithaca (N. Y.) Traction Company.—The Fred T. Lay Company has begun work on the double-tracking of North Tioga Street in Ithaca for the Ithaca Traction Company, which took over the property of the Ithaca Street Railway on April 1. The work was begun at Falls Street, at the north end of Ithaca, and will extend through Tioga to Seneca Street. [E. R. J., April 4, '14.]

Cleveland (Ohio) Railway.—This company has been asked to extend its East Seventy-ninth Street crosstown line southerly to Kinsman Road in Cleveland.

***Galion, Mount Gilead & Delaware Electric Railway, Mount Gilead, Ohio.**—Plans are being considered by this company to build an electric railway from Galion to Mount Gilead and Delaware.

Bartlesville (Okla.) Interurban Railway.—Matters of dispute between this company and the City Council of Bartlesville have been settled and work on the belt line to the southwestern part of Bartlesville will begin shortly.

***Cushing (Okla.) Traction Company.**—Preliminary arrangements are being made by this company to build an electric railway inside the corporate limits of Cushing. Application for a franchise will be made about May 15. Officers: Frank Brown, Independence, Kan., president; B. B. Jones, Bristow, Okla., vice-president; M. Jones, Bristow, treasurer; Roy Jones, Cushing, secretary, and Henry Askin, Cushing, general manager.

Berlin & Northern Railway, Berlin, Ont.—During the next few weeks this company will award contracts for grading 10,000 yd. of new track and to build one 28-ft. span bridge within two months.

***Fort William, Ont.**—The owners of property lying along Victoria Avenue West and the western boundary of Fort William have offered to build an electric railway in that section and turn it over to the city complete, provided the city will give some specified service over the branch.

Hamilton (Ont.) Street Railway.—The special committee of the City Council dealing with electric railway improvements met on April 18 and discussed a number of matters with officials of the company. The latter agreed to complete this year the tracks on Kenilworth Avenue, and to renew the tracks on King Street between Catherine and James Streets, and on Queen Street from Herkimer to Aberdeen Avenue. If possible, York Street will be renewed. The question of a better service on Aberdeen Avenue was not favorably received. The officials said that it could not be done unless there was a double track on the street.

Niagara, Welland & Lake Erie Railway, Niagara Falls, Ont.—Work will be begun at once by this company on its North Main Street line in Welland. C. J. Laughlin, vice-president.

Eugene, Ore.—Residents of Santa Clara district and representative business men of Eugene recently petitioned the County Court to again grant a franchise to the Portland, Eugene & Eastern Railway, or to any other electric line that may be interested to build a line from Eugene to Santa Clara. A company which has for its object the building of a line from Eugene to Santa Clara has been formed. It is known as the Santa Clara Street Car Company. Ray Goodrich, Eugene, has been appointed secretary.

Puget Sound & Willapa Harbor Railway, Portland, Ore.—This company has awarded a contract to Gurthrie, McDougal & Company, Portland, Ore., for the bridge work along the line from Firdale to Raymond.

Washington-Oregon Corporation, Portland, Ore.—This company has been asked by the North End Improvement Club to extend its lines from Centralia to the Logan District, a distance of 1 mile.

Chambersburg & Shippensburg Railway, Chambersburg, Pa.—This company advises that it has completed its 11-mile line between Chambersburg, Red Bridge Park, Greencastle and Shippensburg and plans to place it in operation June 1. Headquarters: Chambersburg. Thad M. Mahon, Chambersburg, president. [E. R. J., April 18, '14.]

Wayne County Railway, Honesdale, Pa.—Construction of this company's line will be begun at once by the laying of its tracks through Honesdale and the paving with vitrified brick between and outside the rails for a distance of about 1½ miles, the work to begin simultaneously with the paving of the roadway under contract awarded by the State Highway Department of Pennsylvania, and all the work will be under the supervision of the State Highway Commissioner. The grading and construction of the railway north and south of Honesdale will be begun about the same time. Six steel bridges with concrete abutments will be required for the operation of the railway. E. F. Draper is contractor for construction and equipment of the railway with offices at Honesdale. Much of the work will be sublet. The line will be 25 miles in length. Power will be purchased. [E. R. J., April 4, '14.]

Clarksville Railway & Light Company, Clarksville, Tenn.—Plans are being considered by this company for a 3-mile extension to Dunbar's Cave.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—This company, which plans to build an electric railway between Fort Worth and Denton, has reported total stock subscriptions of $482,000; cash paid in on three 10 per cent assessments, $112,135, and a cash balance on hand of $107,000. The line will run through Justin or Roanoke. E. E. Baldridge, Fort Worth, president. [E. R. J., April 18, '14.]

***Fort Worth, Tex.**—Plans are being contemplated to build an electric railway from Forth Worth to the new million-dollar reservoir site 6 miles above Fort Worth on the river. The promoters of the line are not yet ready to announce the names of those interested in the project.

Ogden (Utah) Rapid Transit Company.—Surveys are being made by this company near Brigham City for the proposed line into Bear River Valley. The route is north from Brigham City about 2 miles and then near the cement works of the Ogden Portland Cement Company. From there the survey will extend in a northwesterly direction toward Bear River City and then through the Elwood district and into Tremonton and from there to Garland, which will be the terminus for the present.

***Bellingham & Northern Railroad, Sumas, Wash.**—This company has secured a right-of-way for the construction of its proposed electric line around Sumas and it is announced that work will be begun at once. This company is a susidiary of the Chicago, Milwaukee & Puget Sound Railway.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company contemplates an expenditure of $350,000 in track reconstruction, special work and paving on its lines in Milwaukee during the present summer.

SHOPS AND BUILDINGS

San Francisco-Oakland Terminal Railway, Oakland, Cal.—The old buildings of this company at the southwest corner of Twenty-second Street and Grove Street in Oakland are being torn down, to be replaced by a modern three-story office building. The structure will be 118 ft. x 66 ft. and of concrete and brick construction.

Illinois Traction System, Peoria, Ill.—This company has awarded the contract to build its new passenger station and office building at Peoria.

St. John (N. B.) Electric Railway.—This company's new carhouse in St. John will be 58 ft. x 115 ft. and of brick and steel construction.

International Traction Company, Buffalo, N. Y.—Plans are being considered by this company for improvements at its carhouses, which will cost about $40,000.

Johnstown (Pa.) Traction Company.—Work has been begun by this company on its new passenger station in Windber. The structure will be 40 ft. x 31 ft., and of brick construction.

Eastern Texas Traction Company, Dallas, Tex.—Plans are being considered by this company to build a new office building in Greenville.

Texas Traction Company, Dallas, Tex.—Plans for the construction of a new terminal station at the corner of Houston Avenue and Woodward Street, Dallas, are being prepared.

POWER HOUSES AND SUBSTATIONS

Chicago (Ill.) Railways—This company will add to its substation equipment considerable new apparatus comprising four 4000-kw rotary converters, four 4200-kva air-blast transformers, four 600-kva air-blast reactances, four 20,000 cu. ft. blower sets and switchboard panels. The contract for all the apparatus has been awarded to the General Electric Company.

Holyoke (Mass.) Street Railway.—This company will place in operation in its power house in Holyoke a 1200-kw generator with switchboard panel and has contracted with the General Electric Company to build and install the apparatus.

Worcester (Mass.) Consolidated Street Railway.—A new transformer is being installed at the Stutbridge substation by this company.

Guelph (Ont.) Radial Railway.—Plans are being made by this company for improvements at its power house in Guelph.

Dominion Power & Transmission Company, Hamilton, Ont.—This company has let further contracts in connection with its auxiliary steam generating plants as follows: Condensing outfit together with boiler feed pumps to the Canadian Westinghouse Company; two stacks to the Canadian Kellogg Company; boilers to the Edge Moor Iron Works, Edge Moor, Del.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company will add to its substation equipment a 300-kw motor-generator set. The machine has been ordered from the General Electric Company.

Virginia Railway & Power Company, Richmond, Va.—This company will add to its equipment a 938-kva alternating current generator. This apparatus has been ordered from the General Electric Company.

Yakima Valley Transportation Company, North Yakima, Wash.—This company will place in operation in one of its substations a 300-kw synchronous motor-generator set and switchboard, the equipment having been purchased from the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Ithaca (N. Y.) Street Railway has ordered five open and five closed prepayment cars from The J. G. Brill Company.

Glendale & Eagle Rock Railway, Glendale, Cal., expects to purchase one express car and one passenger car.

Union Street Railway Company, New Bedford, Mass., has ordered six 33-ft. car bodies from the J. M. Jones Company, Watervliet, N. Y.

El Paso (Tex.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 4, 1913, as having ordered six closed prepayment semi-steel city cars from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity	44
Weight (car body only),	13,000 lb.
Length of body	28 ft. 10 in.
Length over vestibule,	40 ft. 11 in.
Width over sills	8 ft. 4 in.
Width over all	8 ft. 7 in.
Body	steel
Interior trim	brass
Headlining	Agasote
Roof	arched
Underframe	steel
Air brakes	West. S-M-3
Axles	Pollock
Bumpers	channel
Car trimmings	stat. bronze
Couplers	Tomlinson
Curtain fixtures	National
Curtain material	Pantasote
Destination signs	Hunter
Fare boxes	Johnson
Fenders	H. & B.
Hand brakes	Peacock
Headlights	U. S.
Motors	West.
Registers	International
Sash fixtures	Edwards
Seats, style	St. Louis
Seating material	mahog. slat
Step treads	Feralun
Trolley catchers	Keystone
Trucks	Baldwin, Type M

Northern Texas Traction Company, Fort Worth, Tex., has specified the following details for the twenty closed prepayment cars which are being built by the American Car Company:

Seating capacity	52
Bolster centers, length	26 ft.
Length of body	33 ft. 9 in.
Length over vestibule,	45 ft. 9 in.
Width over sills	8 ft. 4 in.
Width over all	8 ft. 7 in.
Height, rail to sills	32⅜ in.
Height, sill to trolley base,	8 ft. 9½ in.
Body	composite
Interior trim,	statuary bronze
Roof	plain arch
Underframe	metal
Air brakes	West.
Axles	Baldwin
Bumpers	Am. Car Co.
Cables	West.
Car trimmings	Dayton
Control, type	West.
Couplers	Ohio Brass Co., Tomlinson Type A
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Fenders	H. B.
Gears and pinions	tool steel
Gongs	P. Wall Mfg. Co.
Hand brakes	Am. Car Co., with Peacock brakes
Heaters	Consol.
Headlights	Crouse Hinds
Journal boxes	Baldwin
Motors, type and number,	West. 306-CA, outside hung
Paint	Am. Car. Co.
Registers	International
Sash fixtures	O. M. Edwards
Seats	Heywood Bros. & Wake.
Seating material	cherry slat cushions & backs stained mahogany
Springs	Baldwin
Step treads	Feralun
Trolley catchers or retrievers,	Elec. Serv. Sup. Co.
Trolley base	Holland
Trucks	Baldwin Type M
Ventilators	Am. Car Co., Stone & Webster Type
Wheels	Baldwin

TRADE NOTES

Walpole Tire & Rubber Company and the **Massachusetts Chemical Company, Walpole, Mass.**, have removed their Boston sales offices to the general offices at Walpole.

H. F. Keegan Company, Chicago, Ill., has been appointed sales agent in Indiana, Ohio and Illinois for the Chillingworth seamless gear cases manufactured by Thayer & Company, New York, N. Y.

H. M. Byllesby & Company, Chicago, Ill., have removed their offices from the Insurance Exchange Building to the nineteenth floor of the new Continental & Commercial Bank Building, LaSalle and Adams Streets.

Ralph H. Beach, formerly connected with the Federal Storage Battery Car Company, has opened an office in the Singer Building, 149 Broadway, New York, N. Y., where he is in the business of selling storage battery cars and locomotives. Mr. Beach has no connection with the Railway Storage Battery Car Company, of 30 Broad Street, New York.

J. G. White Engineering Corporation, New York, N. Y., has been retained by the Capitol Traction Company of Washington, D. C., to make a complete inventory and valuation of its property. This valuation is to be made simultaneously with a valuation of all public utilities in the District by the Public Utilities Commission of the District of Columbia, in accordance with the provisions of the Act of Congress passed March 4, 1913, creating that commission.

Mesta Machine Company, Pittsburgh, Pa., has received an order from the Sistersville Electric Light & Power Company, Sistersville, W. Va., for a 28 in. x 36 in. twin tandem horizontal double-acting natural gas engine to be direct connected to a 1250-kw a.c. generator, to run at 120 r.p.m. This engine is of similar design, although of larger size, to the other two Mesta gas engines installed by this company in 1911. These two engines have been running continually at 200 r.p.m. and furnishing the power for lighting and street railways at Sistersville, W. Va. The Whitaker-Glessner Company has recently ordered a 26 in. x 48 in. simple Corliss steam engine of the heavy duty rolling mill type.

Western Engineering Sales Company, San Francisco, Cal., has opened offices in the Rialto Building, where it will represent manufacturers of contractors' equipment and electric railway supplies, including the St. Louis Frog & Switch Company; the Toledo Bridge & Crane Company; the Euclid Crane & Hoist Company; the Chicago Pneumatic Tool Company; the Connersville Boiler Company, and the Curtis Pneumatic Machine Company. In the new company are associated F. N. Rumbley and J. W. Stjernstedt. Mr. Rumbley was for some time connected with the Curtis Pneumatic Machine Company, the Pennsylvania Railroad Company and the National Railways of Mexico; while Mr. Stjernstedt was formerly with the Curtis Pneumatic Machine Company, and later engaged in mining work.

General Electric Company, Schenectady, N. Y., has received the following orders for car equipment: Portland, Eugene & Eastern Railway, four GE-216, 50 hp two-motor car equipments; San Diego (Cal.) Electric Railway, forty GE-201, 60 hp, two-motor car equipments complete with MK control and forty emergency straight air brake equipments with CP-27 compressors; Union Electric Company, Dubuque, Ia., six GE-203, 50 hp, two-motor car equipments; Connecticut Company, New Haven, Conn., will install on cars at Hartford, Conn., twenty complete GE-200, 40 hp, four-motor car equipments and air brake equipments with CP-27 compressors; American Railawys Company, Philadelphia, Pa., ten two-motor and four-motor complete GE-201, 65 hp car equipments, twenty-six additional GE-201, 65 hp motors, ten GE-203, 50 hp, complete four-motor equipments, twenty K-35 controllers and eight extra CP-27 air compressors.

ADVERTISING LITERATURE

Egry Registry Company, Dayton, Ohio, has issued catalogs describing its systems of unit waybilling and train dispatching.

Thomas A. Edison, Inc., Orange, N. J., has issued a booklet entitled "The Edison Primary Cell as Applied to the Track Circuit."

Watson-Stillman Company, New York, N. Y., has issued a catalog describing its hydraulic jacks and lifting tools, which include pulling jacks, pit jacks, motor lifts and battery lifts.

McKeen Motor Car Company, Omaha, Neb., has issued a leaflet describing its latest model motor truck, and also a cartoon entitled "The Railroad of the Future as Seen by the Cartoonist."

Allen-Bradley Company, Milwaukee, Wis., has issued Bulletin B-531 describing its Type G starting switches for small a.c. induction motors which do not require a starting resistance to limit the current.

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ATLANTIC CITY CHOSEN AGAIN

The announcement is made by the convention location committee of the American Electric Railway Association that Atlantic City has been chosen again for the annual convention, which this year will be held during the period of Oct. 12 to 16 inclusive. Those who are familiar with the great advantages of Atlantic City as a convention place, on account of its unexcelled hotel facilities, convenient exhibit arrangements and natural attractions will heartily commend the choice of the committee. The fact is that Boston and Washington also were seriously considered, but as the convention has grown bigger from year to year the choice of a gathering place has become little greater now than the celebrated choice which Hobson permitted to the university students who wanted to use his livery service in traveling between Cambridge and London. In the case of Boston the committee found that Mechanics Hall, the only suitable structure in that city large enough for the exhibits, would not be free until November. That month the committee thought would be too late in the year. Washington, of course, is an excellent hotel city, but it has no suitable place for the equipment display which has justly come to be considered the prime attraction of the convention. No western cities were discussed this year owing to the fact that the 1915 convention will be held at San Francisco during the Panama-Pacific Exposition. By the selection of Atlantic City for the 1914 convention American electric railway men will have the opportunity of attending the two next conventions on the shores of the Atlantic and Pacific Oceans alternately.

THE ALTERNATIVE OF REGULATION

William D. Kerr, speaking before the Finance Forum of the Young Men's Christian Association in New York this week, said that the alternative of regulation is municipal ownership and operation. This is, we believe, an accurate conclusion. The only possible other alternative of private ownership with regulation is private ownership without regulation. It is scarcely thinkable that there will ever be a permanent return to the old conditions of unregulated management of public utilities in this country. Such a return would not be in the interest of either the companies or the public. Out of the progress of the last few decades there was developed a theory that private ownership with public regulation is the logical, fair policy. It means generally the acceptance of monopoly in public utility service in each city or district. Disregarding the confusing cloud of minor issues, the main problem before the utilities now is that of making regulation a permanent success for the companies and the public. Other issues are less important than this. It is true that upon the settlement of other issues such as rate-making, rate of return and valuation, the future of the policy of regulation will largely depend. It is also true, however, that it is better for the public and the companies to lose some points on minor issues in order that the entire policy of regulation may not be a failure. All the parties concerned should work toward the goal of success in regulation with a willingness to sacrifice, if necessary, something small in order to attain the large end.

THE IDEAL SUPERVISORY OFFICER

Few but significant and sincere were the words of the address on "Your Duty to Yourself" which was delivered recently before the Public Service Railway section of the American Electric Railway Association by George J. Roberts, first vice-president of the Public Service Corporation of New Jersey. Perhaps the keynote of this address is better expressed by its sub-title: "Some Rules of Conduct for Supervisory Officers by One Who Has Practiced Them." Mr. Roberts' theme is the old but ever-vital one of making the rank and file take a real interest and pride in their work from the example set by the men immediately above them. The general cannot get personally acquainted with the private, but the corporal can. The supervisory officer does not hold office merely to exact the pound of flesh from each man in his charge. As Mr. Roberts says: "The duty of him who directs others, in fact the highest duty, is that he shall see that those under him cheerfully perform their work with the maximum efficiency." It is all too common to suppose that the management of men is a matter of wages and time clocks. Far more is it a question of treating them like human beings instead of automatons. A friendly act when a man is in affliction, an informal smoker, a dinner now and then, a personally-donated prize for an athletic competition—these are the things that make for the spice of life and the foundation of unshakable loyalty. Many preach these sentiments; few practice them. It is pleasant to add, therefore, that the property of which Mr. Roberts is first vice-president is conspicuous for its spirit of camaraderie although its employees number thousands and its area embraces the larger portion of the state of New Jersey. On the Public Service property every division has its social as well as operating organization, and apparently one of the greatest delights of the members is to give honorary dinners to their superintendents and other officials of the company. If the sincere application of the simplest principles of common humanity can lead to such results on so great a system what excuse can be offered by the officers of far smaller properties whose every day is fraught with distrust of what the men will demand next? Must they not say with Cassius: "The fault, dear Brutus, is not in our stars but in ourselves"?

THE PROBLEM OF POPULAR EDUCATION

Few of the many discussions of publicity as a means of popular education equal in cogency the paper by Henry C. Hazzard published in these columns last week. The presentation of the problem and the discussion of its solution together make a document not to be overlooked by railway men conscious of the need for action in this direction and earnestly seeking for guidance as to what action should be taken.

Mr. Hazzard's comparison between highlanders and lowlanders and corresponding groups of public utility managers is apt. So also is his statement that "the lowlanders must educate the highlanders and the highlanders must educate the lowlanders, before they may hope to co-operate in successfully educating the public." In this particular we are somewhat more hopeful than Mr. Hazzard seems to be. This hopefulness arises out of the action taken at the mid-winter meeting of the American Electric Railway Association, with regard to a co-operative publicity campaign; but aside from this one incident, hopefulness is justified by the fact that we have made much progress in establishing the conviction that the situation of public utilities and the problems confronting them demand action which will secure for these properties a fair hearing from the public. This was the foundation necessary to be built before anything else could be done.

The conviction is now very general that public utilities may no longer with safety to themselves stand mute in the face of popular misunderstanding and attack. Having secured a very general consent to this proposition, the problem that remains is to work out a method of accomplishing what nearly everyone now agrees to be desirable.

If it is true, as we believe it is, that the problems of electric railways are less local than territorial or national and that permanent relief is to be found only in corrective measures which are based on broad underlying causes, then the campaign of popular education will ultimately be cast along these lines, and means will be found to carry it out. To express the faith that these things will come to pass is only to profess a belief in the intelligence and progressiveness of the men who are controlling the destinies of the public utility companies of the United States.

On the subject of the best method to accomplish the end that all desire, Mr. Hazzard, as we understand him, advocates direct rather than indirect publicity, meaning, as we interpret his words, advertising as distinguished from that form of publicity which finds its way into the news columns. There is room for difference of opinion on this point. All that he says as to the drawbacks and weaknesses of indirect publicity is entirely justified, but the well-rounded publicity campaign must take account of every opportunity; and with a central bureau directing operations the country over, the opportunities for indirect publicity, which when it can be properly presented is the most effective, are numberless. This does not mean that direct publicity in the form of advertising could be dispensed with entirely, but the ELECTRIC RAILWAY JOURNAL'S observations as to the conduct of many publicity campaigns confirms the belief that from indirect publicity is to be expected the best results in popular education. Electric railways have news about themselves that the newspapers will print ungrudgingly if it is properly presented, and it is in this direction that the greatest opportunities are now going to waste. A national advertising campaign of fact and argument and propaganda, designed to reach every section of the country, would be so costly that there is no immediate prospect of its being carried out. A limited direct campaign supplemented by a broad and intelligent indirect publicity campaign is, on the other hand, as practicable as it is desirable. If new proof is wanted of the truth of this statement, we have only to refer to the publicity campaign conducted by steam roads in support of their application for an increase in freight rates.

THE FOUNDATION OF GOOD PUBLIC RELATIONS

There have been many discourses upon the desirability of maintaining good relations between the public service corporations and the public, but the public judges the corporation by the treatment which it receives, and concrete suggestions as to what this treatment should be are the most helpful contributions to the literature on this subject. Such a paper was that presented at the last meeting of the Iowa Association by P. P. Crafts, who discussed the proper manner of caring for complaints. As a foundation for his remarks Mr. Crafts assumed that the service given by the company was good. Otherwise it had better expend all of its energies in improving its service and in the meantime simply ask the public for a suspension of judgment until this preliminary work is accomplished.

But even with good service, complaints will come, some justified and some unjustified, and if they are cared for in the proper manner the company can make friends where otherwise it would make enemies. After all, the public in any community is made up of individuals not greatly different from the same number of men, women and children in any other community, and they are prepared to take a common-sense view of any situation if it is presented to them in the right light. The gist of Mr. Crafts' remarks, in connection with the manner of dealing with complaints, was to treat the complaints in a businesslike way or, as he expressed it, in a dignified way. By this he meant that the company should avoid assuming blame for conditions for which it was not responsible just as much as it should avoid the appearance of indifference to any complaint.

The impression to be conveyed by the company should be that of intention to right the trouble if one exists, of willingness to receive information and of command of the situation. Such an attitude is not inconsistent with affability of the right sort, but it requires personality, bigness of mind and heart on the part of the representative of the corporation. When relations with the public are involved, or, in fact, with anyone who understands what fair and reasonable thinking are, such a position is necessary.

To carry out a policy of this kind small men are useless because they will either be cringing or domineering. The kind of men required are those who have the ability to put themselves in the place of the customer or patron as well as the capacity to infuse a like spirit in all the representatives of the company who are brought into contact with the public. If a complaint is made, the chances are that there is some foundation for it. The cause should be sought, and if it can be remedied every effort should be made to do so. If this is not possible the reason should be made clear to the offended patron. If this plan is followed the idea will certainly grow that the company is anxious to do all that it can do to make the service satisfactory, and the public will then be more inclined to be lenient in regard to matters which are beyond the control of the utility.

PUBLIC OWNERSHIP IN FRANCE

Advocates of public ownership have often claimed that the function of publicly owned utilities is not to bring in profits but to afford proper service and that financial results may be sacrificed to administrative results. Yet, according to Yves Guyot, in his recent book on "Where and Why Public Ownership Has Failed," government administrations are especially characterized by an absence of a feeling of responsibility in regard to immediate, thorough and dependable service. This phase of the question is admirably brought out in a more popular discussion on government ownership in France which appears in a current issue of the *Saturday Evening Post.*

It is stated that after more than twenty years of state ownership France has only recently taken up the matter of improving a very bad telephone service. In one case in particular, exasperated subscribers through an organized league harried the government for years and finally received some satisfaction—but only when the principal exchange burned down and the government was practically forced measurably to modernize the system. To one who is acquainted with the eagerness of American telephone companies to install public pay stations, it must come as a surprise that in France the concessionaire must purchase an instrument, pay rentals quarterly in advance and make a deposit covering all toll charges, all of which amount to $50 or $60 in cash before service begins. Yet the government can go still farther, for it presumes to arrogate to itself the right of punishing through a suspension of service any individual with whom it may be at odds. It is quite needless to say that no institution, be it either public or private, which is actuated by an honest desire to serve the public fully and efficiently could possibly impose such conditions.

Although the writer is primarily interested in the quality of service, he brings out an interesting point in regard to the financial success of public ownership. No recent authoritative statement was available as to whether the governmentally owned telephone produced a surplus or a deficit, for the telephone, telegraph and mail services were all handled by one organization and no scientific allocation of expenses had been made to each division. To the average man the reluctance that is exemplified in most cases of public ownership in regard to giving an exact statement of the financial operations and conditions is a fitting counterpart to the conception that the success of public ownership should be measured by the standard of service alone. The latter basis, however, is as unsatisfactory as the first, not only in the case of telephones but also in that of other utilities.

In the matter of railroads, the article states that one of the finest suburban trains ever seen runs over the state railroad for 12 miles from Paris to Versailles, but that with this exception there is nothing whatever to admire in the governmental management of railroads. Indeed, many of the cars are strongly suggestive of a dingy caboose of a way-freight train on a third-class American line.

The writer admits that the privately owned roads in France, as well as that publicly owned, may be criticized, but he insists that there is an overwhelming mass of testimony to show that the latter has given the poorest service and been the slowest to make improvements. Since the advent of state ownership, the operating expenses have increased in a much greater ratio than the operating receipts, and the operating ratio increased to 90 per cent, caused mostly by the padding of theoretical payrolls. True, the state railroad was always in an impoverished condition, and when the state was induced to take it over as a result of its original partnership arrangement, brilliant results were not anticipated. The point is, however, that when such management results in less efficient service and poorer financial returns than were obtained under private ownership, it most assuredly is not an argument or even an excuse for public control.

A current report to the Chamber of Deputies emphasizes the rehabilitation, new construction and electrification work that has been done and predicts a decreasing deficit in two or three years. Such was the dream in 1908, but the trend of the years has all but dissipated it. In the days of the millenium, perhaps, there may come that civic righteousness that will make possible a union of the forces of operation and regulation, but until that time they would better be kept separate. When political units operate, they must regulate themselves, and the result is not better public service. The operation of utilities is inherently adapted to private enterprise, whereas the function of the state and municipality is proper and just control thereover.

Express and Freight Service on the Detroit United Lines

A Description of the Methods Employed and Service Rendered by the Detroit United Railway in Handling More Than 1,000,000 Lb. of Freight In and Out of Detroit Each Day

The evolution of the freight and express business on the Detroit United Railway lines affords an excellent example of what may be accomplished in the development of this class of traffic on other electric interurban railways. From a modest beginning more than twelve years ago, the freight traffic has grown to such proportions that more than 1,000,000 lb. of l.c.l. freight is received and delivered each day through the Detroit station. Undoubtedly the almost ideal layout of this system for the development of a passenger and freight business explains in a large measure the success which it has attained. On the other hand, the possibilities for each class of traffic on each of the seven lines radiating from Detroit as a center were no more than those afforded by any other electric interurban line through a prosperous rural community and with a terminal in a city of more than 100,000 population.

Detroit Freight and Express—General View of Tracks and Warehouses

In 1900, about the date of the beginning of the company's freight and express traffic, the Detroit United Railway system consisted of a number of disconnected, separately owned interurban lines with separate terminals in the city of Detroit. Each had an agent in charge of freight and passenger traffic. As has been the experience on other electric interurban roads, freight business, in the beginning, was forced on these railways, and it consisted only of small packages which could be transported on the passenger cars.

During 1900 the Detroit United Railway acquired the various interurban lines that are now a part of the properties of that company and also the Rapid Railway System, which still retains that name. At about the same time the general freight and express business was consolidated, with George W. Parker, the present general express and freight agent, in charge. In the meantime the freight business on the various interurban lines had developed to a point where special cars were being operated to take care of it, and the practice of handling packages of freight on passenger cars had been discontinued. Later the Detroit, Monroe & Toledo Short Line and the Detroit, Ypsilanti, Ann Arbor & Jackson Railway were acquired, the merged lines now being known as the Detroit United Lines.

At first all freight and express matter was loaded direct from the cars to the consignee's door or transfer wagon, and if he was not on hand to receive it, it was left with the ticket agent. As the business developed, however, the property owners began to file complaints that the streets and sidewalks were being blocked at the points where receipts and deliveries of freight were made. In fact, at about this time, the city authorities of Detroit took up the question of relief and requested the railway company to arrange for the receipt and forwarding of shipments on its own property. As a result of this request, the railway company purchased freight house property situated just outside the Detroit business district and close to the freight terminals of five steam roads. The location selected also was near to the docks of a number of steamship lines operating on the Detroit River, which made it easily accessible for transfer of shipments.

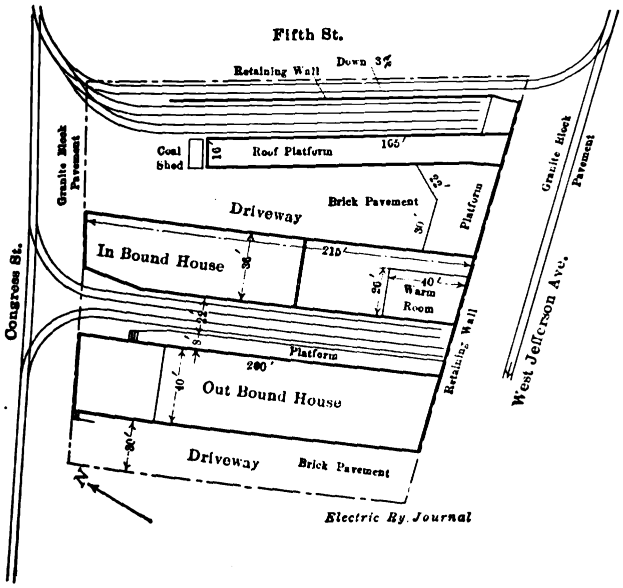
The construction of a freight terminal made it possible to concentrate the express and freight traffic handled over the seven interurban lines operating out of Detroit; consequently the Detroit Electric Depot Company was organized to receive and forward shipments over all lines. At the same time, arrangements were made whereby all other freight and express agencies in the city were discontinued and combined into one. The arrangement brought with it greater economy and further facilitated the prompt handling of shipments. Moreover, it gave the shippers and consignees a single point at which all freight and express could be received and forwarded.

A factor which seriously retarded the development of the freight and express business in the early days was the character of the rolling stock used for this purpose. Usually, it consisted of discarded passenger equipment along with the combination passenger and express cars, which made it very difficult to plan revenue-producing runs and at the same time provide satisfactory regular passenger service. However, the purchase of new rolling stock especially designed to handle express and freight shipments soon demonstrated that it was not economical to handle this class of traffic in the old passenger cars.

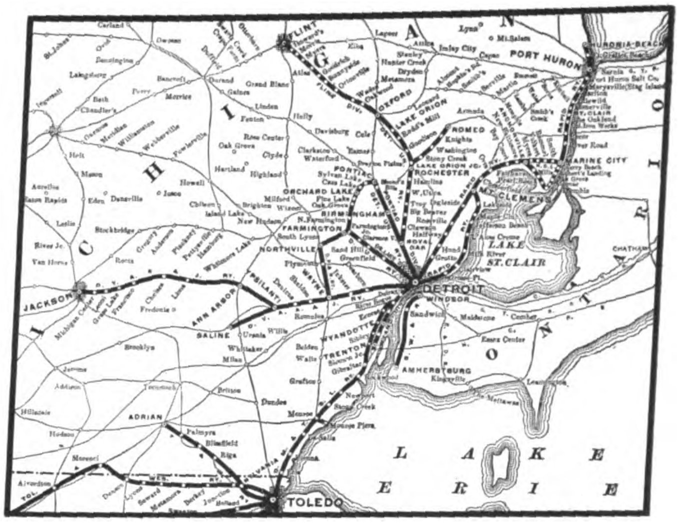
In a number of instances the Detroit United lines traversed a territory not served by steam roads, and this, along with a number of prepay points on competitive lines, gave each community access to the outer world to the exclusion of steam roads. The service rendered by the electric line was further enhanced by transfer arrangements made with boat lines operating on the lakes, as well as contracts with three old-line express companies. On the other hand, prior to the establishment of agencies at the way stations along the Detroit United lines, receipts and deliveries were made from the car to the store in the small towns. This was attractive to the shippers but very unsatisfactory to the company, because cars engaged in loading or unloading freight in the villages blocked the main line to the detriment of the passenger service. Also, when these freight cars engaged in making deliveries cleared the main line for passenger trains, it was necessary to make a round trip to some switch track before loading or unloading could be completed. This resulted in numerous errors through improper checking, which greatly annoyed both the company and the patrons. To add to the troubles, no receipts were taken for shipments delivered in this manner; consequently, when a claim arose it was practically impossible to settle it. As a result of this unsatisfactory experience, and wherever the business warranted, agencies were established and made responsible for the proper checking and delivery of all shipments.

DETROIT FREIGHT TERMINAL FACILITIES

Although the existing freight terminal was outgrown several years ago, it still serves as a means of handling a large freight business, if not the largest received by an electric railway company in this country. While the freight terminal site is centrally located, its irregular shape as well as its location on a hillside made its adaptation for freight terminal facilities rather difficult.



Detroit Freight and Express—General Plan of Freight Houses



Detroit Freight and Express—Map of Detroit United Lines

The tracks approach the site on two sides over main city thoroughfares, one along the top of the hill and the other along the bottom. The difference in the grades of the two streets made it necessary to level off the property, provide a retaining wall on the lower side and operate it as a stub terminal. Entrance to the terminal from the main track on the lower side of the property is along a cross street at one end, where a connecting track is laid on a 5 per cent ascending grade.

In the beginning one warehouse about 40 ft. wide and approximately 200 ft. long was constructed at one side of the property, and the office of the local agent was in one end of this building. For a time this served for both inbound and outbound business, and an old building on another part of the property was utilized to care for rough freight, such as empty beer packages, crates, etc. In time, however, the increased business made additional facilities absolutely necessary, and accordingly another warehouse of the same size as the first was erected and was used exclusively for handling inbound shipments. Two parallel tracks were constructed between these two buildings, and later additional platforms and storage tracks were installed. A covered platform, about 15 ft. in width and 165 ft. in length, was the last structure to be erected on the property. This is used for rough inbound freight in the morning and for loading the cars on the Flint and Jackson divisions in the afternoon, thus relieving the congestion in the outbound warehouse.

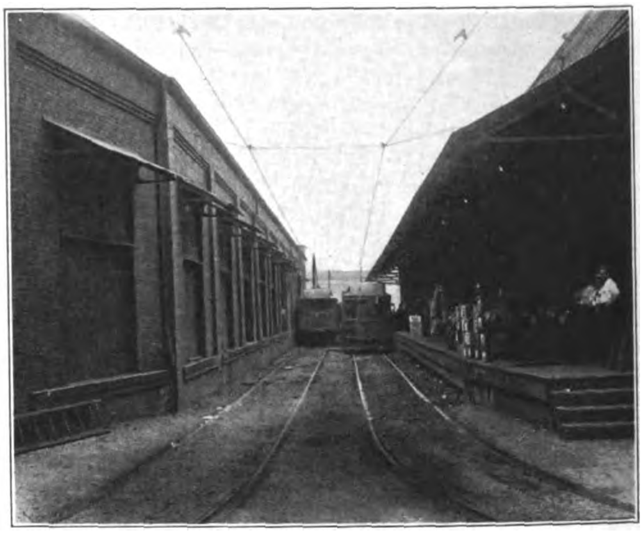
TRAFFIC DEPARTMENT ORGANIZATION

The organization of the express and freight traffic department is quite simple and includes the general express and freight agent, a traveling freight agent, a chief clerk, an "over, short and damage" clerk and a claim clerk. In addition to these, all the way-station agents report to the general agent as regards express and freight matters. The Detroit local agent in charge of the Electric Depot Company also reports direct to the head of the traffic department.

Probably the most striking feature of this simple organization is the absence of freight and express solicitors. The only kind of freight soliciting done at this time is for shipments carrying a high rate and low warehouse cost. In fact, the traffic department has made a strenuous effort to eliminate many undesirable shipments by filing exceptions to the official classification, either by refusing to handle them or by increasing the rates to a point where it becomes profitable to accept the business.

The traveling freight and express agent acts as an assistant to the general agent in issuing tariffs and arranging schedules. He also personally solicits desirable freight and express shipments in advance of their movement to points on his lines. The claim clerk undertakes to clean up all freight at the way stations as fast as it accumulates; consequently all reports covering freight on hand, unclaimed or refused, are sent to him. In case freight shipments are not removed from the local stations within two months, they are sent to an "on hand" warehouse, where they are held until proper disposition may be provided. In many instances the claim clerk has been able to make savings for the company by repairing damaged shipments so that they were acceptable to the consignee. For instance, shipments of sacked commodities are often damaged in transit, and it has been found that it is more economical to resack the damaged pieces in new sacks than to dispose of them in a broken condition. The clerk in charge of over, short, damaged or refused reports conducts all the correspondence necessary to obtain disposition or trace shipments. In case personal investigations are necessary, they are made by the local agent or the traveling express and freight agent.

Detroit Freight and Express—Delivery Side, Inbound Warehouse



Detroit Freight and Express—Tracks Between Inbound and Outbound Warehouses

DETROIT DEPOT ORGANIZATION AND METHODS

As mentioned earlier in this article, the Electric Depot of Detroit ranks among the first in this country in the quantity of express and freight handled through it each day. As a general rule the outbound shipments exceed the inbound; consequently, the local freight house force is sufficient to handle the outbound rush of freight. A general foreman is in charge of the warehouse force, and under his direction are the foremen in charge of the outbound warehouse and the inbound warehouse and a night foreman who has charge of both houses. In the outbound warehouse freight is received by nine door checkers, one caller and two truckers. When this force is not engaged in loading cars it is required to keep the doors cleared by transferring the shipments to the various sections into which the car side of the warehouse is divided. These sections are designated by signs showing the various division stations, and their location is such as to be as nearly opposite the car making deliveries to that destination as warehouse space will permit. This reduces the necessary amount of trucking to a minimum after a car has been set.

The nine receiving checkers stationed at the eight outbound warehouse doors on the driveway side check all shipments against the shipper's orders and at the same time inspect their condition as well as check their weight. In case the shipment is unusual in character and the weight unknown, it is weighed on an automatic scale. Generally, the various commodities are contained in crates of a standard average weight, and the warehouse trucks are of a minimum size and weight averaging 100 lb. each, thus making it unnecessary to readjust the automatic scales in order to determine the tare represented by the weight of the trucks.

Following the receipt and check of the shipper's order, the receiving checker signs his name to a copy of the order and notes the time and date it is received. This shipping order is either held or deposited in a common receptacle, whence it is removed by a bill clerk or messenger sent from the billing office. This messenger makes round trips every few minutes so that the receipted shipping orders are kept from accumulating in the receiving checker's hands.

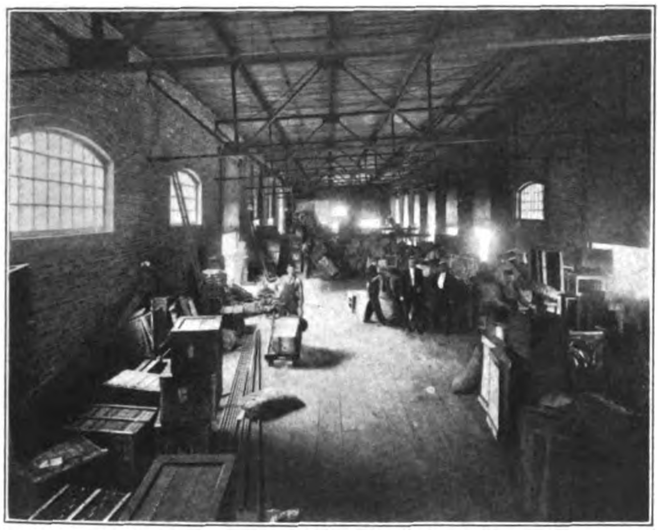
In most instances every shipment is checked twice, first by the receiving checker when it is deposited on the floor and then by the loading checker when it is moved into the car for transportation. When freight arrives late and the car in which it is to be transported has been set, the shipments receive only one check as they pass through the warehouse into the car.

At other times, to insure the proper loading of all shipments and at the same time obtain a double check, the loading checker is furnished with the shipper's order when the goods are loaded into the car. He is held responsible for the loading into proper cars and has supervision over a stevedore, an experienced packer who is required to examine the marking as an additional check on the proper loading. All shipments are packed in the car with the labels up, and articles of a fragile nature are loaded on top or in other safe positions. The stevedore follows the usual practice in loading out shipments in station order, and to facilitate his work the loading checker keeps him posted as to what is on hand in the warehouse to be loaded into the car.

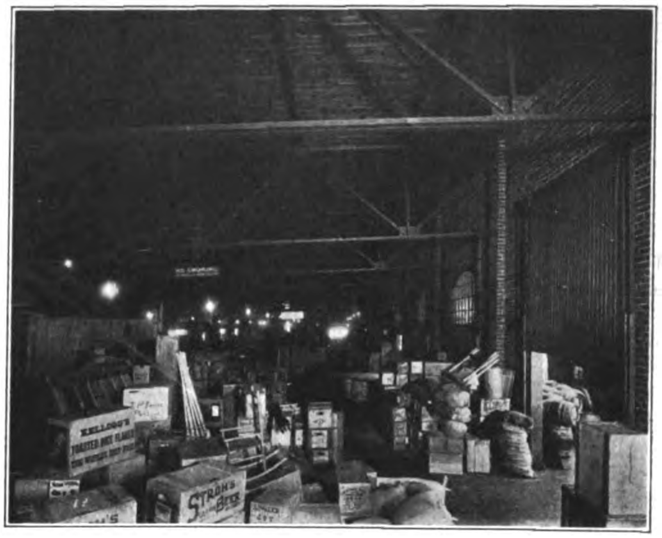
After the loading checker has completed loading all shipments contained on a single shipping order, he returns the order to the head bill clerk, but before so doing marks the bill with his name and the numbers of the cars into which the shipments have been loaded. In case he finds a discrepancy between the shipping order and the marking on the shipment, the freight is held until an additional check can be made.

The Detroit Electric Depot warehouses are open for the receipt of freight shipments from 7 o'clock in the morning until 5 o'clock in the evening, except on Saturday, when they are closed at 1 o'clock. As there are several express and freight trains over each division every day, it is the rule to receive general freight shipments until one hour before the departure of each train, an arrangement which gives ample time for billing and loading.

The trackage on the car side of the warehouse is sufficient to hold eight cars, four on each of two tracks. Most of the express and freight runs are in single units; consequently, when the tracks are filled to their capacity there is usually one car for any destination on the system. The cars on adjoining tracks are set so their doors are opposite each other, and freight may be trucked through those nearest the house to those on the farther track. In loading, an effort is made to use the maximum capacity for each car, but in most cases space is the limiting factor. This condition is found especially to be true with certain divisions, as some transport largely bulky shipments while others move small but heavy ones.



Detroit Freight and Express—Interior of Inbound Warehouse



Detroit Freight and Express—Interior of Outbound Warehouse

The limited space provided in the freight-terminal driveways as well as the rush of teamsters at certain periods in an effort to make outbound cars would result in congestion had not the local agent employed a traffic officer to direct wagon movement to and from the warehouses. It is this officer's duty to keep teams in line and see that all the receiving doors are occupied. Paved driveways and an overhanging awning protecting the door openings are provided on the receiving side of the outbound house, thereby affording protection of property while being unloaded from drays to warehouse. In some instances it is necessary to hold perishable shipments in the warehouse, either inbound or outbound. While the local agent endeavors to reduce this practice to a minimum, it has been found necessary to provide a warm room at one end of each of the warehouses to protect perishable shipments during extremely cold weather.

Experience in the warehouse has shown that the best help as truckers and checkers is none too good to reduce to minimum the number of claims for lost and damaged shipments. Consequently, this company has adopted the policy of paying wages a little higher than those paid by the steam roads, and as a result the best men engaged in this work are obtained. The truckers are paid 20 cents an hour for the first six months and 21 cents thereafter. From time to time these men are advanced to callers, when they receive 22 cents per hour. Most of the receiving and loading checkers are on a monthly salary basis. Considerable night work is necessary at the warehouse, however, and it has been found quite difficult to obtain good men at the monthly wage. In order to obviate this, some are paid on an hourly basis, permitting them to earn a fair salary for their work. There are also a few of the day loading checkers that are paid on an hourly basis because it is oftentimes necessary to keep them longer than regular hours.

OUTBOUND FREIGHT AND COLLECTIONS

An average of more than 1250 shipments requiring expense bills are forwarded and received each day; hence it is necessary to employ an unusually large clerical force to handle the details. The local agent's staff includes approximately thirty men and boys, namely, chief clerk, chief biller and five bill clerks, an account man, a head collector, an accountant and an assistant, two abstract men, three men on over, short and damage reports and tracing shipments, two clerks to make out expense bills for prepaid shipments, one messenger, one file clerk, two stenographers and one switchboard operator. Other members of the local agent's staff include two clerks for special work, a cashier and an assistant, two inbound clerks who make out all expense bills and over, short and damage reports on incoming freight, as well as through business from one division of the Detroit United Railway to another. The cashier is assisted by two outside collectors who make their turn-ins to him and report to the chief collector in the local agent's office. The chief collector's duties include the selection of routes for the outside collectors for each day, and he keeps a record of the stops made daily as well as the collections made by each man. This record of efficiency is used in reprimanding the collectors when they do not obtain satisfactory results.

The telephone service has become quite an important factor in the handling of freight and express business, and in order to make it possible to serve several patrons at once, four lines run into the local agent's office. These are connected through a local switchboard to the agent's office, the chief clerk's desk, the tracing clerk's desk, the cashier, the baggage room and warehouses.

In a general way, the billing methods conform to the usual practice of other roads but the detailed processes may be of interest. There are a number of prepay points on the road or points where agencies are not maintained, and when a Detroit checker receives shipments for these points from shippers who are not on the credit list he directs the representative of the consignor to the cashier, who applies the shipment classification, fixes the rate on the shipper's order and then receipts for the amount collected. Shippers on the credit list are furnished with a complete station list when they ask for credit. Therefore, when shipments are billed to prepay points, the shipper is held responsible for payment and a prepaid form of expense bill is made out and presented for collection. The prepay receipted shipping orders together with other shipping orders are sent to the chief bill clerk, who inserts the rates and charges. Most of the rates can be applied from memory.

After shipping orders have been supplied with rate and classification, they are turned over to the bill clerks, who prepare blanket waybills which go forward with the shipments. Two impression copies are made of the blanket waybill. A bound copy serves as the forwarding agent's record and a loose copy serves as the auditor's check against expense bills. In case there is a joint billing—that is, freight forwarded to a point on a connecting line—two loose copies of the blanket waybill are made so that the auditor can properly distribute the earnings.

In order to fix the responsibility on the conductor in charge of each express train, he is required to receipt for all waybills. This receipt also serves as a record of those responsible for placing the shipments in the car and contains the time of departure of the train. In case of freight short or damaged at the time of loading exceptions are registered on the record by the conductor or loading checker. In order to reduce the time elapsing between the checks of shortage in shipment and the time tracers are sent out, all the conductors' receipted records are checked daily at the local agent's office. If the receiving agent also checks the shipment as short, line tracers are sent out immediately.

INBOUND FREIGHT METHODS

The quantity of inbound freight is considerably less than that outbound; consequently, the force required to handle it is much smaller. This force is composed of a delivery foreman and seven delivery checkers, who have a sufficient number of truckers to make deliveries promptly. Usually four or five truckers are all that are required, and these are only on duty during the rush hours. After rush hours the delivery checkers deliver their own freight to consignees, and the truckers are assigned to duty in the outbound house, where they report to the loading checkers.

During all the year, and especially in the summer months, large quantities of freight of a highly perishable nature are brought into Detroit each day. A rather unusual feature with this class of commodity is that it arrives during the night and most of it is delivered before the time of opening the warehouse in the morning. These deliveries are made by the night foreman assisted at certain periods by delivery checkers, and this accommodation has brought the railway company practically all such perishable shipments coming out of the territory served.

In many instances inbound cars contain through shipments from one division to another. These are unloaded and checked against the blanket waybills, which are afterward sent to the inbound office, where a clerk makes exact copies of the waybills for through shipments. The result of the check from the inbound car, as well as that made when it is reloaded on the outbound car, is recorded on the office copy, which is retained at the transfer point for record.

The blanket waybills for inbound shipments are checked by the unloading checker, after which they are sent to the inbound office, where expense bills are made in triplicate. These expense bills are given to a clerk who notifies the consignees by telephone for perishable shipments and by postal card for other shipments. At the same time a record of the manner of notifying the consignee is made on the triplicate expense bill so that they may be used as future reference. Following this procedure, the expense bills are then sent to the cashier, who has them distributed in alphabetical order in a bill case. When a consignee or his agent calls for goods he must first go to the cashier and obtain an expense bill. The cashier gives him two numbered parts of the expense bill, which are presented to the delivery warehouse foreman before delivery is made. The checker assigned to make the delivery in turn checks the articles on the No. 2 portion of the expense bill, after which the consignee or agent is requested to receipt for the shipment delivered. Part No. 1 of the expense bill is the consignee's record of the transaction and part No. 2 is filed in numerical order in the local agent's office.

In case the shipment arrives over, short or damaged, the delivery warehouse foreman or his assistant investigates the expense bill, first as to its accuracy in the number of articles recorded, next as to the legibility of the marking, and finally as to the agreement of the expense bill with the waybill. In case an actual shortage is found it is acknowledged on the receipted portion of the expense bill and an O., S. & D. report is issued. This is sent to the forwarding agent, who follows the usual procedure in tracing matters of this kind. In case a shipment is damaged the bad-order notation must contain an exact description of the nature of the defect, which, in case a claim is filed, limits the liability of the company.

Whenever exceptions are taken to the waybill by the delivery warehouse foreman they are immediately reported to the general freight agent, who has charge of all freight claims. This is done in order that he may have advance notice of over, short or damaged shipments and may take at once such action as is necessary.

Another precaution taken by the local agent in the receipt and delivery of freight to consignees is to require that shipments be receipted for by the party to whom they are billed and marked, or by his authorized drayman or representative. Draymen sign for the company to which they are making deliveries with the company's name and their own names. In case an outside cartage company performs the delivery service the driver signs for the consignee, the cartage company and himself.

Some years ago a contract was entered into with a cartage company to pick up and deliver shipments in Detroit. This company not only caters to those patrons who do not operate their own drays but assists materially in reducing the congestion on inbound traffic by hauling the freight when consignees' drays are otherwise engaged. The cartage charge is fixed on a basis of distances and weights, and weekly settlement is made to the Electric Depot by the cartage company for all charges on shipments delivered.

EXPRESS TRAIN SERVICE

At the present time express train service in and out of Detroit includes thirty-five cars each way daily. Some of these trains begin their runs at Detroit, while others start from an outside point, but all of them make round trips daily. On the seven divisions radiating from the Detroit Electric depot, two to seven express trains are operated each way daily except Sunday. On Sunday the only freight trains operated are those in the milk-train service.

In addition to the express service rendered by the railway company, it has made separate contracts with three old-line express companies—namely, the Wells Fargo Express, the Adams Express and the United States Express—and each operates only over certain divisions of the Detroit United Lines. Each of the old-line express companies receives a special express-train service, and in a few instances where it is possible the company utilizes a portion of these express cars for its own business. Practically all the express business is loaded directly into the car from the wagon. One express company occupies space in a portion of the outbound house.

All cars when within 300 ft. of the Electric Depot, or in what is known as its yard limits, are under the direct supervision of the local agent. After the cars are set on the storage tracks or sent to the inbound warehouses, the regular crews are relieved and such switching as is necessary is handled by two crews, one for day work and one for night work, who report to the local agent.

In order that the shippers of Detroit as well as those along the seven divisions of this system may be on hand to receive or forward freight shipments, all express trains are operated on a regular schedule. The adherence to a regular schedule has been particularly advantageous in stimulating and holding the prepay station business, and at the same time it has eliminated every excuse for filing claims for damage or theft, as the shipper or consignee knows when to meet trains.

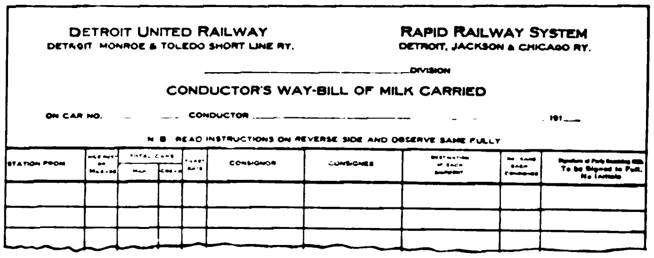
The express train service over the seven divisions of the Detroit United lines is of two kinds. Through cars which do not make local stops between Detroit and the outer terminals make it possible to give an early delivery of freight at the outlying points. Local cars which follow these through cars make way station deliveries en route. On the longer runs, as a general rule, if the outbound car is a local, it is returned as a through car, leaving outbound through cars to serve as locals on the return trip. The only competition now offered to this class of express service is that furnished by auto trucks transporting freight between Detroit and points 12 and 15 miles out. On the return trip, these auto trucks as well as other teams are creating a certain amount of competition by picking up milk shipments bound for Detroit.

In order to obtain a record of the work done by all crews, they are required to make detailed reports of freight, express and milk carried. These reports also furnish a record of the arrival and departing times of trains at the various stations as well as the weights and charges for freight delivered and received. The reports permit a check on the earnings of each run, which is very important when an adjustment in schedules is contemplated or it is found that a run is not profitable to the company.

MILK-TRAIN SERVICE

Few electric roads in the country have developed a milk traffic such as is handled on the Detroit United lines. A milk-train service is furnished on all divisions, and the schedules are arranged to meet both the shipper's and the consignee's needs. For this service the Michigan Railway Commission has issued an order for rates as follows: 15 cents per 10-gal. can for a distance of 1 mile to 30 miles on either milk or cream, and 22 cents for 31 to 35 miles, with a graduated scale for greater distances. At the present time more than 2000 cans of milk are brought into Detroit each day and most of it is shipped from the 1-to-30-mile zone. The crews on these special cars also serve as a source of information to the traffic department as to the milk production in the territory served. Their daily conversation with the shippers at the way stations, as well as personal observations, are the source of this information.

The delivery of milk and return of empty cans at the Detroit station is under the supervision of one man. The assignment of one man for this work accomplishes two things. The responsibility of deliveries to consignees is fixed as well as the return of the proper number of cans to each of the milk shippers. In order that the checks may be correct and serve as a record of the milk received and delivered, the conductor on each milk train is required to fill out a conductor's waybill of milk carried. The names of the consignor and consignee are written in by the conductor, but the individual receiving the milk at the Detroit end is required to receipt for the number of cans delivered to him. A copy of this conductor's waybill of milk carried is shown in one of the illustrations. Similar waybills of empty cans carried are also prepared by the conductor.



DETROIT UNITED RAILWAY
DETROIT MONROE & TOLEDO SHORT LINE RY.

RAPID RAILWAY SYSTEM
DETROIT, JACKSON & CHICAGO RY.

________________ DIVISION

CONDUCTOR'S WAY-BILL OF MILK CARRIED

ON CAR NO. ______ CONDUCTOR ________________ 191__

N. B. READ INSTRUCTIONS ON REVERSE SIDE AND OBSERVE SAME FULLY

STATION FROM	[illegible]	TOTAL CANS		[illegible]	CONSIGNOR	CONSIGNEE	[illegible]	[illegible]	[illegible] To be Signed in Full. No Initials
		[illegible]	[illegible]						

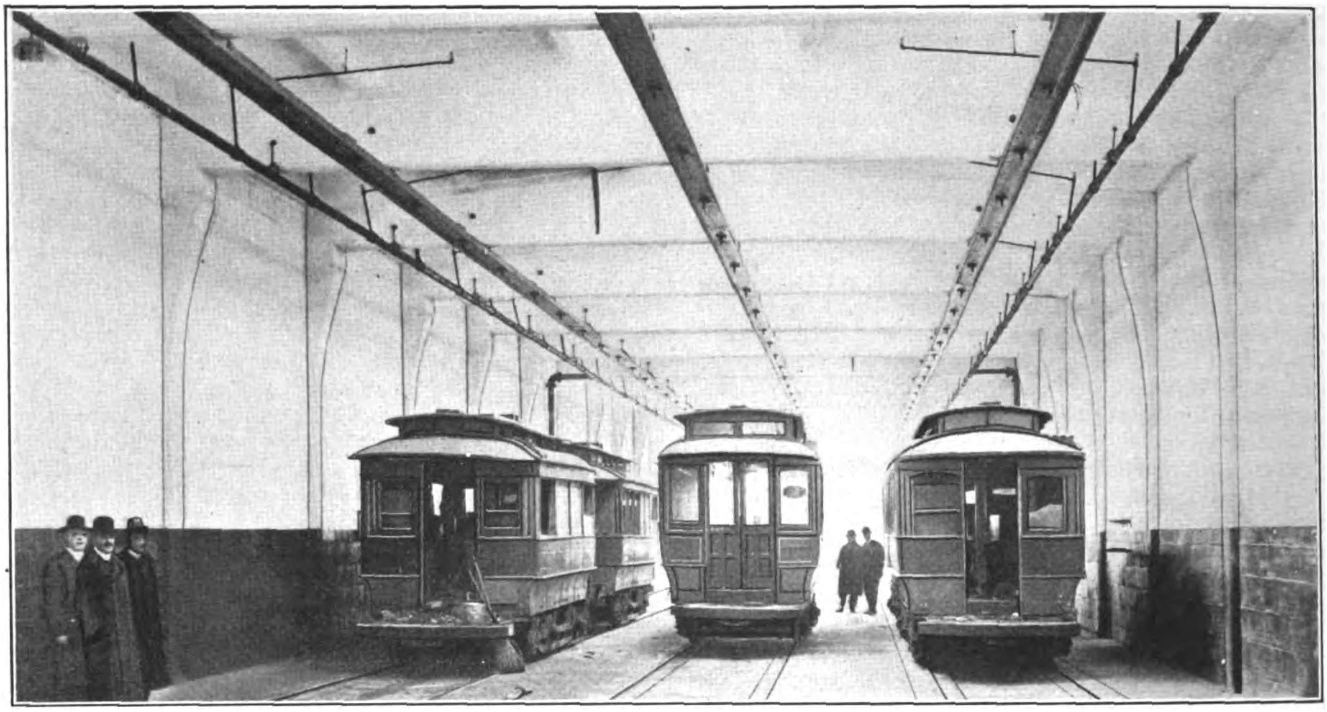
Detroit Freight and Express—Waybill of Milk Carried

Interchange of freight and express business is limited practically to that with connecting electric lines. Those that have been established include the Michigan United Traction, which connects at Jackson, Mich., and the Saginaw & Flint Railway, which connects at Flint, Mich. It is hoped that satisfactory through rates with electric lines connecting at Toledo, Ohio, will be established in the near future.

KANSAS RULINGS ON WORKMEN'S COMPENSATION LAW

Kansas State Labor Commissioner O'Brien has ruled for the benefit of casualty insurance companies operating in that State that workmen injured in an accident which incapacitates them for a longer period than two weeks shall receive recompense under the workmen's compensation law from the date of injury. A meeting recently held in Kansas City between employers and workingmen to interpret the law adjourned without reaching an agreement. The commissioner's ruling followed.

It is believed that the Kansas courts, in the event of a test case, will uphold the ruling, despite the fact that Senator Hunter, of Wellington, one of the framers of the compensation law, stated recently that the intention of his committee was to make payment begin two weeks after the date of the accident in which the workman sustained injuries incapacitating him for longer than a fortnight. Mr. O'Brien also has ruled that payment shall be made on a gross basis of the workman's earnings, rather than net, as maintained by the employers. In conclusion, he asserted that the next Kansas Legislature would settle the disputed points as he has outlined them—in favor of workmen rather than employers.



Philadelphia Sprinkler Test—Fig. 1—Conditions Before Start of Fire, Showing Layout of Sprinklers with Test Car on Middle Track

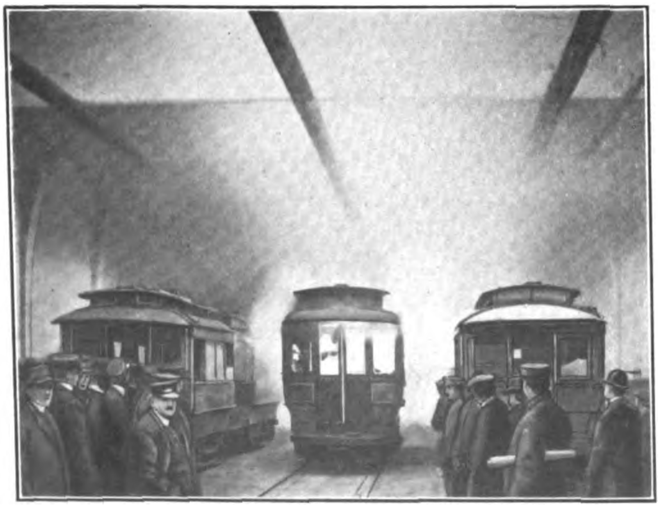
TEST OF AUTOMATIC SPRINKLERS AT PHILADELPHIA

A test was recently conducted at the Luzerne carhouse of the Philadelphia Rapid Transit Company primarily for the purpose of bearing out the contention of the company that with a low ceiling carhouse with sprinkler heads properly distributed in the ceiling, a loss of more than one car could not occur from any fire starting within a car. A further object of the test was to show that with a low ceiling carhouse, aisle sprinklers are not necessary as a supplement to the roof sprinklers.

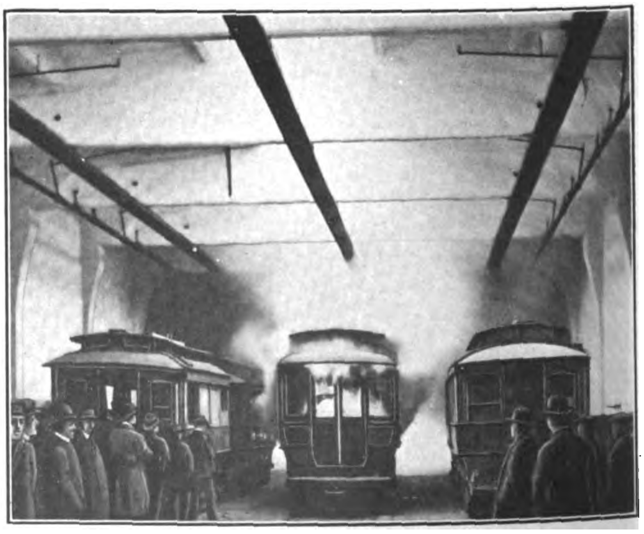
The Luzerne carhouse was built in 1912-13 of unit concrete construction and was fully described in the ELECTRIC RAILWAY JOURNAL, issue of June 28, 1913. The carhouse is one story in height and consists of ten bays divided by walls of 6-in. tile. These bays are open at each end and have a capacity of thirty-six cars each, or a total carhouse capacity of 336 double-truck nearside cars. The company contends that the building is absolutely fireproof. The automatic ceiling sprinklers were installed solely for the protection of the cars when in the carhouse.

The sprinkler installation was made by the Rockwood Sprinkler Company, Worcester, Mass., and is the dry-pipe system. The sprinkler heads are staggered, each head being so located as to cover an area of 8 sq. ft. The placing of the sprinkler heads under the skylights made it necessary to use fuses of 212 deg. Fahr. under the glass, while 165 deg. Fahr. heads were used throughout the rest of the system.

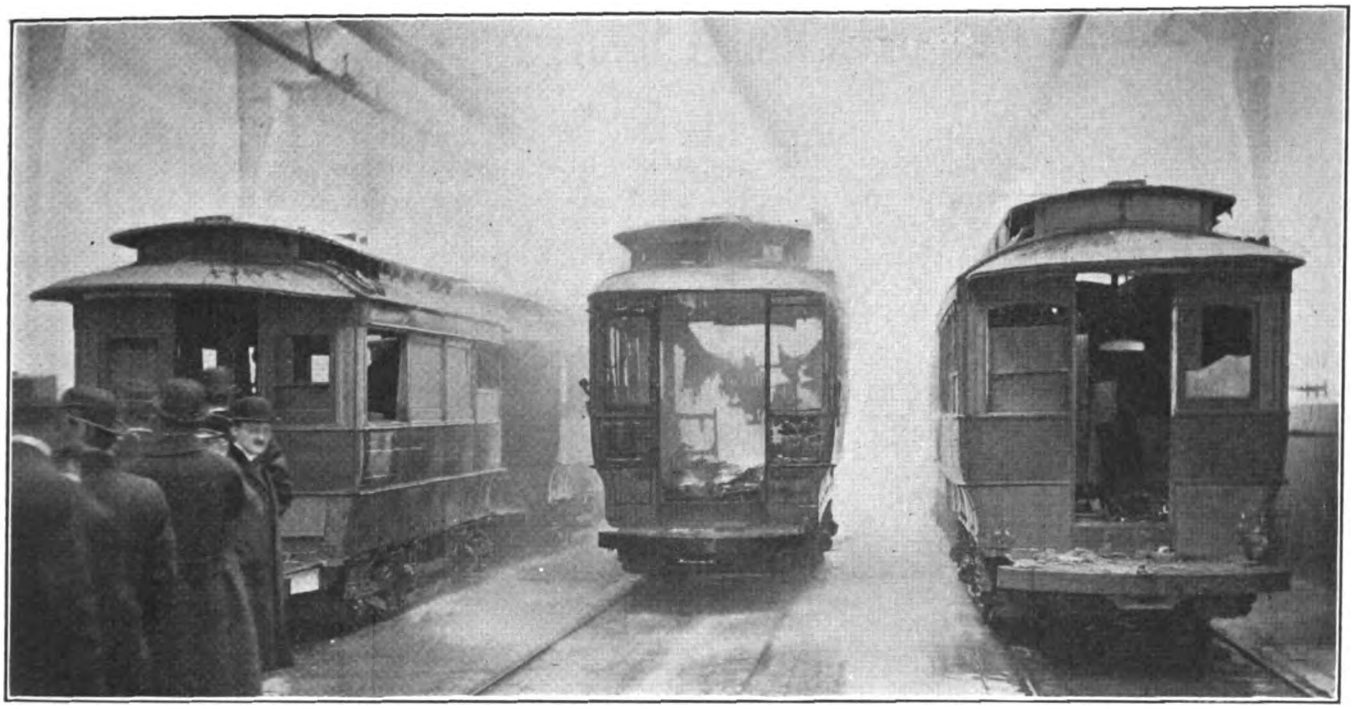
The fire test, which was made March 25, 1914, in the presence of various fire insurance officials and others interested, was as follows: Five single-truck cars were used in this test and were placed upon the tracks in the ordinary positions as they come off the street, as shown in the first engraving on this page. Fire started upon the floor of the middle car at 2.16 p. m. The fire was rather slow in starting owing to the absence of air, all



Philadelphia Sprinkler Test—Fig. 2—Start of Fire After Glass was Broken to Give Draft



Philadelphia Sprinkler Test—Fig. 3—The Fire at the Maximum Did Not Affect the Adjacent Cars



Philadelphia Sprinkler Test—Fig. 4—View Taken After the Sprinkler Had Put Out the Fire Without Giving It a Chance to Spread to the Cars on the Near-by Tracks

doors and windows being closed. Therefore, a pane of glass was broken from each door and in 5½ minutes, or at 2.21½ p. m., the flame burst through the windows and doors communicating to the sides of the cars on the adjoining tracks. This is the period shown in Fig. 3 on page 1028. In 1½ minutes later, or at 2.23 p. m., the first sprinkler head (212 deg. in skylight) opened, followed almost immediately by others until forty heads within an area of 400 sq. ft. had opened. The fire on side cars was put out immediately by the water from the sprinkler heads, and the curtain of water falling kept the fire confined to the center car in which it was started.

These cars were placed about 100 ft. from the west end of bay No. 8. A strong breeze was blowing from the east, the temperature of the bay being about 50 deg. Fahr.

The 1000-gal. auxiliary fire pump was not used in this test, the sprinklers operating under the ordinary pressure from tank and main at about 40-lb. pressure. The trolley troughing, which is about 4 ft. above the roof of the cars, was not damaged at all. A small section of the trolley wire was slightly annealed, but not sufficiently to require replacement. The walls and ceiling of the building were not damaged or even discolored. The local alarm of the private fire department at this carhouse was sounded within a minute after the fire was started, no advance knowledge having been given to the employees. The men were on hand, fully equipped with their appliances, and if they had been allowed could have put the fire out with but very little damage to the car.

RESULT

The result of this test indicated without doubt that in a low ceiling carhouse of modern construction aisle sprinklers are not absolutely necessary, as the sheet of water which descends from sprinkler heads forms a curtain in such a manner as fully to protect the adjacent cars. In this test ordinary pressure of 40 lb. only was used and accomplished the desired results. After this test was finished the pump pressure was put on the system, resulting in such an increase (nearly 50 per cent) in the flow of water that it was impossible to see through it, and it would without doubt have extinguished any fire.

CALIFORNIA RAILROAD COMMISSION REPORT

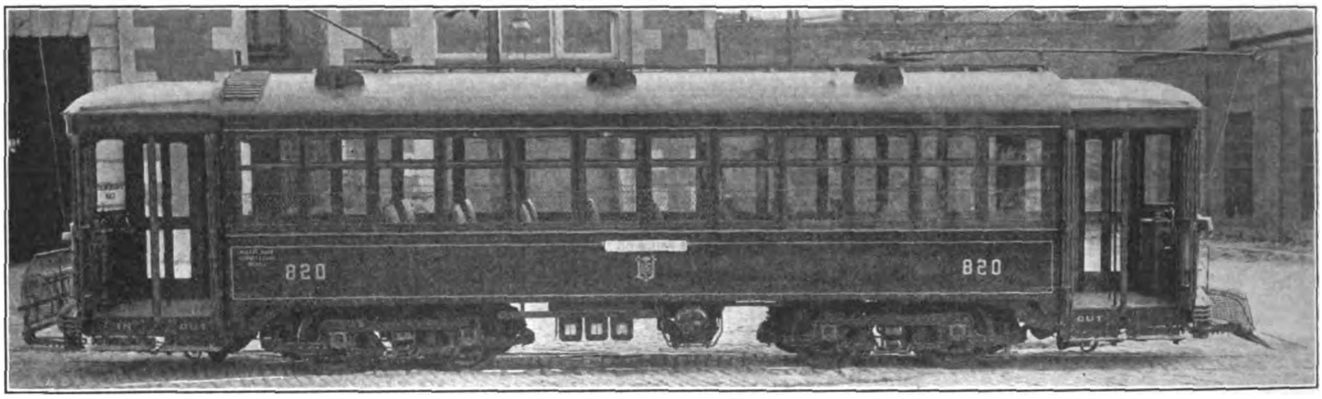
The Railroad Commission of California has issued a 2005-page report of its activities for the period from June 30, 1912, to June 30, 1913. The report covers the general divisions of the commission's work, and it also devotes considerable space to complaints filed with the commission, the resulting orders and an appendix of regulatory laws. Between March 23, 1912, and June 1, 1913, application was made to the commission to issue $167,778,361 in the form of stocks, bonds, notes and certificates, of which sum the commission authorized the issue of $146,495,597. Of the amount applied for, 23 per cent was asked for by electric railways, and 84 per cent of this amount was authorized. The electric railways ranked third in new financing among the utilities, being only about $10,000,000 below the steam railroads as regards the amount applied for and about $50,000 below the gas and electric companies. The report contains individual comparative balance sheets and income statements for the various street railways in California, and also presents group tables in order to afford an easier comparison between companies. The operating expenses are given in detail, and capitalization, mileage, traffic and miscellaneous statistics are presented for each separate company and for all the companies grouped in one table. During the year valuation work was entirely completed on the Stockton Terminal & Eastern Railroad and the Pacific Coast Railway, nearly completed on the San Diego & Southeastern Railway, and partly completed on the Southern Pacific Railroad and the Los Angeles & San Diego Beach Railway.

The Interborough Rapid Transit League, composed of employees of the Interborough Rapid Transit Company, New York, opened its baseball season on April 25 with two games at Hedley field.

Changes in Car Design at Albany

The New Semi-Steel Pay-Within Cars of the United Traction Company Are a Wide Departure from an Earlier Flush Platform Design for Suburban Service—Experiences with the Old Cars and the Advantageous Features of the New Ones Are Described

During 1907 the United Traction Company, Albany, N. Y., installed for service between Albany and Troy twenty-five "easy-access" cars with flush platforms, air-operated doors and double folding steps. This car was described in the STREET RAILWAY JOURNAL for Jan. 18, 1908. This design did not prove satisfactory because the double step and the fully partitioned cab for the motorman prevented maximum speed in loading and unloading. Furthermore, the steps could not be cheaply maintained to fold up completely with the closing of the door. These cars are now being rebuilt. In the first two the cab bulkhead and doors were removed, the platforms were dropped and fixed steps were substituted for folding ones. While the last change is not consistent with the practice adopted for its new cars, the company believes that the omission of all possible handholes on the outside of this car makes it impossible even for a small boy to get on the step after the door is closed. The sliding doors are now manually operated by means of a vertical handle similar to the reverse lever in the cab of a steam locomotive. With a travel of only 7 in. this lever permits the easy control of a door which is 40⅜ in. wide. On the reconstructed cars the conductor stands with his back to the vestibule and with the cash box in front of him.

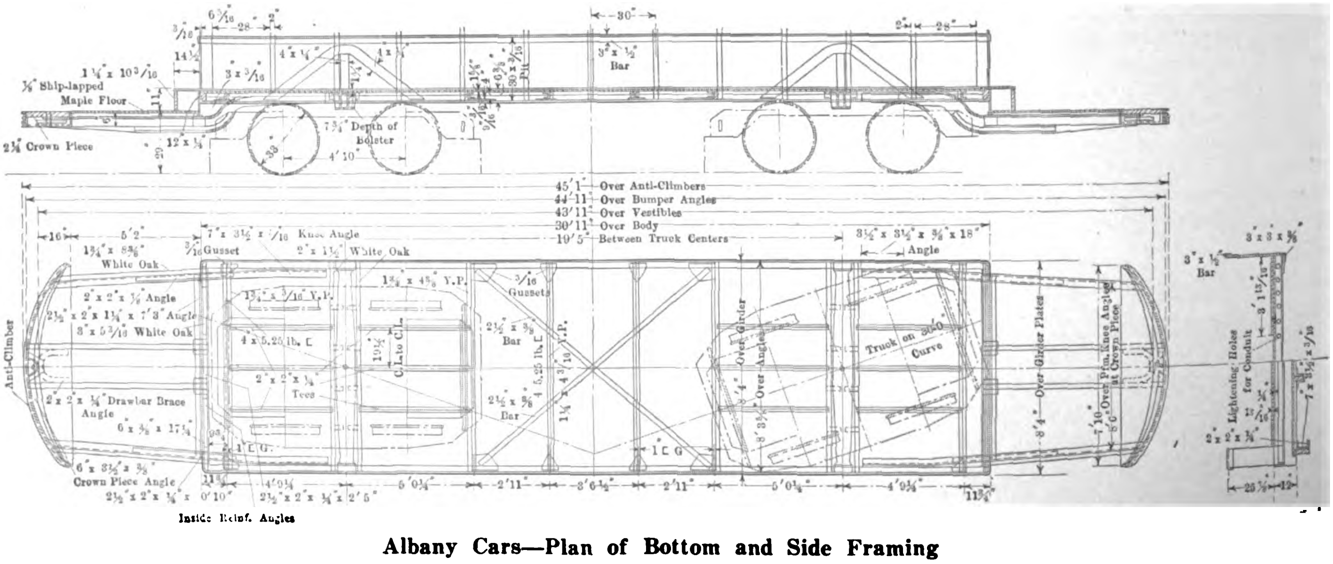

820
820
IN
OUT
OUT

Albany Cars—Latest Prepayment Design Without Bulkheads; Vestibules Opened to Show Grooved Posts Into Which the Bufferless Folding Doors Make an Air-Tight Fit

GENERAL DIMENSIONS AND FRAMING OF NEW CARS

The twelve new double-end cars are of pay-within design and were built by the Cincinnati Car Company. As they have no bulkheads, particular care was taken to make them draft-proof for winter service. In addition, the new type has several other interesting features, none involving any radical departure, but all tending toward better service.

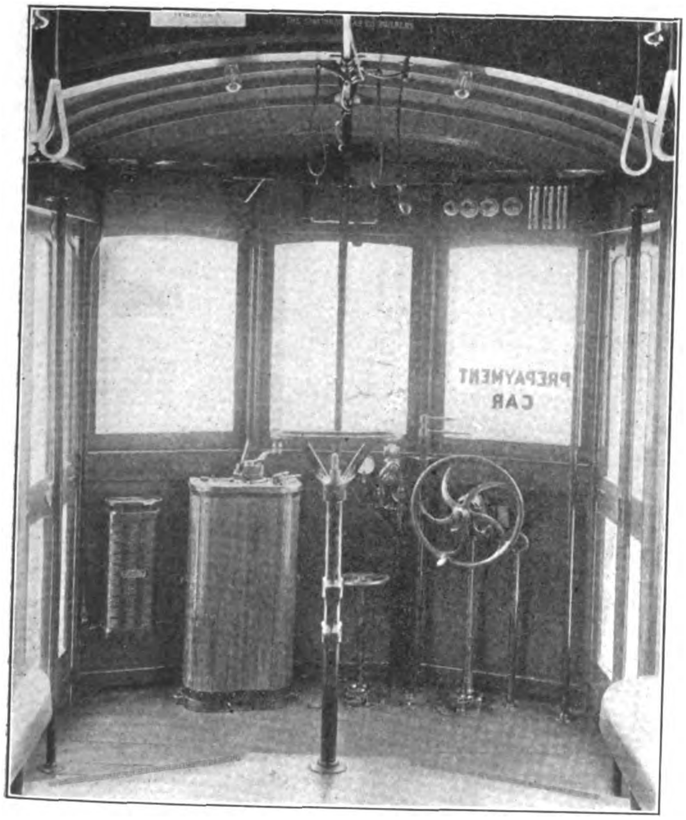
The principal dimensions of the new car are shown on the accompanying drawings. It has a body length of 30 ft. 11 in. and accommodates forty passengers in a combination of Walker & Bennett transverse reversible and short corner seats, all covered with pantasote. The bottom framing comprises steel channels and I-beams, yellow pine fillers and oak cross members. The 30-in. x 3/16-in. side girders are bent around the corner posts from door post to door post. These girders are riveted to a 3-in. x ⅜-in. lower sill angle, which is


6 5/16
28
2
3/16
14½
1¼ x 10 3/16
⅞ Ship-lapped Maple Floor
11
2¼ Crown Piece
12 x ¼
3 x 3/16
4 x ¼
7¾ Depth of Bolster
4' 10
33
30
3 x ½ Bar
30 x 3/16
2
28
45' 1 Over Anti-Climbers
44' 11 Over Bumper Angles
43' 11 Over Vestibules
30' 11 Over Body
19' 5 Between Truck Centers
16
5' 2
7 x 3½ x 5/16 Knee Angle
1¾ x 8⅜ White Oak
3/16 Gusset
2 x 1½ White Oak
1¾ x 4⅝ Y.P.
3/16 Gussets
2 x 2 x ⅛ Angle
1¾ x 3/16 Y.P.
2½ x 2 x 1¼ x 7' 3 Angle
3 x 5 3/16 White Oak
4 x 5.25 lb. [
19¼
C.L. to C.L.
2½ x ⅜ Bar
4 5.25 lb. [
1¼ x 4 3/16 Y.P.
Anti-Climber
2 x 2 x ⅛ Tees
2 x 2 x ¼ Drawbar Brace Angle
6 x ½ x 17¼
1 [G.
1 [G
6 x 3½ x ⅜ Crown Piece Angle
2½ x 2 x ¼ x 0' 10
2½ x 2 x ¼ x 2' 5
11¾
4' 0¼
5' 0¼
2' 11
3' 6½
2' 11
5' 0¼
4' 9¼
11¾
Inside Reinf. Angles
3½ x 3½ x ⅜ x 18 Angle
8' 4 Over Girder
8' 3⅜ Over Angles
Truck on 30' 0 Curve
8' 4 Over Girder Plates
7' 10 Over Pin. Knee Angles at Crown Piece
5' 0
3 x 3 x ⅜
3 x ½ Bar
3' 1 13/16
Lightening Holes for Conduit
13/16
2 x 2 x ¼
7 x 3½ x 3/16
25⅝
12

Albany Cars—Plan of Bottom and Side Framing

made in one length and bent around the corner post to form a spliced member in the center. At the side bolster the side girder plates are reinforced by riveted diagonal braces of 4-in. x ¼-in. steel bars. The end-sill reinforcement consists of 10-in. x ¼-in. steel plate riveted to the end-sill angle. Like the cross sills, the cast-steel bolsters were made with the proper apertures for conduit and air piping.

Ash is used for the body posts, belt rail, letterboard and carlines. The posts are mortised into pine sills which in turn are bolted to the steel underframe. The framing of the arch roof is reinforced by 1½-in. x ⅜-in. steel carlines. The roof and ceiling comprise ⅞-in. white-leaded poplar, agasote headlining and an intermediate lining of ¾-in. cork, the last being used for insulation and sound-deadening. Cork of the same thickness is also used as a heat insulator between the side girders and the inside panels of agasote. The detachable bonnets are built like the roof, but have no steel carlines. The inside finish is of mahogany of plain sanitary design, with the headlining painted to match. The trimmings are of statuary bronze. A double floor of yellow pine is used.

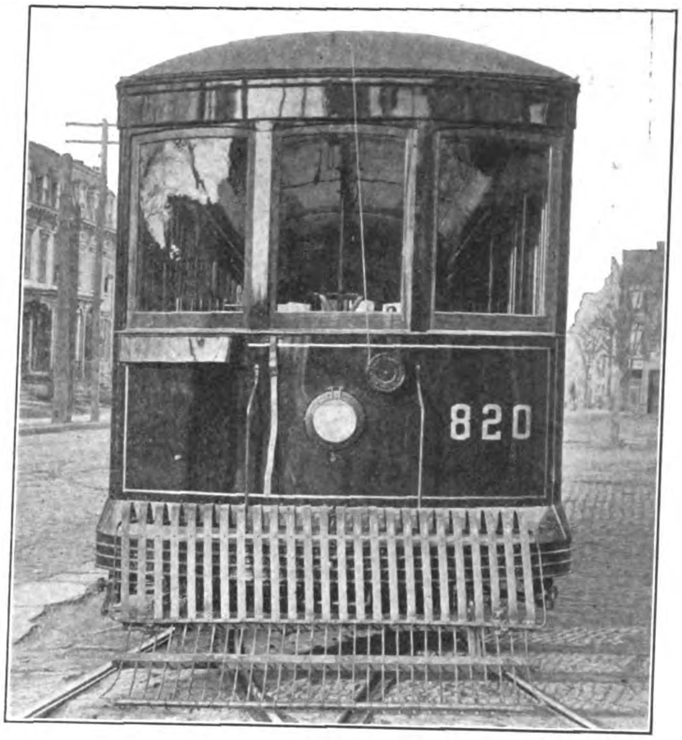


Albany Cars—No. 1, End, Showing Stanchions to Prevent Getting Off Car Backward, Location of Snap Switches, Switch Rod in Pocket, Etc.

The use of raised instead of drop sash permits an aisle of 26¼ in. instead of 20 in., other conditions being equal. The short, rigid upper sash gives a free outlook of 37½ in., which does not interfere with the line of vision.

VESTIBULES AND DOORS

The vestibules are supported on outer side knees of 7-in. x 3½-in. x 7-in. angles and center knees of 2¼-in. x 6-in. oak. The dash carries a buffer shield and Hedley anti-climbers. While the folding doors and steps are of standard hand-operated type, the doors differ from common practice in several points. They have no rubber buffers, but fit snugly in the grooves of an intermediate post. This method insures a better draft-excluding joint than can be obtained when one rubber buffer bears against another. Two years' service with such doors on rebuilt cars indicates that no trouble need be anticipated from the pinching of passengers with non-buffered doors. Another draft-excluding feature is that the doors close ⅞ in. below the vestibule floor instead of at the platform level. The door-operating handles of the conductor and motorman are interchangeable to secure their standardization and to avoid carrying them from one end of the car to the other.

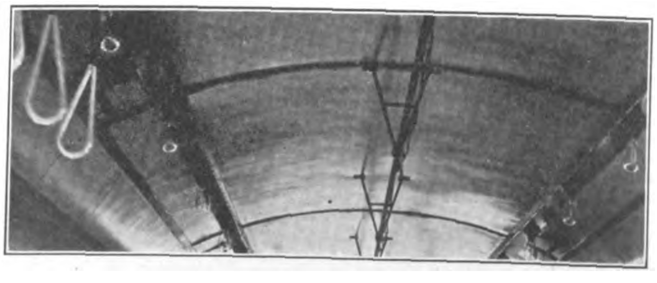


Albany Cars—End View of New Car with Bonnet Construction

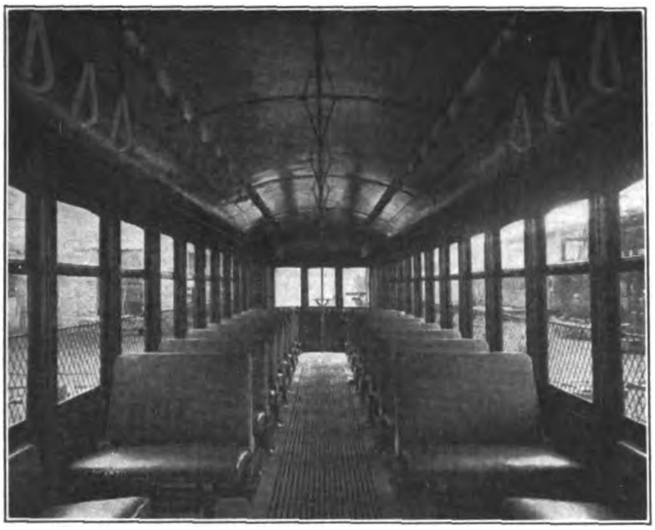
PASSENGER MOVEMENT FEATURES

The car floor extends out into the vestibule section with the conductor's stand so placed thereon that a 32-in. aisle is left on each side of his station. During rush hours a chain is hooked across the rear exit, but at other times the passenger may use either aisle. As the illustration of the vestibule shows, the vertical stanchions are so placed that it is practically impossible for a passenger to get off backward. Straps with Rico sanitary sleeving are installed only above the corner seats, but despite this the transverse seats have no grab handles. The reason given for this omission is that when a high-speed car comes to a sudden stop there is a possible danger that a passenger clasping such a grab handle may have his fingers broken. All steps and the vestibule extension of the car floor are fitted with Mason safety tread.

Fares are placed in a New Haven recording-type fare



Albany Cars—Ceiling Detail, Showing Truss Plank from Which the Lamps and Straps Are Carried



Albany Cars—Interior, Taken Before Installation of Lamps; Grab Handles Purposely Omitted to Avoid Broken Fingers

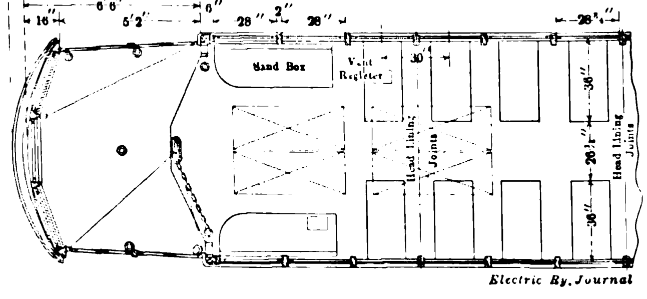
box, but in addition to this box standard registers of the same manufacture are used to record fares and transfers separately.

MECHANICAL AND ELECTRICAL EQUIPMENT

Each car is mounted on Taylor S. B. trucks equipped with four Westinghouse 101-B-2 motors. The braking equipment consists of General Electric air brakes and Peacock hand brakes of vertical wheel type. The electrical equipment includes 35-G platform controllers, Crouse-Hinds incandescent headlights, sixteen cross-seat, four truss-plank and two vestibule Consolidated heaters, Consolidated push-button buzzer system and twenty 36-watt tungsten lamps. The successive lamps are wired on alternate circuits and are carried from the same truss planks from which the corner hand straps are suspended. All wiring is in conduit with Crouse-Hinds condulets. The only important change from standard practice is that, instead of bringing all leads out through one bell mouth, the wires are brought out separately. This end was accomplished by drilling and tapping out the blank side of the junction box and fitting the holes with nipples. To each lead as brought out from the box a mark is given for identification.

The vestibule at No. 1 end carries over one sash a three-way snap switch whereby the headlights, platform lights and sign lights can be reversed with one movement. Adjacent to this switch are two snap switches for the control of the lighting and main heater circuits. The cab heater switch is shown above the sash at the left of the motorman. This view also shows some examples of the neat conduit work throughout. It will be noted further that a pipe pocket has been provided for the awkward but useful switch rod.

The auxiliary equipment on these cars includes Root spring-type track scrapers, automatic ventilators, Providence fenders and Earll trolley catchers.

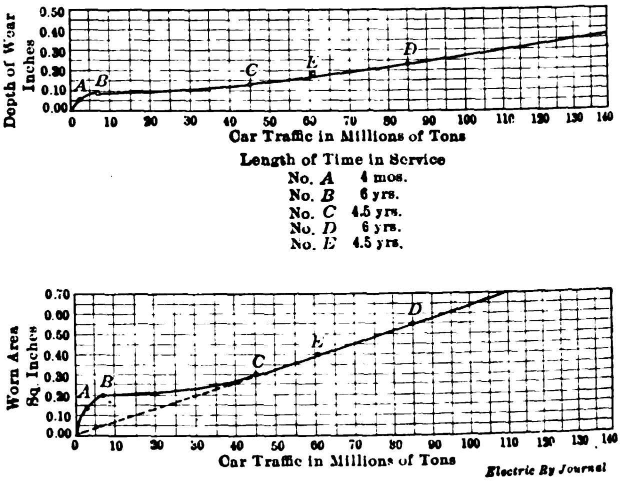


Albany Cars—Half-Plan Showing Vestibule and Seating

RAIL-WEAR MEASUREMENTS ON THE UNITED RAILROADS OF SAN FRANCISCO

Careful measurements were recently made by the United Railroads of San Francisco, of which C. N. Black is president and B. P. Legare is engineer of maintenance of way, to show how the rails now in service on lower Market Street in San Francisco are withstanding the wear of heavy traffic. These rails, which had been in service six years when the measurements were taken, weigh 141 lb. per yard, and their section is the standard No. 395 as rolled by the Lorain Steel Company. Under the conditions existing on lower Market Street it was possible to compare rails which had been subjected to different degrees of wear under exactly the same conditions, because the outer tracks, which are used by a smaller number of cars of the same weight and type, were laid at the same time as the inner tracks, the latter being the main arteries of all the city traffic.

Some thirty measurements of the wear shown by the rail head were taken at as many points along about ½ mile of track, and these figures were averaged to get the values plotted in the diagram shown in Fig. 1 as points *B* and *D*. Point *B* on the diagram represents the average wear on the outer tracks, which were subject to a lighter traffic, while point *A* represents wear on the rails which had been placed in the inner tracks in the course of putting in new turn-outs or switches. Points *C* and *E* show the average wear on the inner tracks near a branch line; point *E* including the traffic contributed at this junction, and point *C* excluding it. The tonnage of the car traffic was figured from the time schedule of the cars which daily run over this route, and is the sum of the weights of empty cars only, as there was no accurate means of estimating the weight of their loads. The weights of the cars ranged from 22 tons up to a maximum of 27 tons.



San Francisco Rail Wear—Fig. 1—Diagram Showing Wear on Ball of 141-Lb. Rail

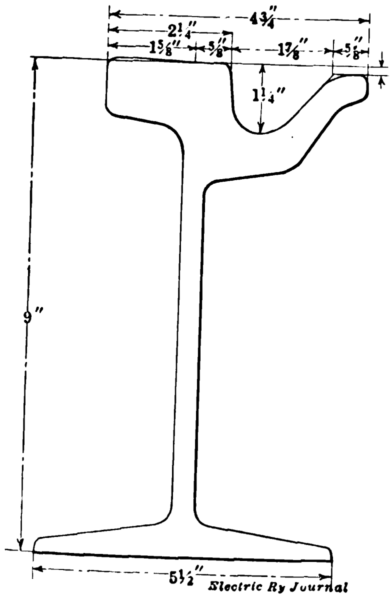
The rail wear was measured by taking the present depth of the flange groove and subtracting this from the depth which it was known to have when the rail was laid. Obviously this method could not be used after the wheel flanges had begun to cut the groove deeper, but the wear was found not to have reached this stage as yet in the track examined. The rapidity with which the rate of wear changes at the beginning of the curve is explained as being due to the larger percentage of wear while the corner of the rail head is still sharp. The fact that the curve practically becomes a straight line after a certain time is believed by company engineers to bear out the theory that these rails, while in service, are undergoing a process of hardening due to the rolling-out action of the car wheels.

In considering this question of rail hardness for the lines of the United Railroads, the climate of San Francisco has an important influence. It is pointed out that a rail for service in that city does not need the protective features required where temperature extremes are experienced. Rails weighing over 100 lb. to the yard rarely break on the lines of the United Railroads, it is reported, and wearing quality is therefore given primary consideration in comparing rail sections. The table, which compares different rail sections, was made to show the relation between the rail which has been adopted as standard by the United Railroads, and heavier and lighter rails of other design. The standard section which is the 106-lb. No. 422 of the Lorain Steel Co., is considered as having a cross-sectional wearing surface of unity, and the corresponding area on other rails is expressed in terms of this unit value. It is to be noted, however, that in the standard section the flange groove is offset sufficiently from the plane of the web so that even after this groove has been deepened to a considerable extent by wear, there is still no weakened section just below the railhead that threatens a break. The table is, therefore, giving other rail sections the benefit of the doubt as to whether or not there would be danger of a break after the wear had reached a certain point. The wearing area assumed for the standard rail is considered fair in view of the company's experience with rail sections not so well adapted to withstand heavy wear, such as in the Sutter Street tracks, for example. In these tracks, on which 96-lb. rails of weaker section have been in use for seven years, the wear has been so great that only about 25 per cent of the head proper is left. At some points on this track the wheel flanges have deepened the grooves until the guard-lip has been completely separated from the remainder of the rail.

CALCULATED PROPERTIES OF VARIOUS RAIL SECTIONS

Rail Section	Weight per Yard	Height in Inches	Neutral Axis Perpendicular to Web: Moment of Inertia	Section Modulus	106-lb. Standard Taken as Unity: Relative Strength	Rel. Strength per Unit Weight	Rel. Wearing Area
L.S. 141-395	141	9	159.0	34.0	1.46	1.10	1.14
L.S. 129-461	129	9	136.1	24.6	1.05	0.87	0.92
L.S. 119-341	119	9	129.0	25.0	1.07	0.96	0.90
L.S. 109-340	109	9	124.0	24.0	1.03	1.00	0.97
L.S. 106-422	106	9	119.3	23.3	1.00	1.00	1.00
P.S. 85-201	85	9	99.2	21.0	0.90	1.12	0.62
P.S. 107-254	107	7	72.0	19.0	0.82	0.81	0.97
L.S. 81-378	81	4	16.0	7.3	0.31	0.41	0.96
8-in., 75-lb. T	75	8	62.0	15.0	0.64	0.80	0.78
L.S. 80-335	80	7	57.3	15.6	0.67	0.89	0.72
A.S.C.E. 100	100	5¾	48.9	15.0	0.64	0.68	1.07
A.S.C.E. 90	90	5⅝	34.6	12.2	0.52	0.62	0.99
A.S.C.E. 80	80	5	26.6	10.1	0.43	0.58	0.88
A.S.C.E. 75	75	4 13/16	22.9	9.1	0.39	0.55	0.80
A.S.C.E. 70	70	4⅝	19.8	8.2	0.35	0.53	0.72

L. S.—Lorain Steel Company.
P. S.—Pennsylvania Steel Company.

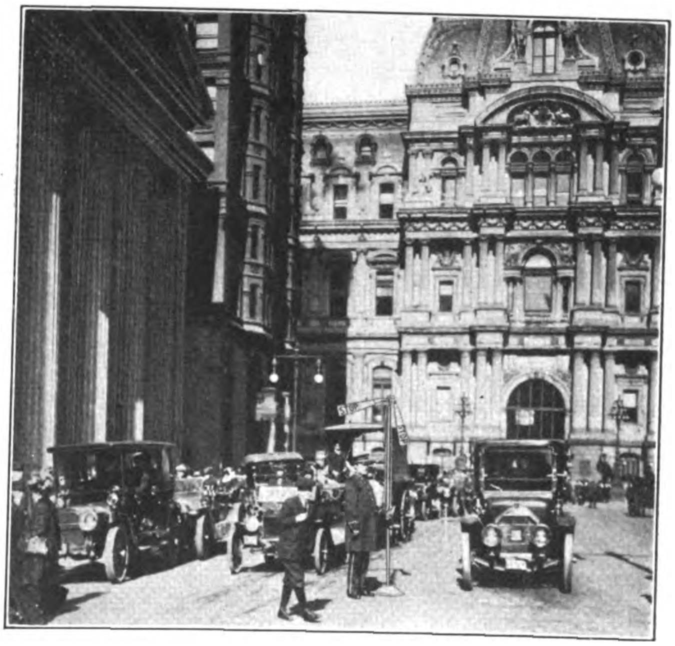


San Francisco Rail Wear—Fig. 2—Cross-Section of Standard 106-Lb. Rail

The standard rail section shown in Fig. 2 was first laid in San Francisco in 1909, and at present time it is in use on about 60 miles of the company's 278 miles of track. During 1913 some 12 miles of track was laid with the 106-lb. rail, and this year about 15 miles more is projected. Although no official report to this effect has been made, it is a matter of belief in the engineering department that when the old rails on lower Market Street are finally removed, the 106-lb. standard should be used to replace them. This belief is based upon the investigations of the company as outlined which indicate that a 106-lb. rail can satisfactorily withstand the wear of 27-ton cars on a trunk line.

SEMAPHORE SIGNALS FOR TRAFFIC REGULATION

The department of public safety of the city of Philadelphia placed in service during the past summer at the intersection of Chestnut and Broad streets, at the City Hall, a semaphore signal which is used in connection with the regulation of street traffic. As the accompanying illustration shows, this semaphore is installed in the middle of the street and is manipulated by the local traffic policeman. Two arms are used, one marked "stop" and the other "closed." When either of these arms is in a horizontal position traffic is not free to pass but otherwise the arm is dropped. The advantage of the semaphore scheme, of course, is that the signals of the policeman are made visible at a greater distance to the drivers of the vehicles in the rear. The department reports that it has found the semaphore scheme of inestimable value in controlling traffic at this point. It is now experimenting with several devices with a view of adopting something which will be practical for use in regulating traffic in other congested centers throughout the city of Philadelphia.



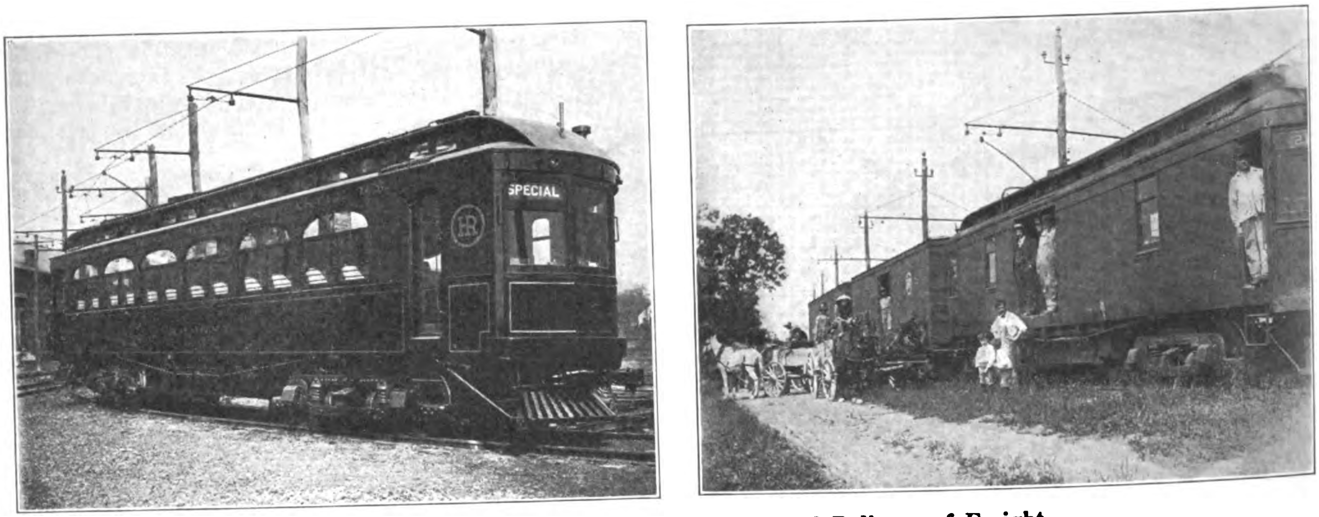
Semaphore Signal for Traffic Control in Philadelphia

Freight Transportation on the "Harmony Route"

The Author Gives an Account of the Methods by Which the Company Has Been Able to Increase the Freight Business Along Its Lines—The Freight Schedule and a New Form of Waybill Are Also Described

BY J. B. M'INTIRE, GENERAL FREIGHT AGENT PITTSBURGH, HARMONY, BUTLER & NEW CASTLE RAILWAY

The Pittsburgh, Harmony, Butler & New Castle Railway, popularly known as the "Harmony Route," has been in operation since 1908. It is divided into three divisions, namely, the Pittsburgh division, which includes that portion of the system from Pittsburgh to Evans City, 23 miles; the Butler division, or that portion of the system from Evans City to Butler, 12 miles, and the New Castle division, or that section from Evans City to New Castle, 28 miles. This makes a total length at present of 63 miles. We also have under construction a 7-mile extension from Ellwood City, on the New Castle division, to Beaver. On its completion the system will consist of 70 miles of track connecting the county seats of Allegheny, Butler, Lawrence and Beaver Counties and serving a population of nearly 1,000,000 people.



Harmony Route—Special Party Car and Local Delivery of Freight

The road was originally built exclusively for passenger traffic. Later the management conceived the idea of the development of a freight business, and in May, 1910, the first freight train was run. Its total cargo was four 5-gal. milk cans, representing a gross revenue of 40 cents. From this modest beginning has grown our present freight business, which employs thirty-three persons and operates six motor or freight cars, eight box cars, three gondola cars, one flat car and forty dump cars. The cars vary in carrying capacity all the way from 20,000 lb. to 50,000 lb.

All freight and passenger runs originate and terminate at Harmony Junction, which is about midway between Pittsburgh and New Castle, on the New Castle division. Here also are the main power station, carhouses and executive offices. A city office is also maintained in Pittsburgh.

We have a direct connection at Harmony Junction with the Baltimore & Ohio Railroad, and by means of a tipple all material coming in over that road in hopper cars destined for us is dropped into our cars. All gondola or box-car material is transferred by hand. The gage of our road, like that of many other electric lines in western Pennsylvania, is 6 in. wider than standard track, hence the necessity of the transfer of material.

FREIGHT SCHEDULE

Following is our freight-train schedule: Freight train No. 51 leaves Harmony Junction in the morning, proceeds to Evans City, thence over the Butler division to Butler, delivering freight received from the Pittsburgh and New Castle divisions the preceding evening. Returning to Evans City it connects with trains No. 52 and No. 54, exchanges freight with them, and then makes another trip to Butler and Evans City.

Train No. 52 leaves Harmony Junction in the morning, proceeds to Pittsburgh and loads with New Castle division freight, running from Pittsburgh to Evans City as an express train and making no stops on the Pittsburgh division. It then proceeds as a local freight over the New Castle division to New Castle and returns to Harmony Junction in the evening.

Train No. 53 is our milk train. It leaves Harmony Junction in the morning and proceeds over the New Castle division almost to Ellwood City. From this point to Pittsburgh it accepts milk shipments only, the amount carried being from 1000 gal. to 1500 gal. daily. From Pittsburgh north the train runs as a local, handling shipments over the Pittsburgh and Butler division, and returns to Harmony Junction.

Train No. 56 leaves Harmony Junction in the morning for New Castle and returns to Harmony Junction at noon, carrying through any local freight over the New Castle division.

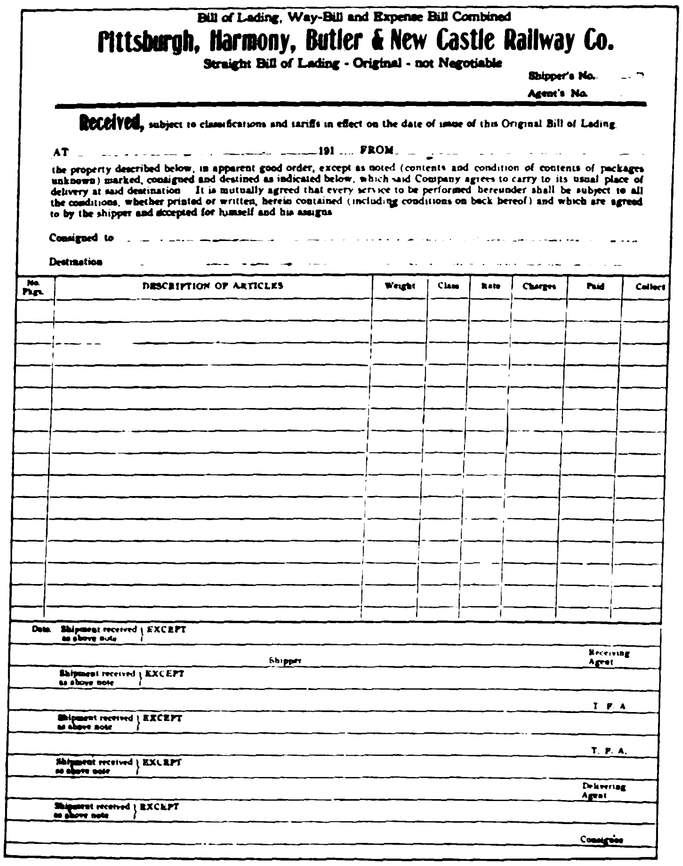
Train No. 54 picks up train No. 56 at Harmony Junction at noon and proceeds to Pittsburgh, then returns to Harmony Junction late at night, handling through and local freight over the Pittsburgh division.

Train No. 55 picks up train No. 52 at Harmony Junction, leaving this point in the evening, arriving at Pittsburgh during the night, and unloads. Then it proceeds to the freight house of the Wells Fargo Express Company and loads with express shipments for the Butler division, returning to Harmony Junction the following morning.

Each freight crew consists of three men, a traveling freight agent, a conductor and a motorman. The business of the traveling freight agent is to supervise loading and unloading of all freight and to check waybills and markings on shipments. The conductor and motorman assist in the loading and unloading of freight and have direct charge of car movement and operation.

NEW FORM OF WAYBILL

We have recently adopted a new form of waybill, which takes the place of the usual bill of lading, waybill, expense bill, exception report and daily report. Prior to its adoption we did not receive a report of the business done by any agent until after the first of the following month, when he turned in all of his waybills for the preceding month, as well as his forwarding and receiving abstract sheets and his settlement sheets.



Bill of Lading, Way-Bill and Expense Bill Combined

Pittsburgh, Harmony, Butler & New Castle Railway Co.

Straight Bill of Lading - Original - not Negotiable

Shipper's No.

Agent's No.

Received, subject to classifications and tariffs in effect on the date of issue of this Original Bill of Lading.

AT 191 FROM

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as indicated below, which said Company agrees to carry to its usual place of delivery at said destination. It is mutually agreed that every service to be performed hereunder shall be subject to all the conditions, whether printed or written, herein contained (including conditions on back hereof) and which are agreed to by the shipper and accepted for himself and his assigns.

Consigned to

Destination

No. Pkgs.	DESCRIPTION OF ARTICLES	Weight	Class	Rate	Charges	Paid	Collect

Date. Shipment received as above note } EXCEPT

Shipper

Receiving Agent

Shipment received as above note } EXCEPT

T. F. A.

Shipment received as above note } EXCEPT

T. F. A.

Shipment received as above note } EXCEPT

Delivering Agent

Shipment received as above note } EXCEPT

Consignee

Harmony Route—Waybill Combining Many Features

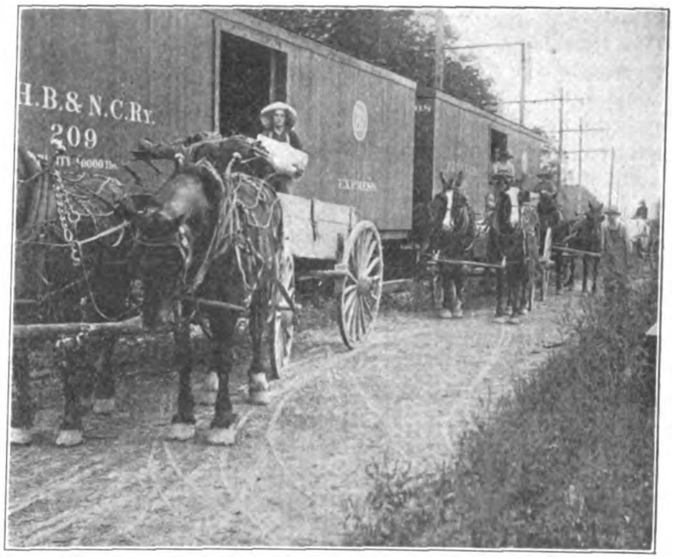
Our new form of waybill contains a printed contract like that in our original bill of lading, and on the reverse side is another printed contract similar to that on the reverse side of the former bill of lading. There is also a place for the signatures of both shipper and receiving agent.

The station agent receiving the shipment signs for it as receiving agent. If the shipment is received subject to any exception, notation is made in a space left vacant for this purpose. The receiving agent then requires the traveling freight agent who receives this shipment to receipt for it on the waybill. If he discovers any shortage or damage to the shipment, he may also make his exception or notation in a space provided for this purpose. If the traveling freight agent delivers the shipment at a transfer point to another traveling freight agent, the signature of the second man is required on the waybill before the delivery of shipment is made. The same procedure is followed by the traveling freight agent in delivering the shipment at final destination.

The delivering agent who delivers the shipment to the consignee receives the signature of the consignee to the waybill as soon as the shipment is delivered. The delivering agent sends the waybill to the office of the general freight agent. This at once places upon the records in the office of the general freight agent a complete history of the movement of each piece of freight handled throughout the system.

The receiving agent is required to make the waybill out in quadruple. One copy is given to the shipper, the second copy goes to the traveling freight agent, who delivers the shipment, and this is the copy that finally reaches the general freight agent's office. One copy goes to the auditor, and as soon as this is audited it is forwarded to the delivering agent of the shipment. The fourth copy is kept by the original receiving agent for his own records. Thus there is placed on record in each agency a waybill covering each shipment which goes out or comes into his office.

The main office also receives each day a record of all the business done on the preceding day. If a question arises as to loss, damage, overcharge or wrong delivery of shipment, etc., the general freight agent's office can determine at once whether the claim is well founded, and if so, where the loss or damage occurred and who was responsible.



Harmony Route—Local Consignees Unloading Lime

On the left-hand side of each waybill is a column for date, in which each agent is required to place the date upon which he handled the shipment.

OTHER FREIGHT BUSINESS

Our general freight business also includes the distribution of considerable coal from a coal mine on our line, by means of side-dump cars which hold from 5 tons to 6 tons of coal each. These cars are shunted on sidings and are then unloaded by the consignee. In many cases platforms are built for the use of the neighborhood, and the cars dump coal on these platforms, from which the farmer or consignee loads on his wagon. There is a screen at the mine, so that we can furnish slack, screened coal or run-of-mine coal. Track scales are placed at the mines, so that as soon as the car is loaded it is run on the scales, weighed and marked. For this purpose we have a shipping card showing the date when the car is loaded, number of car, net weight, kind of coal loaded on the car, name of consignee and destination. This card is filled out and tacked on the car by the superintendent of the mines as soon as car is loaded. The first freight train going the direction of the destination of this car picks it up and takes it along.

We also have developed on our system lime works, which furnish three grades of crushed limestone. The first, or No. 1, runs from dust up to ¾ in.; No. 2 grade is from ¾ in. to 1¼ in., and No. 3 from 1¼ in. to 2¼ in. The latter is especially adapted for railroad ballast. Nos. 1 and 2 are used for concrete work. A pulverizer furnishes raw pulverized lime for agricultural purposes, and it is becoming very popular with many of our farmers. In addition, the company furnishes burnt lump-lime, burnt ground lime and hydrated lime for agricultural and commercial purposes. The company which operates the lime works is composed largely of farmers living in the neighborhood of the mine.

It is the policy of this company to lend all encouragement possible to the development of agriculture and horticulture along its road. The liberal use of lime by the farmers has been recommended by the general freight agent, who is a member of the grange. He attends grange meetings and gives talks on the subject of lime as well as on that of direct marketing. This is in accord with the policy of the company that anything that helps the farmer must help the transportation company. In fact, the company feels that the better the transportation and marketing facilities, the larger the number of farmers who will want to locate along that line. The larger the number of farmers, the greater will be the demand for farms and the higher the price. As the price increases the size of the farms will decrease and the number of farms will increase. As the number of farms increases so will the passenger, freight and express business. Therefore, as a matter of business, we encourage agriculture and horticulture.

There is now on our road a magnificent orchard development of some 400 acres, from which we expect to haul many carloads of freight. There are also twelve commercial greenhouses in operation, and others are building. One of these is 120 ft. wide by 600 ft. long.

Under proper management greenhouses are good for 100 tons of product per acre per year and, based on a freight rate of 10 cents per 100 lb., this means an annual freight revenue of $200 for every acre under glass.

CANADIAN ELECTRIC RAILWAY STATISTICS

According to the railway statistics of the Dominion of Canada for the year ended June 30, 1913, published by the Department of Railways and Canals, the length of road of electric railways in Canada amounts to 1356.63 miles. The total car mileage during the year was 90,819,638; the total number of passengers carried was 763,388,470, and the number of tons of freight carried was 1,957,930. The total railway capital amounts to $141,265,631, divided $62,079,767 for outstanding stocks and $79,155,864 for funded debt outstanding. A summary of the income account for the year showed net earnings from operation of $10,482,665; total income from operation, $11,769,648; deductions, $5,334,906; net income, $6,612,575; surplus, $3,444,507. The report also contains an analysis of the car earnings and miscellaneous earnings, as well as an analysis of the various divisions of operating expenses. Out of a grand total of $17,755,372 for operating expenses $1,066,413 was expended for maintenance of way and structures and $1,699,641 for maintenance of equipment. The Canadian railways have a total of 3835 passenger cars and a grand total of 4989 cars of all classes.

The Bessemer & Lake Erie Railroad is experimenting with the McKeen motor car on the Hilliards branch, a distance of 12 miles, in which there are fifteen stops. The line runs from Branchton to Hilliards. One sixty-passenger car is being operated over this branch and records kept of each trip, so that operating cost may be accurately determined.

MEETING OF SUB-COMMITTEE ON AIR-BRAKE HOSE SPECIFICATIONS

A meeting of the air-brake hose specification sub-committee of the committee on equipment, American Electric Railway Engineering Association, was held at the association headquarters in New York on May 1. Those present were W. W. Brown, Brooklyn Rapid Transit System; W. E. Johnson, Brooklyn Rapid Transit System, representing W. G. Gove, superintendent of equipment, who is chairman of this sub-committee; R. N. Hemming, Union Traction Company of Indiana, who acted as chairman in Mr. Gove's absence; Roy L. Reed, Mulconroy Company, Inc.; George C. Penboss, United & Globe Rubber Manufacturing Companies; J. A. Queeny, General Electric Company, and E. H. Dewson, Westinghouse Traction Brake Company.

The first order of business was the discussion of questions contained in a circular letter of April 21, 1914, which had been sent to air-brake hose manufacturers and others. It was decided as the result of the discussion that oil-resisting tubes should be provided for service wherein the hose is subject to oil from motor-driven compressors, such as reservoir line in multiple unit trains and straight air emergency line in city trailer operation. It was decided further that the specifications should include two classes by grade, namely one for use where the hose is subject to oil and one for general use where that condition does not exist; also that the specifications would provide for three classes, namely, ¾ in., 1 in. and 1¼ in. nominal diameter.

It was agreed that chemical requirements should not be included in the specifications. It was also agreed that any guaranty that might be required should be made a matter of contract between the consumer and the manufacturer to meet the individual local conditions. It was left optional with the manufacturer whether the inner tube should be made by hand or machine. It was decided that the hose should be made straight throughout its entire length. A standard form of label was also selected.

The following changes were made in the tentative draft of the proposed specifications. As to the porosity test, it was decided that any porosity of the inner tube shown by the test proposed would be cause for rejection, and that there should be a paragraph to include this point. The stretching test was approved as written for regular grade of hose, but to be modified for oil-resisting tubes in accordance with further investigations to be made by the committee. As to tension tests it was decided that the committee would confer with the manufacturers' committee and draft requirements in line with action being taken in the revision of the M. C. B. specifications. Regarding dimensions, it was decided to revise the table to include sizes and dimensions for ¾ in. and 1¼ in. nominal size; also that the classifications be made by sizes instead of style. The matter of requirements to cover the oil-resisting quality of the inner tube was left subject to further investigation. It was the consensus of opinion that penalty clauses in connection with retests should be made a matter of contract instead of being part of a general specification.

The Compania Andino de Electricidad, which is controlled by the Compania Anglo-Argentina de Electricidad, has acquired the electric tramway concession which the government of San Juan, Argentina, granted to Mr. Basnaldo. Mr. Dirks, of the Siemens-Schuckert Company, is making final plans in order to have the work started at once. The first line will join the city of San Juan with Desamparados.

A. E. R. A. 1914 Convention at Atlantic City

After Consideration of Several Locations, Committee Decides on the New Jersey Seashore Resort Again—Bureau of Fare Research Organized with F. W. Doolittle in Charge—Conditions of Competition for Anthony N. Brady Gold Medal Announced—Standardization of Line Material and Construction—Manufacturers' Meeting

The 1914 convention of the American Electric Railway Association and affiliated associations will be held at Atlantic City, N. J., on Oct. 12 to 16. Official announcement was made by Secretary Burritt on May 7 that after a canvass of a number of cities, including personal visits to some of the places under consideration, Atlantic City appeared to be, on the whole, the most desirable location.

The principal other cities which were considered by the committee were Boston and Washington. It was found that a suitable hall in Boston would not be available until the middle of November. Because of this late date and the various considerations involved, the committee concluded that it would be inadvisable to decide on this city. Investigation of the possibilities of Washington showed that it would be impossible to secure a suitable hall in that city. While there was some question as to the wisdom of holding the convention in Atlantic City again, the committee concluded that as the 1915 meeting is to be held in San Francisco, it would be desirable to decide on an Eastern city for the 1914 convention, and Atlantic City was able to provide the necessary space for meetings and exhibits.

BUREAU OF FARE RESEARCH ORGANIZED

The Bureau of Fare Research of the American Electric Railway Association has been organized and will begin its work soon. It will be in charge of F. W. Doolittle, who has retired from service with the Public Utilities Commission of Illinois to take up the new work of the association in this direction. Mr. Doolittle is now spending two or three weeks in the West in order to familiarize himself with some of the particular problems of the kind with which the bureau will deal. He will reach New York City about May 18, and thereafter his headquarters will be at the main association office.

The Bureau of Fare Research will work along the lines discussed at the convention of the association in Atlantic City last October. These will include the determination of factors affecting the cost of passenger service, the compilation of data relating to operating results and the study and analysis of unusual conditions affecting electric railways. The object is to provide a center for information for the member companies.

The work of the bureau will be conducted so as to provide at all times comprehensive information in regard to rates of fare and matters affecting rates of fare. It will be the object of the committee on cost of passenger transportation service, which will have direct charge of the work, to undertake the most searching analysis of all factors and results that have a bearing on the subject.

CONDITIONS OF COMPETITION FOR THE ANTHONY N. BRADY GOLD MEDAL

The conditions governing the competition for the Anthony N. Brady gold medal have been completed by the committee of the American Electric Railway Association. This committee was composed of Arthur W. Brady, chairman; C. S. Sergeant and Frank Hedley. The competition is open to street and interurban roads operated electrically and a statement of the conditions, together with a blank form for the returns, will be sent to all the companies in the country soon.

The family of the late Anthony N. Brady authorized the American Museum of Safety to award annually a gold medal to the American electric railway company which for the year of award, the twelve months ended June 30, shall have done most to conserve the safety and health of the public and its employees. In addition to the gold medal to the company which presents the best record, a replica in silver will be awarded to the member of the operating staff who has contributed the most to the successful results of the company. Another replica in bronze will be awarded to the employee of the winning company whose services have been of the greatest value in the promotion of safety and health.

A committee on award of the medal will be appointed soon. It will probably be composed of five members.

The following have been adopted as the conditions of competition:

The competition shall be for the year ending June 30, and the award for the first year shall be for the year ending June 30, 1914.

Every company entering the competition shall file with the American Museum of Safety by Aug. 31 next after the close of the year the data upon which it founds its claim to the award. Such data for the year ending June 30, 1914, shall be filed by Aug. 31, 1914.

Every competing company shall include data covering all lines comprising the entire system of which it is a part, without regard to technical ownership. The test ordinarily would be operation under the jurisdiction of a single president. Such data shall include:

1. A report of all casualties to passengers, employees and others in Table I.

TABLE I—ACCIDENT REPORT FORM

The American Museum of Safety Competition for Anthony N. Brady Memorial Medal. Returns for ——— Company, Year Ending June 30, 1914.

Accidents in Train Service.

Total train miles run......................................

Total car miles run..

	Number		Number per million train miles run	
	Killed	Injured	Killed	Injured
Casualties in train accidents:				
Passengers				
Employees				
Other persons				
Other persons, trespassing.....				
Total				
Casualties in other than train accidents (excluding industrial accidents):				
Passengers				
Employees				
Other persons				
Other persons, trespassing.....				
Total				

Industrial accidents (not involving movement of cars):

Total number of "industrial" employees................

	Number		Number per 1000 employees	
	Killed	Injured	Killed	Injured
Total casualties to employees....				

Signed....................................
(State official title)

NOTE—Each competing company may file details of the casualties reported, analyzing and classifying the causes and circumstances thereof and showing whether due to the fault of the person injured or killed, or to causes beyond his control.

The terms used in this form are to be understood as follows:

Train miles run shall be the total of all revenue and non-revenue mileage made by motor cars or locomotives in all classes of service, except construction service. The mileage of single car operation is regarded as train mileage.

The number of employees for computing the rate per 1000 in industrial accidents is determined by dividing the aggregate days worked by all employees in industrial service, such as track men, linemen, shop men, power house and substation men, freight handlers, and others not actually engaged in the operation of cars, by the number of working days in the period covered by the report.

Train accidents include all casualties resulting from collisions with other cars or trains, derailments, and miscellaneous accidents to trains.

Other than train accidents include all casualties resulting from accidents to roadway or bridges not causing derailments, as, for instance, fires, floods, landslides, explosions, etc.; also all resulting from collisions with vehicles, platform accidents, and other accidents connected with the actual operation of cars not including industrial accidents.

Industrial accidents include all accidents not involving train operation, but occurring to employees of the company on or about railway premises. Instances are, accidents occurring to employees while working on tracks, bridges or other structures, at stations, in or about power houses, substations, shops, barns, transmission and distribution lines. Railway premises include highways and other public property occupied under franchise rights.

Passengers include passengers on passenger, freight and mixed trains or cars, and persons carried under agreement or contract, such as employees of express companies, postal employees, etc.

Employees include employees of the company competing, but not the employees of other companies carried under agreement or contract.

Other persons not trespassing include all persons other than passengers, employees and trespassers.

Killed: Accidents to persons resulting in immediate death or in death within 24 hours from the time the accident occurred should be reported in columns headed "killed."

Injured: All other accidents to persons, including those resulting in death of the person injured after interval of more than 24 hours from the time the accident occurred, should be reported in the column headed "injured." Trivial accidents need not be reported. Accidents to employees shall be regarded as trivial if they result in injuries so slight as not to prevent the employee injured from performing his accustomed service for more than three days, in the aggregate, during the ten days immediately following the accident. Injuries to passengers and other persons that do not prevent the injured person from following his customary vocation for more than one day shall be regarded as trivial.

2. A report of the various measures tanken during the year to conserve the safety and health, including, among others, those indicated as follows:

MEASURES TO PREVENT ACCIDENTS

a Block signals.

b Protective devices at railroad crossings.

c Protective devices at highway crossings.

d Protective devices at other points of danger.

e Automatic stops.

f Safety devices in cars, shops, power houses, substations, and in connection with roadway and transmission and distribution systems.

g The separation of grades, the reduction of curves, and the elimination of obstructions to view.

h The observance of high standards with regard to the inspection, maintenance and improvement of rolling stock, roadway, transmission and distribution systems.

i Standards of employment, physical and mental.

j Periodical examinations of employees, physical and mental.

k Rules and discipline.

l Educational measures affecting the public, including school children.

m Educational, protective and co-operative measures by and through employees.

MEASURES TO ALLEVIATE EFFECTS OF ACCIDENTS

a First aid to the injured, including instruction and training of employees, and first aid equipment.

b Emergency and other hospitals.

MEASURES TO PROMOTE HEALTH

a Attention to lighting, ventilation, cleanliness, disinfection, pure water, sanitary conveniences, and other factors affecting the health of passengers.

b Attention to lighting, ventilation, cleanliness, disinfection, pure water, sanitary conveniences, and other factors affecting the health and welfare of employees.

c Instruction of employees in matters of hygiene and sanitation.

3. A report showing the following facts in connection with the operations of the company for the year:

a The single track mileage of all lines operated during the year.

b The division of the track mileage into surface, elevated and subway lines respectively; also into urban, suburban and interurban lines respectively, showing also what part of the mileage is on private right-of-way.

c The number of revenue passengers carried, showing separately the number carried on surface lines.

d The number of car miles run, showing separately the car miles run on surface lines.

e The gross earnings per mile of single track in each class of service.

f The amounts of earnings, both the amount set aside and that actually paid, on account of accidents occurring during the year, together with the ratio of such amounts to gross earnings.

g The monthly average number of employees.

h The especial difficulties, if any, physical, legal and other, affecting the safety of operation.

4. A report of all other facts regarded by the company as materially bearing upon the record for conservation of safety and health made during the year. Data for other years may be given under this heading.

The committee on award may ask for any additional data.

VALUE TO BE GIVEN DATA

It is obvious that in determining the weight to be assigned to the casualties reported consideration must be given to the relations between the company and the person injured, and to the cause of the casualty. The following rule has, therefore, been adopted for the guidance of the committee on award: The casualties per 1,000,000 car miles, and, in the case of industrial accidents, per 1000 employees, shall be multiplied by the factors stated in Table II.

TABLE II—RULE GOVERNING DATA

	Multiplier	
	Killed	Injured
Casualties in train accidents:		
Passengers	200	4
Employees	80	2
Other persons (not trespassing)	80	2
Casualties in other than train accidents:		
Passengers	100	2
Employees	40	1
Other persons (not trespassing)	40	1
Employees in industrial accidents	40	1

The company showing the smallest total of the added results thus obtained would have the best record for the year, provided equality existed in all other respects. It is clear, however, that no company would be on an exact equality with its competitors in all other respects, and that the total result obtained by the application of this weighted scale would be only one of the elements to be considered by the committee on award. The committee would also consider all the other data reported, together with any supplemental data provided at the request of the committee, and endeavor to give proper weight to every element shown.

STANDARD LINE MATERIAL AND CONSTRUCTION

Letters from manufacturers, received by G. W. Palmer, Jr., chairman of the committee on power distribution of the American Electric Railway Engineering Association, indicating willingness to adopt the standard design of cap and cone, have been made public by Secretary Burritt of the American Association. Extracts from the letters are as follows:

Westinghouse Electric & Manufacturing Company: "In order not to further delay the adopting of this standard, our engineers are willing to approve the cap and cone as per drawing of June, 1913. We should like to see the drawing finally approved by the committee (committee on power distribution) at an early date."

H. W. Johns-Manville Company: "If the dimensions of cap and cone insulators are standardized by the American Electric Railway Association at the meeting in October, we will be willing to change our dies in accordance with specifications."

Electric Railway Equipment Company: "We shall be very glad to make such slight changes in our cap and cone hanger as will make them conform to these (proposed) dimensions."

The Macallen Company: "We . . . have instructed the factory to make the necessary change in the mould in order to bring our insulator in line with your drawing."

The Ohio Brass Company: "Any information which you can give us at an early date regarding dimensions which you feel certain will be adopted as standard, will be greatly appreciated. If we find it necessary to make any changes in our dies, we wish to do so as soon as possible."

The A. & J. M. Anderson Company has also signified verbally to Mr. Palmer its intention to fall into line and has promised to confirm this in writing to Mr. Harte, chairman of the sub-committee.

The association urges all member companies to specify the standard design on their future orders for this material. Manufacturers will be notified officially of the adoption of the standard design and will be asked to place themselves in a position to furnish it.

MEETING OF THE MANUFACTURERS' ASSOCIATION

A meeting of the American Electric Railway Manufacturers' Association was held at the office, 165 Broadway, New York, on May 7. The action in regard to the selection of Atlantic City as a meeting place made by the joint committee of the American Electric Railway Association and the Manufacturers' Association was approved. In addition C. R. Ellicott, vice-president in charge of entertainment, announced the appointment of W. C. Kaylor, Westinghouse Traction Brake Company, as chairman of the entertainment committee for the 1914 convention; S. K. Colby, vice-president in charge of finance, announced the appointment of Wylie Brown, Bridgeport Brass Company, as chairman of the finance committee for the current year. E. H. Baker, chairman of the membership committee, read a satisfactory report of the activities of that committee. Those present at the meeting were President Hawley, vice-presidents Ellicott, Colby and Baker, and B. A. Hegeman, James H. McGraw, H. C. Evans, Bertram Berry, F. A. Elmquist and D. W. Smith. C. Loomis Allen, vice-president of the American Electric Railway Association, was also in attendance.

A PRO-RAILROAD CANDIDATE FOR CONGRESS

News from Portland, Ore., states that E. L. Van Dresar, representative in that city of the Rail Joint Company, has announced his candidacy for the democratic nomination for Congress. He has declared his platform includes a sane treatment of the entire railroad problem as a "situation which vitally affects the financial integrity of the whole country."

In a recent speech he said, in part:

" 'More settlers for Oregon, and more railroads to put them on the land.' This might well be reversed to read 'More railroads for Oregon and more settlers for the land,' for we will never get settlers in the numbers we desire, nor will we ever get them on to the vast areas of interior Oregon until proper transportation is provided which will take them within easy striking distance of their proposed homesteads.

"All we need in this country to promote steady, healthy construction of new lines is reasonable stability of rates and expenses, with readjustments of the former from time to time as the latter make necessary. This I take it is the proper function of the Interstate Commerce Commission. Not merely to see that rates are forever lowered, but to stand as a just judge and arbiter between the railroads and the people,to se that rates are not made too high, and also to see they are not made so low as to impair the usefulness of the carrier. This I conceive is the nub of the entire situation.

"Almost from the beginning of railroad legislation and commission control the trend has been in one direction only as to rates and expenses, the former down, the latter up, until in many instances the margin between income and outgo has vanished and the receiver has had to step in for the final obsequies.

"If the promptness with which the Interstate Commerce Commission acts in suspending rates could be even partly duplicated in permitting advances where the same are reasonable and justified, then many of the strained, halting, uncertain elements in present railroad financing and operation would be eliminated.

"I have already announced that my purpose in entering this campaign for Congress in the third Oregon district is not political, but that it is purely commercial and industrial. I have not consulted one single railroad official regarding my purpose, nor do I intend doing so. It is not necessary. This whole matter of railroad ruin, and through it of community ruin, has gone too far to be affected in the least by what any railroad official may say or think. The remedy must be applied by the people through an enlightened public opinion."

Several cars embodying an improvement in the double-staircase type of double-deck car devised by C. W. Mallins, general manager Liverpool (England) Tramways, and described in the ELECTRIC RAILWAY JOURNAL of March 29, 1913, are being placed in service. While retaining the double staircase the vestibules have been made more commodious, and wide aisles have been provided on both decks between the transverse seats. The wheelbase has been increased to 8 ft. and in some instances to 9 ft.

COMMUNICATIONS

SIGNAL FAILURE DEFINITION ON DOUBLE-TRACK LINES

INTERBOROUGH RAPID TRANSIT COMPANY
NEW YORK, May 5, 1914.

To the Editors:

Signal failures can, of course, be divided into several different classes, but it will be a difficult undertaking to harmonize the opinions of different signal engineers as to what these various classes should include. Failures should be viewed from the standpoint of reliability of the signal system. The purpose of a signal system is not only to protect traffic but also to accelerate it, that is, to increase the capacity of the road, and any delays due to the improper display of a stop indication should be charged to signal failures, no matter how creditable such a failure may be to the design and installation of the system.

On the lines of the Interborough Rapid Transit Company the acceleration of traffic is of particular importance. It is just as important to display a proceed indication when it is safe to proceed as to display a stop indication when it is unsafe to proceed, and if a signal does not do so, it is charged with a failure. Such a method of recording signal failures includes not only all delays due to failure of or accident to any part of the signal equipment or signal power mains, but also those due to outside interferences, such as carelessness of the track forces in short-circuiting the track, breaking bonds, etc.

A standard whereby the efficiency of different signal systems may be compared, can be reached only by placing all signal failures in one class, using a definition for signal failure that will include all cases in which a signal displays a stop indication for any other than a normal operating condition.

CHARLES R. PEDDLE, Signal Inspector.

THE TECHNICAL SCHOOLS AND THE ELECTRIC RAILWAYS

UNIVERSITY OF ILLINOIS
URBANA, ILL., April 29, 1914.

To the Editors:

I have been much interested in recent articles and editorials in the columns of the ELECTRIC RAILWAY JOURNAL bearing on the relation of technical schools and electric railways. In my opinion the electric railway courses in the United States are not accomplishing as much as they would if the railroads would give greater consideration to technical men. Unfortunately, teachers in railway subjects are not in a position to advise students that their advance in the railway field will be as rapid as in other lines of engineering work. I know that this is exactly the conclusion at which you have arrived as covered in your editorial statements.

I am especially glad to see papers dealing with foreign installations in some detail. In this country we seem to have the idea that our engineers are the best in the world and that foreign practice is inapplicable to our conditions. While the former may be true, the developments which are taking place in electric railway apparatus in other countries certainly merit serious study. Our engineers can, without doubt, learn some valuable lessons from European experience.

A recent editorial entitled "Fascination of Railroading" seems to me to point out the chief reason why technical men enter and remain in this line of work. With adequate salaries, the fascination of the work would soon draw properly trained men who would be able to bring about wonderful advances. There are still many problems to be worked out by the railroads which require the most carefully trained engineers for their solution. If the ELECTRIC RAILWAY JOURNAL can, by its influence, assist in changing the attitude of the railroads toward our technical graduates, I believe that the schools, on their part, will be able to furnish well trained men. You have my heartiest support in this important work.

I have read the ELECTRIC RAILWAY JOURNAL every week for the past ten years and have watched its development along with other developments in the electric railway field. I therefore feel quite familiar with the paper. I am certain that the large knowledge I have of electric railway practice and to a great extent of electric railway theory has been obtained from my constant reading of this publication. It has seemed to me that, while the editorial pages have always been a source of inspiration, they seem at the present time to be broader than ever before.

A. M. BUCK,
Assistant Professor of Railway
Electric Engineering.

RENEWABLE CENTER OR SOLID MANGANESE SPECIAL WORK

TRANSIT DEVELOPMENT COMPANY
BROOKLYN, N. Y., May 4, 1914.

To the Editors:

I have read with interest the article in your issue of May 2 on Chicago special work. In 1911, in company with other members of the A. E. R. E. A. way committee for that year, I examined some of these solid manganese crossings at Chicago. I remember distinctly that most of them had not been in more than three years and some of them for a lesser time, yet nearly every crossing viewed showed at least one frog battered down or broken out. This was conceded to be due to "sub-cutaneous blow-holes" or some other cause which produced spongy or soft spots in the manganese at critical points. I believe that the non-appearance of such faults at critical points cannot be guaranteed.

The style of construction which has generally been adopted with solid crossings has been to include all four frogs of a crossing in one piece. This has, in the past, rendered it almost impossible to make any repairs to some one defective frog without excessive cost. The modern method of making arc-weld repairs so as to build up points, and the use of oxy-acetylene flame for the purpose of cutting manganese, may possibly render repairs to this style of crossing more reasonable in cost. But I think that the committee was of the opinion at that time that a solid crossing was a mistake for general uses. Since then, the scheme has come forward of making a solid manganese crossing with manganese renewable inserts for centers.

These influences have made some change in the situation, but from my own observation of various properties I believe that solid manganese crossings generally are not of service to us except in cases of certain types of steam railroad crossings over street railways. In these cases where the steam railroad traffic is exceptionally heavy, a certain form of solid manganese rails for the steam railroad runs, with ordinary high-carbon steel rails for the street railways, has been found to be very serviceable, since in such cases the steam railroad traffic has been the one which destroyed the crossings. I have also observed that manganese has given exceptionally good service when installed in curves of sharp radii and subject to the heaviest traffic. Even for such installations, careful analysis of the conditions should be made, because it has been noted that the increased life of a manganese curve did not always offset the difference in cost in favor of two high-carbon steel curves, including the labor for re-installation and repavement.

In closing I would say that I thoroughly believe that this manganese subject in connection with special work has been overdone and that a great deal of money has been wasted. R. C. CRAM, Assistant Engineer.

THE NEAR-SIDE STOP

PUBLIC SERVICE RAILWAY COMPANY
NEWARK, N. J., May 2, 1914.

To the Editors:

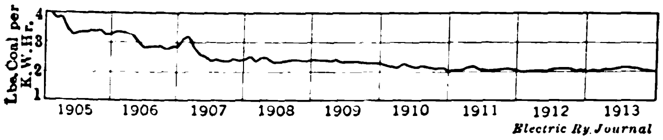
In an editorial in your issue of April 25, advocating the adoption of the near-side stop in New York City, you express the opinion that greater safety would be promoted by so doing. This idea seems to be quite general, but figures supporting it apparently are lacking.

It seems reasonable that the only class of accidents which would be minimized by the near-side stop is such collisions as occur, under far-side operation, when the car is about to stop at the intersection. It does not seem reasonable that these accidents would constitute a very large percentage of the collisions which do occur where the far-side stop is in vogue. Even if such accidents were entirely done away with, which is not certain, the reduction in accidents would not be large, and it is not unlikely that such reduction would be more than offset by an increase at those intersections where the car passes rapidly and without stopping, this because after near-side operation has been the rule for a considerable while, drivers will be apt to get it into their heads that the car will stop before crossing the street in every case. If any company has records to show the reduction in collisions from near-side operation, such figures would doubtless prove of interest to your readers. GEORGE H. LYNE.

[The theory of the advantage of the near-side stop, of course, is that it is more easy to stop a car when it is accelerating after a service stop on the near side of the street than to do so while it is being braked for a service stop on the far side of the street. Moreover, the motorman has an opportunity to select a proper time to make the crossing. Comparative figures of the kind mentioned by our correspondent, compiled by any company which has used both methods, would be interesting.—EDS.]

POWER PRODUCTION ECONOMIES ON THE INTERBOROUGH

At the recent exposition of the National Efficiency Society the Interborough Rapid Transit Company included in its exhibit a number of diagrams showing the remarkable economies that have been effected in its various power stations. Of these diagrams, which were prepared under the direction of H. G. Stott, superintendent of motive power Interborough Rapid Transit Company, three are reproduced herewith.

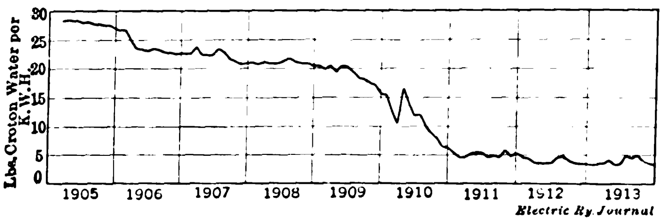


Electric Ry. Journal

Interborough Power—Diagram Showing Decrease in Coal Consumption During Nine Years of Operation

The first reproduction, which shows the amount of coal used per kw-hr. by all power stations of the company, indicates the remarkable improvement in power station operation which has been effected on this railway system during the last nine years. The economy is, of course, due in part to the introduction of the low-pressure turbine with its high operating efficiency, and also to the adoption of high rates of driving steam boilers, the latter obviously effecting a very great reduction in the stand-by losses incident to the variable load. From the curve it will be seen that the coal consumption has been maintained for several years at an average figure of 2 lb. per kw-hr. at the switchboard, including all incidental uses.

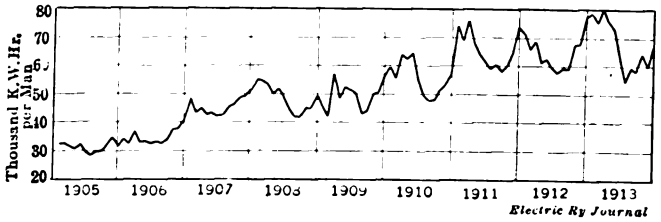
The diagram showing the weight of Croton water per kw-hr. used in the various power houses includes all water required for make-up purposes but does not include the circulatory water for the condenser. The reduction shown to have been effected has been due in part to an increased use of surface condensers and also to the use of highly economical auxiliaries. The present water consumption, amounting to about 4 lb. per kw-hr., shows that the make-up is equal to some 25 per cent of the steam consumption of the various plants, part of this being needed to supply blow-off and leakage losses and part being required for non-condensing auxiliaries of which the exhaust is not returned to the system.



Electric Ry. Journal

Interborough Power—Unit Consumption of Make-up Water Required by Boilers

The third curve, which shows the output in kw-hr. per man employed in the power houses, serves as an indication of the great reduction in the amount of labor required to produce power in recent years. It will be seen from the curve that the amount of power turned out by each man is greater in winter than in summer. In other words, the power-house force in summer time is relatively increased. This will be accounted for by the fact that the output is naturally greater during cold weather and also by the fact that more repair work is done during the summer months when more equipment can be taken out of service for overhauling.



Electric Ry. Journal

Interborough Power—Diagram Showing Decreased Amount of Labor Required in Power Houses

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Edward E. McCall, chairman of the Public Service Commission for the First District of New York, has expressed his regret at the action of Mayor John Purroy Mitchel in vetoing the bill, which had been favored by the commission, amending the Rapid Transit Act. The proposed bill clothed the commission with power to do actual construction work on the new rapid transit lines, in the event of this becoming necessary by reason of some contractor not being able to perform the whole of his contract. It also raised the amount from $10,000 to $25,000 for which the commission could let contracts without formal competitive bidding. Before doing any work under either amendment it would have been necessary for the commission to secure the consent of the Board of Estimate and Apportionment, of which the Mayor is a member.

Equipment and Its Maintenance

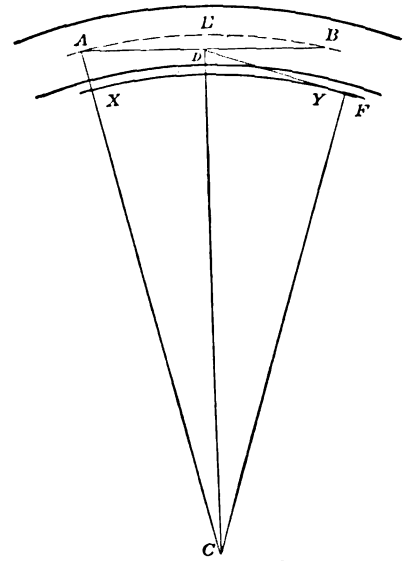
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

DETERMINING THE CORRECT POSITION OF THE TROLLEY WIRE ON CURVES

BY R. D. DIXON, MAINS SUPERINTENDENT NEW SOUTH WALES GOVERNMENT TRAMWAYS, SYDNEY, AUSTRALIA

It appears to me that too little consideration has been given by engineers to the placing of the trolley wire at its theoretically correct position on curves. Your readers might therefore be interested in the uniform practice which has been followed for the last decade with quite satisfactory results on the Sydney (New South Wales) Tramways, the service of which totals more than 26,000,000 car miles per annum. This practice consists in placing the trolley wire in such a position that the boom or pole makes as nearly as is practicable, a tangent to the trolley wire curve. It was not until I read the article by J. H. Barnard in your issue of June 28, 1913, that I learned that such a condition was recognized as being the correct one. Mr. Barnard states that "the cases most affected are those of short radius curves, which are rarely circular, and a great majority of tracks are traversed by various classes of cars, so that any sufficiently accurate formula would be entirely too cumbersome for ready application." With this I do not agree and propose to show briefly a theoretical method which can be practically applied.



Electric Ry Journal

Fig. 1—Offsetting Trolley Wires—Case of Circular Curve without Superelevation

If we assume a certain definite height of trolley wire above the rail level, length of trolley pole and height of car, there are then two governing factors which are variable, namely, the radius of the curve and the superelevation of the outer rail.

Take first a case in which the curve is circular.

In Fig. 1, A and B are the centers of the car trucks. If the rotating center of the trolley base is in the center of the car, then this point will be represented by D. DF is the horizontal projection of the trolley pole. When DF forms a tangent to the curve XY, this curve represents the theoretically correct position of the trolley wire. The distance that the point F is from the center of the track is the offset required. To find this offset, proceed as follows according to Fig. 1.

Radius of curve	AC
Length between truck centers	AB
Trolley wheel	F
Horizontal projection of trolley pole	DF

Then $DC = \sqrt{AC^2 - AD^2}$.

$FC = \sqrt{DC^2 - DF^2}$.

$AC - FC =$ Distance of point F from center of track.

To find additional offset due to superelevation:

In Fig. 2 a cross-section through MN (the center of the car) is shown. ED is the distance of the center of the car from the center of the track when no superelevation exists. When the car is tilted owing to the elevation of the outer rail, the point D moves to D_1. This distance is equal to

$$\frac{\text{superelevation} \times \text{height of trolley base}}{\text{gage of track}}$$

If the superelevation of the outer rail is 3 in., the height of the trolley base 11 ft. and the gage of the track 4 ft. 8½ in., then

$$DD_1 = \frac{3 \times 11}{4.7} = 7 \text{ in. approximately.}$$

The theoretically correct position of the trolley wire is then a curve to which the trolley pole D_1F is a tangent as indicated in Fig. 2. It can readily be seen that if the car were on a four-wheeled truck the point D would be nearer the center of the track, but the method of calculation is precisely the same if the trolley base remains in the center of the car.

In a case where the car is on double trucks and the center of the trolley base is not in the center of the car, the offset is obtained as follows according to Fig. 3:

A and $B =$ centers of trucks.
$G =$ center of chord.
$D =$ center of trolley base.
$F =$ trolley wheel.
$DF =$ trolley pole projected horizontally.
$C =$ center of curve.

$GC = \sqrt{AC^2 - AG^2}$.

$DC = \sqrt{GC^2 + GD^2}$.

$FC = \sqrt{DC^2 - DF^2}$.

$AC - FC =$ distance of trolley wire from center of track.

In practice very few tracks have curves which are complete circular arcs but are eased at each end with transition curves. In such cases the engineer who pegs out the position for the trolley wire measures the versine of a chord, say, 20 ft. to 25 ft. in length, and from tables he assumes that for this length the curve is a circular arc with a versine equal to the measured versine. This is, of course, not theoretically correct, but it is an assumption which is close enough for practical purposes. As trolley wire cannot be erected in a curve, it is a matter of judgment as to what length of chord should be allowed, i.e., distance between pull-offs.

On the Sydney system the spacing is such that the angle made between two chords should not deviate from 180 deg. more than 7 deg. 18 min., for a curve of 45 ft. radius, and diminishing to 5 deg. 16 min. for a curve of 350 ft. radius. The curve of larger radius has the smaller angle owing to the cars traveling at a higher speed than is the case on a curve of smaller radius.

Fig. 4 shows the spacing of pull-offs for curves with radii up to 350 ft., and the offsets for various classes of cars with the trolley wire 19 ft. above rail level. Such curves can be prepared for any type of car. The engineer, when setting out the positions for the pull-offs, has merely to measure the superelevation and refer to his table and curves which give the total offset required (the superelevations multiplied by the height of trolley base above rail level and divided by the gage of track can be tabulated).

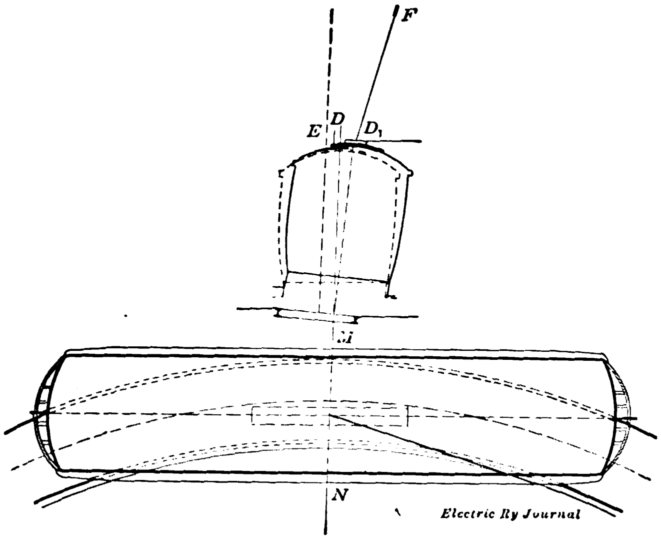
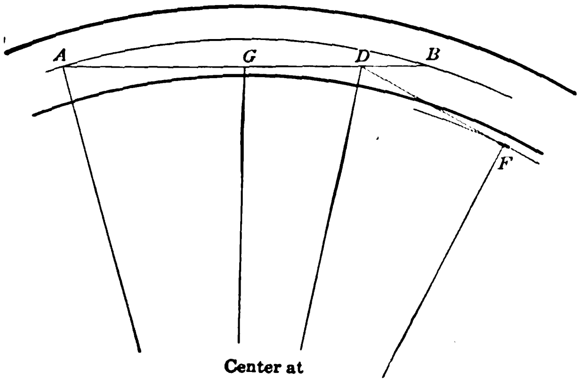


Fig. 2—Offsetting Trolley Wire—Finding Offset Due to Superelevation

Since the article by Mr. Barnard appeared, the "Specification for Overhead Trolley Construction," issued by the American Electric Railway Engineering Association, has been published in your journal. It appears to me that the conclusions arrived at are not quite correct for four-wheeled single-truck cars and very incorrect for double-truck cars. No allowance is made for the distance which the center of the car, and consequently the trolley base, is from the center of the track. This is very large when the trucks are, say, 22 ft. between centers, and the car is on a curve of sharp radius. With a radius of 40 ft., the center of the trolley base, if placed in the center of the car, is no less than 18 in. from the center of the track. This distance, of course, diminishes as the radius increases; with a radius of 200 ft. it is nearly 4 in. These distances should be added to any offsets calculated by the method proposed by the A. E. R. E. A.



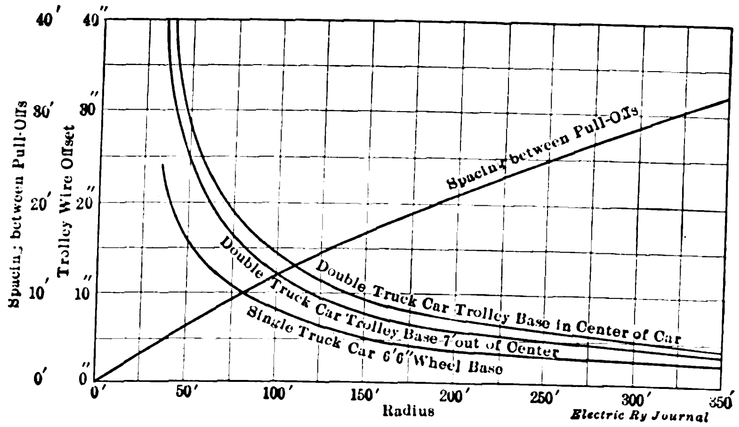


Fig. 3—Offsetting Trolley Wire—When the Trolley Base Is Not in the Center; Fig. 4—Spacing of Pull-Offs and Offsets for Three Classes of Cars

It is also, I think, incorrect to allow 4-in. offset for every 1 in. of superelevation on curves. From Fig. 2 it will be seen that the trolley base is the portion that is affected by the superelevation, as it is from this point that the trolley pole is required to make a tangent to the trolley wire. As explained before, if the trolley base is 11 ft. from the rail, and the gage of track is 4 ft. 8½ in., the offset of the trolley base caused by the superelevation is

$$\frac{\text{Superelevation} \times 11}{4 \text{ ft. } 8\frac{1}{2} \text{ in.}}$$

POINTS RAISED BY MR. DIXON

[Mr. Dixon's article was submitted for comment to Charles Rufus Harte, construction engineer, Connecticut Company, who is a recognized authority on line construction practices in the United States. Mr. Harte's comments follow.—EDS.]

Mr. Dixon, in his very interesting paper, apparently has misunderstood Mr. Barnard's statement. There is no question that for any specific case the offset can be figured with absolute accuracy and usually without very much complication. But after such result has been obtained the offsetted position of the trolley wire is not the proper one, unless the line is used only by equipment which maintains the conditions of the calculations. The operating position of the wire must be that which is the best compromise of the conflicting figures. Any equation which attempts to reconcile those conditions in the determination of the value will be, as Mr. Barnard states, too cumbersome for ready application.

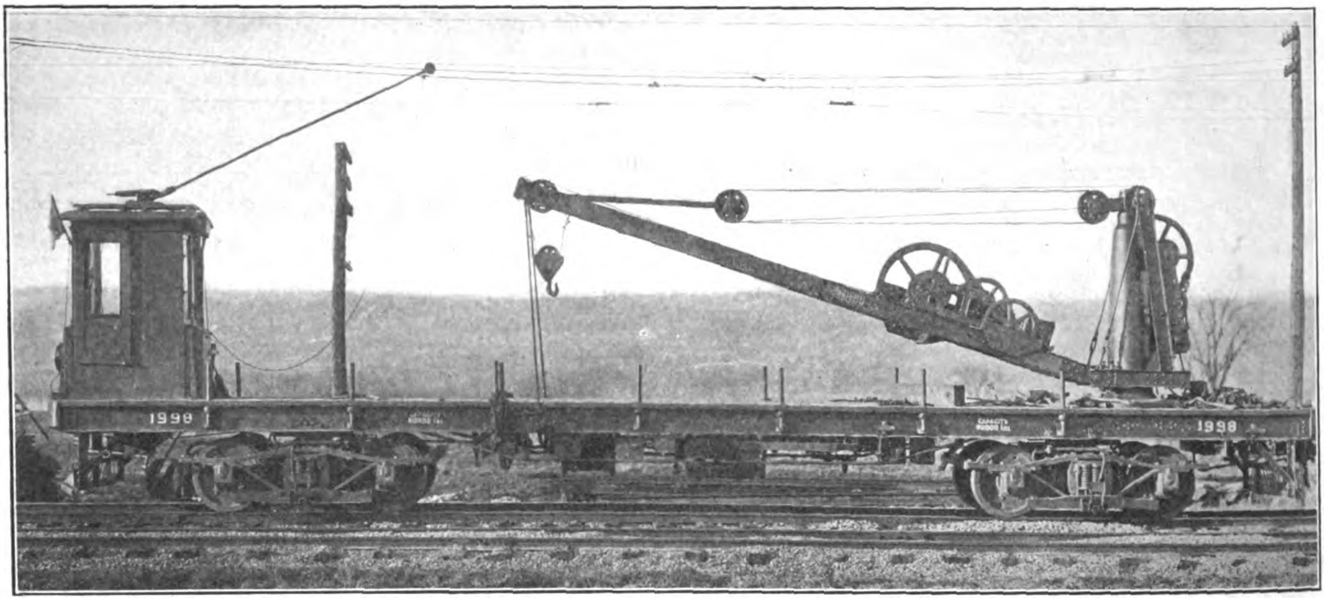
In questioning the value of the equation given in the American Electric Railway Association specification, Mr. Dixon apparently is unaware of the fact that on most of our American lines the trolley pole is over, or practically over, the center of the truck. A single trolley on a double truck car of considerable distance between bolsters, is so far as I know, very rarely used in this country; long-bodied cars with double trolleys on single trucks are almost equally so. Further, in this country the use of only one type of equipment on a line is not at all usual. In view of these circumstances the A. E. R. A. specification gives a position for the trolley wire which is sufficiently accurate for hanging up, and in most cases will be entirely satisfactory without further change. However, no position values on the calculation should be made up permanently until a little observation has determined whether or not they are satisfactory. As a matter of fact, it is very evident from the behavior of existing overhead that there is a space of quite a little width within which the trolley wire may be placed with very satisfactory results.

HOME-MADE CRANE MOTOR WORK CAR

BY J. R. AYERS, MASTER MECHANIC, NEW YORK STATE RAILWAYS—UTICA LINES

A crane motor work car recently placed in service by the New York State Railways—Utica Lines has several unusual construction features that possibly make it worthy of mention. As this car was intended for the joint use of the maintenance of way and line and building departments, it was necessary to incorporate several special features in its design. Thus it is used to set up poles to place special work and to tear down bridges. The entire operation of building was carried on in the Utica Shops of the New York State Railways. The type of construction is all-steel underframing of standard steel shapes.

Two side sills of 12-in. I-beams and two center sills of 10-in. I-beams comprise the principal load carrying members of the underframing, the capacity being 80,000 lb. Due to the location of the derrick and cab on opposite ends of the car, four-fifths of the carrying capacity load rests between the truck centers. This made it necessary further to reinforce the underframing by the use of two 1½-in. truss rods which extend under the car from end sill to end sill. The end sills consist of 12-in. channel iron securely riveted to the longitudinal members by means of standard connecting angles. To insure rigid construction, underframing is secured by diagonal braces of 4-in. x 6-in. angles and needle beams of 8-in. I-beams. The bolsters are of the steel plate truss type with the bent lower or compression member built up of a 12-in. x ¾-in. plate, reinforced by two 3-in. x 3½-in. angles. These angles, which run from side sill to side sill, are bent to conform to the plate and are securely riveted to the same. The upper or tension member is of 12-in. x ¾-in. plate. The bolster is further reinforced by placing a 1-in. truss rod on the plate truss. The body rub irons are made of 4-in. I-beams which are curved to the required radius.


Derrick Work Car of the New York State Railways—Utica Lines

On account of the relatively large working radius of the Brown hoist pillar crane required by the line department for setting up 35-ft. concrete poles, i. e., 25 ft., the securing of the pillar to the underframing necessitated the framing in between the sills of 6-in. x 6-in. x 1-in. angles for holding the 2-in. pillar base bolts. As the crane specifications called for 8000 lb. at 25-ft. radius, it was essential to provide some means, other than by blocking under the side sills, to keep the car from tipping. This was accomplished by the use of a sliding 10-in. I-beam which could be extended out 2 ft. on either side of the car body. By placing a jack under the end of this beam, it is effectively secured against upsetting when the boom is working at right angles to the car. The derrick, which has a maximum and minimum radius of 25 ft. and 10 ft. respectively, is equipped with motor control throughout. A solenoid brake on the hoisting motor also assures safe operation. The boom, which is built of channel iron, is protected against coming into contact with the trolley wire by wooden fillets in the channel iron. All control apparatus both for crane and car operation is centralized in the motorman's cab.

The car which is geared for maximum speed of 25 m.p.h. is powerful enough to pull two loaded freight gondolas if required. For hauling freight and general shifting work, Tomlinson radial M.C.B. couplers and train line air were installed. The electric equipment consists of four Westinghouse 533-Y-3 motors, with HL control arranged for both trolley and third-rail operation. Other parts of the regular equipment are arc headlight, incandescent headlights, a radial sander which insures a plentiful supply of sand to rail irrespective of the radius of curvature of the track, and steel pilots fitted on both ends of the car.

The car is equipped with Brill No. 50-E-4 M.C.B. trucks especially designed and constructed to meet the severe requirements to which it is subjected. The principal dimensions and weights of the car are as follows:

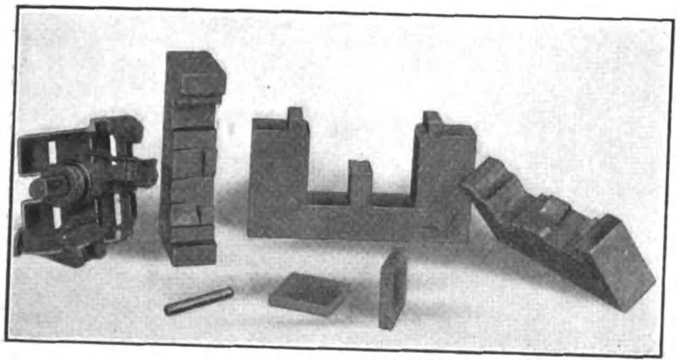
Length over all	53 ft. 11 in.
Distance between truck centers	31 ft. 11 in.
Width	8 ft. 0 in.
Height from rail to car floor	4 ft. 4 in.
Height from rail to top of derrick pillar	13 ft. 6 in.
Total weight, car body, trucks, and equipment	50,000 lb.
Weight of crane	13.000 lb.
Maximum load capacity	80,000 lb.
Total weight loaded	143,000 lb.

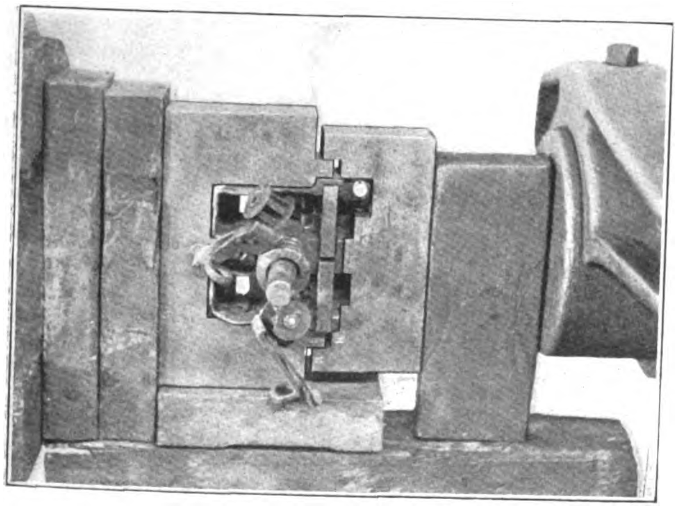
After having been in service since February, during which time the car has been called upon to assist in taking down a truss bridge and to help clear the tracks during one of the most severe snowstorms experienced in the history of the road, its value has been proved conclusively.

DIES FOR REMOVING THE WORN SLOTS OF BRUSH-HOLDERS—CHUCK FOR TURNING UP BEARINGS

BY F. J. FOOTE, MASTER MECHANIC OHIO ELECTRIC RAILWAY, COLUMBUS, OHIO

As every railway motor repair man knows, the slots that inclose the brushes on brush-holders become badly worn after several years of service. When this condition is reached, the brushes are very likely to spark badly upon reversing the motor because they tip over and ride the commutator on one edge only. The problem of closing in these slots to the original size has been a live one with the writer for some time. As various methods such as hammering and electric welding proved unsuccessful, we finally originated the present plan of simply pressing or squeezing the slots together with the aid of a wheel press. The result has been very satisfactory, for we have since reclaimed, and made as good as new, a lot of brush-holders that had been marked for the scrap heap.


Parts of Die with Brush-Holder Alongside

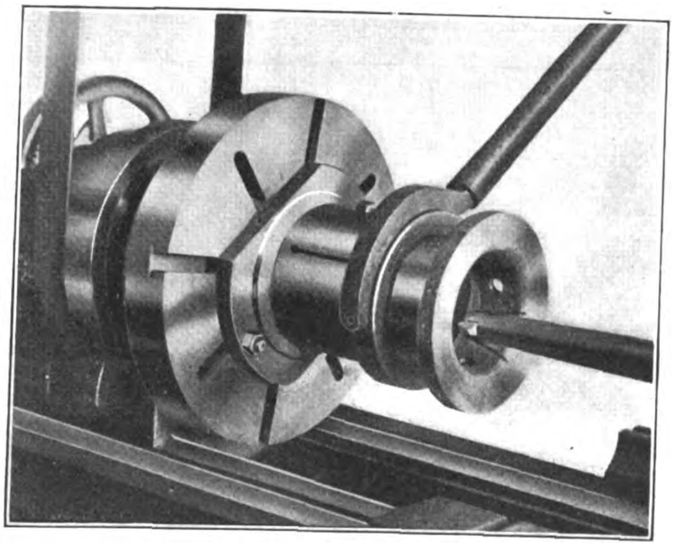

Dies and Brush-Holder in the Wheel Press

Referring to the illustrations, the two parts in the first view that look like carbon brushes, are steel pieces which are placed in the slots to keep the pressure from closing the slots too much, and also to straighten up the slots. These pieces are planed up perfectly true and made about 0.005 in. thinner than the brush to be used; this allows for the "spring back" of the holder after the pressure is removed and also for a slight truing up with a file. Worn brush-holders will be found to have slots worn taper with the large end next to the commutator. By using the dies in the wheel press, as shown, the dies are supplied with enough "give" to permit the slots to be so closed in that they are practically parallel again. It is found best to go over the brush-holders before pressing and to file out any lumps or unevenness in order to secure better results.

So far, we have made dies for GE-73 brush-holders only, but we expect to make dies for other styles of brush-holders in the near future. One of the important things to guard against is the side tipping of the thin walls of the slots when the pressure is applied. This is avoided by the use of lugs or dowels which interlock to prevent the parts of the die shoving endwise on each other while under pressure. The upper view shows three parts of the die. One part is cut in deeply to receive the main bulk of the brush-holder. The other two parts, which are cut more shallow, are used on the right-hand and left-hand brush-holders respectively. The round steel pin is placed in the cable clamp hole to prevent the pressure from distorting the hole. We have found that a pressure of approximately 50 tons is about right to do good work. The dies are made of ordinary soft steel and are not case-hardened, although it might be better if they were.

CHUCK FOR TURNING UP BEARINGS

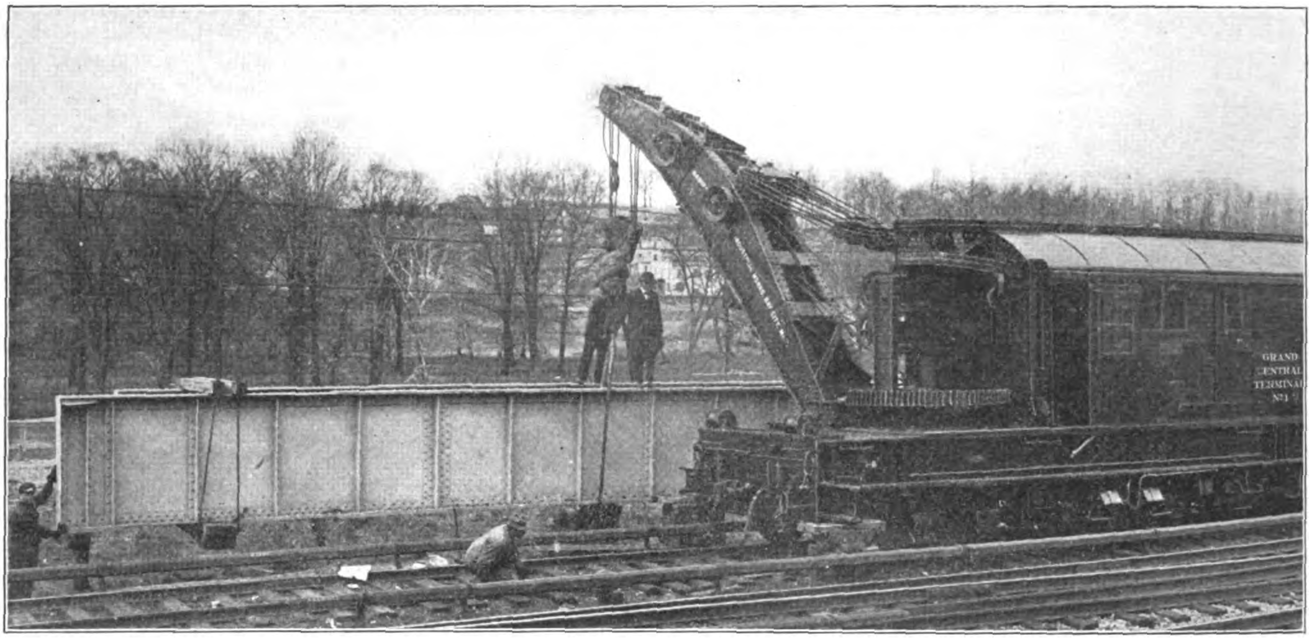
The accompanying view shows a chuck or jig for turning up armature and motor axle bearings as devised in the shops of the Ohio Electric Railway. This chuck is provided with a circular dowel or raised ring, about 10-in. diameter and ¼ in. wide and ¼ in. high, which fits into a groove in the face plate of the lathe to which it is bolted, so that the chuck can be set up in the lathe very quickly. The chuck is simply a hollow cylinder cast solid with a base plate and with walls about ⅜ in. thick. Four slots, of which one is shown, are cut from the outer end down to near the base. The outer end is made with a taper thread of about twelve threads per inch with a steel-ring threaded taper to match. This ring has a number of holes for the spanner wrench shown. The method of using this chuck is to insert the bearing in the chuck and to tighten the nut. The chuck is made to fit the largest size of bearing used, and is provided with suitable split bushings to fit all bearings of smaller size. It is, of course, necessary to machine the outside of the bushings to the proper size before the chuck can be used to finish the inside.


Chuck for Turning Up Bearings

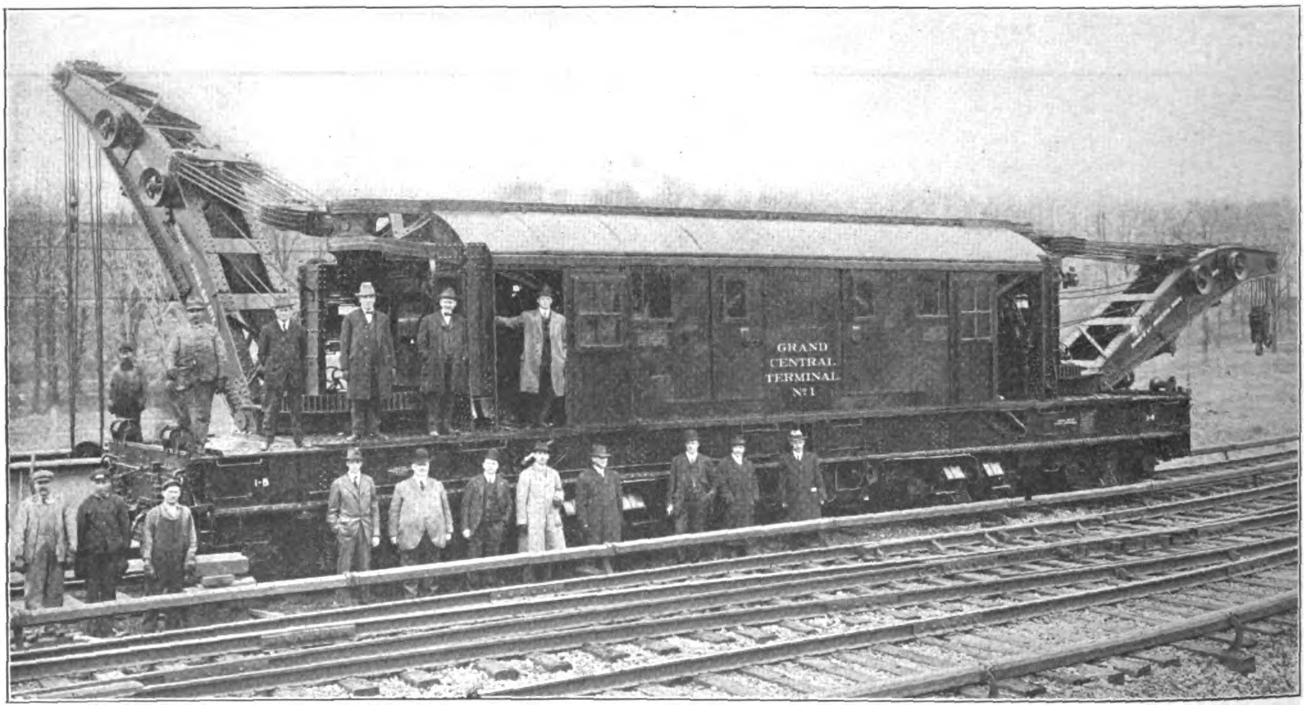
On May 11 the running time over the line of the Lehigh Valley Transit Company between Philadelphia and Allentown will be reduced by twenty minutes, so that the Allentown limiteds will make the run from Allentown to Sixty-ninth Street, Philadelphia, in an hour and fifty-eight minutes.

DOUBLE-ENDED WRECK CAR

A self-propelling wrecking outfit has just been put into service in the electric zone of the New York Central & Hudson River Railroad in New York City. The wrecker has at each end a crane having a capacity of 100 tons and permitting operation independent of the other. The machine will pass under the low bridges prevalent in the electric zone, will operate over a curve of 135-ft. radius and will develop a speed of more than 30 m.p.h. on level tangents while hauling a trailing load of 100 tons. While it is primarily designed to receive its power from the third-rail, it is equipped with storage batteries which allow it to run where there is no other power available. Of many advantages demonstrated by the outfit, the main one is the saving of time in getting to a wreck—an average of an hour. The machine is similar to that built in 1910 by the same company for the New York terminal of the Pennsylvania Railroad, but has double the capacity and has entirely new features in the storage battery equipment, the ability to propel itself at a comparatively high speed and the power-operated outriggers.



Electric Wrecking Crane—View Showing Crane Lifting Bridge Girder with Outriggers Extended



Electric Wrecking Crane—General View of Crane with One Boom Swung 90 Deg. Off Center

The car body is 57 ft. long and 9 ft. 6 in. wide and is constructed entirely of steel. At each end is a boom which will revolve through 180 deg. and can be operated independently of or simultaneously with the other. There is a cab at each end, from which is controlled not only the corresponding boom, but also the propelling mechanism of the car itself. Thus the wrecker can be operated equally well in either direction from either end, and no time need be wasted in turning it. No heavy levers are required as all motions are controlled by air.

With all outriggers set each boom can handle 100 tons at radii varying from 24 ft. 2 in. straight ahead down to 13 ft. 8 in. at right angles. Lighter loads may be swung through 180 deg. The outriggers, of which there are one on each end and one in the center of the car body on each side, are for adding stability during heavy lifting. These outriggers are 18-in. beams, mounted on rollers, which may be thrown out 2 ft. 3 in. at right angles to the track by means of compressed air, allowing the use of wedges and blocking under them to give the machine a broader base. When they are not needed they are drawn in and do not interfere with the travel of the car. The booms require no counterweights. Two 150-hp General Electric motors operate the booms and appurtenant machinery.

Four 200-hp General Electric railway motors propel the car, taking current from the third-rail. For service when the third-rail is out of commission, however, or on tracks not electrified, a storage battery of 230 cells, with a capacity of 75 amp for eight hours, replaces the current obtained from the third-rail and permits uninterrupted operation of the car and cranes for several hours. In case the third-rail connections at a wreck are restored before the wrecker has finished its work the storage batteries can be charged from the power rail, thus making the machine ready for the next emergency. The motor parts are of the same design as used on the multiple-unit cars, hence no time need be lost waiting for special repair parts, and little special stock of repair parts need be carried.

The wrecker is capable of a speed of 30 m.p.h. running light on level tangents, with a trailing load of 100 tons, and 12 m.p.h. with the same trailing load and an additional suspended load of 50 tons. It will climb a 2.7 per cent grade with an 80-ton rolling load at approximately 15 m.p.h. The cranes will lift their maximul loads 15 ft. per minute and will slew 180 deg. in one minute with a light load. The weight of the entire machine has been kept down to 380,000 lb. to meet the load restrictions on the upper level of the terminal, which is supported on columns.

The machine throughout conforms with U. S. safety-appliance standards. As the wrecker is its own locomotive, it is equipped with air pumps and reservoirs enabling it to operate the air brakes in its train, having both automatic and straight air brakes.

Under service conditions the wrecker has proved highly satisfactory. Its chief advantage, the saving of an hour's delay by eliminating dependence upon a locomotive when called out, is of paramount importance in a district in which there are so many train movements and in which derailments at certain points may cripple the service.

The outfit was designed and furnished by the Industrial Works, of Bay City, Mich., from specifications prepared by a committee consisting of H. A. Currie, assistant electrical engineer, B. S. Buell, wrecking master, and C. H. Quereau, superintendent of electrical equipment of the New York Central & Hudson River Railroad.

The Prussian Minister of Public Works has issued a decree that the daily hours of labor of city motormen shall not exceed ten, and those of conductors and brakemen not more than eleven hours, to include a thirty-minute rest. No day shift must exceed sixteen hours, and the interval between duties must be at least eight hours. In any shift covering fourteen to sixteen hours, at least four hours must be for rest. In each month there must be at least two rest days of twenty-four consecutive hours each. If the rest day does not fall on a Sunday then the employee must have at least one free Sunday in the month.

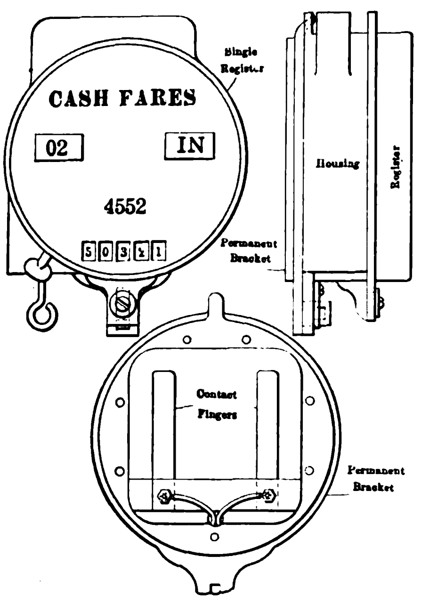
ELECTRICALLY-OPERATED RINGING DEVICE FOR FARE REGISTERS OF PREPAYMENT CARS

Before the Brooklyn Rapid Transit System undertook the operation of center-entrance cars a series of experiments was made with the various forms of registers and register-operating devices then available. Eventually the company decided to retain the standard round form of register but to operate it electrically from a push-button in the conductor's pedestal instead of employing register rods or pedal devices. The chief operating reasons for making this departure from previous practice was to enable the conductor to be freer to operate the center doors, to handle and register fares in the quickest and yet most accurate manner and to avoid the fatigue incident to ringing mechanically a large number of fares in succession. A car-building advantage of this electrical fare registration is the absence of all ropes and rods, especially as the signals to the motorman are also electrical. The unique apparatus hereinafter described was invented, patented and developed by E. J. Kennedy, mechanician of the railway's register department, to meet practical operating conditions. Equipments for general sale are being manufactured by the Perey Machine Works, Brooklyn, N. Y., for installation on prepayment cars of any type whatsoever.

In the center-entrance cars the standard fare registration practice of the Brooklyn Rapid Transit System is followed. That is to say, a cash register is mounted on the bulkhead at one end and a transfer register on the bulkhead at the opposite end of the car. When a passenger enters a center-entrance car he places his cash or ticket fare on the change plate of the pedestal. The conductor slides the fare to one side and at the same moment taps the push-button which corresponds to the proper register. If, say, five fares are to be recorded at one time, it is necessary only to maintain pressure on the button until the register has rung five times. The superiority of this method to that of mechanical transmission to the registers is clear from the fact that this device is timed to ring as high as 200 fares per minute, yet with a little experience conductors soon learn to gage instinctively the relation between the time of pressure and the number of registrations. The repeating switch hereinafter described limits the speed of registration to any degree desired by the railway, but even at the maximum speed named it is impossible for a conductor to bunch his registrations. A heavy drop in voltage lowers the rate of registration, but not enough to be of any consequence. Furthermore, it is utterly impossible for a dishonest conductor to drown the register by rattling handles or making other noises that might confuse a person who was keeping count of the register ringing.

The device consists essentially of a solenoid mechanism placed between the ordinary ringing back of any standard register and the bulkhead of the car, requiring only an extra space of 3-in. depth. The push-button circuits pass from the pedestal under the floor in conduit, up the bulkheads to each solenoid, thence to the repeating switch and to ground. So far none of the 225 devices in use has required any maintenance after operating for six months to a year. Should the register itself get out of order it can be lifted off of the mechanism and a new one substituted without further change because the contacts with the electric housing are made automatically. The maximum amount of current required for operating the register is 0.65 amp per operation.

For convenience, the accompanying illustrations, Figs. 1, 2, 3 and 4 show the devices as designed to fit the single-fare register on the Brooklyn cars, al-



Figs. 1, 3 and 4—Register, Showing Housing and Contacts

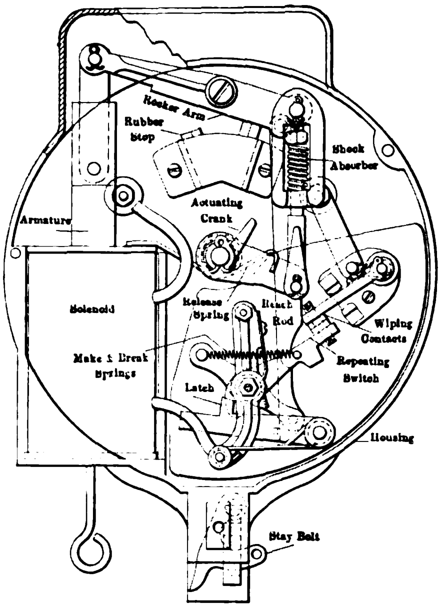
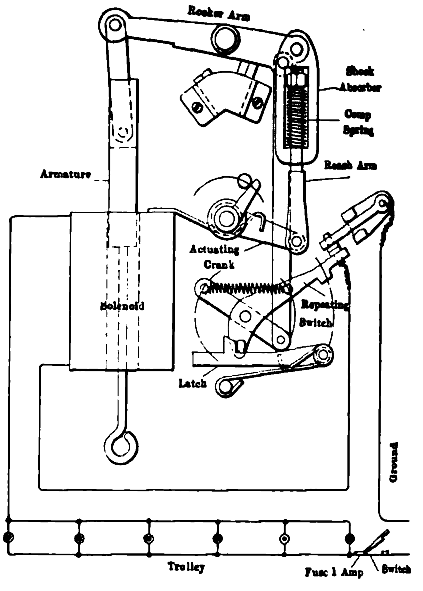


Fig. 2—Ringing Device with Register Removed



Electric Ry Journal

Fig. 5—Showing Repeating Switch Closed

though a register with any combination of dials may be used. Fig. 2 shows the device with register removed, Fig. 1 with the register in place, Fig. 3 is a side view of device and register, and Fig. 4 the permanent bracket with spring contacts. The housing, which contains all the working parts, has the same hooking attachments as the register back with the addition of electrical contacts.

The device is actuated by solenoids and a repeating switch. One solenoid is used for each dial of a register (should it have more than one dial), but only one repeating switch is required. Fig. 2 shows the solenoid, armature, rocker arm, reach rods, register actuating crank and repeating switch in place. When contact is made at the push button, which is a secondary circuit-breaker, the solenoid becomes energized and will pull down the armature, bringing with it the rocker arm. This rocker arm in turn is connected through a shock absorber to the repeating switch and also to the register actuating crank, which engages with the actuating pin of registers, in order to keep the repeating switch in circuit until a full stroke of the armature takes place. A latch holds the contacts together while the make-and-break springs are passing over the center. After this the contacts are released by the reach arm, but not until a registration is caused in the register. The repeating switch then releases and opens the circuit, whereupon all parts are returned to normal position by the release spring which is wrapped around the actuating crank. The repeating switch will then snap back into circuit and the solenoid again becomes energized.

The foregoing operation will be repeated so long as the contact is maintained at the button. The push-buttons are of the double-break contact type, well insulated and enclosed in a brass case. As the operation is on 550 volts without any intermediate resistance, the arc is cared for by the repeating switch which breaks the circuit before the push-button. The contact points of this switch come together with a blow and wipe, thus making the contacts self-cleaning and obviating the need for inspection.

To remove the housing, it is necessary only to remove a little padlock and lift it off its bracket, as there are no wires to disconnect. The wires or leads are secured to the spring-contact fingers of the bracket, and these fingers engage with two binding posts on the back of the ringing device housing. All housings are interchangeable. Since the electrical registration always exerts the same moderate pull at the register and the space behind the register is sealed by the cast-iron housing, the register itself is protected against both abuse and dust. Fig. 5 shows all parts in normal position with the repeating switch closed and a diagram of circuits.

ADJUSTABLE TIME-TABLE RACK

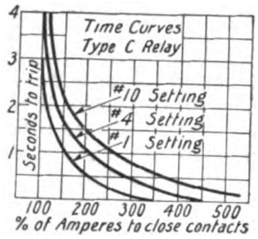
A new time-table rack for accommodating folders of any width has recently been put on the market by the American Railway Supply Company, New York, N. Y. This rack, as shown in the accompanying illustration, has partitions that are adjustable to allow the insertion of folders of any width. The ordinary time-table rack is made of rigidly spaced partitions and so is suitable only for folders of average size. Hence those folders which are wider than the spaces in each rack have to be displayed under less favorable conditions, say, by placing them on tables and counters. The new rack obviates this disadvantage.

Adjustable Time-table Rack

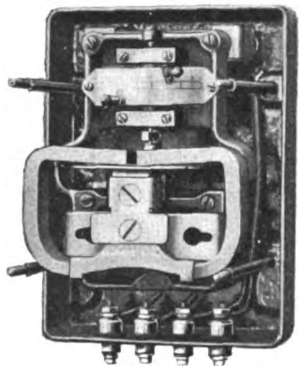
On Dec. 31, 1913, there were 160 miles of elevated roadbed carrying 1000 miles of track, either completed or under construction in Chicago. As there are approximately 3000 miles of track within the city limits, one-third of the total trackage in Chicago is elevated or being elevated. In addition 24 miles are to be elevated in the near future. There remains 179 miles still at grade and for which no elevation ordinances have been passed, but most of this trackage is in the outlying districts of the city.

INVERSE TIME-ELEMENT RELAYS

Alternating-current reverse-power relays close their contacts under conditions of overload or of reverse power. They are of three different characteristics, each having the inverse time-limit feature: Overload and reverse power; overload only—instantaneous or adjustable definite minimum time at heavy overloads; reverse power only—instantaneous or adjustable definite minimum time at heavy overloads. Relays of this type are made by the Westinghouse Electric & Manufacturing Company.



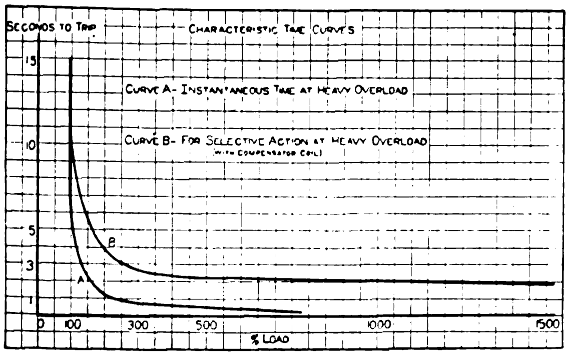
Curves of Time Element Adjustment



Overload Relay with Cover Off

In principle, overload and reverse power relay consists of contacts closed by an induction type instrument in which are combined the functions of ammeter and wattmeter, tripping at heavy overloads and on low reversed power. At zero voltage the relay acts as an ordinary current-actuated overload relay, and therefore low power-factor or absence of voltage does not prevent it from tripping. The relay is operated from voltage and current transformers of 100 volts and 5 amp secondary. The contacts close a direct-current tripping circuit. The maximum time element setting for any given tripping load setting is about ten seconds and the minimum about one second, the minimum having instantaneous tripping action at heavy overloads.

Three adjustments are provided. One is for regulating the ratio of the reverse to the overload tripping current, one for regulating the absolute values of these quantities and the third as above described for regulating the value of the time element. The relays can be adjusted to operate at from 6 amp to 14 amp in normal direction and from 0 amp to 4 amp reverse power with normal voltage.



Differences Between Instantaneous and Definite Minimum Time at Overloads

The plain overload relays are similar in principle to the overload and reverse power relays, but the voltage connection is omitted. The instrument therefore acts as an induction ammeter. Curve *A* shows the time-element characteristics of these relays. The definite minimum, Curve *B*, is obtained by means of the Westinghouse torque compensator used as an auxiliary to the overload relay. The torque compensator reduces the torque of the relay at heavy overloads without reducing the torque at light overloads and by using it with the relay, the latter can be adjusted for any definite minimum time from zero to two seconds at heavy overloads in the standard relays. The maximum and minimum time-element curves of the overload relay are also reproduced. These curves are modified in the manner shown in the first curves by using a torque compensator in connection with the relay.

One adjustment is provided for regulating the value of the time element between the limits shown in the time curves and one for determining the minimum current at which the relay is to operate. The minimum current at minimum time setting can be adjusted from 3 amp to 5 amp and at a maximum time setting for from 3 amp to 8 amp. The relay for reverse power only is a combination of the overload and reverse power relay movement with a selective wattmeter element that keeps the trip circuit open when power is flowing in the proper direction. This removes the overload feature of the main relay and allows the instrument to close the circuit only on reverse power. It does this even should the voltage or power-factor drop to 2 per cent of normal; in other words, if the true watts in the reverse direction drop to 2 per cent under short-circuit conditions. Power flowing in the normal direction equal to 2 per cent or more normal prevents the relay from tripping. The time-element characteristics of the reverse power relays are the same as those of the plain overload relays, and the same adjustments are provided.

An important feature of all these relays is their inherent accuracy in time characteristic. Relays controlling circuits operated in series can be safely set one-half second apart and will act selectively even at extremely high overloads. The operating characteristics of many circuit-breakers will allow this setting to be as close as one-third second. The resetting feature is so well worked out that should the overload in any relay be interrupted for one-twenty-fifth second short of the time the relay is set to operate, the movement will return to its starting position without closing its contacts.

JAPAN'S ELECTRICAL PROGRESS

According to a British Consular report, eight years have seen a very great development in the Japanese electrical industry. During that period the capital invested in supply undertakings and electric railways increased from $14,290,000 to $229,683,810. In the same period the length of transmission lines increased from 5981 to 35,584 miles, and the length of electric railways from 93 to 704 miles. Rapid development in all directions has caused a large demand for all kinds of electrical machinery, tools and materials. As copper is produced in Japan the manufacture of electric wire has made good progress, and imports of this material are practically confined to a certain quantity of submarine and other cables. Only two or three years ago insulators and other porcelain ware required in connection with electrical work were imported from Germany, but the Japanese article is now said to be in no way inferior to that imported, and has the additional advantage of costing only half the price.

News of Electric Railways

Request for Committee to Consider Kansas City Franchise

Henry L. Jost, Mayor of Kansas City, on May 4 sent a communication to the City Council, asking for the appointment of a committee of six members, three from each house, to sit with himself and the receivers of the Metropolitan Street Railway while an ordinance granting the company a new franchise was being drafted for reference to the people. The franchise ordinance prepared by the Mayor some time ago will probably form a basis for future negotiations. The decision to resume negotiations was reached at a conference between Mayor Jost and representatives of the city and the company on May 1. R. J. Dunham, one of the receivers, was unable to attend. Ford F. Harvey, the other receiver, said he certainly favored an early vote by the people.

Judge William C. Hook, in the United States Court at Kansas City, on April 30, granted the petition of the representatives of the bondholders of the Metropolitan Street Railway, who asked an additional 1 per cent interest on bonds that have matured. The order is said to mean added annual interest of $180,721. This also is in addition to an extra 1 per cent interest which has been paid for the past year on about $5,000,000 of bonds. Judge Hook, however, reserved the right to make any adjustments later developments might justify. As the result of the decision, 1 per cent additional interest will be paid on $7,242,000 of bonds from Nov. 1, 1913, secured by the mortgage of the Old Colony Trust Company; upon $2,000,000 of bonds of the Central Electric Railway which matured on May 1, and on $8,500,000 of bonds from Nov. 15, 1913, representing the Metropolitan's proportion of the 5 per cent obligations of the Kansas City Railway & Light Company. The order granting the increase was made over the protest of representatives of the city.

Through Senator A. L. Cooper, its Kansas City representative, the Equitable Trust Company, New York, brought a foreclosure suit for $2,000,000 against the Metropolitan Street Railway on May 2. The mortgage is secured by the Brooklyn and Northeast lines of the company. Permission to file the suit was granted to the attorney for the Equitable Trust Company by Federal Judge Hook at a hearing on April 27. The mortgage matured on May 1. This suit will be added to others of the same character which are pending. The court appointed Judge Herman Brumback special master to hear testimony in this and other similar suits which are pending.

Following the receipt of a communication from Mayor Jost, the Kansas City Council at its regular meeting on May 4 appointed a committee of six men, three from each house, to resume franchise negotiations with the Metropolitan Street Railway. The upper house committee is composed of Peter Michaels, L. L. Carroll and Isaac Reicher. That from the lower board is made up of James B. Allen, E. C. M. Towne and Frank Welch. All of those named are in sympathy with the present administration. Of the six men appointed, Messrs. Michaels, Towne and Welch served during the negotiations held prior to the municipal election in April. The six men form the streets, alleys and grades committees in their respective houses. The Council committee was directed, in accordance with Mayor Jost's message, to resume negotiations with the receivers of the company on May 7.

On May 6 Mayor Jost vetoed the ordinance granting permission to the Metropolitan Street Railway to lay tracks on Twenty-fourth Street between Main Street and Grand Avenue. The measure had passed both branches of the City Council. The Mayor explained that he regarded the ordinance as superfluous, as receivers for the company have not yet indicated their refusal of a similar measure passed some months ago. In his message to the Council on May 4, Mayor Jost asked the Council franchise committee to take up the Twenty-fourth Street routing of cars to the new Union depot before proceeding with general franchise negotiations. The committees were so instructed by the speakers of the two houses.

Agreement on Most of Toledo Franchise Terms

Agreements have been reached on most of the sections of the revised franchise ordinance submitted to the special committee of the Toledo City Council by Henry L. Doherty and his associates. The work was completed at a conference held on the evening of May 6. At that time the company through Mr. Doherty agreed that the city should have complete control of the service, such control to be exercised through resolution of the Council with any step subject to a referendum vote. Mr. Doherty holds that if the Council has control of the service and also fixes the rate of fare, the one will hold the other in check and legislation will be fair to all concerned.

It was also agreed on May 6 to exchange transfers between the city lines and the Maumee Valley and Toledo Beach lines, but the fare to points outside the city limits must be paid where transfers are accepted on interurban cars. The committee abandoned the effort to arrange for the exchange of transfers with other interurban lines.

After a discussion which covered practically every point, Mr. Doherty agreed to arbitration of the value of the property, should the city desire to purchase it. He objected to the requirement that the company should sell the property at a price fixed by arbitration, but finally conceded this point in the interest of harmony.

Another conference was arranged for the evening of May 8 for discussion of the rate of fare. Mr. Doherty told the representative of the ELECTRIC RAILWAY JOURNAL on May 7 that the company would insist upon its plan of a trial with 3-cent fares for one year, in order to learn just what rate will be necessary for the next period of five years. The plan is to have the Council fix the rate for each five-year period after the experimental period of one year. Mr. Doherty believes that the people, educated for the past twelve years to demand a 3-cent fare, should be permitted to see the results with this fare and be thoroughly satisfied before a rate for any considerable time is fixed.

Mr. Doherty is convinced that the publicity forum conducted in the newspapers is doing much towards enlightening the people on street-railway questions. Every criticism, favorable or unfavorable, receives fair consideration in these advertisements and he feels that the campaign is making many friends for the company. According to Mr. Doherty, people are now studying these criticisms and replies dispassionately and will decide upon them with fairness, whereas, if their presentation was left until the heat of a referendum campaign or a contest in the Council, they would not receive the same careful thought and consideration and would do little good.

From his experience in this instance, Mr. Doherty feels that methods of education and the giving of truthful information will do more good than anything else in a contest where the public has been taught previously to demand unreasonable things.

According to Mr. Doherty Toledo has for years been absorbing views held by many people, and it is a difficult matter to change such decided views within a short time by publicity. In the past few weeks criticism has been directed at the company from every angle.

Mr. Doherty believes that when the matter is submitted to a referendum, the voters will be called upon to decide between a well-defined ordinance providing for municipal ownership and what may be known as the Doherty franchise. The contest will be sharply defined, but Mr. Doherty expressed the belief that the people will uphold a franchise that has been fairly formulated and with a rate of fare to be fixed by the Council in proportion to the income of the railway.

The revised franchise provides for a rearrangement of the system within four months by an expert employed by the city, construction of a cross-town line, the appointment of a commission of one to three members to direct operation during the first year, the use of pay-as-you-enter cars, provisions giving the city the right to purchase, regulation of service by the city, paving of streets between rails and 12 in. outside, and the transportation of freight between midnight and 5 a. m. Other matters included are the requirement that the tracks shall be kept clear of snow and sprinkled, that the tracks shall be removed at the end of the grant and the streets restored, that a bond of $300,000 to indemnify the city shall be furnished and that the franchise shall be forfeited if the company does not live up to its conditions. The term of the grant is twenty-five years.

The company is keeping track of all data so as to be able to go into a campaign whenever necessary. The general policy has been adopted of working slowly and making friends. It is estimated that about one-third of those who ride on the city lines are being carried free on account of their refusal to pay more than a 3-cent fare, but no trouble has occurred on this score for some time.

Further Municipal Railway Extensions in Seattle

A municipal railway extending from Dearborn Street to the south city limits at Ryan Street, Seattle, Wash., paralleling the Seattle, Renton & Southern Railway, and the construction of a line from Fourth Avenue South to a connection with the Highland Park & Lake Burien Railway at Iowa Street, in West Seattle, will cost $853,154, according to estimates submitted to the City Council by W. H. Teidamann, assistant city engineer. This amount does not include the cost of cars.

The utilities committee of the Council of Seattle by unanimous vote has rejected the proposition to take over the Seattle, Renton & Southern Railway on the basis of paying 25 per cent of the gross receipts for twenty-five years into a fund to the credit of that company. According to the committee, the total payment under the plan suggested would amount to between $2,000,000 and $3,000,000. According to the committee, the line is worth about $700,000.

Toronto Purchase Deal Apparently Off

On May 1 Sir William Mackenzie confirmed an announcement that the Toronto Railway is preparing to offer new capital stock to its shareholders to the amount of $1,000,000. He is quoted in part as follows in regard to the negotiations for the purchase of the railway by the city:

"I never thought much of the thing, anyway. It was the city that came to me about it in the first instance. Personally I don't believe the purchase question ever will be submitted to the people."

Asked about the probable disposition of the proceeds of the new issue Sir William said he thought a good deal of it might be spent in the city; perhaps none of it would be spent outside of the city. The Toronto Power Company and the York Radial Company finance most of their own capital expenditures with bond issues.

The proposed new issue of stock, which is to be offered to shareholders of record of May 11, will increase the stock capital of the Toronto Railway from $11,000,000 to $12,000,000. This is in addition to outstanding bonds of the company amounting to about $4,000,000, and to a guarantee of the principal and interest of the bonds of the York Radial and Toronto Power Companies, and through the latter of the Toronto Electric Light & Electrical Development Company.

Interesting Points in New York Workmen's Compensation Law

The workmen's compensation law recently passed by the Legislature of the State of New York classes among its groups of hazardous employments the operation, construction and repair of electric railways, including car and machine shops.

Every employer subject to the law must pay or provide for the payment of compensation for the disability or death of an employee resulting from an accidental personal injury sustained by the employee arising out of and in the course of his employment without regard to the cause thereof, except where the injury is occasioned by the wilful intention of the injured employee or is the result solely of the intoxication of the injured employee while on duty. The liability prescribed shall be exclusive, except that if an employer fails to secure the payment of compensation for an injured employee the latter or his representative may elect to claim compensation or to maintain an action for damages. In the latter case the defendant may not plead the assumption of risk, the fellow servant or the contributory negligence doctrine.

Electric railways should not overlook the fact that medical, surgical, hospital and additional attention must be rendered promptly to injured employees and carried on for sixty days, according to the extent of the injury. If the employer fails to provide this the injured employee may do so at the expense of the employer. The employee however, shall not be entitled to recover any amount expended by him for treatment or services unless he has requested the employer to furnish the same and the latter has refused or neglected to do so. When the employee pays his own expenses, a greater expense might result to the employer than if he furnished the medical service. The fees and other charges are subject to the regulation of the insurance commission and are limited to average charges for persons in similar conditions of living.

If payment of compensation is not made within ten days after it is due by the employer or insurance corporation liable therefor, the amount of such payment constitutes a liquidated claim for damages which with an added penalty of 50 per cent may be recovered in an action instituted by the commission in the name of the State. If a default is made in the payment of an installment of compensation and the whole amount of compensation is not yet due, the commission may declare the whole amount due and recover this with an added penalty of 50 per cent.

Electric railways should remember that if a workman entitled to compensation is injured or killed by the negligence or wrong of another not in the same employment, the injured workman may elect either to take compensation or to sue for recovery against the third party. If he elects to take compensation the cost of action is assigned to the State for the benefit of the State insurance fund if compensation is paid therefrom, and otherwise to the person or corporation liable for the payment of such compensation.

No benefit or insurance of an injured employee independent of those provided by law will be considered in determining compensation. No valid agreement can be made by any employee to pay any portion of the premium or to contribute to the cost of mutual insurance, and any employer who makes reduction for such purpose on the wages of employees is guilty of a misdemeanor. No agreement made by an employee to waive his right of compensation is valid, and claims for compensation cannot be assigned, released or commuted and are exempt from all claims of creditor's execution and attachment. Compensation and benefits can be paid only to employees or their dependents.

An employer must secure compensation by insuring in the State fund or in a mutual or stock company or by paying the compensation himself if he can furnish satisfactory proof of his financial ability. Failure to secure compensation in one of these ways shall be punishable by a penalty of $1 a day during continuous failure for each employee under the act.

A company that insures in the State fund should not overlook the fact that it must perfect all its arrangements and pay the premium prior to July 1, 1914. A company that elects to be self-insured should take up the matter with the compensation commission at least a month in advance of this date in order to have ample opportunity for compliance with all requirements for the issuance of the certificate by that date. The company which elects to insure in a stock or mutual company should not neglect to obtain a duplicate policy and file this with the compensation commission, together with a form which will be furnished by the commission, prior to July 1, 1914.

Perhaps the most important condition for the insuring company to keep in the foreground is the fact that the amount payable for a compensation is a preferred claim or lien against the assets of the company. For this reason the company should be particularly careful to select a solvent insurer—one whose resources would survive the losses of a disaster or catastrophe. This is particularly important because of its effect on credit. Bankers and other creditors appreciating that because of the unlimited liability of the insured there might result an obligation of thousands of dollars, will scrutinize carefully the insurance protection of companies to whom credit is extended.

A number of electric and gas companies in New York State have joined in a plan for a mutual insurance company for the carrying out of their obligations under the compensation law. As yet no move has been made by electric railways to form a similar organization. It is not proposed that they should be included in the above plan, but some discussion has been held relative to the inclusion of railway power plants. Frederic Culver, 25 Broad Street, New York City, has been appointed temporary secretary for the organizers.

Injunction to Prevent Extensions in Detroit Denied

The Michigan Supreme Court has affirmed the decision of the Wayne County Circuit Court in refusing an injunction to restrain the Detroit United Railway from constructing the proposed Junction Avenue extension. The injunction was sought by a resident of one of the streets to be traversed and it was set up in the petition that the city, under the low-fare agreement of August 7, 1913, had granted an interminable franchise to the railway company contrary to the state constitution which provides a maximum of thirty years for franchise grants. The Supreme Court held that the agreement was a day-to-day arrangement only and could be terminated at any time, and in addition held that because of its indefinite nature it would terminate at the expiration of thirty years as named in the constitution. The decision is regarded as having removed the last obstacle to the construction of very considerable extensions which have been agreed upon by the city and the company.

James Couzens, a member of the Detroit Street Railway Commission, who has returned to Detroit from a four months' vacation on the Pacific coast, was quoted as follows:

"The sooner we take over the street railway system, the better we can tell just how cheaply and well we can run it. The commission should be allowed to charge a 5-cent fare until it can actually determine what it will cost to run the system. This would be no hardship. The people would be virtually paying the money into their own pocketbooks, but the commission might be embarrassed if required to run a 3-cent system at once. I have seen too much fixing of prices of things before the actual cost is known not to realize that it is the quickest way into difficulties."

Mr. Couzens expressed the opinion that a subway would have to be built to take care of the growing population and to relieve the rush-hour congestion.

Future Regulation of Public Utilities

William D. Kerr, director of the Bureau of Public Service Economics, was the speaker before the finance forum of the West Side Young Men's Christian Association in New York on the evening of May 4. His subject was "Future Regulation of Public Utilities." Mr. Kerr reviewed briefly the history of regulation in opening his remarks. He could not even outline the future. The only thing he could do was to give an idea of the lines along which regulation was moving. The underlying principle of all regulation was to insure the convenience, welfare and comfort of the public. All other interests were subordinate to these. The speaker said that his subject divided itself almost naturally into three parts, public service economics, regulation and its functions, and factors influencing the future.

In public service work capital turned itself over in from four to six years. This turnover was so infrequent that the charge on the consumer was proportionately large. In some cases of public service capital stood idle about sixteen hours a day. There was a point in the use of capital where the principal passed away entirely. In order to counteract this adequate measures had to be adopted to take care of depreciation. Another matter of concern was obsolescence. In this connection Mr. Kerr quoted Samuel Insull, president of the Commonwealth Edison Company, Chicago, Ill., a previous speaker before the forum. The expense which the companies rendering service to the public found it necessary to meet in order to keep pace with the art had to be borne by the service. All regulation which denied a return on the investment commensurate with the risks and hazards involved would put a stop to further developments. In many localities there was a demand for flat-rate terms for all consumers regardless of the incidents of any of the cost factors. Charging what the service would bear usually meant charging what monopoly power made it possible for the utility to exact. This method was indefensible. The charge for service based on the joint cost of that service was the proper one and had resulted in development.

Under regulation and its functions Mr. Kerr reviewed the tangible forms of regulation by commissions. In addition there was the wasteful regulation through unrestrained competition. Wherever there was unrestrained competition the public paid the bills eventually. Referring to the proposed competition in electricity supply service in Cleveland Mr. Kerr said that the new service would not be competitive unless the city plant was required to meet tax and other charges in proportion to those exacted from the privately owned plants.

The two principal methods of regulation were direct regulation by legislative enactment such as the recent full-crew bills and legislation by means of authority delegated to boards or commissions. The legal theory of principal and agent had been developed to hold the companies to the strictest accountability, but this doctrine could not be brought to bear until the public became initiators as well as constructors. In this connection Mr. Kerr quoted from the speech, "Control of Public Service Corporations," made by Prof. John H. Gray of the University of Minnesota before the American Economic Association at its meeting in Minneapolis Dec. 27-30, 1913. This speech was referred to in the report of the discussion of that meeting which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 3, 1914.

In speaking of the future Mr. Kerr referred to the attitude of both the companies and the public toward regulation. The companies must meet the commissions with all the cards on the table and the faces of the cards turned up. It was his opinion that most of the companies were now doing this. All future laws would have to be so drawn that there could be no question about the powers conferred on the commissions, and the personnel of the commissions would have to be high. A reporting system for the public at large and the members of the various commissions was essential so that doctrines and principles could be developed for the future. If the defects which were inherent in the system of private ownership could not be corrected by regulation the public would have before it the question of going over to another system with defects probably still more onerous. If public regulation should work well, however, there would be no occasion for supplanting private ownership with public ownership.

Calvert Townley, assistant to the president of the Westinghouse Electric & Manufacturing Company, who introduced the speaker, brought up the question of the rate of return. He declared that the principal object of regulation of public utility corporations by the public is to see that the profits are not too great. He emphasized, however, the fact that it is also to the interest of the public to see that the rate of return thus limited be not made too low.

Valuation of Los Angeles & San Diego Beach Railway

According to a recent decision of the Railroad Commission of California the original cost data of the Los Angeles & San Diego Beach Railway, San Diego, Cal., are not available. The construction period of the company extended over twenty-five years, during which time a systematic segregation of expenditures was not attempted. Hence it was impossible for the commission to show the exact original cost, but from data secured it would appear that the actual cash investment approximates $442,000, which agrees quite closely with the present value as obtained by the engineering department of the commission. This figure, however, does not include interest on the investment. The books of the company show a total investment for road and equipment to June 30, 1913, of $858,384.

The reproduction value contains full amounts for all improvements made subsequent to the original construction, and depreciation and appreciation are considered. The usual overhead, interest and contingency allowances are added to the value of the physical elements, including 5 per cent of the physical property for engineering, 1 per cent on the same basis for law expenses, and 3 per cent for interest and commission on all items. The chief point of difference between the company's valuation and the commission's valuation was in connection with the right-of-way. The engineering department of the commission valued this at a wholesale price for the entire track, but the company claimed that the reproduction cost should be based on the retail value of individual and subdivided lots. A compromise was finally agreed upon on the market value of $2,000 per acre for an estimated mean of a minimum value of $1,000 originally adopted and a maximum value of $5,000. The reproduction cost was fixed at $554,590 as of June 30, 1912.

In computing the present value of the railway, the commission allowed the same amount for overhead expenses as in the case of the reproduction cost. In other words, it did not subtract anything for depreciation on overhead expenses. The present value of the physical elements of the operative property of the company, including engineering, law expenses, interest during construction and contingencies, was determined to be $461,016.

Providence Subway Act Opposed

The passage of the Providence subway act was opposed by the Rhode Island Company on April 28 at a hearing on the measure held before the Senate judiciary committee at the State House. Attorney Nathaniel W. Smith, counsel for the company, suggested the continuance of the matter until the next session of the General Assembly. This, he said, would afford the trustees of the company an opportunity to become familiar with conditions. He said:

"This subway act is bound to put the Rhode Island Company upon the defensive. On the one hand there is the subway committee as a rapid transit commission enthusiastic to plan, advocate and construct additional subways. On the other hand the Rhode Island Company is unable to assume the financial burdens, principally because it has within two years entered into a contract with the city of Providence under which it has already expended large sums of money and under which it is obligated to further heavy financial burdens to carry out the very recommendations the city's own expert made for the solution of the transportation problem.

"It seems hardly fair that the city should first ask the Rhode Island Company to make a contract ostensibly to solve the city's transportation problem under which it assumes heavy burdens and then, before the improvements under that contract are completed, seek subway legislation which can but still further embarrass the company.

"The gentlemen who are to assume the control of and responsibility for the Rhode Island Company are understood to be not unfriendly to the subway idea. Before the next General Assembly convenes, less than nine months hence, these gentlemen will have entered upon their duties and had an opportunity to study the question. Considerations of prudence and fairness, therefore, seem to urge that final consideration of this act be deferred until these trustees can, with a knowledge of the facts, give you the benefit of their study of the situation."

Demand for Readjustment of Schedules in Cleveland

The executive committee of the Cleveland branch of the Amalgamated Association of Street & Electric Railway Employees has made a formal demand on the Cleveland (Ohio) Railway for a readjustment of the schedules which, it is claimed, cause a large number of the men to spend extra hours each day at the stations in order to get anything like a day's work. J. J. Stanley, president of the company, promised to make an investigation and then take the matter up with the other officers of the company. Many of these schedules were established through the insistance of Peter Witt, street railway commissioner. The employees claim that investigations on the Broadway line disclose the fact that eighteen and a half hours is the longest time spent on duty by any one man, in order to obtain ten hours' work, while the shortest time is ten and a half hours to secure pay for nine hours and twenty minutes. On this line 125 men are paid for approximately 884 hours, but 1,322 hours are spent on duty in order to secure that number of hours of work. The average duty of each man, they say, is thirteen hours and thirty-six minutes, and the time lost is four hours and thirty-five minutes.

The Dispatchers' and Inspectors' Association, made up of the dispatchers and inspectors of the Cleveland Railway, was organized on April 27, for the purpose of uniting in a request for higher wages and better working conditions. The dispatchers, it is said, desire that their working shift of twelve and thirteen hours be reduced to eight hours, while the inspectors want a work-day of ten and a half hours, with wages of $110 per month. The dispatchers receive $100 per month. Twenty-eight dispatchers and thirty-five inspectors are employed by the company.

Tornado Hits Iowa Railway

A tornado which swept over Johnson and Linn Counties in Iowa on the afernoon of May 3 snapped off fourteen poles supporting a high-tension transmission line of the Iowa Railway & Light Company. The damage occurred just north of the town of North Liberty, Ia., along the line of the interurban railway connecting Cedar Rapids and Iowa City. A three-phase, 16,500-volt transmission line supported on wishbone cross-arms occupied the tops of the poles, while lower down a 550-volt trolley line for the railway was suspended on brackets. A telephone wire was also strung on the same poles. Traffic of the interurban line was tied up from 4 p. m. until 6:30 the next morning. The Iowa City Electric Railway depended on the transmission line for its power, and its lines were also tied up for the same interval. Since it was Sunday night and traffic on the interurban railway was lighter than usual, it was thought best to take additional time and supplant the damaged section with new and permanent construction. Accordingly the fourteen broken poles were replaced with new ones and the three-phase line, the trolley wire and the telephone line were restrung before the next morning by a record force of men summoned from all departments of the railway. A car loaded with passengers was just outside the path of the storm.

The New Haven Inquiry

The federal inquiry into the affairs of the New York, New Haven & Hartford Railroad has been confined during the last few hearings to the intercorporate relations of the New Haven Company, the Metropolitan Steamship Company and the Billard Company. Warren E. Chase, a lawyer of Hartford, said on May 6 that he had looked after all the legal details of the organization of the Metropolitan Steamship Company at the request of E. D. Robbins, general counsel for the New York, New Haven & Hartford Railroad. He also looked after the details of the organization of several other subsidiary companies, one of them the New England Investment & Security Company, which controls the electric railways at Springfield, Mass. Mr. Hemingway, a banker of New Haven, who was treasurer of the Billard Company, was questioned in regard to the details of the transactions between the Billard Company and the New Haven. It is expected that he will be recalled after Mr. Billard himself has been examined. Mr. Hemingway declared that he had no vouchers for expenditures he had made on behalf of the Billard Company and had not kept any memorandum to show how the $4,000,000 that had passed through his hands as treasurer had been distributed.

David E. Brown, examiner for the Interstate Commerce Commission, presented at the hearing on May 6 a copy of schedules containing the names of more than 1000 individuals to whom about $500,000 had been paid during the years 1912 and 1913 for advertisements and publicity work. These disbursements were grouped under legal services and disbursements, services pending litigation in various cases, retainers on legal services, professional services, advertising and publicity. Under the head of "Amounts paid to any newspaper or periodical or to any employee thereof or writer therefor, together with all other payments for every kind of publicity for influencing public opinion, including expenses incurred for the printing and distribution of time-tables, circulating pamphlets of information, issued directly by the New York, New Haven & Hartford Railroad, to its officers, employees or patrons," there was expended during 1912 and 1913, $370,588.

Missouri Commission Report

In the first annual report of the Public Service Commission of Missouri for the eight and one-half months ended Dec. 31, 1913, the commission has announced its policy of discussing in its annual report questions that are of interest to the public and public service corporations, and issuing its opinions, orders and decisions in separately bound volumes. It is stated that many of the reports issued by other state commissions are too voluminous and cumbersome to be sent through the mail and easily handled by those in search of information. Furthermore, the commission feels that the publication of the various opinions, orders and the like from time to time would give better results than to withhold the printing of the same until the issuance of the annual report.

The first report of the commission is devoted to a general analysis of the jurisdiction of the commission, the organization of its various departments, and a statement of the policies to be pursued by each department in its work with public utilities. There are twenty-one interurban and street railway corporations under the jurisdiction of the commission.

It is stated that the commission has devoted considerable time to the study of a uniform system of accounts used by other state commissions and has issued tentative classifications and forms of reports for gas, water, heating and electrical corporations. Up to the present time the commission has not perfected a tentative classification for electric railways. It intends, however, to follow the classification of the Interstate Commerce Commission, taking into consideration the American Electric Railway Accountants' Association system, but what changes, if any, will be made in these systems it is not yet possible to state.

It has been the endeavor of the commission to draft such annual reports as would include only information which should also be furnished to the directors, stockholders and bondholders. Since the organization of the engineering department of the commission valuations have been begun on the Kansas City, Clay County & St. Joseph Railway for the purpose of rate making and on the Cassville & Western Railroad for security issuing purposes. During 1914 the commission expects to make a special study of the various public service regulation statutes of other states and of the operation and effect of the indeterminate franchise laws. It expects to report proposed legislation to the Forty-eighth General Assembly in January, 1915.

Hearing by Massachusetts Commission on Depreciation Allowances

The Massachusetts Public Service Commission gave a hearing at Boston on April 29 upon a proposed order requiring railroads and street railways to show, as a part of their case, the extent to which they have provided for depreciation when requesting the right to issue stock or bonds other than for refunding purposes. Chairman McLeod announced that the purpose of the hearing was to see if a general policy to govern the commission's action could be formulated for passing upon new issues. He pointed out that the time had arrived when depreciation should be considered in detail and suggested that it might be helpful to require the filing of statistics with the board at regular periods that would throw more light upon the depreciation problem.

James F. Jackson, for the Bay State Street Railway, contended that higher fares must come if street railways are to give proper attention to depreciation, but suggested that each case of security issue should be treated by the board upon its merits. He said that in some cases depreciation had little or no bearing upon the propriety of a security issue, and expressed the willingness of his client to assist the board in every way within its power. Bentley W. Warren, for the Berkshire Street Railway, concurred in the view that higher fares must come with an adequate depreciation allowance. Rates should be such that they will supply the money needed to cover depreciation and obsolescence and leave the companies in a position properly to serve the public. Earning power was a fundamental factor in the determination of security issues and it would be burdensome to thresh over the depreciation question every time a company desired to issue new stock or bonds.

Commissioner Anderson declared that he was aware that the question of higher rates on street railways must be faced; that if the companies were carrying passengers at a loss, rates must go up, and that proper charges to cover depreciation must be made possible to enable the roads to make the earnings needed. After hearing a number of steam railroad officials, the board adjourned the session until May 18 to give the representatives of the Boston Elevated Railway and other companies an opportunity to present their views.

Question of Extensions Before Missouri Commission.—As a result of negotiations between the Hannibal Railway & Electric Company, Hannibal, Mo., and the special committee of the Commercial club, the question of extensions to the company's lines will be referred to the Public Utilities Commission of Missouri.

Meeting of the Central Safety Committee at Portland. A meeting of the central safety committee of the Portland Railway, Light & Power Company, Portland, Ore., was held at the Commercial Club on April 20. The meeting was preceded by a supper. A great deal of enthusiasm is felt in the work of the committee, which now numbers 104.

Elevated Third-Tracking Contract Approved.—The Public Service Commission for the First District of New York has approved the form of contract submitted by the New York Municipal Railway Corporation for the construction of the third-track on the Fulton Street elevated railroad in Brooklyn for that portion of the road between Nostrand Avenue and East New York. The company can now submit the contract to bidders.

Plan for Power Development at Washington.—Senator Norris, of Nebraska, has introduced a bill in the Senate as an amendment to the river and harbor bill for the development of water-power on the Potomac River above Washington and for the construction of a power plant to furnish electric light and power for use in the District of Columbia. The amendment authorizes the expenditure of $15,021,600 to meet the expense of the project.

Plans for Reconstructing Fillmore Hill Line, San Francisco.—Nothing will be done until some time in June on the changes planned by the United Railroads, San Francisco, Cal., for the Fillmore Street hill funicular line. This hill is one of the obstacles that block the company from securing ready access to the exposition. The actual grade on Fillmore Street hill is 24 per cent. The company operates over it now by means of a cable attached to ascending and descending cars.

Additional Ozoning Apparatus in London.—Ozoning apparatus is being installed in connection with the ventilation of the Charing Cross, Euston & Hampstead and the Baker Street & Waterloo Railways, at Edgeward Road, Euston, Goodge Street, and Charing Cross, London, England. The apparatus is similar in every way to that provided at all the stations of the Central London Railway some two or three years ago, but of rather larger capacity. A washing arrangement is, however, being put in, which is thought to be an improvement over the previous installations.

"Leaving" Defined by Court.—In upholding a City Court judgment secured against the International Railway, Buffalo, N. Y., by an employee for wages, Justice Wheeler in Supreme Court defined the word "leaving," which was in the contract of employment and contended by the plaintiff to mean voluntary quitting of work and by the defendant to mean discharge or other means of severing relations. Justice Wheeler sustains the voluntary side of the case. The contract provided that if the employee should leave within six months after entering on his employment, the money paid him during the ten-day period of his instruction in the duties of a conductor should be refunded to the company.

Protection in Pennsylvania Strike.—Seventeen members of the State constabulary arrived at Freeland on May 4 and are patrolling that section on account of the trouble which has developed as a result of the strike of the motormen and conductors of the Lehigh Traction Company, Hazelton, Pa. An attempt was made to blow up the bridge over which the company operates at Drifton near Freeland, and stones and logs have on several occasions been piled up on the tracks to impede the progress of cars. The strike began on Jan. 1, but as stated in the ELECTRIC RAILWAY JOURNAL of April 18, 1914, page 894, the company made no effort to restore full service until last month.

Recommendation by Rhode Island Commission for Increased Powers.—The adoption of a law which will give the Public Utilities Commission of Rhode Island power to pass upon all leases, assignments or transfers of railroad properties in this State from one corporation to another is recommended by the Public Utilities Commission in a letter addressed to Governor Pothier. The letter was sent in response to a request for information directed to the commission several weeks ago by the Governor. The Governor asked the commission to draft an act which would meet the situation presented by the proposal of the New York, New Haven & Hartford Railroad to dispose of its holdings in the Rhode Island Company.

Report Favoring Municipal Ownership in Pekin.—The Mayor and the Corporation Counsel of Pekin, Ill., have reported to the Council in favor of taking over the line of the Pekin & Petersburg Interurban Railway in Pekin and rehabilitating it. The property was recently sold under foreclosure. With the report was submitted an estimate of the engineer on the cost of construction, operation and probable earnings, showing a net profit of 12 per cent on an investment of about $60,000. The probable cost is figured as follows: purchase of present line, $7,000; rehabilitation of present tracks, $4,480; new construction, $23,000; overhead construction, $7,000; equipment, $10,000; carhouse and shop equipment, $8,500; total, $59,800. Gross income, $22,000; power, $2,500; transportation, $7,300; maintenance, $3,000; general expense, $2,700; total, $15,500; net earnings, $6,500. The equipment would consist of three motor cars and three trailers.

Illinois Commission Attempts to Force Track Elevation.—The Illinois Public Utilities Commission in further consideration of forcing the Chicago & Oak Park Elevated Railroad to elevate its tracks through the suburban territory west of Chicago, has ordered Samuel Insull, receiver of the road, and B. I. Budd, president, to show cause why the commission should not enter an order for immediate elevation of the tracks. The difficulty arising in this particular situation is one of jurisdiction. At the present time Mr. Insull is operating the road under an order of the Federal Court. In explanation of the situation Mr. Insull gave out a statement as follows: "About a year before the commission came into existence I recommended to the court that that part of the railroad located upon the surface be elevated, and secured authority to do the work if necessary funds could be provided. Up to the present time it has been impossible to raise the money."

Reopening of Kings County Rate Case.—The Public Service Commission for the First District of New York has decided to reopen the rate case of Kings County Lighting Company recently decided by the Court of Appeals. A further hearing was set for May 7. The commission ordered the company last year to reduce the price of gas to 95 cents per thousand cubic feet. The Appellate Division sustained the commission's action except in connection with the going value, paving over mains and the annual increase in land value. The Court of Appeals recently agreed with the Appellate Division as to going value and annual increase in land, but sustained the commission in regard to paving over mains, as was noted in detail in the ELECTRIC RAILWAY JOURNAL of April 11, 1914, page 821. The decision of the court was of considerable interest on account of its extended discussion of the elements which should enter into a determination of going value in rate cases.

Effort to Organize Louisville Employees Fails.—The effort of the Amalgamated Association of Street & Electric Railway Employees to organize the employees of the Louisville Railway and the Louisville & Interurban Railway have evidently failed. After a committee, purporting to represent the employees, had waited on officials of the companies with demands for increases in wages, shorter hours and recognition of the union, an announcement was made that concerted action would be taken at 9 p. m. on May 1, at which hour a meeting of all the employees was to be held. Not a motorman or conductor left his car and everything at the various carhouses of the company was quiet and orderly, with nothing to substantiate the claims of the organizers that 700 men had been enrolled. W. F. Welch, second vice-president of the national body, on the ground at the time, declared that if the men did not want a union there was nothing left for the organizers to do but leave.

Track-Laying in Fourth Avenue, Brooklyn, During Summer.—The work of track laying in the Fourth Avenue subway in Brooklyn probably will begin early in the coming summer, as the Public Service Commission for the First District of New York has advertised for bids, to be opened May 21, for this work. The city will furnish rails, ties, ballast and other material necessary to lay the tracks, and the contractor will simply perform the work of putting them in place. The contract calls for tracks to be laid from the Manhattan Bridge through Flatbush Avenue extension, Fulton Street, Ashland Place and Fourth Avenue to Eighty-sixth Street. From the Manhattan Bridge to Sixty-fifth Street the subway will be mainly a four-track line, although there will be parts of the road with as many as eight tracks. From Sixty-fifth Street to Eighty-sixth Street it will be a two-track railroad. Under the contract, however, no electrical or signal apparatus will be installed, as that is part of the equipment and will be placed by the operating company.

Mutiny of the Lamentation Club.—On Saturday, May 2, the members of the Lamentation Club, sometime known as the Deportation and Importation Club, held a wake or "coronach" in the Flemish Room of the Grand Union Hotel over the remains of Simeon Ford's famous gathering place of New York electric railway and supply men. Some of the forty-odd mourners recalled with regretful reminiscence that in a period of thirty years they had worked their way forward from the mahogany lunch counter to the sedate tables of the Flemish Room. At the beginning of the luncheon a dun pall of grief hung about the boards which had so often resounded with such abandon to vibrant tales of fenders and couplers 'yond compare. But joy soon reigned supreme as the mourners reflected that, after all, the destruction of the good old landmark was to make room for a new subway. So those who came to grieve remained to smile and to rebaptize the organization as the Exultation Club. Among the honorary pallbearers were noted the following: Tom Mullaney, Bill Sawyer, Jack High, Jim Doyle, Harry Ransom, Bill Wampler, Charlie Ellicott, Epicure Wood, Stymie Banghardt and Messrs. Quinn, McWhirter, Whipple, McIver, Keyes, Hayes, Elmquist, Palmer, Thompson, Taylor, Carlton, Davidson, Berry, Bassett, Sabin, Stocks, Milo, Clark, Armstrong, Shephard, Kent and McMurrough.

PROGRAMS OF ASSOCIATION MEETINGS

Missouri Electric, Gas, Street Railway & Water Works Association

The annual meeting of the Missouri Electric, Gas, Street Railway & Water Works Association will be held on May 20-23. The delegates are to assemble in St. Louis on May 20. On May 21, at 10 a. m., they will board the steamer *Quincy* for a trip on the Mississippi River to the Keokuk dam, returning to St. Louis on May 23. The sessions of the association will be held on board the steamer.

Illinois Electric Railways Association

The next regular meeting of the Illinois Electric Railways Association will be held on May 15 at the Hotel La Salle, Chicago. Following the transaction of the regular business of the association R. B. Stearns, vice-president and assistant general manager of The Milwaukee Electric Railway & Light Company, will deliver a short address. P. Junkersfeld, assistant to the second vice-president of the Commonwealth Edison Company, Chicago, will read a paper. After the usual association luncheon has been served, the members will be the guests of the Commonwealth Edison Company on an inspection trip to the Fisk Street power station.

Financial and Corporate

Stock and Money Markets

May 6, 1914.

In the trading on the New York Stock Exchange to-day price changes were irregular, but the prevailing tendency was reactionary. The general level of quotations again showed a net loss. The Mexican question is not expected to be a factor unless some striking event should occur. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 3 per cent; six months, 3 @ 3¼ per cent.

In the Philadelphia market to-day Rapid Transit was stronger, 14⅞ being bid for this issue. Other issues were unchanged and quiet.

The market for stocks in Chicago to-day was dull. The bond transactions totaled $108,000, par value.

In the Boston market to-day small sales were reported of Boston Elevated, Boston & Worcester preferred, Massachusetts Electric and West End Street Railway. Only four bond issues were dealt in for a total of $19,500, par value.

The Baltimore market to-day was broad, but the volume of transactions was small, the sales totaling 600 shares. The bond transactions to-day totaled $67,000, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Apr. 29	May 6
American Brake Shoe & Foundry (com.)	83	87
American Brake Shoe & Foundry (pref.)	130	132½
American Cities Company (com.)	35½	32
American Cities Company (pref.)	60⅜	62
American Light & Traction Company (com.)	340	345
American Light & Traction Company (pref.)	105½	106½
American Railways Company	37½	37½
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	37	76
Boston Elevated Railway	78	79
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	36
Brooklyn Rapid Transit Company	90	92¼
Capital Traction Company, Washington	100	100⅜
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	90	92½
Chicago Railways, ptcptg., ctf. 2	30½	31¾
Chicago Railways, ptcptg., ctf. 3	6	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	102½	102
Cleveland Railway	103¾	104
Cleveland, Southwestern & Columbus Ry. (com.)	*4	a4
Cleveland, Southwestern & Columbus Ry. (pref.)	*2	a30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*71	63
Detroit United Railway	a80	a80
General Electric Company	144	146¾
Georgia Railway & Electric Company (com.)	120½	120
Georgia Railway & Electric Company (pref.)	87	86½
Interborough-Metropolitan Company (com.)	14¼	14⅞
Interborough-Metropolitan Company (pref.)	60¼	62½
International Traction Company (com.)	*80	40
International Traction Company (pref.)	*85	85
Kansas City Railway & Light Company (com.)	*15	18
Kansas City Railway & Light Company (pref.)	a35	37
Lake Shore Electric Railway (com.)	*5	6
Lake Shore Electric Railway (1st pref.)	*92	92
Lake Shore Electric Railway (2d pref.)	*22	22
Manhattan Railway	131⅛	130¼
Massachusetts Electric Companies (com.)	9¼	10
Massachusetts Electric Companies (pref.)	57	57
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25¾	25½
North American Company	74	75⅞
Northern Ohio Traction & Light Co. (com.)	70	a70
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	38¾	40
Philadelphia Company, Pittsburgh (pref.)	38¼	38½
Philadelphia Rapid Transit Company	13½	14½
Portland Railway, Light & Power Company	51	50
Public Service Corporation	112	112
Third Avenue Railway, New York	39	41½
Toledo Traction, Light & Power Co. (com.)	a20	a20
Toledo Traction, Light & Power Co. (pref.)	a70	a70
Twin City Rapid Transit Co., Min'apolis (com.)	103	105
Union Traction Company of Indiana (com.)	*11½	11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	14
United Rys. & Electric Company (Baltimore)	26⅜	26½
United Rys. Inv. Company (com.)	15	15½
United Rys. Inv. Company (pref.)	43	42½
Virginia Railway & Power Company (com.)	56	50
Virginia Railway & Power Company (pref.)	87	94
Washington Ry. & Electric Company (com.)	87½	86⅝
Washington Ry. & Electric Company (pref.)	84½	83⅞
West End Street Railway, Boston (com.)	a68	67
West End Street Railway, Boston (pref.)	82	86
Westinghouse Elec. & Mfg. Company	73	74½
Westinghouse Elec. & Mfg. Co. (1st pref.)	118½	120

* Last sale. a Asked.

ANNUAL REPORT

Easton Consolidated Electric Company

The comparative consolidated income statement of the Easton (Pa.) Consolidated Electric Company, and the affiliated companies for the years ended Dec. 31, 1912 and 1913, follows:

	1913	1912
Gross revenue—railway lines	$468,508	$427,536
Operating expenses, including provision for depreciation and payment of damage claims	286,630	277,298
Earnings from operation	$181,878	$150,238
Deduct—		
Interest on bonds, taxes, etc	$54,715	$53,239
Deficit—Easton Amusement Company	725	2,662
Total	$55,440	$55,901
Net earnings from operation of railway lines	$126,437	$94,336
Edison Illuminating Company—		
Rentals, less taxes and expenses	23,013	24,719
Interest received	....	64
Total earnings	$149,450	$119,119
Deduct charges of Easton Consolidated Electric Company—		
Interest on collateral trust bonds	$61,850	$61,850
Expenses and taxes	9,226	7,835
Total	$71,076	$69,685
Surplus earnings	$78,374	$49,434
Less—		
Dividends paid, 4 per cent	30,000	30,000
Taxes paid applying to prior years	....	3,885
Loss on carousel sold	....	2,169
Total	....	$36,054
Surplus	$48,374	$13,380

The gross revenue from the railway lines for 1913 increased $40,972, or 9.58 per cent. The increase in the number of passengers carried was 9 per cent. Passenger receipts increased 9.5 per cent and car mileage 1.5 per cent. The operating expenses for 1913 were 62.06 per cent of the revenue, a decrease of 5.32 per cent. Provision was made for depreciation, but none of the details of the operating expenses are given so as to afford an analysis of the maintenance and depreciation charges.

The net earnings from the operation of railway lines amounted to $126,437, and the net receipts from the Edison Illuminating Company $23,013, total $149,450, or an increase of 25.46 per cent. After the deduction of the fixed charges of the Easton Consolidated Electric Company and its expenses, amounting to $71,076, surplus earnings of $78,374 were left for the year. This represented 10.45 per cent on the paid up capital stock, out of which 4 per cent was paid in dividends. The balance of $48,374 transferred to surplus increased the credit to that account as of Dec. 31, 1913, to $190,338.

There was no material change in the mileage of the railway during the year. The company owns or controls 53.707 miles of railway extending from Easton to Bethlehem, South Bethlehem, Nazareth, Pa., and Phillipsburg, N. J. The car equipment consists of fifty-nine passenger cars fully equipped, as well as ten service cars and thirty-five open car bodies.

The current assets increased over $9,357 and the bonded debt of the Easton & South Bethlehem Transit Company was reduced $4,000 during the year.

Liability for Unsecured Debts After Reorganization

Attorneys representing several railroads in the hands of receivers have joined in asking the United States Supreme Court to give a more explicit decision as to when a reorganized corporation is liable for the unsecured debts of old corporations taken over by the new ones. The Kansas City Southern Railroad was recently held by the Federal District Court of Missouri to be liable for the unsecured debts of the Kansas City Belt Line Company, the stock and property of which were taken over by the Kansas City Southern Railroad. This decision was the result of the judgment of the Supreme Court in the case of the Northern Pacific Railroad vs. Boyd. It is asserted that the decision in the latter case, however, has been differently construed and the Supreme Court has been asked to review the lower court's decision.

Separate Organization for Connecticut Company

The following statement has been issued to the public in regard to the separate organization which has been established by the New York, New Haven & Hartford Railroad for the Connecticut Company, New Haven, Conn.:

"The Connecticut Company, which controls and operates 675 miles of electric railway in the State of Connecticut, operated by 4000 employees, all residents of the State, has just taken offices in the Second National Bank Building at New Haven. When Howard Elliott, the chairman of the board of the New York, New Haven & Hartford Railroad, took charge of the affairs of that company he at once planned to give to a company as important as the Connecticut Company a management complete and independent, so that there would be the closest supervision of every detail, the highest efficiency and the greatest economy, and so that the patrons of the road and the employees would find responsible officers near at hand for the prompt dispatch of business.

"It has taken some time to work out all details, and the moving into the new offices is one of the last steps of the plans formulated in September, 1913.

"In December, 1913, L. S. Storrs was elected president of the Connecticut Company. Since then Mr. Elliott and he have been working on the plans of organization, and the following officers of the Connecticut Company have now been moved from the office building of the New Haven Company to the new location: president, general manager, auditor, chief engineer of power and equipment, construction engineer, traffic agent, purchasing agent, assistant treasurer, assistant secretary.

"The law department, under H. G. Day as counsel, is near at hand in the Exchange Building.

"Mr. Elliott and Mr. Storrs both feel that this arrangement will be of advantage to the Connecticut Company, its patrons and employees, and will help to make the Connecticut Company of the greatest possible use in the development of business in Connecticut.

"On account of the changing relations between the New Haven Company and the Connecticut Company, because of the agreement with the federal department of justice, there must of necessity be stoppage of plans for improvements, but it is hoped that the actual operation of the property can be maintained on a basis that will be steadily bettered."

American Water Works & Electric Company, Pittsburgh, Pa.—In the United States District Court at Pittsburgh on April 28 Judge Charles P. Orr made an order confirming the sale of the property of the American Water Works & Guarantee Company to representatives of the reorganization committee for $1,250,000. The purchasers are allowed four months in which to make final payment. The details of the financing of the successor company, the American Water Works & Electric Company, have been published previously in the ELECTRIC RAILWAY JOURNAL.

Anglo-Argentine Tramways, Buenos Ayres, Argentina.—The gross receipts of the Anglo-Argentine Tramways for the calendar year 1913 amounted to £2,963,192, and the working expenses £1,969,161. After adding interest on investments and the 1912 balance and deducting interest and municipal and other charges, there remained a balance of £232,796. After the payment of dividends equal to 6¾ per cent on the total issued ordinary capital stock of £3,250,000, a balance of £13,421 was carried forward. The number of passengers carried was 340,014,573, an increase of 7.51 per cent during the year. The car mileage increased 6.29 per cent. One hundred and thirty new motor cars completely equipped, twenty motor cars without electrical equipment and 200 new trail cars were ordered. The percentage of working expenses to receipts decreased from 60.52 in 1912 to 60.29 in 1913. During the year the company established a pension fund for its employees, setting aside $4,000 paper per month.

Bristol & Plainville Tramway, Bristol, Conn.—The directors of the Bristol & Plainville Tramway have declared a quarterly dividend of 2 per cent, payable on May 1 to stock of record of April 30. This is the first quarterly dividend declared by the company, former payments having been 4 per cent semi-annually. The directors have recommended an increase in the stock of the company from $375,000 to $562,500, present stockholders to have the right to subscribe for one share of new stock for each two shares now held. The proceeds of the new issue will be used for extensions and betterments.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—L. L. Lewis, Jr., president of the Buffalo & Williamsville Electric Railway, says: "The necessary transactions will be completed soon and the Batavia Traction Company will take over the street railroad in the village of Batavia which heretofore has been operated by the Buffalo & Williamsville Electric Railway. The granting of the certificate of public convenience and necessity by the Public Service Commission of the Second District completes the permission for the purchase of the line by the new company, which was formed for the purpose by business men in Batavia. We will turn over the line, all our equipment, including the power house, dynamo, four or five cars, etc., and the new company will operate the road, which is approximately 2 miles in length running through the main street in Batavia. The line in Batavia has been a losing venture for the eleven years that it has been operated by the Buffalo & Williamsville Electric Railway."

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—The Chardon, Jefferson & Meadville Interurban Railway has applied to the Public Utilities Commission of Ohio for authority to issue $290,000 of stock and $425,000 of its twenty-five-year 5 per cent bonds, to defray the cost of constructing the proposed road between Chardon and Jefferson. The commission recently denied the amended application of the company for permission to issue $250,000 of capital stock and $750,000 of thirty-year first mortgage bonds.

Chicago (Ill.) Railways.—The management of the Chicago Railways is understood to be preparing a statement for participation certificate holders regarding the company's condition, the compromising of suits against the company and possible merger propositions involving the Chicago surface and elevated railways.

Columbus Railway & Light Company, Columbus, Ohio.—The directors of the Columbus Railway & Light Company have declared a dividend of 75 cents a share on its capital stock, payable on May 25, to shareholders of record May 9. This distribution will not apply to shareholders who are in default in the payment of assessment due on Dec. 30, 1913. It will, however, be applied as of May 25 on account of final assessment due on June 30, 1914. Money for this special dividend was secured from the 1¼ per cent initial dividend on the common stock of the Columbus Railway, Power & Light Company, a large amount of which is held by the Columbus Railway & Light Company. There is approximately 1½ per cent on the $3,500,000 of common stock of the Columbus Railway which has not yet been deposited for exchange into common stock of the Columbus Railway, Power & Light Company, under the terms of the recent consolidation of the Columbus properties. Holders of this undeposited stock cannot participate in the 1¼ per cent common stock dividend, which was paid on May 1, until their holdings have been exchanged in accordance with the reorganization plan. The Columbus properties are managed by E. W. Clark & Company, Philadelphia.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—The Public Service Commission for the First District of New York has denied the application of the Dry Dock, East Broadway & Battery Railroad for the approval of a mortgage and the issue of $4,300,000 in bonds, of which $2,800,000 was to be a new issue and $950,000 refunding bonds. This action was taken upon the recommendation of Commissioner Milo R. Maltbie, who held the hearings. The motion to deny was adopted by a majority vote, Commissioners Maltbie, Eustis and Cram voting for it, and Chairman McCall and Commissioner Williams against it. The main objections to the granting of the bond issue were that if allowed the new issue would make the capital of the company more than its property is actually worth, and also that the evidence showed that the company would not be able to earn the interest charges on all the proposed bonds. This opinion was not shared in by the minority of the commission.

Empire United Railways, Inc., Syracuse, N. Y.—The Public Service Commission of the Second District of New York has authorized the Empire United Railways, Inc., to issue $81,000 of its 5 per cent fifty-year first and refunding gold mortgage bonds under a certain indenture given to the Equitable Trust Company, as trustees, to be sold for not less than 85 per cent of their par value and accrued interest, the proceeds to be used for the reimbursement of the treasury for expenditures for capital purposes.

Gary & Interurban Railway, South Bend, Ind.—Joseph D. Oliver, who owns 800 shares of stock of the Gary & Interurban Railway, and Charles E. Russ, also of South Bend, who owns 875 shares, have filed suit in the Valparaiso Circuit Court praying for a dissolution of the Gary & Interurban Railway.

International Railway, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the International Railway to issue $502,000 of its 5 per cent fifty-year refunding and improvement mortgage gold coupon bonds under a certain indenture given to the Bankers' Trust Company, as trustee, to be sold for not less than 88 per cent of their par value and accrued interest, the proceeds to be used for the purchase of real estate in connection with the new terminal which the company proposes to erect in Buffalo.

Liverpool (England) Corporation Tramways.—The annual report of the general manager of the Liverpool Corporation Tramways for the calendar year 1913 gives the total revenue for the year as £715,120; operating cost, including rental of leased lines, £451,667; gross profits, £263,453; net profits, £154,163, an increase of £20,305 over 1912. During the year £54,163 was placed in the renewal and depreciation account, and the total sum set apart in this, as of Dec. 31, 1913, amounted to £765,803. The number of passengers carried during the year was 144,085,927, an increase of 7.3 per cent over 1913; the traffic receipts, £677,881, an increase of 7.4 per cent, and miles run 13,442,605, an increase of 6.8 per cent. The average earnings per car mile amounted to 12.1d., an increase of 0.07d. It is stated that traffic receipts and car mile earnings, together with the passengers carried, are the highest recorded in connection with the Liverpool Tramways.

Railway & Light Securities Company, Boston, Mass.—Stone & Webster, Boston, Mass., are offering for subscription at 98½ and interest, yielding about 5.10 per cent, $500,000 of Railway & Light Securities Company collateral trust sinking fund 5 per cent gold bonds, fifth series, dated May 1, 1914, and due May 1, 1944, interest being payable on May 1 and Nov. 1 at the office of the Old Colony Trust Company, Boston, Mass. The bonds are in coupon form in the denomination of $1,000 with the privilege of registration as to principal and are callable as a whole or in part at 103 and interest on any interest day upon twenty-one days' notice. There is a sinking fund provision for the retirement of the bonds which will result in practically the entire issue being taken up before maturity.

Rochester Railway & Light Company, Rochester, N. Y.—The Public Service Commission of the Second District of New York has authorized the Rochester Railway & Light Company to issue $642,548 par value of its 5 per cent fifty-year consolidated mortgage gold bonds under a certain indenture given to the Security Trust Company, Rochester, as trustee, to be sold for not less than 97 per cent of their par value and accrued interest, the proceeds to be used for the discharge and payment of underlying real estate mortgages.

United Railways Investment Company, New York, N. Y.—At the annual meeting of the United Railways Investment Company on May 1 much time was taken up in the discussion of the plan for readjusting the company's finances, paying back dividends and resuming dividends, as presented by the committee appointed at the annual meeting in May, 1913. A resolution was adopted "creating the agency contemplated by the plan to effectuate the plan as presented to the meeting or to effectuate the plan with such modification as the agency shall make, the agency having been duly authorized by the meeting to make such changes as it may deem fit." The committee thus created will be composed of nine members, to be named by the chairman of the meeting. The proposed readjustment plan, on which action was deferred, was referred to at length in the ELECTRIC RAILWAY JOURNAL of April 11, 1914, page 846.

West Penn Traction Company, Pittsburgh, Pa.—A. B. Leach & Company, New York, and the Continental & Commercial Trust & Savings Bank, Chicago, are offering, at 99 and interest, $6,000,000 of three-year notes of the West Penn Traction Company. The notes will fall due on March 1, 1917, and are callable at 101 during the first year, 100½ during the second, and 100 in the final year of their life. This is the first of three issues. The other two issues are to be junior notes, one issue dated April 1, 1914, and due April 1, 1917, and the other dated after March, 1914, and due in 1919, both expressly subordinate as to principal and interest to the first issue of notes above mentioned and maturing after these notes.

Dividends Declared

Detroit (Mich.) United Railway, quarterly, 1½ per cent.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1¼ per cent, preferred.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$148,019	*$98,493	$49,526	$36,371	$13,155
1 " " '13	141,502	*92,032	49,470	32,342	17,128
9 " " '14	1,520,206	*966,998	553,209	309,698	243,511
9 " " '13	1,455,950	*860,244	595,706	289,327	306,379

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Feb., '14	$5,786	*$7,176	$1,391	$1,065	†$2,456
1 " " '13	6,849	*6,755	94	1,087	†993
12 " " '14	122,800	*99,220	23,580	12,997	10,583
12 " " '13	120,684	*91,968	28,717	12,629	16,088

CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.

1m., Feb., '14	$25,285	*$15,698	$9,587	$6,401	$3,186
1 " " '13	26,142	*17,006	9,136	6,071	3,065
12 " " '14	378,058	*209,448	168,610	73,857	94,753
12 " " '13	366,133	*196,795	169,338	68,728	100,610

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Feb., '14	$53,510	*$22,286	$31,224	$24,838	$6,386
1 " " '13	52,812	*24,126	21,564	19,861	8,823
12 " " '14	643,571	*289,919	332,416	283,019	71,047
12 " " '13	625,947	*275,417	275,060	228,623	120,907

DALLAS (TEX.) ELECTRIC COMPANY

1m., Feb., '14	$183,066	*$113,819	$69,248	$26,654	$42,594
1 " " '13	163,243	*93,829	69,414	24,635	44,779
12 " " '14	2,243,580	*1,322,352	921,227	307,132	614,095
12 " " '13	1,890,698	*1,124,160	766,538	295,895	470,643

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEXAS

1m., Feb., '14	$50,039	*$33,415	$16,623	$8,242	$8,381
12 " " '14	525,885	*310,253	215,632	79,837	135,795

EL PASO (TEX.) ELECTRIC COMPANY

1m., Feb., '14	$89,664	*$47,729	$41,936	$4,344	$37,592
1 " " '13	75,298	*36,070	39,228	4,240	34,988
12 " " '14	913,037	*497,722	415,315	59,667	374,118
12 " " '13	818,121	*440,254	377,867	61,589	316,278

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEXAS

1m., Feb., '14	$175,051	*$106,501	$68,550	$38,963	$29,587
1 " " '13	158,773	*99,155	59,619	33,660	25,959
12 " " '14	2,417,005	*1,374,142	1,042,262	429,340	612,922
12 " " '13	2,073,593	*1,207,868	865,725	404,255	461,470

HOUGHTON COUNTY (MICH.) TRACTION COMPANY

1m., Feb., '14	$20,946	*$15,277	$5,669	$5,595	$74
1 " " '13	22,112	*16,520	5,592	5,690	†98
12 " " '14	293,446	*178,439	115,006	67,355	47,651
12 " " '13	309,901	*174,303	135,599	68,220	67,379

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEXAS

1m., Feb., '14	$155,976	*$94,868	$61,107	$25,338	$35,769
1 " " '13	142,784	*84,318	58,466	24,646	33,820
12 " " '14	2,161,438	*1,202,767	958,671	287,002	671,669
12 " " '13	1,862,411	*981,299	881,112	273,865	607,247

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*Includes taxes.

†Deficit.

Traffic and Transportation

The Puget Sound Electric Railway Rate Case

In connection with its application to the Railroad Commission of Washington for an increase in passenger rates between Seattle and Tacoma, Wash., referred to in the ELECTRIC RAILWAY JOURNAL of April 25, 1914, page 949, the Puget Sound Electric Railway has issued a statement, signed by L. H. Bean, general manager, in part as follows:

"From the time the Puget Sound Electric Railway was constructed and up to and including the year 1908, the fares were fixed at considerably less than 2 cents per mile, and with particularly lower fares from Seattle and Tacoma to suburban points.

"Although it was realized that the rates were entirely too low for the service furnished, it was hoped that conditions would enable the company to maintain these rates. (At that time the boat fare from Tacoma to Seattle was 75 cents one way and $1.25 for the round trip.) After experimenting for a period of about seven years, it was necessary for the company, on account of serious financial losses, to endeavor to secure sufficient revenue from the money invested in the line to cover operating expenses, taxes, depreciation and interest, and the only way open to obtain this result was by an increase of the rates to approximately 2 cents per mile. In view of the fact that suburban localities had enjoyed the lower rates, a commutation rate of 1.4 cents per mile was installed for the benefit of regular riders.

"As steam roads throughout the State are allowed, and justly so, to charge 3 cents per mile, as the service rendered by the Puget Sound Electric Railway is practically the same as steam road service, as the other interurban lines of the same character in the State usually charge 3 cents per mile, and as throughout the entire country the base rate is rarely less than 2 cents per mile, it was not felt that the rate asked by the Puget Sound Electric Railway was at all excessive.

"These rates were installed on Oct. 17, 1909. Complaint to the State Railroad Commission was made by residents along the line and others, and after a long and exhaustive hearing the Railroad Commission and its engineer placed a financial valuation on the property of the Puget Sound Electric Railway, or, in other words, found that the actual cash value of the property was $4,070,237.

"The purpose of the commission in fixing this valuation was for the establishment of rates, and the commission determined that the company should receive a return on its investment of 7 per cent per annum, after paying operating expenses and depreciation. On April 17, 1910, the commission ordered that Tariff No. 4 be installed, and estimated that the rates charged under this tariff would yield a net return to the Puget Sound Electric Railway of $289,179.32, or approximately 7 per cent on the valuation.

"After testing the legality of the order through the courts, Tariff No. 4 of the Railroad Commission was put in force on Oct. 14, 1911, in order that the rates of the commission might be tested to ascertain if the estimate of the results to be accomplished was correct. After this tariff had been in force for a period of approximately two years, it was found that instead of the rates yielding a net return of $289,179 for the year 1912, they yielded a net return of $89,655, after operating expenses and taxes had been paid, (but no provision had been made for accrued depreciation) or an amount of $199,524 less than the commission estimated, which amount was only a return of 2.2 per cent on the investment, instead of 7 per cent as estimated by the commission, the net return for 1913 being $67,718 instead of $289,179 as estimated by the commission—or a return of 1.66 per cent instead of 7 per cent as estimated by the commission on actual money invested by the company.

"In view of the above facts, it will be understood that it was absolutely necessary for the company to seek relief in order that the property might be maintained and some fair return made to the owners on their investment. Consequently, an application was made to the Public Service Commission of Washington, asking that the order of the Railroad Commission be set aside and the company be allowed to operate under a new tariff. The hearing of this application was before the Public Service Commission, beginning April 15, and a decision in the matter is expected at an early date.

"It might be well to call attention to some of the facts relative to Tariff No. 4, which was ordered by the Railroad Commission of Washington. There are several stations suburban to Seattle, ranging from 6 to approximately 12 miles, at which the rate was fixed by the commission at 15 cents for one-way and 15 cents for the round-trip. There being no difference between one-way and round-trip fares, great injustice resulted to the company. Other single and round-trip rates were made at rates ranging from slightly in excess of three-fourths of a cent per mile to approximately 5 cents per mile, which on its face is a discrimination in favor of places and people."

Magazine for New York Railways Employees

The New York (N. Y.) Railways has begun the publication of a monthly magazine in the interest of its employees. The new publication is the *New York Railways Employees' Magazine*, and in appearance and make-up it is similar to the *Interborough Bulletin*, published by the Interborough Rapid Transit Company, which, with the New York Railways, is controlled by the Interborough-Metropolitan Company. The contributors to the first issue of the new magazine include T. P. Shonts, president of the New York Railways; Frank Hedley, vice-president and general manager of the company; H. H. Vreeland, director of welfare of the company; H. G. Stott, superintendent of motive power, and B. S. Josselyn, former president of the Portland Railway, Light & Power Company. The salutatory from the editor, Henry Proctor Waugh, follows in part:

"With this issue the *New York Railways Employees' Magazine* makes its initial bow to the 8000 or more employees of the transportation lines of the New York Railways Company and to the public.

"The magazine is solely a publication of and for the employees of the New York Railways Company. Its mission is to bring employees of all departments closer together; to cement their friendship; to co-operate with and work for a common cause, and to afford a channel of easy communication in publishing both technical and personal articles and items that will be of interest to all. In other words, we should not hide our light under a bushel. Through the columns of the magazine it is proposed to let the right hand know what the left hand is doing. In nearly all cities of the United States and Canada, and for that matter throughout the world, public utility and other large corporations are now publishing monthly periodicals for free distribution among their employees. President Shonts and the board of directors are, therefore, creating no precedent in authorizing the publication of the *New York Railways Employees' Magazine*.

"The publishers invite the heads of all departments, and all employees of each department, to submit articles of technical interest, or information that is of educational value, or items of personal interest for publication from month to month in the magazine.

"As a matter of fact, we cannot have too much personal mention. We want to publish names and personal matter from all departments. This does not refer to the general offices alone. We want personals and news items from the power houses, the substations, the carhouses, the employees' stores and from here, there and everywhere over the entire system.

"And again, if you have any suggestions to make that you think would, if adopted, be of value to yourself, your fellow employee or to the company, do not hesitate to send them along. They will be welcomed, even if only one out of one hundred should be used.

"While this is the first issue of the magazine, the editor believes it is fully as good and as attractive as the first issue of any other similar publication. We do not claim perfection, and suggestions looking to improving the paper or criticism of the current issue are invited and will be received in good grace. Remember that two, or for that matter, many heads are better than one.

"With these few words, we salute you and, with the hearty co-operation of all employees, bespeak for the *New York Railways Employees' Magazine* a long and successful career."

Progress of Detroit Safety Campaign

Of all the suggestions received by the district boards and general safety board of the Detroit (Mich.) United Railway from interurban and city lines since the beginning of the "safety first" movement only 2 per cent have been rejected. In the instances where the general board has turned down suggestions they involve radical changes in equipment with large expenditures or have been adjudged impractical and not in accord with general practice and experience. In the cases where large expenditures are involved the general board has deemed it advisable to take no action pending a consideration by the management.

Seventy-six per cent of the suggestions have secured final action. Of the remaining 22 per cent the work involved in a large number of suggestions is partially completed, while many, such as cutting trees, moving milk stands, tracks, etc., have been held up pending the acquirement of the necessary property to permit of the work being done.

One of the suggestions on which there is a wide difference of opinion among interurban motormen is whether there shall be large or small vestibules and what arrangement shall be made of the door to the vestibule. At the last general board meeting there was a lengthy discussion of the subject and it was found that interurban motormen did not agree at all as to the proper vestibule. At the next general board meeting three cars which will be equipped to meet the various ideas will be ready for inspection and a decision probably will be made at that time.

A number of suggestions have been received as to the placing of highway crossing bells and these will be taken care of as rapidly as delivery is made by the manufacturer. In respect to the suggestions for changes in semaphore boards, block light systems, telephone booths, and minor changes in equipment on both city and interurban cars, the majority of these are practically all under way.

The report of accidents on the Detroit United Lines for March, 1914, shows a very gratifying decrease over the same month a year ago, attributed by the management to the practising of the principles of "safety first." In March, a year ago, there were 370 cars in collisions of all degrees, while for that month this year there were but 235. The reports of all kinds of accidents totaled 1391 a year ago, compared with 1219 for March, 1914.

The Detroit United Railway has begun the publication of *Safety*, a magazine for the employees of the company, to be issued monthly. The first number is dated May. In concluding its announcement in regard to the purposes of the new publication the company said:

"To help each of us remember the things we ought to do and leave undone the things we ought not to do, *Safety* will be published for and distributed without cost to the employees of the Detroit United Lines."

Jesse W. Lilienthal on Co-operation

The following communication addressed by Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., to the employees of the company, appears in the *United Railroads Magazine* for April, 1914:

"If we can just make up our minds that we are all members of one family working for a common cause; that we cannot injure that cause without injuring ourselves; that what is to the interest of one is to the interest of all; that every man in the organization, no matter how humble his position, is a link in the chain and that no chain is stronger than its weakest link; that your officials are concerned not simply to maintain an efficient service and to collect the largest possible revenue and to pay our debts at the earliest possible moment, but to have the employees happy and prosperous and well; that saving life and limb is more important than maintaining schedules; that next only in importance to the duty of avoiding accidents is the duty to be courteous to the public even under the strongest provocation; that the door of your president is always open to you to counsel with him even as to matters not connected with the company—then we shall, indeed, be an ideal organization and a happy family, with our hearts in our work and a feeling of friendship for each other that will make our tasks easy and our future assured."

Ordinance Against Smoking in San Antonio.—The Council of San Antonio, Tex., has passed over the veto of Mayor Brown the ordinance to prohibit smoking on the cars of the San Antonio Traction Company and the San Antonio & San José Interurban Railway.

Extension of Time Under Brooklyn Transfer Order.—On the application of the several Brooklyn Rapid Transit companies affected by the recent transfer order, the Public Service Commission for the First District of New York has granted an extension of one month, from May 1 to June 1, 1914, in which the companies are to obey the commission's order for the establishment of the so-called universal transfer system among the surface lines of Brooklyn.

Public Relations in Springfield.—The Springfield (Ill.) Consolidated Railway, of which A. D. Mackie is third vice-president and general manager, was the subject of a long illustrated description published in the Springfield *Record* of April 27. The article dealt particularly with the growth of the company and the improvements which have been carried out by it recently. The illustrations included reproductions of two group photographs of the employees, carhouse, rolling stock and interiors and exteriors of the power house.

Serious Head-on Collision in Detroit.—Early in the morning of May 5 a Detroit, Mich., northbound Sherman-Victor car filled with passengers jumped the track and collided head-on with a Fourteenth Street car coming in the opposite direction on a parallel second track. The accident occurred on a section of track which, under a contract with the city, is operated as a 3-cent line and the city is required to maintain the roadbed. As a result of this accident both cars were badly wrecked, the motorman of one car and a passenger were killed, a third passenger fatally injured and forty-one others slightly injured.

New York Smoking Order Modified.—The Public Service Commission for the First District of New York has modified the anti-smoke order passed last year, so that smoking will be allowed upon the four rear seats of the convertible cars of the Third Avenue Railway. The original order forbade smoking except upon the open cars of the running-board type, and then only upon the four rear seats of such cars. This order prevented smoking on the convertible cars, and as these cars are practically open cars in the summer season the commission, on the request of the Third Avenue Railway, decided to exempt such cars from the operation of the order.

Increase in Wages in Akron.—Notices were posted by the Northern Ohio Traction & Light Company, Akron, Ohio, on April 18 that on and after May 1 the wages of all trainmen would be advanced 2 cents an hour. This gives on city lines a minimum wage of 25 cents an hour, advancing 1 cent an hour for each year of service to a maximum of 29 cents for employees who have been five years or more with the company. The suburban trainmen will receive 25½ cents an hour minimum and 30 cents maximum, and interurban men 26 cents minimum and 31 cents maximum, advancing for each year of service as indicated. An advance of 2 cents an hour was also made a year ago. Previous to that time there had been each year for twelve years an annual advance for the men with the exception only of 1908.

Interchange of Traffic in Iowa.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., recently made a contract with the Chicago, Rock Island & Pacific Railway which permits it to run its freight trains over the steam road from Center Point, Ia., to Cedar Rapids. This arrangement also permits the electric line to make use of the steam road's terminal facilities at Cedar Rapids until such time as its own line is completed. Progress on the construction of the Waterloo, Cedar Falls & Northern line between LaPorte City and Cedar Rapids has now progressed to a point where the company expects to operate over its own rails into the Cedar Rapids terminal by Oct. 1. Extensions of the company's lines now under construction will when completed add 60 miles of main line to the existing property.

Trenton Company Seeks to Abolish Sale of Tickets.—The Trenton & Mercer County Traction Corporation, Trenton, N. J., has renewed its effort to abolish the system of selling six tickets for 25 cents. It would substitute straight 5-cent fares, with transfer privileges. At a general community meeting on April 30, at which fourteen civic organizations, including the Chamber of Commerce, were represented, Rankin Johnson, president of the company, outlined his plans. In return for the establishment of the straight 5-cent fare, effective on May 31, he agreed that the company would purchase ten new double-truck cars yearly until seventy had been added to the system; to establish a waiting-room in the center of the city; to develop a package express, subject to the approval of the Board of Public Utility Commissioners, and to inaugurate a pension system, including death benefits to families of employees.

Rapid Transit Between the Twin Cities.—The question of bettering service between Minneapolis and St. Paul, Minn., by providing for rapid transportation between the cities was recently discussed by the members of the Engineers' Club of Minneapolis. Edward P. Burch, consulting engineer, advanced four proposals. He presented plats of the two cities and plans showing how the situation might be bettered, first, with the system as at present, by the elimination of stops, making possible a greater speed. The second suggestion was for an elevated track part of the distance between the two cities. The third possible method suggested was the electrification of one of the steam railroads, and the fourth was the building of a subway either the whole or part of the distance between the two cities. The attitude of the Twin City Rapid Transit Company, which operates between the cities, toward the proposal to construct an elevated railroad to connect the cities was referred to in the ELECTRIC RAILWAY JOURNAL of April 18, 1914, page 899.

Fare Case Carried to the Courts.—The Cincinnati & Hamilton Traction Company and the Ohio Traction Company have entered proceedings in the United States Court at Cincinnati for an injunction against the city and its officials, prohibiting them from enforcing the new 5-cent fare ordinance applying to Mill Creek Valley districts. The companies assert generally that the ordinance is in disregard of their contract rights and an open violation of the United States Constitution, as it impairs contracts and takes property without due process of law. The Federal Court is asked to issue an injunction to stop the city and the officials from attempting to enforce the new ordinance, or in any way interfering with the company in the operation of its lines in the manner in which it has been conducting them. The court also is asked to declare the city ordinance null and void, in so far as it attempts to disregard the conditions under which the company holds its franchises to its present several routes. W. Kesley Schoepf, president of the Cincinnati Traction Company, recently suggested that the villages in the Mill Creek Valley combine in selecting a commission with power to represent them in negotiating with the company for revised rates of fare in the valley.

Compromise on St. Louis Transfers.—At a conference on April 29 participated in by Richard McCulloch, president of the United Railways, St. Louis, Mo., Attorney Francis of the company, and City Counselor William E. Baird and T. P. Young, his associate, Mr. McCulloch announced that he had worked out a plan for issuing transfers which he thought would meet the requirements of the recent decision of Judge Grimm, referred to at length in the ELECTRIC RAILWAY JOURNAL of April 18, 1914, page 892, and at the same time protect the company against fraudulent use of the slips. According to McCulloch's plan universal transfers will be issued only to passengers who ask for them upon payment of fare. The passenger is to be required to tell his destination. The conductor will then issue a double transfer or a triple transfer, if need be, which the passenger can use in going over several lines. The conductor will route the passenger over the most direct route to his destination. A statement setting forth the conditions to govern the issuance of transfers as reached by the representatives of the company and the city will be submitted to Judge Grimm for an expression of opinion as to whether the system which it is proposed to adopt will meet the requirements of the decision handed down by him. The amended decree of the court in the case against the company was placed on record on May 1, and the system of transfers will be put in force on July 1.

Personal Mention

Mr. H. F. Swift has been elected treasurer of the West Penn Traction Company, Pittsburgh, Pa., to succeed Mr. J. B. Van Wagener, resigned.

Mr. William L. Day, who resigned recently as judge of the United States District Court of Cleveland, Ohio, has been admitted to membership in the firm of Squire, Sanders & Dempsey, counsel for the Cleveland Railway.

Mr. F. R. Newman has resigned as manager of the property of the Greenville Railway & Light Company, Greenville, Tex., to accept the position of vice-president of a real estate and development organization operating in Texas.

Mr. M. S. Sloan, who has been manager of the railway and electric departments of the New Orleans Railway & Light Company, New Orleans, La., has been appointed general manager of the company. A portrait and a biography of Mr. Sloan were published in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914.

Mr. Edward W. Bemis, Chicago, who is to supervise the valuation of the property of the public service corporations operating in the District of Columbia for the Public Utilities Commission of the District, has established headquarters in Rooms 5 and 17 of the District Building. The principal assistants of Mr. Bemis in the work will be Mr. Andrew Sangster and Mr. Robert McArthur.

Mr. George O. Nagle, vice-president and general manager of the Wheeling (W. Va.) Traction Company, has been appointed a member of the Panama-Pacific Exposition Commission of West Virginia by Governor Hatfield of that State. The commission consists of five members. It will have charge of the erection of buildings, arrangements for exhibits and other West Virginia State matters at the exposition to be held at San Francisco in 1915.

Mr. Patrick Calhoun, who was succeeded in September, 1913, as president of the United Railroads, San Francisco, Cal., by Mr. Jesse W. Lilienthal, has resigned as a director of the United Railways Investment Company which owns or controls most of the stock of the California Railway & Power Company, which in turn controls the United Railroads, the Sierra & San Francisco Power Company, the Coast Valleys Gas & Electric Company and the San Francisco Electric Railways.

Mr. P. S. Young, who has been comptroller of the Public Service Corporation of New Jersey, Newark, N. J., has been elected treasurer of the company to succeed Mr. James P. Dusenberry, who, as noted elsewhere in this column, has retired, having reached the age limit fixed by the company. The offices of comptroller and treasurer have been consolidated and Mr. W. S. Barker, formerly assistant comptroller, has been appointed an additional assistant treasurer to serve with the present assistant treasurers, Mr. R. D. Miller and Mr. T. W. Van Middlesworth.

Mr. R. T. Montgomery, superintendent of the railway lines of the Monterey Railway, Light & Power Company, Monterey, Nuevo Leon, Mexico, who was imprisoned and threatened with death by the insurrectionists in Mexico, was released on April 24 and started for New Orleans, where he expects to enter the employ of the New Orleans Railway & Light Company. Mr. Montgomery was formerly superintendent of the Rankin division of the Pittsburgh Railway. Six years ago he went to Mexico City to become connected with the Mexico City Tramways. Three years later he became connected with the Monterey Railway, Light & Power Company.

Mr. C. E. Lenhart has been appointed master mechanic of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., to succeed Mr. William Lish, who has been assigned to other duties. Mr. Lenhart was formerly with the International Motor Company, New York, at its main plant in Allentown, Pa. Before that he was mechanical engineer in charge of shops and rolling equipment of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio. He began electric railway work in November, 1888, after nine years' service in engineering and mechanical departments of steam railroads. Among the electric railways with which he has been connected in addition to the one previously mentioned are the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Lehigh Valley Transit Company, Allentown, Pa.

Mr. Ralph W. Eaton has been appointed superintendent of power plants and equipment of the Shore Line Electric Railway, Norwich, Conn. He will have charge of the generating plants at Saybrook, New London, Thamesville and Danielson, and the substations at Guilford, Waterford, South Windham, Plainfield and Putnam, and also the generating plants of the Norwich & Westerly Traction Company at Hallville and Mystic, and substations at White Rock and Mistuxet Brook. Mr. Eaton was graduated from the Massachusetts Institute of Technology as an electrical engineer and later was employed by the Westinghouse Electric & Manufacturing Company at its Pittsburgh works. He was appointed electrical engineer of the Connecticut Company in January, 1913, and has had supervision of the operation of the steam end of the power plants of that company since May, 1913.

Mr. James P. Dusenberry was tendered a testimonial banquet by the executive and operating officers of Public Service Corporation of New Jersey and affiliated companies in Newark, N. J., on the evening of May 5. The occasion marked the retirement of Mr. Dusenberry from the office of treasurer of the corporation, which position he had held ever since Public Service Corporation was organized in 1903. For thirty-three years prior to that time Mr. Dusenberry was identified with the gas industry in Newark. Having reached the age of seventy years, his retirement was in accordance with the company's pension system. About forty of the officials acted as hosts, and President Thomas N. McCarter served as toastmaster. He paid a glowing tribute to the character and ability of Mr. Dusenberry. Addresses were made by Mr. Randal Morgan, Philadelphia, third vice-president of Public Service Corporation of New Jersey; Mr. Uzal H. McCarter, president of the Fidelity Trust Company, Newark, and a member of the Public Service Board; Mr. E. A. Armstrong, Mr. J. L. O'Toole and Mr. Frank Bergen. On behalf of the hosts who were present at the banquet Mr. Bergen presented the retiring treasurer with a silver centerpiece.

Mr. W. G. Murrin has recently been appointed general superintendent of the British Columbia Electric Railway, Ltd., with headquarters at Vancouver, B. C., as noted briefly in the Electric Railway Journal of May 2. His work will cover the duties of mechanical superintendent, with control of equipment over the company's entire system, as well as the supervision of the Vancouver and suburban division of the company's railway system, the most important division of its several lines. Mr. Murrin went to British Columbia from the old country in 1913 to take the position of mechanical superintendent of the British Columbia Electric Railway. His early technical training was obtained in the Finsbury Technical College, after which he served as apprentice in the shops of the City of London Lighting Company. He next served as shift engineer on the Middlesboro & Stockton Tramway, after which he started on his thirteen years' experience as an electric railway executive, first serving as superintendent of power on the London United Tramways and later being appointed to a post with the same company as manager of rolling stock and electrical equipment and works manager. His service of more than a year with the British Columbia Electric Railway as mechanical superintendent has won for him the high regard of his associate officials. It is believed that in his new and wider field of activity Mr. Murrin will be able to do better work for the general interest of the company than in the narrower but very important field which he filled previously as mechanical superintendent of the company.

W. G. Murrin

Mr. Williston Fish, formerly general manager of the Chicago (Ill.) Railways, has been elected vice-president and comptroller of the West Penn Traction & Water Power Company, Pittsburgh, Pa., and its various subsidiaries. Mr. Fish became connected with the surface railways in Chicago in 1890 and was very active in the affairs of the Chicago (Ill.) Railways during the rehabilitation of that property, under Mr. Henry A. Blair, who was chairman of the board and president of the company. That company, now included in the Chicago Surface Lines, under the plan for unified operation of the Chicago Railways and the Chicago City Railway, operated 480 miles of track. The principal operating subsidiary of the West Penn Traction & Water Power Company is the West Penn Traction Company, which operates more than 140 miles of city and suburban railway in the vicinity of Pittsburgh.

OBITUARY

John R. Neat, cashier of the Louisville (Ky.) Railway, died recently at his home in New Albany, Ind., just across the Ohio River from Louisville, Ky. Mr. Neat was fifty-four years of age and all his business life had been spent in the employ of the Louisville Railway, the service of which company he entered as a boy. He and Mrs. Neat spent the winter in Florida. Mr. Neat was born on a farm a few miles north of New Albany, was a Knight Templar, and a member of the Trinity Methodist Church. He is survived by his widow and two daughters.

D. P. Sheehan, general roadmaster of the Chicago (Ill.) Elevated Railways, died on April 28, as a result of a fatal injury received while superintending reconstruction work on the Chicago elevated loop. Mr. Sheehan was born in New York State in 1869. In 1891 he accepted a position as construction foreman with the contractor for the South Side Elevated Railroad in Chicago. At the completion of this work in 1894 he took a similar position with another contractor on the construction of the Metropolitan West Side Elevated Railway structure. Later he accepted a position with the North American Railway Construction Company as general superintendent, during which time he built the Northwestern Elevated Railway main line structure and added a third track to the South Side Elevated Railroad structure. He also assisted in the reconstruction of the surface lines in Detroit, Mich., and Kansas City, Mo., and the rehabilitation of that part of the surface railways of Chicago outside the city limits. In 1910 he was appointed roadmaster of the Metropolitan West Side Elevated Railway, and when this line was consolidated with the four other elevated railway companies he was made general roadmaster of all the lines.

New Kentucky-Tennessee Developments

Probably the most important and definitely formulated of the new electric railway projects in the Kentucky-Tennessee territory at this time is that which contemplates the extension of the Clarksville (Tenn.) Street Railway from the edge of the city, across Red River, and thence across country to Dunbar's Cave. The Clarksville Chamber of Commerce, with which the officers of the railway company are co-operating, is at work on a program which includes the raising of some $12,000 by the people of Clarksville as a loan to the Clarksville & Dunbar Cave Railway, taking therefor five-year notes secured by the cave property.

The project, while talked about for years, has been halted by the prohibitive cost of a bridge over Red River, and by the construction cost on account of the broken topography of the country over which the line must run. It is proposed that the company provide for the transfer of passengers at the river over the wagon bridge until such time as the company and the city, or Montgomery County, may be able to join in the building of a combination bridge. The Chamber of Commerce has appointed committees to get subscriptions, contingent upon needed franchises, rights-of-way, etc.

A line of 3½ miles is projected to connect Hodgenville, Ky., on the Illinois Central Railroad, with the Lincoln Memorial Park. The Louisville Board of Trade acted at a recent meeting expressing positive conviction that something should be done to make the park available to tourists who might stop at Hodgenville.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Parker-Colorado River Valley Electric Railway, Parker, Ariz.—Application for a charter has been made by this company in Arizona to build an electric railway and other public utilities in Parker and through the Colorado River Indian reservation and along the Colorado River, a distance of 35 miles. Capital stock, $250,000. Incorporators: Thomas Taylor and David Connor, Jerome; J. E. Beck and W. H. Tharpe, Parker; I. W. Wallace, Bisbee, and William Drury, Lowell. [E. R. J., April 11, '14.]

***Lafayette & Northwestern Railroad, Lafayette, Ind.**—Incorporated in Indiana to build an electric railway between Lafayette, Wolcott, Remington, Goodland, Rensselaer, Morocco and the Illinois state line. Capital stock, $100,000. Directors: G. J. Thomson, O. A. Cummins, A. P. Rainier, E. B. Simmons and O. L. Brown.

***Rolla, Ozark & Southern Railway, Rolla, Mo.**—Chartered in Missouri to build an electric or steam railway from Rolla to Anutt, a distance of 18 miles. Capital stock, $200,000. Directors: F. W. Webb, J. Ellis Walker and E. W. Walker, Rolla; E. C. Comstock, Lecoma, and J. A. Frank, Anutt.

***International Suburban Railway, Windsor, Ont.**—Application for a charter has been made by this company at the present session of Parliament to build a railway to be operated by electricity, steam or gasoline between Ojibway, Sandwich, Windsor, Walkerville, Ford City, Belle River and Amherstburg and allowing connection either by tunnel or ferry with Detroit, Mich.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has received an extension of time of twelve months on its franchise from the Council in Montgomery.

Globe, Ariz.—The Globe & Miami Traction Company has received, a twenty-five-year franchise from the Council in Globe. This is part of a plan to build a line between Globe and Miami. Richard West, Miami, president. [E. R. J., April 25, '14.]

Paxton, Ill.—The Kankakee & Urbana Traction Company has received a franchise from the Council in Paxton.

***Middleboro, Ky.**—Fred Moomau of the Tri-State Realty Company, has purchased the electric railway franchise in Middleboro. Mr. Moomau claims to represent Cincinnati capitalists, who will arrange at once to begin the construction of lines to connect Middleboro with the mines to the south and with Jellico, Tenn.

Shreveport, La.—The Shreveport Traction Company has received a franchise to double-track its Fair Grounds line on Texas Avenue, from Jordan Street to the Kansas City Southern crossing in Shreveport.

Lowell, Mass.—The Bay State Street Railway has asked the Council for a franchise to relocate and extend some of its lines in Lowell.

Batavia, N. Y.—The Public Service Commission, Second District, has granted a certificate of convenience and necessity to the Batavia Traction Company, Inc., for the construction of an electric railroad, and permission to said company for the purchase from the Buffalo & Williamsville Electric Railway Company of its franchise, rights and property in Batavia. [E. R. J., April 4, '14.]

Bartlesville, Okla.—The Bartlesville Interurban Railway has received a franchise from the Council to extend its lines through the southern section of Bartlesville.

***Dallas, Tex.**—Daniel Sonnentheil, Dallas, has asked the Council for a franchise to build an electric railway through the Lakewood Heights property.

Blaine, Wash.—The Blaine-Lynden Electric Railway has asked the Council for a franchise in Blaine, and a franchise is also asked from the city limits of Blaine over the Cloverdale right-of-way of Great Northern Railroad, to Lynden. J. J. Pinckney, Blaine, president. [E. R. J., March 21, '14.]

TRACK AND ROADWAY

Glendale & Montrose Railway, Glendale, Cal.—During the next few weeks this company will award contracts to build 2.7 miles of new track and seven new sidings.

Pacific Electric Railway, Los Angeles, Cal.—The initial link in what will probably be a new electric line between San Pedro and Redondo Beach is announced by the Harbor View Land Company. A contract with the Pacific Electric Railway was signed in Los Angeles recently calling for the immediate extension of the Fifth Street car line to Santa Cruz Street along Bandini Street from La Alameda. The plans of the Harbor View Land Company call for an extension of the line to Lomita which ultimately will be extended to Redondo. The land company has offered a right-of-way for the line free along the Western Avenue boulevard through its holdings.

San Pedro Street Railway, Los Angeles, Cal.—This line, which is leased by the Pacific Electric Railway and operated as a part of the Pacific Electric System, has completed 1.37 miles of its line from Aliso Street to Ninth Street in Los Angeles. R. W. Stewart, Los Angeles, engineer. [E. R. J., Jan. 4, '13.]

Redwood City, Cal.—Articles of incorporation are being drawn by the attorney by the San Mateo County Development Association for the holding company which is to obtain the requisite right-of-way for the independent electric railroad, which will extend 30 miles down the peninsula from San Francisco to Palo Alto. The directors of the company will be Terrence Masterson, San Mateo; D. G. Doubleday, Millbrae; H. C. Tuchsen, Redwood City; F. A. Cunningham, South San Francisco; E. M. Moores, Burlingame, and M. B. Johnson, Montara, the association's president. [E. R. J., April 11, '14.]

United Railroads, San Francisco, Cal.—This company has placed in operation its extension of the Polk Street and Larkin Street line near the exposition grounds in San Francisco. It is the intention of the company eventually to continue the extension to North Point Street or to a pier which may be built there.

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company has been authorized by an order of Judge Seawell to continue its construction work in Solano County, southeast of Dixon, regardless of the injunction proceedings instituted recently. The injunction has not been dismissed, but it will be discussed before Judge Seawell the first week in June. At that time it is expected that it will be dismissed by mutual consent. The continuation of the work on the roadbed was ordered with the consent of all concerned in the matter. George W. Pierce, president. [E. R. J., April 11, '14.]

Connecticut Company, New Haven, Conn.—Work has been begun by this company double-tracking its line through the business section of Ansonia.

***Stafford Springs, Conn.**—George L. Baldwin has formulated a plan and taken steps for the incorporation of a company to construct a passenger and freight carrying electric railroad from Putnam to Stafford Springs, the proposed route being to South Woodstock, thence past Roseland Park to East Woodstock, North Woodstock, West Woodstock to Eastford, passing near Woodstock Valley, thence past Crystal Lake to North Ashford, through Boston Hollow to Westford, Stafford, Staffordville, Stafford Hollow to Stafford Springs, a total of about 31 miles. Also a branch from Putnam easterly through East Putnam to Chepatchet, R. I., there to connect with the electric line to Providence, a distance of 12 miles.

Valdosta (Ga.) Street Railway.—During the next few weeks this company will award contracts to build 1¼ miles of new track in the western section of Valdosta.

Union Railway & Power Company, Chicago, Ill.—As soon as right-of-way is secured this company will begin the construction of its electric railway to connect Hammond, Ind., and West Hammond, South Chicago, and Harvey, Ill. Capital stock, authorized, $10,000. Capital stock, issued, $10,000. Officers: F. Arthur Jost, president; John J. Mcguire, vice-president; Thomas Simson, Jr., secretary and treasurer, and J. W. Paul, general manager, all of 161 Quincy Street, Chicago. [E. R. J., Nov. 29, '13.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has been asked to consider plans to extend its line along East Main Street instead of having its terminus at the Public Square in Belleville.

Chicago, Peoria & Quincy Traction Company, Quincy, Ill.—Surveys have been completed by this company on its 120-mile line between Peoria and Quincy. The line has been located between Quincy and Timewell, 9 miles, and it is planned to begin construction about June 1. A 9-mile branch will also be built from Banner to Canton. John L. Soebbing, 302 North Sixth Avenue, Quincy, president. [E. R. J., Nov. 29, '13.]

Emporia Railway & Light Company, Emporia, Kan.—This company contemplates an extension of its lines west from Commercial Street on South Avenue in Emporia for about 1 mile.

Union Traction Company, Independence, Kan.—Work has been begun by this company on its line between Coffeyville and Nowata, Okla.

Central City, Greenville & Drakesboro Railway, Central City, Ky.—Surveys have been completed, financial arrangements made and work will soon be begun by this company grading for its electric line to connect Central City, Drakesboro, Greenville, Hillside, Brownsville, Mercer, Powderly, Bevier and Graham. W. H. Netherlands, Central City, is interested. [E. R. J., Feb. 28, '14.]

South Covington & Cincinnati Street Railway, Covington. Ky.—Contracts for the erection of a new steel bridge, to cost between $160,000 and $200,000 have been let to the American Bridge Company by the South Covington & Cincinnati Street Railway. The bridge will span the Licking River at Twelfth Street, Covington, and will replace the present structure. Polk Lafoon, secretary, is authority for the announcement.

***Lexington, Ky.**—A large part of the right-of-way for the projected construction of an electric railway between Lexington and Richmond, Ky., some 30 miles, has been pledged, according to John G. King, who launched the project. It is said that numerous subscriptions from local capitalists have been received.

Orleans-Kenner Electric Railway, New Orleans, La.—Surveys have been completed for this 110-mile line between Kenner, New Orleans, Hanson City, Harrihan and Shrewsbury. Grading has been completed between New Orleans and Harrahan, 6 miles, and 3 miles of track have been laid from Kenner 3 miles south. Headquarters, New Orleans; J. A. Bowman, New Orleans, president. [E. R. J., April 25, '14.]

***Winnipeg, Man.**—The Winnipeg Council has awarded a contract to John H. Kern, Moose Jaw, Sask., for the construction of an electric line between Winnipeg and Transcona, Man. The matter of double-tracking is to be left to the discretion of the builders, and the time for completion to be Oct. 30, 1914.

Hannibal Railway & Electric Company, Hannibal, Mo.—Plans are being considered by this company to build soon its extension to Riverview Park and also to improve some of its lines in Hannibal.

New York State Railways, Rochester, N. Y.—Work has been begun by this company double-tracking and improving some of its lines in Syracuse.

Tidewater Power Company, Wilmington, N. C.—Arrangements are being made by this company to extend its suburban line in the lower part of the county.

Cape Breton Electric Company, Sydney, N. S.—Plans are being made by this company to build soon its extension into New Waterford.

Northern Ohio Traction & Light Company, Akron, Ohio.—Following a conference with the Canton City officials this company has agreed to double track and extend several of its lines in Canton.

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—John B. Chapman, Cleveland, has again applied to the Public Utilities Commission for approval of a plan to finance the proposed electric interurban line from Chardon to Jefferson. Mr. Chapman asks authority for issuing to stockholders $10,000 of capital stock in lieu of $1,000 cash paid in for preliminary expenses and to issue and sell at 80, $290,000 of capital stock and $425,000 of twenty-five-year 5 per cent bonds, the proceeds to be used for constructing and equipping the line. [E. R. J., March 21, '14.]

London (Ont.) Street Railway.—Plans are being considered by this company for extensions of its lines in London.

Pacific Power & Light Company, Astoria, Ore.—Work will be begun at once by this company on the extension of its local lines around Smith's Point and to the Hammond Mills in Astoria.

Lancaster City (Pa.) Street Railway.—Plans are being made by this company to extend its lines on Chestnut Street and Ann Street to King Street, thence by curve to connect with the present lines of the company in Lancaster.

Montreal & Southern Counties Railway, Montreal, Que.—This company has retained the Arnold Company, of Chicago, as consulting electrical engineers on a 15-mile extension of its line from St. Cesair to Granby. This is in addition to the electrification work reported in the ELECTRIC RAILWAY JOURNAL of March 28, on page 702, and provides for the construction of a new line, including grading, track, overhead and electrical equipment.

Jackson Railway & Light Company, Jackson, Tenn.—This company has extended its line into West Jackson to the Country Club and West Tennessee agricultural experiment station.

Knoxville Railway & Light Company, Knoxville, Tenn.—Plans are being made by this company to double track its line between Knoxville and Fountain City.

Memphis (Tenn.) Street Railway.—Surveys have been made by this company to extend the Florida Street line in Memphis to the Nonconnah yards of the Illinois Central Railroad, a distance of 2 miles.

Nashville (Tenn.) Traction Company.—The Nashville-Detroit Construction Company, to have an authorized capital of $100,000, has filed articles of incorporation in Tennessee. The company has been organized to take over the contracts for the construction of the Nashville Traction Company's lines and equipment in Nashville and was organized by Cameron Currie and others. W. O. Palmer, Nashville, president. [E. R. J., April 4, '14.]

***Crowell, Tex.**—The Young Men's Business League of Crowell, Tex., has received an offer from financiers to provide half of the estimated amount of $210,000 necessary to build an electric line between Crowell and Vernon, provided local residents raise the other half.

***Dallas, Tex.**—The Dan Sonnentheil Company is considering plans to build a double tracked electric railway through Lakewood Heights and have connections with the business center of Dallas. A franchise is being asked of the County Commissioners over the old Greenville road, which is now the extension of Junius Street. The line will be constructed at once. The property is all owned by the company, and no complications will arise over the right-of-way.

Dallas (Tex.) Consolidated Electric Railway.—This company is asked to extend its Highland Park Street Railway to the Southern Methodist University in Dallas.

Southern Traction Company, Dallas, Tex.—This company plans to spend about $40,000 in improvements of its lines in Dallas. Its line to Trinity Heights, just south of Oak Cliff, will be placed in operation at once.

Texas Traction Company, Dallas, Tex.—Among the improvements planned by this company in the near future will be a loop line to the southwest portion of Denison, a double-track on Main Street or a new line down Woodard Street in Denison.

San Antonio, San Jose & Medina Interurban Railway, San Antonio, Tex.—This company has completed about 3½ miles of its 15-mile line between San Antonio, San Jose and Kirk. Power will be purchased from the San Antonio Traction Company and the repair shops will be located at San Jose. Three cars will be operated. Capital stock, authorized, $100,000. Capital stock, issued, $50,000. Bonds, authorized, $100,000. Officers: A. D. Powers, San Antonio, president; E. O. Burton, San Antonio, vice-president; C. A. Newton, San Antonio, secretary and treasurer, and L. S. Powers, San Antonio, general manager and purchasing agent. [E. R. J., April 25, '14.]

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Stockholders and directors of this company have decided to sell this railway provided a satisfactory bid is received. The specifications and profiles are complete and are now on file in the office of the chief engineer. The cross-sectioning has been completed as far as Haskell. The length of the line is approximately 34 miles. E. E. Baldridge, Fort Worth, president. [E. R. J., April 18, '14.]

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Right-of-way has been secured and preliminary arrangements are being made to soon build this 27-mile electric line between Austin, San Antonio and New Braunfels. Vories P. Brown, president. [E. R. J., Feb. 7, '14.]

San Antonio & San Jose Interurban Railway, San Antonio, Tex.—Work has been begun by this company on the West Commerce Street extension in San Antonio.

Wheeling (W. Va.) Traction Company.—Guy Tripp, New York, president of the American Water Works & Electric Company, conferred with the officers of the Wheeling Traction Company, a subsidiary company, recently relative to the beginning of extensive improvements and additions to the traction company. Of the $6,500,000 secured on a bond issue, a large part will be used in expanding the Wheeling Traction Company's lines.

POWER HOUSES AND SUBSTATIONS

Glendale & Montrose Railway, Glendale, Cal.—During the next few weeks this company expects to purchase one 350-kva to 500-kva motor generating set, 2200 a.c., 600 d.c.

Connecticut Company, New Haven, Conn.—This company has completed its new power house on Pine Street in Norwalk. In it have been installed three motor generator sets and three rotaries, together with transformers, switchboards, etc., 11,000 volts will be turned from the Cos Cob power house into this plant. When ready for operation this power plant will have cost $160,000.

American Railways Company, Philadelphia, Pa.—This company will place in operation for one of its subsidiary companies new station equipment consisting of a 1000-kw Curtis turbo-generator, a 200-kw rotary converter, six 100 kva and two 300 kva transformers and switchboard. The contract for building and installing this apparatus has been awarded the General Electric Company.

Austin (Tex.) Street Railway.—Work will soon be begun by this company on an addition to its power house in Austin. The structure will be of brick and concrete construction. The cost is estimated to be about $2,000.

SHOPS AND BUILDINGS

Glendale & Montrose Railway, Glendale, Cal.—During the next few weeks this company will award contracts to construct the following buildings: one carhouse, 40 ft. x 100 ft.; two freight depots, 30 ft. x 30 ft., and one passenger station, 20 ft. x 30 ft.

Springfield (Mass.) Street Railway.—Plans are being considered by this company to build a new carhouse between Carew Street and Bond Street in Springfield.

International Traction Company, Buffalo, N. Y.—This company's interurban depot in Buffalo has been moved from the basement of the German-American bank building on the south side of Court Street at Main Street to the basement of the Western Savings Bank on the north side of Court Street at Main Street. The new quarters will be used until the new terminal in Franklin Street is ready.

Texas Traction Company, Dallas, Tex.—Plans are being made by this company to build a new terminal station in Denison.

Southern Traction Company, Dallas, Tex.—A new passenger station has just been completed by this company at Comal and Jefferson Streets in Dallas.

West Virginia Traction & Terminal Company, Wheeling, W. Va.—This company is now building a new passenger station at Wheeling Park.

Ohio Valley Electric Railway, Huntington, W. Va.—During the summer this company plans to build a new terminal at Eighth Street and Fourth Avenue in Huntington. The structure will be two stories and will consist of waiting rooms and offices. The cost is estimated to be about $60,000.

Manufactures and Supplies

ROLLING STOCK

Homestead & Mifflin Street Railway, Homestead, Pa., has purchased one closed car.

United Traction Company, Albany, N. Y., is remodeling fifteen of its semi-convertible cars.

Lincoln (Neb.) Traction Company has ordered four motor and two trail cars from The J. G. Brill Company.

Valdosta (Ga.) Street Railway expects to purchase during the summer two 10-bench open cars.

Chicago (Ill.) Surface Lines is preparing plans and specifications, and will shortly consider the purchase of a large number of new cars.

Chicago & Joliet Electric Railway, Joliet, Ill., has ordered five prepayment cars from the McGuire-Cummings Manufacturing Company.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, has ordered three single-end steel prepayment cars from the Cincinnati Car Company.

Third Avenue Railway, New York, N. Y., has ordered eleven Russell sweepers and four storage battery sweepers through Wendell & MacDuffie Company.

Portland, Eugene & Eastern Railway, Portland, Ore., has ordered two cars from the American Car Company, to be equipped with four GE-216, 50-hp two-motor car equipments.

Charlotte (N. C.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21, 1914, as expecting to purchase six closed city passenger cars, has ordered these cars from the Southern Car Company. Their length over all will be about 38 ft.

St. Paul Southern Electric Railway, St. Paul, Minn., has purchased four 51-ft. interurban cars, including two passenger and two combination passenger and express cars, from the Niles Car & Manufacturing Company. Each car will be equipped with four 70-hp Westinghouse 1200-volt motors with multiple unit control.

United Railways & Electric Company, Baltimore, Md., noted in the ELECTRIC RAILWAY JOURNAL of April 4 as having ordered eighty-five semi-convertible pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity	44
Weight (car body)	19,000 lb.
Bolster centers, length,	18 ft. 8 in.
Length of body	30 ft. 8 in.
Length over vestibule,	42 ft. 1 in.
Width over sills	8 ft. 1 in.
Width over all	8 ft. 5 in.
Height, rail to sills,	2 ft. 8⅞ in.
Height, sill to trolley base,	9 ft. 1 in.
Body	wood
Interior trim	bronze
Headlining	Agasote
Roof	monitor
Underframe	composite
Bumpers	angle-iron
Car trimmings	Brill
Control, type	GE type K
Couplers,	Van Dow No. 5 head
Curtain fixtures,	Rex all metal roller
Curtain material	Pantasote
Destination signs	Hunter
Fare boxes	International
Gongs	Dayton
Hand brakes	Brill
Heaters	Consol.
Headlights	Dayton
Journal boxes	Symington
Motors,	4-GE-200, outside hung
Paint	Felton & Sibley
Registers	International
Sanders	Brill Dumpit
Sash fixtures	Brill
Seats, style	Hale & Kil.
Seating material	cane
Springs	Brill
Step treads	Universal
Trucks, type	Brill
Varnish	Hildreth
Wheels	33 in.

TRADE NOTES

Hickey & Schneider, New York, N. Y., have moved their offices to 61 Broadway.

R. Thomas & Sons Company, New York, N. Y., has moved from 227 Fulton Street to 61 Broadway.

Standard Paint Company, New York, N. Y., has removed its Boston office from 70 Kilby Street to 6 Beacon Street.

Otis H. Cutler, president of the American Car & Foundry Company, has been elected a director of the New York Telephone Company.

C. O. Mailloux, New York City, N. Y., consulting engineer, has removed from 90 West Street to 20 Nassau street, telephone number 131 John.

Ingersoll-Rand Company, New York, N. Y., has appointed R. C. Cole to a position in the pneumatic tool department of its Chicago office.

MacArthur Brothers Company, New York, N. Y., engineer and contractor, has moved its Chicago office to Room 1892, Continental & Commercial Bank Building.

Welding Materials Company, New York, N. Y., has removed from 149 Broadway to the Engineering Building, 114 Liberty Street, telephone number 3213 Rector.

J. G. White Engineering Corporation, New York, N. Y., has appointed Douglas I. McKay, until recently police commissioner of the city of New York, as first assistant to Gano Dunn, president.

Westinghouse Lamp Company, New York, N. Y., has appointed F. N. Kollock, Jr., until recently district manager for the Westinghouse Electric & Manufacturing Company at Seattle, Wash., as treasurer, with office in New York City.

Taylor-Wharton Iron & Steel Company, High Bridge, N. J., Wm. Wharton, Jr., & Company, Inc., Philadelphia, Pa., and the **Tioga Steel & Iron Company, Philadelphia, Pa.,** have moved their Chicago office to room 1880 Continental & Commercial Bank Building.

Van Dorn & Dutton Company, Cleveland, Ohio, has opened branch offices at 1007 North Alameda Street, Los Angeles, Cal., and at 515 Mission Street, San Francisco, Cal. The Los Angeles office is in charge of H. E. Borland, the San Francisco office, W. B. Wilson, district sales manager.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed Walter D. McDonald, formerly branch manager at Minneapolis, as district manager at Seattle, Wash., succeeding F. N. Kollock, Jr. Curtis C. Curry has been made branch manager at Minneapolis, succeeding Mr. McDonald.

J. Sutherland Warner, inventor of the Warner non-parallel axle, recently arrived at New York from abroad. Mr. Warner will make an extended business trip throughout this country, in connection with the introduction of the Warner non-parallel axle to double-truck cars. During his stay here he will make his headquarters with the Wendell & MacDuffie Company, manufacturers' agents, 61 Broadway, New York.

William R. Garton, New York, N. Y., has opened an office in suite 706-707, 299 Broadway, where he will conduct a sales engineering business. Mr. Garton has taken the eastern sales engineering agency for the products of the Root Spring Scraper Company, Nichols-Lintern Company, J. F. Hodgkins Company, Monarch Refillable Fuse Company and the W. J. Baker Company's lock washers. Mr. Garton will continue to represent in an engineering and expert capacity some of the large interests with whom he has been associated for some time.

Clark Electric & Manufacturing Company, New York, N. Y., has just made a second shipment of seamless copper splicing sleeves for use on the U. S. Government transmission lines in the Panama Canal zone. Other sleeves and a large number of the company's patent insulator clamps will be furnished to the Otter Tail Power Company, Fergus Falls, Minn., to be used on 75 miles of transmission line which that company will build this year. Overhead protective clamping sets for use on railroad right-of-way have been sent to the Rochester Railway & Light Company.

Thayer & Company, Inc., New York, N. Y., United States selling agents for Chillingworth seamless steel gear cases, have appointed the following agencies to represent them: W. R. Garton & Company, who will represent them in Minnesota, Wisconsin and Iowa, including the cities of Omaha and Lincoln, Neb.; Grayson Railway Supply Company, St. Louis, Mo., who will represent them in the states of Missouri (except St. Joseph), Arkansas, Oklahoma, Texas, Louisiana, Mississippi, western Tennessee and western Kentucky, also East St. Louis, Ill.; The Union Electric Company, Pittsburgh, Pa., will represent them in the western parts of Pennsylvania, New York and Maryland and the state of West Virginia.

ADVERTISING LITERATURE

American Electrical Company, Phillipsdale, R. I., has issued a price list of its wire and cables.

Van Dorn & Dutton Company, Cleveland, Ohio, has issued a folder illustrating its railway and mill motor gears and pinions.

National Scale Company, Chicopee Falls, Mass., has issued a catalog and testimonial letter in regard to its accounting machines.

H. F. Keegan Company, Chicago, Ill., has issued a catalog describing and illustrating the Kerwin Detroit rail girder, manufactured by the Kerwin Machine Company, Detroit, Mich.

General Railway Signal Company, Rochester, N. Y., has issued Catalog Section B, Part 7, containing price lists of equipment for its R. S. A. mechanical dwarf signals.

Buffalo Brake Beam Company, New York, N. Y., has issued a catalog describing and illustrating its various types of brake beams and brake-beam parts for freight, passenger and electric car service.

Lombard Governor Company, Ashland, Mass., has issued a card showing the geographical locations of water-plants in New York State which electrically operate locks, on the waterwheels of which fifty-eight Lombard governors are installed.

Fairmount Electric & Manufacturing Company, Philadelphia, Pa., has issued a reprint of a paper entitled "Notes on Grounding of Electrical Systems," by H. P. Liverside, which was presented at the Eighteenth Annual Convention of the International Association of Municipal Electricians, at Watertown, Aug. 19 to 22, 1913.

Consolidated Expanded Metal Company, New York, N. Y., has issued a catalog illustrating its steelcrete guards for protecting machinery and for use in connection with expanded metal lockers in factory washrooms. This company has also issued sheets explaining in detail its universal slab computer for calculating concrete slabs reinforced with steelcrete mesh.

Fairbanks-Morse & Company, Chicago, Ill., have issued a series of catalogs on their motors and generators. Bulletins Nos. 27 and 29 describe their d.c. types CP and TRC motors and generators, respectively. Bulletin No. 2024 describes a.c. type B constant-speed induction motors. Bulletin No. 210 describes internal starter motors for two and three-phase a.c. circuits.

Elyria Iron & Steel Company, Elyria, Ohio, has issued a catalog describing its plain and shoulder tie plates both with flat bottom and with longitudinal and transverse flanges, also its types of screw spike plates. Another folder recently issued illustrates its Manhattan compromise or step joints for connecting different size sections of tee rails and for connecting girder and tee rails.

Western Electric Company, New York, N. Y., has issued a special "Office Boys' Number" of its *Western Electric News* for May, 1914, which contains forty pages of contributions relating to and furnished by those who are either at present serving the company in the capacity of office boys or have done so in the past. F. B. Uhrig, western district manager of the Kansas City office, contributes the leading article on the office boy of thirty years ago, and there are pictures of thirty-nine men now holding important positions with the company, all of whom started as office boys.

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued Bulletin No. 41010, describing its Types C and D d.c. motors for all classes of general industrial service. Type C motors are equipped with commutating poles and are especially suitable for high speeds in variable speed service where the range of adjustment desired by field control exceeds 50 per cent above the normal or full field speed of the machine. Type D motors are not provided with commutating poles and are suitable for low and moderate speed ratings, but can also be used for adjustable speed service where the normal or full field speed is low and where the range of increase by field control is not excessive. Another folder recently issued by this company describes its laboratory ozone apparatus.

Electric Railway Journal

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WHAT IS A REASONABLE RETURN?

An interesting discussion of what constitutes a reasonable rate of return on public utility investments appears in another column in the form of some testimony presented by the Pacific Gas & Electric Company in a San Francisco rate case. It has the merit of disregarding the theory of the subject and of bringing the question down to the actual price which public utilities have to pay for new capital. Since the days of Lycurgus attempts have been made by fiat to reverse the laws of finance, but iron money could not be made a success in Sparta, nor can public utilities sell their securities at a higher price than investors are willing to pay for them. Mr. Hockenbeamer first shows that the company with which he is connected is obliged by law to make certain capital expenditures in extending its service. He then shows that neither it nor other large public utility companies in California with good credit can sell underlying bonds for less than on a 6 per cent basis, and usually the return must be higher. He then shows that, according to the law as well as according to sound finance, stock capitalization should be increased with an increase in the bonded indebtedness. This means that the stock must be sold on a basis of providing a reasonable assurance of a return of 10 per cent. Finally, he shows that this is not an unreasonable profit when the earnings of the national banks show an average annual profit in excess of 9 per cent and the greater hazard of the public utility business is considered.

BURNING THE BOOKS

There is an old rule of criminal law that flight from the scene of a crime establishes a presumption that the fugitive is probably guilty, and certainly not guiltless. It is a rule that appeals to reasoning of the same kind that is likely to convict of wrongdoing those corporation officials who appear on the stand at investigations and say that the books relating to transactions under scrutiny have been burned. This is what has happened in the New Haven investigation. Probably the worst that the burned books could show would be poor judgment in investments or favoritism toward certain financiers at the expense of the New Haven stockholders. But it is safe to say that ninety-nine men out of a hundred who read of the burning of the Millbrook books believe that it was to conceal outright thievery. In matters both more and less serious than this it is always best to let the worst of the truth be known, for the alternative is a general belief in something very much worse than the truth. For the rest, railroad men who are trying to lead decent lives may well ask, "How long, Oh Lord, how long are disclosures of railroad misdeeds to make life miserable for us all?" We do not know the answer to this question, but we do know that the only policy of right and wisdom is to avoid making new material for disclosures of the future!

THE FAULT AND THE REMEDY

It will be remembered, of course, that the books concerned in the above episode were not those of the New York, New Haven & Hartford Railroad itself but of an affiliated company. Owing to commission activities, the extent to which common carriers can cause a destruction of their records has become quite circumscribed. For example, the 1913 regulations of the Interstate Commerce Commission expressly state that all electric railway corporate and financial books of original and final entry are to be permanently preserved, and the period of retention for all other reports, accounts and memoranda is most specifically outlined. Furthermore, the regulations provide that an executive officer shall be appointed by the board of directors to supervise the permissible destruction. In view of such facts, it may be said that reasonable precautions have been taken to guard against a wanton mutilation and demolition of the books and records of common carriers themselves. Unfortunately, however, the details of financial relations with bankers and other corporations are generally not found on the carrier's books. Just now the attention of the country is fixed on the Newlands interstate trade commission bill providing that no interstate carrier may enter into a contract with another corporation for the disposal or acquisition of securities or the purchase, sale or lease of property if there is an interlocking directorate or managing board. In such a case as the Millbrook Company, however, the public is less concerned with the names of the directors involved than with the exact accounting of the transactions. As early as December, 1911, the Hadley Railroad Securities Commission recommended that the Interstate Commerce Commission "should have the power to investigate all financial transactions and to inquire into the bona fides thereof, and the right to call for the production of books and papers of railroads, construction companies and other companies with which the railroads had financial relations and that from the purchase of supplies to the acquirement of new lines the interest of the directors should be disclosed." It goes without saying that the New Haven investigation will give some such movement as this a decided impetus.

THE KANSAS CITY CYCLE In our issue of Oct. 4, 1913, we said that Mayor Jost's proposed franchise for the Metropolitan Street Railway of Kansas City would have to traverse a rocky path before it would run the gantlet of miscellaneous approvals and political bickerings in store for it. Later events have proved this prediction only too true. A multiplicity of every conceivable and impossible amendments, designed not to improve the proposed franchise but to make it a football in the spring elections, finally forced the receivers to withdraw from the negotiations in order not to jeopardize the vast interests under their control. Now, with the election over and Mayor Jost returned to office, Federal Judge Hook has ordered the receivers to resume negotiations, and thus once more the cycle is resumed. The property of the Metropolitan Street Railway has been in the hands of receivers since June, 1911, and during this time various efforts have been made to rescue the property from threatened dismemberment and place it on an assured financial and service basis. Up to the present all these attempts have failed, but it is to be hoped that the present negotiations will result in a settlement satisfactory to both the public and the company. The Kansas City case is a shining example of the results of continuous and paralyzing controversies between city and company as a result of a limited franchise. A company operating under such an arrangement is so exposed to the attacks of politicians that effective State regulation under the indeterminate franchise form would be a veritable blessing. It is time that the citizens of Kansas City realized that the issue is not one alone of better service to the city but also of fairness to the security holders of the company, and that in protecting the latter the company needs the thoughtful cooperation of the public, and not its blind antagonism.

ON CONCENTRATING PUBLICITY During the past three or four years extensive publicity campaigns have been waged by electric railways. Perhaps, the most significant kind were those in which the companies published statements of the amounts spent annually for different kinds of equipment. However, as the arguments were addressed to the community at large, the result was often as ineffective as other scattering shot because the attention of the reader was directed to general rather than to individual improvements. Would it not be well to supplement a city-wide publicity campaign by references to the work done and money spent in particular neighborhoods? For example, in one large city the local railway has equipped several of its routes with a new type of car which cost from $7,000 to $8,000 each. If the riders on these routes were informed that every car was the equivalent in cost to a fine one-family suburban house, they would have a decidedly tangible idea of what the railway was doing for them. Again, a substation is frequently an installation common only to a few lines. In that event, some good publicity might be obtained by stating the cost of the outfit required to maintain good schedules and car lighting on the outlying divisions specified. In another recent instance, the sum of $4,000 had to be spent to replace a double-track branch-off at a certain corner after only five years of service. Here is an opportunity to blazon the fact that the railway will have to carry 80,000 passengers merely to pay for a single piece of special work at the intersection of two routes. If news of this domestic character was made known by means of chatty car announcements to the passengers of the line affected, the public would be likely to appreciate the cost of good service more directly than by references to the expenditures on the system as a whole.

ANALYSIS OF SERVICE AND ACCIDENT COSTS

Without doubt, one of the biggest questions before the American railway at present is to prove to its public that the service given is fully commensurate to the rate of fare and the amount of traffic. It is not so difficult to do this in the case of isolated lines where the unfavorable operating conditions are appreciated even by the layman, but how can the public be convinced as regards electric railway systems generally that crowded cars during a few hours a day do not spell a twenty-four-hour profit? A way out of this dilemma is suggested by the frank publicity methods of the Scranton Railways, as described by its superintendent, P. T. Reilly, before the last meeting of the Pennsylvania Street Railway Association. In the case quoted elsewhere in this issue the Scranton Railways demonstrated to the public by way of the daily press that it had actually lost money on the peak-load business which had resulted from a great religious revival. Of course, a general statement of this kind would have been greeted with derision by those who had seen the crowded cars going to and from the tabernacle on a two-minute headway. But the traffic conditions were analyzed and described with such care by the railway that no room was left for disbelief. Surely this is real publicity for, and fair dealing with, the public. And we shrewdly suspect that Mr. Reilly's demonstration that peak loads do not always add to the net earnings will surprise many an optimistic operator who is too eager for park, baseball or other business which may be located away from the beaten trails of traffic.

The same paper contains some noteworthy mathematical proof on the accident-saving value of experienced car men in addition to the publicity data on peak loads, which has just been mentioned. To be sure, every thoughtful operator will admit that the average man who has gone through the painful experience of one accident is far less likely to repeat than the recruit who may be hired to supplant him. Not many railways, however, have gone to the trouble of proving this fact in dollars and cents. Mr. Reilly's company has done so with results that bear a lesson to the manager who will permit his transportation division superintendents to cut down the number of the higher-waged platform men from motives of false or superficial economy. The Scranton figures show that the annual accident expense accounts of the one-year, two-year, three-year, four-year and four-year plus platform men are respectively $236.81, $146.63, $100.61, $95 and $48.47. If we assume that the wage increase per year is 1 cent more per hour, then the annual raise in wages for 3600 hours is only $36. In all but one of the classifications given, this amount is less than the savings in accident costs produced by more platform experience. But the savings are still greater if we consider that $50 to $100 is spent to train a man merely to operate a car and that months will elapse before the new man reaches his highest efficiency in controller and brake manipulation. Thus to the slogan of "Safety First" may be added that of "Safety Pays."

A GREAT RAILROAD MAN ON GOVERNMENT OWNERSHIP

Nearly all discussion of government ownership of railways is, on the one side, by advocates of this policy, and on the other side by interested and biased opponents. A grateful relief from arguments of both of these types is found in a statement in a recent issue of the *Outlook* by Sir Thomas Shaughnessy, president of the Canadian Pacific Railway. Sir Thomas has no government ownership problem of his own, so he may not be charged with self-interest. He, as a railroad man, is happy because from the first the railways and the government of Canada have maintained a sort of partnership that has conserved the interests of the public as well as those of the carriers. And he thinks we shall be happier in our transportation relations when we realize that "government ownership or private ownership is not the fundamental thing. The fundamental thing is honest service on one side and honest compensation on the other."

This is really the conclusion of Sir Thomas's remarks. To start with, he clears the air by showing that government ownership is not a principle of democracy but a question of pure expediency. Will government ownership secure better service and secure it more cheaply or as cheaply as at present? This, he claims, is the real question to be considered, and calmly considering it he marshals four points against and four points in favor of the proposition.

Against the idea he places these considerations: That government ownership does not move with the promptness or enterprise of private ownership; does not show the same economy; is less responsive to business demands as to service and rates, and involves the "sinister possibilities" of adding 1,500,000 government employes to the federal payroll. Whether or not the latter consideration is an important one Sir Thomas does not know because he is doubtful as to whether or not we have really finished with corrupt government. Had he been less kind he might have pointed out that at the present moment the presence of Mr. Bryan in the State Department and of Mr. Daniels in the Navy Department indicate what degree of adaptability and training would be required of the man who might preside over the railways of the United States under government ownership. Because one of these gentlemen was a successful lecturer and an unsuccessful candidate for President he was thought to be well fitted to handle our foreign relations. Because the other gentleman was a fairly successful newspaper publisher and a friend of Mr. Bryan he was selected for the highly specialized duties of directing the navy. On the same line of reasoning a "secretary of transportation" might be a clergyman or an astronomer.

But to return to Sir Thomas. In favor of government ownership he includes these considerations: It would, by socializing some twenty billions of railroad property, limit our "enormous and distressing inequalities of wealth"; railway investment would lose its speculative character; unfair discrimination would disappear, and railway development and rate adjustment would proceed with reference to the maximum development of the country as a whole, rather than be governed by the needs or the profit-making possibilities of any section. These are the four favorable considerations that are balanced against the four drawbacks of government ownership. We are not so certain as Sir Thomas seems to be that an administration that changes every four years would preserve that nice adjustment of railway development that he speaks of, but admitting that this would be the case the matter is not, as it is put here, one for heated advocacy or denunciation, but for weighing upon grounds of expediency.

Evidently with some current facts of railway history and the trend of regulation in mind, Sir Thomas concludes his interview with this sapient comment: "Clearly, the interests of the public must rank first; but the very fact that the public accepting the service is also to be final authority in the matter of compensation would make it as unfair and improper to have that compensation established at a figure below its value, to the detriment of the shareholders, as it would be if the transaction were between two business men of recognized integrity."

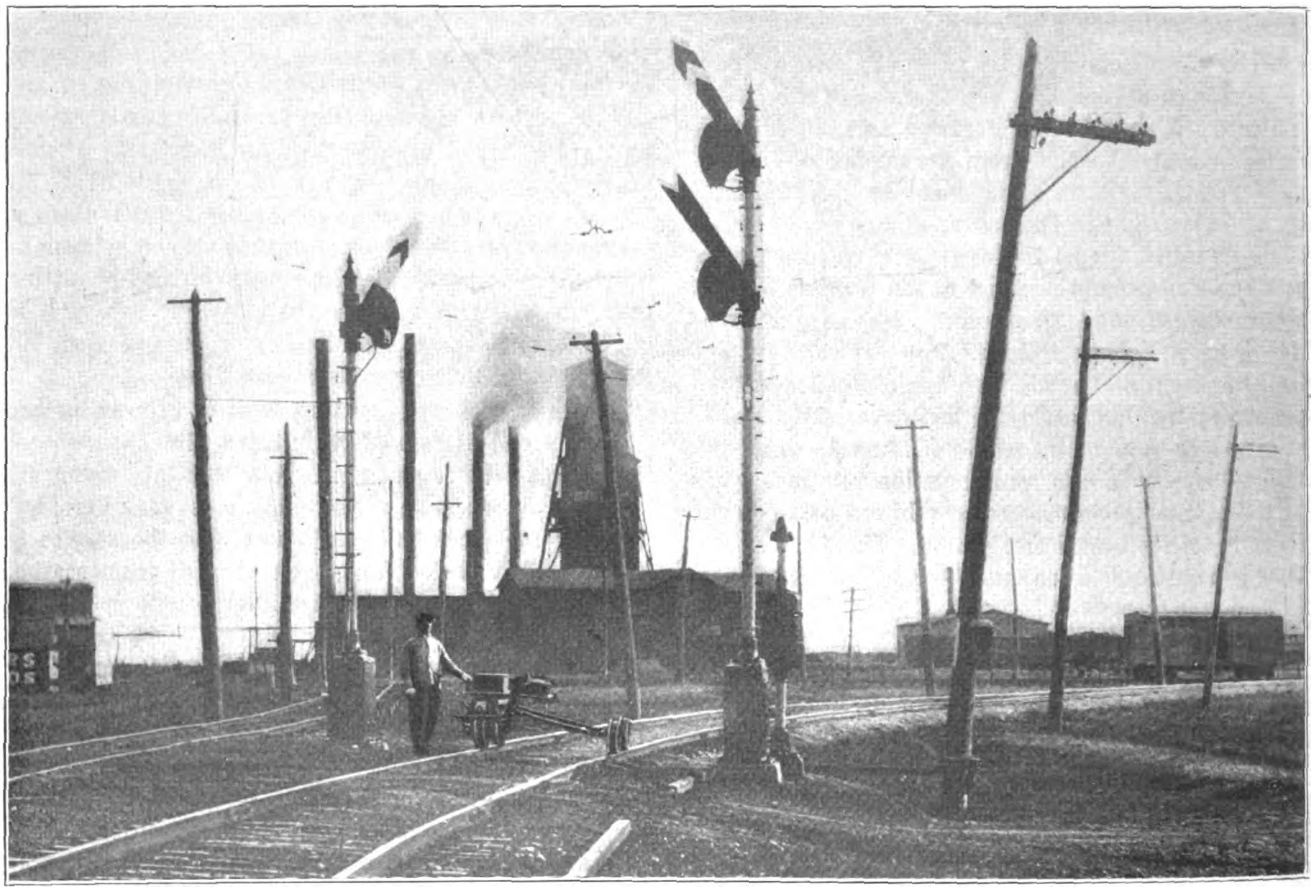
The most radical railway baiter can take as little exception to this statement as can be taken to the summing up of the municipal ownership proposition as outlined above. This also is a position so rational that it is one to which all can repair: "I shall be satisfied to see your railways go under government ownership if you calmly and deliberately think best that they should, although it seems to me that your control over them under your present arrangements is comprehensive and sufficient. But my main hope is, as I said before, not so much for the sake of your railways as your national spirit, that you will get through to the end of your problem, whatever that end may be, with full justice to all, and without petulance or bad temper."

While we believe that the common sense of the American people and their traditional sentiment in favor of individualism instead of collectivism will triumph in the end, we expect that there will be more agitation in favor of government ownership of railroads and of municipal ownership of street railways before there is less. The hearing which occurred in Washington this week and is reported in this issue is significant in this connection.

Signal Maintenance on Illinois Traction System

On This Interurban System Automatic Block Signals of the Track-Circuit-Controlled Type Have Been in Operation for Three Years, and an Account Is Given of the Maintenance Organization and Costs

The first installation of track-circuit-controlled, automatic block signals on the Illinois Traction System was placed in service exactly three years ago. Since then various other sections of track have been equipped until, at the present time, all dangerous localities have been fully protected, and by the end of this year the entire main line between St. Louis and Springfield will be provided with track-circuit signals in addition to those already installed between Springfield and Peoria. Owing to the relatively long time that these signals have been in operation the methods of maintaining them have been established upon a permanent basis, and the following outline of the company's organization and practice will serve as a guide to other interurban roads which have made more recent installations.



Illinois Signal Maintenance—Signal Maintainer with Gasoline Speeder That Is Used for Traveling Between Signals

SIGNAL EQUIPMENT

As shown by the accompanying map every section of the whole system has its quota of signals. In all there are 95.6 miles of protected track in operation in which are included 183 track-circuit-controlled signals. The short sections indicated upon the map as being protected are isolated curves or sidings where meets are frequently made.

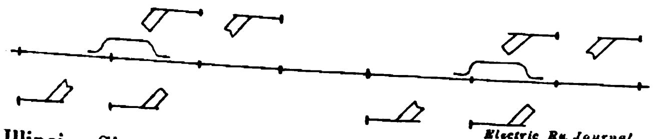
The signals at sidings are arranged in accordance with a standard system as shown in the accompanying diagram. Distant signals are provided for every home signal. In general all sidings are double-ended and the first car approaching the siding takes it regardless of direction of movement. Preliminary sections in every case are at the south end of the block, and telephones are provided at the distant signals at the beginning of each preliminary as well as at the sidings for the purpose of permitting trains which may stop before entering the preliminary to call up the dispatcher from that point.

Telephones are provided also at all sidings in unsignalled territory where operation is carried on by train order. The telephone line is double, one line being used exclusively for train orders and the other for railway business. Originally the entire line was operated by train order with the assistance of the telephone.

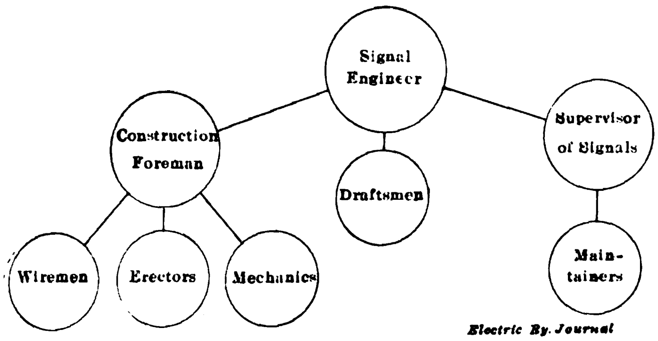
On the division between Danville and Springfield where there are no particularly long sections of continuously signalled territory practically every siding is furnished with a telephone booth upon which is a Blake signal controlled by the dispatcher. These dispatcher's signals are also installed in some cases on the line between St. Louis and Peoria, but they are being rapidly displaced by the introduction of the track-circuit signals. There are also several types of contact signals at various points in cities through which the line operates at slow speed, but no contact signals are used on the main line outside of city limits.

In general, sidings are located between 1½ miles and 2 miles apart, and the line is single track except in certain sections within city limits.

The present organization of the signal department



Illinois Signal Maintenance—Standard Arrangement of Signals



Illinois Signal Maintenance—Organization Chart

is shown graphically in the accompanying chart. In charge of the department is the signal engineer, John Leisenring, and to him report the draftsmen, the construction foreman for new work and the supervisor of signals for maintenance work. Construction work is an important feature as new work is going on all of the time. At present the construction forces are installing signals from a point a few miles north of Carlinville to Springfield.

Under the supervisor of signals, who is in direct charge of repair work, are five signal maintainers. These employees were developed from telephone repairmen, and all of them were originally employed in the telephone work on the system before the automatic block signals were installed. All of them still make telephone repairs in the field although a considerable part of this work is being gradually replaced by field work on the automatic signals.

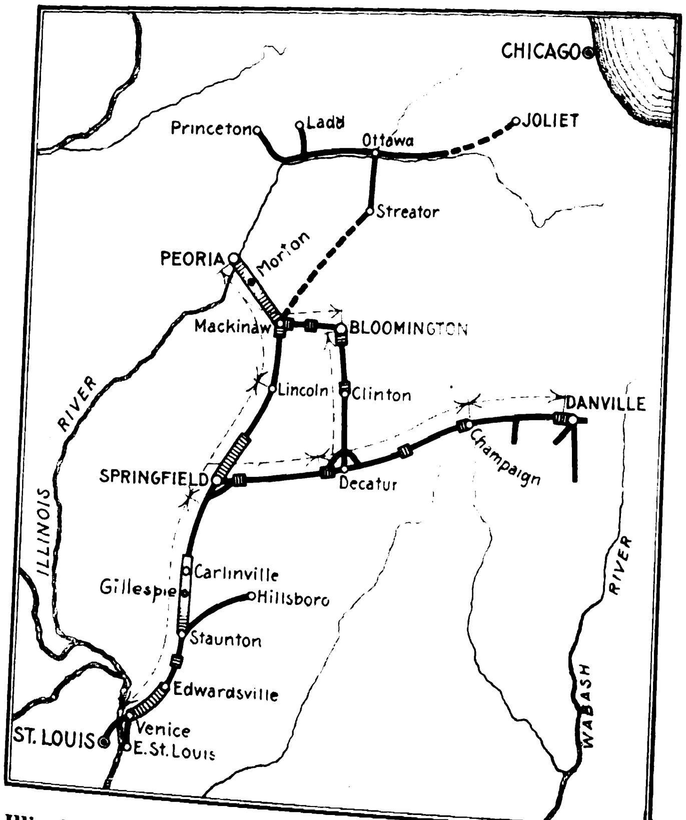
In addition to the employees shown on the chart there is a telephone repairman, who spends the major part of his time in repairing various pieces of defective telephone apparatus which have been replaced by the men along the line. In addition he is responsible for the field work on the telephones between Springfield and St. Louis. This employee is entirely separate from the signal maintenance department, although he reports to the signal engineer. However, he has been trained in signal maintenance and is able to fill in when any of the regular signal maintainers are off duty. His work in connection with the repairs to telephone apparatus was developed on account of the fact that it was originally the custom to replace defective telephones with complete new ones so that a large amount of slightly damaged telephone apparatus was at one time on hand in the shops of the company. The present telephone repairman has eliminated the necessity for this, and the only telephone material kept on hand is that necessary to make quick replacements of damaged or defective parts.

Each of the five signal maintainers is located on a clearly defined district and is responsible for all telephones and signals within its limits. The five districts are shown on the accompanying map of the system, the dotted lines and arrow heads showing the extent of each. The maintainer for the southernmost division on the main line between St. Louis and Peoria is located at Gillespie about halfway between St. Louis and Springfield, and the maintainer for the district north of this is located in Springfield, the district taking in also a part of the line to Danville to a point within a few miles of Decatur. The district south of Peoria which extends to Lincoln and includes the branch to Bloomington has a maintainer with headquarters at Morton. At Decatur is a fourth maintainer whose district extends to Champaign on the west and to Bloomington on the north, and at Danville is the fifth maintainer whose district covers the west end and branches of the Danville line.

The various districts have been arranged on the basis that one mile of telephone, including the two wires, is equivalent to one signal whether the latter is of the track-circuit type, the dispatcher's type, or the trolley-contact type. On this basis each maintainer is responsible for the equipment listed below.

The maintainer at Gillespie has charge only of eighty-three track-circuit-controlled signals. The maintainer at Springfield has seventy-six miles of telephone line, nineteen track-circuit signals and twenty-four dispatcher's signals, making a total of 119 equivalent miles. At Morton the maintainer has 65 route miles of telephone line, forty-three track-circuit-controlled signals and two trolley-contact signals, making a total of 110 equivalent miles. At Decatur the maintainer is responsible for 108 route miles of telephone line, eighteen track-circuit-controlled signals, twenty-nine dispatcher's signals and four trolley-contact signals, making a total of 159 equivalent miles. The maintainer at Danville is responsible for 62 route miles of telephone line, seventeen track-circuit-controlled signals, twenty-six dispatcher's signals and eight trolley-contact signals, making a total of 113 equivalent miles.

It will be noticed that the maintainer at Gillespie has considerably less equivalent territory than the others, but this district is a particularly hard one to cover on account of the large number of signals and their wide separation. This district, between St. Louis and Springfield, is the one upon which the telephone repairman is located, and the latter takes care of all of the telephone work. This involves 100 route miles of telephone line. The telephone repairman also maintains twenty dispatcher's signals within the district.



Illinois Signal Maintenance—Map Showing Protected Sections of Track

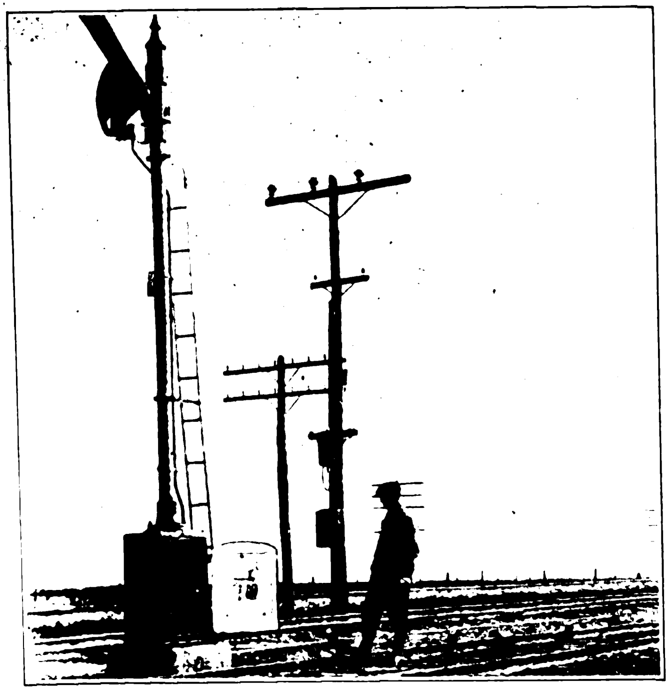
It is planned in the near future to change the title of the telephone repairman to that of signal maintainer and to divide the territory into two approximately equal parts, giving each one of the two men now employed on it a single section of track for his work. The change will, of course, materially reduce the time spent in traveling from place to place. It should be said that the automatic signals will extend over the whole division between St. Louis and Springfield by the end of the present year. At this time, as explained above, the force of signal maintainers will have to be increased by one man.

It is interesting to note that the introduction of automatic block signals on this system has involved only the addition of one man to the force. The original organization required to keep the telephones in repair consisted of five telephone inspectors. However, notwithstanding the large increase in the block signal territory all of the work is now kept up by five signal maintainers and one telephone repairman.

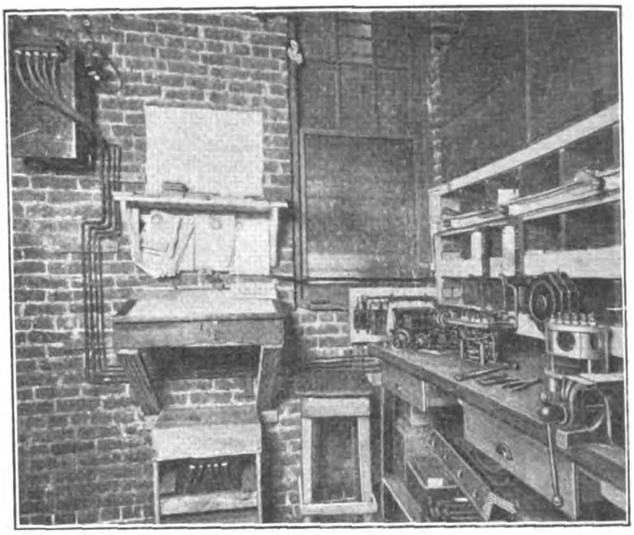
MAINTENANCE METHODS

The signal maintainers do practically all of their work in the field. They have been trained to make all classes of repairs by themselves, even including blacksmithing, although there is very little work of this nature. Most of the repairs are either electrical in character or else consist in making adjustments and replacements of apparatus. For making replacements approximately $3,500 worth of material is kept on hand at the headquarters of the various maintainers. This stock consists of extra relays, motors, transformers, lightning arrestors and miscellaneous repair parts. A considerable number of the defective pieces are repaired by the maintainers at their various headquarters, but some have to be sent to the manufacturer for reconstruction if the damage is extensive, for example, such as would require the complete rewinding of a coil. The cost of the work done by the manufacturer during 1913 for the whole system amounted to approximately $175.

A regular inspection of every signal on the whole line is made once each month. At this time the signal is inspected throughout and the apparatus cleaned, oiled and adjusted as necessary. Any parts found defective are replaced or repaired as required, and the whole operating mechanism receives a thorough test. By this method of monthly inspections it is found that very little difficulty develops between times. In fact, the necessity of frequent, thorough inspection is obvious if it is desired to reduce signal failures to a minimum.



Illinois Signal Maintenance—Signal Operating Mechanism Exposed for Repairs



Illinois Signal Maintenance—Interior of Maintenance Shop at Morton

Each one of the signal maintainers is furnished with a No. 28 Fairbanks-Morse gasoline speeder to enable him to get quickly from place to place in case of breakdowns of the signal system. Such trouble is extremely limited, and even lightning damage has been found to be very slight in character. One or two small transformers and several relays have, however, been somewhat injured by lightning, but all of these were repaired in place. A lightning arrestor and a fuse are installed in every connection from the line wire to the signal apparatus, and this has provided such thorough protection that it is now not even customary to make special trips after thunderstorms unless some trouble is actually reported.

Signal blades are painted once each year, the method of procedure being to keep a number of spare blades in stock and to replace the old blades with the newly painted ones. The old blades are painted at the signal maintainer's leisure at his headquarters and are then put into stock and used as required. The company has been experimenting with a number of different paints, but thus far no standard has been adopted for general use.

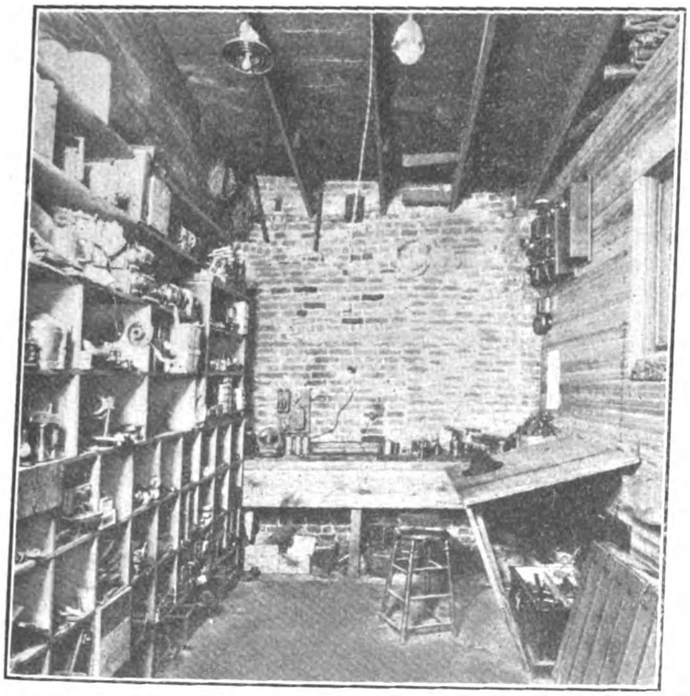
Signal lamps are replaced only when they are burned out, two lights being installed in multiple for each blade so that one may go out without leaving the signal dark. However, it has been found that with the electric-arc headlights used on the interurban cars of this system the signal blade is visible at night for a distance sufficient to provide ample warning of its position. The lights are therefore largely a matter of precaution, needed only in case the electric headlight on a car should go out.

COSTS AND PERFORMANCE

The cost of labor chargeable to maintenance of automatic signals alone, including supervision, amounts to about $385 per month for the 183 signals operated during the past year. The division of costs shows an actual maintenance charge on automatic signals amounting to $271.50 per month, and this covers approximately two-thirds of the time of the signal maintainers, the remainder of their time being devoted to maintenance of the telephones and the despatcher signals. This makes a unit cost for labor alone amounting to $17.80 per blade per year. In addition there is a charge for material amounting to $4.40 per blade per year, giving a total unit cost for labor and material of $22.20 per blade per year. Included in this is the before-mentioned cost of work done by the manufacturer amounting to about $1 per blade per year.

The unit cost per blade per month for labor and material ranged from $1.39 in July of last year to $2.38 in February of last year. None of these figures includes the cost of current for the operation of the signals. This amounts to approximately 95 cents per blade per month.

The total number of signal movements during the last year amounted to 3,034,478 and the percentage of perfect operation during the year was 99.968 per cent.



Illinois Signal Maintenance—Interior of Telephone Repairman's Shop

In connection with these figures it should be recorded that on the Illinois Traction System a signal failure is charged for each train that is improperly stopped by a signal regardless of how or why the signal happens to be in stopped position. A broken line wire or power off the line is charged against the signal just as would be a failure of the operating mechanism. If power is off the entire line and a train stops at each signal along the whole route, a failure is counted for each stop made by the train. It will thus be seen that the definition of signal failure used in this case is a very broad one and involves the necessity for a high degree of reliability in case a good record is made.

During the year of 1913 out of the 3,000,000 signal movements only four false clear indications were given. These are included with the other failures going to make up the percentage of perfect operation, but owing to the fact that they are of much more serious import than the ordinary failure they are here recorded separately.

For the purpose of checking the attention paid by trainmen to the signals surprise tests are conducted twice each year. These surprise tests are made by putting out signal lights, dropping signal blades just in front of a moving train after it has approached the signal under a clear indication, removing the blade from the signal entirely, and having the signal held in stop position by a maintainer who is working upon it and then giving a hand signal to proceed. Unless proper consideration is accorded to the unusual conditions the motorman is invariably disciplined. The results obtained thus far in the surprise tests which have been carried out have been, however, uniformly satisfactory, and practically no failures have been found in observance of rules on the part of the trainmen.

NEW CEDAR RAPIDS INTERURBAN

The Iowa Railway & Light Company, Cedar Rapids, Iowa, is just completing the first section of an interurban line extending eastward from Cedar Rapids. The line is practically completed to Mt. Vernon, and the larger part of the grading has been done between Mt. Vernon and Lisbon. Lisbon is 17 miles east of Cedar Rapids. It is reported that the line eventually will connect Cedar Rapids with Davenport.

The new line has exceptionally generous construction standards. It is built on a private right-of-way, 108 ft. wide, and although it extends through heavy rolling country, the grades have been kept low by doing a large amount of cutting and filling. All bridges are of permanent fireproof construction. The largest structure is a 140-ft. through truss, spanning the right-of-way of the main line of the Chicago & Northwestern Railroad. Shorter spans include through girders and concrete slabs. For supports most of the bridges have concrete piling.

The track is laid with 70-lb. rails, bonded with A. S. & W. "twin-terminal" bonds of No. 0000 capacity. Where the line passes through the street of Mt. Vernon, a high T-rail is being used, supported by Cârnegie steel ties imbedded in concrete.

The distribution system is designed for 1200-volt trolley operation. Current is supplied by the central station in Cedar Rapids which also feeds the Cedar Rapids and Iowa City division. Plans are under way for changing the distribution of the latter system from 600-volt to 1200-volt operation. Current is distributed by a 33,000-volt transmission line carried on "wishbone" arms at the tops of the trolley poles. When the road has been completed, the sub-stations will be located about 16 miles apart. At present, and until 1200-volt operation is begun, a portable sub-station located at Mt. Vernon feeds the extreme end of the trolley wire.

The trolley wire is catenary supported. The wire itself is No. 0000 capacity, and it is supplemented by a No. 0000 feeder. The catenary messenger is "copper clad." This latter kind of wire was used for the messenger, both to increase the conductivity and to assure long life to the mechanical support for the running trolley wire. The overhead catenary fixtures are of General Electric manufacture.

The catenary construction is carried through the small towns, being supported by heavy tubular steel poles and cross-spans.

The McGuire-Cummins Manufacturing Company recently delivered two cars to this company. These cars are of all-steel construction, 58 ft. long x 9 ft. 10 in. wide. They are equipped with M. C. B. radial couplers, and the bodies are mounted on McGuire-Cummins No. 70-A high-speed interurban trucks. Each car has four 205-B G. E. motors.

In its rolling stock equipment as well as in the construction of the roadbed, overhead and in the location of the route, the new eastern extension of the Iowa Railway & Light Company's interurban system contemplates heavy freight as well as high-speed service.

Cost of Money to California Public Utilities

An Analysis of the Conditions Under Which the Public Utility Companies in California Are Required to Raise New Capital—The Cost of Money—The Necessity of an Adequate Rate of Return

Some interesting testimony on the cost of money to California public utilities is found in the affidavit made by A. F. Hockenbeamer on March 2, 1914, in the case of the Pacific Gas & Electric Company vs. the City and County of San Francisco in the United States District Court for the Northern District of California, Second Division. Mr. Hockenbeamer has been connected with the Pacific Gas & Electric Company since Feb. 1, 1908, as comptroller, treasurer and vice-president, and previous to that time for three years was connected with N. W. Halsey & Company, bankers, New York.

RAISING OF NEW CAPITAL REQUIRED BY LAW

Mr. Hockenbeamer's affidavit says that the company is compelled under the law of the State to render satisfactory and adequate service and to extend its facilities to all residents within its territory who may be within 100 ft. of its main or distribution lines. The penalty for neglecting to do this within ten days after an application for service is $50, and $5 per day thereafter. The possible aggregate of such damages can be understood from the fact that during the calendar year 1913 the company connected 15,350 new customers to its distribution system within the city and county of San Francisco, and 28,452 to its entire distribution system.

The capital expenditures required for such connections were, of course, not limited to the cost of connections, and meters, but the company from time to time was obliged to enlarge its entire plant. Other capital expenditures become necessary when the company is required by law to place underground its street lines and various supply systems or to make other improvements. For various purposes the company has been obliged to spend during the past eight years more than $54,000,000 for capital purposes, and as a matter of self-preservation it must keep its system modern and efficient. For some years to come it will probably have to find between $5,000,000 and $10,000,000 new capital. It must also, according to the terms of its mortgages, secure money for its sinking fund payments to the extent at present of approximately $800,000 a year and later of $1,813,000 a year.

MARKET QUOTATIONS ON BONDS NOT A MEASURE OF RATE OF RETURN

The affidavit then says that public utility companies cannot sell their securities on as low an interest rate as municipalities or well-established steam railroads, and that the market quotations of their bonds do not correctly indicate the cost to the utility of the new capital required in the growth and development of its enterprise.

Where a company has to find a market for an average of approximately $10,000,000 of new securities per annum, like the Pacific Gas & Electric Company, it is not practicable to obtain its new capital through the sale of securities in small amounts directly to investors. It must dispose of them at wholesale to investment bankers who have the necessary capital or credit to pay for the bonds in cash when delivered. The cost to the public utility companies of marketing their bonds in this way, including the compensation to trustees under the mortgages, fees of counsel, commissions paid to bankers and official fees required under the law to be paid to the Railroad Commission of California, is considerable, and it amounts rarely to less than 5 per cent and frequently is 10 per cent or more of the par value of the securities thus sold.

DISTINCTION BETWEEN BONDHOLDERS AND STOCKHOLDERS

The affidavit then says that a distinction should be made between (*a*) what is a reasonable and fair rate upon investments made by a corporation in acquiring or directing or operating its properties for public purposes, and (*b*) the rate of interest at which the public utility corporation can borrow a limited portion of the capital necessary in the conduct of its enterprises.

There is also a fundamental difference so far as the rate of return to be permitted between the stockholders and the bondholders of public utilities. The former are partners in the enterprise, while the latter are merely creditors. The former assume all the risks of the business while the latter merely loan money secured by the stockholders' property, and the rate of return which would be attractive to a bondholder would not tempt investors to engage as owners in the same line of business. The affidavit then quotes several instances of prices at which it has sold its obligations during the past three or four years. When capital for investment purposes was normally abundant a thirty-year general and refunding mortgage 5 per cent bond sold on a basis of about 6.1 per cent annual return if held to maturity. Later, some securities of this same issue could not be sold on that basis. Other securities with a shorter term were sold on a basis of a considerably higher rate of return.

The accompanying table of issues of bonds of gas and electric companies in California from March 23, 1912, to Dec. 13, 1913, shows the names of the issuing utilities, title of the bond, the annual rate of interest, the minimum sale authorized by the commission, etc., and the approximate yield if held to maturity. This rate of return, of course, does not indicate the rate which must be allowed to utilities to give them a sufficient margin of profit, over and above such interest rates, to establish their credit and the consequent ability to dispose of these securities, nor does it include any of the expenses incident to the issue and sale of these securities, nor does it show the rate which must be allowed to the owners as distinguished from the creditors of the company. The list is not a list of selected bonds, but it embraces fifty issues authorized by the commission during the first twenty-one months of its existence, a period of varying degrees of stress and ease in the money market.

These bond issues have a total par value of $48,086,035. Of this total $10,892,000, or 23 per cent, representing those best secured, were authorized to be sold at prices netting the purchasers 5.34 to 5.92 per cent per annum; $26,955,500, or 56 per cent, were authorized to be sold to net the purchasers from 6 per cent to 6.96 per cent per annum, and $10,238,535, or 21 per cent, were authorized to be sold to net the purchasers from 7 per cent to 10.75 per cent.

UTILITIES MUST ISSUE STOCK AS WELL AS BONDS

Public utilities cannot conduct their enterprises entirely on borrowed capital—that is, on money raised through the sale of bonds. The amount of property pledged for the security of a bond must exceed in value the face amount of the bond. This is a generally recognized principle. The laws of California prohibit savings banks from loaning money on investments in excess of 60 per cent of their market value, and it is customary in public utility mortgages to limit the par value of the bonds sold to provide improvements to less than the actual cost of these improvements. The affidavit quotes clauses of this kind in the mortgages of the different utility companies, and the principle has been indorsed by the railroad commission.

COST OF STOCK MONEY OF PACIFIC GAS & ELECTRIC COMPANY

The Pacific Gas & Electric Company has $10,000,000 of 6 per cent cumulative preferred stock and $32,109,300 of common stock. Dividends at the rate of 6 per cent per annum have been paid on the preferred stock for a number of years, and the net earnings of the company are in excess of the sum required to meet these dividends. Although this stock is widely distributed, being held by more than 1200 investors at the present time, it is selling at about $87 per share, or on a basis to net the investors 7 per cent. This quotation represents dealings between investors. If it were possible for the company to increase the authorized issue of this stock or to create a new issue equally good for investment purposes and to sell such an issue in amounts commensurate with its needs of money for additions, improvements and betterments it would probably have to do so on a basis to net the purchasers not less than 7½ per cent. The common stock has paid dividends at the rate of 5 per cent from Dec. 15, 1911, to March 15, 1913. During this period the company has sold $3,000,000 par value of this stock at $58 per share net. At this price the return to the purchasers is more than 8.6 per cent.

The prices at which stock of other California public utility corporations has been issued with the authority of the railroad commission are quoted in the affidavit. In most cases they are based upon a yield per annum of 7½ per cent or more.

SURPLUS FROM OPERATION NECESSARY FOR CONFIDENCE

The affidavit then says that the price at which securities for new capital can be sold depends on the confidence of the investors in the certainty of return on such securities, and this confidence in turn depends upon the net profits which the enterprise makes or may be able to make. If the company does not show a rate of growth in its net profits commensurate with all additional capital invested, or if its own profits decline or remain stationary, its ability to raise new capital becomes impaired, and if its net profits are only barely sufficient to pay bond interest its bonds become speculative and can be sold only at a great sacrifice in price. This principle is so well recognized by both investors and bankers that it is customary to insert in the mortgages of public utility bond issues provisions that make the amount of bonds that may be issued dependent on the net profits of the utility and assure, as far as possible, a certain fixed relation between the amount of interest charges of the utility and of its net earnings available for the payment of such interest. A number of such provisions are quoted in the affidavit, and in some cases the net profits for a given term available for bond interest is required to be at least twice the amount of the interest on all the outstanding bonds. In other cases the proportion is one and three-quarters or one and one-half times the interest charge.

Names of Issuing Utilities	Description of Bonds	Unexp'd Life of Bonds, Years	Total Par Value Authorized by Commission	Date Authorized by Commission	Sale Price Authorized by Commission	Approx. Yearly Yield to Inv'st'rs if Held to M't'rity, Per Cent
Holton Power Co	F'st & Ref. 6%	39	$300,000	7- 3-12	.80	7.9
Indian Valley E., L. & P. Co	First 6%	40	81,535	8-23-12	.80	7.9
Mt. Whitney P. & E. Co	First M't'ge 6%	27	250,000	10-18-12	.95	6.39
Northern Cal. P. Co. Con	Deb. Notes 6%	5	500,000	8-14-12	.96	6.96
Pacific G. & E. Co	Gen'l & Ref. 5%	29	5,000,000	9-14-12	.85	6.09
San Diego Cons. G. & E. Co	First M't'ge 5%	27	250,000	9- 4-12	.94	5.43
San Joaquin L. & P. Corp	F'st & Ref. 5%	38	925,000	10-26-12	.87	5.80
Santa Barbara G. & E. Co	First M't'ge 6%	29	5,000	9- 7-12	.95	6.38
Santa Maria G. & P. Co.	6%	15	50,000	7-30-12	1.00	6.
Southern Cal. Util. Co	6%	30	10,000,000	11-13-12	.9675	6.24
Southern Counties Gas Co	First M't'ge 6%	29	47,000	10-14-12	.85	7.23
West Coast Gas Co	6%	40	100,000	11- 5-12	.80	7.9
Western States G. & E. Co	F'st & Ref. 5%	28	351,000	6- 7-12	.875	5.92
Western States G. & E. Co	F'st & Ref. 5%	28	600,000	9-20-12	.875	5.92
West Coast Gas Co	First M't'ge 6%	40	250,000	11- 5-12	.80	7.9
Indian Valley E., L. & P. Co	Notes 7%	. .	. . . . . .	8-25-12	1.00	7
Imperial Valley Gas Co	First M't'ge 6%	17	154,600	1- 8-13	.80	8.12
Western States G. & E. Co	F'st & Ref. 5%	28	397,000	1-10-13	.885	5.84
Southern Cal. Edison Co	Gen. M't'ge 5%	27	2,500,000	1-27-13	.92	5.58
San Diego Cons. G. & E. Co	First M't'ge 5%	26	204,000	2-11-13	.95	5.34
City Electric Co	First M't'ge 5%	25	833,000	2-24-13	.84	6.25
Southern Counties Gas Co	First M't'ge 6%	28	5,500	3- 1-13	.85	7.2
Great Western Power Co	First M't'ge 5%	33	4,411,000	3-11-13	.90	5.56
Los Angeles G. & E. Corp	F'st & Ref. 5%	26	900,000	4-10-13	.945	5.38
Sacramento Natural Gas Co	First M't'ge 6%	28	193,000	4-24-13	.95	6.39
Mt. Whitney P. & E. Co	First M't'ge 6%	26	250,000	4-25-13	.95	6.40
Southern Counties Gas Co	First M't'ge 6%	28	8,000	5- 3-13	.85	7.2
Pacific G. & E. Co	Debenture 6%	10	5,000,000	5-15-13	.95	6.69
Southern Counties Gas Co	First M't'ge 6%	28	4,000	6-11-13	.85	7.2
San Diego Cons. G. & E. Co	First M't'ge 5%	26	180,000	6-30-13	.85	6.21
Beaumont Gas & Power Co.	Notes 8%	5	5,000	7- 2-13	1.00	8.
Economic Gas Co	First M't'ge 5%	28	270,000	7-10-13	.83⅓	6.35
Santa Barbara G. & E. Co	First M't'ge 6%	28	100,000	7-10-13	.95	6.39
California Tel. & L. Co	First M't'ge 6%	30	350,000	6-17-13	.94	6.42
San Joaquin L. & P. Corp	F'st & Ref. 5%	37	1,776,000	7-12-13	.80	6.50
Southern Counties Gas Co	First M't'ge 6%	28	75,000	8- 6-13	.85	7.2
Western States G. & E. Co	F'st & Ref. 5%	27	354,000	8-30-13	.885	5.83
Western States G. & E. Co	F'st & Ref. 5%	27	75,000	10- 2-13	.825	6.35
Midland Counties Pub. Serv. C	First M't'ge 6%	40	1,559,000	10- 1-13	.92	6.55
Pacific G. & E. Co	Gold Notes 6%	1	7,000,000	9-24-13	.955	10.75
Sonoma Valley L. & P. Co	First M't'ge 6%	30	30,000	9-30-13	.825	7.4
Amador Light & Power Co	First M't'ge 6%	16	12,000	10- 2-13	1.00	6.
Hemet-San Jacinto Gas Co	First M't'ge 6%	13	3,000	10- 8-13	.825	7.1
Napa Valley Electric Co	First M't'ge 6%	17	20,500	10-14-13	1.00	6.
San Diego Cons. G. & E. Co	First M't'ge 5%	26	27,000	10-29-13	.85	6.21
Coast Valleys G. & E. Co	First M't'ge 6%	38	114,000	10-30-13	.90	6.75
San Diego Cons. G. & E. Co	First M't'ge 5%	26	41,000	11-14-13	.85	6.21
California Tel. & Light Co	First M't'ge 6%	30	100,000	11-21-13	.94	6.46
Mt. Whitney P. & E. Co	First M't'ge 6%	26	250,000	12- 5-13	.95	6.40
Coachella Val. Ice & E. Co	6%	31	300,000	12-13-13	.80	7.6

NOTES TO TABLE

San Diego Consolidated Gas & Electric Company—First Mortgage Bonds. These bonds are secured by an absolute first mortgage on all property of the San Diego Consolidated Gas and Electric Company. Further bonds may be sold only for 75 per cent of the cost of improvements when net earnings equal at least double the interest charges. A renewal fund is provided, to which must be paid an amount equalling 3 per cent of outstanding bonds from 1910 and 5 per cent from 1915 to 1938. Profit and loss statement for the year ended Dec. 31, 1912, shows net earnings of $511,767.01 and bond interest of only $159,002.82. This must therefore be regarded as an exceptionally high-grade first mortgage public utility bond. The later entries referring to these bonds show subsequent authorizations by the Railroad Commission of sales of bonds of this issue to yield 6.21 per cent.

San Joaquin Light & Power Corporation. The first entry shows that the company was permitted to sell its first and refunding bonds on a 5.80 per cent basis. This utility was subsequently authorized by the Railroad Commission to sell additional bonds of the same issue on a 6.50 per cent basis.

Western States Gas & Electric Company—First and Refunding Mortgage Bonds. These bonds may be issued for betterments and improvements only at 75 per cent of cost and only when net earnings for twelve months preceding have been at least twice the fixed charges on all bonds outstanding and contemplated to be issued. Sinking fund amounts to ½ per cent semi-annually of outstanding bonds from Dec. 1, 1912, to June 1, 1914, inclusive, 1 per cent semi-annually from Dec. 1, 1914, to June 1, 1919, inclusive, and 1¾ per cent thereafter to maturity. They are secured by a first lien on all of the property of the Western States Gas & Electric Company subject only to a prior lien of a portion of an underlying closed issue of $419,000. Net earnings for year ended April 30, 1913, reported as $514,659, interest charges $216,806, balance over interest charges $297,853. This must therefore be regarded as an unusually good bond. As shown in the last entry the Railroad Commission authorized bonds of this issue to be sold on a basis of yield of 6.35 per cent per annum.

Southern California Edison Company—General Mortgage Bonds. These bonds may be issued to reimburse the company for not more than 75 per cent of the cost of improvements, providing net earnings for the preceding year are equal to at least one and three-fourths times the interest charges on all bonds issued and to be issued. Annual sinking fund of 2 per cent of all bonds outstanding under this mortgage and underlying mortgages began in 1910. Net earnings reported for twelve months to Sept. 30, 1913, were $2,295,924, as against total interest charges of $793,358, a balance over interest charges of $1,502,566. This must be regarded as an exceptionally high-grade public utility bond.

Great Western Power Company—First Mortgage 5's. These bonds are selling in the open market at a fraction over 80 per cent of their par value, at which price they yield to the purchasers thereof, if held to maturity, approximately 6½ per cent per annum. Affiant has been informed, and believes, that these bonds have not been sold by the utility in question.

Los Angeles Gas & Electric Corporation—First and Refunding 5's. The bonds of this issue may be issued to cover only 75 per cent of the cost of improvements, extensions, etc., but only when net earnings for the preceding year shall have been one and three-fourths times the interest charges on all bonds outstanding and those applied for. An annual sinking fund of 2 per cent of outstanding bonds began July 1, 1910. The net earnings of this utility for the year 1912 were reported as $1,876,620, with interest charges of $396,405, leaving a balance after interest of $1,480,215. This must be regarded as a high-grade public utility security.

Public utilities can obtain capital only in competition with the demands for capital in other lines of business. As the demand for capital in other enterprises in California is large, many of the public utilities have had to seek capital in the Eastern States and in countries of Europe, and this condition has contributed to the difficulties of securing new capital and has increased the cost of doing so.

PROFITS IN THE BANKING BUSINESS

Quotations are then made from the annual report of the Comptroller of the Currency dated Dec. 1, 1913, in which statistics were given of the earnings of all the national banks of the country. The net earnings totaled $160,980,084, and dividends were paid to the amount of $119,906,050, or at the rate of 11.4 per cent as against an average of 11.01 per cent during the prior five years. Dividends based on capital and surplus averaged 6.75 per cent for the year, but the net earnings to capital and surplus were 9.06 per cent. The per cent of dividends to capital in the different divisions of the country were: New England, 8.61 per cent; Eastern States, 12.16 per cent; Southern States, 11.21 per cent; Middle Western States, 10.52 per cent; Western States, 15.08 per cent; Pacific States, 11.94 per cent.

The affidavit calls attention further to the fact that the failure of national banks has averaged less than 12 per annum since 1865, and that among the businesses devoted to the service of the public there is no cleaner, safer and more easily liquidated business than that of banking under the national bank act. On the other hand, the property of the gas and electric enterprise is irretrievably placed in the service of the public and the owners cannot, if they will, liquidate the affairs of the corporation and distribute its assets. Moreover, the financial, engineering, operating and commercial management of such enterprises is constantly beset with hazards and difficulties arising from financial stringencies, from competition with other forms of energy, from actual and potential competition of other like utilities, from the actual and potential competition of municipally owned utilities, from the diminution of earnings through the improvement of lamps and current consuming devices, from the constantly growing burden of taxation, from the constantly increased cost of labor and continual demands by organized labor for higher wages, from changes in the processes of manufacture, from regulation of rates, etc. The speaker believed that if under government regulation capital in banking was permitted the profits mentioned, the gas and electric enterprises of the State should certainly not be limited to any smaller rate of return.

SUMMARY

Mr. Hockenbeamer summarizes the statements in his affidavit as follows:

"1. That the law compels constant expansion of plaintiff's facilities and corresponding increase in its investment.

"2. That plaintiff must raise from $5,000,000 to $10,000,000 of new capital per annum for new construction, and additional large sums for the payment of maturing obligations and other purposes.

"3. That market quotations on bonds do not measure the cost to utilities of borrowed capital.

"4. That plaintiff's stockholders are entitled to a greater return on the value of their property than the mere cost to them of borrowed capital.

"5. That it has cost plaintiff from 6.1 per cent to 10.75 per cent per annum to borrow money on secured obligations, exclusive of necessary expenses.

"6. That in twenty-one months the Railroad Commission of California authorized the issuance and sale of more than $37,000,000 of secured obligations of California gas and electric corporations at prices making the cost to these utilities of the money so borrowed from 6 per cent to 10.75 per cent per annum.

"7. That plaintiff must obtain a large proportion of its new capital from stockholders.

"8. That the best price at which plaintiff was able to sell $3,000,000 of its stock was on an 8.6 per cent basis of yield.

"9. That the Railroad Commission of California has authorized various gas and electric utilities to sell an aggregate of $3,327,500 par value of preferred stock on a basis of yield of 7.5 per cent, and $3,000,000 of common stock on a basis of yield of 7.74 per cent.

"10. That there must be a substantial margin of earnings in excess of interest and dividend requirements to make stocks and bonds salable and to provide for other necessary charges against net earnings.

"11. That the utilities of California must offer their stocks and bonds in competition with thousands of other investment securities and must make them to conform to the standards of safety demanded by investors.

"12. That California utilities cannot raise the required new capital in the home market owing to other demands and to the many other profitable avenues of investment open to such home capital.

"13. That capital in large amounts is safely employed in the business of banking under the national bank act at an average annual profit in excess of 9 per cent.

"14. That, owing to severe competition capital employed in the electric light and power business in San Francisco is exposed to unusual hazard and uncertainty of return."

CONCLUSION

In his conclusions Mr. Hockenbeamer expresses the opinion that unless his company is able, and is permitted, to derive net profits from the operation of its business equivalent to at least 8½ per cent per annum upon the money invested or to be invested in its enterprise, it will be unable to obtain the additional capital necessary to carry on its business.

He is also of opinion that the capital employed by the company in its electric business in the city and county of San Francisco could not, under existing conditions, be persuaded to embark in its enterprise without the reasonable assurance of a return of at least 10 per cent per annum.

LAUBAN-KÖNIGSZELT SINGLE-PHASE LINE

Experimental operation of the electrified Lauban-Königszelt line of the Prussian-Hessian State Railways in Silesia is now under way. On March 14 the 80,000-volt transmission from the power station at Mittelsteine to the substation at Niedersalzbrunn was connected up electrically for the first time. During the two weeks following the transformers, oil switches and other apparatus were baked out as a preliminary to the opening of service on April 1 between Niedersalzbrunn to Bad Salzbrunn. Trial trips have also been made on the section between Niedersalzbrunn and Conradsthal. The tests are being conducted with a triplet type of articulated car, the center body of which carries a pair of pantographs. In a special trial on April 7, this triple unit hauled two steam-type trailers.

Two ball clubs will be put in the field by the Metropolitan Street Railway, Kansas City, Mo. One of the teams will be comprised of general office employees, while the other will be made up of shop attachés. The uniforms will be provided by the company.

Third Avenue Railway Truck-Overhauling Shop

The Writer Describes the Course of Truck Wheel and Axle Overhauling and Gives Some Figures on Time and Cost of Truck Handling

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT THIRD AVENUE RAILWAY SYSTEM

Owing to the fact that the Third Avenue Railway, New York, had increased its number of passenger cars operated from 800 in 1909 to 1050 a day in 1913, with a corresponding rise to about 5,000,000 car miles a year, it became necessary for our company to change the general plan of its truck repair shop. Originally jib cranes and air hoists had been placed alongside of a gallery onto which the cars are run from the carhouse in front of the shops. The cars were then jacked up by a 20-ton traveling crane, and the trucks were removed and lowered to a single track in the truck repair shop.

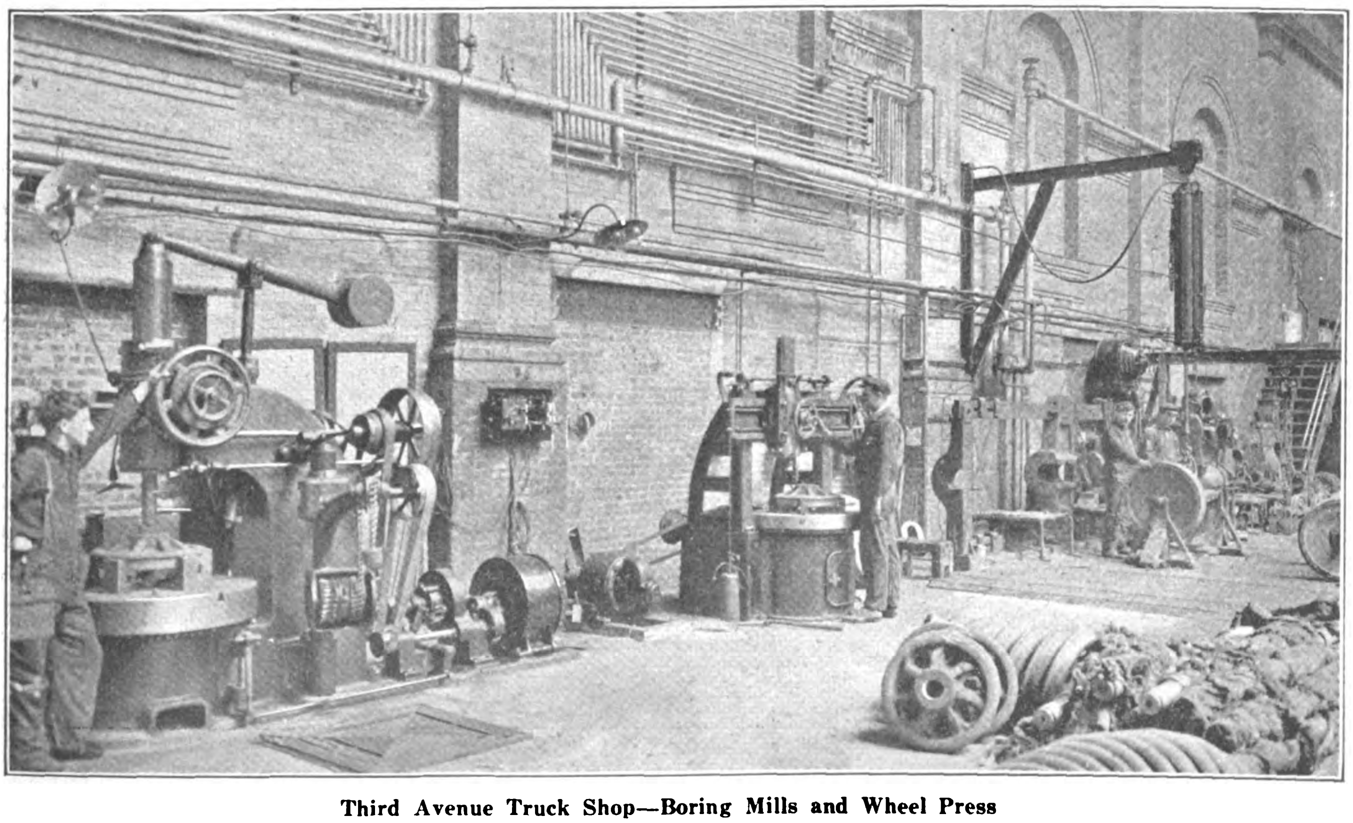
The increase in the number of cars has made it necessary to install an additional track for truck overhauling. The jib cranes and hoists have also been shifted from the side of the gallery and placed between the two overhauling tracks, as shown in an accompanying view. This change relieves the large crane by enabling the men to use the hoists in removing motors and wheels from trucks on both tracks. The displaced motor repair shop was then installed in the cellar of the truck repair shop as described in the ELECTRIC RAILWAY JOURNAL for March 21.

This shop insures abundant space for the truck and compressor overhauling of six cars a day, the present schedule. The jacking up of cars on the gallery and the removal of trucks onto the truck shop floor permit the equipment attached to the under part of the car body to be entirely exposed and easily accessible, thus aiding the inspection of loose parts and other defects. When cars are run onto the gallery two men require about twenty minutes each, with the aid of the large crane, to jack up the cars, disconnect the trucks and deposit the latter on either of the overhauling tracks. Two men then strip the truck of motors, wheels, etc., the wheels being deposited by the crane alongside of the wheel lathe while the motors are lowered into the electrical shop, all within one hour.

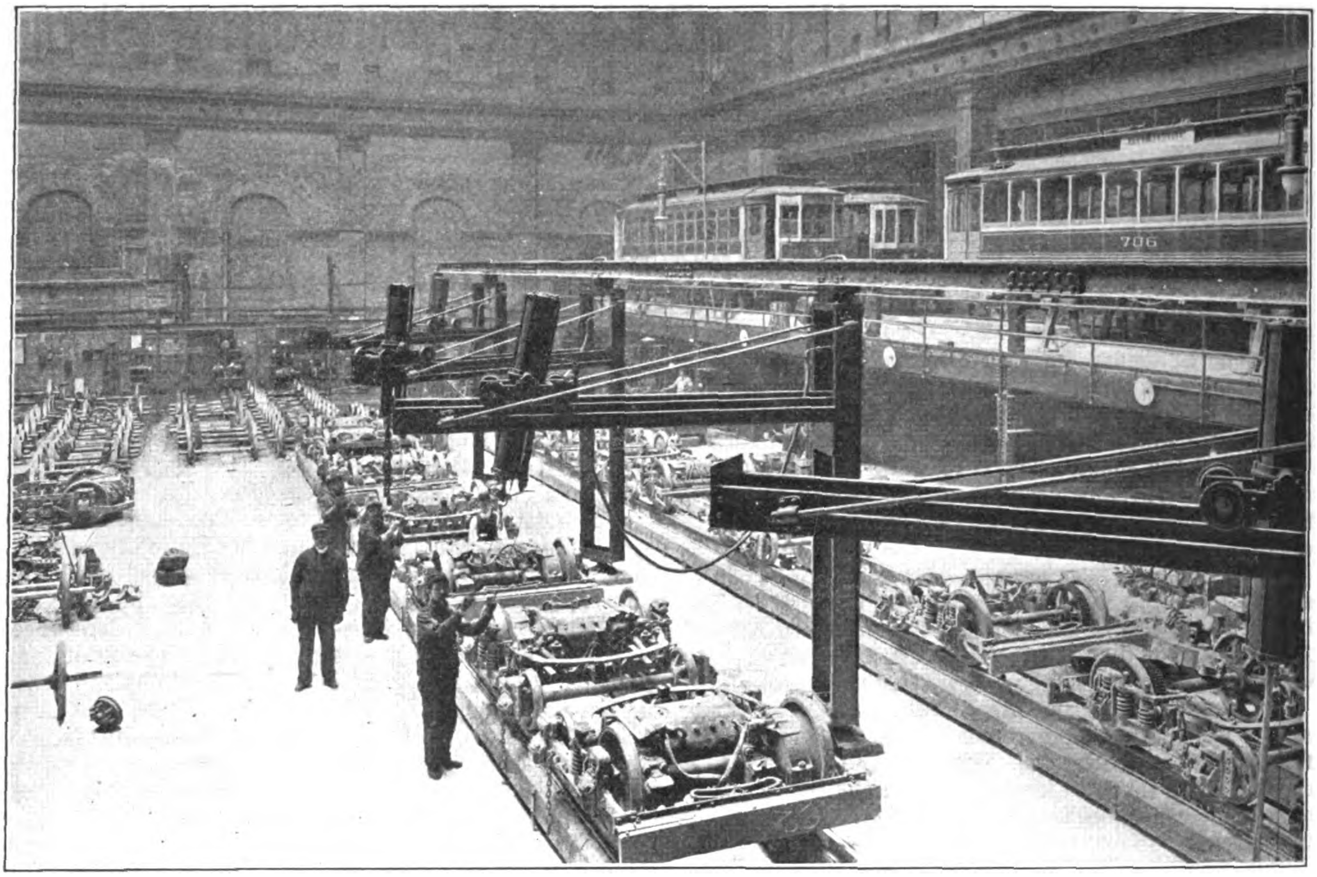
The wheel lathe is of Niles-Bement-Pond type with individual motor drive like all of the other tools in the shop. It is set up at the end of the overhauling tracks, and on it one man will average twelve pairs of steel wheels a day. The lathe is fitted with cutters of Jessop's "Ark" high-speed steel. The same material is used also on the axle lathe and boring mill. In addition to this, Jessop's carbon tool steel is used for chisels, punches and dies. The tools next the lathe are two boring mills, a Niles-Bement-Pond 300-ton wheel press, which presses in one hour on an average of four pairs of pony wheels or in one day the wheels and gears of approximately twenty driver axles. The axle turning lathe is mounted in front of a boring mill. Pony and other cast-iron wheels are handled at the opposite end of the shop by means of a Hampden grinder. This tool grinds from fourteen to twenty pairs of wheels a day. It is fitted with an adjustable bearing, which permits it to take journals up to 6½ in. and wheels from 18 in. to 36 in. in diameter. This tool was described in the ELECTRIC RAILWAY JOURNAL for May 25, 1912.

Among the tools in other parts of the shop is the Acme bolt-cutting and threading machine, here illustrated, which has reclaimed thousands of dollars from the scrap pile, besides enabling the men to obtain quickly whatever bolts are necessary for their work.

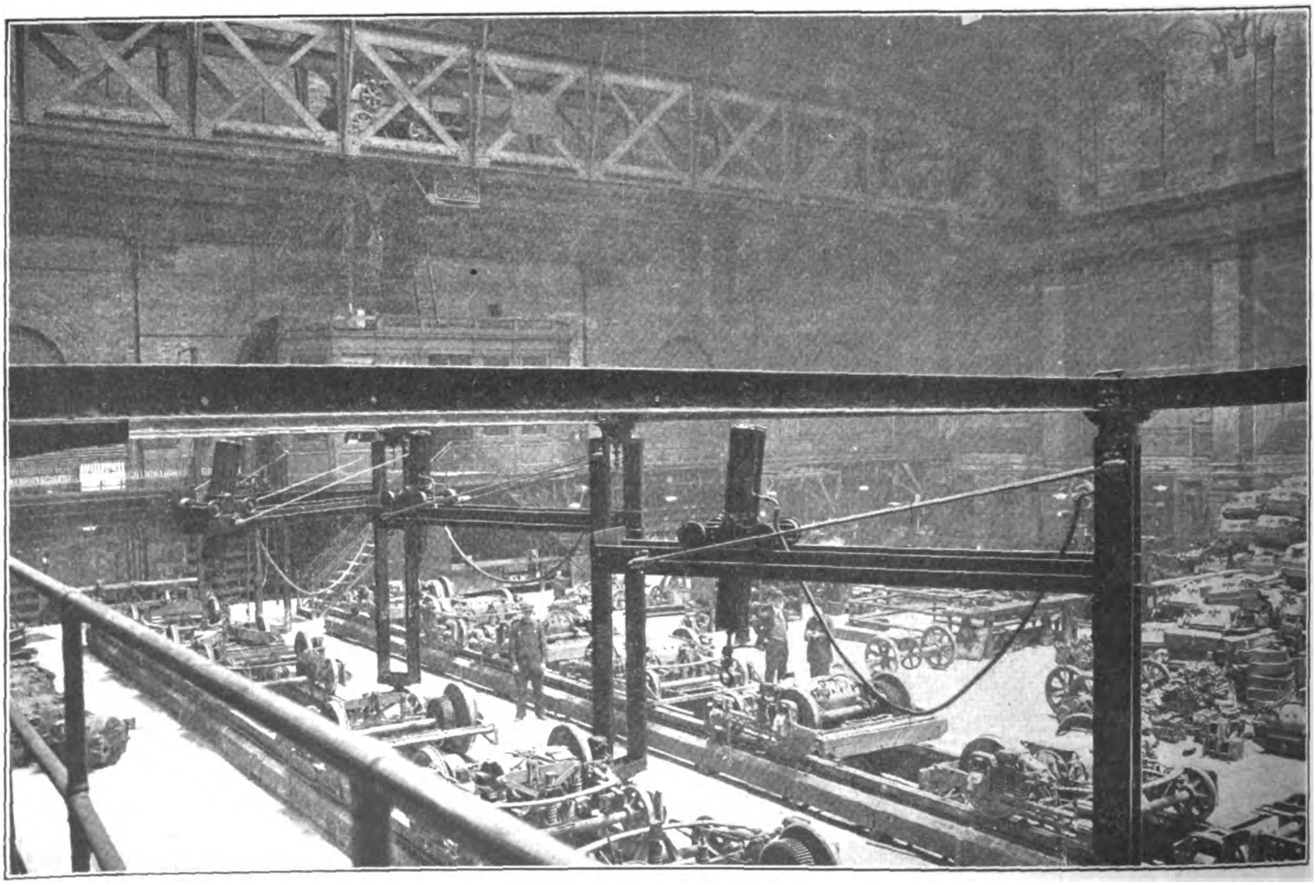
The high-speed drill illustrated was furnished by Montgomery & Company, New York. This machine is



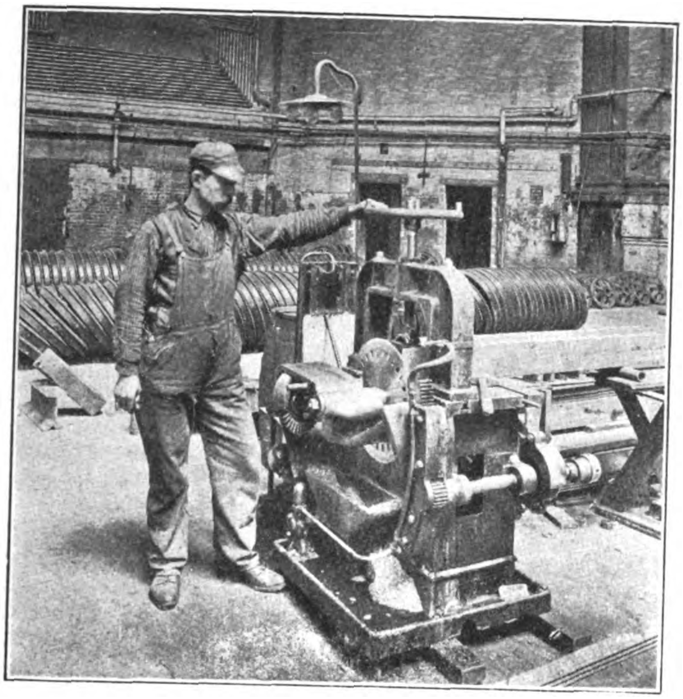
Third Avenue Truck Shop—Boring Mills and Wheel Press



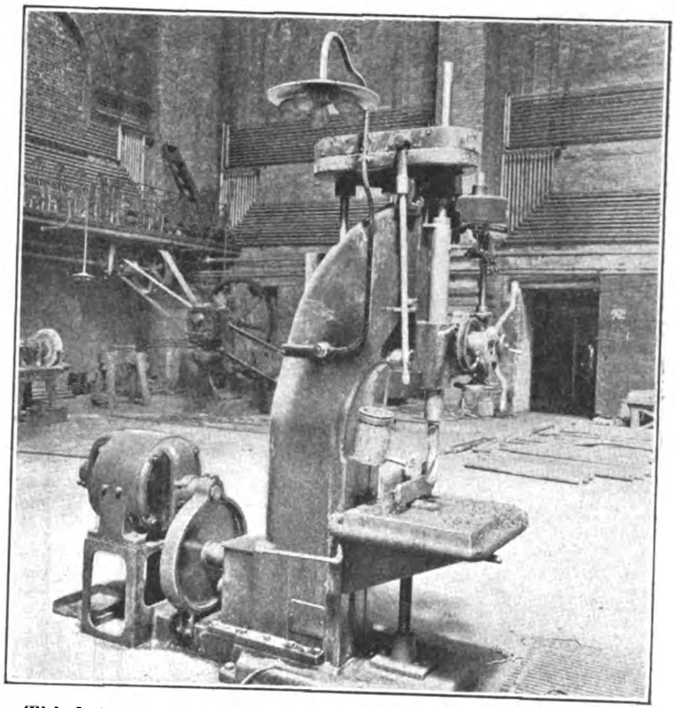
Third Avenue Truck Shop—General View Looking Toward the Wheel and Axle Tools at the Rear—Also Showing Use of Jib Cranes



Third Avenue Truck Shop—General View Looking Toward Carhouse and Showing Air-Operated Jibs Alongside the Gallery Where Car Bodies Are Raised Off of the Trucks



Third Avenue Truck Shop—Cold Saw for Cutting Rails



Third Avenue Truck Shop—Drill for High-Speed Steels

capable of drilling holes of from ¼ in. to 2 in. in diameter. It is located next to the blacksmith shop, the door of which can be seen in the background. The air-compressor overhauling department is situated under the gallery onto which the shopped cars are brought.

The motor overhauling shop is conveniently situated in a room immediately under the truck repair shop. It is reached by way of two stairways, while a large opening in the floor of the truck shop permits the crane to be used for all transportation of heavy parts. This shop also adjoins the electric welding room.

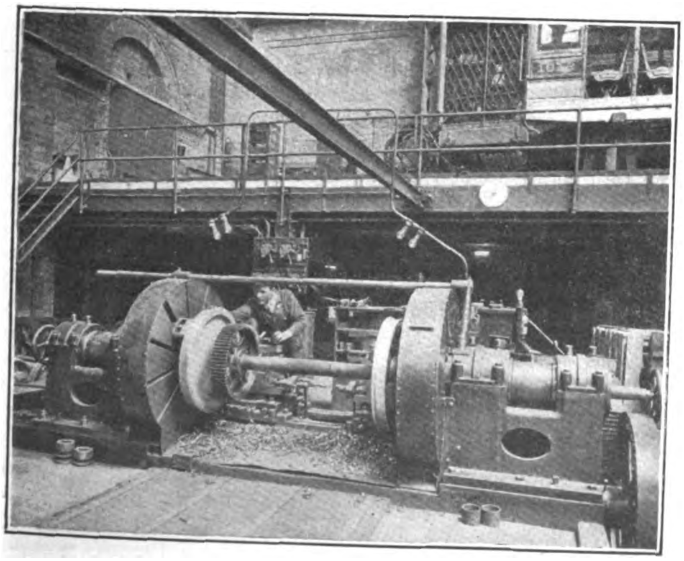
The truck shop is accessible from the side street via a large door which is used principally for the delivery of wheels, axles and other heavy material and also for hauling away scrap. All rails which are to be cut up into "dutchmen" for use by the track department are taken through this door into the truck shop to the Higley rail saw illustrated. This tool is capable of cutting twenty-five lengths of 9-in. rail a day.

SHOP MANAGEMENT

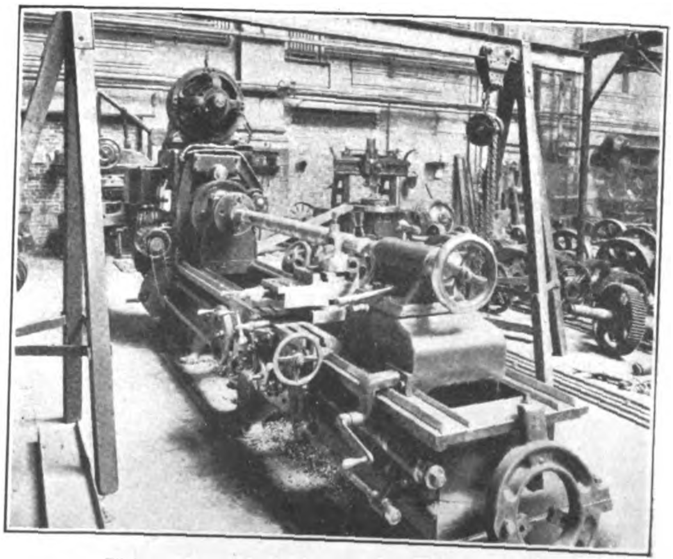
From an economic standpoint, it is very essential to have the general overhauling foreman anticipate as far as possible the required amount of material on hand for the repairs of the trucks so that little time will be lost in waiting for material. For this reason, one man is assigned to the task of getting all material from the general storeroom, thus avoiding the need for any man to leave his work. This man also brings whatever parts need repair to and from the blacksmith shop or welding plant.

When a car has been thoroughly overhauled by the several departments, it is run out into the carhouse by way of the gallery. Here it is examined again by a general inspector. This checking system has proved very satisfactory, for during its use for the past six years not one car has been "pulled in" because of faulty overhauling.

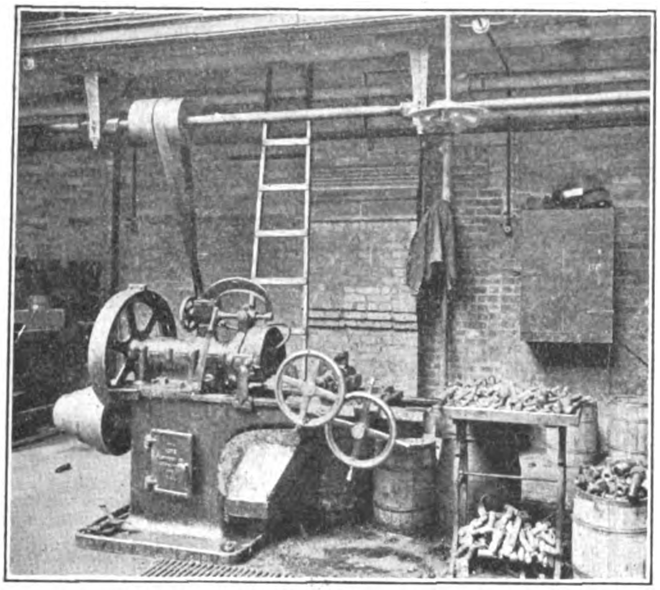
Two men are assigned to overhaul each truck, making four men per car. In the case of the Brill 22-E truck, the time taken for depositing the truck and stripping it of motors and wheels averages approximately six hours at a labor cost of $2.50. The 39-E truck, which is most used on our system, costs much less. Thus,



Third Avenue Truck Shop—Wheel Lathe



Third Avenue Truck Shop—Axle Lathe



Third Avenue Truck Shop—Bolt Renewing Machine

two men average eight hours to strip and reassemble a 22-E truck complete at a cost of $3.36, while the same two men can handle the 39-E truck in six hours at a cost of $2.52.

THE A. E. R. A. FARE RESEARCH BUREAU

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of May 9, 1914, page 1037, of the organization of the bureau of fare research of the American Electric Railway Association. Elsewhere in this issue the appointment of Frederick W. Doolittle as director of the bureau is announced. The objects of the bureau as reported by the committee on the cost of transportation service to the 1913 convention are as follows:

1. The determination of the factors affecting the cost of passenger service, including investment, investment charges, operating expenses, length of haul and traffic density and the distribution to member companies of the results of these studies as far as they are complete, the whole to be developed in as simple language as the subject permits.
2. The assembling, statistical compilation and distribution of various operating data now being received by the secretary of the association.
3. The assembling, statistical compilation and distribution of financial operating results of member companies.
4. The study of unusual conditions affecting either the rate of fare received or the operating expenses of electric railways and the distribution of the results of such study.
5. The providing of a source of authentic, accurate and detailed compilation relating to the economics of the subject of rates of fare on which member companies may draw when in need of such information.

There is a marked difference of opinion as to the definition of fixed and variable cost factors which go to make the basis of fare-rates. Many of the problems affecting these things are analogous for railroads and electric and gas companies, as has been brought out in various rate cases, and one of the duties of the bureau will be to assemble such plans of expense apportionment as have been accepted by courts and commissions where cost of service was in question.

The application of units of comparison for determining operating costs is another matter about which there has been much disagreement. While many roads use the same system of accounts, practically no attempt has been made to standardize the units to be applied in the analysis of such accounts. Because of errors in the choice of units of comparison, very often the entire conclusions of analysis are open to question. It will be one of the first duties of the bureau to standardize these units in order that the data compiled from the reports of commissions and member companies may be uniform.

The bureau is also to investigate the question of depreciation as affecting the return upon the investment or value for rate-making purposes. Traction valuations made by courts and commissions will be analyzed, comparisons of unit costs, comprising the physical valuation made, and the work of determining the extent of accrued depreciation of overhead expenses and other mooted questions in rate cases inaugurated by various committees of the association will be carried on.

The question of the method of assembling costs in order to determine the paying length of haul will be gone into with the idea of arriving at a correct method of determining the facts. Data will be gathered and analyzed in order to secure, if possible, a method for estimating and discounting future operating conditions. The transfer question, including the effect of transfers in stimulating traffic, the experience with universal and continuous transfers and the cost of transfers, is another subject which the bureau will consider. Data on the cost of rush-hour service will be compiled by the bureau from the experience of electric railways and will be made available for use to the association's members. Rapid transit, interurban and suburban rate readjustments and the recent tendencies of the valuation decisions of the Cleveland and Toledo fare situations are some of the other subjects which will properly come under the scope of the bureau.

NEW PARK FOR INSULL PROPERTIES

The southern Indiana Insull properties have been particularly active this season in furthering business-getting enterprises. The latest thing is the improvement of a twenty-four acre tract on Silver Hills, a series of knobs near the Ohio River to the southwest of New Albany, Ind. This tract has been cleared and needed shelters constructed and park benches, etc., added. It has been named Silver Hills Grove and it is advertised as "Nature's Own Park, 300 Feet Above the Ohio River." The lines of the Louisville & Northern, Louisville & Southern Indiana and the local Jeffersonville and New Albany lines, as well as the electric lighting plant of the Insull interests, will profit by the business that results. The calendar of the companies is signed for practically all of the summer with dates for Sunday school, lodge and other picnics. Another enterprise encouraged by the same interests is Glenwood Park, between Jeffersonville and New Albany. It is the scene every summer of the meetings of the Glenwood Chautauqua, and, like the Silver Hills Grove venture, draws a very large part of its patronage over the Insull lines from Louisville, Ky., which is just across the Ohio River.

INTERSTATE CLASSIFICATIONS OF ACCOUNTS

Advices from Washington say that the new Interstate Commerce Commission classifications of accounts are awaiting the approval of the commission. The effective date of the new classifications will be July 1, 1914, but it is impossible to state now the exact date when the classifications will be promulgated.

Spring Meeting Pennsylvania Association

At This Meeting of the Pennsylvania Street Railway Association P. T. Reilly of Scranton Presented a Paper Entitled "Transportation Comments," and Cecil G. Rice of Pittsburgh One on "Accident Analysis"

The spring meeting of the reorganized Pennsylvania Street Railway Association was held at the Board of Trade Building, Harrisburg, on May 12 and 13. The meeting was attended by about 100 delegates from every part of the State, the largest attendance in many years. The first regular session was opened at 2.30 p. m. on Tuesday with President C. L. S. Tingley in the chair.

GOVERNOR TENER'S REMARKS

The first order of business was an address of welcome by Governor John K. Tener. Mr. Tener said that from what he knew of Pennsylvania street railway men, their deliberations would result only in good for the community. He remarked jokingly that his connection with the street railway business went no further than that of being a stockholder in several lines, but he did not know much about the technical details. He did appreciate fully, however, the great advances which had been made in the improvement of electric railway transportation. He regarded the Public Service Commission as the go-between of the State government and of the railways. Certainly the present executive, the majority in the House and in the Senate would not determine upon any drastic measure or endeavor to put through any bill that would work hardship on the electric railways.

The minutes of the previous annual meeting were then read. The constitution and by-laws were adopted as approved by the executive committee.

PRESIDENT'S ADDRESS

The next order of business was the address of the president, C. L. S. Tingley. Mr. Tingley presented a short retrospect of the history of street railway transportation in Pennsylvania beginning with the charter granted on April 4, 1854, to the Frankford & Southwark Philadelphia City Passenger Railway. He showed by quotations from the statutes how a great body of street railway law had been built up from the first simple enactments.

In much the same manner Mr. Tingley traced the technical development of the electric railway, and he put particular stress on the rapid obsolescence of the successive types of equipment used by the present electric street railways.

In his judgment the government cannot treat the public utilities as it treats private enterprise. The answer to this question must be "No," for the government fixes the rate at which the public utility sells its service and may thereby prevent the recouping of development losses. On the other hand, the private enterprise fixes its own rates and in the event of competition preventing adequate returns may pocket its loss and go out of business, whereas the public utility must perform its public duty and continue to furnish service whether it makes a profit or no.

The public is composed of all the people, and in that public are included not only the consumer but also the investor, and the investor is just as much entitled to the beneficent influence of government as is the consumer. To quote from a recent address by Charles A. Prouty:

"Many persons seem to hold the opinion that the government in dealing with monopolies like the railroad owes nothing to the investing public. *Caveat emptor* (Let the buyer beware)! Such has never been my thought. The investor is a necessary part of the well-balanced State and is often in need of protection from public authority. It is the duty of the government, within reasonable limits, to see to it that the would-be investor is not hoodwinked in the making of his investment and that the value of his investment when once made is not improperly destroyed."

This is a doctrine which all regulators of public service would do well to bear in mind, especially in view of the facts with respect to the railway industry which will be disclosed by the records of the Bureau of Railways in this State and which will unquestionably be written large in the records of our Public Service Commission. The facts are that a very large majority of the street railways in Pennsylvania have never made any return to their owners and in all probability some of them never will. Their only justification for existence is that they perform useful public service in their communities, without which their communities would languish and stagnate.

He did not agree with Mr. Prouty, however, that the expression "unearned increment" could be applied to the increase in the value of a railway's right-of-way because of the growth of the city which it served. He asked, would Philadelphia, Pittsburgh, Scranton, Reading, Harrisburg and other towns be teeming, thriving centers of population to-day if it had not been for the foresight, the nerve and the enterprise of the projectors of the public utilities of the Commonwealth of Pennsylvania?

The electric railway business had entered upon a new era in the State of Pennsylvania. The last Legislature in its wisdom had created a commission to regulate and supervise the electric railway industry. This commission could be an instrumentality of great good or it could be an instrumentality of tyranny and oppression. He believed it will be the former. While there were many things in the law creating that commission which personally he would like to see changed, yet they were mostly questions of detail. On the whole he believed that the law was good.

The governor had given them commissioners of whom the State might well be proud. They were men of broad and highly educated minds, men of integrity and standing and before whom no man need fear to stand and argue for his rights. They were, however, largely uninformed as to the details of the electric railway business, and it was up to the railway men, by a fair, free and frank discussion of all matters which come before them to educate them in the intricacies of the electric railway industry; and this education must not stop with the commission. The people must also be educated to deal justly with public utilities.

There had been much outcry against the lobby, but no man had the right to point the finger of scorn at the man who in a lawful and open manner petitions the Legislature for what he believes to be his right. The public must be educated on that line. What is more important still, the public must be educated to select fit men to sit in the halls of legislation. The public utilities of Pennsylvania to-day were asking nothing but justice and fair dealing, they were asking nothing but a right to live and get a reasonable return upon the money invested in their property, but they were asking that they should be protected in that right. They should, therefore, endeavor to see to it that the electorate in their home communities select men of intelligence and integrity to represent them in the Legislature, men who will not be influenced to do that which is unjust or inequitable simply because there appeared to be a momentary popular clamor for the doing of that thing, men who will leave to the body which the State has created the adjustment of all matters of detail with respect to the electric railway business, men who will not take snap judgment and pass hasty and ill-considered legislation affecting electric railway interests vitally, and who will legislate only when the commission advises them that it has not sufficient powers in the laws already upon the statute books.

TREASURER'S REPORT

H. M. Stine, secretary and treasurer, reported the receipts and expenditures of the association for the six months ending May 5, 1914, as follows: Balance last report, $1,471.96, plus dues and membership fees, including a balance of $264.91 from the absorbed Keystone Club, $2,206.87; expenditures, $660.84; balance in treasury, $1,546.03.

TRANSPORTATION COMMENTS

The next order of business was a paper entitled "Transportation Comments," by P. T. Reilly, superintendent of transportation Scranton Railways. Mr. Reilly first discussed relations with the public. Street railways were now recognized as public utilities and their operators were considered public servants. The legislative enactments of city, county and State and the demands of labor union representatives all expressed the voices of the people. Hence it was more necessary than ever for the street railway operator to be acquainted with his public and to give that public a proper knowledge of railway problems.

The passenger wanted safety, courtesy and at least reasonable convenience. These requirements were met to a wide degree by selecting careful and competent platform men. It was the practice of his company to pay no attention to letters of introduction or recommendation, but to size up a man even before handing him an application blank.

With regard to demands for more service, Mr. Reilly said it was the duty of the operator to educate his public about the financial side of the business. The American people were disposed to treat fairly those who were honest with them. A superintendent could not call the people into his office, give them seats and tell each individual why certain schedules were not maintained, why certain business was unprofitable or why more cars were not operated, but he could reach all of them through the public press.

EXPLAINING SERVICE COST TO THE PUBLIC

As a concrete example of effective publicity, Mr. Reilly mentioned the recent Billy Sunday revivals at Scranton. At first, it was the general impression of most Scrantonians that the extra business of the street railway in taking the crowds to and from the tabernacle was very profitable. Toward the end of the revival campaign, however, the newspapers were presented with the figures on the business derived from this source. The data were published and commented on freely, and the public learned that the company had actually lost money on this short-peak traffic. The reasons for a loss instead of a gain were due to the following conditions:

The tabernacle was located in Scranton on a double-track line about 1½ miles from the center of the city. It seated about 9000 people and accommodated about 12,000 in all. The afternoon business did not amount to much except on Mother's Day and the day on which Dr. Sunday preached on "The Second Coming of Christ." The evening crowds were always so good that on many occasions thousands of persons were turned away. The night crowds started for the tabernacle about 5 p. m., and the rush was on during the 6 o'clock peak load. On week days the company operated a two-minute service on the tabernacle line commencing about 12.30. On Sundays it operated a somewhat more frequent service, commencing about 8 a. m. and continuing until it was time to stall the cars. Many of the people who attended the services were aged persons, and the railway found that a more frequent service than a car each two minutes caused congestion because this amount of time was consumed in unloading and crossing cars over a temporary portable crossover near the unloading point. After the afternoon service the company ran six extra cars, and after the evening service fifteen extra cars were stalled in front of the tabernacle and scheduled for different sections of the city.

From the beginning of the campaign, many of the churches were closed, and the theater business, shopping trade and general afternoon and evening travel fell off considerably. Travel converged largely on the tabernacle line, and about 30 per cent of this business was on transfers. For some time preceding and during the campaign many cottage prayer meetings were held. As these meetings were confined to small areas, people would walk to them instead of riding somewhere else. A close analysis of the traffic led the railway to conclude that little new business was created by the Sunday campaign. The same people or nearly an equal number would have been riding somewhere else if Dr. Sunday was not in Scranton. On the other hand, the railway would not have been compelled to furnish so much additional car service to accommodate the patrons. If the tabernacle had been located in a central place which would require no extra car service outside of additions to main lines some new money would have come to the railway, but when located on a side line some distance from the center of traffic the extra expense more than balanced the new business created by the revival.

Dr. Sunday was in Scranton fifty days, namely, from March 1 to April 19, inclusive. He conducted two services each week day, except Mondays, and three services on Sundays. The newspapers estimated the total attendance at 675,000. The railway carried 264,470 cash fares and 56,046 transfers. The total receipts from the tabernacle business amounted to $16,025.80, while the extra car service furnished amounted to 7631 hours.

On taking the expense of management, general expenses and other items not directly connected with the operation of these cars, the cost of extra service was found to amount to $9,163.20. Estimating one-third of the travel as new business (and, in Mr. Reilly's judgment, this estimate was high) the company's loss amounted to $3,921.27.

Mr. Reilly said that his company found that it paid to keep the public informed on what it is doing. It never tried to conceal anything, whether good or bad, from the newspaper representatives. In his opinion the feeling now existing against railroads was largely due to the fact that railways did not talk to the people, while their enemies were continually going about raising and creating all the trouble they could.

LABOR PROBLEMS

During the past decade a new force had arisen with which the street railway superintendent had to contend. This force was the labor union. The day had gone by when loyalty to his company stood in the way of the employee to loyalty to his union. This change had been brought about by conditions which had resulted in heavy increases in wages and better working conditions to all classes of labor. The Scranton company's practice in dealing with the union question was to settle any controversy where possible, first with the individual affected, or second, with the grievance committee. The final step was arbitration. In connection with arbitration, it was the policy of the union to ask that each side chose one man and that these two men chose a third. If they could not agree on a third man, he was to be appointed by one of the judges, the governor or some one else. Mr. Reilly's judgment was that to have two men on each side was a better plan. The company should be careful in agreeing to empower any other agency to appoint a fifth arbitrator. In the present trend of times, strikes were both unprofitable and unpopular for the persons who were responsible for them. It was his opinion that no strike could be successfully conducted against a street railway when the company was disposed to be fair with its employees and to see that proper newspaper publicity was used to bring its standpoint before the public. Of course, a stopping point as in wage increases, must some day be reached, but before that time arrived labor unions would be regulated by law and persons who inaugurated a strike or lockout that affected a public service company would have to deal with the law and the courts.

ACCIDENT-SAVING VALUE OF OLD EMPLOYEES

When a man is employed by the Scranton Railways every possible means is used to educate him to the company's methods and to keep him in the service. The last thing it did was to discharge him. An old employee was rarely discharged. The company found it very unprofitable to do so. Mr. Reilly had compiled figures on Scranton Railways accidents for six years, with the following striking results:

58.4 per cent of all accidents occurred to men in their first year of service.
24.3 per cent of all accidents occurred to men in their second year of service.
7.1 per cent of all accidents occurred to men in their third year of service.
5.8 per cent of all accidents occurred to men in their fourth year of service.
4.1 per cent of all accidents occurred to men in the service more than four years.

The average annual cost of damages for a first-year service man was $236.81; for a second-year service man, $146.63; for a third-year service man, $100.61; for a fourth-year service man, $95, and for men in the service more than four years, $48.47. These figures showed conclusively that it did not pay to discharge the older men in the service unless it was absolutely necessary to do so.

COURTESY

In conclusion, Mr. Reilly said that in conducting a street railway, the superintendent had to encounter the necessity of having "one-hundred point men" on his cars. "A hundred-point man" had been described as "One who does not listen for insults nor look for slights; who carries a civil tongue in his head; who is polite without being fresh; who is moderate in his habits; a man who is willing to learn. Men having these requirements differ very much in ability, but this is always true: they are safe men to deal with whether drivers of drays, motormen, clerks, cashiers, engineers or presidents of railroads." The motto of Marshall Field was: "The customer is always right." This was not a bad motto to get into the minds of street railway conductors. When a conductor got into the natural habit of disputing or taking issue with patrons, he was not working in the interest of his employer. The man who did not work for his employer's interest was not worthy of his job. The company endeavored to impress this fact on the minds of its men.

In brief, let the street railway superintendent strive for peace—peace with his own employees and with the public, for peace was the soil in which prosperity grew.

Following Mr. Reilly's paper, the question box was presented but was held over for discussion at the Wednesday morning session. Mr. Senter, Philadelphia, reported on the subject of car jacks. The railway representatives had recommended to the Public Service Commission that the jack should be of sufficient capacity to lift one-fourth the weight of the car. The subject was still under advisement by the commission. The question of sanitary drinking cups for cars is also before the commission. The meeting was then adjourned.

TUESDAY NIGHT ENTERTAINMENT

At 8 o'clock Tuesday evening, F. E. Elwell, representing B. L. Van Shaick, Philadelphia, gave a demonstration at the Board of Trade Building of the Pathéscope, a portable moving picture outfit with non-inflammable films. The Pathéscope displays a film only 20 per cent smaller than standard in reels up to lengths of 400 ft. As examples of what could be done with this small machine Mr. Elwell displayed films of the ice, coke, sugar and cheese-making industries.

QUESTION BOX

The first order of business at the Wednesday morning session was a discussion of the question box. Galvanized steel pipes and steel-wire hoisting cable soldered to the web of the rail were among the methods recommended to prevent corrosion of grounds. One member had asked whether a gage for use with bond compressors was available, and it was the general opinion that such a gage was highly desirable. As to the question of how electric railways could get the most revenue from their car advertising concessions, one member expressed the opinion that the rate for advertising should bear some fixed proportion to the earnings instead of being on a flat-rate basis over long periods. Messrs. Heindle, Wilmington and Rockwell, Pottsville, said that personally they would like to see the cars free from all kinds of commercial advertising. Mr. Rockwell stated that in the earlier days of the industry cars carried big outside signs and banners, but these had been discarded for both esthetic and safety reasons. He also believed that advertising on a commission basis was the most profitable to the railway.

In response to the question about track work, Mr. Alden, Pennsylvania Steel Company, stated that renewable centers were now so made that they could be replaced from the top without disturbing the paving. As a general rule, if a company operated 100 miles of track or more it could afford to employ special work maintenance men and then it would pay to use renewable hard center work; but on the properties of smaller companies solid work would often be better because the best results from renewable centers depended on proper maintenance.

In reply to a query about Mazda Lamps, Mr. Green, York, said that three years ago he had begun the use of such lamps on several city cars and they were now being installed on suburban cars. It was customary on his system to use the lamps for three months in signal service and then to place them in the cars. In this way, of course, the lamps burned out where they could be readily replaced. Mr. Phillips, Pittsburgh, informed the members that the equipment committee of the American Electric Railway Engineering Association was making a detailed study of car lighting. His own experience was that the tungsten lamp was not particularly economical but it certainly did improve the illumination of the cars. Referring to the question about how many cars a man should be able to clean in a day, Mr. Phillips pointed out that this number varied widely according to local atmospheric and industrial conditions. Thus, when he was in Cleveland one man cleaned twenty-three cars a day whereas in Pittsburgh the record is only nine.

ADDRESS BY MR. CATTELL

James Cattell, city statistician, Philadelphia, was introduced during a suspension of the discussion on the question box. Mr. Cattell made a most eloquent and optimistic address which was all the more impressive to his audience because of his advanced years. He had seen Philadelphia grow from a city of 70,000 to one of 350,000 homes, and he ascribed a great deal of the credit for this growth to the street railway. Every twenty-four hours the trolley cars of Philadelphia ran ten times the circumference of the earth, 250,000 miles, and all of this mileage was made within the municipal limits of Philadelphia. Fifty years ago forty-five minutes was required to ride from Camden Ferry to the Pennsylvania station at Broad Street; to-day, it took ten minutes to make the same trip. The still greater traffic improvements in sight would make it possible to go almost anywhere in Philadelphia in ten to fifteen minutes. Such transportation facilities were of incalculable advantage to manufacturers and the working class. Mr. Cattell also spoke entertainingly of the currency and tariff questions. At the conclusion of his address, he was tendered a rising vote of thanks on motion of C. B. Fairchild, Jr., statistician Philadelphia Rapid Transit Company.

ANALYSIS OF DAMAGE CLAIMS

Cecil G. Rice, superintendent claim department Pittsburgh Railways, then presented the paper on "Analysis of Damage Claims," which is abstracted herewith:

Literally a claim presupposes a right to make the demand or request. Practically speaking, a claim for damages for personal injuries or loss of property is merely an allegation of indebtedness and does not become a liability until proved. I undertake to state as facts that the popular belief that a traction company is easy prey for professional fakers is a mistaken one, and that such of the professionals as once existed have become almost extinct.

It may be interesting to give a thought to the reason for the prejudice and suspicion which heretofore existed in connection with claims adjusting. From the time when the early English kings first granted a right or franchise conferring certain privileges upon such of their subjects as would pay the price until more or less recently, it was considered proper to grant perpetual franchises to public and quasi-public utility corporations. Had it not been for such grants our present commercial and economic development might have been but a vision. On the contrary, I venture to assert that had these corporations been compelled to pay a fair price for the privileges, the corporations would have been far better off. It was this apparent giving of something for nothing that caused the seemingly favored corporations to be singled out as fit subjects from which to get something if it could be secured without regard to the how of it. That was the fault of the public. Then the plan of paying John Doe for the killing of a cow (although by killing said bovine Mr. Doe may have been saved incinerating charges) was developed as a means of secretly reimbursing John for past services or influence. That was the fault of the corporations. Later, as legitimate claims were presented there developed a class of adjusters who read law from city directories, who palmed off a careless conductor as a son who had just married and would lose his job unless the injured person would waive any claim for damages, and who did other things equally reprehensible. That was the fault of the claim agent.

It is small wonder then that the public became prejudiced and suspicious. This attitude has not been easy to overcome, although the cause for it was long since removed. The new era dawned when claim adjustment was placed on a purely business basis. Claim costs are in reality a fixed charge the same as depreciation, taxes, power and the many other things which eat up the profits of an extra-hazardous industry. No longer does the claim adjuster quake and tremble when a claimant appears. System has taken the place of hazard, fairness has replaced fraud, equity unseated injustice, and the claim adjuster has taken his proper place among the higher officials of the electric railway transportation world as an honest, dignified, responsible and respected individual. It may be that he is still the most criticized, but only because the least understood.

In this State the damages recovered in suits entered against traction companies barely equal the expenses of the courts, lawyers' fees and the other charges. Surely this evidences progress and a wholesome divorce for all time from the old order of things. The fact remains, however, that if two street cars collide and passengers are maimed or injured, it is merely a question of cancelling the resultant liability. A release is wanted and it must be paid for. Other claims may be a question of fact for the jury, not clearly liability. Often it is advisable to buy this claim on an underwriting basis. If the operating men are as efficient in preventing accidents as the progressive claims men are in preventing fraud and adjusting legitimate claims, there should be many pages of the "Injuries and Damages" ledger available for income tax records.

Principals are more receptive before an accident than afterward. Therefore, there are six things of which the claims man and those who co-operate with him honestly seek to convince the public, namely:

First—If an accident occurs the principal should not depend solely on the conductor to make a report, but should secure the number of the car, number of motorman or conductor, the exact location and the time of the accident.

Second.—If any personal injury or property damage results for which the principal feels he was not to blame, and intends to make a claim, he should report the accident to the claim department, together with the names of his witnesses, and give every assistance in making an investigation of the facts.

Third—The adjustment of claims is purely a business proposition and should be handled on the same basis as any other allegation of indebtedness.

Fourth—Any legitimate claimant who makes a reasonable demand can secure a satisfactory disposition of his claim without the assistance of an attorney.

Fifth—Only two classes of people need bring suits against the railway companies, namely, (*a*) Persons entitled to something but who want more than they are entitled to; (*b*) Those who are entitled to nothing but who want something anyway.

Sixth—Remember, we seek your co-operation to prevent accidents to yourself and to others.

While burdensome, the carrier's duty is clearly defined and is for the most part reasonable and practicable. It is assumed that when a passenger boards a street car and pays a fare he enters into a contract with the company upon whose car he rides. The company is not made an insurer of its passengers. It does not guarantee him freedom from any and all injury. The assumed contract does, however, require the company to transport the passenger to his destination without injury which could have been prevented by the exercise of the highest degree of care, skill and human foresight on the part of its agents. Because the means and appliances of transportation are under the sole direction and inspection of the carrying company, such company is held responsible for any injury to passengers resulting from defects. The company is responsible for the acts of its agents within the scope of their duty only. To support a claim for damages, four things must be determined in each instance, and viewed according to the circumstances:

First—Was a duty owed the principal by the company?

Second—Did the company fail to perform that duty?

Third—Was the failure to perform the duty owed the proximate cause of an injury or loss to the principal?

Fourth—Was the principal free from contributory negligence?

It will be noted that no inconsiderable task is thus mapped out for the director of claims, particularly when it is remembered that each fact must be considered "according to the circumstances," and that facts cannot be unearthed for the mere asking. In a large claims department this work is handled by the clerical, investigation, medical, adjustment and litigation claims bureaus, each working separately, yet in harmony. They have fixed principles to guide them, such as:

Maximum accuracy, utmost expediency, absolute fairness, persistent courtesy, minimum consistent expenditures and perfected co-operation and efficiency.

With the obtainable facts at hand the claims may then be divided as follows: *First—a*, personal injury; *b*, property damage. *Second—a*, women; *b*, men; *c*, minors. *Third—a*, liability; *b*, question of facts; *c*, no liability. *Fourth—a*, litigated; *b*, current.

It is now that the adjuster is confronted with his most difficult task—that of determining a limit of settlement, no settlement, or suit. Intuition, judgment and facts are massed against his six vulnerable points of attack. They are:

First—Personality of the principal.

Second—Actual and probable pecuniary losses and expenses.

Third—Duration of disability, total and partial.

Fourth—Character and strength of defense to liability.

Fifth—Influences which may control principal's course.

Sixth—Policy.

First—At this point the personality of the principal is far more important than the facts of the accident. In reality the adjustment is with the principal, not of the claim. No two claims nor no two principals are alike, for which reason the value of injuries cannot be made standard. Judgment must be guided by the particular facts in each individual case, but character, capacity and capital are fundamental considerations. Other controlling facts are too numerous to list.

Second—The losses and expenses are readily susceptible of accurate computation. Just as a grocer or manufacturer receives an invoice of goods shipped him checks their receipt, price, condition and quality, so the adjuster must list each and every item, adding to or taking value from the claim. This is largely a matter of mathematics, the results of the investigation made being his rule.

Third—The medical bureau is depended upon to furnish correct diagnosis and prognosis. The advances in this semi-exact science makes the opinion of the doctors reasonably certain, provided they observe and keep in mind the principal's environment, temperament and social status.

Fourth—It is necessary to go behind the written statement of the witnesses accurately to determine their value, the occupation, appearance, permanency of residence and honesty of the witness each wielding an influence. Usually witnesses have four periods: The "egotistical," when they insist they saw everything clearly and know exactly how the accident happened; the "unreasonable," in which they refuse to "get mixed up" in any case in court and declare they have forgotten what did occur; the "reasonable," in which they admit their recollection is clear and that it is their duty to testify to the facts as they know them; and the "confused," wherein the rapid-fire questions of the attorney for the plaintiff, the dignity of the judge, the gaze of the spectators, and his own self-consciousness combine so to confuse as to leave the witness merely an exhibit.

Influences which control the principal's course are: *a*, The advice of an unscrupulous doctor, desirous of building up a big bill without considering the best interests of his patient; *b*, the soliciting lawyer, like a disease germ, burrowing for an opportunity to inject his putrid personality into an otherwise respectable business transaction; *c*, the neighborhood informant who knows of "a woman who once got some money in court after her claim had been declined," or of another woman who "got an attorney to sue for $10,000," the informant being ignorant of the fact that only about 2 per cent of the amount sued for is recovered in court; *d*, the dishonest juror who says: "Well, boys, how much?" rather than "Now let's consider the facts."

Sixth—Questions of policy constantly arise and sometimes overshadow the matter of liability. The injured man with a large family, the ignorant foreigner or the teamster deprived of a livelihood by the destruction of his dray, though clearly the result of their own negligence, slip in under this heading at times and are reimbursed more in the nature of a gratuity than damages.

With a decision arrived at the astute adjuster does not allow the overwhelming odds to deter him, but confidently, fearlessly, consistently and diplomatically proceeds to the accomplishment of the desired ends. Having shown his resourcefulness and progressiveness by embodying in his preliminary work the highest business ethics, scientific management and efficiency, he now turns to the oldest yet least understood of the sciences, psychology, the science of the mind. How he does it is too detailed for description, but what he seeks to accomplish and the successive steps taken are these: To overcome prejudice, to inspire confidence, to analyze and reduce to a business basis, to create a desire, to cause a determination and to satisfactorily close the transaction.

When the adjuster has relieved the mind of doubt and animus and created a feeling of gratification by having set right and made amends for possible wrong or injury done, then only has he most successfully terminated the matter in hand.

MISCELLANEOUS BUSINESS

Before the close of the meeting, Mr. Vickery, Pennsylvania Steel Company, and Mr. Parsons, Westinghouse Electric & Manufacturing Company, spoke on what the manufacturers could do to advance the interests of the Pennsylvania Street Railway Association.

Mr. Vickery mentioned the recent organization of the Manganese Track Society and described how it was co-operating with the Maintenance of Way Association toward the attainment of higher standards in special work manufacture and maintenance. Mr. Parsons thought it would be a good plan to have a manufacturer's representative on such committees where their advice would be of service. He also suggested that at each meeting of the association some manufacturer be invited to present a paper on the latest developments in his line.

President Tingley thanked Messrs. Vickery and Parsons for their suggestions. He said that the Pennsylvania Street Railway Association would certainly be glad to co-operate with its new members, the manufacturers and supply men, on committees and in other ways.

The meeting was then adjourned for luncheon at the Harrisburg Club and for a trip to the frog and switch department of the Pennsylvania Steel Company.

TREATMENT OF RAILROAD TIES

A paper on this subject was read by W. F. Goltra of Cleveland at a meeting on May 8 of the Central Railway Club. Mr. Goltra said that at the close of the year 1903 there were twenty-seven tie-treating plants in operation, with an aggregate capacity of 21,350,000 ties per annum, or its equivalent in timber and other material, while at the end of the year 1913 there were ninety-four plants with an aggregate capacity of 109,441,000 ties per annum. Thus, while the number of treating plants has quadrupled, their capacity has quintripled during the past decade. In 1913, 36,250,000 ties received preservative treatment, being 25 per cent of the entire number purchased by the steam and electric railways during that year. During the same year 100,000,000 gal. of creosote oil and 25,000,000 lb. of zinc chloride salts were used in the treatment of wood by the treating plants in the United States.

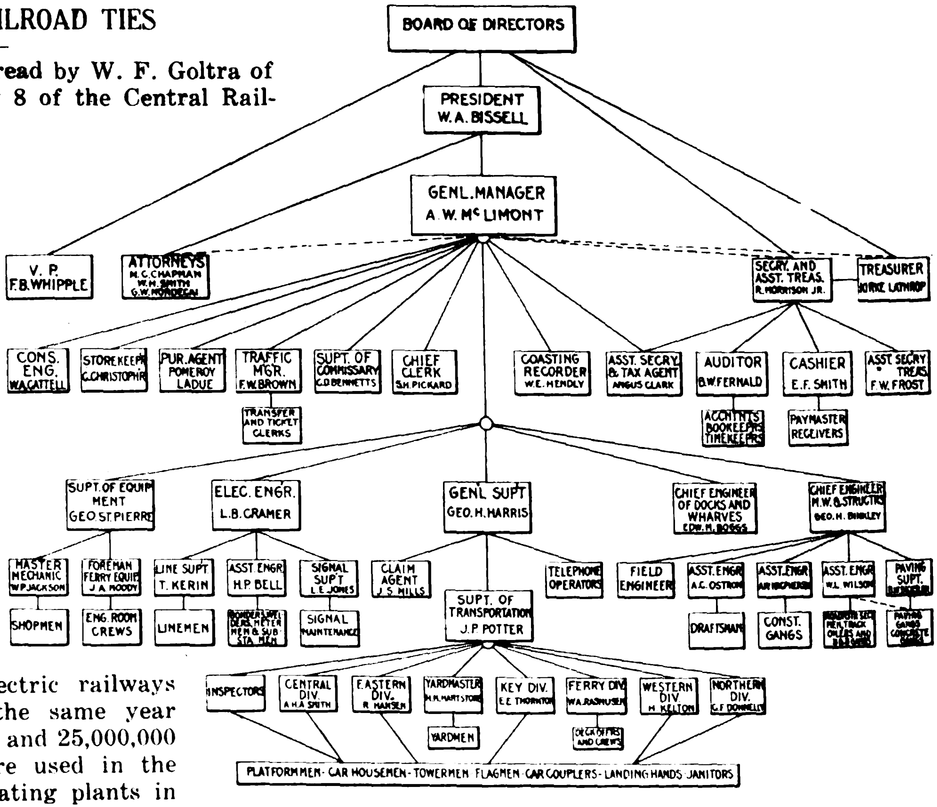
Mr. Goltra says that while there is no doubt as to the beneficial results secured by treatment, there is some doubt as to what woods ought to be treated, as to what preservative treatment should be given, the effect of climatic and other conditions, the cost of different preservatives delivered at the plant, the manner of seasoning and preparing for treatment, the supply and price of timber, the amount and weight of traffic over a given line, the use or non-use of tie-plates, the weight of rail, etc. He therefore recommended to the members of the club the importance of further study of timber preservation.

The provisional plans for the electrification of the Buenos Ayres (Argentina) Great Southern Railway have recently been approved, on condition that the work be completed by December, 1915. It is proposed to work the urban zone electrically, which would connect the Buenos Ayres Great Southern Railway with the Anglo-Argentine tramway system.

ORGANIZATION CHART, SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS

The ELECTRIC RAILWAY JOURNAL of Dec. 6, 1913, contained an organization chart of the San Francisco-Oakland Terminal Railways as then constituted. A. W. McLimont was appointed general manager early in January of this year, since which time a number of changes have been made in the organization and personnel as shown in the accompanying diagram.

One of the most important changes is that the mechanical and electrical department has been divided between a superintendent of equipment and an electrical engineer, each with the subdivisions indicated. In examining the diagram it is interesting to note that the company has established a department for handling all matters in connection with the use of coasting recorders. The ferry personnel of the company are not in one department but are distributed among the mechanical and operation divisions of the railway. The signal work is under the jurisdiction of the electrical engineering department instead of the department of maintenance and structure. It is notable also that the latter department does paving direct instead of letting it out on contract. The claim agent reports to the general manager through the general superintendent. The company maintains an internal telephone system, the operators of which report directly to the general superintendent.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Organization Diagram, Oakland

EXHIBITORS AT THE SAN FRANCISCO EXHIBITION

According to G. W. Danforth, chief of the department of machinery Panama-Pacific Exposition, great interest is being taken by manufacturers in the exhibit. Subscriptions have been entered for most of the space in Machinery Hall. Some of those whose names have been given out to the press are: General Electric Company, Sangamo Electric Company, Edison Storage Battery Company, Chisholm & Moore Manufacturing Company, Cincinnati Planer Company.

All-Steel Cars for the Michigan Railway

The Cars for This New, 2400-Volt, Third-Rail Line Possess Many Remarkable Features in Design, Including the Use of Folding Steps for the Center-Entrance, an Observation Compartment at the Front End, and the Complete Elimination of Wood from the Construction

The first car for the Michigan Railway Company, the new 2400-volt third-rail line in eastern Michigan, has recently been completed by The J. G. Brill Company and shipped to the General Electric Company for installation of the electrical equipment. The car, which is a sample of the twenty all-steel units that will comprise the original equipment of the new line, is a remarkable one in many respects, and it presents numerous features of striking originality in design fully commensurate with the fact that it will be operated by current from a third-rail charged at 2400 volts, the highest third-rail voltage ever attempted.

The new line, which extends over an air-line route between Kalamazoo, Mich., and Grand Rapids, Mich., a distance of approximately 50 miles, has been referred to in past issues of the ELECTRIC RAILWAY JOURNAL during the progress of construction. It is now approaching completion and will be placed in operation late in the autumn of the present year. A branch between Montieth, Mich., and Allegan, Mich., is included in the present construction plans, as is also a line eastward to Battle Creek, Mich.

Connecting these cities a high-speed service is to be given, the permanent way as well as the rolling stock being installed in accordance with the highest grade of steam railroad standards. On the main line between Kalamazoo and Grand Rapids, an hourly service of one and two-car trains will be maintained. The limited trains will make the 50-mile run in an even hour, including probably two stops. This will give an average sustained running speed of approximately 55 m.p.h., an operating standard that is unprecedented for the steam roads with which the new line will compete. The local service will have a schedule time of 1 hour and 45 minutes for the 50 miles, giving a schedule speed of nearly 29 m.p.h., although stops will be made at intervals of approximately 2 miles.

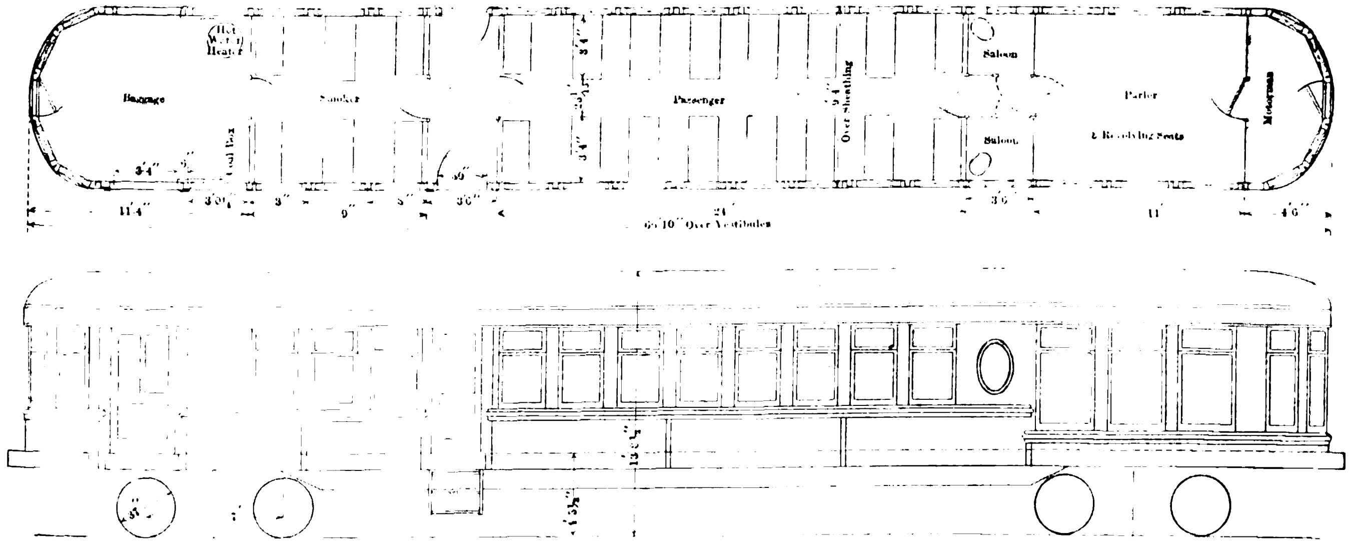
The route between Kalamazoo and Grand Rapids will parallel the tracks of the Grand Rapids & Indiana Railway, and the service to Allegan and Battle Creek will compete with that offered by one of the Michigan Central lines. Competition with these steam railroads, however, will not be confined to passenger traffic, but will cover time-freight and express business as well, and in view of the limited length of the trains that will be operated, at least during the early operating period, the cars for the line are to be universal in character so that all classes of business may be accommodated. This is perhaps the most striking feature of the car that has just been completed, as it is provided with a parlor-observation compartment and an express and baggage compartment in addition to the spaces for passengers and for smokers that are customary in interurban equipment.

GENERAL FEATURES OF DESIGN

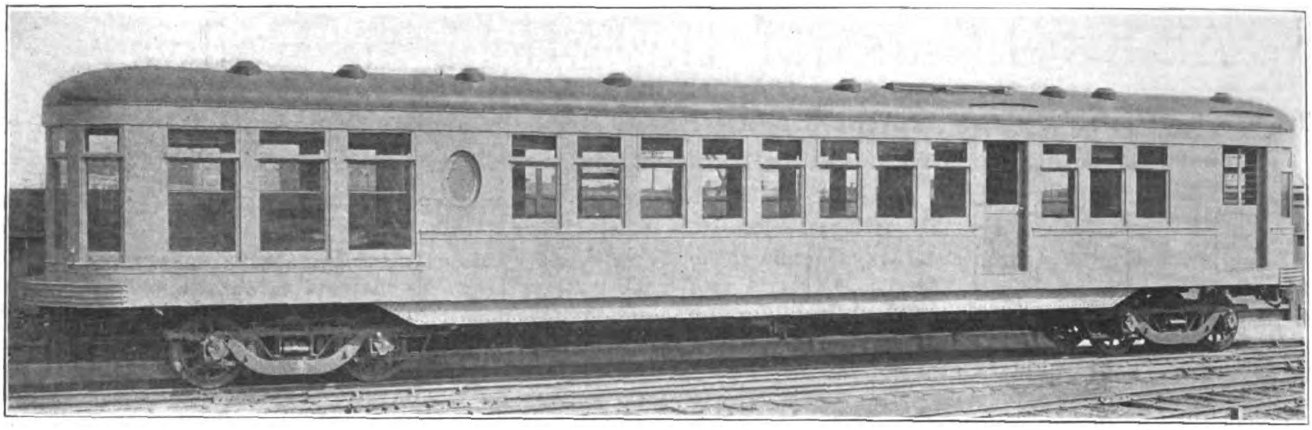
The arrangement of these four compartments is unique. Contrary to the usual custom the parlor observation compartment is at the front end of the car and the baggage compartment is at the rear. A small vestibule for the motorman is provided in front of the parlor-observation compartment, the two spaces being separated by a plate-glass partition, with the glass extending down to within a few inches of the floor. The front windows of the motorman's vestibule also extend down to this level, the passengers in the parlor compartment thus being enabled to see the track ahead of the car without leaving their seats.

Between the parlor-observation compartment and the regular passenger compartment there is a 2-ft. passageway, and on either side of this passage is a saloon. Between the passenger compartment and the smoking compartment is the main entrance space which is a transverse passage 4 ft. wide, doors being provided at each side of the car. At the extreme rear of the car is the baggage compartment, in which is located a heater, together with a coal box and a cabinet for lanterns and markers. The dimensions of the various compartments are shown in the accompanying line cut.

The illustrations show that the main entrance, which is at about one-third of the length from the rear end, is not provided with steps. This unusual condition is



Michigan Cars—Plan and Elevation Showing General Arrangement



Michigan Cars—General View Showing Door Arrangement and Large Observation Windows of Front End

due to the fact that most of the station platforms with which the new line will be equipped are of the raised type commonly in use upon rapid transit systems. However, at the entrance door on each side of the car there will be installed a set of swinging steps which can be moved out into position available for use when the car makes a stop at a point not provided with a raised platform. These steps are to be three in number, giving four risers up to car-floor level. The first rise, or that from the ground to the lowest step, will be 16 in., and the other three will be 12½ in. each. The steps have been designed by the mechanical department of the Michigan United Traction Company, and they will be applied at its shops at Albion, Mich. While the car is running the steps, which are hinged from the side girder, are swung out of the way under the bottom framing.

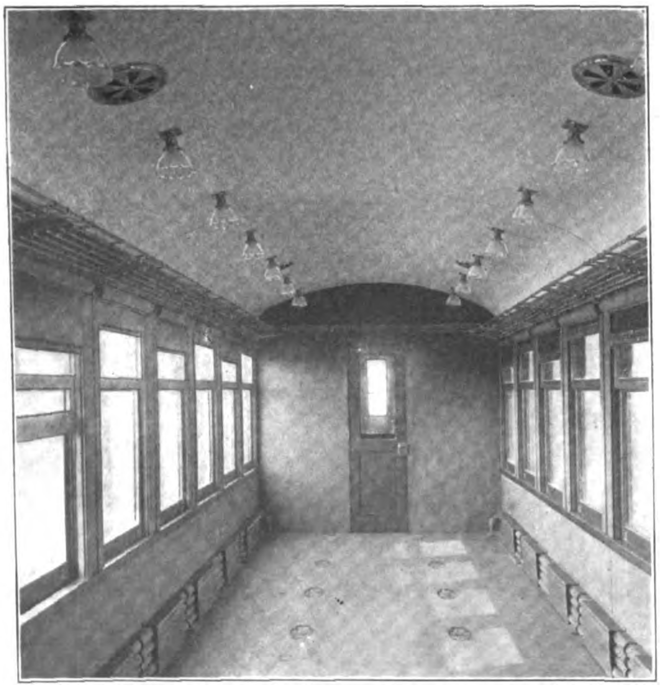
In addition to the main entrance doors there is provided a baggage door on each side of the baggage compartment. The latter doors, when opened, slide behind corrugated iron linings. There are also doors at both ends of the car, one leading into the motorman's compartment and the other providing additional entrance facilities to the baggage compartment. Double windows with raising lower sash are installed throughout, except at the front end where the large plate-glass windows are located.

The interior finish of the car is without exception of agasote or steel. No wood of any description is used, making a thoroughly fireproof interior.

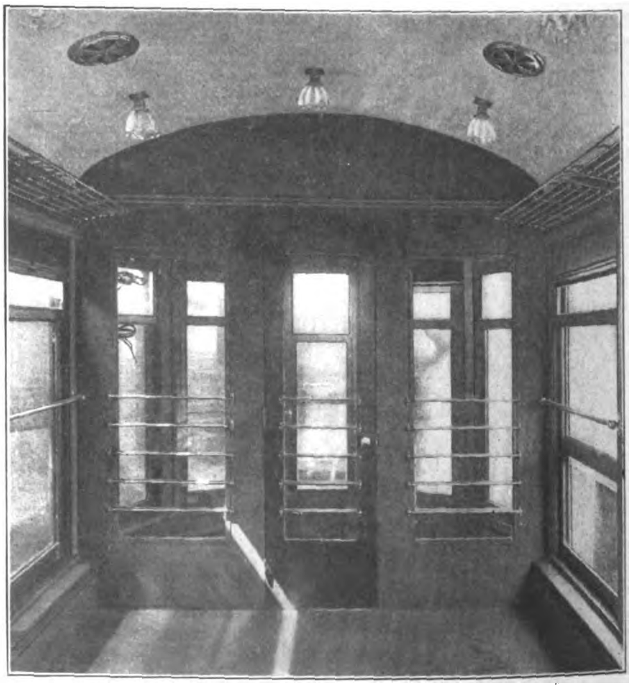
EQUIPMENT

The heating system is of the hot-water type and pipes are provided along the sides of the car near the floor, being supplied with hot water from a Peter Smith heater in the baggage compartment. These pipes extend around the motorman's vestibule at the extreme front end of the car so that the observation compartment is protected from cold drafts during periods of very low temperature. Lighting for all of the compartments is provided by rows of incandescent lamps over the seats, the observation compartment having an extra row of lights along the center. The lamps are provided with frosted reflectors to diffuse the light. This lighting system is to be operated direct from the 2400-volt line, as the lamps and wiring are insulated for that voltage.

The seats are of the "Walkover" type and they are covered with imitation leather in the smoking compartment and with plush in the passenger compartment.



Michigan Cars—Interior of Passenger Compartment with Seats Removed, Showing Arrangements of Lights and Heating Coils



Michigan Cars—View from Observation Compartment at Front of Car, Showing Low Windows of Motorman's Vestibule

The seats in the observation compartment are all of the revolving type, five of them being standard Pullman chairs.

Ingenious folding drinking fountains of the sanitary type have been installed at each side of the short passageway between the observation compartment and the passenger compartment.

The floor is of composition, and air space is provided below it to deaden noise and eliminate dust by introducing sheets of corrugated iron between the floor beams about 3 in. below the surface of the floor. The roof is of the plain arched type with a 1/16-in. steel sheathing, steel carlins and 3/16-in. agasote head lining. Sixteen Brill ventilators are installed on it, adjustable registers being provided in the head lining beneath each one.

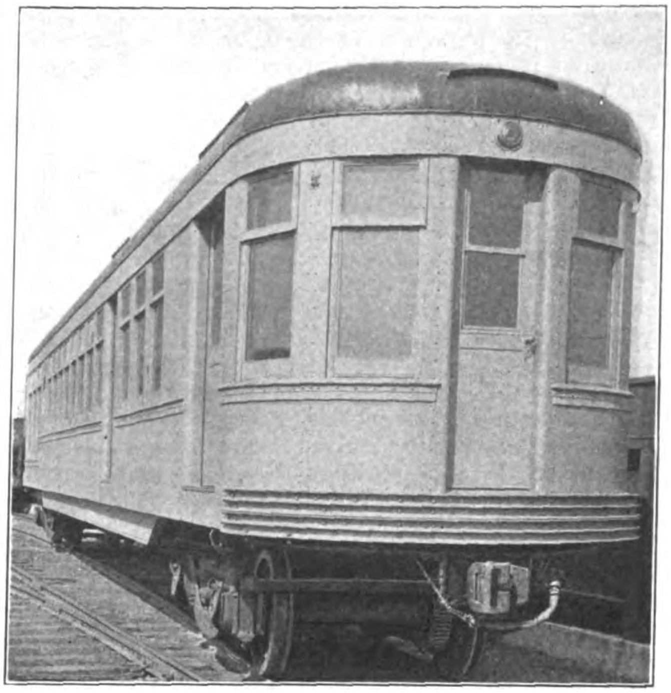
The car is carried on a pair of Baldwin trucks with 37-in. wheels and 8-ft. wheelbase which are spaced on 46 ft. 10 in. centers. The trucks are equipped with the Baldwin roller side-bearings and they are designed for carrying inside hung motors on each side of the bolster as four-motor equipments are to be installed. Tomlinson radial couplers operated by chains carried out to handles at the sides of the car have been adopted and these swing on a radius of 5 ft., being supported on a carrier bar of 3-ft. 5-in. radius extending for practically a full semicircle at the ends of the car. This has been necessitated by the fact that the cars had to be designed to operate in trains around curves of 35 ft. radius.

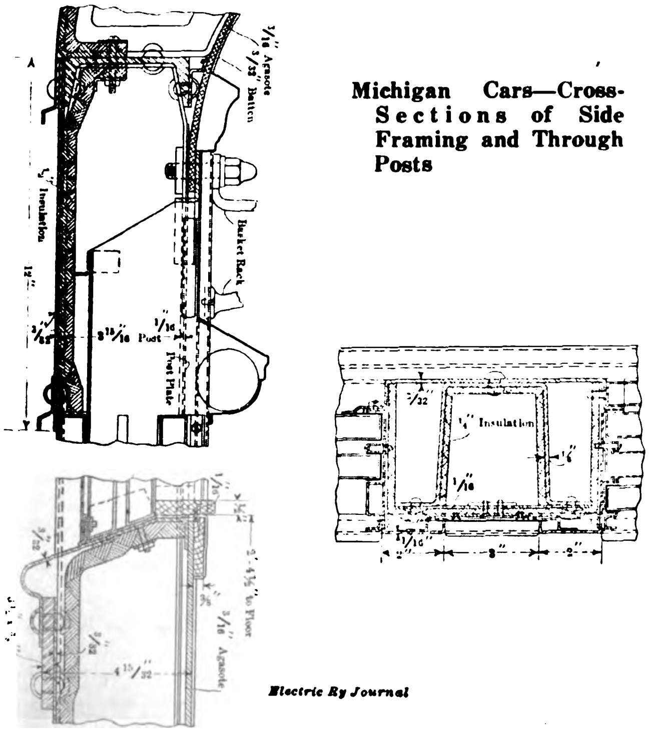
The motor equipment as well as the air brakes are to be furnished by the General Electric Company. Owing to the fact, however, that the equipment is to operate on 2400-volt third-rail system not all of the details have yet been decided on, and for this reason no information regarding them is available at the present time, aside from the fact that four 140-hp, 1200-volt motors connected in pairs in series, together with multiple-unit control, will be installed on each car.

DETAILS OF CONSTRUCTION

The car in general is of the side-girder type, and between trucks the bottom framing is used only to carry the direct load from the floor. The bolsters are of the built-up type, but they are double, one transverse member such as is shown in the accompanying illustration being located 21⅛ in. on each side of the center plate, which is carried on a pair of 10-in. channels extending between the two bolster members. These bolster members are also tied together at a point midway between the center and the side of the car by 10-in., 25-lb. I-beams.

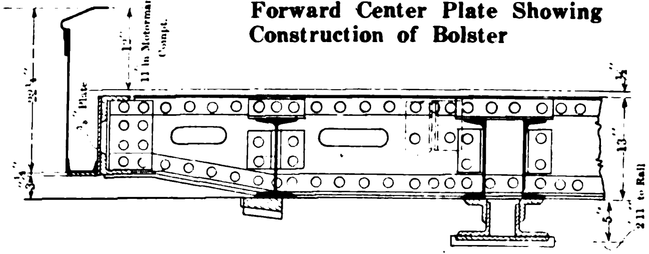
The main supporting member of the car consists of a ⅜-in. plate which extends for the full length of the car and is framed into the crown pieces at the ends.


Michigan Cars—Rear View of Car Showing End and Side Doors of Baggage Compartment



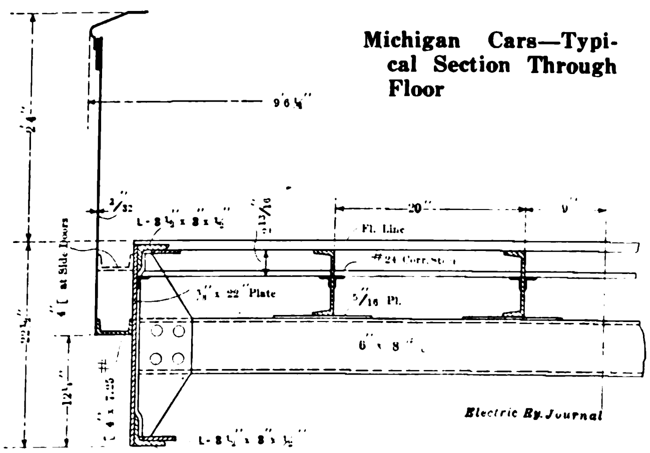
Michigan Cars—Cross-Sections of Side Framing and Through Posts

Electric Ry Journal



Michigan Cars—Section Through Forward Center Plate Showing Construction of Bolster

Electric Ry Journal



Michigan Cars—Typical Section Through Floor

Electric Ry. Journal

Between the bolsters this takes the form of a fish-belly girder 22 in. high, but at the ends its height is reduced to 10 in. The bottom framing is made up of transverse 6-in., 8-lb. channels at 3 ft. 4½-in. intervals that are riveted to the side girders and act as crossings underneath the longitudinal floor sills, the latter being 7-in. channels. Upon the longitudinal channels the floor is directly supported, and, as previously mentioned, a sheathing of No. 24 corrugated steel is introduced about 3 in. below the floor for an air space underneath it.

The side posts are attached to the outside of the ⅜-in. plate that forms the side girder, the latter being reinforced at the inside with 3½ in. x 3 in. x ½ in. angles. The posts, therefore, act as spacers, which necessitates the location of the side sheathing at a distance of approximately 4 in. outside of the side girder. This unusual construction is another unique feature of the car as the side sheathing is connected to the side girder only through a 4-in. channel, with the flanges up, at the bottom of the posts. This channel extends along the approximate center line of the side girder. The side sheathing is 3/32 in. thick. Insulation consisting of ½-in. of sheet cork is fastened inside of the side sheathing below the belt rail and inside of the letter board and the roof. The letter board, as shown in the accompanying illustration, is made up of 3/32 in. steel plate. It is riveted to the 1/16 in. steel roof. The steel carlins rest on a 4-in. channel, with the flanges up, that is riveted to the tops of the side posts. The head lining is of 3/16-in. agasote, as is also the side lining below the belt rail. The posts are U-shaped and are made of ⅛-in. steel with a cork lining. Across the open side of the U is riveted a post plate of 1/16 in. steel. To the outside of the posts is riveted the framework for the window guides, which is pressed out of 3/32-in. steel, and across the inside of this is attached a pressed steel lining that sheaths the inside of the post.

This side construction is maintained throughout the whole length of the car. At the ends, however, the posts are replaced with T-bars. The vestibule radius is 5 ft. 11 in. with a 3-ft. 4-in. radius at the corners. The crown pieces are made up on a 4-ft. 8-in. radius and are therefore semicircular in contour, this being made necessary to provide for the swinging of the coupler when operating the car around curves of 35-ft. radius.

GENERAL DIMENSIONS AND WEIGHTS

The length of the car over all is 66 ft. 10 in. with a 13-in. extension at each end for the crown pieces. The trucks are spaced on 46-ft. 10-in. centers. The width over all is 9 ft. 6¼ in., although the width over the sills or side girders is only 8 ft. 7 13/16 in. This is accounted for by the fact that the side posts are attached outside of the sills, necessitating a space between the sills and the sheathing. The weight of the body complete with couplers, but without wiring or electrical equipment but including foundation brake rigging and pipe, amounts to 65,200 lb. This includes 3000 lb. for seats and 2200 lb. for heater and piping. The motors and control battery will weigh approximately 31,600 lb., and the air-brake compressor and brake equipment will weigh 2200 lb.

The seating capacity is fifty-two, eight seats being provided in the observation compartment, thirty-two in the passenger compartment and twelve in the smoking compartment.

The trucks, complete with gears but without motors or other electric equipment, weight 32,000 lb., giving a total weight of the car and truck of 92,000 lb., and as the estimated weight of the electrical equipment is 33,800 lb. the total weight of the car will be approximately 131,000 lb., giving a weight per passenger of 2500 lb. notwithstanding the fact that the seating capacity is materially reduced on account of the 11-ft. baggage compartment at the rear end.

"SAFETY FIRST" CAMPAIGN AT BUFFALO

The "safety first" campaign recently inaugurated by the International Railway, Buffalo, N. Y., with the aid of Mayor Louis P. Fuhrmann and the municipal authorities, is meeting with the most gratifying aid from the English, German and Polish newspapers of Buffalo and co-operation from the railway company's employees, owners of vehicles, the Automobile Club of Buffalo and other commercial organizations. Thomas Penney, general counsel International Railway Company, is chairman of the so-called "municipal safety first committee." He is being aided by many of the most prominent and public-spirited men in Buffalo, who have been appointed members of the committee by Mayor Fuhrmann. L. H. Stickle of the claim department of the International Railway, is secretary of the committee. The general committee is divided into thirteen standing committees as follows: Schools and playgrounds, boy scouts, church and civic bodies, public institutions other than schools, vehicular and pedestrian traffic, structures and pavements, street railways, explosives, fireworks and firearms, hazardous trades, legislation, publicity, finance and membership.

Every street car carries dasher notices of the campaign. Some of them state: "Safety First—It never pays to take a chance." Others read: "Stop, Look, Listen—Safety First—Do it the right way."

All of the railway poles carry alternately the words, "Stop, Look, Listen," or "Safety First" painted upon them in white letters. Banners like those used in election campaigns will also be used. Lecturers have been allowed to go into the schools to teach the school children to be careful and think of "safety first."

Addresses are being given by members of the safety first committee and employees of the International Railway safety bureau to various business organizations, clubs, etc. With the aid and co-operation given by the members of the Taxi Drivers' Union, the Automobile Club of Buffalo and the Motorcycle Club of Buffalo, it appears as if the movement will be a great success. For instance, the automobile folk are distributing 50,000 circulars on the rules of the road, and 2000 "safety first" streamers will be carried on wagons.

At the request of Chief Counsel Penney of the International Railway, Dr. William H. Tolman, director of the American Museum of Safety, New York, spent three days in Buffalo during the week of April 27 to deliver nine lectures. He congratulated the city upon the ramifications of its movement by taking in not merely the street railway but all forms of vehicular traffic upon the city streets. Superintendent Michael Regan of the Police Department has sent out a message to every precinct captain instructing the police to enforce the traffic ordinances and to keep children off the streets and from catching on behind moving vehicles. Officers in charge of each precinct will be held responsible for avoidable accidents. The seven days beginning May 3 have been designated "safety first" week, during which interval an endeavor will be made to preach the crusade to everybody in Buffalo.

The provincial authorities of Milan, Italy, have sanctioned the scheme for the electrification of the Milan-Saronno Railway. The question of electrifying the steam railway between Rome and Tivoli is under consideration.

Arguments Against Public Ownership in District of Columbia

Clarence P. King and Thomas N. McCarter Condemn Plan to Enlarge Governmental Activities and Declare that Congress Has No Right to Repeal Contract Without Payment of Fair Value, Including Values for Franchises

The District committee of the House of Representatives held a hearing at Washington, D. C., on May 13, on the Crosser bill providing for municipal ownership of the street railways in the District of Columbia. Extended testimony was given by Clarence P. King, president of the Washington Railway & Electric Company, and Thomas N. McCarter, president of the Public Service Corporation of New Jersey. At a continuation of the hearing on the following day, Norman McD. Crawford, president of the Reading Transit & Light Company, discussed the subject with particular reference to conditions in foreign cities.

ARGUMENT OF MR. KING

Mr. King made the opening argument. He said that the companies in the District operate directly under an act of Congress and are really the children of that body. Congress directed that horse cars be abolished. As a result of this action, the company experimented with the cable, compressed air and storage batteries before it finally decided on and introduced the fine system of underground conduit under which it now operates. The underground conduit was introduced long in advance of any other city, and to-day Washington is the only city, excepting New York, that has this system. The system was installed long before the property could possibly earn any return on the cost.

In 1898, before the consolidated operation began, there were ten small companies, and people were obliged, Mr. King said, to change cars several times in order to make many trips, involving payment of several fares. This was very unsatisfactory. With glowing prospects for the future, capitalists purchased the various companies and began to do business through a holding company. The enterprise was unprofitable; the mortgage was foreclosed and the old stock was wiped out. In 1900 Congress again gave a great deal of consideration to the question. The result was a grant of authority for the issue of stock and bonds and a plan under which millions of dollars were invested. The city of Washington had benefited to the extent of many millions of dollars from the additional investment of capital made at that time. All things considered, Washington has, Mr. King declared, the lowest rate of fare of any city in the United States.

EMPLOYEES AND STOCKHOLDERS

Mr. King took up the situation from the standpoint of the 2000 employees and 2000 stockholders. Wages had been increased from time to time and other benefits given. Among these he mentioned the profit-sharing plan, the medical department, the pension system, the relief association for death and sick benefits, the loan system, rest rooms, the library, and such other matters as the Christmas entertainment and annual outing. Holders of the preferred stock waited for some years for a return and did not receive any until December, 1904. The first dividend on the common stock was paid late in 1909. All dividends paid on the entire outstanding stock from the beginning of the operation of the present company to the beginning of 1914 averaged 2.8 per cent per annum on the total par value.

In discussing the operation of the municipal water works of the city, Mr. King said that if private water works had been conducted in the same way they would have gone into the hands of a receiver long ago. In order to illustrate conditions in other cities, he showed photographs of broken poles and wires in Cleveland during a heavy storm in that city. This condition, he said, would not be tolerated in Washington. Answering some of the arguments presented at previous hearings, Mr. King said that New Orleans people had not heard of the reported municipal street railway in that city. No one knew whether the short municipal line built by the city in San Francisco would pay. The commercial prospects were not taken into consideration. He also declared that the conditions existing in Glasgow would not be tolerated in Washington. The plan to tax the city for the expenses of operation and to let people ride free he characterized as sublime, Utopian and Arcadian.

VALUE OF THE PROPERTIES

Mr. King also answered the argument presented in one address that the street railways could be reproduced for $20,000,000. He showed that the market value, as of April 30, of the outstanding securities of the companies, based on the street railway properties, was $47,798,000, as compared with a par value of over $51,000,000. These figures were compiled at a time when all securities were very much depressed and also just after agitation on the subject of municipal ownership of the properties. Congress authorized the issue of the existing stock fifteen years ago, and, notwithstanding the large increase in gross revenues, no additional stock has been put out in the ensuing years. Mr. King declared that the property is worth more than the amount of the outstanding capitalization. If the properties could be bought for $55,000,000 or $60,000,000, the proposition to carry passengers for nothing or at a lower rate of fare would dissolve into thin air.

Mr. King declared that he found no fault with the principle of regulation, but that he did criticise the suggestion to give the commissioners complete control of properties. No street railways of any real importance are owned and operated, he added, by the municipality, although there may be a few "jerk water" roads. He quoted Halford Erickson, member of the Railroad Commission of Wisconsin, on the failure of municipal public utilities in that State to introduce proper methods of accounting.

EFFECT OT REORGANIZATION

In showing the development of the Washington Railway & Electric Company, Mr. King said that under the plan of reorganization the bonds and stock of the holding company were surrendered. For each bond there was given $550 in preferred stock, $550 in 4 per cent bonds and $200 in common stock. Holders of the original bonds had paid par for each $1,000 thereof. The securities received for each $1,000 bonds are worth now about $1,054. Of the stockholders, 1100 are women. Mr. King emphasized the fact that the change in type of construction was ordered by Congress, which gave practically a contract and franchise without limit.

In any valuation of the property, the history of the company from horse-car days would have to be taken into consideration. Other elements to be considered, he said, were the facts that the company is a prosperous concern, that great future growth is probable in Washington and that costs of development have been heavy.

TESTIMONY OF MR. McCARTER

Mr. McCarter, in introducing his discussion of the subject, said that he did not own a share of stock or any financial interest in either of the companies in the District. Although a lawyer by profession, he has been exclusively occupied for the last eleven years as president of the Public Service Corporation of New Jersey. He appeared before the committee because he conceived it to be his duty to give his views and utter a word of warning in regard to what he considered the dangerous experiment the members of the committee were considering.

PUBLIC UTILITY OFFICIALS AND PUBLIC WELFARE

Mr. McCarter said he would frankly state that his expert knowledge came from his connection with the company for the last eleven pears and his practice at the bar for ten years previous when his time was given largely to the representation of companies of the same character. Over and above that, however, Mr. McCarter declared that he was an American; that he thought he was a good citizen and that he had the welfare of his country at heart. Of course, the views of men were likely to be biased by their life activities, but he resented the idea that a public utility official could not be interested in the public welfare of his country.

Answering a question from one of the members of the committee, Mr. McCarter said that he was not sure but that it was an unpatriotic thing for the government to introduce the parcel post. It would have been more patriotic if it had acquired the stock of the express companies at a fair valuation; although he held this opinion, he said that he did not own any express stock.

Mr. McCarter, in continuing, said that his first thought regarding the situation is that the whole scheme of municipal ownership is un-American. It was not suited to the form of government devised by our forefathers and handed down for generations. It would mean bureaucracy galore. It would mean that the government would take on an enormous army of men, and would also mean ultimate operation of the country by the government through this enormous army. The subsidiary companies of the Public Service Corporation of New Jersey had 12,000 employees and served 2,000,000 of the 2,500,000 people in New Jersey. If the same proportion held good throughout the country, there would have to be added to existing government or municipal employees from 600,000 to 750,000 men.

A member of the committee said that the federal government now employs 471,000 people.

BUREAUCRATIC RULE AND EVILS

Such an increase in the army of Government employees, Mr. McCarter declared, would mean bureaucratic rule, with all of its attendant evils. This was foreign to our conception of government and must work evil in the long run. It would be very disastrous to have scattered all over the country so large a percentage of people who would regard events from the standpoint of government operation. It would mean an enormous number of men engaged in politics. Mr. McCarter said that he thought this particular objection was not so applicable to the District of Columbia as to the country at large. He thought, however, that the government should not start in Washington a precedent that might be so far-reaching as any action on this subject would be likely to be. The continuation of private ownership under modern regulation was decidedly preferable to embarkation on the sea of municipal ownership.

Mr. McCarter added that he knew that there had been scandals and cases of exploitation which should not have been permitted and which could not be permitted in the future. He thought that such developments could not take place now. There is, he declared, a very high-grade body of men engaged in the operation of public utilities at the present time. Such exploitation as occurred in the past could not possibly take place where State commissions existed. The speaker did not appear as an apologist for matters of this kind that had occurred in the past. However, since the development of the so-called scandal attendant on the failure of the Metropolitan Street Railway in New York, he knew of nothing of the kind that had gone on in the public utility industry.

THE LESSER EVIL

Mr. McCarter said that he did not want to be understood as saying that if there was water in the securities that necessarily condemned the companies. Men who had the hardihood to embark on experiments before the industries became standardized were entitled to profits as pioneers greater than a mere interest rate of return on the investment. The securities were issued under forms of law recognized and approved. Though there may have been evil in their issue, it would be a lesser evil to recognize the existing situation and securities now than to attempt to repudiate them. Mr. McCarter quoted the report of the Hadley Securities Commission in support of his statement on this point.

In the valuation of properties, Mr. McCarter said that the capital outstanding should be taken as a fair element. The courts would settle ultimately the principles of valuation. It would not be possible to depart from their decisions and everyone was bound to respect them. If Congress sought to condemn the properties, it would have to determine first the physical value. One way of doing this would be to fix the cost of reproduction. Another way would be to make a fair estimate of the cost of the property, based on the development of the art, with recognition of the fact that the companies could not have been expected to write off, from year to year, the costs due to the rapid development of the art.

Morally, the valuation should include out-of-date equipment. Mr. McCarter said that he thought that the public did not expect a company to continue to operate with old equipment. No company could keep pace with the progress of the art without destroying old equipment.

OVERHEAD CHARGES

After determination of the physical value, overhead charges should be calculated. These were just as much a part of the physical cost as the rails and other structural elements. There should be provision for promoters' profits, interest during construction, engineering services, contingencies, etc. The overhead charge would add approximately 20 per cent to the physical cost. The next step was to determine the development cost, or going value. This factor represented the money that was not made during the early and lean years. All authorities, including the higher courts, recognized this as a just element of value. Sometimes this amount could be proved, sometimes it must be estimated. The New Jersey Board of Public Utility Commissioners added 30 per cent structural value to cover development cost. This value recognized the fact that all enterprises had lean years and permitted the capitalization of the difference between what was actually earned and what would have been earned, and also that a completed railway ready for business was worth more as an integral whole than the different parts segregated into individual elements.

If capitalization was not taken into account, the only test, Mr. McCarter continued, was the fair value of the property devoted to the public use. One of the members of the committee asked if this element of cost would not be destroyed in the case of a failure and reorganization of the property. Mr. McCarter replied that the present owners came into possession of the title by proper legal methods and that if the losses of their predecessors were part of the value of the property, they came into possession of that just as much as of the physical property. Perhaps the moral view would lead to the acceptance of the capitalization as the test.

FRANCHISES PERPETUAL IN WASHINGTON

At the commencement of the afternoon session, Mr. McCarter said that conditions in Washington were different from those in Cleveland, where, before the passage of the last ordinance, franchises had expired and the rights to operate were therefore limited. In Washington the franchises were perpetual. A perpetual franchise, the speaker said, is a right given by a proper government authority to a corporation or individual to construct or operate in perpetuity at a charge of a fair return on the value of the property devoted to the public use. The right to alter, amend or repeal an ordinance did not give the right to abrogate a contract. As a leading case, Mr. McCarter cited that of the Broadway Railroad in New York.

In addition to structural cost and development cost in case of the valuation of the Washington properties, Mr. McCarter said that a franchise value must be added. He cited as cases bearing on this point, Monongahela Navigation Company vs. United States, 148 U. S.; Omaha vs. Omaha Water Company, 218 U. S., and Old Colony Trust Company vs. Omaha, 230 U. S. The law is, he said, that there is a limitation on the power of the Legislature to alter or repeal, even though there is a reservation in the franchise. The right to revoke the charter of a company might exist, but the franchise could be sold by the company or a receiver. If the legislating body failed to fix a definite time for duration of the contract, in the opinion of Mr. McCarter, it created a perpetual franchise. Limitation of the life of the corporation did not limit the life of the franchise.

Representative Crosser asked if Mr. McCarter thought that there was no possibility of extinguishing the rights of the corporation if the legislating body failed to name a definite life for the franchise.

Mr. McCarter said that the public could protect itself through the rate-making power or through condemnation of the property.

BURDEN OF MUNICIPAL DEBT

Continuing his discussion, he cited the Consolidated Gas Company case as an illustration of an allowance for franchise value. The cost of acquisition would be an enormous sum of money. An experiment in municipal ownership would be a doubtful venture, and if cities throughout the country embarked on it the result would be an enormous increase in municipal indebtedness. It was best for all prudent men to consider whether it would not be wise for the country to assume such a burden. Mr. McCarter gave statistics for the development of municipal indebtedness, showing that since 1880 State debts had increased about 100 per cent and municipal about fourfold, while the bonded debt of minor civil divisions had increased almost as much as municipal indebtedness. The existing capitalization of electric roads, $4,708,568,141, meant an appalling addition to already large financial burdens.

Municipal governments, Mr. McCarter declared, had enough to do now. The national form of government in this country has been a marked success. Municipal governments had not achieved the same success and were, speaking generally, failures. There had been many evils in municipal management, including graft and corruption. To turn over public utilities to municipalties would add fuel to the fire and would be the most dangerous kind of economic policy. Mr. McCarter commended to his audience the book by Yves Guyot, the French economist on "Where and Why Public Ownership Has Failed."

CAN REPEAL CHARTER BUT NOT FRANCHISE

Members of the committee raised again the question of the right of Congress to repeal the franchises in the District of Columbia. Mr. McCarter repeated his conclusion that a reservation gave the right to revoke the charter, but not to repeal the franchise. It did not, he said, give the right to take away property granted under the act. Any other interpretation would mean that no capital could be raised on a franchise, because no one would advance a dollar if the right to operate might be taken away the next day. The public could protect itself by seeing that the companies obeyed the law and did not charge exorbitant rates. Answering an argument from one of the members of the committee, Mr. McCarter said that the indeterminate franchise was a different form of contract and meant the right to operate during good behavior. He said that he was not trying to be controversial, but was trying to give his opinion of the law as he understood it.

One expert had declared that if properties were owned and operated by the municipality, extensions could be built without reference to the question of whether or not they would be profitable. Mr. McCarter said that a municipality would be harassed for extensions and that there would be demands for shorter hours, the danger of strikes and the labor situation generally as a serious factor. He believed in paying fair wages and said that his company had done it. The companies should not be allowed to exploit the public. The solution of the entire problem was private operation under regulation. Commissions should be supervisory, rather than managerial. They should supervise the issue of securities.

REPRISAL SHOULD NOT BE EXACTED

What to do with the past, Mr. McCarter continued, is another question. Everybody stood by and let securities be issued without protest under forms of existing law. All were struggling to get on the band wagon at the time the old conditions existed. If legislative bodies sought now to exact punishment for what was done in the past, they would not reach the persons that were responsible. Securities were in the hands of investors, including widows and orphans. The committee was dealing with a very serious problem. If the figures of railroad capitalization and value assumed by Senator LaFollette were correct, any purchase by the government on the terms outlined by him would be the most gigantic mistake in the history of the country. There was no household that would not suffer from such a policy.

Mr. McCarter said that thirty years ago no one knew that electric railroads would be a success. He was not sure that they were a success now. It was very hard to earn dividends with a straight 5-cent fare. One improvement in the art succeeds another with lightning-like rapidity. Changes in power, cars and rail have developed rapidly. The men who developed the properties were entitled to a profit. As an example of a project which had been of great public benefit but had not paid a profit on the cost of the enterprise Mr. McCarter cited the Hudson River tunnels. He said that Congress should go a little slow in changes affecting business. The business community has had many rough shocks and was still having them. Business was on a better plane morally, and Mr. McCarter said that he was glad of it. He thought that the public realized that so far as railroads and public utilities were concerned the opportunities for improper conduct had been reduced to a minimum. He thought that the average return on street railways was under 5 per cent. His company was paying, at the present time, nearly 7 per cent for new capital.

During examination by members of the committee, Mr. McCarter criticised the accounting methods of municipalities, which do not show whether or not the operations are conducted at a profit. He discussed at length the Public Service Gas Company case which is now in the courts. While the New Jersey commission did not allow for franchise value in this case, it allowed a return of 8 per cent on the value fixed. Mr. McCarter thought that companies could not obtain capital to develop new enterprises unless they had a return of 8 per cent on the money invested.

ELECTRIC RAILWAYS DIFFICULT TO OPERATE

The street railway was the most difficult of any utility to operate. A water utility was on the border line between those classes of utilities which were best operated privately and those which were normally the function of the municipality. While Mr. McCarter did not believe the municipalities should own gas properties, he thought that municipal ownership of such properties was more practical than of electric lighting plants or street railways. The street railway was difficult for any one to manage satisfactorily. It was in the public eye all the time. It was the last facility that the public ought to undertake to manage.

ASSOCIATION TO BE REPRESENTED

Gen. George H. Harries, past-president of the American Electric Railway Association and E. B. Burritt, secretary of the association, were among those who attended the hearing. General Harries told the committee that the association would like to be heard on the bill. A hearing for this purpose has been announced for May 21.

TESTIMONY OF MR. CRAWFORD

Norman McD. Crawford, president of the Reading Transit & Light Company, testified before the committee on May 14. He outlined strong objections to the municipal ownership of street railways and said that privately owned roads could be operated more successfully.

Municipal ownership meant bureaucracy, Mr. Crawford said. Paternalism crept in because of the tendency of the municipality to extend its business to other affairs which should not be municipalized. Municipal ownership, Mr. Crawford added, is not sound public policy. It had not been a success generally and he advised against it in Washington.

Mr. Crawford referred to his trip in Europe as an expert for the National Civic Federation to study various phases of municipal ownership. He said that in Great Britain he was associated in his study of the subject with J. H. Woodward. He and Mr. Woodward studied the municipally owned systems of tramway in Glasgow, Manchester and Liverpool and the London County Council system. They also studied the private tramway properties in London, Dublin and Norwich.

An occurrence in the history of one company was discussed by Mr. Crawford. In this case, Parliament refused to pass a bill granting a franchise for a street railway because the president of the company had made concessions to one town on the road which Parliament believed were not justified.

In explaining that on account of local conditions no interurban lines were found in England similar to those that exist in this country, Mr. Crawford declared that the territory between Liverpool and Manchester would furnish a satisfactory traffic for a system of this character.

The witness also talked about the competition for municipal lines developed by motor-buses. He said that A. L. C. Fell, chief officer of the London County Council tramway system, came to this country some years ago to investigate street railway matters and would not permit much of the information secured by him to be published. He feared that if the information should be made public, the opposition motor-bus lines would make use of his data to the detriment of his system.

An illustration of the effect of municipal ownership on capital expenditure was cited by Mr. Crawford, who said that in one instance $20,000,000 was spent, of which only $1,886,000 was chargeable directly to the road. The rest was used in other operations, replacement of houses, etc.

In answer to a question from a member of the committee as to why management by the cities could not be made successful, Mr. Crawford said that there was no monopoly in brains but that politics interfered with the independence of the operating staff. In submitting data on the results of operation, Mr. Crawford said that thirteen systems showed no profit under municipal ownership while thirty-five showed only a slight profit. The witness said that he had never seen better street railway service than was given by the companies in Washington.

HANDY TIME-TABLE FOR EMPLOYEES

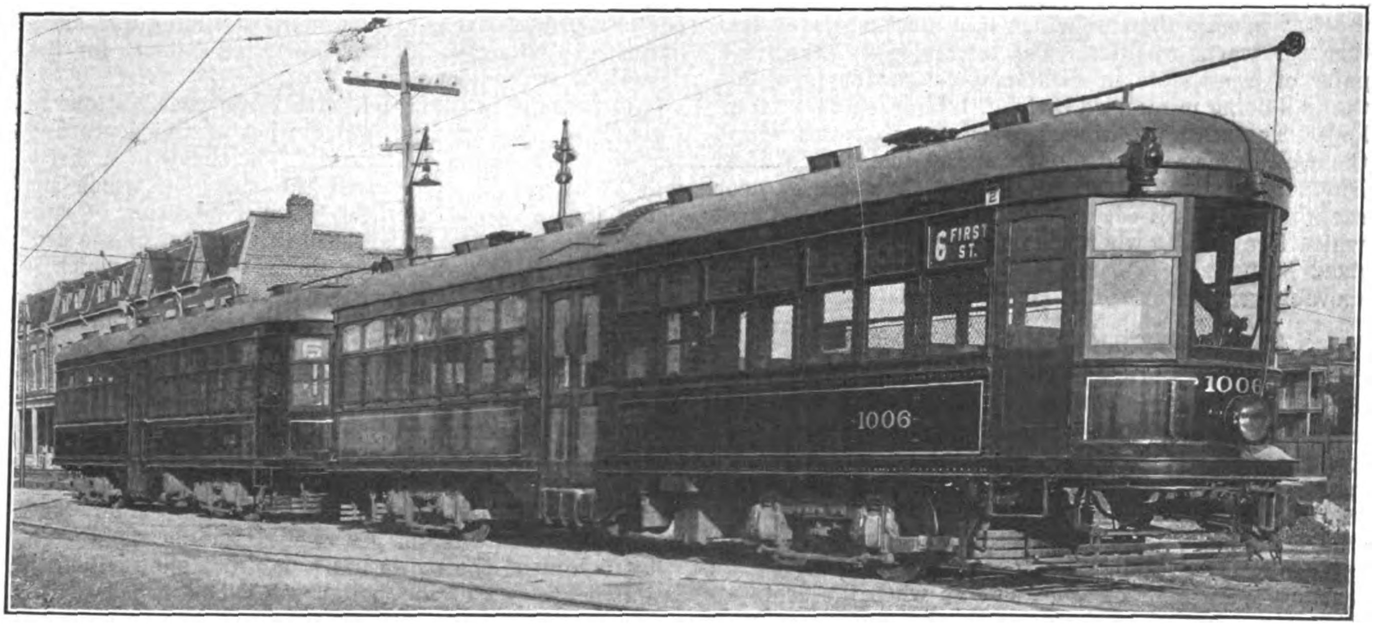
The International Railway Company is issuing its new time-tables for the Buffalo & Lockport division of a very convenient form. It is of the bellows type and is inclosed in pasteboard covers 9½ in. long by 2½ in. wide and fits easily in the pocket. When open the time-table is 21½ in. long, but being in the bellows form the conductor or motorman can look up any single train with one hand without opening it entirely. The time-table was prepared under the direction of E. H. Henning, superintendent of interurban lines International Railway at Niagara Falls.

The Commercial Club of Clinton, Ia., has purchased an electric railway sprinkling car by popular subscription in order to carry out the terms of an agreement entered into between the city and one of the local electric railways. It was found when the time came for the city to carry out its part of the agreement to purchase such a car to be manned and operated by the company that the city had no appropriation out of which the purchase could be made.

Center-Entrance Cars for Richmond

These Cars are Operated on Suburban Lines—The Fare-Box Pedestal is Combined with Supporting Rails, the Framing Has Some Unusual Protective Features, and Route Number Destination Signs Are Used

The Virginia Railway & Power Company, Richmond, Va., has recently placed in service twenty center-entrance cars, built by the Cincinnati Car Company and furnished with the prepayment devices of the Prepayment Car Sales Company. As the lines over which the cars are operated extend into the suburbs, the conditions of passenger entrance and exit are so moderate that the doorway is only 3 ft. 10 in. wide, and no division rails are used. Radical features such as ramps or low wheels were also considered unnecessary for the character of the service. The following paragraphs describe the general features of this design, the details being presented in the accompanying drawings and half-tones.



Richmond Center-Entrance Car—Ready for Train Operation

GENERAL DATA

It was specified that the car body without trucks, operating equipment and load should not weigh more than 21,000 lb. It seats sixty-four passengers and will carry a total of 125 passengers with comfort. The principal dimensions are as follows: Length over the bumpers, 50 ft. ⅜ in.; width over all, 8 ft. 4⅞ in.; height from rail to underside of side sill, 34¼ in. with 33-in. wheels; height from rail to top of trolley board, 11 ft. 10⅞ in.; distance between truck centers, 25 ft. 10 in.; truck wheelbase, 4 ft. 10 in., and width of aisle between cross-seats, 23 in. The limiting curve for operation has a center radius of 30 ft. The successive steps are as follows: 15¼ in. from the pavement to the tread of the folding step at the center entrance; 14 in. from this step to the floor of the well, and 9½ in. from the well to the main floor level.

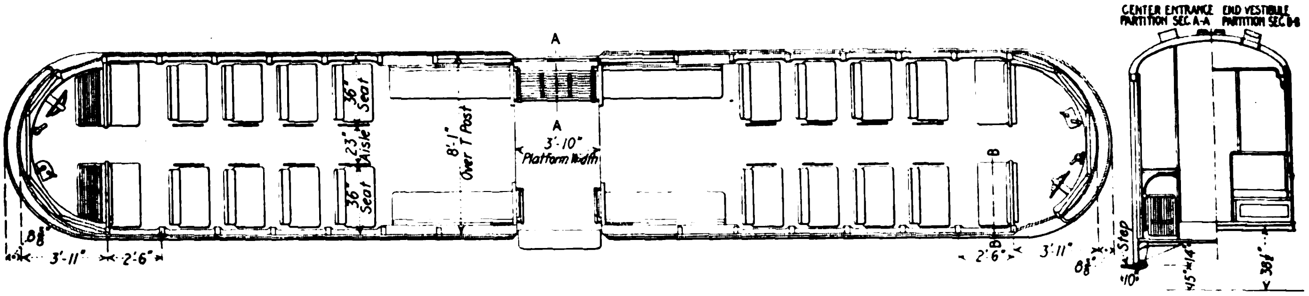
FRAMING

The details of the underframe and sides are so thoroughly shown in the accompanying drawings and bill of materials that it is unnecessary to refer to them at length. The principal constructional feature is the use of a welded 5-in. 6.5-lb. side-sill channel, which is broken only at the center-door openings. The flanges of this channel are turned outward, as in the Richmond drop-platform cars, to secure an anti-climber effect and to prevent wagon wheels from scoring the sides of the car. The side girder is built up of 3/16-in. plate. A thinner plate would have served, but it was desired to have it thick enough to avoid buckling and to resist bending from side impacts. The ends of the car are almost perfect circles, a form which enables the car to operate with maximum clearances for a given length. The cross-sills are 3-in. 5.5-lb. I-beams, except that 6-in. channels are used to form the boundaries of the well. At the ends, the underframe is braced with 3-in. 4-lb. reinforcing channels. The side posts throughout are T members which usually are placed 30-in. centers except at the center doors where the spacing was cut down to 9¾ in.

The roof is formed as an ellipse, and its steel carlins are covered with ⅜-in. agasote. The duck canvas is held all the way around the car by a screwed half-oval iron, which prevents side-wipes from tearing the duck and also prevents the pole rope from wearing through the duck at the ends. The same half-oval acts as a drip rail for the windows. The vestibule hoods are also formed of ⅜-in. agasote covered with duck, but the inner side is not painted and decorated as in the body of the car. Each car carries twelve Garland roof ventilators which are designed to exhaust at least 2000 cu. ft. of air every 4 miles with the car traveling at the rate of 4 m.p.h.

The bolsters are of the built-up type with open-hearth steel plates. The top and bottom member are each ⅞ in. x 9 in., and the cast-iron filler blocks are fitted with side bearings with wrought-iron rub plates. The bumpers at each end of the car are formed by 5-in. steel channels on top of which a sheet-steel guard is set at an angle of about 30 deg.

The interior finish including all doors and moldings is of cherry. The side sheathing between the posts is faced with 3/16-in. agasote and a heat-insulating filler of cork ¾ in. thick. The flooring is of red "Flexolith" laid on "Ferro-inclave" galvanized iron, as shown.



Richmond Center-Entrance Car—Seating Plan and Sections Through Car

The top sash of the fourteen arched windows on each side is stationary, but the lower sash may be raised to various heights not exceeding 26 in. These windows are fitted with Dayton sash locks and anti-rattlers. The center sash of the motorman's compartment is arranged to drop completely while the three other windows have drop sashes. It is thus possible to have sashes open all the way around the car, which is a most desirable feature for warm weather. The seating plan shows five pairs of cross-seats in each half, congestion alongside the well being minimized by longitudinal seats 5 ft. 6 in. long. The seats are hinged to the panels which bound the well and are used alongside the idle center door. Furthermore, each back of the two cross-center door seats nearest each cab is furnished with a second seat which is available when the cab is not in service. The fixed seating is of Hale & Kilburn rattan while the movable seating is of slat construction.

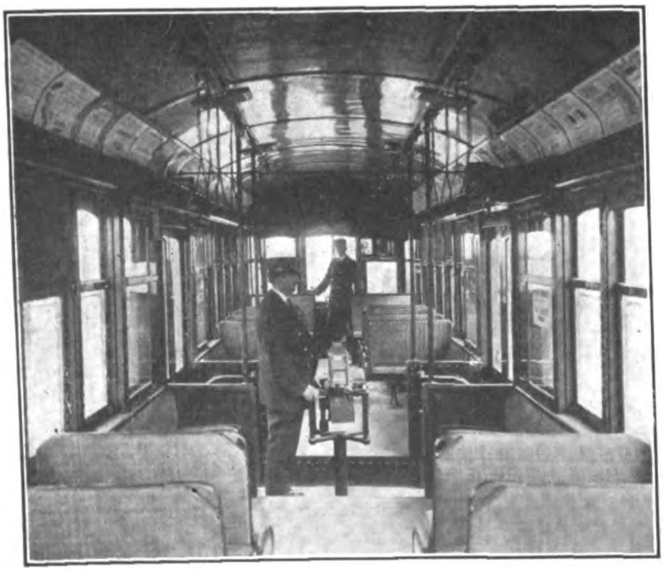
THE CENTER DOORS AND THEIR OPERATION

Each side of the car is fitted with mutually-operating double-sliding doors with a step which folds within the clearance lines. The doors and step are operated electro-pneumatically from push buttons in the conductor's pedestal. A special feature of this power mechanism is that in opening, the steps fold down first and then the doors open. In this way reckless passengers are prevented from jumping off. Conversely, during the closing operation, the step folds up when the doors are still 3 in. apart. The closing of the door is automatically announced to the motorman by means of a signal light on his dasher. As in other modern center-entrance cars, the car cannot start while the doors are open nor can the doors be opened while the car is in motion. The usual push-button buzzer system is installed for the use of the passengers.

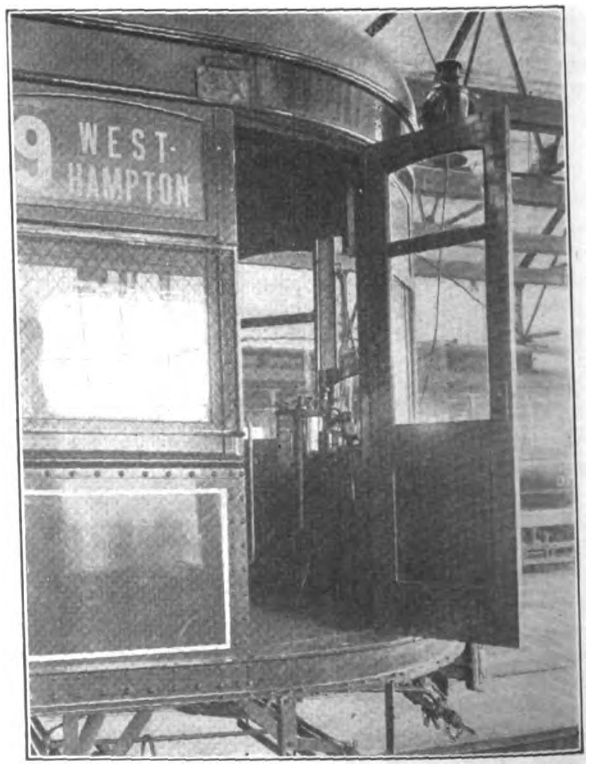
There are no grab handles or other hand-holes outside of the car, but the passenger can support himself by grab-handles set in the panels which bound the well. These oxidized brass handles are of the rather unusual form illustrated and were suggested by Charles Remelius, who was then with the Cincinnati Car Company. The vertical stanchions on the panels and the conductor's pedestal, which is built up of tubing and looks like a turnstile, give further means of support for the passenger at the doorway.

The pedestal is furnished with three push buttons to provide for the opening and closing of the doors and for the signal to the motorman. The throw of a three-way snap switch determines the sides on which the doors should operate for the desired direction of running. The cash box is carried in the center of the pedestal, and all fares are rung up on a register which is mounted over one of the center doorways.

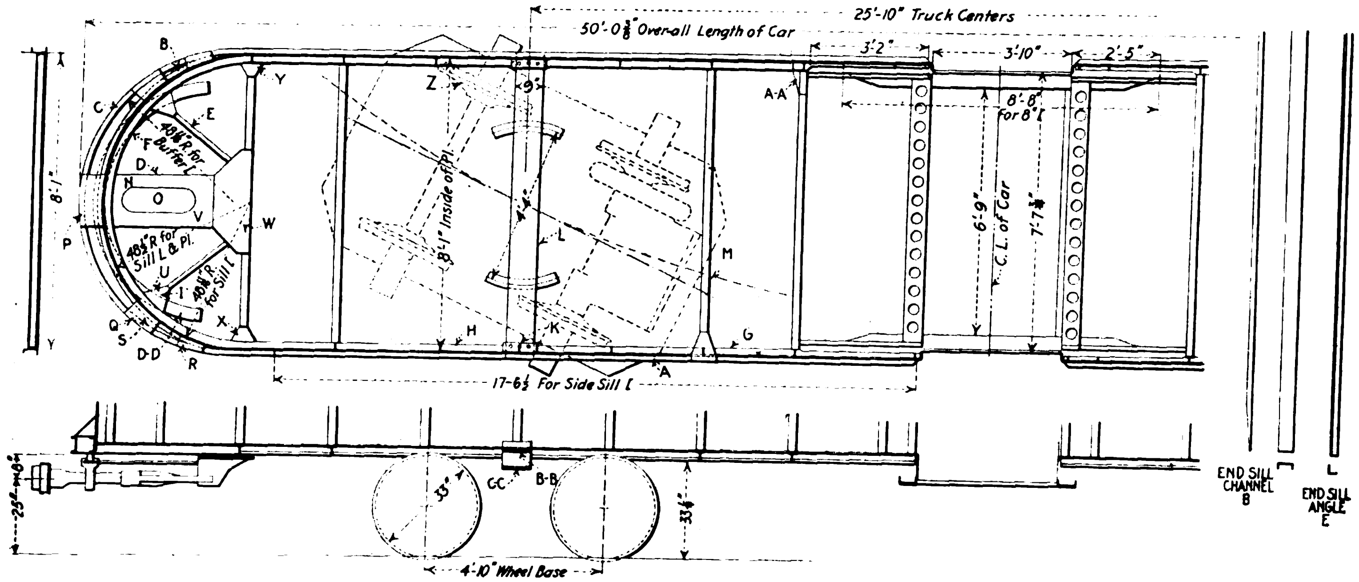
An expensive, built-up cab for the motorman has been avoided. He is separated from the passenger compartment merely by a curtain which is drawn down to the top of the cross-seat backs directly behind him. The motorman enters his compartment by means of a separate door. This door can be opened only with the reverse handle of the controller, which has a square hole for that purpose, so that the motorman cannot leave the car without taking his reverse handle along. The illustration of the motorman's cab also shows the convenient location of the switch rod. This is placed in a



Richmond Center-Entrance Car—Combined Fare-Box Pedestal and Handhold



Richmond Center-Entrance Car—Separate Door of Motorman's Cab

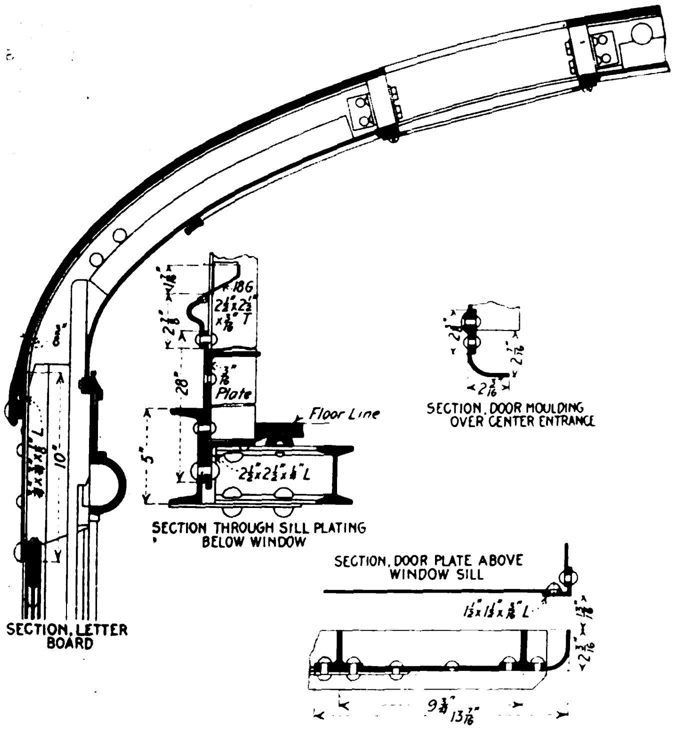

25'-10" Truck Centers
50'-0⅜" Over-all Length of Car
3'-2"
3'-10"
2'-5"
8'-8" for 8' [
6'-9"
C.L. of Car
7'-7¾"
8'-1" Inside of Pl.
48⅜ R for Buffer
48⅝ R for Sill L & Pl.
40⅝ R for Sill L
8'-1"
17'-6½ For Side Sill [
33"
33¼"
4'-10" Wheel Base
End Sill Channel B
End Sill Angle E

Richmond Center-Entrance Car—Half Plan and Elevation Showing Framing

2-in. pipe which is flanged to the floor. In this location the rod is never in the way of passengers, is most accessible for the motorman and is not likely to cause breakage of gages. The motorman obtains access to the roof by way of an iron-ladder step at the center-entrance doors.

APPARATUS

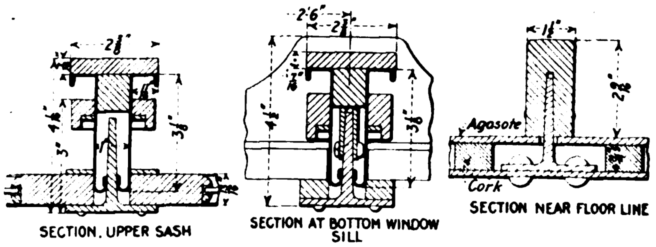
The car is mounted on Brill 51-E-1 trucks with M. C. B. journals. The equipment includes the General Electric Company's MK control for single or train operation as desired; four GE-203 motors; Peacock brakes with Pittsburgh brake handles; GE air brakes with CP-27 compressor and quick-action release in application and with emergency features; Anderson automatic slack adjusters; pneumatic sanders of the Electric Service Supplies Company, Van Dorn No. 31 couplers, H-B wheel guards and Dayton headlights. All wiring except for buzzers is in iron-armored conduits. All lighting, air compressor, heating and miscellaneous circuits are controlled from a 12-in. x 12½-in. slate-base switch panel which is mounted in an asbestos-lined cabinet in one of the end cabs.


.186
2½x2½x¼ T
28"
⅜ Plate
Floor Line
5"
10"
2½x2½x¼ L
Section Through Sill Plating Below Window
Section, Door Moulding over Center Entrance
2 1/16
Section, Door Plate Above Window Sill
1½x1½x¼ L
9¾"
13 1/16"
Section, Letter Board

Richmond Center-Entrance Car—Side, Roof and Floor Sections

SIGNS

With these new cars the Richmond company has begun the use of route number signs. These signs are of two kinds, as follows: the one in the front vestibule sash displays a route number which is 9 in. high; the one in the upper sash of the window alongside the motorman's door carries the usual route names in addition to the number. The signs are of the Hunter type and are carried in a spot-welded-steel box, painted white inside and illuminated with tungsten lamps.


2⅛
2'6"
2⅛
1½
2⅞
Agasote
Cork
Section, Upper Sash
Section at Bottom Window Sill
Section Near Floor Line

Richmond Center-Entrance Car—Typical Sections

The *Daily Consular and Trade Reports* contains statistics from the report of the Liverpool Corporation Tramways for 1913 which show that year to have been unusually prosperous, the number of passengers carried being 144,085,927, as against 134,449,967 in 1912, an increase of 7.2 per cent. The receipts in 1913 were $3,298,907, as compared with $3,071,106 in the preceding year, a gain of 7.4 per cent. The record of miles run was 13,442,605, against 12,590,408 in 1912, an advance of 6.8 per cent. The average earnings per car mile for 1913 amounted to 24.5352 cents, as against 24.3933 cents for the preceding year; an increase of 0.1419 cents per mile. The traffic receipts, car-mile earnings and number of passengers carried were the highest ever recorded in Liverpool Tramways history.

The total revenue for the year 1913 amounted to $3,470,131, and operating costs, including rental of leased lines, were $2,198,037. After apportionment to interest, sinking fund, repayment of loans, reserve, renewal and depreciation accounts and contribution in aid of the general taxes, the net profit for the year was $750,234, an increase of $98,813 over 1912.

TESTIMONY AT WASHINGTON ON PUBLIC UTILITY HOLDING COMPANIES

The clause of the Newlands trade regulation bill which relates to holding companies was discussed before the interstate commerce committee of the United States Senate at Washington, D. C., on May 12 by representatives of public utility holding companies. Those who appeared at the hearing were Bernard Flexner, representing the Middle West Utilities Company, of Chicago; Charles K. Beekman, of Beekman, Menken & Griscom, representing the United Gas & Electric Corporation and the American Cities Company, and Stuart G. Gibboney, of Barber, Watson & Gibboney, New York, representing Bertron, Griscom & Company and William P. Bonbright & Company, Inc.

TESTIMONY OF MR. FLEXNER

Mr. Flexner, who was the first witness, described the Middle West Utilities Company, a Delaware holding company. He cited as an example of a subsidiary company engaged in interstate business the Twin State Gas & Electric Company, which transmits electrical energy across State borders.

In the operations of the holding company various instances had arisen where the communities served desired to permit the consolidation of competing companies. In such cases competition would be destroyed. The absolute purpose in such a consolidation is to rid the community of competitive conditions. In some cases actual consolidation might not be possible owing to the existence of an outstanding stock interest, so that instead of a conveyance there might be substituted the holding company feature.

Discussing the general subject of State regulation, Mr. Flexner said that it has been recognized uniformly by the commissions that the way to regulate is to avoid competition between utilities of one class in each community. Of the thirty existing State commissions, nineteen or twenty in express terms permit the acquisition of stock of operating companies and the transfer of franchises with the approval of the commissions. Gas and electric lighting companies in the same district are generally recognized as competitive forms of business.

Mr. Flexner said that where the entire situation is subject to regulation by a State commission there is ample protection for the public interest. Congress might very easily legislate on this subject in such a way that a particular State might feel that it had acted in the interest of a particular community. So far no court of last resort has held that a holding company owning securities is engaged in interstate commerce.

Referring to Section 12 of the bill, Mr. Flexner said that, while he was in entire sympathy with what the committee has in mind, it appeared to him that the committee might consider the ways in which the various States have handled the question. These States, instead of tying the hands of their commissions, have provided that securities should be issued on terms subject to their approval. The bill gives no leeway to a commission. It is not always possible to sell stock at par. Although not urging the issue of stock for no consideration, Mr. Flexner urged that power be lodged with the commission to say what price should be required. Generally stock is sold at a discount of 10 to 15 per cent.

ARGUMENT OF MR. GIBBONEY

Mr. Gibboney referred to the brief filed with the committee and also to a brief filed with the judiciary committee of the House of Representatives in regard to the bill on the same subject pending before that committee. These briefs are supported by appendices quoting from the utterances of prominent authorities, including Mr. Wilson before his election as President. The briefs are signed by Mr. Gibboney and Barber, Watson & Gibboney, of New York; Mr. Flexner and Ralph D. Stevenson, of Chicago, and H. Alexander Smith, Daniel W. Knowlton and George B. Hatch, of Colorado Springs, Col.

Supporting the argument in the briefs, Mr. Gibboney asked for the insertion of a clause definitely excepting public utility holding companies from the operation of the bill. He argued that regulation by State commissions has been effective and has been largely the answer to the demand by the public for municipal ownership and operation. Through the law enacted by New York State in 1907 under the direction of Governor Hughes the entire cry for municipal ownership was allayed.

Under the New York statute competitive lighting companies may be brought together by permission of the commission through a holding company. Texas does not permit such a form of combination. The States are not uniform in their ruling as to whether gas and electric companies are competitive. It would work great harm for the federal government to interfere in this situation.

Of over $8,000,000,000 of capital employed in public utilities, $5,500,000,000 is held through holding companies. As an instance of the possible effect of legislation, Mr. Gibboney cited the Appalachian Power Company. This company operates in two States. The States were in a better position to regulate within their borders than Congress.

Mr. Gibboney declared that a great advantage of holding companies is that they were able to take broken-down plants and develop them with money raised in larger cities or abroad. Over $300,000,000 of holding company securities were sold in Europe last year. With such capital the holding companies improved service and reduced rates of operating companies. They averaged the risk of the small investor. Investors would not buy securities of plants situated in small towns, while they would buy securities of holding companies controlling many small plants.

Continuing, Mr. Gibboney declared that in his judgment the United States Supreme Court would hold that practically all public utility holding companies were engaged in interstate commerce. He figured that about 20 per cent of the holding companies had properties that were actually engaged in commerce between the States. An Idaho company conducted operations in three States. Mr. Gibboney suggested that the following exception be added at the conclusion of Section 13 of the bill:

"These sections shall not apply to corporations acquiring or holding the stock of, or engaged in the business of conducting, a public utility which is subject to State regulation, other than common carriers as defined in the act to regulate commerce, approved Feb. 4, 1887, and the amendments thereto."

MR. BEEKMAN ON HOLDING COMPANIES

Mr. Beekman explained the scope of operation of the American Cities Company and the United Gas & Electric Corporation and said that these two companies were typical of all others. They were essentially investing companies. They were not controlled by a large moneyed interest, but their ownership was scattered through the holding of their securities in small lots throughout the country and in Europe. Such companies were not controlled by cliques of bankers, but banking houses advised in their operations.

In the last few years the United Gas & Electric Corporation had acquired various properties in the West that had not been able to set aside replacement funds. They were living on their capital and were getting in worse condition. The holding company put the operating plant in good physical and financial condition and introduced proper accounting so that the subsidiary company stopped living on principal. Mr. Beekman explained the financing of holding companies and their subsidiaries.

For instance, the New Orleans Railway & Light Company, a subsidiary, had to spend a large amount of money for improvements required by the city. The holding company guaranteed the notes, and these obligations were sold partly in this country but largely abroad. In 1913, in order to meet absolute capital requirements, the subsidiary companies of the American Cities Company and of the United Gas & Electric Corporation had to issue $14,000,000 of securities. These were to provide for the actual necessities of enlargement due to the development of the business. The financiers made scarcely anything out of the transaction. It would be found, said Mr. Beekman, that small profits, if any, had been made by public utility holding companies in financing subsidiaries.

Mr. Beekman, continuing, said that the price of gas and of electrical energy had gone down steadily. Street railway rates had not gone down, but the service had been extended. The rate of fare was so low on street railways now that it could not be reduced further. Replying to a question as to the low-fare cities in Ohio, Mr. Beekman said that the operating officials in his organization felt that a day of reckoning for those properties was coming. Some of the combined operating companies furnishing different classes of utility service lost on the street railway business but gained in the electric and gas departments. The street railways had to meet the labor problem and were unable to raise fares in order to overcome the effect of higher wages. Reliance had to be placed on the combination of the different classes of service.

The cost of financing would be greater without the holding company, Mr. Beekman said. The local companies had poor credit and were unable to discount bills. Holding companies bought in enormous quantities at prices from 10 per cent to 15 per cent less than small local companies secured. They got the benefit of trade discounts. In addition, they were able to borrow money at lower rates.

MEETING OF MISSISSIPPI ELECTRIC ASSOCIATION

A most successful meeting of the Mississippi Electric Association was held in Meridian, Miss., on April 27, 28 and 29. There were six regular sessions, at which papers on lubrication, boiler economy, tungsten lamp manufacture, etc., were read. The following officers were elected at the last session of the association: President, A. H. Jones, McComb City; vice-president, Charles Hays, Columbus; secretary and treasurer, H. F. Wheeler, Hattiesburg; executive committee: R. B. Claggett, W. F. Gorenflo, E. B. Booth, Charles Hays, A. B. Paterson, A. H. Jones and R. H. Smith. It was decided to hold the next meeting of the association at Hattiesburg, Miss., on April 12, 13 and 14, 1915.

The Illinois Traction System has shown remarkable growth in its freight traffic. In 1908 the system had 250 freight cars of all classes, whereas at the present time it has 851. There are also twenty-two grain elevators on the system which, with the exception of one or two, it serves exclusively.

COMMUNICATIONS

SOLID AND MANGANESE STEEL SPECIAL TRACK-WORK EXPERIENCE

THE CINCINNATI TRACTION COMPANY
CINCINNATI, OHIO, May 9, 1914.

To the Editors:—

I have read with a great deal of interest the article in the JOURNAL of May 2, on "Chicago's Experience with Solid and Insert Manganese Special Track Work" and find a great many points in common with our experience in Cincinnati. For a time we contemplated installing solid manganese switch pieces in special work, but after observing the failures in Chicago, we concluded to do nothing along this line, and have continued to use the inserts. Consequently we can make no local comparisons between the solid and insert type.

We find out greatest trouble in 90-deg. crossings where the inserts loosen quite readily, and eventually the receiving frog points crumble away or else hammer badly. Where the angles are more acute we rarely find loose plates and only slight cupping, even after service of several years. We also find that where cast-steel arms abut rolled-steel rails, even where perfect joints have been made, frequently the cast steel will cup at the receiving end. Where mate points crumble, however, we have found this to be due primarily to bad gage rather than to faulty material. We have tried with great success the electric welding of worn-out frog points but at no point where the conditions are as heavy as in the layout described below.

At one intersection we installed a layout in 1910 with cast-steel switch pieces and manganese inserts, on which, up to the present time, we have not spent a dollar in repairs. A careful inspection does not develop any appreciable cupping nor any signs of crumbling. Incidentally there is no loosening of plates—all angles are less than 90 deg., however. This work under operating conditions is used by an average of 192 wheels per hour during eighteen hours of the day, with an average of 547 tons per hour during the same period. This is at a point in the layout where the greatest travel occurs.

It may be well to note that all of our special work is laid in and on solid concrete construction with wooden ties. Most of the steel has been laid with the cars operating and the concrete afterwards pick tamped until no movement was visible in the work.

E. H. BERRY, Engineer of Roadways.

PACIFIC ELECTRIC RAILWAY COMPANY
LOS ANGELES, CAL., May 5, 1914

To the Editors:

In a general way the life of manganese steel work on our lines was anticipated to be of a certain length, based upon an assumed car service, but the car service and weight of equipment have increased to such an extent as to render original assumptions valueless. Except in two or three cases the solid manganese work has given us much better satisfaction and longer life than the hard center type of construction, and we have had no "chipping" of castings except when we cross steam road rail.

Our change to the "boxed-in supported flangeway type," or channel construction, was made in order to get a more uniform distribution of the metal in castings and to obviate the bending of castings at intersections, which tended to crystallize the metal and cause cracks and breakage. That this was successful is proved by the fact that we have had no breaks on this type of crossing in the past three years, whereas we have had two failures in the past eighteen months where intersections were not supported. It may be that the climate in Chicago has something to do with the trouble of chipping, but I fail to see why it pertains to manganese steel alone. This feature should be referred to the manufacturers and chemists.

I am inclined to think that failures of manganese castings are due more to the quality of the steel used and the treatment in manufacture than to any other cause. It has occurred to me that there should be a standard specification governing manganese metal as regards manganese, carbon, phosphorus and sulphur contents. If there is such a standard specification I have not seen it. I have, however, seen specifications by different manufacturers, and there is a wide difference in them. Where possible there should be a record of the contents, design and service of each piece of work to be compared, as this is the only way to obtain a test of any value. Some of the manufacturers are doing this, and in the course of a year or so we should have the results of their observations, which will go a long way in tracing out our present difficulties.

E. C. JOHNSON, Assistant Chief Engineer.

[NOTE: The "boxed-in supported flangeway type" of construction, mentioned by Mr. Johnson as in use on the lines of the Pacific Electric Railway Company, was described on page 273 of the issue of this paper for Aug. 16, 1913.—EDS.]

MINNEAPOLIS STREET RAILWAY COMPANY
MINNEAPOLIS, MINN., May 11, 1914

To the Editors:

The writer has read the articles in the ELECTRIC RAILWAY JOURNAL on the subject of solid and insert manganese special track work and has been much interested in your presentation of the subject.

It has been the experience of the Twin City Lines that the renewable insert manganese special work has been fairly satisfactory. We have considered that it was more economical to use this type of work in our tracks rather than the solid manganese. We have had but a limited number of pieces of solid manganese, and our opinion, as above, is based largely on the results of the Chicago experience which we have taken some pains to watch upon the occasion of different visits to Chicago in the last few years.

We have found in our tracks that the insert manganese pieces first failed at the corners of frogs and angles. These failures would in most instances have been sufficient to condemn the whole piece if it had been of solid manganese. In many of the insert manganese pieces we have been able to renew the broken piece at a comparatively small expense. Hence, we have concluded that the insert type of work was more economical for our conditions.

For several years we have used in railway and steam crossings either cast or rolled manganese work with very good results so far, and expect to continue the use of this type of construction for steam crossings.

GEORGE L. WILSON, Engineer Maintenance of Way.

ELECTROLYSIS MITIGATION

NEW YORK, May 7, 1914.

To the Editors:

I have noted with interest Prof. Albert F. Ganz's letter on the subject of "Electrolysis Mitigation" appearing in your issue of April 25, and observe in this as in all his published utterances that simplicity and clearness of diction which goes so far to make plain to the reader even subjects which are themselves complicated or difficult of easy explanation.

Responding to your invitation to comment on the article I would advise that many engineers who have devoted their attention to electrolysis mitigation have come to believe that often a judicious application of the return-feeder system will produce effective results. However, it is by no means free from objection, and a danger lies in this as in all other situations where attention is concentrated too much on one object without proper regard for others which may be more important. For example, while it is proper to say that the insulated return-feeder system does not take the current out of the rails entirely, it must be remembered that for a large part of the return circuit the system does substitute insulated copper conductors, costing in the neighborhood of 15 cents per pound and not otherwise necessary, for uninsulated steel rails, costing about 1½ cents per pound and which must be used anyhow, not to mention the surrounding earth, which costs nothing. When we remember that the rail conductor capacity of a double-track trolley line laid with 100-lb. rails and properly bonded is approximately equivalent to 5,000,000 circ. mils in copper conductors, and that in many soils this rail conductor capacity is materially increased by the earth, it will be seen that the substitution of insulated return feeders of as great conductivity as the conductors which they replace will in general be commercially impracticable, and that smaller conductors with heavier losses must be accepted. The heavier the feeder losses the lower will be the electromotive force impressed upon the car motors and the slower the city schedule speeds possible; also there will be a corresponding increased cost of power, sometimes considerable, due to the additional feeder losses. If the cost of installing the required additional copper be very heavy, as it readily may and frequently will be, perhaps without showing anything like an adequate return, the matter may assume a very serious aspect.

It is easy to say, of course, and it has been said with vigorous iteration by some of those whose metallic structures were threatened with electrolytic damage, that it is the duty of the street railway company to protect foreign structures at any cost to themselves or to the character of the service which they render to the public, and that no obligation lies on those owning such structures to themselves take any precautions whatever. It is human nature to try to shift all possible difficulties and the burden of overcoming them to the other fellow. However, without attempting to discuss, much less to decide, the questions of law or of equity involved, on both sides of which there is much to be said, I regard it as economically wrong and highly repugnant to the principles of true engineering to advocate or approve any plan which tends to impair a public service for private gain, and especially so without a due weighing of the offsetting benefits and when other methods not open to this objection and costing less money to provide can be applied.

The insulated return-feeder system, while having much merit is only one remedy for the disease, and to prescribe, or to leave the impression that we intend to prescribe, this one remedy in all cases is a doctrine comparable with that of a physician who prescribes a well-known remedy for a complicated physical ailment before he has attempted to diagnose the symptoms or has even seen the patient. A logical procedure would seem to be first to study the conditions existing in any situation; next, to determine the most effective and economical remedy for whatever troubles may be found to exist without reference to the divided ownership of the properties affected, and then, last of all, to decide upon the duties and responsibilities of the several owners thereof.

At the invitation of the American Institute of Electrical Engineers there has been created a national committee to consider the subject of electrolysis. Delegates have been appointed by the American Institute of Electrical Engineers, the American Electric Railway Association, the American Railway Engineering Association, the American Gas Institute, the Natural Gas Association of America, the Natural Electric Light Association, the United States Bureau of Standards and the American Telephone & Telegraph Company.

This committee is undertaking to collect and compile facts regarding electrolysis troubles to find out what has been done towards mitigation, both in this country and abroad; to consider all phases of the question and to attempt, so far as may be practicable, to establish certain basic ideas and possibly make certain suggestions intended to harmonize conflicting interests and to make more easy the solution of electrolytic difficulties when and as they may hereafter arise. Up to the present time the work of this committee has not progressed far enough to warrant anyone in announcing any conclusions with reference to methods to be employed which have in fact not even been foreshadowed in the committee's deliberations.

Electrolysis is known to be a complicated disease. Its manifestations are many and diverse, and a method of mitigation which might be the best possible remedy in any one case might also be an economic crime in another. Therefore, I would deprecate any premature general advocacy of particular remedies as tending to create false impressions in the public mind and possibly to defeat the objects for which the committee was created and for which it is so earnestly striving. Similarly, it seems to me unwise to now engage in an engineering debate in the technical journals on the comparative technical merits of the various possible methods of mitigation.

CALVERT TOWNLEY.

THE NEAR-SIDE STOP IN CHICAGO

CHICAGO, May 8, 1914.

To the Editors:

I notice the inquiry of Mr. Lyne in your issue of May 9 in regard to the comparative number of accidents with the near-side and far-side stop, but so many factors enter into the question that any figures which may be compiled will not be very significant. Thus, the recent period of unrest among the teamsters in this city was accompanied by an increase in the number of collisions of cars with teams, due undoubtedly to the fact that the minds of the teamsters were upon the question of wages rather than upon their work. The seasons of the year also affect the number of accidents.

Some of the points in favor of the near-side stop, however, as demonstrated in Chicago, are evident. Formerly, the cars used to make two stops at all street intersections in the downtown district, the stop at the near-side being simply so that the motorman could see whether the street was safe to cross, while the one at the far side was to receive and discharge passengers. But with a car with an open rear platform, passengers often attempted to board and alight during the short stop on the near side. Now that the near-side stop has been adopted, boarding and alighting accidents have become much less frequent, in fact, with the near-side stop and fully closed car, I understand that all accidents of this kind have been practically eliminated.

All traffic in the downtown district is controlled by police officers, consequently the point made by Mr. Lyne in regard to reckless drivers does not arise. But in the outlying districts, where the traffic is not so regulated, it is difficult to understand why vehicle drivers should become more reckless under the near-side-stop plan. Their usual method of procedure when approaching a crossing seems to be to consider their chances of beating the car across the intersection. If their judgment is good, they are successful; if not, there is a collision. With the near-side stop this choice does not occur to the same extent, that is, the hazard is reduced directly, according to the number of stops made on the near side.

The matter is of greater importance from the standpoint of reducing accidents than of reducing damages. The courts here have generally held that if a teamster should drive across a track thinking a car would stop and it did not, he is guilty of contributory negligence, and he cannot collect damages from the company. Even where it has appeared that prospective passengers were at the intersection but failed to signal and the car did not stop and a collision occurred, the court has decided against the person driving the vehicle.

An old Chicago ordinance provided for a near-side stop at all boulevard crossings even before the near-side stop ordinance was adopted. At such points drivers have the right to assume that the cars will always stop, and they do. With the present near-side stop ordinance it is also required that automobiles stop immediately in the rear of a car making the near-side stop, provided they are moving in the same street and in the same direction as the car. This, too, is a safety measure, not only to boarding and alighting passengers, but to the intersecting street vehicular traffic.

CHICAGO READER.

ASSOCIATION NEWS

President Brush of the Transportation & Traffic Association has appointed a committee of six to consider the subject of standards for car loading. The committee consists of R. B. Stearns, Milwaukee; H. C. Donecker, Newark; F. T. Wood, New York City; Horace Lowry, Minneapolis; E. J. Dickson, Buffalo; W. H. Sawyer, New York City.

Chairman Bedwell, of the committee on buildings and structures of the Engineering Association, has appointed the following sub-committees: Fire protection rules: R. C. Bird, chairman; H. E. Funk. General specifications and form of contract, C. F. Bedwell, chairman; W. B. Ingham and L. C. Datz. Power house construction (new subject), C. R. Harte, chairman; T. H. Frank, F. H. Miller, H. G. Salisbury.

The committee on standard classification of accounts has lost two members by resignation as both have left the electric railway field. They are W. B. Brockway, of Ford, Bacon & Davis, and F. E. Smith, comptroller Chicago Railways. No announcement has been made of their successors on the committee.

The subcommittee on lightning protection of the committee on equipment of the Engineering Association has sent out a data sheet, covering the question of car wiring, choke coils, lightning arresters, and other matters connected with the protection of cars from lightning. Twenty-five questions in all are asked.

The committee on federal relations has received information from an authoritative source which indicates that interurban railways are to be exempted from the provision of the bills now before Congress, providing for the use of steel cars in interstate transportation. The committee has been informed that the House of Representatives' subcommittee of the committee on interstate and foreign commerce has decided to make this change. This conclusion was reached after the hearings given to the committee on federal relations as reported in the ELECTRIC RAILWAY JOURNAL.

J. K. Choate, vice-president J. G. White Management Corporation, has accepted the appointment of co-chairman of the Transportation & Traffic Association's side of the joint committee on transportation accounting. The association is also represented by B. E. Tilton, Syracuse, N. Y., and E. D. Reed, Chattanooga, Tenn.

Equipment and Its Maintenance

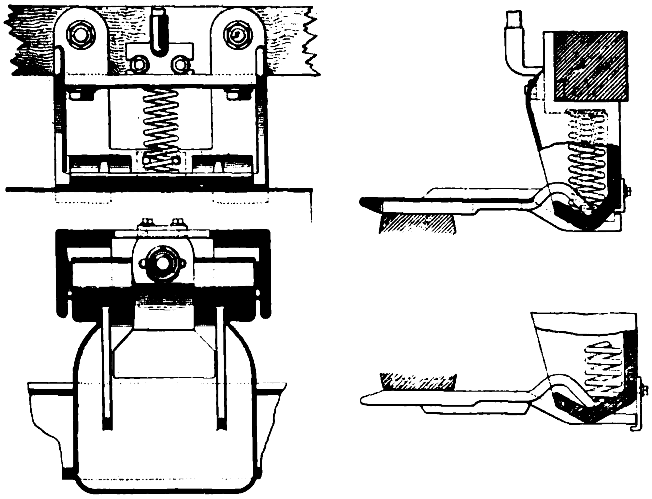
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

A DETACHABLE CONTACT SHOE

BY R. R. POTTER, SUPERINTENDENT OF EQUIPMENT NEW YORK, WESTCHESTER & BOSTON RAILWAY

I have read with interest the article on "Contact Shoes" by C. W. Squier in your issue of May 2. I note that he calls attention to several faults in various types of contact shoes. To correct these defects, I patented several years ago the detachable shoe illustrated in the accompanying drawing.



Views of Contact Shoes of Over-Running and Under-Running Types

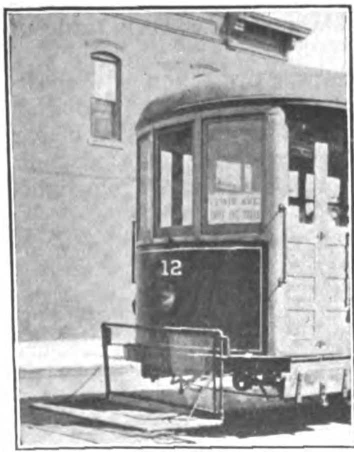
As will be seen no machine work is necessary, no lubrication is required and no shunts are used; also in case an obstruction is met the shoe is easily pulled out of place and not broken, and may be used again. An important item is the saving in the space required by the device on the shoe beam. With the type of shoe shown a minimum amount of space is required with the result that trouble from short-circuits between the shoe hanger and truck support are greatly reduced. A wear strip could be attached to the surface of the shoe, but as no machine work is required on the castings their cheapness does not warrant the use of a wear plate.

The tension or pressure of the shoe on the rail is regulated by the position of the spring in relation to the pivot or bearing points and may be set at any reasonable amount. If the spring is placed back of the line of bearing, the outer end of the shoe is caused to rise and it then becomes suitable for use on an underrunning rail. In case both an underrunning and overrunning shoe is desired, two pivot points are used. The ease of replacement of this shoe is a point in its favor as it may be replaced in a few seconds with the use of the hands only. It has been adapted and is used on the Hudson & Manhattan Railroad, New York, and the Northwestern Pacific Railroad, San Francisco.

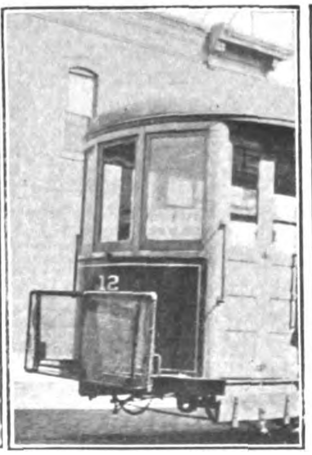
A HOME-MADE FENDER

BY JOHN JOHNSTONE, GENERAL SUPERINTENDENT BILLINGS TRACTION COMPANY

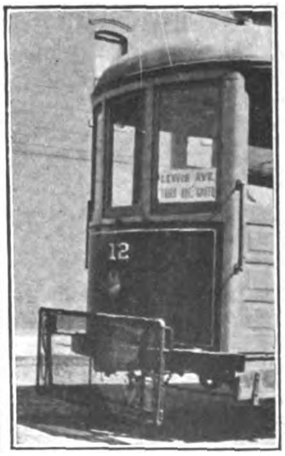
The writer has recently designed and constructed for use on all cars of the Billings (Mont.) Traction Company the fender which is illustrated herewith in three different positions and in a detailed drawing. The complete fender is easy to handle, as it weighs only about 50 lb., and it is cheap to construct. The cost of the material was approximately $10.50, while the labor per fender can be placed at, say, $4. For instance, the writer made one himself in one day of eight hours. A description of the fender follows:



Fender of Billings Traction Company in Normal Position for Use

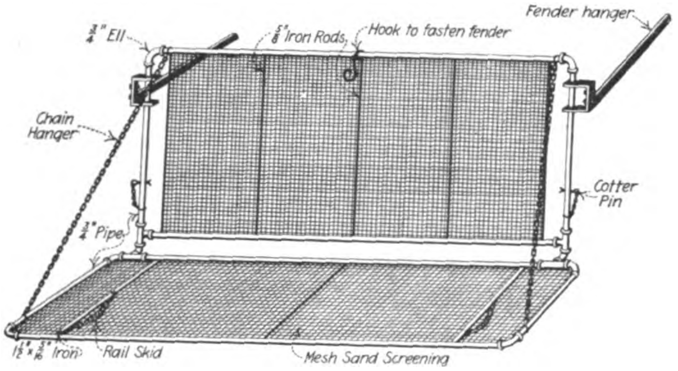


Fender Folded and Raised in Order to Clear Coupler



Fender Folded as for Carhouse Storage

The frame of the fender is made of ¾-in. black iron pipe covered with heavy netting. This framing is joined at the corners with ¾-in. black iron fittings. The folding feature is obtained by loosely fitting the lower part of the fender through a ¾-in. to 1-in. "T," the ¾-in. pipe of the lower frame having plenty of play to permit folding. The hook for fastening the fender when folded is made of 5/16-in. round iron and serves to hold the parts firmly in position. The pair of cotter pins shown 6 in. above the ¾-in. "T" in the lower part of the upright fender are used to hold the fender in position when raised. In service the fender is hung 6 in. above the rails by means of 2-in. x 1-in. x 12-in. hangers. It is secured to the top of the bumpers with ½-in. bolts. It can be raised above and clear of the drawhead, thus avoiding the cutting of holes in the netting to allow for two-car operation. To prevent the fender catching on anything that may be protruding above the level of the rails we use rail skids which are fastened under the fender, one at each side above the rails. Furthermore, the fender hangs 2 in. in front of the bumper and can be swung to any side when rounding a curve so that the fender on the car ahead will not interfere in any way with the car behind. In general there is no possibility that fenders will be torn by catching any obstruction. The complete equipment is finished to a neat appearance by painting it with black turpentine asphaltum.



Construction of Home-Made Car Fender

NEW TYPE OF HEATER

Oskar Stegemann in a paper read before the Electrical Society of Berlin describes a novel type of electric car heater used in Berlin. It consists of a metallic tube made from nickel-steel ribbon bound in helix form so as to form a tube. These resistor tubes are arranged vertically so as to produce a movement of the hot air upward in the tube. With this system it is possible to produce the desired temperature within a few minutes. A heater of this kind of 500 watts weighs 4.5 kg (9.9 lb.), and fifteen such heaters are used in one car on the Berlin tramway system.

EQUIPMENT DEFECTS—THE CONTACT PLOW

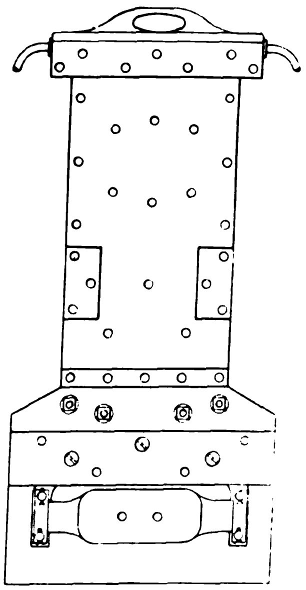
BY C. W. SQUIER, E. E.

The collection of electric current from a conduit railway system has many difficulties not encountered with a third-rail or overhead trolley system. The chief source of trouble is the plow, which is used to collect the current from the conductor bars in the conduit and transmit it to the car. The method and apparatus is perhaps not as generally understood as those for the third-rail and trolley, due no doubt to the fact that the collector is located underneath the car, where it is hidden from view to a large extent.

The plow as used in this country consists of two contact shoes made of chilled cast iron. The shoes are provided with flat-leaf steel springs to keep them in contact with the conductor bars and supply the necessary pressure for properly conducting the current. These springs also provide the necessary flexibility to take care of irregularities in the alignment of the conductor bars or slot and also the side motion due to wheel play. The springs are fastened to a wooden bottom or insulating apron, which in turn is fastened to the plow head by thin steel plates. The electrical connection from the shoes to the car is made by fuse leads which connect the shoes to the main leads, and these in turn are connected to the car wiring by connectors. The fuse leads give protection from short-circuits in the plow and upper wiring. The leads through the plow are necessarily thin due to the narrowness of the street slot, which is usually not more than 7/8-in. wide. No. 4 or No. 6 flexible wire is sometimes used by flattening this out below the plow head and reinsulating it. Solid copper strips are also used, these being insulated by a high-grade rubber compound. The steel plates which connect the apron to the plow head protect the leads from injury. Wearing plates of very hard steel are added to these to take the severe wear caused by the slot edges.

Several methods are used for supporting the plow from the truck. One method consists of hanging the plow on short hangers so that it may be able to drop without danger of being damaged if the car should take a wrong switch or jump the track. All methods provide for lateral movement so as to take care of any irregularities in the alignment of the slot and track rails; also to provide for the side play of the truck wheels between the gage limits.

One of the troubles experienced with the plow is found in the springs. These are subjected to severe strains because they are compressed and released very quickly and with great force when the car goes over a gap in the conductor rails as at a crossover. The failures are increased by careless handling of the controller at such points for the car is often run over them with the power on, resulting in the breaking of a heavy arc by the plow contacts which are attached to the springs. The arc carried to the springs heats them to a point which takes the temper from the steel and causes weak springs. In turn the weak springs produce further trouble because the contacts make poor connections to the conductor rails, thus drawing a continuous arc which burns the conductor rail, blows the fuses and often destroys the wood base of the plow.



Contact Plow

There are also some cases where the flat conductors become grounded primarily on account of mechanical troubles. Occasionally the malleable iron wear plates riveted onto the side plates of the plow where they slide through the slot become worn thin. In this case the friction of the plow sliding through the slot heats and weakens the insulation of the conductors to the breakdown point.

Defective switches or plow guides in the slot often make the car go down one track while the plow starts down the other track. The natural results are bent and grounded plows, bent plow bars and broken yokes. Cars off the track cause more than ordinary delays for invariably the plow is bent so badly that the services of the emergency crew are required to get the plow out of the slot. A channel rail defect no worse than a bad joint will tear the springs off of all the plows which pass over that rail, often disabling ten or fifteen cars at a time.

Heavy rains and thaws cause increased labor in keeping the plows in good condition for frequently the plows are practically under water and get wet throughout. This necessitates the daily removal of all the plows on the system to replace them with dry ones, and to dry all the wet ones so slowly that the wood base will not crack. The fact that the channel rail slot is a low point in the street makes it the receptacle for everything carried along by water on a rainy day, and even for the treasures of the small boy. Although this slot is cleaned daily, pieces of dirt, wire and other foreign objects find their way into the slot, damaging the plow by causing short-circuits or by obstructing it.

PAY-AS-YOU-ENTER SUBWAY OPERATION OF PHILADELPHIA RAPID TRANSIT COMPANY

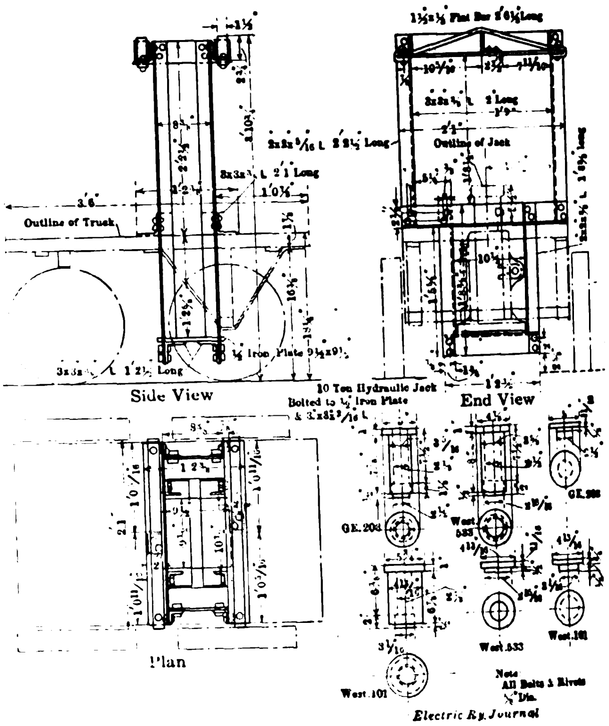
In the Philadelphia subway all except two of the stations have been provided with Dayton self-registering fare boxes during the last three months, and the ticket sellers' booths and ticket-chopping machines have been eliminated. The entrance to the station platforms have been provided with railings of horseshoe shape, and between each pair of passageways a fare box has been mounted. Behind the fare box stands a fare-collector, whose duties are equivalent to those of a conductor on a pay-as-you-enter car, as he makes change for entering passengers and sees that no one passes the fare box without depositing a nickel. A gate that slides across the entrance to the platform is installed, and during the non-rush hours this gate is partly drawn so that all except two of the passageways, served by one fare box, are closed up. During the rush hour the gate is withdrawn and one or more extra men collect fares.

MONTREAL ARMATURE BEARING PRESS

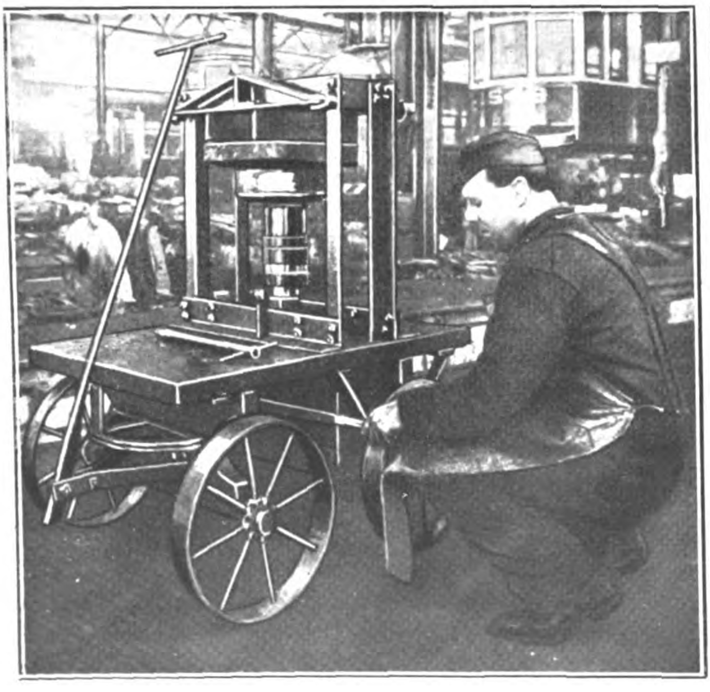
BY KEITH MACLEOD, MONTREAL TRAMWAYS

One of the most economical improvements in railway motor design has been the use of solid housings for armature bearings. The change from the old method of clamping the bearing between two separable parts has resulted in the elimination of a host of troubles with bearings and incidentally with armatures and fields. The changing of the newer bearing is much more difficult, however, unless the proper equipment is provided. Within the limits of even the best machine shop practice the variation in the press fits will involve differences of several tons in the necessary pressure for assembly or removal. Add to this the effect of salt during the winter months in rusting iron linings, and the carhouse problem of renewing bearings becomes serious. The illustrations show how the Montreal Tramways handle this detail of motor maintenance. A four-wheeled truck is equipped with a Watson-Stillman "low" hydraulic jack of 10-ton capacity on a light angle-iron framework let through the platform, the jack being placed so that the operating handle and relief key are in easily accessible positions. Long and short plugs to fit the various types are provided for pushing bearings out of and into housings. Of course the press can be used for other light work requiring a uniform pressure, such as rebushing brake levers, etc., but the principal use is for armature bearings. It has proved very successful so far, the 10-ton capacity being ample for all motors.

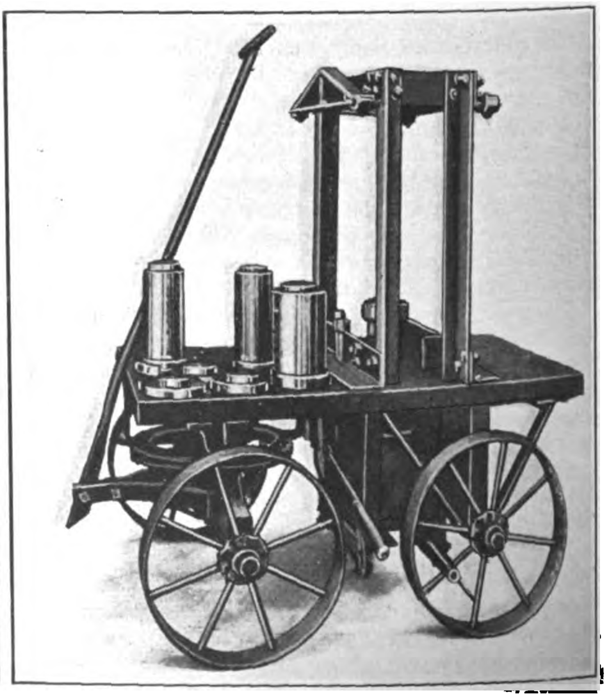
This method is so much safer and less laborious than the old way of using a sledge hammer that the press is becoming quite popular with the shopmen.



Montreal Bushing Press and Attachments for Different Types of Motors



Montreal Bushing Press in Service



Montreal Bushing Press Complete

OVERHEAD PROBLEMS—FEEDERS, FEED TAPS AND LIGHTNING ARRESTERS

BY CHARLES RUFUS HARTE, CONSTRUCTION ENGINEER THE CONNECTICUT COMPANY

In city work the municipal tendency to force underground everything possible often relieves the overhead department of one of its troubles. Elsewhere the feeders are a nuisance, unsightly and imposing heavy stresses, often at points where guys or other forms of assistance are out of the question.

The "weatherproof" coatings are standard. Where the lines run through trees such insulation has some value in its early life, but the best is subject to pretty rapid deterioration and some lasts barely long enough to get it up on the poles. City authorities, however, have great confidence in such insulation—perhaps it would be better to say have great fear of its absence—and a suggestion that bare feeder be used is rarely taken kindly in spite of the obvious evidence on the poles as to the lack of permanency of "weatherproof."

As against twig contact, weatherproofing as long as it lasts will usually prevent short circuits. However, where boughs of any size touch or are very close to the feeder they soon rub through to the copper unless some form of protection is employed. Ordinarily this is whitewood molding, grooved to fit the cable, well painted or, still better, well treated with carbolinium or similar preservative. The two parts are held together by wrappings of wire, since nails and screws are very apt to go wild and reach the conductor metal. For some reason with the condition of negative feeders and positive track there seems to be a much greater tendency to ground through trees than with the usual arrangement. In one case where the ordinary tree molding failed very satisfactory results were obtained with two 1-in. x 4-in. strips of treated wood, held about 4 in. apart by porcelain cleats through which the feeder was threaded.

A few engineers call for porcelain feeder insulators, but for the majority the present-day glass is good enough, particularly if composition is used at points of heavy stress. For very heavy stress an excellent practice is the use of double arms with eyebolts for spacers, the feeder itself not being cut but anchoring to the eyebolts through short pieces spliced in. It is still better to anchor through a cable clamp which should be attached to the conductor itself and not over the insulation. To be in keeping, if the feeder is covered the clamp and the metal at the live end of the strain insulator should be well taped. The pulls should be balanced as nearly as possible, and in addition the ends of the arms should be guyed to meet any unusual twisting tendency from gusty wind, unequal sleet loads or a broken wire.

Trolley wire is sagged with reference to its safe mechanical strength, but the larger feeders can be safely stressed far beyond the capacity of any but special supports, while for appearance—and to prevent swinging together if negative returns are in the group—all feeders on a given line should have the same sag, regardless of size. Luckily these requirements are not opposed for the same metal. The values in the following table for copper or aluminum, as the case may be, will serve for bare or covered and sizes from No. 0000 to 2,000,000 circ. mils. If installed at 60 deg. Fahr. the sags remain very nearly the same at all temperatures; if installed at either extreme there is a little difference for different sizes at the other extreme, but not enough to cause any trouble. The table sags are for 100-ft. spans; for other spans the correct sags are equal to

$$\frac{(\text{length of span})^2}{10{,}000}$$

times the sag given in the accompanying table.

SAGS FOR FEEDERS FOR DIFFERENT TEMPERATURES

Temp., Deg. Fahr.	Copper Feeder, In.	Aluminum, In.
0	10	5
30	13½	10
60	17	16
90	20½	21½
120	23½	26

Bare aluminum has but one-half the weight of bare copper of the same resistance; in the covered cables the difference is less, for the covering material is the same and the aluminum is of greater diameter than its copper equivalent. This makes easier and cheaper handling and greater radiating surface in case of overload heating for the lighter metal, but the price is apparently figured to keep the two on a parity. Those who have used aluminum seem well pleased with it, but the equally satisfactory behavior of copper and its longer record gives the latter a decided advantage.

Feeder is best run out from a reel so mounted on a flat car or wagon that it can turn freely as it travels along. Where it is necessary to keep the reel at one point and to pull the feeder "on end" snatch blocks of ample size should be used at each support. A careful watch should be kept lest the cable jam and the covering or even the conductor itself be injured. The blocks preferably should be hung above the arm on which the feeder is to go. It is at best an awkward proposition to pass a heavy feeder around the end of a crossarm, and if a feed tap or similar run on that side has been overlooked, the English language can hardly do justice to the occasion, not to mention the trouble and expense resulting.

There is no particular difficulty in splicing feeder or in tieing it to the insulators, but existing lines throughout the country show how little good work is done. Solid feeder happily is fast joining the has-beens, but there is still quite a little aloft which must still remain for some time. A connector sleeve twisted or soldered on or the good old Western Union makes the best treatment. The latter joint is made by baring some 24 in. of the ends to be spliced. Lay the bared ends side by side but pointing in opposite directions; twist together the middle 12 in. giving four complete turns; twist the remainder of each end tight on the standing part, and finally, sweat full of solder and tape.

Stranded feeder should be joined either by a sleeve or by a "sunburst" splice. The first, of which there are several good types, consists essentially of a body with conical pockets in which the cable ends are inserted, wedged open and sweated full of solder. The sunburst splice, which is more easily made than described, is started by stripping the ends for 24 in., unlaying each for 18 in., and cutting out the central strand at the end of the unlaid portion. The cables are then put together with the ends of the center strands in contact, and the outside strands of each end interlaced and then laid straight along the standing part of the other end. One outside strand is then served over the remainder; the next is started at the end of the first and served on the balance; and so till the last strand serves on the standing part alone. The other side is similarly treated, the splice sweated full of solder and taped. As in all solder work, great care should be taken that the "sweating" is done at just the right temperature.

Feeder should be top tied on tangents, and side tied on the outside of the insulator at angles, using No. 6 soft drawn wire in 16-in. lengths of the same metal as the conductor. For top tie loop one wire around the insulator neck, twist once under feeder, then bring ends up, one either side and wrap on in opposite directions and away from the insulator, crossing alternately, finally giving ends a twist together on top. Put a similar tie on the opposite side.

For side tie use one piece of wire, looped around neck and twisted once together under cable. Bring up the ends outside the feeder, serve each on for four turns, bring together behind the insulator and twist together. The cable side of the insulator is front.

Such construction details should be a part of every lineman's early education, but it is astounding how many there are calling themselves line foremen who cannot either splice or tie properly. In double-arm work these are the men who can be counted on to set the arms square with the line on one side instead of splitting the angle. So mis-set, the strain comes all on one pin, thwarting the purpose of the double-arming.

To meet the heavy pulls of large feeders some little inventive effort has been expended, but many of the resulting devices are not unlike one tested by the writer a few years ago. Weighing six times as much as a commercial 1¾-in. wood strain and costing ten times as much, it developed barely two-thirds the breaking strength. Ingenuity can better be directed toward the reduction of the stresses to limits which permit the use of commercial strains. Occasionally, however, an unusually long span with limited headroom results in very heavy stresses which cannot be avoided. For such conditions the extra heavy strains which have been developed for steam road catenary, although designed for far higher voltages, will generally prove best, the fact that they are commercial or at least semi-commercial material giving better delivery and cost than a strain for lower voltage but of special design.

The accompanying tables give the factors necessary in calculating the mechanical elements of such spans on

CONDUCTOR TABLES—BARE STRANDED COPPER CABLES

Circ. Mils of Conductor	STRANDS OF CONDUCTOR		Diameter of Cable Overall	Area of Actual Conductor	STRENGTH OF CABLE				LOADING PER LINEAL FT.			
					Hard Drawn		Soft Drawn					
	Number	Diameter			Ultimate	Allowable Equals One-half Ultimate	Ultimate	Allowable Equals One-half Ultimate	Cable Alone	Cable, With One-half In. Ice Coat	Wind at 8 Lb. per Sq. Ft.	Resultant Cable, Ice and Wind
		In.	In.	Sq. In.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
2,000,000	91	0.1432	1.630	1.569	90,500	45,250	48,100	24,050	6.205	7.543	1.754	7.744
1,750,000	91	0.1387	1.526	1.365	80,000	40,000	42,100	21,050	5.429	6.702	1.684	6.910
1,500,000	91	0.1284	1.412	1.178	68,900	34,450	36,000	18,000	4.654	5.855	1.608	6.072
1,250,000	91	0.1172	1.289	0.982	58,200	29,100	30,100	15,050	3.878	5.002	1.526	5.230
1,000,000	61	0.1280	1.152	0.785	45,900	22,950	24,000	12,000	3.100	4.138	1.435	4.380
950,000	61	0.1248	1.123	0.746	43,900	21,950	22,800	11,400	2.915	3.965	1.416	4.210
900,000	61	0.1215	1.094	0.707	41,700	20,850	21,700	10,850	2.790	3.792	1.396	4.010
850,000	61	0.1181	1.063	0.669	39,500	19,750	20,500	10,250	2.635	3.617	1.375	3.870
800,000	61	0.1145	1.031	0.628	37,200	18,600	19,200	9,600	2.480	3.442	1.354	3.698
750,000	61	0.1109	0.998	0.589	35,700	17,550	18,100	9,050	2.325	3.267	1.332	3.528
700,000	61	0.1071	0.964	0.550	32,900	16,450	16,800	8,400	2.172	3.092	1.309	3.358
650,000	61	0.1032	0.929	0.510	30,700	15,350	15,600	7,800	2.015	2.913	1.286	3.184
600,000	61	0.0992	0.893	0.471	28,400	14,200	14,400	7,200	1.860	2.735	1.262	3.013
550,000	37	0.1219	0.853	0.432	25,500	12,750	13,200	6,600	1.703	2.553	1.236	2.837
500,000	37	0.1162	0.813	0.392	23,200	11,600	12,000	6,000	1.548	2.377	1.209	2.667
450,000	37	0.1103	0.772	0.352	21,100	10,550	10,800	5,400	1.393	2.193	1.181	2.491
400,000	37	0.1040	0.728	0.314	18,900	9,450	19,600	4,800	1.239	2.010	1.152	2.317
350,000	37	0.0973	0.668	0.275	16,600	8,300	8,400	4,200	1.083	1.824	1.119	2.140
300,000	19	0.1256	0.629	0.236	13,800	6,900	7,200	3,600	0.926	1.635	1.086	1.963
250,000	19	0.1147	0.574	0.196	11,600	5,800	6,000	3,000	0.772	1.446	1.049	1.786
211,600	19	0.1055	0.528	0.166	9,900	4,950	5,000	2,500	0.653	1.299	1.018	1.630

CONDUCTOR TABLES—TRIPLE BRAIDED WEATHERPROOF STRANDED COPPER CABLES

Circ. Mils of Conductor	STRANDS OF CONDUCTOR		Diameter of Cable Overall	Area of Actual Conductor	STRENGTH OF CABLE				LOADING PER LINEAL FT.			
					Hard Drawn		Soft Drawn					
	Number	Diameter			Ultimate	Allowable Equals One-half Ultimate	Ultimate	Allowable Equals One-half Ultimate	Cable Alone	Cable, With One-half In. Ice Coat	Wind at 8 Lb. per Sq. Ft.	Resultant Cable, Ice and Wind
		In.	In.	Sq. In.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
2,000,000	91	0.1482	2.000	1.569	90,500	45,250	48,100	24,959	7.008	8.579	2.000	8.809
1,750,000	91	0.1387	1.906	1.365	80,000	40,000	42,100	21,050	6.193	7.705	1.937	7.915
1,500,000	91	0.1284	1.781	1.178	68,900	34,450	36,000	18,000	5.380	6.813	1.858	7.064
1,250,000	91	0.1172	1.656	0.982	58,200	29,100	30,100	15,050	4.508	5.863	1.771	6.124
1,000,000	61	0.1280	1.531	0.785	45,900	22,950	24,000	12,000	3.674	4.950	1.687	5.230
950,000	61	0.1248	1.468	0.746	43,900	21,950	22,800	11,400	3.503	4.745	1.645	4.922
900,000	61	0.1215	1.437	0.707	41,700	20,850	21,760	10,850	3.332	4.549	1.625	4.831
850,000	61	0.1181	1.406	0.669	39,500	19,750	20,500	10,250	3.162	4.360	1.604	4.645
800,000	61	0.1145	1.375	0.628	37,200	18,600	19,200	9,600	2.992	4.170	1.583	4.461
750,000	61	0.1109	1.343	0.589	35,100	17,550	18,100	9,050	2.822	3.977	1.562	4.272
700,000	61	0.1071	1.312	0.550	32,900	16,450	16,800	8,400	2.650	3.789	1.541	4.090
650,000	61	0.1032	1.250	0.510	30,700	15,350	15,600	7,800	2.443	3.543	1.500	3.847
600,000	61	0.0992	1.234	0.471	28,400	14,200	14,400	7,200	2.235	3.325	1.489	3.556
550,000	37	0.1219	1.156	0.432	25,500	12,750	13,200	6,600	2.064	3.105	1.437	3.421
500,000	37	0.1162	1.108	0.392	23,200	11,600	12,000	6,000	1.894	2.908	1.405	3.230
450,000	37	0.1103	1.062	0.352	21,100	10,550	10,800	5,400	1.724	2.705	1.375	3.035
400,000	37	0.1040	1.031	0.314	18,900	9,450	9,600	4,800	1.553	2.515	1.354	2.856
350,000	37	0.0973	0.968	0.275	16,600	8,300	8,400	4,200	1.345	2.267	1.312	2.620
300,000	19	0.1256	0.921	0.236	13,800	6,900	7,200	3,600	1.174	2.067	1.281	2.431
250,000	19	0.1147	0.875	0.196	11,600	5,800	6,000	3,000	0.985	1.849	1.250	2.232
211,600	19	0.1055	0.812	0.166	9,900	4,950	5,000	2,500	0.800	1.624	1.208	2.024

the basis of an ice load increasing the diameter of the cable by 1 in., and a wind pressure of 8 lb. per sq. ft. of surface. This will meet conditions in almost all localities, for while sleet is sometimes heavier, and wind pressures sometimes greater, the two rarely occur in combination. Local conditions should be carefully investigated, however, and heavier loads used if there is any likelihood of their occurrence. The effect of a resulting failure warrants the cost of preventing it. The effect of the conditions assumed on the rest of the system is always an important factor. If, for example, a supplying transmission line is involved, there is no use making the feeder line from the substation any more stable so far as continuity of service alone is considered.

CONDUCTOR TABLES—TRIPLE BRAIDED WEATHERPROOF STRANDED ALUMINUM CABLES

Circ. Mils of Conductor	STRANDS OF CONDUCTOR	Diameter of Cable Over-all	Area of Actual Conductor	STRENGTH OF CABLE		LOADING PER LINEAL FT.			
	Number			Hard Drawn		Cable Alone	Cable, With ½ In. Ice Coat	Wind at 8 Lb. per Sq. Ft.	Resultant Cable, Ice and Wind
				Ultimate	Allowable Equals One-half Ultimate				
		In.	Sq. In.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
3,180,000	....	....	....	.....	.....	....	....	....	....
2,782,500	....	....	....	.....	.....	....	....	....	....
2,385,000	....	....	....	.....	.....	....	....	....	....
1,987,500	....	....	....	.....	.....	....	....	....	....
1,590,000	61	1.875	1.249	31,600	15,800	2.070	3.562	1.917	4.045
1,515,500	61	1.813	1.190	30,300	15,150	1.977	3.430	1.875	3.909
1,431,000	61	1.781	1.124	28,800	14,400	1.877	3.310	1.854	3.794
1,351,500	61	1.750	1.051	27,400	13,700	1.779	3.193	1.833	3.680
1,272,000	61	1.719	0.999	26,000	13,000	1.683	3.077	1.813	3.571
1,192,5C0	37	1.688	0.937	23,200	11,600	1.586	2.961	1.792	3.461
1,113,000	37	1.563	0.874	21,800	10,900	1.489	2.785	1.708	3,267
1,033,500	37	1.531	0.812	20,400	10,200	1.390	2.666	1.688	3.155
954,000	37	1.500	0.749	19,000	9,500	1.293	2.550	1.667	3.047
874,500	37	1.469	0.687	18,500	9,250	1.197	2.434	1.616	2.938
795,000	37	1.438	0.624	16,200	8,100	1.100	2.217	1.625	2.749
715,500	37	1.344	0.562	14,800	7,400	0.994	2.152	1.563	2.660
636,000	37	1.250	0.500	13,400	6,700	0.886	1.983	1.500	2.486
556,500	19	1.188	0.437	10,900	5,450	0.772	1.832	1.458	2.341
477,000	19	1.031	0.375	9,500	4,750	0.657	1.615	1.354	2.107
397,500	19	1.000	0.312	8,100	4,050	0.544	1.487	1.333	1.997
336,420	7	0.938	0.264	6,300	3,150	0.460	1.363	1.298	1.882

CONDUCTOR TABLES—BARE STRANDED ALUMINUM CABLES

Circ. Mils of Conductor	STRANDS OF CONDUCTOR		Diameter of Cable Over-all	Area of Actual Conductor	STRENGTH OF CABLE		LOADING PER LINEAL FT.			
	Number	Diameter			Hard Drawn		Cable Alone	Cable, With ½ In. Ice Coat	Wind at 8 Lb. per Sq. Ft.	Resultant Cable, Ice and Wind
					Ultimate	Allowable Equals One-half Ultimate				
		In.	In.	Sq. In.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
3,180,000	....	....	....	....	....	....	....	....	....	....
2,782,500	....	....	....	....	....	....	....	....	....	....
2,385,000	....	....	....	....	....	....	....	....	....	....
1,987,500	....	....	....	....	....	....	....	....	....	....
1,590,000	61	1.462	1.438	1.249	31,600	15,800	1.462	2.679	1.625	3.1331
1,575,500	61	1.393	1.406	1.190	30,300	15,150	1.393	2.591	1.604	3.047
1,431,000	61	1.317	1.359	1.124	28,800	14,400	1.317	2.485	1.573	2.941
1,351,500	61	....	1.328	1.061	27,400	13,700	1.243	2.392	1.552	2.851
1,272,000	61	....	1.281	0.999	26,000	13,000	1.171	2.290	1.521	2.749
1,192,500	37	....	1.250	0.937	23,200	11,600	1.098	2.195	1.500	2.658
1,113,000	37	....	1.203	0.874	21,800	10,900	1.025	2.095	1.469	2.559
1,033,500	37	....	1.156	0.812	20,400	10,200	0.950	1.990	1.438	2.455
954,000	37	....	1.109	0.749	19,000	9,500	0.877	1.888	1.406	2.354
874,500	37	....	1.063	0.687	18,500	9,250	0.805	1.787	1.375	2.255
795,000	37	....	1.016	0.624	16,200	8,100	0.732	1.684	1.344	2.155
715,500	37	....	0.969	0.562	14,800	7,100	0.658	1.587	1.313	2.060
636,000	37	....	0.906	0.500	13,400	6,700	0.585	1.469	1.271	1.943
556,500	19	....	0.859	0.437	10,900	5,450	0.512	1.366	1.240	1.845
477,000	19	....	0.781	0.375	9,500	4,750	0.439	1.244	1.188	1.720
397,500	19	....	0.719	0.312	8,100	4,050	0.365	1.131	1.146	1.610
336,420	7	....	0.656	0.264	6,300	3,150	0.310	1.037	1.104	1.515

Commercial feeder will usually give the breaking values shown in the table. Occasionally feeder is spliced with a thin, short sleeve giving full conductivity but anything but full mechanical strength. It is only wise to require that the mechanical integrity be guaranteed.

FEED-IN PRACTICE AND LIGHTNING ARRESTERS

In line with the general tendency to simplification feed-in points now employ the conductor as a portion of the span, obviating the older practice of paralleling the span by the feed tap. A regular line ear is used, soldered to the trolley to insure proper contact, and carried either by a Grover type suspension or by a feed yoke. The former, which is practically an uninsulated bronze round top hanger, can be moved along the span for lining up. However, the yoke soldering to the feed tap seems more logical as a feeding device where good contact always should be assumed.

Where lightning arresters are used they should be connected to the feed tap close to its attachment with the feeder. Great care should be taken to insure that the "ground" is really such; a poorly grounded arrester has little, if any, protective value.

Where the earth is permanently damp a pipe or rod can be driven from the surface, but if there is any question, conditions should be developed by digging. While there are many patent grounds and many companies have patterns of unpatented devices, nothing is better or cheaper than a flat coil containing about 40 ft. of bare solid No. 4 copper wire embedded in a couple of bushels of charcoal to hold the moisture. Incidentally, the moisture should "belong." The practice, not unknown, of trying to reform a dry hole by carting water to it from a distance is not entirely to be commended.

There is a division of opinion as to whether or no lightning arresters should be connected to the rails as well as to earth. The principal argument in favor is that such treatment insures a good ground. It is usually quite practicable to secure the desired results by the drive pipe, coil, plate or the like. If this special ground is good, a direct connection between it and the rails is a bid for trouble from stray current; if the special ground is not good it is useless anyway. In either case the connection, to many engineers, seems unnecessary if not positively harmful.

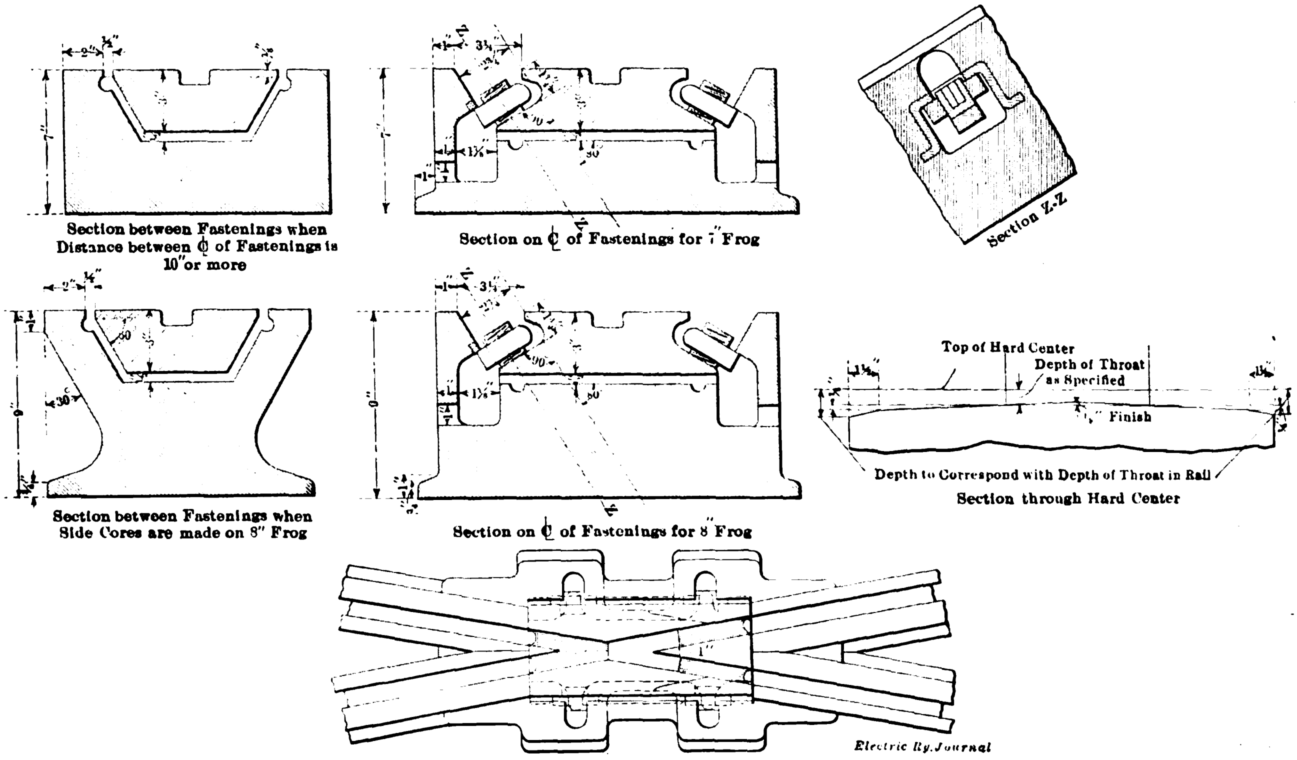
IMPROVEMENTS IN INSERT SPECIAL WORK

The Pennsylvania Steel Company has recently made some improvements in its design of Manard steel insert special work as shown in the accompanying illustration. These changes consist briefly in increasing the area and thickness of the insert, in eliminating the ribs which formerly were on the bottom of the plate and in changing the angle of application of the renewable bolt used in holding the plate in place.

In connection with areas, the size of the insert has been increased from 12 in. x 12 in. to 13 in. x 13 in. on 90 deg. crossings, an increase of 17.3 per cent. For smaller angles the area is not increased in the same proportion, as it is not considered necessary, but is larger than heretofore. At the same time the thickness of the Manard piece for street railway work is increased to 3 in. for all angles. Experience of the steel company leads to the belief that this will give much greater life to the work and reduce the tendency to pound down.

The purpose of eliminating the ribs from the bottom of the plates is to insure a better bearing surface on the spelter. The company says that presence of these in the past has sometimes prevented an even flow of spelter between the iron and the center, while their usefulness in preventing any lateral movement is questionable. An additional advantage in eliminating the ribs lies in the fact that the bearing of the center at the point of application of the bolt is larger than heretofore. Formerly the lugs on the casting which received the end of the bolt had to be dropped down below the level of the bottom of the casting. In the new center, the entire bottom surface is in one plane in order to distribute the load uniformly over a large area. All centers will be speltered, the thickness of the spelter being ½ in.

The final change of importance is in the angle of application of rapid renewable bolts. Formerly, the bolts were applied at an angle of 45 deg. to the vertical. The improvement consists in changing this angle to one of 30 deg. to the vertical. This means that the force holding the center in position is applied more nearly vertically and the manufacturers believe that it will result in the bolts maintaining a constant downward pressure and in staying tight.


Section between Fastenings when Distance between ℄ of Fastenings is 10" or more

Section on ℄ of Fastenings for 7" Frog

Section between Fastenings when Side Cores are made on 8" Frog

Section on ℄ of Fastenings for 8" Frog

Section through Hard Center

Section Z-Z
Top of Hard Center
Depth of Throat as Specified
Finish
Depth to Correspond with Depth of Throat in Rail
Electric Ry. Journal

Plan and Sections of Improved Type Insert Special Work

EXPERIMENTAL TRAIN ON BERLIN STADTBAHN

The Prussian State Railways are planning to place in experimental operation on the Dessau-Bitterfeld line a specimen train which has been designed for the Berlin Stadtbahn electrification. The train includes twelve short-coupled trail cars of the standard Stadtbahn type, arranged for use as two independently operated halves when necessary. The motive equipment consists of a head-end locomotive with two driving axles and a pusher locomotive of similar type. The driving axles are furnished with a geared jackshaft connected to the single motor. The current collectors are carried on the car next to each locomotive. This car also contains the motorman's cab, which is available for passengers when not in service. The cars are equipped with air brakes, electric light and electric heating. The total seating capacity of the twelve cars is 600, and their weight when carrying a maximum passenger load is 290 metric tons. The collectors take single-phase current at 15,000 volts and transmit it to the locomotive transformers, which lower it to 200 to 600 volts.

PRIZES FOR AIR-BRAKE STORY

The Westinghouse Air Brake Company, Pittsburgh, Pa., has announced a series of six prizes, aggregating $2,000, for the best written narratives of air-brake performance in actual service for any period covered by the life of the art. The prizes are as follows: First prize, $1,000; second prize, $500; third prize, $300; fourth prize, $150; fifth prize, $100; sixth prize, $50. The stories must be true and must be written either from practical experiences or personal observations of the writer or from information obtained at first hand from railroad men who actually know the facts. Correct names, dates, places and persons should be used so far as possible, but fictitious substitutes may be employed, provided this is so stated in transmitting letters and the fundamental facts related have actually occurred. Each contestant may use his own style of expression, use railroad dialect, if desired, and illustrations, if thought advisable.

There is no limitation as to the time when the facts given in the story may have occurred, but naturally these facts will be of larger interest if covering recent years and particularly if they apply to present standard forms of Westinghouse brake equipment. The stories will be judged primarily upon the convincing character of the narrative as to the value of the air brake; originality; striking or unusual features; accuracy of facts given; relation of the story to present-day conditions; concise expression and brevity.

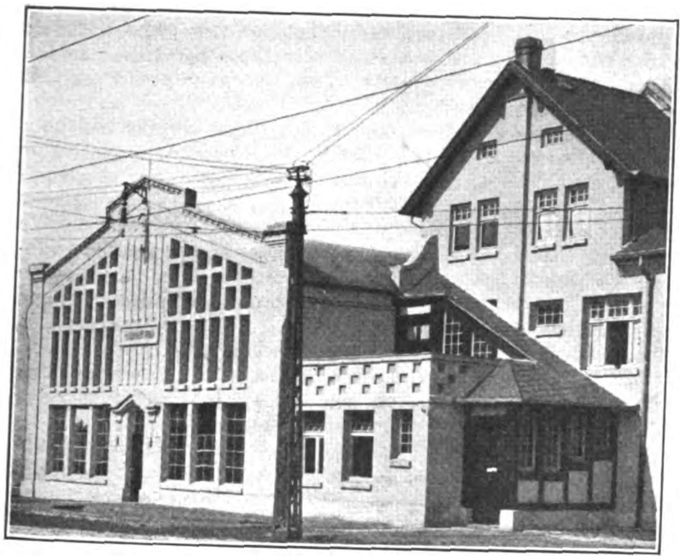
The contest is open to bona-fide employees of any railroad in the United States, operating regular traffic schedules. No stories should be more than 2000 words in length and must be written on one side of the sheet only and preferably typewritten. The name and address of the writer must not be shown on the manuscript but in the transmitting letter. The committee of judges will be three persons not associated in any way with the Westinghouse interests. Each story should be addressed to the judges, room 2121, 165 Broadway, before Aug. 1, 1914.

AN ARTISTIC GERMAN SUBSTATION

The modern utility structures of German electric railways are notable for the effort made to design them in harmony with and even superior to the surroundings. This end is not attained necessarily by using costly materials but rather by exercising good taste in the outlines and in the window divisions. An interesting example of recent construction is the substation built at Bottrop-Osterfeld by the Recklinghausen Street Railways.

This station is two stories high. The lower floor has large windows of conventional form, but in the upper section the windows are set back to give the massive effect of long, monolithic straight lines. This form of architecture is now very popular in Germany for theaters, libraries and other classes of buildings, whether for artistic or utilitarian uses. The dwelling contiguous to the station is the residence of the substation attendants. It is provided with a separate entrance from the street.

The station equipment was furnished by the Siemens-Schuckert Company. The main floor contains the rotary converters, the switchboard, all d.c. equipment and the remote control gear for the high-tension oil switches. The transformers for the rotaries are placed behind the switchboard but they are mounted on wheels to bring them within range of the station crane when necessary. The second floor contains all high-tension switches, measuring transformers, a.c. busbars and lightning protection equipment.



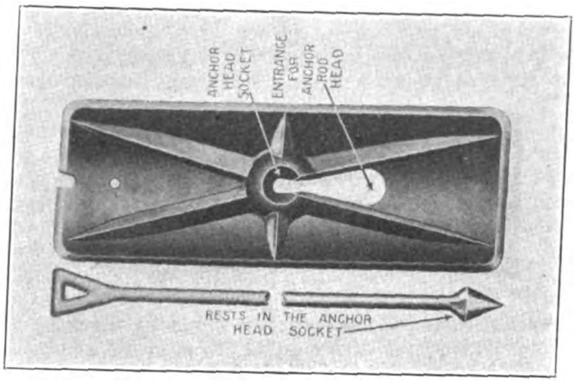
Outside View of Substation at Bottrop, Germany

PUBLIC SERVICE COMMISSION REPORT

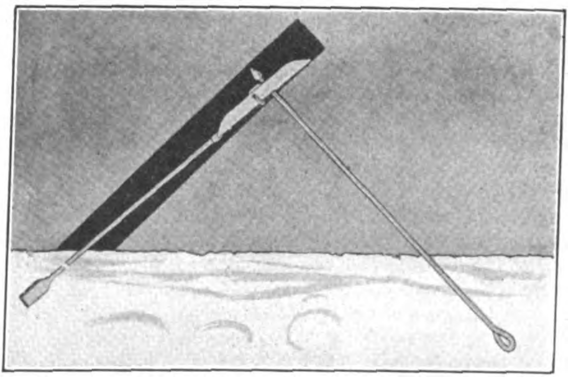
According to the third annual report of the Public Service Commission of Washington for the period from Dec. 1, 1912, to Nov. 20, 1913, the commission considered more than 800 cases during this period. There were 440 informal complaints filed. The tariff orders numbered 259, grade crossing orders 73, other formal orders 49, and 12 electric company cases. During the year about $20,000,000 worth of properties were valued. The most important of these were the Pacific Power & Light Company, some of the subsidiary companies of the Puget Sound Traction, Light & Power Company and the Gray's Harbor Railway & Light Company. The commission announces that during the ensuing year it expects to complete appraisals and rate investigations of the Washington Water Power Company and the Puget Sound Traction, Light & Power Company.

TWO-PIECE ANCHOR BEARING AGAINST UNDISTURBED EARTH

Guy anchors are usually of one piece, designed to be set with the pull-rod in the strain position, but they differ in the method of installation and in the manner of transmitting the strain from the anchor to the surrounding earth. However, the anchor recently placed on the market by the Chance Manufacturing Company, Centralia, Mo., involves a new principle for manufactured anchors although it resembles the dead-man in that the anchor plate bears on undisturbed earth. In order to accomplish this, the new anchor, known as the "Never Creep," was made in two pieces—a pull-rod and an anchor plate. The anchor hole in the earth is bored with an ordinary 8-in. auger, and as near at right angles to the line of strain as conditions will allow. The depth of the hole varies with the length of the rod used. After the hole is dug, the pull-rod is driven through the undisturbed earth to the center. The anchor plate is then lowered into the hole and set on the end of the pull-rod by means of a special hook casting fastened to the end of a tamping bar. The slot in the anchor plate is tapered so that it will slip over the end of the pull-rod without difficulty. When the plate is released it assumes a position in which the anchor head socket engages the head of the pull-rod, holding both securely in place. It is asserted that this anchor has a greater holding power than a dead-man of the same area, and at the same time it is much more quickly and easily installed. It has an advantage over other types in that the strain is against undisturbed earth. The manner of attaching the pull-rod to the anchor plate is also considered advantageous because there are no threads, consequently the entire pull-rod section is available for anchor strains.



Parts of Non-Creeping Anchor



W. B. Strang, Overland Park, Kan., president of the Missouri & Kansas Interurban Railway, has issued a pamphlet "The Benefit District Plan for Building Interurban Railways."

News of Electric Railways

Toledo Negotiations Abandoned

Negotiations between the Council franchise committee at Toledo, Ohio, and Henry L. Doherty, representing the Toledo Railways & Light Company, were abandoned on the evening of May 12, when it was found that absolutely no progress had been made toward an agreement on the rate of fare. Mr. Doherty informed the committee that he had made the best proposition possible on the rate, and that as the committee still seemed determined to insist upon a flat 3-cent fare it appeared useless to spend further time in negotiations.

City Solicitor Thurstin told Mr. Doherty that the committee would like to include in its report to the Council a statement of the lowest flat rate of fare he would accept for the company. Mr. Doherty said that he could not agree to any fixed rate unless the city would surrender control of operation. These two phases of the business were interdependent and the company could not undertake to fix the fare with control in the city's hands. The franchise proposed by Mr. Doherty, as revised at the conferences during the week ended May 9, provided that both control of operation and fares be placed in the hands of the City Council, the rate for a five-year period to be fixed after a year's trial at 3 cents under a commission to be named by the city.

Before the meeting on May 12 closed Attorney Tracy asked that the committee in its report set forth all of the provisions upon which an agreement had been reached and that Mr. Doherty's proposal be made a part of such report, so that the entire matter might be properly placed before that body. He asked further that Mr. Doherty be heard by Council when the report is made. Mayor Keller expressed doubt as to whether any progress would be made by this course.

Councilman Sievert appeared before the committee and declared in favor of the Doherty plan. At the same time he asked the committee to make a favorable report on the plan. He said: "I think that this proposal is fair; in fact, the fairest that has ever been made to the city. I do not think there is a man here who can show that a 3-cent fare would be profitable. I should like to see the committee take a definite stand for this proposal and report it favorably to the Council. I think that if the Doherty plan were submitted to the people to-day they would adopt it."

At the same meeting Assistant City Solicitor Schlatter asked Mr. Doherty what would prevent the company from making such representations to future councils as would induce them to grant too high a rate of fare, in case Mr. Doherty's plan were put into effect. Mr. Doherty replied that it would always be possible to trust the people and every act would be subject to a referendum. Mr. Schlatter continued to argue, however, that after the expiration of one year at a rate of 3 cents, the remainder of the franchise period would be uncertain. City Solicitor Thurstin added that future councils might be friendly to the company. Mr. Doherty said that he was willing that the franchise should require every fare revision to be submitted to a referendum.

It is possible that the franchise committee will submit its report to the Council on the evening of May 18, but more probable that it will be presented a week from that time. It is believed that the committee fears a protest from the business interests for refusing to accept what seems to them to be a just proposal. On the other hand, some of the men interested in the company do not believe the business men will take a hand in the matter. While the business men are in sympathy with the policy which the company has adopted, they have not been active so far in trying to bring about an agreement. Progress toward an understanding between the company and the city would probably have been made if the business interests had participated actively during the negotiations and tried to show the committee good reasons for testing the company's proposition.

When the committee makes its report to the Council, Mr. Doherty will ask the privilege of presenting the company's side of the case, and he will urge the Council to consider the proposed franchise further on the ground that the difference between the city and company should be adjusted at the earliest possible moment.

It is said that the Municipal League will at once start petitions for a referendum vote on a municipal ownership ordinance. The company will probably take like action with respect to the present franchise proposition, but not until the nature of the proposed municipal ownership ordinance is known. It is not anticipated that the company will have any trouble in securing a sufficient number of names to a petition for a referendum. Under such conditions the franchise could be put before the people within a very brief period.

A conference between the committee and representatives of the company was held on the evening of May 8, but little was done except to discuss the question of fare.

One feature that has attracted great attention is the publicity campaign carried on by Mr. Doherty and the company. The city's representatives declare that the educational forum in the newspapers is not fair. The political followers of the administration are particularly averse to the heading "So the People May Know," but the only plausible objection to the campaign which has been advanced is that the company's money is paying for the publicity.

In speaking of this matter Mr. Doherty said that for years there had been loud complaints because the affairs of corporations were not given publicity, but when the broadest and clearest explanations of all questions pertaining to the Toledo company were placed where everyone could see and read, protests followed. Mr. Doherty said:

"The settlement of the Toledo franchise trouble will be a most important matter to public utilities companies all over the United States, and especially to street-railway companies. Franchises are expiring in many places and questions similar to those at Toledo are likely to arise elsewhere. We can strengthen the situation, if this contest is settled properly, or we can weaken it, if the reverse is true. That is the reason I am willing to leave my other interests and spend so much time and effort in Toledo. I expect to remain in Toledo until some definite conclusion is reached."

Mr. Doherty said that time will be allowed to work out all the problems and give the people an opportunity to get a thorough grasp of every detail of the situation.

The Blade Printing Company, Toledo, is preparing to publish all the matter used in the publicity forum in pamphlet form, on account of the demand for the matter. These pamphlets will be supplied by the company mentioned in connection with the Toledo *Blade*.

Kansas City Franchise Negotiations Reopened

The receivers for the Metropolitan Street Railway, Kansas City, Mo., met with the Council franchise committee and other representatives of the city on May 7 for the purpose of resuming negotiations looking toward an extension of the franchise of the company. After a short discussion, an adjournment was taken until May 11. Frank Hagerman, attorney for the receivers, reviewed the former negotiations and outlined the financial situation of the company, stating that $23,000,000 of mortgages were due and the court could not stave off foreclosure any longer unless an early adjustment was in prospect. Referring to the former franchise negotiations, he stated the receivers had withdrawn because it was apparent some of those interested were attempting to make political capital of the franchise proceedings. Mayor Jost stated he would send a copy of the franchise draft to the Missouri Public Utilities Commission at Jefferson City for any suggestions members might care to volunteer.

An agreement to begin immediate work on the laying of tracks on Twenty-fourth Street, between Main Street and Grand Avenue, as a portion of the routing plan to the new Union Depot, was reached. The company agreed to lay the track under the peace agreement, which eliminates the provision that any competing company may use three blocks of the track of the Metropolitan Street Railway. The city reserved the right to revoke the authority to operate on Twenty-fourth Street if the Metropolitan system is dismembered before the expiration of the franchise.

The Kansas City Commercial Club, at a recent meeting, authorized President H. A. Fitch to appoint two members to act with himself as the franchise committee of the organization, and to attend all conferences between the city and the Metropolitan Street Railway.

Some Legal Aspects of Regulation

The series of lectures before the public utility section of the finance forum of the West Side Y. M. C. A. in New York was concluded on May 11, with an address by Charles F. Mathewson, of Krauthoff, Harmon & Mathewson, on "Some Legal Aspects of Regulation of Public Service Corporations." Mr. Mathewson cited many authorities and said that hours might be consumed in the discussion of any one of the many subjects to which he would refer. He alluded particularly to the Consolidated Gas case in New York. This is the case of William R. Wilcox and others constituting the Public Service Commission of the First District of New York vs. the Consolidated Gas Company of New York. It was decided by the United States Supreme Court on Jan. 4, 1909. While this case was not a complete victory for the company, certain principles enunciated in the decision were of the greatest value in all similar cases involving the regulation of rates and prices.

Mr. Mathewson said that all business was more or less under supervision or regulation and referred particularly to the police powers. He quoted from both the fifth and fourteenth amendments of the Constitution and from state constitutions. The trade commission bill now pending in Congress conferred particularly broad powers on the commission. The definition of a public service corporation had not been finally fixed by the courts and there was no telling how the present interpretation in regard to such corporations might be extended in the future. In this connection fire insurance companies had recently been included under the designation of public service corporations as interpreted by the courts. Special legislative committee investigations were particularly pernicious. The Stevens legislative committee of 1905 in New York State attempted within a few months to determine and pass upon the value of many companies. A public service commission or like body could proceed in a similar case at leisure and was well equipped to carry on such work.

Perhaps the paramount question in connection with appraisals was the value of the operating company's plant. The second most important question was the value of the intangible property. No uniform rate of return was applicable to all cases. The market value of the securities of a company was no test as to the proper rate of return. Accounting was extremely intricate. Mr. Mathewson had never known of a case where the books of a corporation showed the real property value. In successful companies money was usually put back into the property through improvements whereas unsuccessful companies frequently capitalized their improvements. The cost of reproduction new frequently equalled the original cost and had come lately to be accepted as a fair criterion of the worthy of a property. He thought that in most cases the federal valuation figures would be antedated before the valuation had been completed.

In speaking of development expenses Mr. Mathewson referred to the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, which expended $1,285,000 in experiments with compressed air as a possible means of motive power on its lines. This expenditure was part of the price of development and due allowance should be made for it in any consideration of the company's affairs. He also quoted at length from the recent Kings County case in regard to going value. The value of physical property and the going concern value had to be ascertained separately. The recent Passaic gas case was also referred to by Mr. Mathewson. In the Consolidated Gas case the Supreme Court held that less than 6 per cent return would be confiscatory. This company had practically a complete monopoly and the court regarded it as extremely unlikely that competition would develop in the future.

Cases of returns as fixed by the courts which were quoted by Mr. Mathewson were the Cumberland Telephone case 7 per cent, Minnesota rate case 7 per cent, Des Moines Water case 8 per cent, Queensboro Lighting case 8 per cent, and the Kings County Lighting case 7½ per cent. Mr. Mathewson contended that 8 per cent was a fair return on any investment in New York. He also referred to the setting aside by the court of the decision of the Railroad Commission of Wisconsin in the Milwaukee fare case.

A serious mistake was frequently made in assuming that a decrease in the price of a service would be more than offset by an increase in the use of the service. Even if the decrease in the cost of service to the consumer did result in a large increase in business extra capital would have to be put back into the property to meet the increased demand. Mr. Mathewson knew of no rate reduction that had worked materially to the benefit of the company. He said that the subject of depreciation had never been fairly before the Supreme Court. In the Minnesota rate case the question came before the court only incidentally.

Accounting Between City and Company in Chicago

Barrow, Wade, Guthrie & Company, public accountants, have reported to City Comptroller Traeger of Chicago in regard to the methods of keeping the books of the Chicago City Railway under the provisions of the 1907 franchise ordinance. In concluding their report the accountants say that various expenses charged to capital account appear to them to be proper charges to operating expenses, that certain payments made out of the renewals and depreciation fund appear to be proper charges to operating expenses and that the present system of adjustment of interests on deposits might be changed to the interest of the city. It is also pointed out that fines and expenses which are inflicted on the company on account of violations of the city ordinance are included with other payments made by the company before the city participates in the division of the net earnings of the company.

Bion J. Arnold, chairman of the Board of Supervising Engineers, Chicago Traction, is reported to have said that the board is planning to inquire into at least three of the items criticized by the accountants in their report. These items include $16,000 paid out in connection with the proposed subway plan, certain payments to the Commonwealth Edison Company and the payment of more than $7,000 income tax out of the partnership account between the company and the city instead of out of the company's own funds. Mr. Arnold issued a statement in which he said in part:

"The accountants have brought out no new points, as most of them have been thoroughly discussed and passed upon by the board, and the board's rulings concurred in by the passage of the ordinance of Nov. 13, 1914. The other points raised by the accountants, such as the disposition of the income tax, were under consideration by this board before the accountants pointed them out, and no decision has as yet been rendered by the board regarding them."

It is generally regarded that the controversy over the accounting as accepted by the Board of Supervising Engineers and rejected by the Mayor and his followers is a purely political move. The Mayor is believed to feel injured because the Board of Supervising Engineers did not support him and his comprehensive subway plan. The Council and the board have been working in conjunction in these matters. On the other hand the Mayor appears to have lost his control of the Council, particularly the local transportation and the terminal committees. It is doubtful whether the Mayor's influence will result in any action by the Council.

Successful "Safety First" Campaign in Dallas

C. V. Cosby has completed a satisfactory course of lectures among the trainmen of the Dallas (Tex.) Electric Corporation on the subject of "safety first." "Safety first" lapel buttons are to be distributed to all employees of the Dallas Consolidated Electric Street Railway, Metropolitan Electric Street Railway, Rapid Transit Railway and the Dallas Electric Light & Power Company, all controlled by the Dallas Electric Corporation, as an ever-present reminder of the principles of the movement. Later a "safety league" is to be formed. The "safety first" buttons are attractive in appearance. The design comprises a triskelion in the center of a circular white field surrounded by a black border, on which appears the motto "safety first" in gold letters.

The New Haven Inquiry

In connection with the inquiry into the affairs of the New York, New Haven & Hartford Railroad, a sharp controversy developed on May 13 between Joseph W. Folk, general counsel for the Interstate Commerce Commission, and Attorney General MacReynolds. The commission earlier in the week summoned to Washington William Rockefeller, Louis Cass Ledyard, George F. Baker and George W. C. Miller. Mr. McReynolds wrote the commission on May 12 suggesting that the members consider very carefully the effect of the proposed examination of Charles S. Mellen, former president of the New Haven Railroad, and E. D. Robbins, counsel for the company, upon any criminal prosecution which the government might desire to institute hereafter. Mr. Folk declared on May 13 that he intended to put Mr. Mellen on the witness stand on May 14, contending that Mr. Mellen as a witness telling the truth would be a thousand times more valuable than Mr. Mellen could possibly be as a defendant. He said:

"The great question before the American people to-day is to secure honesty in the management of the railroad systems of the country. The revelations already brought to light in this investigation, and the further disclosures that Mr. Mellen and other witnesses can make, should be of immense value, and result in legislation that will cause it to be just as grave a crime to plunder the public through a corporation as it is now personally to rob an individual."

On the same day the commission, through Mr. McChord, announced that the hearing in the New Haven investigation would be resumed on the morning of May 14 without any change in the original plan. This action was unanimously concurred in by all the members of the commission.

The proceedings before the commission on May 8 were very short. Charles F. Linsley, Meriden, Conn., who was one of the directors of the Billard Company, was the first witness. He had never taken any active interest in the company. He became a director to accommodate Mr. Billard and acted according to Mr. Billard's directions. Birdsey E. Case, an attorney of Hartford, was also examined on May 8.

At the hearing on May 11 Timothy E. Brynes, the former vice-president of the New Haven Railroad, testified regarding the disbursement of approximately $400,000 among legislative lobbyists, publicity promoters, lawyers, special agents and advertising men for helping to "create sentiment" favorable to the New Haven. The first witness on May 11 was George D. Phippen, treasurer of the Boston Railroad Holding Company and treasurer's agent of the New Haven Railroad, stationed at Boston.

At the hearing on May 12 Louis Cass Ledyard, a director of the New Haven and chief counsel for the Morgan interests, defended the late J. P. Morgan in answering an attack upon the financier by William B. Lawrence, a Boston lawyer. Mr. Lawrence said that he was a "victim" of the New Haven management to the extent of $1,500,000 and charged that a deal in Boston & Maine stock had been engineered in the interests of the Morgan combination.

The most interesting feature of the hearing on May 14 was the testimony of Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, relating to the acquisition by the New Haven road of a large number of shares of stock issued by the New York, Westchester & Boston Railway, now operating a high-speed electric railway out of New York. This stock, according to Mr. Mellen, was redeemed through due bills given by him to the late Thomas E. Byrnes, former chief of the New York detective bureau. Mr. Mellen had never been able to find out to whom the due bills were given, although the bulk of them had been redeemed for about $150,000. In Mr. Mellen's opinion, the Westchester shares had been "scattered in the hands of people of what you may call influence," the inference being that the distribution of due bills was effective in securing modifications in the franchise of the New York, Westchester & Boston Railway. The Westchester stock which was redeemed through the medium of Mr. Byrnes was according to Mr. Mellen "worth about ten cents a pound." The hearing was adjourned until May 19 in order to make it possible for Mr. Mellen to gather papers which the commission wanted and to permit the commission to examine the documents furnished by Mr. Mellen.

Exhibits of Northern White Cedar Association

An exhibit of Northern white cedar products was held from April 30 to May 9, inclusive, by the Northern White Cedar Association, at the Coliseum, Chicago, Ill. At the exhibit were displayed telephone poles of northern white cedar that have been in actual service for fifty years, ties for twenty-nine years and posts of high quality. Another exhibit will be held at the Grand Central Palace, New York, N. Y., from May 21 to 30, inclusive.

The object of this association is to establish grades of poles, posts, ties and shingles which will be standard and to maintain those grades so that the purchaser may be assured of procuring material suitable for his purposes. The association also looks after the interests of its members in the establishment of minimum carload weights and railway rates of freight. A traffic department is sustained within the association to handle, for the members, all matters pertaining to freight rates, railway claims and tracing of cars.

Intercollegiate Debate on Municipal Ownership

On the afternoon of May 11 a debate was held at Stevens Institute, Hoboken, N. J., between Stevens Institute and Cornell University on the subject of "Municipal Ownership and Operation of Public Utilities." The judges, C. W. Baker, editor of *Engineering News*, and F. R. Hutton, rendered a decision in favor of Cornell. B. P. Goldman, the representative of Sibley College, Cornell, based his affirmative case upon three points—that public utilities are natural monoplies; that regulation has proved inefficient and ineffective, and that municipalities have a financial advantage in dealing directly with public utilities. Mr. Goldman stated that the only way to treat public utilities was as functions of the city government, and that the only logical step was for municipalities to adopt the more direct method of municipal ownership,

Charles A. Colvin, the Stevens representative, on the negative, took as his point of view that of the consumer as the receiver of service and as the citizen, and based his case upon the proposition that municipal ownership would result in an increase rather than decrease the service per unit cost. Moreover Mr. Colvin declined to present any comparative data in regard to the efficiency of private or municipal ownership, on the ground that comparative figures were of no value unless each case was thoroughly examined to show that items such as taxes, depreciation and interest were taken into account under analogous conditions. The true test of municipal ownership was whether the city could rent the utility and receive a greater return than was possible under its own operation. This debate—the first one of its kind between the two colleges—was inaugurated this year with a view of giving the engineering students concrete forensic practice in the presentation of facts and data to a critical audience.

National Foreign Trade Convention

The call for the National Trade Convention to be held in Washington on May 27 and 28, under the auspices of the American Manufacturers' Export Association, the American Asiatic Association and the Pan-American Society proceeds from a realization that the foreign trade is now at a point where its future is vital to the country's prosperity. The general committee is headed by Lloyd C. Griscom, former American ambassador to Italy and Japan. Secretary Redfield of the Department of Commerce at Washington will open the convention. The importance of foreign trade to the railroads will be the subject of a paper by Fairfax Harrison, president of the Southern Railway. The Illinois Manufacturers' Association was asked to designate the manufacturer to treat of the situation in the Middle West and nominated its president, H. G. Herget, for the duty. E. C. Simmons, head of one of the largest hardware houses in the country, will deal with a similar topic. E. N. Hurley, vice-president of the Illinois Manufacturers' Association, who recently headed a party of sixty Illinois manufacturers in a trip to South America and who investigated South American banking and credits for the Department of Commerce, will make an address on the Panama Canal and Latin-American trade opportunities.

Alba B. Johnson, president of the Baldwin Locomotive Company, will handle the possibilities of stimulating American exports by a larger use of raw materials from partially developed countries. James A. Farrell, president of the United States Steel Corporation, will be active in the convention. All papers will be distributed to the delegates in advance of the convention. It is expected that the delegates will study the papers and engage in the discussions.

Injunction Granted in Omaha.—The District Court at Omaha, Neb., has granted an injunction restraining the city from enforcing the ordinance requiring the Omaha & Council Bluffs Street Railway to sell seven tickets for 25 cents recently voted on under the initiative and referendum law.

Plans for Electrification of Burlington Section.—It is stated that the Illinois Central Electric Railway, which operates from Lewistown to Canton, Ill., and other points in Fulton County, may arrange with the Chicago, Burlington & Quincy Railroad for running electric cars from Lewistown to West Havana over the tracks of the steam railroad.

Subway System Suggested for Detroit.—At its last meeting the Detroit Street Railway Commission passed a resolution to the effect that a subway system is the solution of the rapid transit and congested traffic problem in Detroit and it was agreed to get all possible information on the subject. A resolution was also passed providing that all surface lines constructed in the future shall be built by the commission. This action does not interfere in any way with the extensions which have been agreed upon between the city and the Detroit United Railway, work upon which has been started.

Conference on Uniform Accounts.—The committee of the Missouri Electric, Gas, Street Railway & Water Works Association appointed to consider the question of a uniform classification of accounts for all members, except street railways, met in Kansas City on May 6 and 7, with J. M. McShane, statistician for the Missouri Public Utilities Commission. Philip J. Kealy, of the Kansas City Railway & Light Company, presided as chairman. A dozen members were present. The tentative classification will be presented to the Missouri Association at its annual meeting on May 21.

Cars to Be Equipped for Fire Fighting.—Albert Patten, superintendent of the Topeka (Kan.) Railway, has proposed that two cars of the company be equipped with fire-fighting machinery and the plan probably will be adopted by the city commissioners. Mr. Patten pointed out that the company's lines run through the thickly populated sections of the city and that the street railway equipment would therefore be available where the conflagrations were likely to be unusually dangerous. An ordinance providing for the changes probably will be introduced by the city commissioners in the immediate future.

New Franchise Under Consideration in Findlay.—The Toledo, Bowling Green & Southern Traction Company proposed at a meeting of the City Council at Findlay on May 8 to exchange its franchise which expires in 1915 for a new 25-year grant under which it will reduce the cost of street lighting to $55 per arc light per year, pave the street between the tracks and 18 in. on the outside and reduce the price of current for commercial purposes from 8 cents to 6.65 cents per kw-hr. The city desires to pave Main Street, but the company insists upon a new franchise before it will agree to pave its right-of-way.

Massachusetts Senate Favors Municipal Ownership Report.—The Senate of Massachusetts has passed to be engrossed the resolution providing that the Public Service Commission shall furnish the Legislature of 1915 with certain information relative to public ownership of street railways, this information including the amount invested in street and elevated railway lines; also an estimate of cost to the commonwealth of acquiring the same by eminent domain; also an opinion as to what proportion of such cost could be properly assessed upon real estate to be benefited by such acquisition. The resolution now goes to the House.

Changes Recommended in Kansas Utility Law.—A committee appointed by the recent Kansas Legislature to recommend changes in the present public utilities commission act met at Topeka, Kan., on May 8. Among the subjects discussed at the meeting were extension of the jurisdiction of the commission, the basis of rate making, accounts, reports, franchises, stock and bond issues, and a uniform classification for public utilities. J. M. Kinkel and James Cable, of the present Kansas Public Utilities Commission, attended the meeting and advanced suggestions. Ernest Hogueland, secretary of the last commission, also attended.

Record Verdict in Accident Case.—A jury in the Supreme Court at White Plains, N. Y., on May 8, decided that the New York, New Haven & Hartford Railroad should give Oscar Fried $75,000 damages as a recompense for the loss of both his arms. The injured man sued for $150,000. While working on a strut holding the catenary bridge, which supports the high tension wires of the electric system in Mount Vernon, Dec. 8, 1913, Mr. Fried came in contact with a wire carrying 11,000 volts. Counsel for the railroad moved that the verdict be set aside on the ground that it was excessive and that Thomas J. O'Neill, attorney for Fried, had not elected whether he would sue under the State or under the federal statute. Justice Morschauser reserved decision.

Straight Five-Cent Fare Rejected in Trenton.—The Commissioners of the city of Trenton, N. J., have adopted a resolution holding that the reasons advanced by the Trenton & Mercer County Traction Corporation for desiring to abolish the sale of strip tickets are insufficient and they have directed City Counsel Bird to take any action necessary before the Public Utility Commission should the matter be referred by the company to that body. The company desired to substitute straight 5-cent fares, with transfer privileges, for the system of selling six tickets for 25 cents. In return for the establishment of the straight 5-cent fare the company agreed to purchase ten new double-truck cars yearly until seventy had been added to the system; to establish a waiting room in the center of the city; to develop a package express and to inaugurate a pension system for the benefit of its employees.

Brooklyn Subway Section Contract Awarded.—During the week ended May 9 the Public Service Commission for the First District of New York executed a contract with the Cranford Company for the construction of a part of the Eastern Parkway subway in Brooklyn. The Eastern Parkway subway will be operated by the Interborough Rapid Transit Company as an extension of the existing subway. The route begins at the present subway terminus, at Atlantic and Flatbush Avenues, Brooklyn, and runs through Flatbush Avenue and Eastern Parkway to Buffalo Avenue, whence there will be an elevated extension through East Ninety-eighth Street and Livonia Avenue to New Lots Avenue. The section covered by the Cranford contract lies in Flatbush Avenue between St. Marks Avenue and Prospect Park Plaza, and will be mostly six-track construction. The contract price is $2,225,519. Work on this section will begin on May 23.

Illinois Commission Orders Track Elevation.—Regardless of the position taken by Counsel for the Chicago & Oak Park Elevated Railroad, which is now in the hands of receivers, the Illinois Public Utilities Commission has issued an order instructing the company to elevate that portion of its tracks now on the surface. In its order the commission instructs the elevated railroad to file plans with the commission for its approval, before July 1, 1914. Within sixty days after the plans have been approved track elevation work must be started, and until the tracks are finally elevated the trains must stop at every street intersection, and proceed by signal only. If the receivers for the road refuse to comply with the order, all trains beyond Laramie Avenue, or the end of the elevated structure, will be prohibited from running. The order of the commission will be submitted by the company to Federal Judge Carpenter and his instructions will be obeyed.

Chairman's Opinion on Inquiry Into New York Commission.—Chairman Van Santvoord of the Public Service Commission of the Second District of New York, has issued a statement in answer to the proposed investigation of the commission by the State department of efficiency and economy on complaints filed by citizens of Buffalo that the commission acted improperly in granting authority to begin business to the Canadian American Power Company. After stating that action on this application was taken before he came into the commission, the chairman concludes: "If I could seriously believe that the statement intends to convey the idea that an investigation of the commission had been undertaken and would be pressed because the commission declined to comply with demands of the department of efficiency and economy to investigate certain complaints or to decide a pending application, I would quite as seriously suggest that such action or threat might properly be taken before the grand jury."

Service Resumed on Pennsylvania Road.—The Webster, Monessen, Bell Vernon & Fayette City Street Railway, Charleroi, Pa., reported on May 11 that its cars were in regular operation and that the regular schedule was being maintained. The strike of the employees was brought about by the refusal of the officers of the company to recognize the Amalgamated Association. There was a local union among the employees which was recognized by the company, but that body was not affiliated with the Amalgamated Association. The men also had a working agreement with the company which did not expire until May 1, 1914, but on the refusal of the officers of the company to recognize the Amalgamated Association the men declined on April 23, 1914, to report for work. The differences between the men and the officers of the company are still unsettled, no concessions having been made by either side. The statement that a corps of the State constabulary had been called was incorrect, and the company has placed no guards on its cars. The company operates a 9-mile suburban line.

Abrogation of Existing Contracts for Increased Rates.—Judge Mathews of the Superior Court of Georgia has rendered a decision upholding the right of the Public Service Commission acting under order of the Georgia Railroad Commission to abrogate existing contracts for electric power and to charge an increased rate. The power company defended its right to make a demand for increased rates by setting up an order of the commission that the contract in question, executed on July 18, 1912, and similar contracts be abrogated and that maximum rates be fixed. The plaintiff in the case denied the power of the commission to abrogate a contract already legally made, but the court held that such contracts were made subject to the law then in existence giving the commission power to fix rates and prevent discrimination. The court decided, therefore, that the power company was bound by the rulings of the commission as to maximum and also as to discriminatory rates, and that the consumer also must yield to the same authority when the commission condemned any contract either in contemplation or in actual existence as discriminatory and therefore regarded by the commission to be opposed to public policy.

Office Building of Birmingham Railway, Light & Power Company Destroyed by Fire.—Two employees lost their lives on May 8 in a fire which completely destroyed the office building of the Birmingham Railway, Light & Power Company, Birmingham, Ala. The two employees, W. M. Childress and H. H. Keyser, were killed by jumping from upper floors to the pavement below, in order to escape the flames. The fire is thought to have originated in some waste paper in the basement of the building. General Manager J. P. H. de Windt said Saturday morning that most of the important books and papers in the claims and auditing departments were in the safe and are supposed to have escaped the ravages of the flames. Private papers of all the officials were destroyed. Early Saturday morning temporary quarters were opened in the old Jefferson County Bank Building, which had been tendered the company by the bank officials. The old Gilreath office next to this building on Twenty-first Street is also being occupied temporarily. President Ford, General Manager de Windt, and the auditing, treasury and railway departments will be located in these buildings. The engineering department will also be in the old bank building. Insurance on the building occupied by the Birmingham Railway, Light & Power Company, which was owned by Judge W. M. Walker, amounted to a total of $50,000. Insurance on schedule amounted to $132,600, of which $36,200 was a total loss. This was on furniture and fixtures, $22,000; electrical stock, $8,900, and gas stoves, $5,300.

PROGRAMS OF ASSOCIATION MEETINGS

American Railway Association

The spring session of the American Railway Association will be held at the Biltmore, Madison and Vanderbilt Avenues, Forty-third and Forty-fourth Streets, New York, N. Y., on May 20, at 11 a. m. Reports will be presented by the following committees: The executive committee; the committee on transportation; the committee on maintenance; the joint committee on automatic train stops; the committee on relations between railroads; the committee on the safe transportation of explosives and other dangerous articles; the committee on electrical working, and the committee on nominations. The election of a president and a first vice-president will take place at this meeting. Two members of the executive committee, three members of the committee on transportation, three members of the committee on maintenance, three members of the committee on relations between railroads and three members of the committee on nominations are to be elected.

International Congress at Budapest

The preliminary program of the convention at Budapest this year of the International Street & Interurban Railway Association has just been published. The subjects to be considered by the delegates are as follows:

"The Effect of New Transportation Systems on the Development of Cities and the Social Conditions of the Community; the Proper Basis for Fares and Transfers and the Effect of Reduced Fares on Travel," by Mr. Duval-Arnould of the Paris Municipal Council and Dr. Kuhles of the Munich Municipal Council.

"Rail Corrugation," by Mr. Busse, chief engineer of the way and structures of the Great Berlin Street Railway, and Mr. Regal, manager of the Bordeaux Electric Railway & Omnibus Company.

"Study of the Best Shape of Rails and Tires to Give a Minimum Wear on the Curves; the Use of Manganese and other Special Rails for Curves," by Mr. Bacqueyrisse, chief engineer of the General Omnibus Company, Paris, and Mr. Minorini, manager of the Municipal Tramways of Milan.

"Ball Bearings and Roller Bearings for Motor Cars and Trail Cars," by Mr. Largiader, manager of the Zurich Municipal Tramways, Mr. Schoerling, chief engineer of the Hanover Tramways, and Mr. Tobias, superintendent of shops of the Budapest Tramways.

"Training of Motormen, Conductors and Inspectors, the Collection of Fares and Accounting for Receipts," by Mr. Noirfalise, general manager of the Liégeois Tramways, and Karl Roethy, chief inspector of the Budapest Tramways.

"Methods of Trans-shipment of Freight from Narrow-Gage Railroads to Standard-Gage Railroads," by Mr. Sapin, manager of the Paris Central Railway & Tramway Company, Paris, and of the Ekaterinoslav Tramways Company.

"Joint Operation of Lines with Several Franchises," by Mr. Carnevali, chief engineer of the Turin Tramways Company.

"Self-Propelled Cars," by Mr. Hamelink, formerly manager of the Netherlands Tramways, and Mr. De Soignie, manager of the Mosane Tramways which are operated in Ardenne.

"Underground Conduit Construction for Feeders," by Mr. Sekutowicz, operating manager of the Lyons Tramways.

"Direct-Current Distribution at Several Potentials for Electric Railway Service," by Mr. Sieber, manager of the Nuremberg-Fürther Tramways.

"Relative Merits of Various Methods of A.C.-D.C. Conversion," by Mr. Dalrymple, manager Glasgow Corporation Tramways, and Mr. Sarrat, engineer of the Empain Syndicate, Brussels.

"Passenger Stations, Stop Signs, Destination Signs and Car Advertising," by Rodolphe de Weck, manager of the Freibourg Tramways and president of the Swiss Interurban Railway Association.

Financial and Corporate

Stock and Money Markets

May 13, 1914.

In the trading on the New York Stock Exchange to-day the balance of the net changes showed a loss too small to be regarded as significant. Liquidation of New Haven has apparently come to an end. The total dealings in New Haven to-day consisted of one sale of four shares. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¼ @ 2¾ per cent; four months, 3¼ per cent; six months, 3 @ 3¼ per cent.

In the Philadelphia market to-day Rapid Transit advanced to 17¼ and Union Traction sold at 44⅝. Lehigh Valley Transit common sold at 17½ and the preferred at 30½.

The Chicago market was narrow and dull to-day. The principal bond transactions were in Chicago Railways and Chicago City issues.

The Boston market to-day developed an improved tone and trading became more active on the advance which followed the opening.

In the Baltimore market to-day small sales were recorded of United Railways & Electric and Washington, Baltimore & Annapolis preferred. The bond sales totaled $44,400, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	May 6	May 13
American Brake Shoe & Foundry (com.)	87	86
American Brake Shoe & Foundry (pref.)	132½	133
American Cities Company (com.)	32	29
American Cities Company (pref.)	62	61⅞
American Light & Traction Company (com.)	345	340
American Light & Traction Company (pref.)	106½	107
American Railways Company	37¼	37¾
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	76	76
Boston Elevated Railway	79	79
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*63	a55
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	92¼	91⅝
Capital Traction Company, Washington	100⅜	100
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg, ctf. 1	92½	98
Chicago Railways, ptcptg., ctf. 2	31¾	33
Chicago Railways, ptcptg., ctf. 3	5	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	102	102½
Cleveland Railway	104	104
Cleveland, Southwestern & Columbus Ry. (com.)	a4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	a30	*30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	63	*63
Detroit United Railway	a80	a80
General Electric Company	146¾	145½
Georgia Railway & Electric Company (com.)	120	119⅞
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14⅞	14⅝
Interborough-Metropolitan Company (pref.)	62½	62¼
International Traction Company (com.)	40	*40
International Traction Company (pref.)	85	*85
Kansas City Railway & Light Company (com.)	18	18
Kansas City Railway & Light Company (pref.)	37	37
Lake Shore Electric Railway (com.)	6	6
Lake Shore Electric Railway (1st pref.)	92	92
Lake Shore Electric Railway (2d pref.)	22	22
Manhattan Railway	130¼	131¼
Massachusetts Electric Companies (com.)	10	10
Massachusetts Electric Companies (pref.)	57	59
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25½	25½
North American Company	75⅞	76½
Northern Ohio Traction & Light Co. (com.)	a70	70
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	40	39⅞
Philadelphia Company, Pittsburgh (pref.)	38½	38½
Philadelphia Rapid Transit Company	14½	17
Portland Railway, Light & Power Company	50	50
Public Service Corporation	112	112
Third Avenue Railway, New York	41½	41
Toledo Traction, Light & Power Co. (com.)	a20	20
Toledo Traction, Light & Power Co. (pref.)	a70	70
Twin City Rapid Transit Co., Minn. (com.)	105	104½
Union Traction Company of Indiana (com.)	11½	11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore)	26½	26⅝
United Rys. Inv. Company (com.)	15½	15
United Rys. Inv. Company (pref.)	42½	42
Virginia Railway & Power Company (com.)	50	a53
Virginia Railway & Power Company (pref.)	94	94
Washington Ry. & Electric Company (com.)	86⅝	86¼
Washington Ry. & Electric Company (pref.)	83⅞	84¼
West End Street Railway, Boston (com.)	67	67
West End Street Railway, Boston (pref.)	86	85½
Westinghouse Elec. & Mfg. Company	74½	74
Westinghouse Elec. & Mfg. Co. (1st pref.)	120	120

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* Last sale. a Asked.

ANNUAL REPORTS

Chicago Railways

According to the sixth annual report of the Chicago (Ill.) Railways, the comparative income statement for the fiscal year ended Jan. 31, 1914, and for the preceding period is as follows:

	1914	1913
Income:		
Passengers	$19,243,056	$17,709,205
Special cars	4,597	4,806
Mails cars	38,238	31,489
Advertising	100,000	100,000
Rent of equipment	7,902	12,545
Rent of buildings, etc	7,239	8,024
Sale of power	46,163	60,413
Interest on deposits	91,102	61,361
Miscellaneous income	136,418	88,934
Gross income	$19,674,715	$18,076,777
Expenses:		
Maintenance way and structures	$644,337	$738,174
Equipment	722,549	682,862
Renewals	1,575,208	1,446,142
Power	1,991,090	1,852,719
Operation of cars	5,176,464	4,881,644
General	1,425,318	1,410,693
Expense investment real estate	23,678	39,309
Taxes (estimated)	813,159	676,959
Total expenses	$12,371,803	$11,728,502
Balance	$7,302,912	$6,348,275
Deduct interest at 5 per cent on valuation	3,928,580	3,778,449
Net income	$3,374,332	$2,569,826
Division of net income:		
City of Chicago, 55 per cent	$1,855,883	$1,413,404
Chicago Railways, proportion of income from joint operation	$1,518,449	$1,156,422
Interest allowance on valuation of property	3,928,579	3,778,449
Interest on bank balances	161,734	122,775
Interest on treasury securities	93,479	90,653
Miscellaneous income	175,000	840
Gross income	$5,877,241	$5,149,139
Deductions:		
Interest accrued on:		
First mortgage bonds	$2,478,944	$2,297,750
Consolidated mortgage bonds	1,830,572	1,817,919
Purchase money mortgage bonds	162,920	162,920
Collateral and funding notes	....	24,900
Current liabilities	1,121	....
Sinking fund reserve accrued	250,000	250,000
Corporate expenses and adjustments	157,297	120,574
Total deductions	$4,880,854	$4,674,063
Net income	$996,387	$475,076

To the net income of $996,387 shown by the above statement there was added a surplus at the beginning of the period of $435,511, giving a total of $1,431,898. From this there was deducted interest on adjustment income bonds of $100,000, dividends on participation certificates No. 1 of $852,864, and dividends on participation certificates No. 2 of $248,600, or a total of $1,201,464, leaving a balance at the end of the period of $230,434.

During the accounting period the passenger revenues increased 8.6 per cent, interest on deposits 48.4 per cent, miscellaneous income 53.2 per cent, whereas the income from the sale of power decreased 23.6 per cent. The gross income for the period showed an increase of 8.8 per cent. The expenses for maintenance of way and structure decreased 12.7 per cent, but the expenditures for maintenance of equipment increased 5.8 per cent, the renewal expenses 7.4 per cent and the estimated taxes 20.1 per cent. The total expenses increased 5.48 per cent. The percentage of operating expenses to gross income was 50.75 in 1914 as compared to 53.14 in 1913; taxes, 4.13 per cent in 1914 and 3.74 per cent in 1913, and the reserve for renewals 8 per cent in each period, giving a total of 62.88 per cent in 1914, and 64.88 per cent in 1913. Interest on plant value as compared to gross income was 19.97 per cent in 1914 and 20.9 per cent in 1913, and the net divisible income was 17.15 per cent of gross income in 1914 and 14.22 per cent in 1913.

The passenger car mileage in 1914 was 62,807,503 as compared to 59,276,772 in 1913 and the mail car mileage 206,736 in 1914 and 188,575 in 1913, or comparative totals of 63,014,239 and 59,465,347. The revenue passengers carried increased from 355,518,500 in 1913 to 385,451,459 in 1914, and the transfer passengers from 256,408,891 in 1913 to 273,456,205 in 1914, or from 611,927,391 in 1913 to 658,907,664 in 1914.

In addition to the annual report the company has published under date of April 30 a report of H. A. Blair, president of the board of directors. According to this, the amount added to the capital account of the company during the past accounting period as shown by the certificates issued by the Board of Supervising Engineers, Chicago Traction, was $3,487,490, which, added to the total capital account as of Jan. 31, 1913, gives a capital account on Jan. 31, 1914, of $80,975,950. The total cost of rehabilitation, re-equipment, extensions and additions to the last-named date as determined by the board equals $50,196,076.

It is stated that the unification agreement which went into operation Feb. 1, 1914, has been attended with a great many difficulties but that these are gradually disappearing and general results to date amply justify the unification of the operation of the city lines. All the pending litigations brought against the Chicago Railways based upon the claim that it was liable for the debts of the Chicago United Traction Company and its constituent companies have been ended. These litigations referred more particularly to an alleged liability upon the 4½ per cent thirty-year gold bonds of the Chicago Consolidated Traction Company, purporting to be guaranteed by the Chicago United Traction Company. The three mandamus cases brought by Oak Park, Maywood and River Forest to compel the company to exchange transfers with the County Traction Company have been terminated in favor of the Chicago Railways by a denial of the writs in each case.

Union Traction Company of Indiana

The statement of income, profit and loss of the Union Traction Company of Indiana, Anderson, Ind., for the year ended Dec. 31, 1913, is as follows:

		Per Cent
Revenue from transportation:		
Passenger	$2,080,110	84.34
Baggage	10,549	00.43
Parlor, chair and special car	7,144	00.29
Mail	690	00.03
Express	91,481	03.70
Milk	22,839	00.92
Freight	196,862	07.97
Switching revenue	193	00.01
Total	$2,409,868	97.69
Revenue from operation other than transportation:		
Station and car privileges	$7,942	00.32
Parcel room receipts	1,262	00.05
Storage	12	00.00
Rents of tracks and terminals	11,824	00.48
Rent of equipment	2,935	00.12
Rent of buildings and other property	6,518	00.26
Power	20,773	00.85
Miscellaneous	5,698	00.23
Total	$56,964	02.31
Total operating revenue	$2,466,832	100.00
Operating expenses:		
Way and structures	$291,493	11.80
Equipment	165,064	06.68
Traffic	19,976	00.81
Conducting transportation:		
Superintendence	24,291	00.98
Power	216,784	08.77
Operation of cars	433,248	17.63
General and miscellaneous	311,161	12.60
Extraordinary flood expense charged in 1913	20,700	00.84
Total operating expenses	$1,482,717	60.11
Net operating revenue	$984,115	39.89
Taxes	102,360	
Net operating revenue less taxes	$881,755	
Other income	51,797	
Gross income	$933,552	
Deductions from gross income (bond and other interest, discount and rentals)	858,858	
Net income	$74,694	
Dividends on Union Traction Company of Indiana first preferred	50,000	
Surplus for year	$24,694	

The total operating revenue for 1913 was $2,466,832 as compared with $2,308,649 in 1912, an increase of 6.8 per cent. The total operating expenses for 1913 were $1,482,717 as compared with $1,335,841 in 1912, an increase of 10.9 per cent. The net income for 1913 was $74,694, while that for 1912 was $126,592, a loss of $51,898. This loss was chiefly accounted for by the disastrous spring flood and the street railway and the teamsters' strikes in Indiana later in the year. The operating expenses for the year included $291,493 expended upon maintenance of way and structures and $165,064 expended upon maintenance of equipment, which, together with $20,700 charged as the 1913 portion of the flood expense, made an aggregate sum expended on maintenance of $477,257. This amount equals 19.32 per cent of the gross earnings for the period and is equivalent to about $1,256 per mile of road operated.

The amount charged for additions and betterments during the year was $344,912, this being in addition to $37,209 advanced during the year to the Traction, Light & Power Company and $41,879 expended on account of sinking funds. The largest and most important single item included in the above charges for additions and betterments was that of $159,342, covering ten all-steel interurban combination passenger, smoking and baggage cars. Other important items were $48,193 for additional automatic block signals covering 32.41 miles of the company's lines; $25,900 for station sites and $23,356 for improvements in power distribution.

The 1913 flood inflicted great damage upon the property of the company, particularly in the case of the interurban lines. In rehabilitating the property the company endeavored to improve conditions so as to prevent a recurrence of injury from such a cause. Bridges and grades were raised and widened and the foundations of piers and abutments were deepened and strengthened. The total charges caused by the flood amounted to $88,001, of which $70,918 was chargeable against maintenance. Of this amount $20,700 was included in the operating expense for 1913 and the remainder was placed in a suspense account to be charged off in three similar annual instalments.

The report states that earnings and temporary loans should not and cannot be relied upon to provide all the funds necessary for capital expenditures from year to year and that provision should be made to meet the bonds and other obligations of the company as they fall due. The time when this situation must be met has been hastened by the flood and strike losses during the year, and it appears urgent to consider the authorization of a general and refunding mortgage which will provide for taking up the Union Traction Company of Indiana and the Indiana Northern Traction Company and other underlying bonds and also provide additional bonds to be used, under proper restrictions, for additions, betterments and other corporate purposes.

The number of passengers carried during the year was 18,313,721, divided 9,712,348 for interurban lines and 8,601,373 for city lines. The freight handled amounted to 74,803 tons and the express carried, exclusive of United States express, 6,792 tons. The total mileage of cars for the year was 8,033,526, of which 6,373,022 was for interurban lines and 1,660,504 miles for city lines.

Taxation of Public Service Corporations

The Annual Tax Association has just published the report of the committee on the taxation of public service corporations which was submitted at the annual meeting of the Association held in Buffalo, October, 1913. This committee was composed of Charles J. Bullock, professor of economics, Harvard University; F. N. Whitney, tax attorney, Western Union Telegraph Company; C. C. Plehn, professor of political economy, University of California; Samuel Lord, tax commissioner of California; S. F. Howe, State tax commissioner of Kansas; H. G. Hayes, professor of political eeconomy, University of Michigan, and G. G. Tunell, Atchison, Topeka & Santa Fé Railway.

The report of the committee, which was prepared by Professor Bullock, considers the following three questions: (1) Should public service corporations be subject to special heavy taxation because they hold franchises of great value? (2) Does effective regulation of public service corporations necessary to equalize taxes of public service corporations with the taxation of other business or property? (3) Should taxation of public service corporations be governed by the general rule of equality? The committee rejected the first and second theories on the ground that effective regulation completely alters the incidence of special taxes upon monopolies and at the same time removes the evil which has led to the demand for such taxation. The committee held that equality should be the controlling principle in governmental affairs and that in none is it more necessary than in the matter of taxation.

The committee discussed and approved the doctrine of classification and held that "without classification real, as distinguished from formal, equality is absolutely unattainable." "The taxation imposed upon public service companies should be the same as that imposed upon property subject to the full rate of State and local taxation." The committee was clearly of the opinion that equality does not require ad valorem taxation but that taxes upon gross receipts or other specific taxes can be adjusted from time to time so as to make them substantially equivalent to the rates imposed upon all unclassified property.

The committee closed its report as follows: "Whether public service corporations are taxed at local or at average State rates they should be subject to the true and not the nominal rates of State or local taxation. So long as undervaluation of their property continues, therefore, we hold that either the valuation of public service corporations should be made on the same basis as that of other property, as is the practice in a few States, or that the corporations should be taxed at the true rate imposed upon other property, as is the practice in Wisconsin. Better still would be the eradication of the evil of undervaluation of property by the local assessors, as it is now attempted in Kansas, Arizona, Colorado and New Mexico; but this must necessarily be the work of time and in the interim public service corporations are entitled to fair play."

The announcement is made that the eighth annual conference of the Annual Tax Association is to be held on Sept. 8-11 in Denver, Col. This convention is composed of three delegates appointed by the Governor of each State. Among the sessions to be held are one on the subject of the income tax and one on the subject of efficiency in government.

Suit Threatened to Enforce Interest Payments on Income Bonds

Holding that the New York (N. Y.) Railways has been earning a surplus sufficient to pay interest on the adjustment bonds issued to security holders of the Metropolitan Street Railway in the reorganization, the New York Life Insurance Company has called upon the Farmers' Loan & Trust Company, as trustee under the mortgage, to take action against the company to compel payment on the bonds. Darwin P. Kingsley, president of the New York Life Insurance Company, says in his letter to the Farmers' Loan & Trust Company:

"An investigation which has been made of the New York Railways' gross earnings since Jan. 1, 1912, and of the legitimate deductions therefrom, will disclose that the said company has realized an amount of net income in each year more than sufficient to pay the 5 per cent interest on these bonds, and that it is illegally withholding from the bondholders an amount of interest due them as follows: For the period ending June 30, 1912, 1.73 per cent; for the period ending Dec. 31, 1912, 0.25 per cent; for the period ending June 30, 1913, 0.864 per cent; for the period ending Dec. 31, 1913, 0.155 per cent.

"The New York Railways has defaulted in the payment of interest on these bonds at the end of each semi-annual period since the bonds were issued in so withholding interest, and has acted, and is acting, in direct violation of the provisions of the mortgage, which provides the amount of interest payable on these bonds and the method of computing net income from which such interest is payable.

"The company's semi-annual statements of income show that it has set apart in each period a reserve fund for injuries to persons and property which is not only grossly in excess of the amount necessary to meet the requirements, but also is not computed in accordance with the express provisions of the mortgage in relation thereto.

"Such statements further show that these reserves are not being used for the purpose for which they were created, but that expenditures on account of injuries to persons and property occurring in past periods are being made from current earnings, and that such reserves are allowed to accumulate, to the detriment of the bondholders, and in violation of the provisions of the mortgage."

Mr. Kingsley asks the trustee to take appropriate action against the New York Railways to compel an accounting of the business done and net profits received by the company for each half-yearly period since Jan. 1, 1912, to set aside the approval by the bondholder directors of the statements rendered by the company, if such approval has been given, and to compel the payment of the full 5 per cent interest on these bonds as earned. The letter concludes:

"This company is ready and offers to furnish such security and indemnity against the costs, expenses, and liabilities to be incurred in bringing suit, as shall be satisfactory to the trustee."

Scranton & Wilkes-Barre Traction Bonds Offered

Perry, Coffin & Burr and N. W. Harris & Company, Boston, Mass., are offering first refunding 5-per-cent gold bonds of the Scranton & Wilkes-Barre Traction Corporation at 95½ and interest yielding 5.28 per cent. The bonds are dated July 1, 1913, and are due on Aug. 1, 1951. They are callable on any interest date at 105 and interest. These bonds are subject only to a prior pledge to secure $888,000 of underlying bonds, for the exchange and retirement of which a like amount of the bonds of this issue is reserved. The mortgage provides for a cumulative sinking fund which requires the deposit with the trustee on Nov. 1, 1917, and annually thereafter until maturity, of a sum not less than one-half of 1 per cent of the aggregate amount of the bonds both issued and reserved for refunding. Money so deposited must be used for the purchase of these bonds and the bonds so purchased will continue to draw interest for the benefit of the sinking fund. It has been calculated that this fund will retire at least $1,215,000 of bonds. The total authorized first refunding issue is $3,000,000.

American Water Works & Electric Company, Pittsburgh, Pa.—At a meeting of the board of directors of the American Water Works & Electric Company on May 8 the following permanent officers were elected: H. H. Porter, president; Stuart H. Patterson, New York, vice-president and treasurer; Harry E. Towle, Boston, secretary. J. H. Purdy, Pittsburgh, was appointed assistant to the president. An executive committee was named consisting of President Porter, Samuel Insull, Guy E. Tripp, A. H. Wiggin, J. D. Mortimer and H. H. Pierce. The executive, financial and operating offices of the company will be located in New York City.

Binghamton (N. Y.) Railway.—The statement made public on May 2 by G. Tracy Rogers, president of the Binghamton Railway, in regard to the conclusion of the deal by which the Scranton & Binghamton Railroad takes over the Binghamton Railway follows: "The Scranton & Binghamton Railroad completed its purchase of the Binghamton Railway on May 2 and formal transfer of the property was made. No changes in the officers, directors and operating forces of the company have as yet been made. The local company was represented at the transfer by G. Tracy Rogers, president; ex-Senator George E. Green and Thomas J. Keenan. The Scranton & Binghamton Railroad was represented by R. W. Day, general manager; S. B. Michael, assistant treasurer, and C. R. Bedford, attorney for the purchaser." References to this purchase were made in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, Feb. 7, 1914, and March 7, 1914.

Central Park, North & East River Railroad, New York, N. Y.—Justice Vernon M. Davis of the Supreme Court of New York has dismissed the suit brought by minority stockholders of the Central Park, North & East River Railroad against former directors of the company to recover $2,000,000 damages. The suit was also brought against the Metropolitan Street Railway, but the court held that there was no cause for action except against the Belt Line Company. It was also held that action against Mortimer L. Schiff is barred by the statute of limitations because he served as a director only between 1902 and 1903.

Chicago (Ill.) Railways.—The Chicago *Examiner* says: "The plans of the Chicago Elevated Railways for refinancing its $30,000,000 note issue which matures on July 1 next, will shortly be presented to the Illinois Public Utilities Commission. It is understood that securities of three different classes will be issued, including first mortgage 5 per cent bonds of the Northwestern Elevated Railway, debentures and short term collateral trust notes."

Elmira Water, Light & Railroad Company, Elmira, N. Y.—Bodell & Company, Providence, R. I., announced on May 11 that the entire issue of 7 per cent cumulative first preferred stock of the Elmira Water, Light & Railroad Company recently offered by them had been sold. The stock was offered at 103 and interest, yielding 6.80 per cent. The total issue was $850,000. There are now outstanding in addition to the $850,000 of first preferred stock $1,000,000 of 5 per cent second preferred stock, $1,000,000 of common stock and $5,000,000 of 5 per cent bonds. Provision has been made to retire a further $307,000 of bonds of the Chemung Gas Company at 105 on July 1. Merrill, Oldham & Company, Boston, Mass., are offering at 92½ and interest, yielding 5.45 per cent, their block of $617,000 of first consolidated mortgage 5 per cent bonds of the Elmira Water, Light & Railroad Company, due on Sept. 1, 1956. The total amount authorized under this mortgage is $5,000,000, of which $2,948,000 is at present outstanding. The balance, $2,016,000, is reserved to retire prior liens. The mortgage is therefore now closed except for refunding purposes.

Georgia Railway & Power Company, Atlanta, Ga.—The $6,860,000 of Georgia Railway & Power Company first refunding mortgage 5 per cent forty-year sinking gold bonds, recently purchased by Drexel & Company, Philadelphia, are being offered at 92½ and interest in Chicago and the West by Kennett, Cowan & Company, as Western members of the syndicate. The bonds also are being offered in New York by Kissel, Kinnicutt & Company, and in Boston by E. H. Rollins & Sons.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee representing holders of the first lien refunding 5 per cent gold bonds of the Kansas City Railway & Light Company, due on May 15, 1913, and holders of certificates of deposit representing such bonds announces that it has arranged for the payment on May 15 next at the office of the New York Trust Company of 5 per cent interest on the bonds from Nov. 15, 1913, to May 15, 1914.

Massachusetts Electric Companies, Boston, Mass.—The Massachusetts Electric Companies proposes to sell $1,045,000 of 4 per cent bonds of the Boston & Northern Street Railway and the Old Colony Street Railway.

New York (N. Y.) Railways.—Milo Roy Maltbie of the Public Service Commission of the First District of New York was to hold a hearing on May 14 on the question as to whether the commission shall require the New York Railways to restore to its reserve for injury and damage claims $33,984 which had been transferred to its surplus account. The proceedings involved the question as to the jurisdiction of the commission, inasmuch as the company's officials take the stand that the question of the reserve is an optional matter with the company and solely within its discretion. The commission charges that the change that was made is in violation of the rules prescribed by the commission for uniform systems of accounting by railroad companies.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad has called an assessment of $5 a share, delinquent June 6, sale day Aug. 4. The company has outstanding $3,856,950 of stock and no bonds. The last assessment, which amounted to $2.50 a share, was levied in April, 1913.

Philadelphia Company, Pittsburgh, Pa.—Stockholders of the Philadelphia Company of record of April 15 will vote on June 15 on reducing the authorized capital stock of the company from $73,400,000 to $69,433,400, such reduction to be in the preferred 5 per cent shares.

Springfield (Ill.) Consolidated Railway.—W. F. Workman has been elected a director of the Springfield Consolidated Railway to succeed H. T. Willett.

Toronto (Ont.) Railway.—Stockholders of the Toronto Railway of record of May 11 are to be permitted until June 1 to subscribe at par for $1,000,000 of new common stock of the company to the extent of one share of new stock for every eleven shares of old stock now held. The proceeds of this issue are to be used for general purposes.

Dividends Declared

Baton Rouge (La.) Electric Company, 3 per cent, preferred.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Columbus Railway & Light Company, Columbus, Ohio, 75 cents.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$62,498	*$31,047	$31,451	$17,470	$13,981
1 " " '13	58,130	*27,595	30,535	17,374	13,161
12 " " '14	776,310	*354,444	421,866	207,782	214,084
12 " " '13	724,050	*327,273	396,777	202,951	193,826

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$87,550	*$56,490	$31,060	$27,676	$3,384
1 " " '13	93,157	*56,997	36,160	24,226	11,934
12 " " '14	1,202,708	*715,389	487,319	308,253	179,066
12 " " '13	1,103,348	*663,330	440,018	274,352	165,666

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$30,310	*$16,154	$14,156	$11,167	$2,989
1 " " '13	27,981	*15,214	12,767	10,421	2,346
3 " " '14	83,937	*49,181	34,756	32,785	1,971
3 " " '13	80,624	*47,805	32,819	31,120	1,699

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$242,732	*$71,499	$171,233	$80,000	$91,233
1 " " '13	121,122	*12,839	108,283	30,000	78,283
12 " " '14	2,780,103	*657,542	2,122,561	910,000	1,212,561
12 " " '13	1,385,308	*157,203	1,228,105	360,000	868,105

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$227,929	*$142,774	$85,155	$55,919	$29,236
1 " " '13	216,077	*120,083	95,994	49,713	46,281
12 " " '14	2,736,341	*1,675,519	1,060,822	600,227	460,595
12 " " '13	2,503,497	*1,389,618	1,113,879	582,025	531,854

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$105,452	*$70,868	$34,583	$35,299	†$714
1 " " '13	93,746	*63,171	30,574	34,954	†4,380
3 " " '14	300,961	*203,169	97,792	105,642	†7,850
3 " " '13	283,937	*188,569	95,368	104,829	†9,461

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$127,713	$73,644	$54,169	$57,429	$3,260
1 " " '13	134,065	70,715	63,350	46,070	17,280
12 " " '14	1,777,314	890,028	887,286	621,555	265,731
12 " " '13	1,605,113	796,732	808,381	522,704	285,677

MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$77,506	$28,906	$48,601	$25,236	$23,365
1 " " '13	71,998	24,645	47,353	24,106	23,247
3 " " '14	225,813	86,649	139,164	76,348	62,816
3 " " '13	206,381	71,269	135,112	72,310	62,802

NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '14	$600,289	*$302,227	$298,062	$205,470	$92,592
1 " " '13	587,137	*288,907	298,230	190,343	107,887
2 " " '14	1,234,710	622,821	611,889	410,490	201,399
2 " " '13	1,194,629	598,502	696,127	381,723	314,404

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$274,198	*$168,811	$105,388	$50,331	$55,057
1 " " '13	227,146	*147,406	79,739	45,214	34,525
3 " " '14	793,165	*494,979	298,185	149,824	148,361
3 " " '13	687,181	*427,785	259,396	135,082	124,314

PORTLAND (MAINE) RAILROAD.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$74,798	*$51,131	$23,667	$22,038	$1,629
1 " " '13	73,943	*60,931	13,012	10,298	2,714
12 " " '14	1,037,467	*666,515	370,952	218,046	152,906
12 " " '13	997,252	*698,774	298,478	123,381	175,097

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '14	$547,393	*$280,263	$267,130	$177,185	$89,945
1 " " '13	544,896	*276,148	268,748	160,998	107,750
12 " " '14	6,763,416	*3,322,134	3,441,282	2,067,420	1,373,862
12 " " '13	6,677,595	*3,295,576	3,382,019	1,820,883	1,561,136

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*Includes taxes.

†Deficit.

Traffic and Transportation

Oregon Fare Cases

At the hearing before the Railroad Commission of Oregon on May 4 on the application of the United Railways, Portland, for an increase in the passenger rate between Portland and Linnton from 5 cents to 10 cents a table of valuation showing the reproduction cost new and the depreciation was presented as follows:

	Reproduction cost, new	Depreciated to
Portland Industrial line	$201,312	$166,643
Non-operating property	22,228	18,393
Passenger Line—		
Portland-Linnton	46,033	38,067
Portland-Linnton, common to freight and passenger	241,336	202,697
Linnton-Wilkesboro	1,439,328	1,284,629
Mt. Calvary line	59,522	54,313
Telephone lines	11,130	8,168
Rolling stock	131,588	111,636
Right-of-way and operating real estate	57,212	57,212
Non-operating real estate	36,741	36,741

To allow for a more complete presentation of the valuation data of the Oregon Electric Railway properties hearings in both the Linnton and the Garden Home cases have been continued until May 18. The Oregon Electric Railway and the United Railways are owned by the same interests. The plea of the Garden Home people is that they are being discriminated against by being charged more than 5 cents, when the people of Linnton, which is farther from Portland than Garden Home, travel for 5 cents. Pending the solution of the Linnton rate case action on the application of residents of Garden Home and intermediate points on the Oregon Electric Railway for a reduction in the rate to and from Portland to a flat 5-cent basis is being delayed.

Man Plays Hero in Effort to Secure Work

A confession which has been secured by the officers of the Columbus, Delaware & Marion Railway, Delaware, Ohio, discloses a very peculiar scheme which was used to secure employment with the company. On April 29 the dispatcher at Delaware was called by telephone just as the 9.03 p.m. car was about to leave for Columbus. The person calling said that his name was Bickle, and that about 2 miles south of Delaware two men were tearing up the tracks. C. C. Moyer, chief train dispatcher of the company, was notified and ordered the southbound train to proceed to the scene of the attempt to wreck the car. Bickle was covered with dust and he showed other traces of rough treatment. Mr. Moyer's examination, however, made him skeptical of the story. He discovered several matches of peculiar type partly burned at the side of the track near the scene of the alleged attempt at train wrecking. The tools with which the track had been torn up were marked with the name of the Big Four Railway. After going back to Delaware Mr. Moyer discovered that the toolhouse of the Big Four had been broken open, and his investigation there also disclosed several matches like those which had attracted his attention at the place where the alleged attempt at wrecking was made. As a result of a conference between J. H. Lahrmer, superintendent of the Columbus, Delaware & Marion Railway, William Baker, roadmaster, and Night Chief of Police Vinney, it was decided to detain Bickle as a witness. He was taken back to the scene of the fake attempt to wreck the car, and the ground was gone over a second time. The investigating party went back to Delaware at midnight, and Bickle was told that he was under suspicion. At first he became abusive, but finally confessed that he had been a fireman on the Erie Railroad, was out of work and thought that by doing what he did it would appear to the officials of the company that he had done them a great service and he would be taken into their employ.

Through Service Between Buffalo and Queenstown.—The International Railway, Buffalo, N. Y., is operating through service from Buffalo to Queenstown, Ont., where the cars connect with boats on Lake Ontario for Toronto and other Canadian points. The cars are operated via Niagara Falls.

Southern Pacific Company Asks Permission to Increase Fares.—The Southern Pacific Company has filed an application with the Railroad Commission of California in which it asks the commission for authority to increase its fares between San Francisco and suburban points in Alameda County. This includes the commutation and one-ride rates on the Melrose Branch of the Berkeley system and on the Seventh Street line, Oakland, which comprise the electric system of the company.

More Letters to Automobile Owners.—J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, Joliet, Ill., has commenced a campaign to reduce the number of accidents in which automobiles and street cars are involved. In this connection he has addressed a letter to the owners of automobiles impressing them with the necessity of exercising the utmost care in managing their machines, and telling what the company is doing on its part toward lessening the number of such accidents by careful instruction of its men.

Illinois Traction System Wage Agreement.—Trainmen of the Illinois Traction System have agreed to accept the company's offer of a wage increase from 30 cents to 33 cents an hour. The agreement will take the place of one which expired Nov. 30, 1913. At that time an increase to 40 cents an hour was asked. The demand later was reduced to 35 cents. All other demands of the trainmen have been adjusted by the company. Brakemen will receive an increase of 10 per cent. The new agreement will hold for three years from Dec. 1, 1913.

Accident Fakir Arrested in Pittsburgh.—The Pittsburgh (Pa.) Railways recently caused the arrest of James Warner, aged thirty-five, who is charged with perjury. Warner was arrested as he was leaving the court house after losing a suit for damages against the company. Thomas A. McQuaide, former police superintendent, who was employed by the company, alleges Warner has filed thirteen suits against various corporations in several cities. Each time it is said he has sought damages because of dislocation of the right hip. Mr. McQuaide says that Warner's real name is James Burgerstock, alias James Warner, alias Charles Warner, alias James Webb, etc.

Ontario Safety League Work.—The Ontario Safety League is placing an order for 100,000 "safety first" buttons, to be distributed among the school children, the police, street railway employees and other members of the league before the end of May. The league is also distributing 75,000 blotters to the children of the public and private schools. These blotters are printed with ten "Don'ts," and call to the attention of children and their parents the dangers that constantly beset small citizens in their every-day lives. A small folder issued by the league is being distributed among the employees of the Toronto Railway. The folder is accompanied by a letter from R. J. Fleming, the general manager of the company, urging the hearty cooperation of the men in the movement.

Addresses to Kansas City Employees on Responsibility.—The Metropolitan Street Railway, Kansas City, Mo., has concluded its spring meeting with trainmen, held for the purpose of calling the attention of crews to the new conditions with which they are confronted by summer traffic. The meetings are held semi-annually. The trainmen, as a rule, fail to take into consideration the changes demanded by the seasons and the company therefore sends an officer from the transportation department to make short addresses at each division. Two meetings were held at each division point recently, one for the benefit of day crews and the other for tripper trainmen. The division superintendents, who also spoke briefly, emphasized the need for more care with open cars and heavier traffic, as well as the necessity for courtesy in the face of even the most provoking conditions.

St. Louis Company Replies to Complaint.—Henry S. Priest and Morton Jourdan, attorneys for the United Railways, St. Louis, Mo., have filed a return with the State Public Service Commission, following the complaint made by the West End Business Men's Association. The company's answer follows: "The complainant does not fully, clearly and with reasonable certainty state the act or thing done of which complaint is made, and does not state any facts which can either be denied or admitted; all of the statements in said complaint are mere matters of opinion of the complainants, and with said opinions this defendant begs leave to differ and offer the contrary opinion. This defendant respectfully represents that the said complaint should be so amended as to state specifically the facts in such manner and form that said defendant may then admit or deny them, or satisfy them, or make a submission of the relief it is willing to give."

Safety First on the Insull Lines in Southern Indiana.—All the employees of the North Side Utilities, as the lines of the Insull properties in southern Indiana, across the Ohio River from Louisville, Ky., are known locally, are much interested in the "safety first" slogan contest. Charles B. Scott, head of the Insull bureau of safety, announced recently that $30 would be awarded for the best, $15 for the second and $10 for the third selections among the names submitted. The contest will close on June 15, and the names of the winners will be announced as soon as possible thereafter. The quarterly meeting of the employees of the North Side Utilities will be held in June, also, and the officers of the company are preparing an interesting program in the way of "safety first" addresses. The May issue of *The Booster*, a publication issued in the interest of the employees and the cities the lines serve, leads with an article on "The Conservation of Man" by C. A. Gilkerson, who is the secretary of the central committee on safety of the Public Service Company of Northern Illinois.

The World's Busiest Spot.—An editorial, "The World's Busiest Spot," which appeared recently in the New York *Times*, has provoked considerable discussion among transportation authorities. P. Compton Miller, of the Hudson & Manhattan Railroad, claimed for the Hudson Terminal the distinction of being the "world's busiest spot," with a record of 30,535,500 people yearly. Other figures quoted in substantiation of claims which have been made show for the South Station in Boston 28,347,399; Grand Central Station, New York, 22,405,295 and the Charing Cross Station in London 15,000,000. The report of the Public Service Commission for the First District of New York on station traffic for the year ended June 30, 1913, gives the Atlantic Avenue, Brooklyn Subway, station a yearly total of 21,262,140 tickets purchased. This total is for passengers going into the station. It is argued that to arrive at the total number of people using this subway station yearly this figure should be doubled, thus giving the station the distinction of 42,254,280 passengers yearly. By the same method the Brooklyn Bridge Subway station has 36,177,898; the Grand Central Subway station 33,878,476; the Fourteenth Street Subway station 28,173,376, and the Times Square Subway station 26,423,914.

Petition for Revision of Fares on Indiana Line.—The Union Traction Company of Indiana has petitioned the Public Service Commission of Indiana for authority to revise its schedule of interurban fares on its lines. The company proposes that the rules for computing fares established by the 2-cent fare law be disregarded and that fares be computed at the rate of 2 cents a mile for the distance actually traveled, one-half mile at 1 cent to be taken as the unit. Under the present method, fares are computed in multiples of 5 cents. The company represents that the public is complaining of "short-ride fares" because of the 5 cent unit. The company also asks for authority to eliminate the reduction in round-trip fares where the single trip fare is 30 cents or more. The company does not propose to make any change in fares now existing on its interurban lines, as follows: The fare of 5 cents between Indianapolis and Broad Ripple on the city service cars; special round-trip fare of 25 cents and other special fares between Indianapolis and Fort Benjamin Harrison on army post special service cars; the fare of 5 cents between Marion and Jonesboro; the fare of 5 cents between Jonesboro and Fairmount; the fare of 5 cents between Fairmount and Summitville on local cars operated between Marion and Summitville, and the fare of 5 cents for a ride wholly within the corporate limits of one municipality. While the company proposes that the 1-cent unit for one-half mile be adopted, the minimum fare would remain at 5 cents.

Personal Mention

Mr. Charles D. Bell has been elected secretary of the Arkansas Valley Interurban Railway, Wichita, Kan., to succeed Mr. A. Stone.

Mr. J. H. Purdy, Pittsburgh, has been appointed assistant to Mr. H. H. Porter, president of the American Water Works & Electric Company.

Mr. George M. S. Schulz, surrogate of the Borough of the Bronx, has finally declined appointment as a member of the Public Service Commission of the First District of New York.

Mr. T. R. Cummins has resigned as engineer of the Niagara, Welland & Lake Erie Railway, Welland, Ont., to become connected with a timber property with headquarters at Revelstoke, B. C.

Mr. Arthur Cushing has been appointed operating engineer of the Clinton (Ill.) Gas & Electric Company. He was formerly with the Decatur Railway & Light Company and other Illinois Traction properties.

Mr. S. C. Stivers, whose resignation as auditor of the American Cities Company was noted in the ELECTRIC RAILWAY JOURNAL of May 2, 1914, has become connected with Ford, Bacon & Davis, New York, N. Y.

Mr. J. K. Punderford, who for nine years has been general manager of the Connecticut Company, New Haven, Conn., has been appointed vice-president, and his title hereafter will be vice-president and general manager.

Mr. Homer Bunnell, for thirty years employed in various capacities in the office of the Louisville (Ky.) Railway, has been promoted to the post of cashier of the company, made vacant by the recent death of John R. Neat.

Mr. A. H. R. Jackson, formerly general superintendent of the properties of the Illinois Traction System in Jefferson City, Mo., has been made general superintendent of the Oskaloosa Light & Traction Company, Oskaloosa, Iowa, which is also an Illinois Traction property.

Mr. H. M. Wall, assistant chief engineer of power stations for the Memphis (Tenn.) Street Railway, has associated himself with the firm of Ruebel & Wells, consulting mechanical and electrical engineers, Chemical Building, St. Louis, Mo.

Mr. Foster Hannaford has been appointed acting general superintendent of the Galesburg Railway, Lighting & Power Company, Galesburg, Ill., vice Mr. Dickerson McAfee, now on a leave of absence. Mr. Hannaford has been operating engineer of the company, which is one of the subsidiaries of the Illinois Traction System.

Mr. D. W. Snyder, formerly superintendent of the Clinton Gas & Electric Company, Clinton, Ill., has been appointed general superintendent of the Jefferson City, Bridge & Transit Company and the Jefferson City Light, Heat & Power Company, all of which properties are subsidiaries of the Illinois Traction System. Mr. Snyder has been succeeded at Clinton, Ill., by Mr. Charles Cline.

Mr. James Blaine Walker, assistant secretary of the Public Service Commission of the First District of New York, contributed to the *Annalist* of May 11, an article on "Commission Efficiency in Public Service," in which he reviewed briefly the important economies that have been effected by regulation in the operation and administration of steam and electric roads under the jurisdiction of the commission with which he is connected.

Mr. E. T. Stotesbury, chief resident partner of Drexel & Company in Philadelphia and chairman of the board of the Philadelphia (Pa.) Rapid Transit Company, has been elected president of the Reading Company to fill the vacancy caused by the death of George F. Baer. Mr. Stotesbury has also been elected chairman of the board of the Reading Company, the Philadelphia & Reading Railway and the Philadelphia & Reading Coal & Iron Company.

Mr. W. E. Moore, who has been general manager of the West Penn Traction Company, Pittsburgh, Pa., will in the future have the title of vice-president and general manager of the company. His jurisdiction with the West Penn Traction Company in general will cover engineering, construction and maintenance of way, transportation matters, operation of power plants, purchasing, sale of power and the securing of new franchises and rights.

Mr. E. C. Sherwood, who has been general foreman of equipment of the Manhattan & Queens Traction Corporation, Long Island City, N. Y., has been appointed superintendent of equipment of the company. Before becoming connected with the Manhattan & Queens Traction Corporation Mr. Sherwood was general foreman of shops of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y. Previous to that time he was with the New York (N. Y.) Railways as general foreman of the mechanical department.

Prof. R. E. Heilman, of the State University of Iowa, delivered a series of five lectures at the University of Illinois recently on the control of public utilities. The subjects of the lectures were "The Development of Commission Control of Public Utilities," "Principles of Public Utility Capitalization," "Principles of Public Utility Valuation," "Principles of Public Utility Rate Making" and "Principles of Public Utility Service." The lectures were attended by students of the courses in electrical engineering and in economics and business management and also by the general public.

Mr. E. J. Skehan has been appointed general manager of the Muncie & Portland Traction Company, with general offices at Portland, Ind., to succeed the late E. B. Lincoln. Mr. Skehan entered the electric railway field in 1902 as chief clerk to the superintendent of motive power of the Union Traction Company of Indiana. Later he was promoted to storekeeper of that company, resigning to assume the position of storekeeper of the Chicago & Milwaukee Electric Railway. He has held the positions of auditor, purchasing agent, general passenger and freight agent and trainmaster of the Muncie & Portland Traction Company, at different times during the last eight years.

Mr. George Kidd has been appointed general manager of the British Columbia Electric Railway, Ltd., Vancouver, B. C., to succeed Mr. R. H. Sperling, whose promotion to the position of assistant to the chairman of the board is referred to elsewhere in this column. Mr. Kidd has been connected with the company's offices both in London and British Columbia. He was appointed secretary of the company in connection with its London work in January, 1908, when he was transferred to British Columbia. He has since been located at the head office of the company in Vancouver, filling the position of comptroller. He takes up his new duties of general manager well qualified for the post on account of his long experience with the company.

Mr. C. N. Duffy, vice-president and general manager Manila Electric Railroad & Light Company, Manila, P. I., has been elected president of the Manila City Club. This is an organization of business men recently formed to boom the Philippines and to co-operate in the popular movement in Manila now of "Hands Around the Pacific." Its members join at luncheon once a week to hear addresses from visitors or local speakers. At the first meeting of the club Mr. Joseph Leiter, Chicago, who was making a trip around the world, made the principal address. Recent Philippine papers also disclose the fact that the most successful speech at the St. Patrick's Day banquet in Manila this year was made by Mr. Duffy.

Mr. A. H. Jones, the newly elected president of the Mississippi Electric Association, is general manager of the McComb City Electric Light & Power Company, McComb, Miss. He was formerly vice-president of the State association and for several years has been active in its affairs as secretary-treasurer. Mr. Jones was born at Boston, Mass., in 1881, and after the usual preliminary training entered the course in marine and electrical engineering of the Massachusetts Nautical School, Boston, from which he was graduated in 1899. He next took up the testing course offered by the General Electric Company at its Schenectady and Lynn shops, and in 1902 was transferred to that company's sales organization with headquarters at Atlanta, Ga., and later New Orleans, La. In 1904 Mr. Jones was appointed superintendent of the McComb company's system, but he has served as general manager since 1906.

H. J. Jumonville

Mr. H. J. Jumonville, whose appointment as auditor of the American Cities Company was noted briefly in the ELECTRIC RAILWAY JOURNAL of May 2, 1914, was born on July 29, 1879. He entered business with the Edison Electric Company, New Orleans, on July 29, 1896. From the time of his becoming connected with the company to Jan. 1, 1902, Mr. Jumonville was promoted through all desks of the auditing department to the position of general bookkeeper. In August, 1902, a general consolidation of the Edison Electric Company with all of the local street railways and gas companies at New Orleans took place and at that time Mr. Jumonville was appointed assistant auditor of the consolidated company, known as the New Orleans Railways Company. In February, 1911, he was appointed auditor of the New Orleans Railway & Light Company, the successor to the original New Orleans Railways Company. His appointment as auditor of the American Cities Company dated from May 1, 1914. This company controls the New Orleans Railway & Light Company; Birmingham Railway Light & Power Company, Birmingham, Ala.; Memphis (Tenn.) Street Railway; Little Rock Railway & Light Company, Little Rock, Ark.; Houston Light & Power Company, Houston, Tex., and the Knoxville Railway & Light Company, Knoxville, Tenn. All of Mr. Jumonville's business career has been with public service corporations, he having started to work with the Edison Electric Company of New Orleans immediately after completing his high school course.

R. H. Sperling

Mr. R. H. Sperling, who has been general manager of the British Columbia Electric Railway, Ltd., the field of operation of which covers the southwestern portion of British Columbia and the southern portion of Vancouver Island, has been promoted by the London Board of the company to the position of assistant to Mr. R. M. Horne-Payne, chairman of the board, and has also been elected a director of the company. Mr. Sperling has been connected with the work of the British Columbia Electric Railway in British Columbia for eighteen years. He obtained both theoretical and practical training as an electrical engineer in the old country. He entered the company's employ with the light and power system at Victoria in 1896 and was promoted successively until he was made electrical engineer of the company. In 1901 he was transferred from Victoria to the company's head office at Vancouver and assumed the duties of general superintendent and chief engineer. In this capacity he gave special attention to the development of the company in the electrical field, showing extraordinary ability in this work. In 1905 Mr. Sperling was promoted to the position of general manager of the company to succeed Mr. J. Buntzen, who was appointed a director of the company. Mr. Sperling will leave British Columbia during July and take up his residence in London in connection with his new duties at the company's London offices. The position of assistant to the chairman of the board in London to which Mr. Sperling has been appointed, is a new one with the company and has been created on account of the rapid development of the company's work and the advisability of having an executive at the London offices who is fully in touch with the company's operations in its actual field of work.

Williston Fish

Mr. Williston Fish, vice-president of the Chicago (Ill.) Surface Lines, and also recently elected vice-president of the West Penn Traction & Water Power Company, Pittsburgh, Pa., was born at Berlin Heights, Ohio, in 1858. He entered Oberlin College in 1876 and was appointed to West Point in 1877. Mr. Fish was graduated from the military academy in 1881 with high standing in mathematics, engineering, law and language, and was appointed second lieutenant of the Fourth U. S. Artillery in 1881. He served with that regiment at San Francisco, New London, Conn., and Fort Snelling, Minn., during part of which time he continued the study of law in the office of Governor Thomas Waller, of Connecticut. In 1887 he resigned from the army to enter the employ of the Crane Elevator Company, Chicago, as a salesman. Mr. Fish continued the study of law in Chicago in the school of Judge Thomas Moran and was admitted to the bar in 1897. From 1890 to 1899 he served as right-of-way and claim agent, and assistant counsel for the Chicago City Railway. At the latter date he was made assistant to President Jesse Spaulding of the Chicago Union Traction and to his successor, Mr. John M. Roach. During this time Mr. Fish took an important part in the valuation of the property of the Chicago Union Traction Company, and in the negotiations for the settlement ordinances of 1907. He continued as assistant to Mr. Roach, president of the new Chicago Railways, until February, 1912, when he became general manager of that system. When the Chicago Railways and the Chicago City Railway were combined as to operation, under the title of the Chicago Surface Lines on Feb. 1, 1914, he was made vice-president. Mr. Fish's jurisdiction as vice-president and comptroller of the West Penn Traction Company in general covers treasury matters, auditing department, real estate, taxes and insurance, responsibility of following rights and obligations under ordinances, custody of contracts, etc.

F. W. Doolittle

Mr. Frederick W. Doolittle has been appointed director of the bureau of fare research of the American Electric Railway Association by which a careful, detailed study of the factors affecting rates of fare has been begun for the association. Mr. Doolittle has many qualifications for the work. He is a native of Hopkington, Ia., and received his primary education in that city. He holds a B. A. degree from Lenox College, a B. A. degree from Princeton, a B. S. C. E. degree from the University of Colorado and a C. E. degree from the same university. From July to November, 1907, Mr. Doolittle was engineer and cost keeper for the surplus working of the Boston Consolidated Mining Company, Bingham, Utah. From November, 1907, to September, 1908, he was engineer and paymaster of the Consolidated Coal & Coke Company, Dacoma, Col. From September, 1908, to June, 1909, he was instructor in mechanics and hydraulics in the University of Illinois, and from September, 1909, to June, 1910, he was in charge of structural engineering work at the University of Colorado during the absence of Prof. Milo S. Ketchum. From September, 1910, to February, 1913, he was assistant professor of mechanics at the University of Wisconsin. Mr. Doolittle has been very closely associated with railroad work, serving in the engineering department of the Union Pacific Railroad during the summers of 1903, 1905 and 1906, and of the Chicago, Milwaukee & St. Paul Railroad during 1909 and 1910. From October, 1910, to May, 1914, Mr. Doolittle was with the Railroad Commission of Wisconsin as special investigator, being engaged in research work in the apportionment of expenses between services and the consideration of rate schedules, as well as making compiled surveys of operating conditions and traffic studies. In this study as to cost of railroad surveys he collaborated with the special investigations now being conducted by the Interstate Commerce Commission. From January, 1914, to May, 1914, he was in charge of the organization of the new Illinois State Public Utilities Commission. Mr. Doolittle is an associate member of the American Society of Civil Engineers and a member of the honorary engineering and scientific fraternities Tau Beta Pi and Sigma Xi. The establishment of the bureau of fare research is the continuation of the work of committees of the association in previous years along the same lines. In 1910 the committee on determining the proper basis for rates of fares was appointed with Mr. Frank R. Ford of Ford, Bacon & Davis, as chairman. This committee reported at the 1911 and 1912 conventions and its reports were discussed in detail and supplemented by discussions at the mid-year meetings of 1912 and 1913. In 1912 the title of the committee was changed to the committee on the cost of passenger transportation service and Mr. James D. Mortimer, then president of The Milwaukee Electric Railway & Light Company and now president of the North American Company, was named as chairman. At the 1913 convention the committee reported in favor of the establishment as one of the activities of the association of a bureau of fare research, which should engage in a study of the entire question of rates of fare, assembling data and facts for the use of member companies and making available all possible information upon this subject, as well as establishing standards for the consideration of this important subject. The report of the committee was unanimously adopted and Mr. Doolittle's appointment is the beginning of the actual work of the bureau. The objects of the bureau were outlined in the report of the committee on the cost of transportation service presented to the 1913 convention.

OBITUARY

Earle Smithers, manager of the Salina Street & Interurban Railway, Salina, Kan., died at St. Barnabas Hospital, Salina, on May 5, of injuries sustained on the previous day while repairing a guy wire. Mr. Smithers was belted to an 18-foot pole, making some minor repairs, when the post broke near the top, throwing him to the ground.

Interstate Trade Commission Bill

The subcommittee of the Senate interstate commerce committee has completed the draft of a bill providing for the creation of an interstate trade commission of five members to supervise the activities of all corporations. The bill will soon be presented to the full committee for consideration. The subcommittee disregarded the suggestion to permit manufacturers to fix retail prices and did not exempt trade unions and farmers' organizations from operations of the Sherman law. According to the members of the subcommittee, the trade commission will have many of the authorities of a court, without the power to punish but with wide power of investigation, examination and recommendation. Prosecutions for violations of the terms of the bill would be instituted by the Department of Justice in the proper courts. Other supplementary legislation in the proposed bill includes a provision for the supervision of stock and bond issues of corporations. The bill prohibits the issuance of watered stock under penalty of exclusion from interstate trade. Common carriers are specifically prohibited from making purchases from corporations, directors of which are also directors of the carriers. Similar restrictions are also placed upon the activity of banking institutions. Price cutting is forbidden by the terms of the bill.

The property of the Southern Indiana Power Company has been transferred to a group of capitalists, headed by Chester P. Wilson, president of the Interstate Public Service Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

San Francisco-San Mateo Right-of-Way Company, San Mateo, Cal.—This company has been chartered in California to secure a right-of-way for an electric railway down the peninsula from San Francisco to Palo Alto, which will either be sold to a railroad company to build a competing system or retained for the San Mateo electric line. Capital stock, $50,000. Directors: M. B. Johnson, Montara, president of the San Mateo County Development Association; H. C. Tuchsen, Redwood City; Torence Masterson, San Mateo; D. G. Doubleday, Millbrae; F. A. Cunningham, South San Francisco; E. M. Moores, Burlingame, and Rev. W. A. Brewer, Hillsborough. [E. R. J., May 9, '14.]

***Oil Belt Traction Company, Oklahoma City, Okla.**—Application for a charter has been made by this company in Arizona to build a 575-mile electric railway with Fort Smith, Ark., as an eastern terminus and Shawnee, Okla., as a western terminus. The road will connect Blackwell, Newkirk, Ponca City, Pawhuska, Tulsa, Bartlesville, Nowata, Vinita, Miami, Grove, Jay, Westville, Stilwell, Tahlequah, Muskogee and Okmulgee, and extend thence to Oklahoma City via Shawnee and from Okmulgee to Tulsa. Capital stock, $50,000,000.

***Beaver, Meade & Englewood Railway, Beaver, Okla.**—Incorporated in Oklahoma to build an electric railway from Beaver to Forgan, the western terminus of the Wichita Falls Railway & Light Company.

***London, Grand Bend & Stratford Railway, London, Ont.**—The Ontario Legislature has incorporated this company with power to build a railway to be operated by electricity or any other motive power, from London to Lake Huron at the boundary between Lambton and Huron Counties, thence to Stratford and London, Ont., with branches as may be deemed necessary. The company is given authority to generate electrical power and to distribute the surplus in the municipalities along its route. The authorized capital stock is $2,000,000, with a bonding power of $35,000 a mile of line. Directors: W. R. Wullard, G. H. Gray and J. J. Gray.

FRANCHISES

***Fort Smith, Ark.**—The Oil Belt Traction Company, the incorporation of which is noted elsewhere in this issue, has asked the Council for a franchise in Fort Smith. This line will connect Fort Smith, Ark., and Shawnee, Okla.

Los Angeles, Cal.—The Board of Public Utilities has adopted a resolution directing the Los Angeles Railway to complete its line on Vernon Avenue and to install an interlocking apparatus at Long Beach Avenue crossing the Pacific Electric Railway tracks in Los Angeles.

San Diego, Cal.—The San Diego Electric Railway has asked the Council for a franchise to extend its F Street line to Arctic Street and for an extension on Laurel Street to Fifth Street in San Diego.

Boston, Mass.—The committee on street railways has filed in the House of the Massachusetts General Court in Boston a bill extending time within which the Boston & Eastern Electric Railroad shall file penal bond of $400,000 with the State treasurer, before commencing work of construction, to April 1, 1915. The extension granted last year by the General Court to the company expired on Jan. 1, 1914. [E. R. J., Dec. 20, '13.]

Cliftondale, Mass.—The Bay State Street Railway has asked the Council for a franchise to double-track its line from Cliftondale Square to Central Street and along a part of Central Street in Cliftondale.

Rennselaer, N. Y.—The United Traction Company has asked the Council for a franchise to extend its lines on Washington Avenue to connect with the Third Street line in Rennselaer.

Elizabeth City, N. C.—T. J. Markham and associates have received a franchise from the Council to build an electric railway in Elizabeth City. This is part of a plan to build a 100-mile railway from Wade's Point to Norfolk through Pasquotank and Camden Counties via Elizabeth City and South Mills. [E. R. J., Dec. 20, '13.]

Columbus, Ohio.—The Cincinnati Traction Company has asked the Council for a franchise to extend its Price Hill line in Columbus.

Findlay, Ohio.—The Toledo, Bowling Green & Southern Traction Company has offered to give up its present franchise, which expires in 1915, for a new twenty-five-year franchise in Findlay. The company offers to pave the street between and 18 in. on each side of the tracks, lay 100-lb. rails and reduce the cost of current to commercial consumers.

Warren, Ohio.—The Mahoning Valley Street Railway has asked the Council for a twenty-five-year franchise to extend its tracks to Packard Park.

Cushing, Okla.—B. B. Jones, representing the Cushing Traction Company, has received a franchise from the Council to build an electric line in Cushing. This line will be extended to the oil fields 13 miles east of Cushing. [E. R. J., May 2, '14.]

Dunnville, Ont.—The Dunnville, Wellandport & Beamsville Electric Railway has received a six months' extension of time on its franchise from the Council in which to complete its line in Dunnville.

Windsor, Ont.—The Detroit United Railway has received a franchise from the Windsor Council to build the Ferry Avenue loop line on the Canadian end of the railway in Windsor.

***Milwaukee, Ore.**—Louis H. Campbell, Milwaukee, has asked the Council for a twenty-five-year franchise to build an electric railway over practically every improved street in Milwaukee between the downtown district and the eastern town limits.

Frackville, Pa.—The Schuylkill County Railway has received from the Council an extension of time of three months on its franchise in which to complete its line between Frackville and Shenandoah. [E. R. J., June 14, '13.]

Handley, Tex.—The Northern Texas Traction Company, Fort Worth. has received a fifty-year franchise from the Council in Handley.

***Port Angeles, Wash.**—The Seattle, Port Angeles & Lake Crescent Railway has received a franchise from the Council to build an electric railway over certain streets in Port Angeles.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has received a franchise to double track its California Avenue line in West Seattle, extending from the ferry landing to the junction, from College and Hanford Streets, a distance of 1 mile.

Seattle, Wash.—The Vashon Electric Company has received a franchise from the County Commissioners to build an electric line on Vashon and Maury Islands. [E. R. J., April 18, '14.]

***South Bend, Wash.**—Frank Mackean, Seattle, president of the Willapa Power Company, has asked the County Commissioners for a franchise to build an electric railway in Pacific County.

TRACK AND ROADWAY

Northwest Arkansas Railway, Bentonville, Ark.—Grading has been begun by this company on its line between Bentonville and Rogers. H. L. Cross, Bentonville, secretary. [E. R. J., April 18, '14.]

Salt River Valley Electric Railway, Phoenix, Ariz.—This company advises that it has no definite plans when work will be begun on its 20-mile electric railway from Phoenix to Mesa. C. C. Lewis, Phoenix, president. [E. R. J., Nov. 1, '13.]

Glendale & Verdugo Mountain Railway, Glendale, Cal.—On account of being unable to obtain financial backing work has never been begun on this railway in Glendale. Lewis T. Ginger, Glendale, president. [E. R. J., June 8, '12.]

Clear Lake Railroad, Lakeport, Cal.—Plans are being made by this company to begin building its 23½-mile extension between Hopland and Lakeport.

Petaluma & Coast Railway, Petaluma, Cal.—This project to build an electric railway to connect Liberty, Bloomfield and Petaluma has been abandoned. [E. R. J., June 29, '12.]

Redwood City, Cal.—Plans are being made to begin work within the next few months to build a 6-mile electric railway from Redwood City to Woodside. Edward F. Fitzpatrick, Redwood City, is interested. [E. R. J., April 20, '12.]

San Francisco (Cal.) Municipal Railway.—Bids for the construction of the Potero Avenue line of the Municipal Railway which will connect with the Van Ness Avenue line at Market Street and will extend along Eleventh Street and Potero Avenue to Twenty-fifth Street in San Francisco, were opened by the Board of Public Works and the contract awarded to Eaton & Smith, San Francisco.

West Side Railroad, San Francisco, Cal.—This company has constructed a roadbed from the west side of the M Street bridge, crossing the Sacramento River, to the southerly end of the West Sacramento Company properties, a distance of 6 miles. Rights-of-way have been tentatively secured to Rio Vista, a distance of 35 miles from Sacramento. This line is operated by the Northern Electric Railway Company. William Herlitz, 310 Sansome Street, San Francisco, president. [E. R. J., Oct. 26, '12.]

Sacramento Valley West Side Electric Railway, Willows, Cal.—This company has begun laying rails from the Oakland and Antioch Junction, southeast toward Dixon. Only ½ mile of rails can be laid before a bridge 345 ft. long is to be constructed. Melville Dozier, Dixon, general manager. [E. R. J., May 9, '14.]

New Britain, Kensington & Meriden Tramway Company, New Britain, Conn.—No definite arrangements have yet been decided upon by this company when construction will be begun on its electric line to connect New Britain, Kensington and Meriden. E. A. Moore, New Britain, president. [E. R. J., Sept. 20, '13.]

Georgia Railway & Power Company, Atlanta, Ga.—This company is asked to consider plans to extend its Virginia Avenue line into and through Woodland Hills.

Peoria (Ill.) Railway.—This company is obtaining frontage consents in Peoria preparatory to double tracking its West Bluff line.

Rockford & Interurban Railway, Rockford, Ill.—Plans are being made by this company to begin work at once double-tracking several of its line in Rockford.

Union Electric Company, Dubuque, Ia.—A 1-mile extension to the West Locust Street line in Dubuque is being built by this company.

Columbus, Kan.—The Century Engineering & Construction Company, Joplin, Mo., has secured much of the right-of-way for the proposed electric line between Columbus, Kan., and Miami, Okla. George D. Thayer is secretary-treasurer of the company. The railway will probably be constructed through Hattenville, Okla., though another route through Galena and Baxter Springs is under consideration. [E. R. J., May 2, '14.]

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being considered by this company to extend its lines from Newton to Salina, a distance of 60 miles.

Louisville (Ky.) Railway.—This company has completed the relaying of a section of its tracks on Main Street in Louisville. Large forces of men are being employed in other sections of the city, where improvement work will follow. Some 7 miles of new double track is to be laid.

Middleboro, Ky.—Construction of an electric railway in Middlesboro, Ky., in the center of the Eastern Kentucky mining region, is promised in the purchase by Cincinnati capitalists of a city franchise. This provides for a line of 5 miles in length, to communicate with the principal mines near the city and to supply a city service. The Cincinnati men were represented by Fred Moomau, of the Tri-State Realty & Insurance Company, who paid $410 for the privilege. Mr. Moomau is quoted as saying that the work would begin on the construction of the line within the next six months, the time stipulated in the franchise. [E. R. J., May 9, '14.]

Winnipeg (Man.) Electric Railway.—It is reported that this company plans to build an extension to Transcona during the summer.

Sandy Springs Railway, Kensington, Md.—During the next three weeks this company will award contracts to build in Kensington one through plate girder bridge of three spans, one 44 ft. and two 25 ft.

Granite City Railway, St. Cloud, Minn.—Within the next few weeks this company plans to lower its tracks on the bridge over the Mississippi River and also relay ¼ mile of track on East Main Street in St. Cloud. The material for this work has been purchased.

***St. Paul, Minn.**—The firm of A. Guthrie & Company, St. Paul, will be awarded the grading contract for the electric line to connect the main campus of the University of Minnesota with that of the College of Agriculture. The bids were opened recently by Comptroller George H. Hayes of the university.

Lincoln (Neb.) Traction Company.—During the next four weeks this company will award contracts to build 4 miles of new track in paved streets in Lincoln.

United Traction Company, Albany, N. Y.—Plans are being made by this company for an extension from the end of the present Broadway line to Washington Avenue, and on Washington Avenue to connect with the Third Street line in Rennselaer.

Elizabeth City, N. C.—Preliminary arrangements are being made to build a 100-mile electric railway from Wade's Point to Norfolk through Camden County and Pasquotank County via Weeksville, Elizabeth City and South Mills. Right-of-way has been secured from Elizabeth City to Weeksville in the lower part of the county and from Elizabeth City to the upper part of the country through Camden County to Norfolk in Virginia. The Wade's Point terminus is to be connected by boat with points in Tyrell County. Among those interested are T. J. Markham, J. C. Commander and D. E. Williams. [E. R. J., Dec. 20, '13.]

Bartlesville (Okla.) Interurban Railway.—During the next four weeks this company will award contracts to build 2 miles of new track for city loop extensions.

Choctaw Railway & Light Company, McAlester, Okla.—During the next few weeks this company plans to build a 1-mile extension in McAlester. All material is on hand.

Tulsa (Okla.) Railway.—During the next few weeks this company plans to build 2 miles of new track in Tulsa.

Ontario West Shore Railway, Goodrich, Ont.—F. H. McGuigan, Toronto, formerly of the Grand Trunk Railway, inspected the completed work of the Ontario West Shore Railway financed by the municipalities under the guidance of John W. Moyes. Mr. McGuigan was accompanied by Vaughan Roberts, formerly chief engineer of construction for the Ontario West Shore Railway. Neither Mr. McGuigan nor Mr. Roberts would discuss the situation for publication, though Mr. Roberts intimated that some plan affecting the future of the railway was under consideration. [E. R. J., March 14, '14.]

Ottawa, Rideau Lakes & Kingston Railway, Ottawa, Ont.—An extension of time has been granted by the Ontario Legislature to build this projected railway between Ottawa and Kingston. The company is also authorized to build a branch line from near Lombardy, on the projected main line to Perth, and to increase its bonding power from $30,000 to $40,000. N. M. Clougher, Ottawa, president. [E. R. J., April 18, '14.]

Ottawa, Ont.—The plan for an electric railway from Toronto to London and Windsor, with branches to Woodstock and Stratford, has fallen through with the withdrawal in the Railway Committee of the Dominion of Canada Government on April 30 of the Western Central Railway bill asking a time extension.

***Portland, Ore.**—Negotiations are on foot for the construction of an electric line from Bull Run to Welch's, a distance of 20 miles. If this line is constructed, it will not be by the Portland Railway, Light & Power Company, though it may be operated by that corporation under specific traffic arrangements with the builders. When this line is to be constructed and by whom has not been made known.

Moose Jaw (Sask.) Electric Railway.—During the next few weeks this company plans to build 4 miles of new track in Moose Jaw.

Middle Tennessee Traction Company, Franklin, Tenn.—The appropriation of $100,000 asked for Lincoln County by this company has been subscribed in full. P. E. Cox, Franklin, general manager. [E. R. J., Jan. 31, '14.]

***Bonham, Tex.**—The McKinney, Bonham & Paris Interurban Railway Association has been formed to push plans for a 74-mile electric line between McKinney, Bonham and Paris. The line will connect Blue Ridge, Leonard and Bonham and then will parallel the Texas & Pacific Railroad to Paris. The following directors have been elected: R. L. Waddill, J. L. Lovejoy, L. A. Scott, J. W. Russell, Mark McMahan, J. F. McReynolds and M. H. Ragland.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—During the next few weeks this company will award contracts to build 2 miles of paved double track with 80-lb. high T rails, steel ties and concrete foundation. It will also let contracts for a large amount of special work, steel poles, trolley wire, etc.

SHOPS AND BUILDINGS

Public Utilities Company, Evansville, Ind.—This company is rebuilding the present carhouses at Water and Goodsell Streets in Evansville. The special work has been purchased from the Cleveland Frog & Crossing Company, Cleveland, Ohio.

Union Electric Company, Dubuque, Ia.—This company has completed the addition to its carhouse in Dubuque.

Oregon Electric Railway, Portland, Ore.—This company has opened its new passenger station at Eugene. [E. R. J., Jan. 10, '13.]

Southern Traction Company, Dallas, Tex.—This company plans to build soon a new passenger station at Hillsboro.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has recently purchased the property adjoining the general office building on West Temple Street in Salt Lake City. It is probable that the general office building will be provided with new quarters.

POWER HOUSES AND SUBSTATIONS

San Francisco-Oakland Terminal Railway, Oakland, Cal.—Extensive improvements have been begun by this company at the Yerba Buena power plant in Emeryville, with the building of a new boiler shop, machine shop, mixing house and material sheds, at a cost of several thousand dollars. The company has recently undertaken to do its own street work, which has heretofore been let out to private concerns under contract. Increased facilities for handling this work became necessary and the company is adding to its equipment.

Illinois Traction System, Peoria, Ill.—Two horizontal Corliss turbines of 4000-kva capacity have just been purchased for installation in this company's generating station at Danville, Ill. These turbines will be novel in that they will operate at 3600 r.p.m. The additional new work at the Danville station, which is now in progress or being planned, includes a complete new pumping plant and condenser water system to be supplied to obtain water from the Vermillion River. A 10-ft. dam will be built across this stream. Also a new steel stack, 14 ft. x 225 ft. above the grates, will be erected and superheaters will be installed in the fourteen 400-hp boilers now in this plant.

Lincoln (Neb.) Traction Company.—During the next four weeks this company expects to install a large boiler feedwater pump in its power house in Lincoln.

Dominion Power & Transmission Company, Hamilton, Ont.—The contract with the Canadian Westinghouse Company for equipment for the new steam power plant at Hamilton covers the following: Two 10,000-kw, 6600-volt, three-phase, 66 2/3-cycle steam turbine generators operating at 200 lb. steam pressure, 200 deg. superheat, with surface condensers, condensation pumps and boiler feed pumps. All pumps will be centrifugal type, turbine driven. The exciters will be one turbine driven and two motor driven. The step-up transformers will rise from 6600 volts to 40,000 volts. There will be the usual switchboard, lightning arresters and other accessories.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—During the next few weeks this company expects to purchase one 250-hp boiler for heating.

Manufactures and Supplies

ROLLING STOCK

Moose Jaw (Sask.) Electric Railway expects to build one electric sweeper.

San Francisco-Oakland Terminal Railways, Oakland, Cal., is reported to be in the market for thirty city cars.

Montreal (Que.) Tramways has received ten steel underframe city cars, from the Canadian Car & Foundry Company.

Rockford & Interurban Railway, Rockford, Ill., has ordered four single truck city cars from the Niles Car & Manufacturing Company.

Pittsburgh (Pa.) Railways is considering the purchase of several interurban cars. Fifteen new cars, it is reported, will be required.

Toronto & York Radial Railway, Toronto, Ont., is in the market for three cars for its Mimico division to replace those which were burned recently.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has ordered four arched roof cars from the Cincinnati Car Company. Automatic ventilators, ARIE type, are specified.

St. Louis (Mo.) Water Works Railway has ordered from the St. Louis Car Company two T-post steel cars with 38-ft. bodies. The cars will be 50 ft. over all and mounted on St. Louis 23-E trucks.

Wilkes-Barre (Pa.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, as expecting to purchase ten center-entrance cars, has ordered these cars from The J. G. Brill Company.

Rhode Island Company, Providence, R. I., has issued specifications for about 100 new double-truck cars, 42 ft. over all and 29 ft. over body, to be equipped with four-motor equipments.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has ordered four all-steel passenger cars, five electric locomotives and five cabooses from the McGuire, Cummings Manufacturing Company.

Southern Traction Company of Illinois, East St. Louis, Ill., has ordered from the St. Louis Car Company six cars of similar design and dimensions as the six passenger cars which were ordered last year.

Pacific Coast Motor Coach Company, Los Angeles, Cal., is having built by the St. Louis Car Company 104 double-deck motor buses, each seating 54 passengers and being mounted on a Kelly Springfield five-ton truck chassis.

Homestead & Mifflin Street Railway, Homestead, Pa., noted in the ELECTRIC RAILWAY JOURNAL of May 9, 1914, as having purchased one city car, has placed this order with the St. Louis Car Company.

Edmonton (Alta.) Radial Railway has received two single-end double-truck city cars, mounted on standard trucks, with Westinghouse 101-B2 quadruple equipment, from the Preston Car & Coach Company.

Regina (Sask.) Municipal Railway is in the market for four double-truck cars, similar to the sixteen supplied during last year by the Preston Car & Coach Company, except that they will be 6½ ft. longer, with seating accommodation for six additional passengers.

British Columbia Electric Railway, Vancouver, B. C., has received ten double-end double-truck city cars, mounted on 27-G1 trucks with Westinghouse 101-B2 quadruple equipment, for its Victoria service, and five single-end double-truck city cars for its Vancouver service, from the Preston Car & Coach Company.

Electric Short Line Railway, Minneapolis, Minn., has recently ordered an additional GE gas-electric car, making a total equipment of five of these cars. The car measures 70 ft. 1⅜ in. over bumpers by 10 ft. 6⅜ in. wide over all, weighs approximately 50 tons, seat ninety-one passengers and is equipped with two motors having a total of 200 hp capacity.

Missouri & North Arkansas Railroad, St. Louis, Mo., has arranged to place on operation another GE gas-electric car, making a total of three of these cars the company is using.

The new car measures 70 ft. 7⅜ in. long over the bumpers and 10 ft. 4¾ in. wide over all, weighs approximately 51.4 tons, seats eighty-five passengers and is equipped with two motors having a total of 200 hp capacity.

Michigan Railway Company, formerly known as the Michigan & Chicago Railway, has placed an order with the St. Louis Car Company for five limited interurban cars 66 ft. 10 in. long by 9 ft. 6 in. wide. The design of these cars includes four compartments, namely, baggage, passenger, smoker and parlor. They are built of all steel, mounted on Baldwin trucks equipped with GE motors designed for 2400-volt, d.c. train operation, with full speed on 1200-volt trolley and third rail.

Michigan United Traction Company, Jackson, Mich., has purchased from the St. Louis Car Company for its Grand Rapids, Holland & Chicago Railway six local interurban cars, 61 ft. long by 9 ft. 6 in. wide, arranged with three compartments and constructed entirely of steel except doors and sashes, and four freight locomotive express cars, 61 ft. long by 8 ft. 11 in. wide, of all-steel construction and designed to provide a carrying capacity of forty tons. These cars are equipped with Baldwin trucks, General Electric motors designed for 2400-volt and 1200-volt trolley and third-rail train operation.

Guelph (Ont.) Radial Railway has received two double-ended pay-as-you-enter city cars, mounted on standard trucks with rolled steel wheels, Westinghouse 101-B2 quadruple equipment and S.M.1 air brakes, and with all-steel underframes and semi-steel sides and ends, from the Preston Car & Coach Company. The exit and entrance doors are under the conductor's control, and the front door exit under the motorman's control.

TRADE NOTES

Railway & Industrial Engineering Company, Greensburg, Pa., has removed its works and offices from Pittsburgh to Greensburg.

American Creosoting Company, New York, N. Y., has removed from 95 Liberty Street to rooms 1211-1212, 17 Battery Place.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has acquired the plant of the Bullock Electric Manufacturing Company at Norwood, Ohio.

Morden Frog & Crossing Works, Chicago, Ill., has moved its Chicago sales office to the new Continental & Commercial Bank Building, 208 South La Salle Street, Rooms 1873-75-77-79.

Buffalo Foundry & Machine Company, Buffalo, N. Y., announces that it is now handling direct all inquiries covering vacuum apparatus, castings, patterns and machine work.

American General Engineering Company, New York, N. Y., has received an order from the Brooklyn Rapid Transit Company for 10,000 type D Eureka reinforced trolley wheels with special composition.

Price Electric & Manufacturing Company, Basic City, Va., has been incorporated with a capital stock of $500,000. The officers are Paul Steinman, Waynesboro, Va., president, and T. A. Sammis, Basic City, secretary.

W. N. Matthews & Brother, Inc., St. Louis, Mo., have issued a folder describing their teleheight, a little pocket instrument for the accurate determination of correct pole lengths for the safe clearance of any obstruction to pole lines.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has recently moved into its new plant at Elmwood Place, Ohio, a suburb of Cincinnati, and is now situated in quarters about four times as large as those previously occupied. The company has also installed new machinery to take care of its increasing volume of business.

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued a catalog describing and illustrating its electric hoists, including monorail cranes with operator's cages, grab bucket monorail cranes of ½ to 3 cu. yd. capacity and vertical and horizontal electric winches, for foundries and other industrial purposes.

Esterline Company, Indianapolis, Ind., has appointed R. R. Holden, New York Life Building, Chicago, Ill., as factory representative for the sale of Golden Glow headlights for the States of Illinois, southern Wisconsin and northern Indiana. Mr. Holden will also have charge of the sale of these headlights for industrial purposes.

McMeen & Miller, Chicago, Ill., engineers, have opened a branch office at 407 Electric Building, Cleveland, Ohio. Allen C. Morse, who has been engaged in engineering work for several years, has been chosen as resident engineer and manager of the new office. McMeen & Miller do general engineering work, devoting particular attention to the rehabilitation of plants, the making of appraisals and the establishment of proper systems of records.

General Electric Company, Schenectady, N. Y., has received an order for motors for the four storage-battery sweepers which were recently ordered by the Third Avenue Railway from the Russell Car & Snow Plow Company. The motors selected for the eighty-five new cars ordered by the United Railways & Electric Company, Baltimore, Md., are the GE-200, split-frame, commutating-pole, positive-ventilated type, and have a nominal rating of 33 hp on 500 volts and 40 hp on 600 volts. The motors will have a gear ratio of 69 : 14. This additional traction equipment has been purchased primarily to provide adequate service during the centennial celebration of the writing of "The Star-Spangled Banner," which occurs in Baltimore during the week of Sept. 7.

ADVERTISING LITERATURE

Stow Manufacturing Company, Binghamton, N. Y., has issued a folder describing some of its portable tools, including portable emery grinders, tool post grinders, two-spindle drills and electric breast drills.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder describing its switches for sectionalizing, and in connection with outdoor transformer substations and for mounting outside stations and buildings to disconnect in case of fire or accident.

National Lamp Works of the General Electric Company, Cleveland, Ohio, engineering department, has issued Bulletin 11B describing its mazda high-efficiency lamps for series street lighting service and Bulletin 13D, containing technical data concerning 750 and 1000 watt multiple mazda lamps.

Buckeye Engine Company, Salem, Ohio, has issued Bulletin 114-B for April, 1914, which contains interesting data on its Buckeye-mobile engines. This engine, in its elements consists of an internally fired tubular boiler of the non-return or "gunboat" type on which is mounted a compound engine of simple construction. A well-insulated sheet-metal smokebox encloses a tubular superheater, both engine cylinders, all steam piping and valves and a secondary superheater which imparts heat to the steam as it passes from the high to the low pressure cylinder. The engine exhausts through a closed feed-water heater into a jet condenser which is provided with a rotary air pump. This air pump and the boiler feed pump are so located as to be readily driven in an economical manner from the engine shaft. The catalog includes tables showing the general performance of this engine as to coal and steam consumption, steam pressures, superheat, etc., and diagrams showing the small space required for installation.

C. J. Franklin, Portland, Ore., who resigned recently as general superintendent of the Portland Railway, Light & Power Company to open an office in the Wilcox Building, Portland, as a consulting expert, has issued an exceedingly attractive folder, "Expert Service—Public Utilities." Mr. Franklin is prepared to act as a consultant in all matters embracing operating problems, construction, valuations, rate situations, etc., in connection with public utility properties, and the folder deals with the service of his organization in this connection. The subjects covered briefly in the publication follow: "Operating Problems," "Rate Investigation," "Projected Railroads," "Electrifications," "Valuations and Appraisals," "Public Service Commissions," "Audits," "Examinations and Reports." Aside from the several subjects named, the service which Mr. Franklin is prepared to perform embraces the preparation of cases and service upon boards of arbitration, mediation and conciliation, expert assistance in preparation of cases before railroad and public service commissions and expert testimony in connection with damage suits.

Electric Railway Journal

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THE CRYING NEED IN POLITICS

We are suffering in this country from a lack of trained leadership in public affairs, particularly in relation to the administration of the regulative functions of government. When a man like Colonel Goethals undertakes a public work and puts it through effectively, the achievement is heralded not only for its intrinsic value but to prove that it is possible for a government official to serve the public effectively. The inference, however, is that such service is unusual. An analysis of the actual conditions shows that the increase in the demands of public service for trained workers recently has been so rapid that the supply is far less than the demand. We are far from believing that it is wise to create a large office-holding class. At the same time if the government is increasingly to undertake functions of a regulatory and executive character it is extremely important that the details of the work should be in the hands of men trained for this particular task. Elsewhere in this issue we publish a brief account of a conference to bring about such a plan, called by Mayor Mitchel of New York and held under the auspices of the American Political Science Association. The conclusions reached were that the plan was worth while and that the proper place to turn for assistance was to the colleges.

COLLEGES AND PUBLIC SERVICE

We have a right to look to the colleges to help in this work. This is not because they possess a monopoly of learning, but they are the crowning feature of our educational system and have been organized to give training of an especially high character to a small proportion of population, qualified by natural endowments to profit by such training. Too often the college man of to-day considers that he performs his civic duty by complaining about the existing situation. Dr. A. C. Humphreys of the Stevens Institute referred to this condition in an address in Philadelphia last week when he criticized the teaching of civics in modern educational institutions as neglecting the practical and placing undue stress on the theoretical, and added: "The so-called educated man—meaning the man of school, college and books—is to blame far more than the less favored man if his ill-considered words lead others astray." The fact that some college men are active in attacks on capital is no reason why the colleges cannot do an important work in training the right kind of men for civic service. The exceptions really prove the rule. There is no reason why the colleges should not be able to turn out men as well trained in civic matters as they do men trained in engineering, and we hope that Mayor Mitchel's plans will be successful. Certainly there are enough practical problems in social and political economy to call for the services of the best men whom the colleges can produce. After all, the real test of the value of the colleges and the training which they impart is the effectiveness with which the recipients of this training address themselves to their civic duties.

DANGERS OF PUBLIC SERVICE

The present disgraceful attack on Bion J. Arnold and George Weston of the Board of Supervising Engineers, Chicago Traction, by the Mayor and a supporting group of newspapers shows how good public service may fail of appreciation if the expert opposes the wishes of the politician. The Board of Supervising Engineers is strictly non-partisan and non-political, as required by ordinance. As a result of careful engineering study it could not support Mayor Harrison's plan for a comprehensive subway system in Chicago, and this opposition undoubtedly contributed in large part to the defeat of the Mayor's subway plan at the recent municipal election. Now we learn that the accounting methods of the board have been attacked with a view to discrediting the responsible engineers. As Mr. Arnold cannot be removed without due and elaborate process the attack is turned on Mr. Weston, the city's representative, who can be displaced with less ceremony providing public opinion does not protect him. Mr. Arnold is a fighter where right principles are to be maintained. He has answered his critics in a patient, painstaking manner, but he will see this thing through as he has done before in the case of similar although less vigorous opposition. It is discouraging for the advocates of good government and high-grade public service to see men of high character and attainments treated in this fashion, and we confidently believe that the civic spirit of the great city of Chicago which, when roused, is overwhelming, will make itself felt in the interest of fair play. There is evidence that the tide is already rising. In the Board of Supervising Engineers the city of Chicago has a unique and simple device for safeguarding the public interest. The maintenance of such a body of competent engineers is possible only because the magnitude of the work is so great. The board has, during the rehabilitation period, effectively supervised vast expenditures. It has demonstrated its ability to cope with complicated situations. It was supposed to be free from political machinations. The good citizens of Chicago owe it to themselves and to the country to see to it that the good name of the board is safeguarded.

THE SAN FRANCISCO MUNICIPAL RAILWAY REPORT

The report of the Geary Street Municipal Railway, San Francisco, Cal., for its first year of operation, from Dec. 28, 1912, to Dec. 31, 1913, has just been made public and is abstracted elsewhere in this issue. It is a valuable contribution to electric railway financial data, for it is the first municipal railway report in this country that has been presented on a sufficiently standardized basis and in sufficient detail to permit a ready analysis of the results of municipal versus private operation.

The structure of the report is a source of much gratification to the ELECTRIC RAILWAY JOURNAL, for several of the defects in the report for the first six months of operation, as pointed out in an editorial in our issue of Oct. 11, 1913, have been recognized in principle if not in all practical details. Thus in the official report presented to the Board of Public Works for the period from Dec. 28, 1912, to June 30, 1913, the total investment was given as $1,680,255. In the present report the cost of construction has been set at $1,657,251 and a list of "general expenditures" covering organization and development items which apparently did not appear in the prior report has been added. These general expenditures include the cost of engraving and advertising the bonds, early legal expenses, the interest during construction and the cost of the two special municipal ownership elections of July 30, 1909, and April 22, 1913. Altogether they aggregate $181,890, making the total investment $1,839,142. We do not quite understand why, if the justice of capitalizing the cost of the two last elections is admitted, the cost of the special elections on the same questions taken on Dec. 2, 1902, Oct. 8, 1903, and June 24, 1909, should not also be made a part of the capitalization, but perhaps this was considered too great an allowance to be made at one time.

One item, however, about which the municipal line still maintains a discreet silence is the $350,000 appropriated for plans and specifications prior to the 1906 disaster. Whether this sum was entirely expended in the preliminary engineering work on the proposed road or sank out of sight in the earthquake, no one seems to know. Nevertheless, it is a legitimate construction charge, and when one considers that it is over 19 per cent of the stated cost of road and equipment and general expenditures, its omission assumes a position of serious importance.

Another improvement in the form of report is that the charges for taxes, depreciation and insurance have been reduced from the former "mythical" form into concrete estimates. In the latter connection, it may be well to note that although in the main the Interstate Commerce Commission accounting classification is followed, there can be no justification found therein for carrying in the income statement a reserve of 18 per cent for "depreciation" when, as explained in a solitary note in the report, 4 per cent of this amount is for injuries and accidents. The mere fact that reserves are set up to cover injuries and accidents as well as depreciation confers upon the accountant no right to class the two as "depreciation." The effect to others than the close analyst is bound to be misleading.

On its face the report shows a profit, after the deduction of operating expenses, taxes and interest on the funded debt, of $45,304.47, and for this reason we assume that the road will be hailed by municipal ownership advocates as a demonstrated success. Let us see, however, just what this apparent profit amounts to in percentage on the investment. We shall take as the "investment" only the figure $1,839,142 quoted above and omit, so that there shall be no dispute, any capital charges which are not given in the report. The return to the city consists first of $73,887 for interest, including interest of $29,584 computed semi-monthly on the actual investment from Dec. 28, 1912, to June 30, 1913, and interest of $44,302 at 4½ per cent on $1,969,000 of funded debt from June 30, 1913, to Dec. 31, 1913, and second, of profits of $45,304.47 for the year. The total amount available, therefore, for interest and profits was $119,191, which on the basis of the total investment of $1,839,142 means a rate of return of 6.48 per cent.

Let us now consider what return would have to be earned to encourage private capital to engage in this class of enterprise. Fortunately we have this information right up to date, and in regard to enterprises in the same locality, through the testimony which A. F. Hockenbeamer, of the Pacific Gas & Electric Company, offered to the California Railroad Commission last March, as abstracted in the last issue of this paper. Mr. Hockenbeamer presented a list of all of the recently authorized public utility securities in California and showed that the prospect of net profits of at least 8½ per cent upon the total investment was necessary to attract new capital. He gave as a reason for this statement the fact that wage disputes, new inventions, rapid obsolescence of apparatus, engineering and operating mistakes, etc., give the operation of electric railway and power companies certain hazards and that these necessitate a higher rate of return than that required simply for the use of the money where there is not an equal amount of risk. Now the mistake of the municipal ownership adherents lies in imagining that these hazards will be any less under municipal than under private ownership. Certainly, if the city is not securing a rate of return adequate to cover those losses which cannot be foreseen but are certain to come it is operating at a loss. The only reason that an investor will accept the low rate of interest which goes with the San Francisco city bonds is because he knows that if the business venture does not pay the city can and will raise the interest money by taxation. If the city had provided for these risks by establishing a reserve to cover the difference between the present rate of return and 8½ per cent, the rate at which Mr. Hockenbeamer estimates the cost of money for the other California utilities, there would have been a deficit of slightly more than $37,000, or nearly the amount which is now claimed as a surplus.

Thus far we have considered only the capital account of the Geary Street line, the omissions therefrom and the rate of return on the stated total investment.

There are other interesting points connected with the report and with the ability of the road to increase or even to maintain the present rate of "profit" for a series of years. A discussion of these points, however, must be deferred until a later issue. Suffice it to say now that conditions point to a decline rather than to an increase in the net income.

MR. McCARTER ON MUNICIPAL OWNERSHIP

Mr. McCarter's argument against municipal ownership of electric railways in the District of Columbia, published in the ELECTRIC RAILWAY JOURNAL of last week, centered on two fundamental points. These were: First, that public ownership is not sound public policy for this country; and second, that if, notwithstanding this consideration, the cities embark on municipal ownership experiments they must value the existing properties fairly, with allowance for franchise rights where those rights exist. From these two standpoints Mr. McCarter argued to persuade the committee not to follow the course proposed in the bill before it. He has been supported in his arguments by officials of the properties directly affected as well as by those who appeared before the committee this week to give testimony.

Mr. McCarter has wisely schooled himself to meet the large public questions of the day that affect properties of the kind he directs. By so doing he has set an example to other public utility operators. Concerning the policy of the frankness shown by Mr. McCarter in his discussion before the committee there can be no reasonable dissenting voice. Attention is called here to his evident willingness to answer freely and fully all questions asked by members of the committee because that is the proper attitude for a public utility official to adopt in his dealings with all bodies representing the public. The fact that all officials have not done so in the past is one reason for the birth of the troubles that they have felt so heavily during the last few years.

There can be no doubt that regardless of whether the bill was meant seriously by its framer or whether the committee that has it under consideration takes it seriously, the thing for the company and the industry generally to do is to look at it as a grave issue. The time passed long ago when any movement affecting public utilities could be dismissed with a cool wave of the hand. Unfortunately that was the attitude with which some operators dealt with regulation when this powerful force first made its unwelcome appearance. To those men the policy of regulation then seemed unthinkable. After years without supervision they could not bring themselves to realize that a radical change could occur. What did take place is proof, if proof be needed, that indifference or off-hand dismissal of public issues is not the best way. These issues must be answered. Mr. McCarter was controlled by a willingness to heed the plain fact that a bill was introduced in Congress providing for public ownership of the properties. We believe that the public generally is unresponsive to a political movement of this kind now, but he did not propose to be influenced to do other than appear and place himself on record against it. It is far wiser to follow such a course, to accept the gauntlet thrown down and to meet the issue than to avoid or belittle it.

The voice of Mr. McCarter on the public ownership issue is needed. We do not want to be understood as believing that there is a strongly-defined tendency toward municipal ownership in this country at this time. We think that there is not such a tendency in the country. There is, however, a strongly developed radical movement. Some of the functions and avenues of government are in the hands of radical individuals who do not know much about the danger of the courses which they advocate and who care less. They should not be allowed the free rein in action which they claim in speech. Every influential voice that can be raised against proposals to recast radically the national customs and institutions should make itself heard. If municipal ownership does come in time the approach to it should be through sober channels with a full recognition of the rights of the companies whose properties are taken as the basis for public systems. The clauses in some of the recent electric railway franchises, giving cities the right to acquire the property eventually, are outcroppings of tendencies, like the bill pending in Congress, on which the conservative forces of the times should express their opinion.

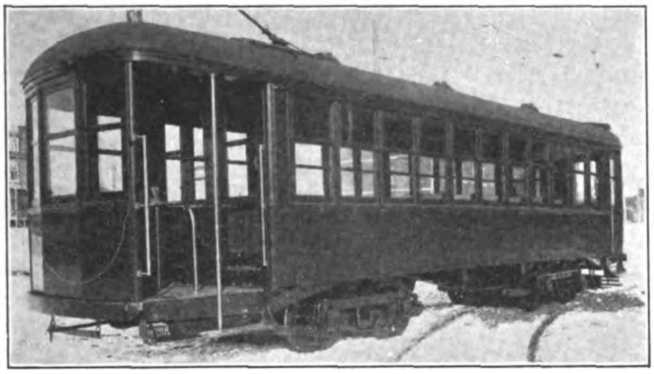
The other phase of Mr. McCarter's argument dealt with the rights of the company under its franchise contract and the value of its property. He made it clear that the public did not lose all of its rights when it granted a franchise which he regards as perpetual. It still has the power to require good service and to make rates. It still may have the power to condemn and take the property. Mr. McCarter's contention that the best public policy is that of private ownership with complete public regulation is, we believe, based on a fair regard for both the public and the corporate interest. If public ownership is substituted ultimately it would be desirable that the community should recognize the capitalization. This assumes, of course, that the capitalization issued is not unreasonable. An unreasonable capitalization, issued without regard to value or fair chance of a return, falls of its own weight in time. But capitalization that represents fairly the costs that, with careful management, made the property what it is to-day and that is capable of a fair defence under the existing settled policies of courts and commissions, should be treated justly. If such treatment is not given through recognition of the capitalization as such, but is given through a valuation, the desired protection of securities issued properly will be obtained.

The value to be allowed for the property in the event of ultimate municipal ownership, which may never take place, is not of controlling importance at the moment. What is of controlling importance is that the policy of private ownership with public regulation is on trial as the answer to the public ownership cry in scattered camps of radicals. It is the duty of both the public leaders and the company leaders to let the trial proceed fairly.

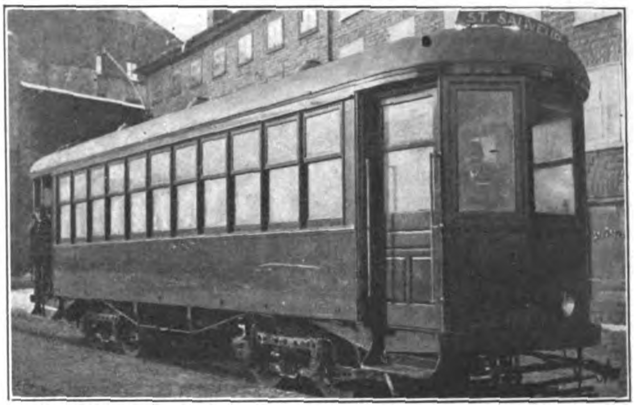
Traffic Development at Quebec

How Traffic from the Local Population at Quebec Has Been Created by More Frequent Car Service and How Additional Business Has Been Secured by Making the City Accessible to Tourists Other than the Well-to-Do by Means of Sight-Seeing Cars

The history of recent traffic development in Quebec is a striking proof that there is little in the belief sometimes expressed that people will ride because they must or that they will visit an attractive place without urging. Perhaps no city railway in America is justified in expecting a heavier traffic from an area of equal size and population than the Quebec Railway, Light & Power Company. The steep grades, particularly between the business and residential parts, certainly conduce to local riding, while the location, romantic history and many ancient houses of Quebec make it one of the most attractive tourist cities in the world. The following paragraphs will show that because of innovations in service and advertising the traffic has been developed remarkably.



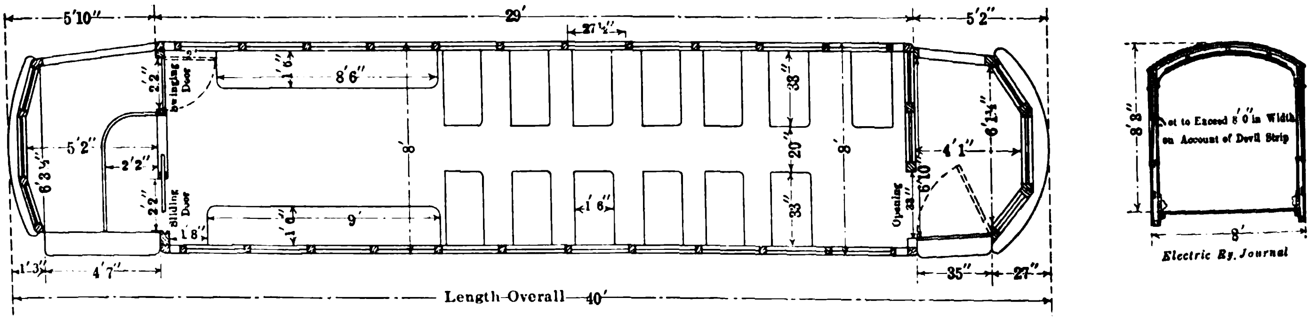
Quebec Traffic Development—Double-Truck Prepayment Car, Showing Arch Roof Construction, and Open Rear Platform with Dividing Rails



Quebec Traffic Development—Double-Truck Prepayment Car, Front Platform Inclosed with Full-Width Swinging Door

DEVELOPING LOCAL BUSINESS

The question of giving increased service for the Quebec public was taken up early in 1912 by H. G. Matthews, the incoming general manager. Ample rolling stock was on hand, yet altogether too many cars were idle. The normal number of cars in all-day use during the summer had been forty, this corresponding to a three-minute headway on the main line of the Lower Town and to a five-minute headway in the Upper Town. The number of cars was increased to fifty with a maximum of fifty-eight during the rush hours, to sixty-six on Sundays and to seventy-seven on extraordinary occasions, like fair and circus days. The addition of these cars made it possible to cut down the headway in the Lower Town to two minutes and in the Upper Town to two and one-half minutes. The immediate effect of this sudden increase in service was to cut down the earnings per car mile considerably, but the public learned to appreciate the extra service so rapidly that to-day the earnings actually exceed the original figures by 1 cent to 2 cents per car mile. This experience has demonstrated that in a hilly city like Quebec people will ride very short distances provided that frequent cars are available.



Quebec Traffic Development—Plan of Double-Truck Prepayment Car

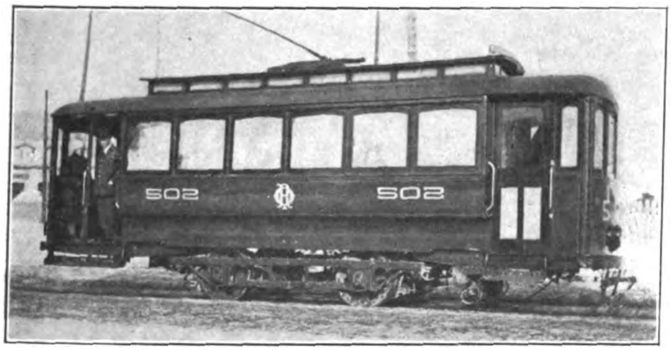
INCREASED ROLLING STOCK FOR CITY SERVICE

The increased business soon took up the rolling stock reserve and brought with it the addition of two double-truck cars of the type hereinafter described. Single-truck cars are best adapted to Quebec conditions except on the longer Crown Street main line and suburban extensions. The company now has fifty-seven closed cars, forty nine-bench and ten ten-bench single-truck open cars and two observation cars. Of the cars in service, sixteen are new prepayment cars of the single-truck type, furnished by the Ottawa Car Company, and five are cars converted to prepayment operation.

The two new double-truck cars illustrated are of arch-roof design. The length of 40 ft. over all is set by the narrow streets common to the older parts of the city. The body is 29 ft. over vestibule corner posts, the front platform 4 ft. 1 in. over all, the rear platform 5 ft. 2 in. over all, and the width 8 ft. over all. Although Quebec has some very cold days, no door is provided at the front bulkhead. The exit door is also an unusual feature, as it covers the entire step width. The rear body doors are of the sliding type for exit and of the swinging type for entrance. The seating plan is the favorite combination of longitudinal seats at the entrance and cross seats in the rest of the car. The omission of a cross seat opposite the front exit, the absence of a door at that place and the opening of the entire front platform are features which greatly encourage the passengers to leave at this end rather than at the rear, where they would oppose incomers.

The body, which was furnished by the Ottawa Car Company, is fitted with upward sliding sashes, which make the car very agreeable for summer service. The Taylor trucks are equipped with four Westinghouse 101-B-2 outside-hung motors and S.M.E. air brakes. These cars are the first in Quebec to have air brakes and steel-tired instead of cast-iron wheels. Ventilation is effected by Brill roof ventilators. The cars are electrically heated. Both cars are operated in regular prepayment service with the Coleman fare box and without the use of any registration devices. Up to Aug. 20, 1913, each car had run more than 20,000 miles without overhauling, the cars thus proving as satisfactory to the company as they have shown themselves to the public.

It is planned to splice sixteen of the single-truck open cars in order to convert them to fourteen-bench open cars 40 ft. over all and equipped with maximum traction trucks. The single-truck cars of the 500 type illustrated were rebuilt for prepayment at an average cost of less than $500, thereby lengthening the life of the car by about five years.



Quebec Traffic Development—Standard Single-Truck Car, Rebuilt for Prepayment Service

Quebec Traffic Development—Stone Paving on Grand Allée, One of the Chief Residential Streets

DEVELOPMENT OF CITY TOURIST BUSINESS

Although Quebec has always been a most attractive place to tourists, the railway did not realize until 1912 that it had not been catering to the much larger number of people who would be glad to visit the town if they could see the notable places in a few hours at nominal expense. Most of the tourists had been people who could afford to stop at the hotels for a week or more and go to each place leisurely in carriages in preference to the street railway. Nowadays, the observation car service is so well advertised that thousands of people come to Quebec by boat in the morning, take in the town by trolley and leave by boat in the evening.

In 1912 Ralph Mayne Reade, superintendent of the city division, prepared the first trolley trip guide ever issued by the company on the attractions of Quebec. This booklet described the many historical places of the city in a pleasing style. The photographs, which were made cheaply with a kodak of post card size, were also taken by Mr. Reade. Of this edition of the guide, 40,000 copies were printed and distributed among tourist agencies, steamship lines and other organizations in touch with travelers. It was found that the guide increased the general traffic but did not help the business of the sight-seeing cars because it had been made out to cover individual trips, each of which would cost but 10 cents per round trip. In 1913, when an edition of 50,000 copies was printed, 50,000 dodgers were also included. The latter, which were handed to tourists when they arrived at Quebec, advertised the observation car as the one way to see the city. The result was an increase of almost 100 per cent in the observation car business. A convenient feature of the guide is that the text is arranged to follow the route of the observation car so that "he who rides may read" to the best advantage. As the text and pictures of the booklet were prepared by one of the officials of the company, the actual production cost was very reasonable. Furthermore, about one-half this cost was made up by securing local advertising at the rate of $50 per page.

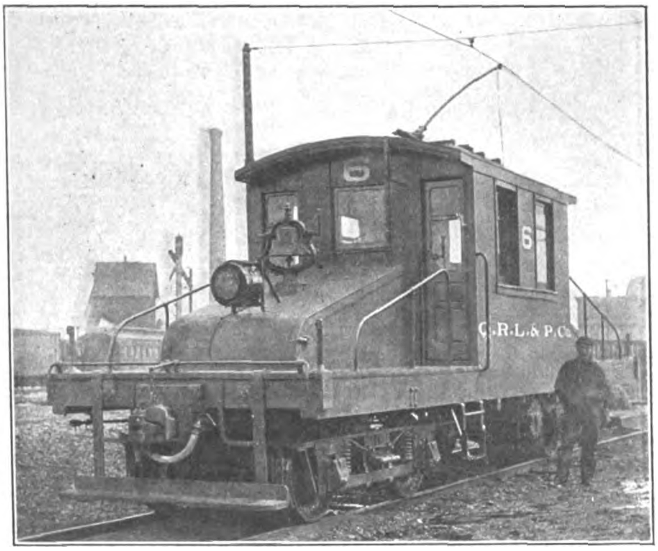
It is planned to print 100,000 booklets for the season of 1914 and to distribute them among forty-eight tourist agencies instead of twenty-four. The extent to which even the 1913 booklet was circulated appears from the fact that 2000 copies were sent to the London (England) emigration office of the Province of Quebec. Not only is the railway company doing its share to advertise the city in this way, but it has also been one of the first to appreciate the greater population and prosperity that must come to Quebec with the opening of the Quebec Bridge and the completion of its harbor and other improvements. In harmony with this spirit, the next guide will contain industrial data to exploit the merits of Quebec as a manufacturing and distributing center. An alphabetical list of all products manufactured in the city will be presented so that outsiders will know what Quebec lacks as well as what it has.

The first observation car was installed in 1910 and the second in 1911. The cars are of the open-tier type used in Montreal. As each pair of seats is one step above those immediately ahead, everyone has a good view and may take snapshots from almost any position. The car is not roofed, but several light brass arches are attached to carry lamps for night service. Each car seats forty-two with a maximum of fifty when camp stools are placed in the aisle. With one of these cars a person can see the principal parts of the city in one hour and forty-five minutes for the nominal price of 50 cents and have a competent guide explain everything of interest along the route. On the other hand, a carriage trip costs at least $3, covers far less territory and is often in charge of a driver who speaks little or no English. To be sure, the observation car when used in this manner does not give a detailed view of every object, but, as an American humorist lately said, most wanderers are "tourists" who lack the money and leisure of "travelers." Quite a large number of riders on the observation cars are people who have just landed from European steamers and are obliged to wait about three hours for train connections. Such persons are led to spend their free time in visiting the city, because their attention has been directed to the trip by means of dining-room advertisements of the sight-seeing cars. During the first sixteen days of August, 1913, the earnings of the observation cars exceeded $100 on all but three days, whereas in the same period of 1912 the earnings fell below $100 on all but three days. The maximum earnings of the two cars in one day came from 374 passengers at 50 cents each.

OPERATING DATA, SHOWING GROWTH OF QUEBEC CITY SYSTEM FOR FIVE MONTHS OF 1911, 1912 AND 1913

	Car Days	Car Miles	Average Earnings Per Car Day	Average Earnings Per Car Mile, Cts.	Passengers Carried	Total Earnings	Operating Expenses per Car Mile, Cents
July, 1911	1549	169,423	$27.15	25	929,006	$42,060	13.00
July, 1912	2012	210,362	22.38	21	1,002,820	45,031	12.33
July, 1913	1904	207,265	26.30	24	1,127,085	50,079	14.00
August, 1911	1653	180,416	28.26	25	1,017,514	46,716	12.00
August, 1912	1971	207,004	25.44	25	1,103,174	50,149	12.25
August, 1913	2005	223,412	30.25	27	1,336,932	60,661	13.40
September, 1911	1531	162,219	24.63	23	849,402	37,718	12.40
September, 1912	1652	184,187	23.07	20	874,254	38,119	12.25
September, 1913	1801	200,529	25.62	23	1,063,125	46,146	14.60
October, 1911	1364	156,443	23.56	20	752,540	32,140	13.00
October, 1912	1534	176,373	23.12	20	838,300	35,479	11.66
October, 1913	1760	191,054	24.24	22	1,010,040	42,671	14.00
November, 1911	1350	146,508	21.17	18	675,188	28,587	13.20
November, 1912	1449	167,866	21.87	18	752,843	31,701	13.75
November, 1913	1629	181,438	23.09	20	895,051	37,613	14.50

It is rather difficult to estimate just how much of the increased business should be ascribed to the local traffic and how much to tourist travel, but the accompanying table, covering operations for the same five months of 1911, 1912 and 1913, will show that conditions have been greatly improved.



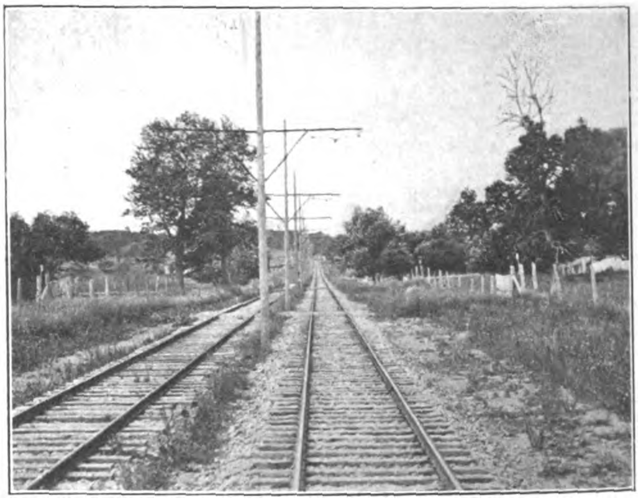
Quebec Traffic Development—Home-Made Locomotive for Interurban Division

MONTMORENCY INTERURBAN DIVISION

The Montmorency division of the Quebec Railway, Light & Power Company includes the line to the famous shrine of Ste. Anne de Beaupré, over which route a great many steam trains are operated directly in addition to the regular electric service. This business has increased from year to year. It was only 80,000 in 1889, the first year in operation; 649,087 in 1901, when the road was electrified, and 1,800,000 passengers in the fiscal year ended June 30, 1913. Of this last number 160,000 passengers were pilgrims who came to the shrine on steam trains. A maximum of 20,000 passengers is carried on Sundays. A most enviable record of this line is that not one passenger has been killed on it despite the heavy service and the mixture of electric and steam trains. All trains are dispatched by telegraph.

Although the traffic of Ste. Anne's would be heavy without any advertising, it has been increased by the use of a personal service for visitors. Thus in 1910 the company began the operation of a train known as the "tourist special." This is an extra-fare train, with guide, which makes no stops between Quebec and Ste. Anne de Beaupré except at Montmorency Falls. By special arrangement, the visitors on reaching the shrine are taken in hand by a Redemptorist brother, who escorts them through the church and the near-by chapel. This good brother wittily expounds the difference between "visitors" and "pilgrims."

At Kent House, Montmorency Falls, the company operates a hotel and park. Formerly the only way to reach the park was by the regular line to Ste. Anne and by an elevator at the falls. In 1911, however, the company built an upper level line which goes directly to Kent House. The construction of this 4-mile line permitted a lower total fare and consequently has greatly increased the popularity of the park. This extension consists of 4 miles of double track. A thirty-minute service is now given to Kent House all the year round, while on the lower level line an hourly service is given to Ste. Anne in the summer and a two-hour service in the winter. The increased travel on the Montmerency division will soon require additional equipment.



Quebec Traffic Development—Sillery Line of Quebec City System

The very latest scheme for advertising the Montmorency division is a moving picture reel 680 ft. long which was made in September, 1913, by the Vitagraph Company. These pictures were secured originally in connection with a drama, but the moving picture company presented to J. A. Everell, superintendent of the Montmorency division, that part of the film showing views along the line. This film has since been used by a lecturer for talks in the United States and Canada.

As the pictures were taken from a moving train, they show the line exactly as the traveler would see it.

TRACK AND EQUIPMENT ON MONTMORENCY DIVISION

At one time the company had much trouble from weeds and spent about $3,000 a year to kill them. Lately it has used with great success the waste tar from its gas plant. As there is no market for tar or tar water in the city, this by-product is not distilled for sale. A dense tar solution is sprinkled over the right-of-way when the weeds first begin to appear and thinner solutions are applied monthly until fall. About 1000 gal. is used per mile of double track. The tar has the double advantage of killing the weeds and giving a dustless road. Incidentally, it helps to preserve the ties.

The equipment on the Montmorency division consists of eight steam locomotives which can haul fourteen to fifteen trailers when necessary, twenty-two steam trail cars, eleven motor cars and one electric locomotive. The last was constructed by the company in 1911 primarily for freight service, but it also hauls eight to ten passenger cars when required. It is 34 ft. long over all, 8 ft. 8 in. wide, weighs approximately 98,000 lb. and has two trucks of 6½-ft. wheelbase, 28 ft. 8 in. center to center. The wheels are of 33-in. diameter. The longitudinal frame of the locomotive consists of two 12-in. x 5-in. pine sills and four 9-in. x 4½-in. inside sills.

SILLERY
LINE JUNCTION

Quebec Traffic Development—Passenger Station of Wood Faced with Tin

The equipment consists of four Westinghouse 303-A motors, geared 16:61, and an L-4 controller which is placed in the center of the steeple cab. The normal speed is 18 m.p.h., and on a level the train will haul 400 tons at 10 m.p.h. Resistances and other equipment are carried under the sloping ends. Westinghouse air brakes are used.

TRACK AND EQUIPMENT EXTENSIONS

In Quebec's Lower Town the soil is largely "made" land, whereas Upper Town is almost entirely on foundations blasted in solid rock. The standard city rail is a 6-in., 80-lb. T. The ballast is of broken stone laid to a depth of at least 4 in. below the ties with a concrete filling and a sand cushion for scoria block. This block has been standard in Quebec since 1903. It is made with a plain bevel to make a runway for wagon traffic. The company must pay the city for the maintenance of all pavement within 2 ft. of each side of the rails.

The extensions made in the suburbs of the city within recent years were with 5-in., 80-lb. T-rail. The upper level line to Kent House has already been noted. Between August, 1910, and June, 1911, 4.8 miles of track, or 2.4 miles of route, were built from Maple Avenue to Sillery and Bergerville. An extra fare of 5 cents is charged on this extension. On weekdays passengers for the extension transfer at Sillery Junction, but on Sundays a through service is given from the Chateau Frontenac, which is the principal hotel and is adjacent to Dufferin Terrace, the famous boardwalk on the cliffs of the St. Lawrence River.

The city system has just been extended by 1 mile of double track into Limoilou Ward from Victoria Bridge at Charles River. This line will open up territory for settlement on the north side of the Charles River. A half-mile of single track has also been built on St. Valier Street to serve the large shops of the Transcontinental Railway which are under construction at St. Malo, directly opposite the latest carhouse of the electric railway company.

NATIONAL CONFERENCE ON UNIVERSITIES AND PUBLIC SERVICE

A unique conference was held in New York City on May 12 and 13 for the purpose of considering the subject of better preparation for public service on the part of individuals ambitious to enter public life. The conference was held in response to a call issued by Mayor John Purroy Mitchel, who aims to improve conditions in city administration in his own territory by adopting modern means for training employees. It was planned and directed by the committee on practical training for public service of the American Political Science Association. The assembly hall of the Merchants' Association of New York and the council chamber of the New York City Hall were used for the meetings. As the future of electric railways is tied up with the development of federal, state and municipal officialdom, the conference has significance to every one connected with this public utility. A synopsis of the salient features having direct or indirect bearing on electric railways is therefore given below.

In the first place the speakers emphasized the well-known fact that the public service in this country is furnished with workers in a very inefficient manner. There is little incentive for men of the right stamp to enter the service, as there is a lack of provision for systematic promotion and adaptation of men to their tasks, and the tenure of office is uncertain. The result is that public offices are filled with men who are not particularly well fitted for their work.

The question then arises as to the best means for training public servants. This is an involved matter, and Mayor Mitchel believes that co-operation between the universities and municipal governments is necessary to secure efficient men for the latter. The committee of the Science Association plans to furnish a means for bringing about the desired co-operation by securing practical work in government bureaus for students. It will also maintain a system of records by means of which properly prepared men can be recommended for particular lines of work.

The movement is under the direction of Charles McCarthy, chief of the legislative reference library of the University of Wisconsin, Madison, Wis., who has had long experience in educational work.

J. M. McElroy, general manager, Manchester (Eng.) Corporation Tramways, has presented to the tramways committee a comprehensive report dealing with the Manchester transportation problem as a result of the investigations into the traffic systems of New York, Philadelphia, Boston, Chicago, Pittsburgh, Newark, Toronto, Montreal, Paris, Berlin, Vienna, Hamburg, London and Glasgow.

Meeting of Illinois Electric Railways Association

Abstract of the Discussion at Chicago on "Present-Day Problems"—A Paper on This Subject Was Presented by R. B. Stearns of Milwaukee

More than eighty members and guests attended the meeting of the Illinois Electric Railways Association at the Hotel La Salle, Chicago, on May 15. The program included a business session in the forenoon, a luncheon in the meeting hall, and an inspection trip through the Fisk Street and the Quarry Street generating stations of the Commonwealth Edison Company. This trip occupied the greater portion of the afternoon.

During the session of the association, B. I. Budd, Chicago Elevated Railways, president of the association, occupied the chair.

After several brief committee reports, W. B. Griffin, secretary, announced that work on compiling the map of the electric railway lines in Illinois was now rapidly nearing completion. The draft of the map was on hand for the inspection of the members. It was expected that every line in the State would be shown on the map and it would then be submitted to the roads for approval before the engraving was made.

Mr. Patten, Chicago Elevated Railways, announced that the proposed central distribution point for advertising and publicity matter of the member roads of the State was still under consideration, but if any lines had folders, circulars or printed matter that they wished to have distributed in Chicago, he might be addressed on the subject, and he in turn would discuss the best method of distribution with the publicity committee of the association.

President Budd announced that tentative arrangements had been made for holding the next meeting of the association at Keokuk, Ia., in the latter part of June. As special features of that meeting it was expected to have in attendance members of the Public Utility Commission of Illinois, who would talk on the new public utility law, and also an engineer from the Stone & Webster organization, who would read a paper on the Keokuk hydroelectric plant.

PRESENT-DAY ELECTRIC RAILWAY PROBLEMS

President Budd next introduced R. B. Stearns, vice-president The Milwaukee Electric Railway & Light Company, who presented a paper entitled "Some of the Present-Day Electric Railway Problems." This paper will be found in abstract on another page.

Mr. Stearns supplemented his paper with interesting descriptions of the welfare work carried on by his company. The various organizations for welfare and recreation have a combined membership of over 4000 of the employees. The headquarters of the various organizations are in the Public Service Building, which provides extensive accommodations including a theater seating approximately 1500, club halls, kitchens, billiard room, bath rooms, library, etc. The several welfare organizations described by Mr. Stearns were the Employees' Benefit Association, the Employees' Mutual Savings, Building & Loan Association, and The Milwaukee Electric Railway & Light Company sections of the American Electric Railway Association and the National Electric Light Association.

The Mutual Benefit Association has a lodge hall and holds initiations, thus maintaining exceptional interest in its meetings. The third degree carries with it insurance features. These contemplate benefits of $1 a day for sickness and $300 for death. The cost to the employees is 50 cents per month premium, and in addition to the other benefits, membership in this association entitles employees to free medicine and free medical attention. The association has a reserve of approximately $25,000 invested in securities, and last year the premiums just about balanced the sick benefits.

The Building and Loan Association is authorized to issue $5,000,000 capital stock. At the first meeting $506,000 in stock was subscribed for, to be paid in cash.

COMPANY SECTION OF A. E. R. A.

On the invitation of President Budd, Mr. Stearns described rather fully the workings of the Milwaukee company section, and afterwards Mr. Budd said that the results at Milwaukee warranted every Illinois member of the American Electric Railway Association in making a careful study of the plan and in starting a local section.

In describing the Milwaukee company section Mr. Stearns recited how the parent association, in October, 1911, authorized the member companies to organize local sections according to a plan somewhat similar to that of the National Electric Light Association. The scheme was simple when a company had enough men of the supervisory class to insure that regular meetings could be held. There was very little "red tape" to the company sections. The by-laws were short, meetings were held monthly and the dues were but $5 per year per member. The payment of these dues entitled a member to all the benefits of associate membership in the American Electric Railway Association and to the publications of that association. The Milwaukee company pays half the dues of any employee whose salary is less than $75 a month. This gives the young men a chance to enjoy the educational benefits. The membership in the Milwaukee company section is largely made up of the supervisory force, and it does not include many of the trainmen, shopmen or trackmen, although a number of these have joined. The attendance at regular meetings ranges from 150 to 250.

The programs of the monthly meetings of the company section are miniatures of the big annual electric railway convention programs. Papers on many subjects are read by the members. The discussions are free and active. The meetings are lightened by amateur entertainment of various sorts, and much latent talent has been developed. Several employees have so perfected themselves in giving entertainment to the company section meetings that they have since been engaged for the professional vaudeville stage. Mr. Stearns was especially enthusiastic in explaining the high value of the company section, its low cost and the many features of improvement in the men which it had brought about in Milwaukee.

POWER PRODUCTION

An illustrated talk on power production for electric railways in Illinois was given by Peter Junkersfeld, assistant to the vice-president Commonwealth Edison Company, Chicago. Mr. Junkersfeld first spoke of the comparative amounts of power purchased from central stations for railway operation. In 1902 the census did not even take account of purchased power for railway use. In 1912, ten years later, 33 per cent of all the power used by electric railways in the United States was purchased. In Illinois, during the same ten years, the amount of purchased power had grown to be 58 per cent of all of that used by the electric railways, and during the first four months of 1914, in Chicago, 90 per cent of the power used was purchased power. Economic reasons, of course, account for this development. The electric-service company specializes in the production of electrical energy, and by serving the diverse wants of the community and by utilizing the most economical apparatus in large units, it is often able to sell electricity for the operation of electric railways cheaper than the electric railway companies can manufacture it.

Slides were displayed which showed the curves of purchased power in Chicago. During 1913, $3,750,000 worth of power was sold in Chicago. Assuming an average load factor of 40 per cent, the rate at which electrical energy is furnished by the Commonwealth Edison Company to the railways of Chicago works out a little over 0.7 cent per kw-hr. In 1902 the rate was approximately 1.03 cents per kw-hr. The amount paid by the Chicago electric railways for purchased high-tension energy in 1913 was, in round numbers, $3,750,000. The cost per unit has so far shown a constant tendency to decrease. During the last six years electric-railway power houses with a total rating of about 80,000 kw have been shut down in Chicago, owing to the fact that their owners purchase energy from the electric-service company.

Until very recently the local railways have purchased power on the high-tension side of their substations. A new conversion service is now being instituted which gives the railways the benefit of practically twice as many feeding-in points, due to the existence of many substations operated by the Commonwealth Edison Company which formerly had been used only for lighting and industrial power purposes, and which now will serve as direct-current feeding points for the trolley and third-rail distribution systems. The new conversion service contemplated the sale of direct current to the roads rather than high-tension current delivered at the incoming side of the substations. Where each of the two surface lines in Chicago formerly had eight substation distribution centers, under the new conversion plan each will have sixteen, and thus the copper in the distribution systems can be worked much more effectively. The elevated system in Chicago also will have sixteen, instead of eight, central direct-current energy distribution centers.

Mr. Junkersfeld exhibited a number of curves, one showing how the investment and operating costs are much less for the railway customers than for the average lighting and power customers, thus indicating how it is possible to sell the energy purchased wholesale for railway operation at such a low rate. A curve of annual load factors showed that as the output per capita increases the load factor improves and the income and cost per kw-hr. decrease. Another diagram gave a graphic illustration of the manner in which the diversity factor enters into the economical production of central-station energy.

Mr. Junkersfeld showed charts prepared by Samuel Insull, president of the Commonwealth Edison Company, as the result of a study of all of the electrical power generation and consumption centers in the State of Illinois outside of Cook County. The total maximum demand for the State exclusive of Cook County was about 306,000 kw. In order to handle this the estimated maximum generating capacity was 437,000 kw. If this demand could be handled by one station or a group of stations tied together so that the diversity factor could be taken advantage of, the capacity of the generating equipment could be reduced about 30 per cent.

After luncheon, and at the invitation of the Commonwealth Edison Company, Mr. Junkersfeld escorted the delegates and their guests through the Fisk Street and Quarry Street generating stations of his company. These two stations have a rating of 350,000 kw and burn more than 1,500,000 tons of coal per year. This is 37,800 carloads of fuel. In 1900 the fuel consumption was 6.90 lb. per kw-hr. In 1913 it was 2.87 lb. per kw-hr.

At the Fisk Street station the visitors were particularly interested in two large new turbine units. One of these, an English unit of the Parsons type, has a rating of 25,000 kw, and the other, a Curtis unit, has a rating of 20,000 kw. Additional boiler capacity has just been installed for feeding these new turbines, which shortly will be supplemented by two more large turbines of the horizontal type. An interesting feature of the boiler installation was the use of a sheet-steel jacket for each boiler. This jacket is made absolutely air-tight, and although its first cost is rather high, Mr. Junkersfeld pointed out that the prevention of air leakage more than warranted the installation cost of the steel jacket.

SOME OF THE PRESENT-DAY ELECTRIC RAILWAY PROBLEMS

BY R. B. STEARNS, THE MILWAUKEE ELECTRIC RAILWAY & LIGHT CO.

Your secretary has suggested that I say something about the Milwaukee group of utilities and some of the problems in the operation of these properties.

Briefly summarizing, the territory within which the Milwaukee group of utilities, controlled by the North American Company, operate, consists of the southeast portion of Wisconsin, extending about 45 miles along the shore of Lake Michigan, running from Kenosha on the south to Milwaukee and its suburbs on the north, and about 55 miles west to Watertown. Within this territory, comprising about thirty-eight cities and towns, these utilities supply practically all the street and interurban railway service, electric lighting, power and heating, together with gas service in three of the important cities. The property owned consists of 417 miles of track in the city, suburban and interurban service, with 686 passenger cars, the usual quota of service cars and construction equipment, together with eight car stations and the extensive Cold Spring Avenue repair shops, which is among the best equipped of its kind in the country and where all new cars are built. A total of 18,000,000 car miles were operated over this system in 1913, and 150,000,000 passengers were carried.

The steam power electric generating plants, common to both railway, light, power and heating utilities, have an aggregate capacity of 79,925 kw, not including 6000 kw of water power, transmitted at 40,000 volts 111 miles from the Wisconsin River. There are fifteen substations with a combined capacity of 38,068 kw in rotary converters, motor generators and frequency changers; light and power service being supplied to 43,000 customers. The combined gas manufacturing plants have a daily capacity of 2,040,000 cu. ft. distributing service through 151 miles of mains to over 14,000 customers. The franchises under which the street and interurban railways operate are of varying duration, but none expire prior to Dec. 31, 1934. These franchises may, however, be extended by surrender and acceptance of indeterminate permits as provided for by the laws of Wisconsin.

QUESTIONS OF THE DAY

Increasing demands of the public for greater transportation facilities in the way of increased service or extensions of lines, extension of city fares and the attitude of legislators and the courts in modifying existing statutes or interpreting old statutes and constitutional provisions under which franchises were granted, are probably the most interesting developments of recent years and should properly give electric railway operators the greatest amount of concern.

The courts are inclined to construe broadly the rights of municipalities under the police power granted by their charters or general statutes, and we find the electric railway business one of decreasing returns with increasing volume. In this regard it differs from almost all other industries.

The nickel fare for city and suburban and interurban zones cannot now properly be regarded as the smallest practicable coin which the American people are willing to carry and exchange for a ride. It is probably true that to-day in many cities electric railway operators regard their franchises as definitely fixing the rates of fare during the lives thereof, but these franchises may probably fail to give the protection which they expect should they be brought into question in the face of adverse regulation.

As we look around we conclude that much of this legislation and judicial determination depends upon what may be called for our purposes "the rule of reason." Most of the requirements imposed by municipalities, regulating commissions and under the interpretation of statutes provided in court decisions depend in large measure upon their "reasonableness." A public utility is supposed to be entitled, unless it contracts away this right, to a "reasonable return" upon the "reasonable value" of its property devoted to public use.

The reasonable value of the property is one of the principal elements involved in the determination of the reasonableness of the given regulation. Since a fair return depends upon operating revenues and operating expenses, many other considerations involve this factor.

Operating revenues depend upon the rates of fare and the system of charging. Operating expenses depend upon taxes, depreciation, wages and the cost of material and supplies, and the distance which passengers are hauled.

Many of these items are in turn affected by the amount of service and its distribution throughout the day, and the amount of service in turn depends upon the loading allowed on the cars, the community habit, the system of operation permitted and the accuracy of the fit of car service to the traffic demand. The whole subject is an exceedingly complicated one, and no problem can be accurately solved by the application of general reasoning. Clever and specious arguments may be of use temporarily, but they will sooner or later fall, as does the platform of the demagogic politician.

Many of the questions involved in the reasonable solution of the many problems that can arise in street railway operation and the relation between the utility and the public depend upon certain elementary principles with respect to which there are wide differences of opinion at the present time.

In the solution of any of these problems one of the first questions involved is: "What does it cost?" One of the elements of cost is the investment charges on the property used and useful. The value of the property depends upon a number of things. We recognize the fact that one of the principal factors of value is that of physical property.

How shall the value of the physical property be determined? Shall it be on the basis of the reproduction value new as determined by an inventory, and the application of unit prices to the property as it is found, or shall it be on the basis of actual cost as disclosed by the books of account?

In either case shall the value of the property be depreciated on account of its age or condition of preservation?

If the property is to be depreciated how shall the amount of accrued depreciation be calculated?

Does depreciation exist as an insurance charge against future replacements, or does it exist only in the way of deferred maintenance? If it exists only in the way of deferred maintenance and has to be made from time to time by charges through ordinary operating expenses, will regulating commissions and courts make allowances for depreciation, or will they eliminate such allowances as separate items of charge?

Shall appreciation in land values and rights-of-way be allowed to the utility, or shall the benefits be assumed entirely on behalf of the public?

Shall property constructed from surplus earnings be allowed to the utility, or shall it be appropriated for the public?

Among the elements of cost of service is the rate of return upon the value used and useful. What is a reasonable rate of return?

Shall it be: 1. Limited to the interest rate on farm mortgages? 2. Shall it be comparable with the interest on municipal bonds issued with the credit of the entire taxable land values of the municipality behind them? 3. Shall a reasonable rate of return be comparable with the rates of return allowed industrial enterprises having somewhat similar hazard?

What is adequate service? How is adequate service to be measured? How is a minimum allowable headway in municipalities to be determined? How is reasonable car loading to be determined?

Are these questions matters of fact, or do they depend on reasonableness under all the circumstances and go back to the allowable return on investment?

Adequate is defined as equal to some requirement or occasion, proportionate, fully sufficient. Reasonable is defined as having the faculty of reason, rational, endued with reason, governed by reason, being under the influence of reason, not excessive, within due limits, proper, just. Many of the public demands are usually regarded as reasonable unless they are confiscatory, regardless of the tributary population, possibilities of later development of the territory, and the right of the utility to a reasonable return upon its investment.

In conclusion let me state that I have endeavored not to express to you any individual opinions of my own or those of my associates. The problems I have referred to deserve the careful study of all electric railway operators, with respect to which they should all search out the truth.

Matters so intimately affecting the electric railway business and the financial results of its operation are necessarily causing increased work on the part of electric railway executives and bringing up from day to day and from year to year new problems, of which those who electrified the horse and cable lines had little conception.

Frank recognition of progressive legislation and court decisions along lines producing results just described is essential if the electric railway industry is to be preserved from large losses. Facts alone must be the basis of our defense in preserving the proper ties.

These problems are not confined alone to the electric railway industry. Other public utilities are facing the same questions in somewhat different form.

None of us should hide his face in the sand, in the belief that he is secure against the storm. We all have much work to do, and as I have said before, our task is not becoming easier with the lapse of time. The more we learn the less we know. It is to a consideration of the great importance of some of our newer problems that I direct your attention.

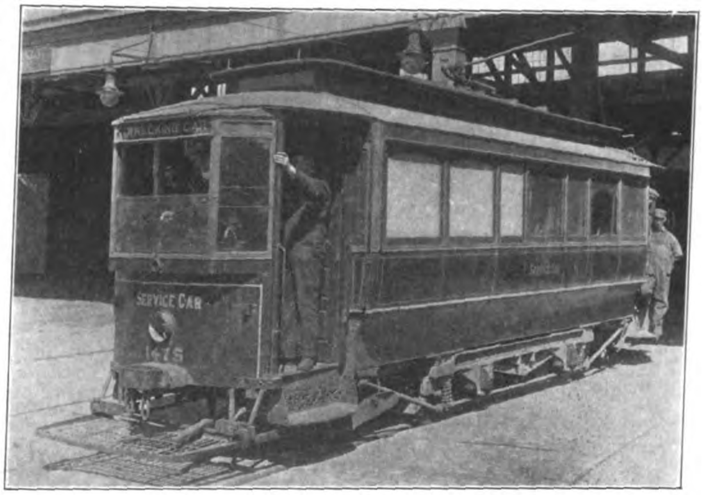
Our future success depends, as do most other things, upon our arriving at the proper solutions of the problems before they are forced upon us by others whose interest is adverse to ours. In other words we should "get there first."

REMOVAL OF SURFACE OBSTRUCTIONS

BY EDWARD DANA, ASSISTANT SUPERINTENDENT OF SURFACE LINES, BOSTON ELEVATED RAILWAY

The Boston Elevated Railway Company operates more than 475 miles of surface track in an area of 105 sq. miles, and it has become necessary to provide a considerable emergency equipment. At ten of the company's twenty-three carhouses there are maintained fully equipped emergency cars. They are of the single-truck type like the one shown in the illustration and are former passenger cars which have been removed from service and fitted up for this purpose. A list of the equipment carried is shown in the accompanying table. The carhouse foreman is responsible for the prompt availability of these cars as well as the upkeep of the equipment and efficiency of the service rendered. A crew for accident calls consists of the carhouse foreman, a competent motorman and three men from the pit room. These cars have the right-of-way over other cars and display red flags in front by day and red oil lights in front and rear during the night.

At other operating carhouses there are maintained standard emergency outfits which can be placed upon the first available cars if time and convenience can be better served thereby. These also are under the supervision of the carhouse foreman.



Boston Elevated Railway—Service Car for Use in Removing Obstructions

At seven other convenient points on the system there are maintained emergency wagons equipped in a manner similar to the cars, only limited in the amount of equipment.

Two of the emergency wagons are in charge of the carhouse foreman, and the remainder are cared for by the "line emergency service," which cares for the line troubles as well as does light repair work. This service

TABLE SHOWING LIST OF TOOLS CARRIED ON EMERGENCY CARS, BOSTON ELEVATED RAILWAY COMPANY

Axe	One.
Bars	One 8-ft. boom bar with chain.
	One 60-in. claw-bar.
	One 36-in. claw-bar.
	Two 30-in. cutting bars.
	One extension drawbar.
	Two ice bars.
	Two 60-in. pinch-bars.
	Two 36-in. pinch-bars.
	Two 30-in. punch-bars.
	One 10-ft. pry-bar.
	One 8-ft. push-bar.
Box	One box "first aid to injured."
Bolts	Two each motor bolts of all kinds.
	Two each motor eye-bolts.
	Four bolts 8 in. x ¾ in.
	Four bolts 12 in. x ¾ in.
	Four bolts 18 in. x ¾ in.
Bolt Cutter	One ¾-in.
Blocking	Eight 6-in. x 6-in. x 2-ft., for vehicles.
	Eight 4-in. x 6-in. x 2-ft., for vehicles.
	Eight 2-in. x 6-in. x 2-ft., for vehicles.
	Eight 1-in. x 4-in. x 2-ft., for vehicles.
	Four 3-in. x 8-in. x 2-ft., broad, for jack foundation.
	Four 3-in. x 8-in. x 4-ft., broad, for jack foundation.
	Four 2-in. x 8-in. x 6-ft., light, for jack foundation.
	Four 2-in. x 4-in. x 12-in., light, for jack foundation.
	Four 4-in. x 4-in. x 12-in., light, for jack foundation.
	Four 4-in. x 6-in. x 12-in., light, for jack foundation.
	Four 6-in. x 6-in. x 12-in., light, for jack foundation.
Blocks	Two, for broken axles.
Brooms	Two push-brooms.
Cages	Four drawbar cages, one of each type.
Chains	Four, for lashing motors, trucks, wheels or brakes with grab-hook and ring, ⅜-in. chain, 6 ft. long, four pieces.
	One drag chain, ¾ in.
	Four lashing chains with rings and grab-hooks, ¼-in. chain, 12 ft. long.
Chisels	Four hand chisels.
	Two handles for chisels.
Connections	Six No. 6 two-way connections.
Fuses	Twelve M.M. fuses.
Gloves	One pair rubber gloves.
Grease	One 5-lb. pail cup grease.
Hammers	Two hand hammers, 2½-lb.
	One sledge hammer, 10-lb.
	One sledge hammer, 14-lb.
Hawkes' Device	One for broken axles.
Jacks	Two 15-ton Norton jacks with traversing base.
	Two 5-ton jacks.
	Two quick-acting jacks.
Lamps	One extension lamp.
	One five-lamp cluster with pole.
Lanterns	Four lanterns.
Ladders	One 24-ft. extension ladder.
Oil	One 4-qt. can lubricating oil.
Plates	Four extension plates for chafe irons.
	Four clamping plates with bolts, 4 in. x ⅝ in. x 12 in., four 1-in. holes.
Plank	Four pieces 8 ft. x 2 in. x 8 in.
	Four pieces 8 ft. x 4 in. x 8 in.
Pliers	One pair gas pliers.
	One pair cutting pliers.
Picks	Two picks.
Pins	Twelve cotter pins, ¼-in.
	Twelve cotter pins, 3/16-in.
	Twelve cotter pins, ⅛-in.
Punches	Two handle punches.
	Four drift punches.
Pails	Two sand pails with scoops.
Replacers	Four car replacers.
Ropes	Two drag ropes.
	One drag rope, ¾-in. wire, 100 ft. long.
	Two lashing ropes, 20 ft., ⅝-in. rope.
	Two lashing ropes, 20 ft., ¼-in. rope.
	One rope falls, 400 ft. 1-in. rope.
	One rope falls, 400 ft. ¾-in. rope.
	One 3000-lb. falls.
Saw	One handsaw.
Sand	One bushel of sand.
Screwdrivers	One each, 6-in., 12-in., 18-in.
Shovels	Four shovels.
Tape	One roll tape.
Tripods	One tripod.
Trolley Pole	One pole complete with cord.
Truck	One two-wheel truck for broken teams.
Twine	100 ft. heavy twine.
Waste	5 lb. cotton waste.
Wire	20 ft. No. 6 wire.
Wrench	One ⅝-in. hexagon T-wrench.
	One ¾-in. hexagon T-wrench.
	One ⅞-in. hexagon T-wrench.
	One 1-in. hexagon T-wrench.
	One ⅝-in. square T-wrench.
	One ¾-in. square T-wrench.
	One ⅞-in. square T-wrench.
	One 1-in. square T-wrench.
	Two 1-in. and ⅞-in. fork wrenches.
	Two ¾-in. and ⅝-in. fork wrenches.
	Two ⅝-in. and ½-in. fork wrenches.
	One 10-in. monkey-wrench.
	One 14-in. monkey-wrench.
	One 24-in. monkey-wrench.
	One 10-in. Stilson wrench.
	One 14-in. Stilson wrench.
	One 24-in. Stilson wrench.
	Two for broken journal boxes.
Washers	Twelve each, iron, 1-in., ⅞-in., ¾-in., ⅝-in., ½-in.
Yokes	

Note: The carhouse foreman is charged with the duty of knowing that such tools and equipment are maintained at all times on wrecking cars, and he will be held strictly accountable.

requires the employment of thirty-nine men, drawing wages of approximately $45,000 per year.

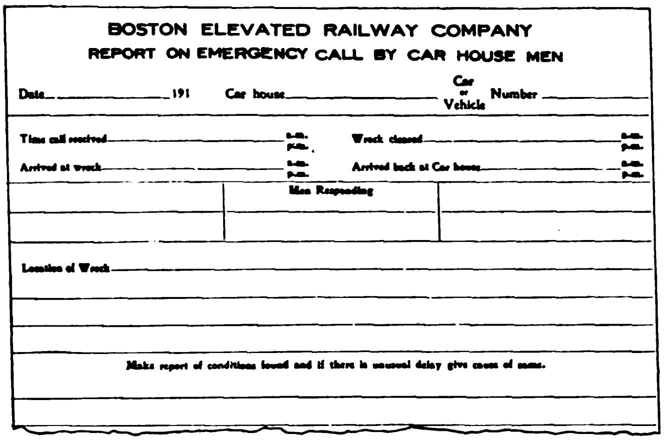
All surface cars of the company are equipped with lifting jacks, and motormen are instructed as to the proper use of these in connection with the several types of rolling stock. While these were ordered by the Public Service Commission for the purpose of quick relief in personal injury cases, they are not infrequently of value to street inspectors in case of a disabled vehicle.

At some fifty-nine different points on the system light emergency equipment for use of street inspectors is kept.

ADMINISTRATION OF THE EMERGENCY SERVICE

The proper location and use of this light material tucked away in inconspicuous locations can result in saving thousands of dollars annually to the street railway company. Drag-ropes, replacing irons and push-bars, to remove stalled teams can often remove the source of expense if intelligently used, while the nearest emergency car is being manned and moved to the site of the accident. The efficiency here rests upon the street inspector, and the live man is in this matter, as well as several others, on the firing line of the company's organization.

The attached form, which is in triplicate in three colors of paper, is used to record the facts in connection with emergency calls by carhouse men. The foreman retains one copy and forwards the other two to the division office, from which one is forwarded to the superintendent of surface lines.



BOSTON ELEVATED RAILWAY COMPANY
REPORT ON EMERGENCY CALL BY CAR HOUSE MEN

Date ________ 191 Car house ________ Car or Vehicle Number ________

Time call received ________ a.m. p.m. Wreck cleared ________ a.m. p.m.

Arrived at wreck ________ a.m. p.m. Arrived back at Car house ________ a.m. p.m.

Men Responding

Location of Wreck ________

Make report of conditions found and if there is unusual delay give cause of same.

Boston Elevated Railway—Form Used for Reporting the Existence of Obstructions

During the year 1913 there were recorded 1030 calls by carhouse men and 1145 emergency calls responded to by the line emergency service, which made also 10,113 calls because of line trouble from all sorts of causes from a loose ear to a bad trolley break.

It was found that of the calls made by the carhouse force 5 per cent occurred from midnight to 6 a. m., 14 per cent from 6 to 9 a. m., 49 per cent from 9 a. m. to 4 p. m., 17 per cent from 4 to 7 p. m. and 15 per cent from 7 p. m. to midnight.

In 19 per cent of the calls the line had been cleared before the crew arrived; 17 per cent of the calls were for disabled cars, while 49 per cent were for disabled vehicles and 15 per cent were for miscellaneous occurrences.

If the emergency forces are intelligently directed, they make quick work after they are once upon the ground. Of the total time consumed on emergency calls, it was found that only 24 per cent was consumed in actually clearing up the cause of the delay. Of course, this percentage was reduced because 19 per cent of the causes of the calls were cleared up before arrival of the forces.

As the development of a system progresses and more accurate and detailed data become available the system can be plotted into zones or squares and the number of calls noted in these sections. It will then be possible to determine the exact points where emergency crews should be stationed to secure the greatest efficiency with the most effective means of covering distance by motor vehicles. Conditions, however, are constantly changing, and the location of the zones or squares should be continued in order to relocate these headquarters if necessary.

ELEVATED TRACKS FOR THE PACIFIC ELECTRIC RAILWAY COMPANY

The Pacific Electric Railway Company has long had under consideration elevated track connections with the Sixth Street depot in Los Angeles and has secured private right-of-way for bringing such tracks into the building from the rear. The matter of granting a franchise for the construction, which would involve a number of overhead street crossings, has been under consideration by city officials for some time, but the first definite action was taken on May 14 when there was submitted to the Board of Public Utilities the final draft of the notice of sale for a forty-year franchise, covering that part of the proposed elevated system between the Sixth Street depot and San Pedro Street.

The notice of sale is drawn up so that one year is allowed to commence work on the structure and three years in which to complete it. Provision is made whereby the city is allowed an option on purchasing the line after a forty-year period, the price to be fixed by a board of arbitrators, and "if the grantee or the city be dissatisfied with the award of the arbitrators, the party so dissatisfied may have the price determined by a court of competent jurisdiction in the same manner prescribed by the statutes at the time in force for ascertaining the value and damages to property sought to be taken by eminent domain." In the event the city fails to exercise its option to purchase, it is provided that the franchise *ipso facto* shall be renewed for a period of ten years from the end of the forty-year term.

During that ten-year extension the city reserves the right to purchase the system upon two years written notice. The grantee is to pay the city a license fee upon each car operated and not less than 2 per cent of the gross annual receipts.

RAILROADS AND STEEL RAIL PRODUCTION

The total production of all kinds of steel rails in 1913 amounted to 3,502,780 tons, an increase of 174,865 tons over 1912, or 5.2 per cent. The maximum yearly amount of production was in 1906, 3,977,887 tons. In the following table is shown annual production and approximate consumption of steel rails in the United States from 1890 to 1913 inclusive. Annual consumption is approximately ascertained by adding quantity imported to total production, and deducting quantity exported:

Gross tons	Prod.	App. cons.	Gross tons	Prod.	App. cons.
1890	1,871,425	1,868,564	1902	2,941,421	2,943,789
1891	1,298,936	1,296,190	1903	2,991,810	3,057,195
1892	1,541,407	1,544,209	1904	2,283,840	1,906,237
1893	1,130,368	1,119,470	1905	3,375,611	3,098,184
1894	1,017,098	1,008,516	1906	3,977,872	3,654,794
1895	1,300,325	1,291,983	1907	3,632,729	3,298,500
1896	1,117,663	1,056,675	1908	1,920,944	1,726,224
1897	1,645,020	1,500,086	1909	3,023,845	2,725,847
1898	1,977,922	1,679,538	1910	3,635,801	3,290,712
1899	2,271,108	1,997,120	1911	2,822,556	2,405,330
1900	2,384,987	2,035,512	1912	3,327,915	2,885,222
1901	2,872,909	2,557,588	1913	3,502,780	3,052,635

Convention of the Southwestern Electric & Gas Association

Abstracts of Part of the Papers Delivered at the Tenth Convention are Given—A Safety First Symposium Was an Important Feature of the Meeting.

The tenth annual convention of the Southwestern Electric & Gas Association was held at the Hotel Galveston, Galveston, Tex., on May 20 to 23, 1914. The following abstracts cover some of the papers.

SYMPOSIUM ON THE SAFETY FIRST MOVEMENT

SAFETY FIRST FROM THE OPERATING STANDPOINT

The street railway operating standpoint was covered by R. T. Sullivan, general superintendentt Austin Electric Company. Mr. Sullivan stated that the central idea of the safety first movement is closely akin to that which created the movement for the conservation of natural resources. Other closely related ideas are those which created the "rotary" clubs of business men who have for their motto "He profits most who serves best," which prompted the movement for international peace and which have created the other big activities of present-day society. If we examine the genealogy of those ideas, we discover practical Christianity to be the trunk of the family tree and that the idea back of the Golden Rule is another distinguished cousin.

FUNDAMENTAL PRINCIPLES

Mr. Sullivan stated that the central idea of the safety first movement is that society, as a whole, suffers if an individual member is maimed or if the property of an individual is destroyed. The instinct of self-preservation teaches one to refrain from acts dangerous to oneself, and the recognition of the central idea of the safety first movement obligates one to refrain from those which may injure or damage others. The same principle compels one to restrain others from committing harmful acts. The instinct of self-preservation kept men reasonably free from harm before the days of steam and electricity. With steam and electricity, however, came new inventions. These brought with them new "sins," and it is these sins of the new inventions which have rendered the safety first movement necessary.

Taking the matter up from a historical standpoint Mr. Sullivan showed that shortly after street-car operation began traction men recognized the need for attention to safety. In the oldest street railway book of rules which he had seen is the command "when in doubt, take the safe course." The desire for greater safety has influenced almost every change in equipment and method of operation. The history of street railway development is the history of the efforts of railway men to make operation more safe, and the marvelous record of the Interborough Rapid Transit Company, which carried 2,198,000,000 passengers without a fatality, is the result of these efforts.

ORGANIZATION OF THE SAFETY FIRST MOVEMENT

Before the crystallization of the safety first idea into a safety first movement and safety committees, these efforts were detached. The safety committee systematized them, and one of the benefits to the operating man of the safety first movement results from the cumulative effects of combined efforts through the activity of these committees. Although the operating man was doing all that he could toward the elimination of sources of danger, he realized that there was still much to be done before operation could be free from injuries and damages. He knew that he must have greater co-operation from the people of the community in which he operated. In the safety committee he finds the means for obtaining this co-operation, and the greatest value of the safety first movement will result from the development of this co-operation.

Mr. Sullivan stated that every now and then one of his men does something wrong wilfully in the operation of a car. He stated that his plan in such cases is to make the offenders feel just as unimportant as possible. This procedure he found more effective than a positive punishment. Mr. Sullivan believes that the policy of safety first committees in promoting public safety should be developed from this principle of forcing offenders to feel their unimportance. The safety first movement has just started and the work before the safety committees is vast. When it is accomplished everyone who commits an act against public safety will feel his insignificance.

SAFETY FIRST FROM THE PUBLIC'S STANDPOINT

The side of the public was stated very frankly by H. T. Warner, managing editor of the Houston *Post.* He said that the public is the prime consideration in the safety first movement, but the public does not always consider its own safety, in fact a very considerable minority pays no attention to the matter.

THE HEEDLESS PART OF THE PUBLIC

The members of this minority know that the safe rule is not to take a chance—but they do it just the same and laughingly dismiss the idea of the danger in which they had placed themselves. Most individuals do observe the safety first principle as a general thing. They do it unconsciously; it is instinctive with them. The thoughtless, reckless minority who have no thought or consideration for themselves or for others, cause the large proportion of the accidents. They are responsible for the hundreds slain yearly, for the great army of cripples who are a burden to themselves, their kindred and the public.

The bulk of this minority is made up of fools; some with specialties in their foolishness, others simply "all around fools." There are some men and women who are perfectly sane upon everything except this one point. The ass who playfully snaps the "unloaded" gun at another or at himself, may be in everything else an adherent of the safety first principle. He would not climb a ladder until he saw that it was firmly placed, or permit his attention to be diverted while he was at the wheel of an auto.

RESULTS OF SAFETY EDUCATIONAL WORK

Mr. Warner stated that with the progress of the safety first educational campaign there is bound to be an impression upon even this part of the public. In Houston this is apparent in many ways. There are fewer accidents on the streets, in railway yards, in the house. Sometimes a week elapses without a single accident being reported in the newspapers of the city. That is one sign of progress which he has noted.

In the development of this work the public service corporations have begun a public service that will, after it is more fully understood, serve to remove some of that prejudice against them which has been fomented and encouraged by certain enemies of society. Certain individuals and interests have represented to the public that this work is undertaken by the public service corporations as another form of oppression. These individuals are generally in the class which makes its living through damage suits—a class which cannot live long if there be no dead and injured. Their hearts have long since been shrunken by the thought of their income. They make a specialty of securing monetary compensation for the crippled, the widow and the orphan, and then take half or more of what they recover as a reward for their humanitarianism. They gloat when they glance down the list of those dead and crippled in an accident. An accident means business for them, hence they have reason for misrepresenting the motives back of the safety first movement.

OPPOSITION FROM MERCENARY NEWSPAPERS

Mr. Warner emphasized the offense of the venal press. There are newspapers which wantonly and persistently so abuse and misrepresent all public service corporations that they will not permit their readers to believe that there can be anything good in any movement backed by or indorsed by a public service corporation. They tell their readers that the railroad, traction, electric and gas companies are inspired only by a desire to further nefarious purposes. Reading between the lines, it would even appear that these papers, by their course, advise parents who read their sheets to send their children into danger merely to spite those who are spreading the slogan of "Safety First."

OPPOSITION FROM SELFISH INDIVIDUALS

Another prejudiced class comprises the men and women who think that their liberty is being infringed. This includes the "jaywalker," the man or the woman who wants to cut corners and to cross streets in the middle of the block. They assume that the pedestrian has every right and the drivers and occupants of vehicles none; that the pedestrian is a privileged person merely because he or she is on foot. According to Mr. Warner the city officials in Houston are broad-minded and progressive, and the "jaywalker" is haled into court just as quickly as would be an autoist who ran his machine along the sidewalk or cut a corner and thus endangered the lives of pedestrians.

SAFETY FIRST WORK NEEDS ADVERTISING

The public takes little thought of the many things done to protect it from injury, because it knows practically nothing about them. Many people are surprised to learn of the widespread organization having as its slogan "Safety First"; to learn that the Red Cross Society maintains a specially equipped car and a lecturer to urge railroad men to conserve the interests of the public regarding safety.

The safety first movement needs advertising, but within the past few months a few newspapers have become interested and this interest is spreading among progressive editors.

SAFETY FIRST AS VIEWED BY THE CLAIM DEPARTMENT

The safety movement from the claim department standpoint was presented by H. W. Withers, claim agent of the Houston Electric Company. He described the organization of a safety committee by the Galveston-Houston Electric Railway Company and the Houston Electric Company, made up of representatives of all departments of the two companies; claim, auditing, engineering, maintenance of way, interurban, carhouse, power plant, real estate, insurance and transportation.

ORGANIZATION OF THE SAFETY COMMITTEE

The idea that men in the ranks should report defects and causes of action is not a new one. The organization of the present committee is to provide a channel through which this matter can be handled in a more systematic way, allowing all employees to present suggestions and recommendations for greater safety and improvements in conditions and methods in a proper and orderly manner. The management has always not only invited suggestions but has solicited them, and by the operation of this committee it secures more effectively than before the benefit of ideas and observations of the men who actually do the work on the road. The officials of the company and the men have been brought closer together.

This committee was organized promptly and formulated rules of action, mapped out a line of campaign and elected sub-committees on safety features, office building construction, maintenance of way, power stations, carhouses, interurban railway and transportation. As soon as a safety report is turned in to the chairman of a sub-committee, he immediately sends it to the chairman of the central committee, who in turn sends a copy to the member of the central committee whose department it affects. The central committee meets once a week and all safety reports received since the last meeting are read and reported on. When this committee was first organized it was decided that all sub-committeemen should be elected for terms of three months but, on finding the interest greater than expected, the terms were fixed at one month instead of three.

HANDLING REPORTS

The central safety committee will be a general clearing house for the prevention of accidents and for the correction of all unsafe conditions out of which accidents might arise. Its work is prosecuted in a systematic way, all reports of unsafe conditions and methods being made to the chairman. These are investigated and reports made. Should a report be of unusual importance, it is laid before the management and such measures as each situation seems to warrant are adopted. The department directly concerned in each instance is advised, and asked to cure each fault as it arises and do what it can to prevent a recurrence. For the purpose of record a report is made to the chairman of the central safety committee, showing what steps have been taken by the department to which such matters have been referred. During the fifteen months of its existence this committee has received and acted upon over 1200 safety reports. The receipt of each report sent in by a committee is acknowledged by letter by the chairman.

EXPRESS WAGONS AND THE SAFETY FIRST MOVEMENT

When the safety movement was started, the electric company was having many accidents with vehicles, especially express wagons. The owners of the vehicles were visited and asked for their aid and influence in the safety movement. In every instance their hearty co-operation was secured. As a result the number of accidents involving these companies has been reduced 50 per cent. Several of the larger express companies of Houston posted bulletins in their offices and barns, warning drivers of vehicles and other employees of the results which would follow more accidents with street cars. Since that time one of these companies, perhaps the largest in the city, has not had a single accident. This was very encouraging, in view of the fact that the company operates night and day from 100 to 150 vehicles of all kinds and that in the past not a week went by in which there was not a claim of some kind to adjust with it.

RELATION OF COMPANY EMPLOYEES TO THE MOVEMENT

Mr. Withers stated that the safety movement is being presented to employees from the following standpoints: First, from the human standpoint, appealing to the very best qualities in a man, if for no other reason than to minimize suffering and to eliminate every possibility of a man, woman or child being killed or maimed or otherwise brought to grief through failure to discover a hazard and to overcome it. Second, from the standpoint of selfishness in the primal instinct, self-protection. Third, from the standpoint of loyalty to the company which employs them. In all honesty and fair dealing they should not fail to guard and protect the lives and property entrusted to their care.

While endeavoring to stimulate public interest, the committee is doing everything possible to keep up the interest among the employees. Prizes were offered for the first and second best safety reports received each month, and safety first buttons were distributed. Besides this two very successful banquets were held during the past year. At the last there were three hundred employees present, and they had an opportunity to listen to many interesting talks on safety.

Should a report come in regarding the carelessness of a trainman in the operation of his car, the central safety committee takes the matter up at once, and if the trainman is found guilty and if he proves to be a student or young in the service, he is sent back to the school of instruction, where he is more thoroughly taught the importance of safety and consideration for the general public. Should the case be that of an old employee, he is sent to the superintendent, where the results of his carelessness are fully discussed with him. The result of these efforts has been of wonderful assistance in the operation of the claim department.

STREET VEHICULAR TRAFFIC AND SAFETY WORK

The city of Houston has a good ordinance regulating traffic, but it was disregarded so that it frequently became necessary for a motorman to step off his car to turn some horse's head or to lead a horse from the track. The chief of police has now issued special instructions to all traffic officers to see that this ordinance is complied with, to the benefit not only of the claim department of the Houston Electric Company but of the general public as well.

The automobile, another important menace to safety, has not escaped attention and is handled thus: Each sub-committeeman has instructions to secure the number of an automobile that is seen to run past a standing street car at a high rate of speed while passengers are being discharged, or is otherwise carelessly driven. This number is then turned in to the chairman of the central safety committee, who sends out a form letter citing the date, time and place of the exhibition of carelessness. The sending out of these letters has accomplished a great deal of good and has resulted in the receipt of a great number of favorable replies, thanking the company for calling attention to this hazardous practice and assuring hearty co-operation in this movement. The reports regarding carelessness in driving vehicles are filed, and the claim department often finds valuable information in this file because, when a claim is made by an automobile owner for damages, the claim department looks up the records and in many instances finds reports that have been sent in on account of this particular owner's carelessness.

SAFETY AND THE CHILDREN

Another dangerous condition in street railway operation is due to the practice of allowing little children to play in streets. To offset the negligence of parents, all safety committeemen and other employees were instructed to get the name and address of each child seen playing around the cars or on the streets so that a member of the committee could call and express to the parents the great danger of this practice. The committee has, during the past year, distributed among the school children of the city over 20,000 blotters with various safety first slogans printed on them, and during the month of January secured the services of a moving-picture film and had it run for a week in a moving picture theater. The title of this film was "The Dangers of the Street." Over 20,000 tickets were given to children and their parents.

THE ELECTRIC LIGHT AND POWER SIDE OF THE SAFETY FIRST MOVEMENT

The relation of line and power house construction to the safety first movement was described by F. N. Lawton, manager Wichita Falls Electric Company. He stated that in the prevention of accident on the power side of the business the natural intelligence of the workman is an important factor. Upon this intelligence and the faculty to grasp the causes of accident depends largely co-operation with the company in applying rules. Several causes enter into an appreciation of the risk of accident; the man's natural intelligence, age, experience, and desire and inclination to be obedient to the rules of the company. The duty of every company is to announce to its employees its policy and rules for safety.

FURNISHING MEN WITH SAFETY FIRST INFORMATION

Mr. Lawton's company posts general notices of instruction and warning and in addition has tried to eliminate as far as possible all dangerous conditions and sources of accident at power houses and other points. Protective guards have been placed around the moving parts of machinery, such as flywheels, belts, pulleys, gears, etc. Where objection is made to guards of this kind on the ground that considerable time is lost in removing them in the event of trouble with the machinery, they may be set in sockets imbedded in the floor. He enumerated a number of sources of danger and suggested means by which they may be eliminated. Boiler gage glasses sometimes burst and they should, therefore, be powerfully illuminated so that they may be always in full view. Gage cocks should be equipped with chains so that firemen may operate them from the floor. Steam valves should be located in accessible places to avoid the risk which would otherwise be taken in reaching them. These valves should either be operated from the floor or from platforms supplied with guard rails. Stairways leading to basements, condenser pits, hot wells, etc., should have railings and should be well illuminated. In fact, the proper lighting of the whole power house is of prime importance from a safety standpoint. Some auxiliary system of lighting should be provided to insure safety in case the regular system is out of commission.

PROTECTING THE LINEMEN

Mr. Lawton stated that in his department linemen furnish most of the serious accidents. Danger to linemen may occur by careless operation of switches in the power plant when men are working upon the line. Safety first switchguards will reduce this danger. Many linemen are young and they are frequently of a reckless disposition. There seems to be a feeling of pride among them as to their ability to place themselves in dangerous positions and to handle live wires in a dangerous manner, especially when anyone is looking on. There is also a deep-seated disinclination on their part to use rubber gloves. In making a selection of men for line work, therefore, only those who are sober, intelligent, competent, and who show a willingness to exercise care and to obey the rules of the company should be selected.

The company should always instruct the linemen fully in regard to the distribution system. Mr. Lawton's practice is to have large maps placed upon the wall showing all circuits plainly marked in colored ink. These maps indicate various junction poles, oil switches, lightning arresters, transformers, etc. The linemen are required to study these maps.

In his paper Mr. Lawton gave considerable attention to the subject of making pole lines safe. His own lines are constructed with a view to making them so. Among the elements of safety he mentioned the use of wires of liberal size, proper spacing of the wires on the poles, the separation of high and low tension wires, the location of ground wires on poles, the securing of good grounds for such wires, the mechanical protection of the ground wires, and the general design of the pole layout so that there is no undue necessity for a lineman to come into dangerous proximity to high-tension wires. Mention has been made of the difficulty of compelling linemen to use rubber gloves. The gloves are stiff, clumsy and awkward to use, they wear out quickly and are difficult to maintain in safe condition. Mr. Lawton has arranged a bag to be hung on the lineman's belt for the purpose of carrying the gloves without hampering him in his work. Many fatal accidents have occurred which would have been prevented if the men had used their rubber gloves, but not having them at hand they took chances.

In conclusion Mr. Lawton urged everyone to give the safety first movement enthusiastic co-operation, with a view to developing in all concerned a true sense of responsibility.

POLICIES TO BE USED IN DEALING WITH THE PUBLIC

"The Public Policy of Public Utility Corporations" was the title of a paper by F. R. Slater, general superintendent Texas Power & Light Company. He called attention to the fact that the relations between public utilities and the public are as delicate, as essential and as complex as is the nervous system of the human being. The public utilities must accept the fact that they bear the same relation to the public as all other legitimate enterprises, they exist for the purpose of rendering service for which they receive payment varying with the number of persons to whom their service is acceptable. Like all other business concerns, it is frequently necessary for them to render service which, on the face of it, represents a distinct and heavy loss. They do this in the belief that the service thus rendered will meet with an appreciation which will eventually develop into profitable business.

ATTITUDE OF EMPLOYEES TOWARD THE PUBLIC

The ordinary public service patron has very little, if any, concern about franchise rights, public ownership and the other larger problems affecting the industry. The treatment he receives from the corporations' employees is personal. The executive officers of the companies he seldom, if ever, sees. The visible part of the corporation is the employees with whom he comes in frequent contact; if these are courteous, if they show consideration, if they are inclined to recognize his rights, it is the company that receives from him most of the credit. Mr. Thomas Duncan, chairman of the Public Service Commission of Indiana, says: "Of all the complaints that come to the commission few of them are against the conduct of the managers of the companies. The chief complaints arise from the insolence of employees." Petty incivilities and slight neglects are not permitted among employees of mercantile enterprises because a great deal depends upon first impressions. Public utility corporations should demand the same policy of their employees. Civility is one of the essentials of business, private or public.

ATTITUDE OF THE EMPLOYEE TOWARD HIS COMPANY

Too much emphasis cannot be placed upon the necessity of the proper attitude of the employee with reference to the work in which he is engaged and to the people with whom he comes in contact. His attitude toward his fellow employee, based on the example furnished him by his superiors, will in a large measure determine his attitude towards the company's patrons. Loyalty to the organization he is associated with is one of the first requisites for success. "United we stand" should be the slogan of corporate effort. This means mutual effort between officer and employee. Each employee, be he officer or private, needs the co-operative support of not only his superior officers but his ranking equals, and especially does he need the respect and support of his subordinates.

To attain high efficiency, one must possess that most valuable attribute—dependability. To be dependable —to be singled out as one who does things—is a tremendous asset. A man may be faithful or industrious or even capable, and still not be dependable. For the faithful man may be incompetent; he who is capable may possess erratic tendencies which minimize his efforts, and the industrious man may be a blunderer. But the dependable man is he who can at all times be depended upon to do that which is set for him to do as it should be done. He has learned by experience how not to do things, and with this has come naturally the knowledge of how things should be done. Like every other quality, dependability can be acquired. Like everything else that is desirable, its acquisition requires effort.

Responsibility for the character of relationship existing between the employee and the official rests primarily with the official. He is the leader, and his attitude to a large extent determines the dominant spirit in the rank and file. If the utility manager expects to get from his employees that co-operation which he desires, he must extend to them the same consideration for their rights, the same fairness, the same humanitarian consideration that he expects shall be shown his patrons. More adverse public criticism can be created by disgruntled employees than in most any other way. This is especially true in cases of personal injury. A humanitarian treatment in these cases will do much to make friends for the company.

EDUCATING THE PUBLIC

The development of public utilities has been so rapid that the public and laymen generally know little about it. It then behooves the utilities to exert every effort to educate the public to a proper understanding of the business. It is impracticable to educate the public as a mass, but if enough individuals be educated the whole public will finally become so. This can only be accomplished, however, through broad, carefully planned campaigns, carried forward through the technical press, monthly periodicals, daily press and personal effort with patrons. It cannot be accomplished in a day, or probably in a year, but it must be accomplished before any material improvement in the attitude of the public can be hoped for.

People everywhere and always, by natural instinct, are seekers after truth. No more just or fair tribunal can be secured than the mass of the people, provided they can make their decision with a full knowledge of the facts. The want of knowledge breeds suspicion.

MAKING THE NEWSPAPER AN ALLY

In the relation of the corporation to the newspaper is a power which can be made an asset if the problem is given intelligent attention. The reporter is the one who has the ability and the opportunity to put thoughts into the minds of thousands of men and women every day, the people from whom we derive our revenue; the people who select those who make the laws which govern us; the people who sit in judgment upon our acts and behavior. This is a power whose importance can hardly be overestimated. The reporter who consciously or unconsciously wields this power must be of good character, with a keen and analytical mind, and further must possess the ability to make friends. This reporter, in his every-day work, is continually coming into contact with the manager and the company representatives, and he is actively interested in all live questions and occurrences. It is a serious error, therefore, if he is not given respectful attention to the end that a bond of confidence may be established. Thus the story which he is preparing will give facts.

In course of events accidents affecting the public, either through bodily injury or inconvenience, will occur. The attitude of the company officers toward the press at this time is of the greatest importance. If the situation is handled from the viewpoint that the occurrence is purely a company affair, every mouthpiece of the corporation may be closed to the newspaper. If, on the other hand, the situation is handled from the viewpoint of one who realizes that the public is entitled to at least a word of explanation, the reporter will be given such information in such a way that the account of the accident will be written in a spirit of fairness. He will not so shape what he says that everyone who reads it will instantly jump at a conclusion that the company wishes to avoid; he will not set in motion in thousands of minds a destructive current of thought. The first impression is an all-powerful factor in all of the subsequent thinking that is done with reference to that event, and the company which does not improve the means to have these first impression at least fair, is missing a large opportunity.

There is an inherent belief in everybody that where there is fear there is wrong, and thus the repeated statement that a company is keeping something under cover poisons the public mind against it. Public opinion to-day may not be newspaper opinion, but it is the creature of newspaper opinion. Public knowledge is disseminated through the press, and it is on the facts as they appear in the news columns that public opinion is based. We may deny and decry the power of the press, but as long as people read newspapers they will be influenced by them.

HANDLING COMPLAINTS

While the newspaper publicity, both in advertising and in the news columns, will go a long way toward the ultimate end of making the public the company's friend, there is a great deal to be done along other lines. To establish public opinion in favor of the company it must demonstrate that it wishes to remove all possible causes of complaint. Honest effort and sincerity of purpose will make friends every time, and this is true either as to corporations or the individual. Complaints give a picture of the company from the outside, and disclose weaknesses and imperfections which might otherwise remain undiscovered or neglected. Likewise, many valuable suggestions for improvement in service often come from the public. When a patron calls in person to make a complaint, much diplomacy is required. He has usually called at some personal inconvenience, and not infrequently has recited to himself so many times his grievance, real or fancied, that he is on the point of exploding when he gets to the company's office. If a complaining patron can be pacified, and at the same time be shown that an endeavor is being made to remedy the situation he has brought to attention, he is likely to prove a live friend of the company ever after. Much adverse public sentiment with which corporations have to contend could be dissipated if systematic attention were paid to the troubles which individual patrons have on their minds.

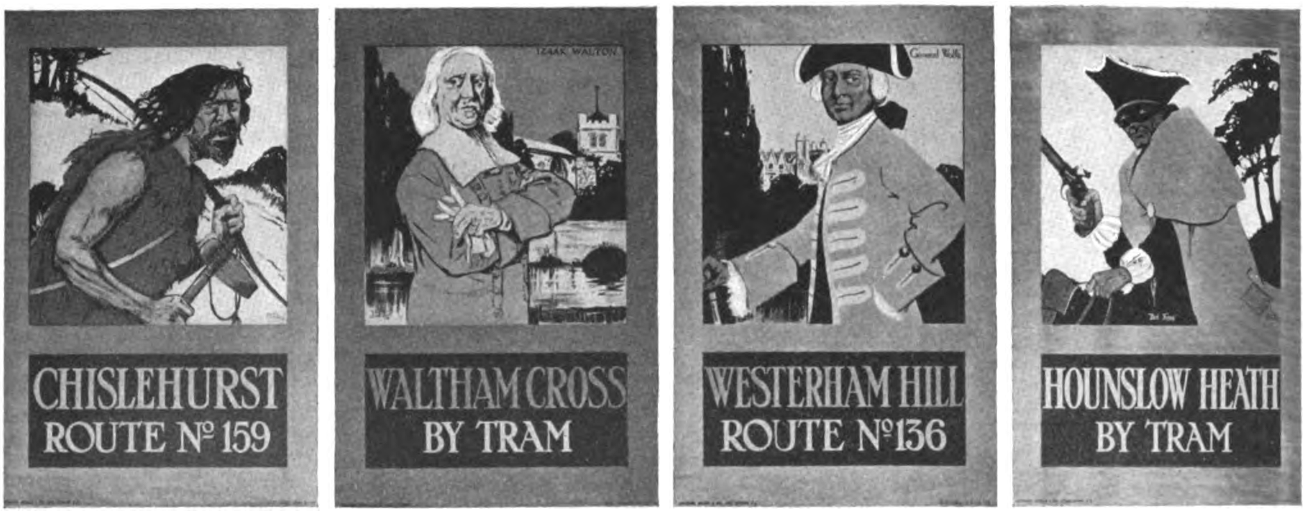
CO-OPERATION WITH THE PUBLIC

No move affecting service or rules relating to the public should be made without giving due notice and explanation to those affected. The manager who would maintain good relations with the public must realize that it is a thinking public. He must realize that in a matter so closely affecting it as does the conduct of public utilities, that it has both the right and the desire to know why. While the rules which govern the conduct of the public utility business are those which govern any mercantile business, at least as far as the public is concerned, there are respects in which they differ. A mercantile establishment can, after it receives its certificate of incorporation, start in serving its patrons without further grants from the city in which it is operating. Before a public utility corporation can give service to its patrons, it must procure a franchise giving it the right to use the public streets and highways. In the past such matters were sometimes taken up with politicians, and not infrequently alliances were made with the political bosses without much regard to the wishes of the public at large. The public utility operator who nowadays relies upon political bosses to help him in franchise matters or in controversies with the public, leans on a frail reed. Alliance between political powers and service corporations goes contrary to the general view. This alliance alienates friends of the corporation and weakens the real good it does and the genuine merit of its cause.

There is no reason why any company should hesitate to tell the public exactly what it needs and wants and what it will give in return, discussing the whole matter in a frank, open, business-like way.

The one part of the utility business which is responsible for the greatest amount of friction between the companies and the public is the price to be paid for the service. This question has been the subject of numerous articles in our technical magazines and the subject of discussion at almost every convention. No attempt will be made to discuss this question here. The prices for utility service should generally be left to the natural workings of business economics. The same factors which determine the prices in any mercantile commodity are those which determine the prices in utilities if due regard is had of the peculiarities of the business.

These are some of the points upon which the utility manager must educate the public. Nor is all of the burden upon the shoulders of the public service company. What is true with reference to fairness, courtesy, tolerance and forbearance upon the part of the company toward the public applies just as strongly as regards the public's attitude toward the company. The company is an important and integral part of the business community, and is entitled to the same courtesy, fairness and impartiality that is shown every other business interest.


IZAAK WALTON
General Wolfe
Dick Turpin
CHISLEHURST
ROUTE Nº 159
WALTHAM CROSS
BY TRAM
WESTERHAM HILL
ROUTE Nº 136
HOUNSLOW HEATH
BY TRAM

London Posters—Series Illustrating Earlier Epochs

SPRING POSTERS IN LONDON

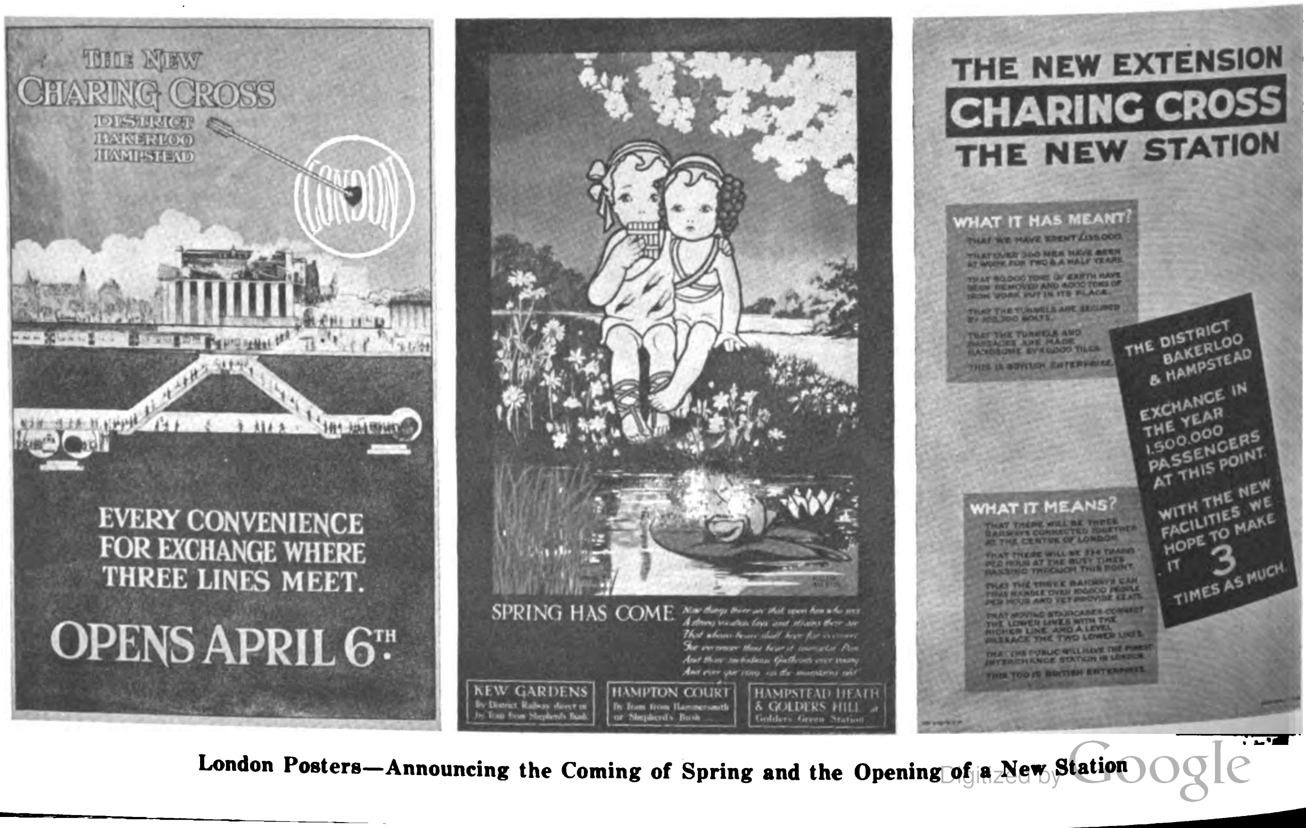
Several articles have been published in past issues of the ELECTRIC RAILWAY JOURNAL containing reproductions of a small portion of the many striking posters originated by the London Electric Railway to advertise its underground, surface car and bus transit facilities.

So many styles of these posters have been made that it would seem impossible to add to their variety and attractiveness. However, the spring crop for 1914 shows that there is no end to the combined cleverness and ability of the London artist and the company's traffic department.

One of the new and original conceptions is to devote an entire design to some one famous person and the locality where he was born or with which he was in some way intimately connected. Those reproduced are General Wolfe, who lost his life at the battle of Quebec in the French and Indian War; Izaak Walton, author of "Ye Compleat Angler" and the patron saint of all amateur fishermen, and Dick Turpin, the famous highwayman, who made Hounslow Heath his particular hunting ground. The "Great Unknown" of the other picture is apparently the really oldest inhabitant of Chislehurst, in fact a man of the stone age. The Englishman, of course, has many more historical associations about places than is possible in a newer country like the United States. For all that, American electric railways rarely take full advantage of the opportunities that do exist for the exploitation of historic localities.

A charming design that any lady would call "cute" is the one entitled "Spring Has Come." The children are appropriately clothed for the occasion, and the boy with his "Pipes o' Pan" is evidently preparing to rival the musical efforts of the frog near by.

The two remaining posters were issued to signalize the opening of the new Charing Cross interchange station which was built for passengers of the District, Bakerloo and Hampstead lines. One of these is pictorial, showing in the most helpful way the various connections by walkway, escalators and bridges, and also a view of the buildings overhead. The other poster presents some significant figures of the cost of the station, its purposes, the amounts of different kinds of material required to build it and of the number of passengers served by the improvement.


THE NEW
CHARING CROSS
DISTRICT
BAKERLOO
HAMPSTEAD
LONDON
EVERY CONVENIENCE
FOR EXCHANGE WHERE
THREE LINES MEET.
OPENS APRIL 6TH.
SPRING HAS COME
KEW GARDENS
By District Railway direct or by Tram from Shepherd's Bush.
HAMPTON COURT
By Tram from Hammersmith or Shepherd's Bush
HAMPSTEAD HEATH
& GOLDERS HILL at Golders Green Station
THE NEW EXTENSION
CHARING CROSS
THE NEW STATION
WHAT IT HAS MEANT?
THE DISTRICT
BAKERLOO
& HAMPSTEAD
EXCHANGE IN
THE YEAR
1.500.000
PASSENGERS
AT THIS POINT.
WITH THE NEW
FACILITIES WE
HOPE TO MAKE
IT 3
TIMES AS MUCH.
WHAT IT MEANS?

London Posters—Announcing the Coming of Spring and the Opening of a New Station

American Association Against Public Ownership in City of Washington

Representatives of the Association Appear Before District Committee of the House of Representatives to Protest Against Bill Providing for Public Ownership of Electric Railways in the District of Columbia

A series of hearings requested by the American Electric Railway Association on the Crosser bill providing for acquisition by the District of Columbia of the electric railways in the District began before the District committee of the House of Representatives in Washington on Thursday, May 21. The hearings resulted from a request made by Gen. George H. Harries, past-president of the association, at the hearing on the same subject which occurred before the committee on May 13. At that hearing, as reported in last week's issue, arguments were made by Clarence P. King, president of the Washington Railway & Electric Company, and Thomas N. McCarter, president of the Public Service Corporation of New Jersey.

Directly after requesting the committee on May 21 for time in which to arrange for witnesses to appear on behalf of the association, General Harries came to New York and consulted with C. Loomis Allen, first vice-president of the association. Conferences were also held with other leaders of the industry and a program was arranged. The matter was also taken up with representatives of the National Electric Light Association and of the public policy committee of that association, as it was felt that the matter was one which concerned the electrical industry as well as the electric railways. The fullest measure of co-operation was extended by representatives of the National Electric Light Association. Although the time allowed was so short that some of the electric railway representatives who would have appeared were unable to arrange to go to Washington this week, a comprehensive representation was outlined. In the preliminary and telegraphic communications on the subject, members of the committee on federal relations of the American Electric Railway Association were consulted in regard to the matter, and it was agreed that every effort should be made to present the standpoint of the electric railway industry concerning the pending bill as fully as possible.

General Harries was in New York during the week, and Secretary Burritt of the association also devoted himself to the matter. The general result of the conferences was that it was felt that arguments should be presented by the association before the committee on the ground that the bill proposed a change in national policy of far-reaching importance.

When the hearing was called to order before the committee on Thursday morning, General Harries introduced the subject briefly by stating that the American Electric Railway Association desired to be heard. As the committee was able to devote only one session to the bill on Thursday, one witness testified, and the testimony of others was deferred until the following day, when another hearing was arranged.

TESTIMONY OF MR. KERR

W. D. Kerr, director of the Bureau of Public Service Economics of New York, the only witness to give testimony on May 21, explained at length the scope of activities of this bureau. The bureau was supported, he said, largely by its own activities. It issued books and pamphlets, and advised public utility companies in matters affecting their public relations. It was devoted to the general welfare of the industry, and was equipped to provide representation at hearings. Mr. Kerr had been asked to assist the association, and was ready to do so because it had been organized in order to subject public relations of the companies to closer analysis.

To a considerable extent, Mr. Kerr said, public relations of the companies had been neglected. The bulk of the energy of the officials of the companies had been devoted to the upbuilding of the physical side of the business. They had not subjected their public relations to the close analysis and study which these relations required. Dissatisfaction of the public with the relations of the companies and their communities had some foundation in fact. It behooved the companies to study and analyze all of their affairs which had any bearing on the large question of public relations, and to do their utmost to rectify anything in these conditions which was not satisfactory. The bureau wanted to assist in finding what the causes of dissatisfaction were and to help to ameliorate conditions that needed change.

Mr. Kerr said that the bill providing for ownership by the District of the electric railways that served it was important from three standpoints, as follows:

First, from that of the city of Washington and the District, the residents of which were most vitally affected.

Second, from that of the residents in the territory in Virginia and Maryland, immediately adjoining the District, who would be directly affected if the bill became a law.

Third, from that of the country at large. The bill was not on a plane with a similar measure that might receive consideration in any other city. It was important because whatever legislation was enacted in the District of Columbia was likely to be regarded as expressive of national policy. It was not the national policy of the country to municipalize its utilities.

MUNICIPAL OWNERSHIP NOT THE COUNTRY'S POLICY

Continuing, Mr. Kerr said that the principle of municipal ownership had not been adopted in regard to electric railways by any municipality in the country. It was manifest that a community could not exist without transportation and that the value of this facility in any city was far beyond representation in dollars and cents. The social value of the electric railway was very large. Much of the agitation concerning electric railways was founded to a large extent on the social value of transportation, on efforts to bring transportation more closely within the reach of the public through reduced rates. It was plain that if the community desired to support the electric railway utility, and to operate it without regard to expense, it could give more service and better rates than if the system was entirely self-supporting. In order to make up the deficit from operations of the electric railway it would take funds from other sources. However, such projects had not been based entirely on the social aspect in this country, but were on a commercial basis. The bill as drafted provided that the District of Columbia should acquire the property and operate it on a commercial basis.

Mr. Kerr said that he was really interested in the bill principally from the standpoint of the country at large. The District of Columbia and the government were united in the management of the territory in which the Capitol stood, and other municipalities might try to follow their example with disastrous results. It was worth while to examine the basis of municipalization of street railways in foreign countries. Mr. Kerr then reviewed the experience with tramways in the United Kingdom. This experience, he said, was cited frequently as favoring the adoption of the policy of municipal ownership in this country. However, the policy of municipal ownership in England arose from a combination of circumstances which could not be found and would not be found in this country.

In support of his argument, Mr. Kerr quoted the book of Robert P. Porter on the "Dangers of Municipal Ownership." He spoke of the difficulty of procuring enabling legislation until 1870, when the tramways act was passed. Electric tramway development in England has been retarded by legislation there, but there had been reached in electric railways in this country a very high state of perfection. The industrial and legislative conditions in England which led to the passage of the tramways act had not been experienced in this country. The progress of electric energy as a motive power in the municipalities which acquired ownership in England had been very slow. The interests of the municipalities did not lead them to develop beyond their borders. They did not build up outlying territory or provide service that enabled the people to live in this territory. Communication between the systems of different municipalities was difficult to arrange. Private capital had to take the initiative.

COMMUNITIES EXPAND

Mr. Kerr asked what community in this country was willing to consider itself merely a self-contained body. What community was not anxious to bring in its neighbors, to carry on a policy of expansion? Systems had not expanded with municipal ownership in England as they had with private ownership in this country. There was no parallel between the special circumstances that led to municipalization in England and the conditions of development in this country.

Cities of the United Kingdom, Mr. Kerr said, were confined in area and were built compactly. Cities in this country covered a great area and contained large stretches of undeveloped land with suburban districts which permitted people to have the benefits of country life with business in the city. The policy here was to extend the cities over a wide area on account of the social results obtained through decentralization of the population. The problem of companies operating electric railways in cities of this country was to expand at a rate sufficiently rapid to meet the requirements of a growing population.

Mr. Kerr quoted from the report made by James Dalrymple, manager of the Glasgow Corporation Tramways, after his return to Glasgow from the trip which he made to this country in 1913. He said that conditions in foreign cities were vastly different from those in the cities of this country. He said that the question should be judged here on a commercial basis, rather than on a social basis. The English system had not given satisfactory results, and in many cases resort was had to the public treasury in order to overcome the deficit arising from the operation of the property.

MUNICIPAL VS. PRIVATE OWNERSHIP ABROAD

In comparing private ownership of street railway systems in the United States with municipal ownership in Great Britain Mr. Kerr cited figures to demonstrate that British cities have less than one-fourth of the electric railway facilities, per capita, afforded by the privately owned systems in the United States. He declared that the governmental ownership of electric railway systems in the English cities had paralyzed their growth and hampered their progress in a way that would not be tolerated by American communities.

He also pointed out the similar experience of cities in Germany and elsewhere on the continent. He quoted an analysis of conditions surrounding forty-one electrical municipal plants in Germany in comparison with fifteen privately owned enterprises to show that while the installation costs of the latter per unit of output were higher because of more extensive transmission systems, their output per unit of investment, their average price, and their unit expenses were lower. Wages and salaries, according to this analysis, were higher for private than for public plants.

He declared that municipal operation of street railways in Germany had been abandoned to a great extent because of losses incurred in operation. He cited Yves Guyot, former minister of public works in the French cabinet, as authority for the statement that out of thirty-six German municipal tramways, only nine were operating without loss and eleven recorded heavy deficits. He declared that in Germany to-day there was a marked evolution toward private management, the city retaining the ownership of the enterprise, but contracting with private corporations for its operation.

The seriousness of the commercial aspect of public ownership of electric railway systems in this country, declared Mr. Kerr, could not be too strongly emphasized. Commercial success, he pointed out, meant conducting electric railways in such manner as to meet all current operating expenses, as well as the charges for depreciation, obsolescence of plant and equipment, interest charges on money borrowed and dividends on stock sufficient to maintain the credit of the company on a plane high enough to finance needed extensions. Enormous sums, he pointed out, have been invested in service in the District of Columbia, and future requirements will be as great as those in the past. Municipally owned companies in Great Britain, he declared, have never been compelled to meet requirements for such great extension of service as have marked the progress of American systems. Mr. Kerr's main argument was made to demonstrate that the system of public regulation of private enterprise was preferable to municipal ownership.

STATUS OF REGULATION HERE

The United States, declared Mr. Kerr, had developed in the last twenty-five years, but particularly in the last decade, a system of such public regulation unlike any other in the world. This system, he argued, was adapted to conditions that existed here. The distinguishing feature of this system, he pointed out, was the power which it conferred on administrative boards subject only to constitutional limits concerning confiscation, to fix absolute standard of service for private companies and absolute rates to be charged by them.

Such commissions, he told the committee, have already been established in the District of Columbia and in Arizona, California, Colorado, Connecticut, Georgia, Idaho, Illinois, Indiana, Kansas, Maine, Maryland, Massachusetts, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington, West Virginia and Wisconsin. In other States, he told the committee, commissions had been provided to regulate public utilities other than street railways, so that the principle of public regulation of privately owned public service utilities has been adopted in Legislatures in all but three States. Because of this general acceptance of this system, he declared, the burden of proof should rest upon those who tried to demonstrate that municipal ownership was the better method of handling this problem than control through public service commissions.

"Regulation is not management," insisted Mr. Kerr. "It is less than management, because it is free from responsibility for result. Regulations prescribe the conditions that are to be met, management finds the way to meet these conditions."

Mr. Kerr presented figures showing the operation of foreign telephone systems, to show that the government-owned service there is not equal to the privately owned enterprises in the United States. He quoted one European authority as excusing the weakness of federally operated service because in the government's system inefficiency alone is not sufficient to warrant the discharge of an employee. Some serious offense was necessary to separate an employee from the payroll.

Mr. Kerr also pointed out the conditions of American highways as an example of what government ownership and control meant in matters of transportation. He declared that it needed no demonstration to convince anyone that the country roads of the United States cannot compare to what they would be if they were handled by private enterprises. He pointed out that it cost 0.7 cent per ton mile for railroad freight, while it cost 25 cents per ton mile for similar transportation on a country road. The difference, he declared, was significant of the difference between government and private enterprise.

Mr. Kerr took up at length the decisions which have been rendered by public utilities commissions throughout the country to show how completely they are meeting public demands for better service conditions.

The most extensive investigation of an electric railway made by a public service commission, Mr. Kerr declares to have been that made by the Wisconsin Railroad Commission in Milwaukee. Since 1908 the Milwaukee system, he said, had been under the continual supervision of that commission. He filed with the committee orders of the commissions of Arizona, California, Idaho, Missouri, New Jersey, New York, Maryland, Ohio and New Hampshire to show the great variety of subjects dealt with.

"These cases," he declared, "are illustrative merely of the kinds of matters which are being determined by public service commissions. Their range covers practically the entire field of service—rates, franchises and capitalization. The Public Utilities Commission of the District of Columbia has substantially all the powers of these commissions, or, if it does not, it may have them so far as they are applicable to the situation in the District."

ATTITUDE OF COMPANIES TOWARD REGULATION

In reply to a question by Representative Igoe of Missouri Mr. Kerr declared that from his contact with the managers of public utilities he found a general acceptance, not only of the desirability of government regulation but of its necessity. Mr. Igoe asked him if this was not because they merely preferred it to the public ownership idea. Mr. Kerr declared he thought they took a broader view and that they felt that their private companies could give the public better service than publicly owned enterprises.

He pointed out also the rapid strides that are being made in electrical matters which only private enterprise could meet and which public ownership would find it difficult to follow. He emphasized the fact that the electrical art is only thirty years old.

Representative Igoe then wanted to know if these managers of private enterprises would not prefer to be independent, instead of being compelled to bow to the decrees of commissions. Mr. Kerr declared that that would be only human, but insisted that these managers admitted the necessity of public control, because any group of individuals, immersed in any business, would not give the same results if left free which they would give if supervised.

Mr. Igoe also wanted to know whether these managers were ready to accept control of stock and bond issues by the same commissions. Mr. Kerr declared he had found the same difference of opinion among them on this subject that he had found in the public generally. He pointed out that while such control of security issues might have its advantage in its initial protection to investors, it might also result in keeping a commission from later reducing rates to impair the value of securities approved by the commission.

"There is nothing in the entire field," declared Mr. Kerr, "from the standpoint of the public which cannot be obtained through public regulation. If the United States government is not equal to the task of securing for the people of the District adequate service at reasonable rates, by means of public regulation, the United States government will not succeed in the successful operation of these facilities."

In discussing the relation of public ownership and labor Mr. Kerr quoted an address of H. T. Newcomb of Washington, D. C., in which the latter declared that when the government engages in industry on a large scale the condition of its employees naturally and inevitably degenerates to that of slavery, that governments do not advance wages with the increased cost of living, that democracy is an arbitrary employer, that public employees are not allowed to seek betterment for their conditions, and that public ownership involves compulsory labor.

Mr. Kerr also argued that the movement for municipal ownership has not gained a strong foothold in the country and that it has been checked to a great extent by the era of public regulation. He presented the report of a special committee of the Board of Trade of Camden, N. J., opposing the establishment of a municipal electric lighting plant. This report was based upon the success of the Board of Public Utility Commissioners of that State in dealing with successive rates and inequalities of service. He also presented a similarly unfavorable report of a special commission that investigated the same kind of a project in Syracuse, N. Y.

AN EXAMPLE IN CANADA

Mr. Kerr devoted considerable attention to the extensive public ownership hydroelectric project in Canada. He presented figures to show that bond issues totalling $5,650,000 had been issued on an original estimate that the work would cost $2,750,000. But on the bond issues themselves there were discounts of $951,765, approximately 20 per cent of their net proceeds. Besides this it was found necessary to spend $1,000,000 more for a steam reserve plant and an additional $1,000,000 of bonds must be issued to provide working capital for the project. This means a total outlay of $7,500,000 on an enterprise originally scheduled to cost $2,750,000. Out of all of this, he declared, less than 30 per cent of the population receives any benefit whatever in the way of reduced lighting rates, and the reductions are far less than the burden of taxes thrown upon the province.

Mr. Kerr also pointed out that one great peril of municipal embarkation in enterprises of such magnitude lay in the fact that with the debt limits imposed upon American municipalities, it frequently crippled their activities in other ways.

Mr. Kerr then referred to the weakness of governmentally owned utilities in meeting public demands.

"We seem to accept from the government, without complaint, poor service that we never would tolerate in a private enterprise," said Mr. Kerr. "Public ownership of a monopoly is pernicious in that it is subject to no regulation. From the very nature of things it is a law unto itself. This freedom from regulation is not so serious a matter when the public undertakes a service for the social advantages that accrue to the public at large; but where the balance-sheet test is applied, experience with unregulated monopoly does not promise well. Public ownership lacks the initiative and the aggressiveness that comes with self-interest. Public administrative officers for the most part hold office for periods of from two to five years. The term of office of District Commissioners is three years. The legislative bodies which ordinarily determine the policies are constantly changing their personnel, and the policies are subject to just as rapid changes. In the conduct of a service which has reached its maturity in an art whose stability is established, this may not be so serious a matter, but we are constantly confronted in this country with the failure of government agencies to keep pace with the development of educational standards in schools, with the growth of communities, in the supply of water service, with new traffic demands in the case of streets and highways, and variously in other departments of the public service."

If the electric railway companies in the District of Columbia, declared Mr. Kerr in concluding his testimony, were not furnishing adequate service at reasonable rates, the United States government has the power to compel the improvement of the service and the reduction of rates. The same, he declared, was true of New York, Philadelphia and other cities. He said the power was vested in the government to provide the regulation necessary to compel the best service for the public. But he insisted that this difficulty would never be solved by going over to public ownership. If the country was not able to regulate, it was not fitted to own. This, he insisted, was a matter of vital interest not only to the District of Columbia but to the country at large.

PROTEST FROM MAINE

Representative Asher C. Hinds of Maine presented a statement to the committee, declaring that he appeared before it to voice the protest of William M. Bradley, a representative citizen of Portland, against the entire project outlined in the Crosser bill. Mr. Hinds, however, said that he was not ready to appear against the bill as the representative of the people of the first district of Maine, that he did not know their views and that until the committee has reported the final draft of the bill he would not be ready to announce his judgment concerning the measure.

FURTHER HEARINGS

At Friday's hearing General Harries was the only speaker. Further testimony will be heard next Tuesday.

TESTIMONY OF MR. CRAWFORD

N. McD. Crawford, president of the Reading Transit & Light Company, Reading, Pa., who testified before the committee on May 14, has sent a written statement to the committee and has asked that it become a part of the record. It is in amplification of his views expressed in oral testimony. Mr. Crawford first described his railway experience and his connection with the investigation of British municipal tramways, conducted in 1906 by the National Civic Federation. In this investigation Mr. Crawford was associated in his study of the British tramways with J. H. Woodward, chief engineer for Sir William Preece and Company, of London, England. Continuing the statement said in part:

"At a recent meeting of the Municipal Tramways' Association of England, W. W. Beaumont, technical adviser to the Commissioner of Police, of London, stated that about 26 per cent of the tramways of Great Britain, from the report published by the *Tramway and Railway World*, are either making no profit or are calling upon the rates to make up the deficiencies. F. Smith, of the Liverpool Corporation Tramways Committee, stated that there is great likelihood that the tramcars would be handed over to commercial people, to be run as a commercial proposition.

GLASGOW TRAMWAYS' CONTRIBUTION TO TAXES

"In a recent address by Arthur Williams, of New York, it was stated: 'The mileage of the service, is approximately half of such cities as Boston and Brooklyn, where the population may be compared with Glasgow. The investment of the public money in the tramways is $17,500,000. The average fare paid on the "zone" system is between 3 and 4 American cents. Those living in the suburbs, however, pay in the extreme, twice the American fare for the corresponding amount of service. The wages of the working classes average approximately half our American wages. The contribution of the tram system of Glasgow in the form of taxes averages about 35 cents annually per capita, while in Boston and in Brooklyn the average tax contribution is much in excess of $1 per capita, or more than three times Glasgow's tramway contribution to the cost of conducting the affairs of the city.'

FAILURES OF MUNICIPAL OWNERSHIP IN AMERICA

"Your committee has before it a pamphlet showing 200 failures of municipal ownership and operation in America.

"Your attention is drawn to the failure of the municipal gas plant in Philadelphia, where, under municipal ownership, the prices were high, the service was poor, extensions were most inadequate to meet the needs of the public, and in the last year of operation the deficit approximated $400,000. Under the private operation of this property for the last few years, all of the conditions mentioned above have been reversed. The public has benefited by a series of reductions in price, and instead of an annual deficit, an annual income for the relief of taxes in general has been enjoyed, which for the year 1912 amounted to $1,369,966.

CHICAGO REPORT

"Mr. Dalrymple, general manager of Glasgow Municipal Tramways, although committed to municipal trading, when engaged as an expert by Mayor Dunne and after thorough investigation, advised that in his opinion municipal ownership and operation was not advisable in Chicago.

MUNICIPAL OWNERSHIP LEADS TO BUREAUCRACY

"A recent book written by Yves Guyot demonstrates that every government or municipal enterprise is exposed to political out-bidding of one politician by another and that government employees become electoral factors, so much the more important in proportion to the increase of government and municipal activities. They become the actual masters of those to whom in theory they are subservient.

"In Great Britain the suppression of the vote of municipal employees has been demanded a number of times. In the 'Municipal Trading Report of 1900,' Sir Thomas Hughes, twice Mayor of Liverpool, states: 'The day on which a man becomes the employee of a municipal corporation he ought to have no further voice in the choice of his superiors.'

"The New York *World* states editorially: "Nominally the civil service employees of New York are public servants. In reality they are public masters. The original civil service laws were enacted to protect faithful public servants from political bosses and safeguard the public business from the demoralization of party warfare. We have protected all these employees from the boss, but we have yet to devise means to protect the public from its employees. No corporation would dare take the aggressive stand against public regulation that these civil service employees take. New York has a written charter, but it is only a matter of form. The real charter of New York is to be found in the decrees of 60,000 and more civil service employees, all organized against their employers, the people of New York. They are the despots of our democracy.'

"If the ownership and operation of the street railways in the city of Washington were vested in the District of Columbia, this ownership would of necessity largely increase the number of employees under the control of the district.

BUREAUCRACY RETARDS EFFORT AND ENTERPRISE

"It is certainly a sound economic principle that no government, either national, state or municipal, should embark in a business that can be as well conducted by private enterprise. The fact that many of the undertakings which should belong to the field of private enterprise are controlled by municipal corporations in Great Britain indicates the tendency exhibited by the adherents of municipal ownership to enter into and dominate the field logically belonging to private enterprise. If this tendency, which springs logically from bureaucracy, continues to run wild and is not controlled by saner legislation, the field of private enterprise will be so restricted that the citizen will be left without opportunity for investment and without ambition or aspiration beyond that of seeking employment under the government.

"If the ownership and operation of a municipal street railway or a municipal electric lighting plant is justified, why not a municipal bakery or a municipal department store?

MUNICIPAL PLANTS DO NOT ASSUME ENTIRE BURDEN OF INVESTMENT

"This statement is sustained by the figures contained in a report made by the London County Council, disclosing the absence from the tramway accounts of capital expenditure made solely on account of the tramways, which was ascertained to be not less than $20,224,220, of which only $1,886,300 was debited to the tramway undertaking. The difference was improperly charged to other municipal undertakings controlled by the council.

MUNICIPALITIES SHOULD NOT ENTER INTO SPECULATIVE ENTERPRISES

"It is unquestionably bad economics that a municipality should enter into any undertaking where the profits to be made depend upon speculative conditions, and there is no justification for so doing, either in law or by precedent. Delos F. Wilcox has testified before the committee that if the city is going to control its development at all it has to develop transit along the line of building extensions for the public purposes rather than for a private purpose—'the purpose of making profit out of it.'

"If a municipality should not own and operate a street railway property for profit, it will be difficult to determine the point at which profits commence, i. e., at which the rates of fare should be reduced or the service increased; and anyone familiar to the smallest degree with bookkeeping will realize the difficulty of establishing a fixed amount which will provide for legitimate operating expenses, fixed charges, depreciation, obsolescence and inadequacy, and after which the resulting surplus should be used either in bettering the service or decreasing the cost of transportation.

PRIVATE OWNERSHIP MORE WATCHFUL IN EXPENDITURES THAN MUNICIPAL OWNERSHIP

"While it is certainly true that a municipality could and would secure trained managers, outside of politics if possible, to operate its street railways, it is also evident that there would not be the same watchfulness and efficiency exhibited to avoid useless expenditures as there would be under private ownership, where the expenditures are all carefully watched by the owners, each jealously and efficiently guarding his own investment; because under municipal ownership, by reason of paternalism, any deficit in earnings required to meet operating expenses would be made up from general taxation.

PRESENT SERVICE IN WASHINGTON

"From personal observation it is my opinion that the construction and operation of the street railway in Washington would not be improved under municipal ownership. I find the track and roadway construction is in fine operating condition. The cars are clean and attractive and are operated with even greater frequency than called for by the traffic presented. The employees are courteous and efficient in their departments.

"I find that the estimated population and the number of cars available for operation in the cities shown below are as follows:

	Population	Cars available
Washington	360,000	1,000
Glasgow	1,000,000	623
Liverpool	750,000	494
Manchester	750,000	532
Dublin	448,000	294

"The flat rate system of fares in use in Washington is as liberal in its provisions as in any other city in the United States and is far more liberal than the fares under the 'zone' system, which is in force throughout Great Britain and which tends to restrict the development of the city.

CONCLUSIONS

"In conclusion, it is my opinion that your committee would not be justified in favorably reporting the bill under consideration, for the following reasons:

"Municipal ownership and control is and has been un-American from its inception. It was conceived to meet conditions existing in Great Britain and foreign countries, and even there it has been a failure when compared with private control of like enterprises.

"Municipal ownership and control in its home, Great Britain, is already endeavoring, octopus-like, to embrace and smother all fields of development which should be open to the private individual and investor.

"Municipal ownership and control should not embark upon speculative undertakings, such as street railways, electric lighting, etc., because there is no reason why employees of the people should be allowed to speculate with the funds provided by their employers.

"Municipal ownership and control leads to bureaucracy, and the logical outcome of bureaucracy is the control of the master by the servant and the people by the politician.

"Municipal ownership and control leads to paternalism, and paternalism results in delusive accounting and extravagant expenditure of money derived from the people by taxation.

"Municipal ownership and control is obsolete and indicates retrogression. Governmental regulation is modern and indicates progressiveness."

MEETING OF AMERICAN RAILWAY ASSOCIATION

The spring session of the American Railway Association was held at the Biltmore Hotel, New York City, on Wednesday, May 20. There were present 170 delegates, representing 240 member companies, out of a total of 403 members, operating 272,949 miles of track.

After the reports of several committees had been presented resolutions were ordered to a vote by letter ballot of the association to the effect that the present standard inside dimensions of box cars, viz., 36 ft. in length, 8 ft. 6 in. in width and 8 ft. in height, should be adhered to, except in the construction of special equipment, such as automobile cars, and that special equipment should not exceed the inside dimensions of 40 ft. 6 in. in length, 8 ft. 6 in. in width and 9 ft. in height, with maximum outside dimensions of 9 ft. 2 in. in width at 13 ft. above the top of the rail.

AUTOMATIC TRAIN STOPS

The joint committee on automatic train stops then presented a list of requisites for installations for automatic train control, but reported that replies to a recent circular indicated that not one of the devices which had been tested on a number of roads met these requirements. No automatic train control apparatus, so far as known, could be universally applied without adding elements of danger in train operation, and the expediency of its installation at any particular point had to be determined by all the surrounding conditions.

The requisites of installation for a train control system, as formulated, were designed for application only where the conditions of traffic were such as to justify the use of an automatic block signal or interlocking system which was, itself, so nearly perfect as to indicate that efforts be directed toward the enforcement of obedience to signals rather than toward the installation of additional devices.

SPECIFICATIONS FOR SUCCESSFUL AUTOMATIC STOP SYSTEM

The requisites of installation which were drawn for application in connection with a properly installed block signal or interlocking system included, among other items, clauses to the effect that the apparatus must be so constructed that it would control the train in the event of a failure of fixed signals to give proper indications; to be operative when the engine was running forward or backward; to be effective on that engine only from which the brakes were controlled when two or more engines or a pusher were being used; and to be operative on trains moving only with the current of traffic. In addition, adjuncts to automatic train control consisting of cab signals, detonating signal apparatus, speed indicators and recording devices were specified as being permissible.

DEVELOPMENT WORK ON AUTOMATIC STOPS

A further research and study of the subject convinced the committee that great care must be exercised in working out a system of automatic train control, in order to avoid the introduction of new elements of danger in operation which might offset those they were intended to overcome, and that "the successful stoppage or reduction in the speed of a train composed of many freight cars or of heavy passenger equipment required the exercise of skill and judgment on the part of the engineman in handling the air brakes. If this is improperly done, serious damage to the train and possibly to the track and to trains on parallel tracks may follow. The sudden application of the brakes by an automatic device without the exercise of intelligence in its performance is, therefore, necessarily hazardous." The committee reported also that an inquiry showed that on twelve railroads experiments were in progress with fourteen different devices.

SAFE TRANSPORTATION OF EXPLOSIVES

Among others, the committee on the safe transportation of explosives and other dangerous articles reported that it had attended a hearing at Washington before the Interstate Commerce Commission, to consider proposed amendments to the existing regulations on the subject, and that at the conclusion of the hearing the commission took the proposed amendments under consideration. It was anticipated that within a few weeks an order would be issued promulgating the revised regulations and specifications. The committee also called attention to a statement showing that in the transportation and storage of explosives on railway property during the year 1913, no life was lost and only four slight personal injuries occurred. The total property loss amounted only to $22,048. In 1907 incomplete records showed a loss of fifty-two lives, eighty injuries and a money loss of about $500,000.

ELECTRICAL WORKING

The committee on electrical working then reported, in regard to third-rail working conductor clearances, that it would be desirable to await the action of the various engineering associations interested before making a definite recommendation to the association. With regard to clearances for overhead working conductors, the committee appointed a sub-committee to confer upon the subject with similar committees of the engineering associations. With regard to overhead crossings for power and other wires, the committee reported that the Association of Railway Superintendents of Telegraph had requested that the American Railway Association adopt its "Specifications for crossings of wire or cables, telephone, telegraph, signal and other circuits of similar character over steam railroad rights-of-way, tracks, or lines of wire of the same classes." The committee on electrical working believed that it should take up the subject with the railway engineering associations before definitely recommending any specifications of this kind and had, therefore, appointed a sub-committee to take up this subject with similar committees from the other associations. The sub-committee would also include in the scope of the proposed specifications the general subject of electric light and power line crossings, in order that the final report of the committee would cover the general specifications for all classes of wire and cable crossings over or under railway rights-of-way. The sub-committee consists of J. H. Davis, electrical engineer Baltimore & Ohio Railroad, and E. B. Katté, chief engineer electric traction New York Central & Hudson River Railroad.

At the conclusion of the meeting H. U. Mudge was elected president of the American Railway Association for the ensuing two years. It was decided to hold the next regular session in Chicago on Nov. 18, 1914.

The National Association of Corporation Schools has issued bulletins No. 1 and No. 2, giving officers and members of the society and containing articles of interest on the subject of training of employees. Some of the articles included are the following: "Engineering Schools of Electrical Manufacturing Companies," by Dr. Charles P. Steinmetz, General Electric Company; "Methods of Selecting Men in Business," by F. C. Henderschott, New York Edison Company; "Reasons for the Shortage of Skilled Mechanics," by A. F. Bardwell, Yale & Towne Manufacturing Company; "Report of Sub-committee on Manufactures and Transportation," by Mark B. Hughes, Cadillac Motor Car Company.

MAYORS' NIGHT AT THE MASSACHUSETTS STREET RAILWAY ASSOCIATION

Forty mayors of cities in the Bay State were the guests of the Massachusetts Street Railway Association at a regular meeting and dinner of that organization held in Boston, on May 20. The occasion was one of the most enjoyable and successful affairs that has ever taken place in New England street railway circles.

H. H. Crapo, president Union Street Railway Company, New Bedford, Mass., president of the association, expressed the pleasure of the association in entertaining the chief representatives of 2,500,000 people, and pointed out the important service rendered by the electric railway industry in modern life. Managers are seeking to give the public the best possible service within the limitations of the companies' finances; street railways are not antagonistic to the public authorities, and the desire to co-operate is general. President Crapo pointed out that the Massachusetts laws effectually prevent any street railway from becoming a so-called "money-making" enterprise. More than a reasonably modest return cannot be obtained under the statutes governing the disposition of any surplus. Money has been made in some cases in exploiting and reorganizing properties, but in the ordinary course of business only a moderate return is gained. Nearly 60 per cent of the Massachusetts companies earn no dividends at present. The speaker's opinion was that a city system can be operated to give complete satisfactory service to the public and a modest return to the investor, but under present conditions the suburban and country lines are in a hard situation. He urged the mayors, with the quasi-public officers who are the street railway executives, to study the conditions upon the local systems, and pointed out the evils of pushing the companies too hard, a policy which leads toward bankruptcy or toward impoverished and unsatisfactory service. Citing the Boston Elevated Railway, President Crapo outlined its financial status, emphasizing the point that its permanent investment had increased 400 per cent in the last ten years, compared with an increase of but 55 per cent in gross revenue. The investments have been largely of the non-income-producing type. Only less aggravated conditions exist in other cities. He urged the mayors not to be controlled by civic improvement societies, privileged parties or labor unions, but to make impartial studies of local traction conditions and problems shoulder to shoulder with company managements.

Mayor James M. Curley, Boston, made a powerful speech on behalf of greater justice to the men and women who have invested their money in street railway securities. He said in part: "We have come here to-night for light on the question of a greater degree of justice to street railway security holders. Heavy burdens rest on the shoulders of the street railway men because the general public is unaware of their causes, if not of their existence. Not ten persons in a hundred realize the changed conditions resulting from the use of motors instead of horses, the character of construction necessary to-day compared with formerly, or the limitations of the street railway treasury. The general public needs more light before it will be safe to propose a general increase in rates. The city has its own remedy for increased costs in street and other construction in a higher tax rate, but the street railway is not so fortunate. The latter never will have the opportunity to increase its rates until the public realizes that the companies must have the money to which they are entitled." The mayor further pointed out that in a single snowstorm last winter $60,000 was saved the city of Boston and $30,000 the Boston Elevated Railway by co-operation in removing the snow from the streets instead of shoveling it back and forth, as in older days, from tracks to roadway. Much money has also been saved by conferences of company and city officials in connection with street openings for construction purposes. Others who spoke of the improved relations existing between the companies and the municipalities were Mayors J. A. Dennison of Springfield, O. B. Munroe of Melrose, and T. W. Good of Cambridge. Mayor John F. Hurley of Salem spoke wittily of former and present service conditions, and Mayor W. H. Feiker of Northampton pointed out the benefits of consolidation of operating companies in small cities, also urging that something be done to develop the trolley facilities of western Massachusetts in the absence of a constructive program of the New York, New Haven & Hartford Railroad.

P. F. Sullivan, president Bay State Street Railway, Boston, was the last speaker. He expressed his pleasure at the realization of the first "Get-Together" meeting of the association and said that the remarks of the various speakers are an augury of better times. He outlined the limitations of the street railway fare unit, touched upon the tendency for traffic to outgrow facilities offered, and said that 90 per cent of the men he had known in the street railway industry in Massachusetts had lost money. Rule-of-thumb methods are out-of-date and the work of street railway operation may fairly be called a profession to-day in view of its complexities. It calls for the very best executive engineering and financial ability to produce even a moderate return on the actual capitalization. To-day, the street railway is sensitive even to such apparently remote conditions as the cotton and corn crops. A knowledge of psychology, particularly of crowds, is becoming essential, and Mr. Sullivan predicted that most of his auditors would live to see departments of psychology established in street railway organizations. A finer type of men has been developed in the industry of late years and the electric railway official who fails to carry out a promise to-day is soon ostracized.

Mr. Sullivan sketched the effect of the increased cost of living upon street railways, stating that he could not recall a single construction item which has not risen in cost from 10 to 60 per cent in the last fifteen years. The purchasing power of the nickel is only from 67 to 80 per cent of what it was fifteen years ago, according to authorities. Taxes on the Bay State system are 7 per cent of the gross income now compared with 2.5 per cent twenty-five years ago, and the increase represents $400,000 a year, or 2 per cent on the capital stock. A 3 per cent depreciation charge added to the cost of repairs would total more than the last year's dividends. He spoke in high terms of the work of the Massachusetts Public Service Commission and its predecessor, the Railroad Commission, characterizing the present board as exceptionally well balanced to consider the great problems laid before it and urging more confidence in its personnel on the part of the public. He appealed to the younger men of the industry to keep its banner high and in fidelity to duty, honor and responsiveness to the public to win popular support and a devoted following within the ranks.

The *Boston News Bureau* recently issued a report showing gross earnings of fifteen traction lines selected in all parts of the country, for February of this year and in 1913; and for the two months from Jan. 1 to Feb. 28, 1914 and 1913. The total gross earnings of the fifteen lines for February of this year amounted to $5,263,795, an increase of $790,372 over February, 1913. For the first two months of this year the same systems earned in gross $11,117,787, which was $501,758 more than in corresponding period a year ago.

DEPRECIATION HEARINGS CLOSED AT BOSTON

The Public Service Commission of Massachusetts gave a final hearing on May 18 upon the proposed order of the board relative to the keeping of accounts by railroads and street railways so as to show the methods of providing for depreciation in use by such companies. A large number of counsel were present and the discussion centered chiefly upon the desirability of framing the order in language sufficiently broad to include rate cases and other pertinent matters in addition to the issue of securities. As originally discussed, the proposed order required the companies to show as a part of their case, when applying for permission to issue new stock or bonds, the method by which depreciation has been provided for. Counsel for the Bay State Street Railway Company, the Boston Elevated Railway Company, the Massachusetts Street Railway Association and other electric railway interests were in general agreement that the board has ample power under the Public Service Commission act of 1913 to investigate depreciation accounting and to order the operating companies to set forth any desired information upon the subject, and it was the consensus of opinion that the importance of depreciation in relation to rate cases warranted the formulating of a more comprehensive order than one dealing merely with security issues.

In the course of the hearing Frederic E. Snow, counsel for the Boston Elevated Railway, brought out the point that he had never known any public service commission or corporation to authorize any increased capitalization to take care of depreciation. The Boston company has been criticized more before public bodies and members of the legislatures for the fact that it has had a depreciation fund than for anything else, as the popular impression is that a depreciation fund represents unreasonable profits. Bentley W. Warren, for the Massachusetts Street Railway Association, concurred, stating that a depreciation account is always criticised in rate cases and similar proceedings before the public.

Mr. Warren had advised a client in the past to eliminate its depreciation fund and take care of maintenance by charging it to operation, for the reason that the company was being criticised and that frequent applications were being made for reduced rates because of the large depreciation account then carried. Mr. Snow said that the Interstate Commerce Commission is about to provide that after July 1 a depreciation account on rolling stock shall be kept by all interstate street railways.

Chairman McLeod brought out the point that if the board were to make its orders relative to the approval of stock issues conditional upon a satisfactory showing in regard to the method by which depreciation is handled the board would be confronted with the alternative of making some finding which might be taken as an affirmation by the commission that depreciation had been reasonably handled or else to refuse to allow the issue of the securities. In the chairman's judgment, it would appear in nearly every case that according to any scientific method of determining depreciation and resources for depreciation, an adequate provision had not been made. Mr. McLeod considered this objectionable and liable to hamper the companies in raising new money. As a result of the discussion it was tentatively agreed that the board should issue an order providing that railroads and street railways shall hereafter be prepared to show at any time and in connection with any proceedings, the method by which and the extent to which such corporations provide for the depreciation of their property.

MR. ARNOLD'S REPLY ON ACCOUNTING PROCEDURE

The ELECTRIC RAILWAY JOURNAL of May 16, 1914, contained a reference to a report made by Barrow, Wade, Guthrie & Company, public accountants, to City Comptroller Traeger of Chicago in regard to the methods of keeping the books of the Chicago City Railway under the provisions of the 1907 franchise ordinance. Since that time B. J. Arnold, chairman of the Board of Supervising Engineers, Chicago Traction, has issued a detailed statement taking up each one of the points that was criticised by the accounting firm.

Mr. Arnold's statement calls attention to the fact that he requested the accountants to inform him if they encountered anything that they thought contrary to the ordinances and that the accountants replied to the effect that there was nothing in their report of interest to the board. Nevertheless, the last report of April 28, which the board was unable to obtain until May 11, was so written as to be of vital interest to the board in that it criticised the judgment, and the deductions drawn from it affected the integrity, of its members.

The points criticised in the accountants' report are taken up seriatim and the justice of the accounting procedure followed by the Board of Supervising Enginees is fully shown. The accountants say that the various items questioned by them have operated to place an indirect charge of 31.9 per cent to capital improvement and additions, but according to Mr. Arnold such charges constitute only about 10 per cent, for the accountants incorrectly included in their calculations the items which they did not question. In general, the accountants disregarded the provisions of the 1907 and subsequent ordinances and particularly the unification ordinances affected since Jan. 1, 1914, and criticised what had been done under them from the standpoint of purely general accounting, and even then their conclusions are stated to be questionable.

In regard to the depreciation and renewal reserves, Mr. Arnold observes that the methods adopted by the Board of Supervising Engineers were approved through the recent unification ordinances. The question of the adequacy of the charges to the renewal and depreciation fund is now under consideration by the Board of Supervising Engineers and has had careful study and investigation for many months past. Mr. Arnold calls attention to the fact that the matter of an adequate reserve for damages has been discussed frequently during the past year and the company actually set aside a large percentage to the damage reserve that the board deemed necessary. The question of accounting for the income tax, according to Mr. Arnold, is a point well taken by the accountants but this, too, has been under consideration by the board and no decision has been yet reached. The right of the company to class fines among operating expenses is based upon Section 3 of the unification ordinance and the opinion of the corporation counsel in regard thereto.

It should be clearly understood, Mr. Arnold states, that the Board of Supervising Engineers has been and is absolutely non-political, but that during its past seven years of work it has been annoyed from time to time by those who would make it a political board if they could. This last attack has not been for the purpose of protecting the city's interest but for other reasons better known to the politicians. The decisions questioned by the accountants have been beneficial to the city rather than detrimental. The accountants' report unjustly and unfairly impugns the good faith of the board in the performance of its duties, but it is quite content to rest upon the facts when fairly presented and invites the fullest inquiry.

COMMUNICATIONS

THE COST OF USELESS WEIGHT IN STEEL CARS

L. B. STILLWELL, CONSULTING ENGINEERS
NEW YORK, May 21, 1914

To the Editors:

In your issue of Feb. 7, 1914, you published an editorial entitled "Somnolence in Car Design." The point of the editorial, which was well taken, was that the art of steel car design had passed the pioneer stage and was rapidly developing to a point where standard methods of construction could soon be established. Obviously, such methods must be based on the scientific use of steel in the car-body structure, the form and distribution of the members and their connections being such as to provide for the full development of their strength in order, first, that the protection to passengers in cases of collision or of derailment at high speed may be as complete as possible; second, that the operating cost for power may be minimized by the elimination of unnecessary weight and, third, that the cost of maintenance be kept down by insuring that the strength of structure may be adequate to resist the stresses of service.

The description of a steel car for high-speed interurban service, published in your issue of May 16, offers no explanation of the apparent disregard of the feature of weight. It is not my intention to criticise this car, as full structural details and weights are not at hand, but from a comparison of the published weights of the car, with the known weights of several types of all steel cars in even heavier service, it appears that approximately 17,000 lb. of unnecessary weight is incorporated in the body and trucks.

Aside from the economic loss involved in the operation of a car of unnecessary weight, which even at an assumed rate of 1 cent per pound per year on 17,000 lb. for twenty cars will amount to $3,400 per year, the cost of the excess material must, of course, be included in the first cost of the car. At an assumed price of 10 cents per pound this useless expenditure would amount to about $34,000 for the twenty cars.

While this loss is primarily the affair of the road and not a serious one (the number of cars involved being small) it would seem that in these times of difficulty in meeting operating expenses, and also difficulty of the financing of railway projects, the broad subject of consistent design of steel cars and equipment, including trucks, motive power and brake equipment, is one that warrants further and fuller consideration by those whose business interests are affected by the success of enterprises in the field of electric traction. A great deal has already been accomplished in the reduction of weights by the manufacturers of motors, control, air brake and other motive power equipment in co-operation with the operating and engineering departments of electric railroad properties, but it is apparent from an examination of current technical literature that the subject of steel car design warrants still more careful analysis for the purpose of establishing methods of construction which will minimize weight of structure while developing the utmost strength of all its members.

In this connection an investigation of the behavior of all such steel cars as are now in use will be most fruitful in demonstrating the strong and weak points of various designs in various services.

The operation of the cars described in your issue of May 16 and referred to above, will of course be watched with more than usual interest on account of the motive power equipment being arranged for 2400-volt direct current, and the excess weight of car body must be considered in any analysis of the operating results which may be made in the future. F. M. BRINCKERHOFF.

WHAT CONSTITUTES A REASONABLE RETURN?

SPENCER TRASK & COMPANY
NEW YORK, May 9, 1914.

To the Editors:

The question of what constitutes a proper and fair rate of return on electric railways is so broad that it is practically incapable of a generalized answer. The conditions that confront various public utilities are so different that commissions and appraisers must consider the individual aspects of each particular case. The most that can be said is that the public should recognize that the rates paid must be sufficiently high to afford an operating revenue that will cover the operating expenses, set up a liberal contribution for the assuring of the continuance of service and pay a fair return on the reasonable value of the property at the time it is being used by the public. In valuing a utility property the actual money expended should be considered, with deductions on a proper basis for depreciation. The bond issues outstanding should not be in excess of 80 per cent of this reproductive cost.

In arriving at this cost, intangible assets, such as franchises, going value, overhead charges, developmental expenses, etc., should be taken into account as well as the tangible assets. Bond and stock discounts, franchise expenses and all expenses actually paid should be capitalized. In cities where franchise taxes are paid, the franchises should be capitalized on this basis, for the public should realize that it is eminently unjust to a public utility to assign a value to its franchise for the purpose of assessment and deny to it the right of including it at a similar figure in the basis for rate making. Then, too, when a railway has been conservatively financed and dividends have been passed for a number of years, the money being put back into the road out of earnings, the actual declaration of dividends should not be the determinative factor as to the going value, for early unpaid dividends should be allowed.

In so far as it is possible to set definite rates of return for electric railways, it may be said that they should lie between the limits of 6 and 8 per cent, depending on the age and condition of the property. I believe that the Railroad Commission of Wisconsin has exercised excellent judgment on the question of a fair rate of return, and that its awards are illustrative of a proper course to be pursued by regulatory commissions and courts. A return of 8 per cent seems in its broadest aspects high, but in cases of more than the average or extraordinary investors' risks this limit might well be approached and equalled. These limits for the rate of return are based on a consideration of all the elements of the capitalization of a utility, for no distinction can be made between stocks, bonds and notes. JAMES T. WOODWARD.

BOSTON, MASS., May 19, 1914.

To the Editors:

I have read with interest the abstract of the testimony of Mr. Hockenbeamer, before the California courts, on "Cost of Money to California Public Utilities," which appeared in your issue of May 16. This is a matter to which I have given some attention in connection with my studies in utility economics. It would certainly be very interesting if someone should make a careful analysis of the costs of money under different conditions, starting with a basis of absolute security and building up with different factors representing elements of risk to both investment and return, the effect of discounts payable at maturity, rights, speculative features, and other influences so commonly interwoven in the prevailing security rates. Various writers have speculated on this subject and have given figures which were probably based on some actual experiences. Accurate figures would, however, require a careful study of a large number of market prices on securities of different classes, at different times and in different localities, similar to the tabulation which Mr. Hockenbeamer has given for bonds of California utilities. When the average rate of return required by investors on securities of different classes is determined, the proportion of these classes entering into public utility capitalization must be fixed before the necessary average rate of return to be used in rate cases can be obtained.

In looking over Mr. Hockenbeamer's testimony, I was impressed with the conservatism of his estimates. His tabulation of the bond issues, authorized by the California Commission, shows figures for yearly yield to investors, if held to maturity, which illustrate this conservatism. His total yield is made up of two factors: interest figured on the basis of the actual investment, and an annuity, which, at the rate of interest of the bonds, would be equivalent to the total discount during the life of the bonds. I think it is more common simply to distribute the discount in equal amounts over the various years which the bonds have to run. Taking a particular case from Mr. Hockenbeamer's table, that of a 6 per cent thirty-year bond sold at 94, Mr. Hockenbeamer's method gives a yearly yield of 6.46 per cent, whereas the method I have suggested gives an average yield of 6.58 per cent. The only logical reason for assuming an annuity basis of distributing the discount which occurs to me is in the case of a trustee of an estate, for instance, who might wish each year to distribute to the then beneficiaries of the trust, the amount due, which would require him to arrange with a trust company for the annuity in question, for which the trust company would require a deposit of some of the securities as collateral. I do not think such conditions surround a sufficient proportion of investments to justify the utilities in figuring the discount factor in the cost of their money on that basis.

To return to the original subject of my letter, I think that it would be of interest to the readers of the JOURNAL, and to the advantage of the utility interests, if such data as Mr. Hockenbeamer has collected could be presented with some regularity. It would serve to educate utility managers, would reach some of their critics and might also influence some of the commissions which are just assuming the responsibilities of rate cases.

L. R. NASH.

NEAR-SIDE STOP IN PHILADELPHIA

PHILADELPHIA RAPID TRANSIT COMPANY
PHILADELPHIA, PA., May 18, 1914.

To the Editors:

Prior to July, 1912, the rule relative to "stopping for passengers" in Philadelphia read as follows: "Cars must stop only on the near-side of all main streets to receive and discharge passengers. They must also stop on the far-side of streets on which there are double tracks."

This rule was very literally enforced, and it was the practice for all cars to come to a full stop at the near side of all principal streets even when there were no passengers to board or alight, and the second or far-side stop was usually also made as a matter of course. This strict observance of the rule resulted in a very slow average speed of the cars.

The second or far-side stop was abolished in July, 1912, but the obligatory stop at the near side of all main streets was continued.

A more reasonable rule was promulgated by ordinance of councils, approved June 27, 1913. This provides that the motorman of every street railway car shall bring his car to a full stop on the near side of all main streets within the thickly built-up area of the city (practically 1 mile square) and also at the near side of Broad Street and Diamond Street throughout their entire length, these being the principal thoroughfares without car tracks. At all other main street intersections outside the specified district, the motorman must make a "safety" stop, i. e., "the car shall be reduced to a speed of not exceeding 5 m.p.h. at the near-side building line."

The elimination of the far-side stop and the universal acceptance of the near-side stop in Philadelphia have been made possible by the adoption of the "near-side" cars, which were largely introduced during the years 1912 and 1913. As is generally known, the entrance and exit in this type of car are both by way of the front platform, enabling passengers to enter and leave directly at the crosswalk on the near side of the street.

For the year ended June 30, 1913, the total number of accidents occurring showed a decrease of 8.7 per cent as compared with the previous year, although the number of passengers carried increased more than 6 per cent.

It may be interesting to note the results from an accident standpoint under the ordinance requirements established in June, 1913, providing for the obligatory full stop only on the near side in the restricted district, and the "safety" stop (speed reduced to 5 m.p.h.) at the near-side building line in other sections of the city. For the ten months to April 30, 1914, as compared with the corresponding period of the preceeding year, there was a decrease of 5 per cent in the number of collisions with vehicles and a decrease of 7 per cent in the collision of cars.

The elimination of the far-side stop has served very greatly to increase the average speed of the cars, with, as shown by the foregoing record, a material reduction in the number of accidents. It is estimated that the saving in time by the removal of the far-side stop has been responsible for at least 1 cent per hour of the increase in wages now enjoyed by the motormen and conductors. The discontinuance of the far-side stop has particularly accelerated traffic movement at congested crossings because, for one reason, cars and vehicles lining up behind a loading car do not block the intersecting street.

In the narrow one-direction streets of Philadelphia, only eight trolley cars and not more than eighteen or twenty automobiles can be contained within an entire block. When this number is congregated, the roadway is packed tight practically as far back as the next street. If cars were permitted to make the second stop after crossing the intersection the traffic movement would be at least 100 per cent slower than under the present regulations.

As to the relative merits of the near-side vs. far-side stop in any given locality, it is possible to theorize to almost any extent.

It is evident that the design of car is probably the chief factor in the situation, because a car having entrance or exit at the rear platform will, under the near-side stop rule, require that passengers walk in the street at least a car length from the nearest crosswalk. Other controlling elements are density of population, habits and customs of the people, condition of pavement and location of tracks, width of streets, established direction and speed of car and vehicle traffic, and relative location of principal office buildings, department stores, theaters, depots, etc., with reference to street intersections.

The policies and methods followed in introducing a change from the far-side to the near-side stop will also influence the failure or success of the experiment, extended notice to the public through the newspapers and by signs in the cars being essential to success in making the change.

Any departure from the established practice is bound to cause, at least for a time, some confusion in the minds of the public, and especially of strangers, until the new order is generally known and understood. Prospective passengers will continue to wait at the far crosswalk, and will think they have a grievance when cars pass them by. If the car platforms are not inclosed, irate passengers will occasionally attempt to board the moving car at the far side, resulting in an additional hazard. This, in any event, is a non-liability hazard and does not occur if both platforms are inclosed. The intensity and duration of this confusion and protest can be greatly modified if a campaign of notification is started well in advance of the date set for instituting the change, and the degree of publicity given in advance will have a direct bearing on the success or failure of the innovation.

Where stops are made on the near side of street intersections as a safety precaution, there seems to be no good argument for making the second stop beyond the crossing. If there are a large number of locations where the near-side stop must be made, it seems logical to extend the practice over the entire railway system.

It is quite clear that the elimination of the second or far-side stop accomplishes a very considerable saving in running time, with the attendant saving in power consumption and maintenance due to the reduction in the number of stops. It is likewise evident that the tendency of the near-side stop is towards a reduction in the number of collisions because cars ordinarily approach the street intersections under control. The assumption that drivers of vehicles will take unusual chances because they assume the car will make the near-side stop is not supported by the experience in this city. C. B. FAIRCHILD, JR., Statistician.

SOLID AND MANGANESE STEEL SPECIAL TRACK WORK EXPERIENCE

THE TOLEDO & WESTERN RAILROAD COMPANY
SYLVANIA, OHIO, May 11, 1914.

To the Editors:

Your recent articles on renewable center and solid manganese special work have been very interesting to me.

A certain manufacturer has been attempting this year to get us to use solid manganese special work. In my experience on steam roads I was very much opposed to solid manganese work when the crossings were at a large angle. We had good results with pieces that were built on a slight angle, such as a No. 20 frog or crossing, not to exceed 35 deg., but I have never been in favor of solid manganese on angles of greater degree.

In my opinion there is too much risk with the high speed employed on the steam roads. When engaging in electric railway work I was pleased to see that the city of Toledo had practically no solid manganese work, for the chances of flaws with a casting such as a tongue switch or a mate or a frog, say 9 in. in height, are very great, because one part of the casting may be 1 in. thick, another part 2 in. thick and another part ¾ in., varying, of course, in length for these different thicknesses.

In my opinion manganese steel is one of those metals of which we know very little so far, and the possibilities for air bubbles in the casting are such that I do not care to take too many chances with them.

There is no doubt that the pound on a right-angle crossing of one line with another is extreme, and as soon as one of the running points begin to chip you might just as well say your crossing is gone, for it takes but little time after that to spoil the whole piece. Therefore, why spend the money for a solid piece, when a small insert can be bought for from $10 to $20 and installed at a cost of not to exceed $5 for labor? The fact is that if a roadmaster watches the hard-center piece closely, he can detect flaws long before they show up, can make a requisition for new hard centers and can then have them on hand so that as soon as the flaw is such as to require renewal he can do it at a moment's notice. The wear on the running rails is such that if care is taken in measuring for the hard-center casting, it can be made a trifle less thick so as to overcome the wear on the running rails, thus insuring a fair fit after the new piece is installed.

On the other hand, a long angle piece which shows nothing more than gage wear can very well be made of solid manganese, although on this point, if the track is well maintained with a guard rail on the opposite side from the manganese piece, I am not sure but that I would still stick to the manganese insert.

We have a type of insert in use on our lines which is very easy to replace, and we have replaced quite a few. I do not care to go on record as saying that renewal of inserts is the best practice at points of heavy traffic, for we had one case last year where the rest of the installation went to pieces soon after we had renewed the inserts.

As I have stated, my experience with solid manganese on city lines is not very great, but with the class of material which we are getting to-day in our manganese inserts, it will be some time before I am converted to the use of solid manganese for a city the size of Toledo. Neither do I believe that solid manganese work is absolutely necessary nor always economical with slow traffic, as on a street railway system.

A. SWARTZ, Vice-President.

FOREST PRODUCTS EXPOSITION

The Forest Products Exposition is being held in the Grand Central Palace, New York, May 21-30, inclusive. Of interest to electric railway men is the exhibit of the Northern White Cedar Association, in which ties of northern white cedar are shown, which have been in continuous service on the Chicago & Northwestern Railway for twenty-nine years and telephone poles which have been used for fifty years. The exhibit of the American Wood Preservers' Association shows a model of a plant for the purpose of creosoting wood, together with a number of examples of veteran creosote-treated ties which were removed from various railroads after unusual service records.

Interesting tables are also displayed at the exposition showing the proportion of different kinds of wood utilized for car construction. Yellow pine ranks first with 54 per cent; Douglas fir is 7 per cent; white pine, 6 per cent; yellow poplar, 3 per cent; ash, 1 per cent; hemlock, 1 per cent; all other kinds, 4 per cent.

The Forest Products Exposition is under the management of George S. Wood.

The Zürich Municipal Railway, which began to install aluminum car panels during the year 1910, now has seventy cars thus equipped. The results with these panels have been so satisfactory that thirty-four cars now in hand will be equipped in like manner.

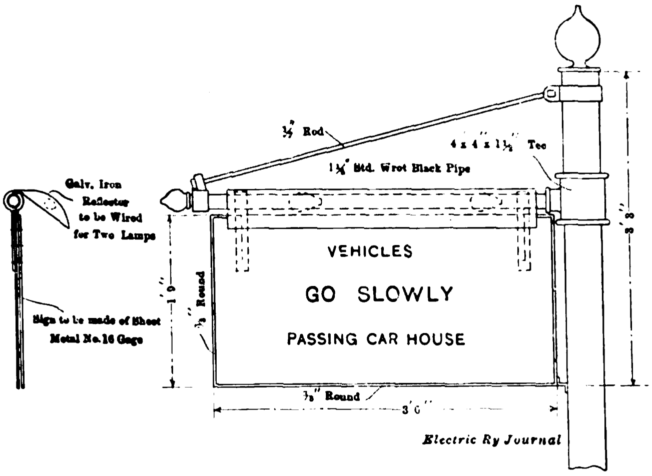
Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

CARHOUSE WARNING SIGNS AT WASHINGTON

In accordance with an order issued by the Public Utilities Commission, Washington, the Capital Traction Company has recently installed at the entrances to certain of its carhouses a safety sign of the style reproduced in the accompanying drawing. As the lettering shows, the sign is a warning that vehicles go slowly in passing the carhouses. This sign is 3 ft. 6 in. long and 1 ft. 9 in. high, the words "Go Slowly" being in letters 6 in. high. As the letters are painted white on a dull-black background, the warning is visible at a considerable distance. At night two lamps illuminate the sign. These lamps are carried under a galvanized iron reflector as shown. The sign was designed by the commission.


½" Rod
4" x 4" x 1½" Tee
1¼" Std. Wrot Black Pipe
Galv. Iron Reflector to be Wired for Two Lamps
VEHICLES
GO SLOWLY
PASSING CAR HOUSE
1' 0"
⅜" Round
Sign to be made of Sheet Metal No. 16 Gage
⅜" Round
3' 6"
8' 8"
Electric Ry Journal

Speed Warning Sign for Vehicles, Installed in Front of Washington Carhouses

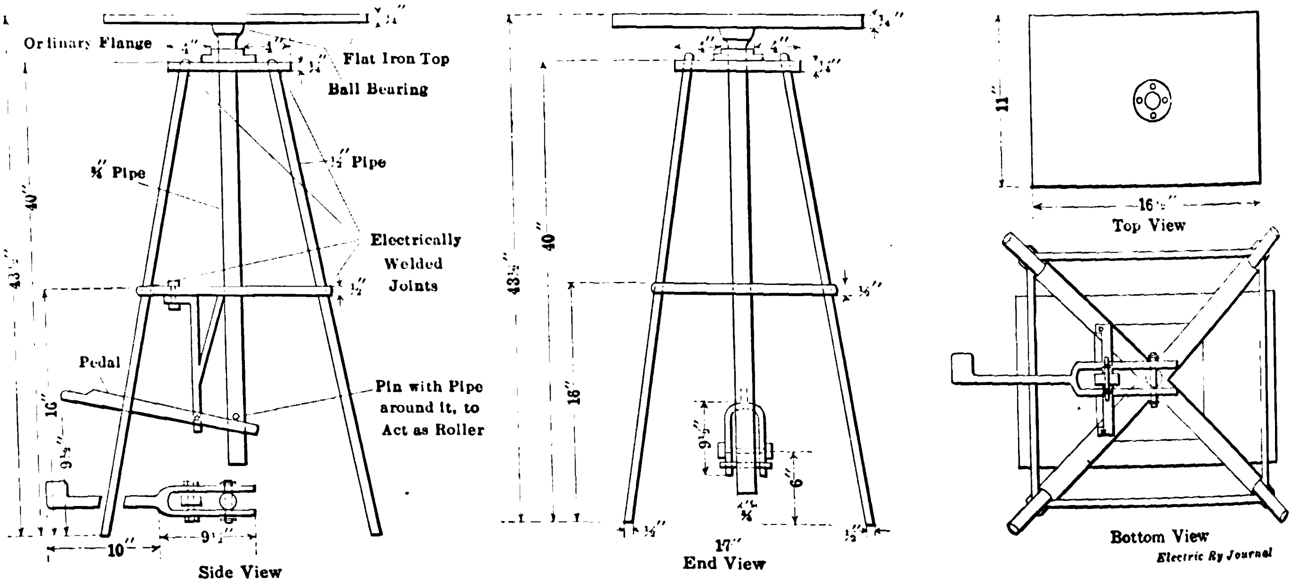
STAND FOR HANGING RHEOSTATS TO CARS WITH ONE MAN

BY R. H. PARSONS

The work of hanging rheostats to cars is usually a two-man job. In the first place, the boxes are heavy; in the second place, it is inconvenient for one man to place the rheostat and to hold it there while handling the nuts on the bolts which hold the frames. If the changing of rheostats is done where a pit is available or where the cars are jacked up on the floor, a stand similar to the one illustrated will eliminate the need of a helper. This stand is made of ½-in. pipe for supports, with a flat-iron top or platform which will turn, and which is raised, lowered and guided by a ¾-in. pipe extending down to a pedal.

In the instance of the stand described, the pipe connections to the other parts of the frame are electrically welded, but otherwise the stand could be framed together by threading and using lock nuts or by riveting. The latter is what we did in installing the small ball-bearing used between the iron platform and the pipe guide. A ball-bearing, by the way, is not absolutely necessary, for a flange is nearly as good. In this case the ball-bearing was simply a bit of surplus stock which we adapted to a special purpose.

The fulcrum of the pedal is fastened to the stand and is forked about the pipe which raises the platform. A pin through the movable pipe, fitted with a small piece of pipe which acts as a roller, raises the platform when the operator bears down on the pedal. The removable pipe is guided through the braces in the frame by means of ordinary floor flanges which are drilled to fit the pipe. If the stand is to be used in the same pit all the time or under cars of about the same height, a 3-in. to 4-in. increase in platform height is all that is nec-


Ordinary Flange
Flat Iron Top
Ball Bearing
¾" Pipe
½" Pipe
Electrically Welded Joints
40"
43½"
Pedal
10"
9¼"
Pin with Pipe around it, to Act as Roller
10"
9½"
Side View
40"
43½"
16"
9½"
6"
¾"
17"
End View
11"
16½"
Top View
Bottom View
Electric Ry Journal

Construction Details of Platform for Raising Rheostats

essary. To use the stand, first set it under the rheostat to be removed. As the nuts are being taken off the weight of the grid is held up by bearing down on the pedal; when the nuts are off, the rheostat box can be lowered slowly until it clears the bolts. The same method is followed when hanging a rheostat. The stand is placed under the location where the box is to be hung. Then the box is put on the iron platform, and is raised, turned and guided into position. The pressure of the foot on the pedal will keep the box steady while the nuts are being screwed up enough to hold the grid.

The dimensions of this stand vary, of course, to suit the height of the pit or horses used for carrying the cars jacked up. The stand is light, readily handled by one man and makes light for one man a job that was formerly heavy for two.

ONE YEAR'S OPERATING COSTS OF AN ELECTRIC EMERGENCY WAGON

BY A LINE ENGINEER

The horse-drawn emergency wagon is rapidly becoming a thing of the past, and it is probable that in a few years it will be almost entirely superseded by the automobile. But it would seem that altogether too large a proportion of the automobiles purchased by railways are of the gasoline type, electric machines being used chiefly by only a few companies in the larger cities. The general practice is to use a gasoline machine even when the railway sells electricity and where the use of an electric automobile would advertise the company.

The principal points urged against the use of an electric vehicle are that it is slow as compared with a gasoline machine and that its radius of action is limited. It is unfortunately true that the manufacturers of electric trucks have not considered it worth while to bring out an automobile constructed substantially enough to carry a tower and the tools and supplies needed in emergency work and yet to be fast enough to make more than 10 to 12 m.p.h. on a level road. This is really the only important objection to the electric truck as the radius of action has been greatly extended in the last few years. The number of miles that can be covered in a day has been further increased by the heavy charging rate that is now allowed by the makers. Low speed really is not so great a disadvantage, especially in city work where heavy street traffic and the liability of accidents limit other self-propelled vehicles to speeds much below their minimum.

So far as reliability and ease of operation by unskilled employees are concerned, everything is in favor of the electric machine. There is no need for trained chauffeurs because any man who can operate a trolley car can operate an electric automobile. Repairs are either simple mechanical operations or, if of an electrical nature, they are easily understood by any crew of electrical workers. The cost of operation is also lower with the electric automobile. For this reason, especially, and because figures giving the cost of such operation are scarce, the writer calls attention to the following records of a truck used in emergency service by one of the large city companies in the Eastern States.

The total mileage during the year amounts to 5607, and the energy consumption to 5865 kw-hr., making the average for the year 1.046 kw-hr. per car mile. As the weight of the truck fully loaded is 4⅝ tons this works out to an average consumption of power equal to 0.2265 kw-hr. per ton mile. In the column headed "Cost of Labor and Material" is included all expense for maintenance and repairs. In the entire year this amounted to $90.50, making the cost per mile, excluding the cost of power, 1.614 cents.

In comparing the energy used with this automobile and some of the others it must be remembered that the service was confined to a city in which most of the streets were well paved and in which there are very few steep grades. The average daily run was only about 15 to 16 miles, but on many days the truck traveled twice that distance. Longer runs could have been accomplished easily without fully discharging the batteries. The worst showing, as regards both energy per mile and cost of repairs and supplies, was in March last. This was due to the heavy snowstorms which were then encountered. These storms not only called for much more energy but also required such hard work from the motors that many of the commutator leads were unsoldered and had to be repaired.

OPERATING COSTS OF ELECTRIC LINE WAGON

Month	Year	Mileage	Kw. hr.	Kw. hr. per Mile	Cost of Labor and Material
May	1913	637	550	0.863	$6.30
June	1913	535	552	1.032	1.60
July	1913	433	438	1.011	0.00
August	1913	510	546	1.069	2.97
September	1913	392	385	0.982	0.60
October	1913	425	420	0.988	1.55
November	1913	438	442	1.008	15.49
December	1913	421	464	1.101	18.07
January	1914	450	521	1.159	8.84
February	1914	521	558	1.070	6.97
March	1914	435	556	1.278	26.96
April	1914	410	443	1.080	1.15

In conclusion it might be said that the company owning the truck was so much pleased with its performance that another one has been ordered for emergency service. Still another electric truck has been ordered by another department to take the place of a worn-out gasoline automobile.

DISPATCHER'S TELEPHONE JACK BOXES MOUNTED ON B., A. & P. LOCOMOTIVES

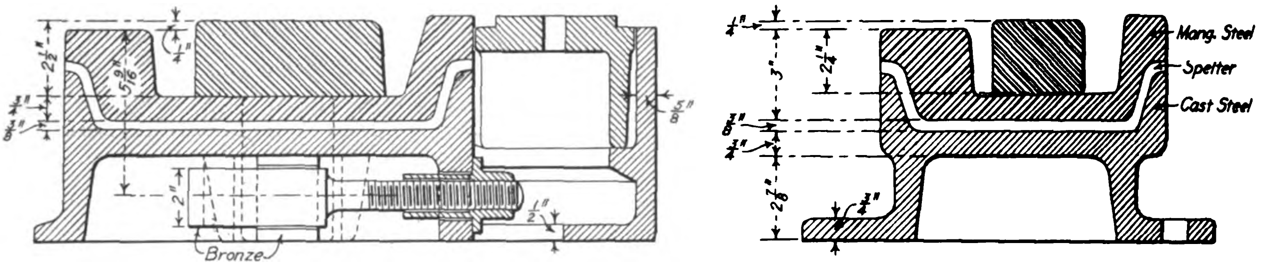
The Butte, Anaconda & Pacific Railroad, an electrified steam road recently described in the ELECTRIC RAILWAY JOURNAL, has installed a Western Electric telephone dispatching system to cover 76 miles of its track. While the trains for the most part are used to haul copper ore from the mines at Butte to the smelter at Anaconda several passenger trains are operated each day over the line, all traffic being handled by electric locomotives. The dispatcher is located at Anaconda and is in communication with thirteen stations on the system. Thirteen of the seventeen locomotives in service are equipped with telephones, and have jack boxes so placed on the oustide of the engine cab that connections can be easily made to the overhead wires by line poles. This road has an unusually fine system of overhead construction in its electrical plant, using a No. 10 B. & S.-gage, copper circuit for the telephones, although the line is only 40 miles in length.

The annual report of the Société Nationale des Chemins de fer Vicinaux of Belgium, just issued, shows that the company is increasing its electrical lines. It now has 490 electric motor cars and 751 steam locomotives and has under construction 100 motor cars and only thirteen steam locomotives. The Société Nationale is owned partly by the Belgium Government and partly by private capital and operates a network of interurban railways in Belgium. It has about 2500 miles of track, mostly narrow gage. The gross earnings in 1913 were about $5,600,000.

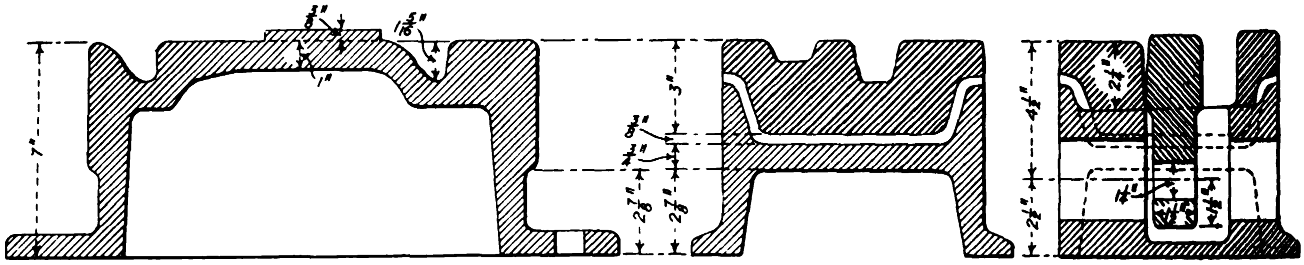
The Pennsylvania Lines West have recently had built for use in the Cleveland ore docks three locomotives of unusual design. The locomotives run on a gage 42 in., inside the main tracks, and are attached to the cars they handle by side arms.

MANGANESE INSERT TURNOUTS FOR NEW YORK RAILWAYS

The New York Railways is about to receive from the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., for use at the Brooklyn end of the Williamsburg bridge, the right-hand and left-hand turnouts of 100-ft. radius, which are shown in the accompanying half-tone. This piece is of the manganese insert type standard for the conduit conductor track construction of the New York Railways. It is of particular interest as the first piece of special work ever built by the Columbia company. The manufacturer installed a special grinder and planer outfit for the proper machining of the job, and has since undertaken a number of other special work installations. In fact, the manufacture of special work will hereafter be a regular feature with this company.



At Heel of Switch At Yoke Fastening of Switch

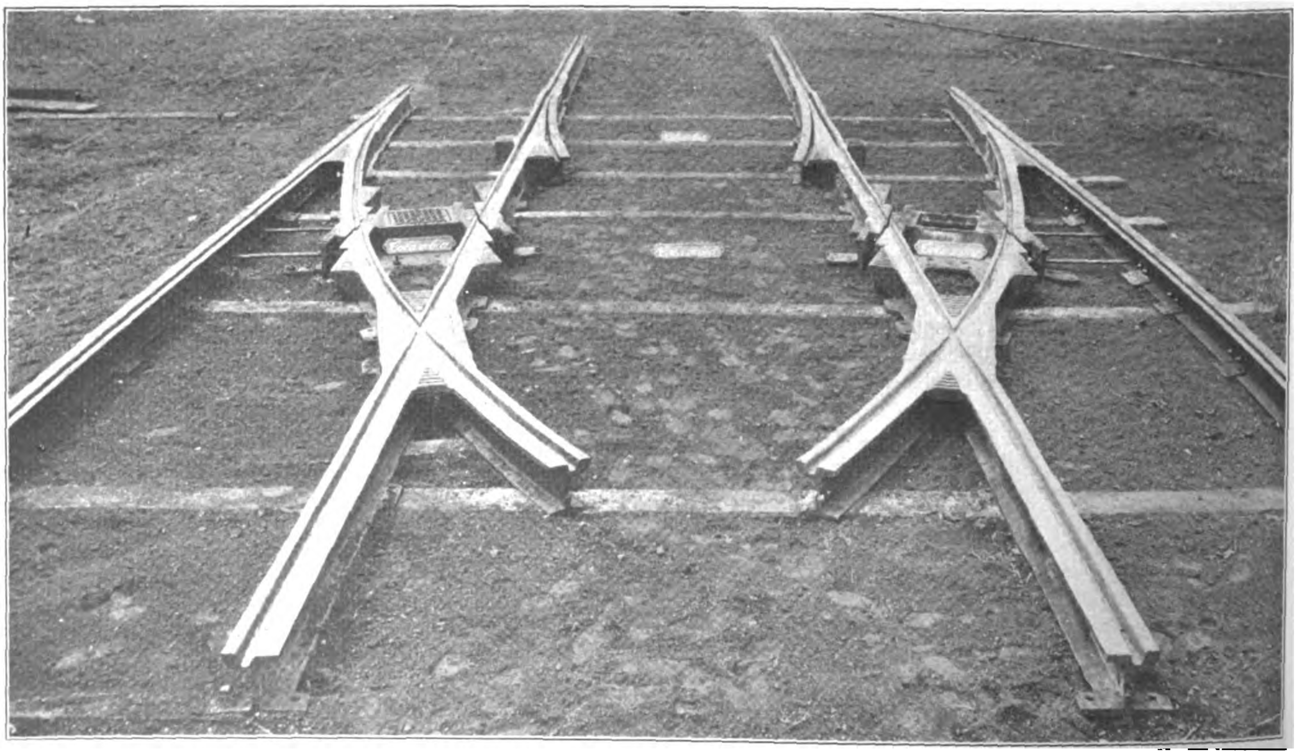


At Yoke Fastening of Mate At Point of Mate At Switch Operating Rod

Cross-Sections of Manganese Insert Work for the New York Railways

The piece illustrated has the following dimensions for both turnouts: Length of inner rails, including rolled steel approach, 52 ft.; length of outer rails, 39 ft. 6 in.; total length of switch, 16 ft., and of the manganese insert therefor, 10 ft. 6 in. The switch tongue itself is 10 ft. long and, like its insert, is made of manganese throughout. The gage on curved track was specified as 4 ft. 8¾ in., with a minimum admissible variation of ⅛ in. The weight of the complete job is approximately 8 tons.

The manganese steel inserts which were specified for this work conform to the following chemical analysis: Manganese, 10 to 13.50 per cent; carbon, 1 per cent; silicon, 0.36 per cent to 0.38 per cent; phosphorus, 0.045



Right-Hand and Left-Hand Manganese Insert Turnout for the New York Railways per cent, and sulphur, 0.02 to 0.03 per cent. The remainder of this special work conforms to the New York Railways' specification for rolled steel rails, as follows: Carbon, 0.50 to 0.60 per cent; silicon, 0.20 to 0.28 per cent; phosphorus, 0.03 per cent or less, and manganese, 0.70 per cent to 0.85 per cent.

RECORDS OF NEW HAVEN SINGLE-PHASE ELECTRIC SWITCHING LOCOMOTIVE

Although the complete electrification between New York and New Haven has not yet been placed in service, the switching of all freight cars between Stamford and Harlem River has been done successfully with Westinghouse single-phase locomotives for approximately eighteen months. The economies and reliability which the New York, New Haven & Hartford Railroad obtained by the use of the electric switcher locomotives are said to have exceeded all expectations.

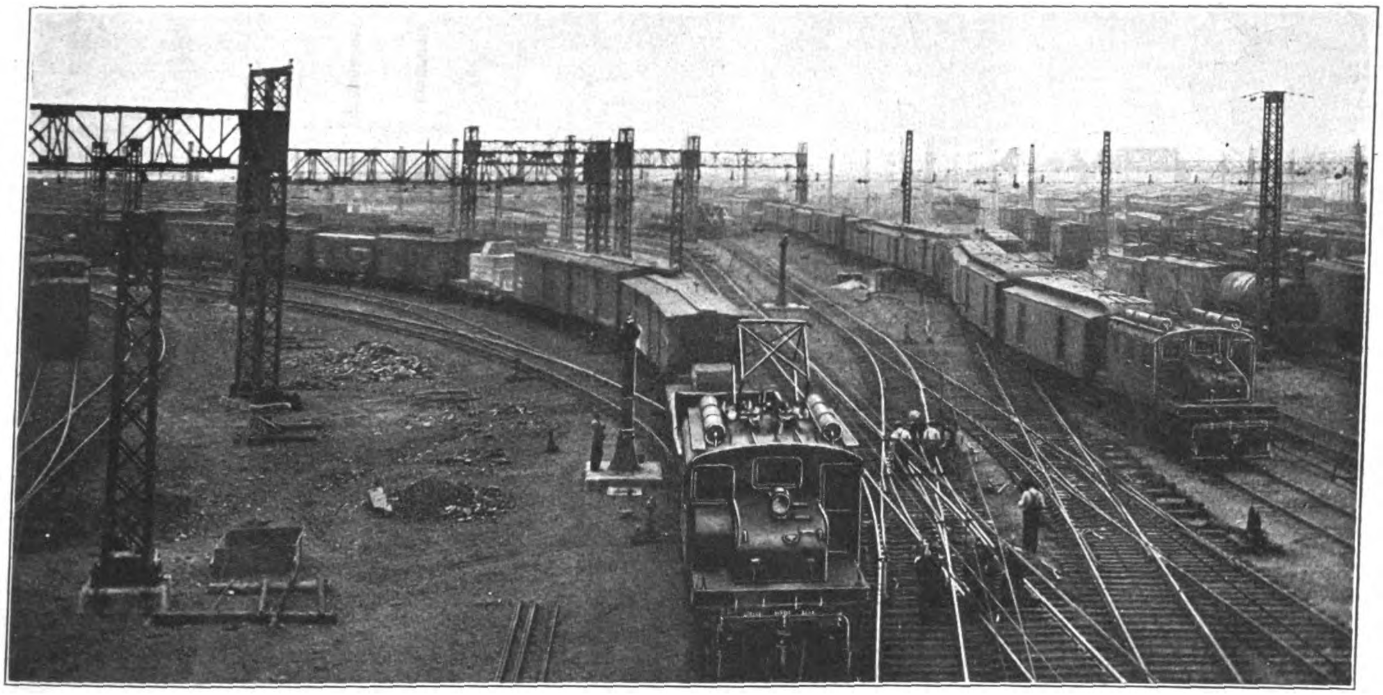
The three main switching yards on the New Haven system are as follows: Harlem River yard, length 23.3 miles; Oak Point yard, length, 37.16 miles, and Westchester yard, length, 22.29 miles. The Van Nest yards are used for storage only.

In March, 1911, the first switching engine was placed in operation at Stamford, Conn. In August, 1912, the first switcher started to work in the Westchester yards; in September, 1912, the first was started in the Oak Point yards in float service, and in August, 1913, the first began its operation in the Harlem River yards proper. The service performed by the locomotives in the Oak Point yard is of special interest. This yard is the terminal where all the cars on flats destined to the New England States are unloaded. Each float is properly docked and secured. There are two large controlling bridges at this terminal, one with accommodations for five floats and the other for three. These bridges contain all of the counterweights used to compensate for the weight of the individual gang or approach bridges besides all control apparatus for the operation of these float docks. The entire gang bridge to each float is hinged on to the mainland. The bridge consists of two parts connected by a hinged joint. Each of these two parts of the approach bridge leading to a float is raised and lowered electrically by means of two controllers. In addition to these controllers, there are two controllers which manipulate two motors connected to a friction drum which by means of a rope holds the floats in their slips securely to the gang or approach bridge. Three large steel bars keep the tracks on the float properly aligned with tracks on the approaches while cars are being loaded or unloaded.

Six movements are required to unload a float and dispatch a train to the yard; six movements are also necessary to load a float. When either loading or unloading floats two flat cars are always coupled between the electric switcher locomotive and the cars being hauled on or off the float. In this way the locomotive always remains on land, the two flat cars acting as an arm for reaching the train. Each float has three tracks, the two outside tracks with a capacity for eight cars and the center one for six cars. In this float service it is important to load and unload cars so that the floats do not capsize. This is prevented as follows: The eight cars on track No. 1 are hauled off until two cars remain, enough to have about 100 tons on this track, and this train is left standing until later. Then all the eight cars on track No. 3 are hauled off. Next the six cars on track No. 2 are hauled off by way of a switch on to track No. 3 and then off. Finally the remaining cars of the eight-car train on track No. 1 are hauled off. The minimum time required to load and unload a float (twelve movements) is thirty-five minutes.

To date not a single feature has developed in which the electric locomotive is not superior to the steam locomotive in switching service. The ease with which electric locomotives are controlled, the elimination of stand-by losses and those that are necessary where coal and water are used, elimination of liability for freezing up in cold weather, are all features which are to be credited to the electric locomotive.

Six electric locomotives do the work of approximately twice the number of steam locomotives formerly used. Eight electric locomotives are sufficient for practically all of the switching work between Stamford and Harlem River station. These are kept in service twenty-four hours a day, each making on



Single-Phase Switching Locomotives at Harlem Yards of New York, New Haven & Hartford Railroad

an average approximately 140 miles in twenty-four hours with three eight-hour crew shifts. The electric locomotives handling the work between Westchester yard and Harlem River for a given month made 38,000 locomotive miles and consumed approximately 896,000 kw-hr. at the locomotive. During this same period the six locomotives handled approximately 65,000 cars which had an approximate total weight of 1,000,000 tons. Practically all of these cars were transferred from floats, and since the control of the electric locomotive is more sensitive than the control of the steam locomotive this is a feature that appeals strongly to the operators. All of this enormous tonnage is handled within the corporate limits of New York City, where the elimination of smoke is greatly appreciated.

Sixteen switching locomotives are included in this installation. Each locomotive has four Westinghouse No. 410, 125-hp, twenty-five-cycle motors and unit switch control. These locomotives each weigh 80 tons and are able to exert a maximum tractive effort of 40,000 lb. with a clean dry rail. The following items as to hauling capacity may be of interest.

The figures given for straight level track show the load which may be handled in infrequent switching service. The switching locomotives are guaranteed to exert a maximum tractive effort of 36,000 lb. for about three minutes at speeds up to 6 m.p.h. and a continuous tractive effort of 14,800 lb. at a speed of 11½ m.p.h. In practice it has been found that an electric switching locomotive can do the work of two steam locomotives because it can be run day and night. It is not expected that the maximum voltage on the motors will be reached in ordinary switching service, but it is available when climbing grades or on longer runs in the yard. The average operating potential is estimated to be 190 volts. The hour rating corresponding to this voltage and current of 900 amp is about 125 hp per motor.

Rated Hauling Capacity*

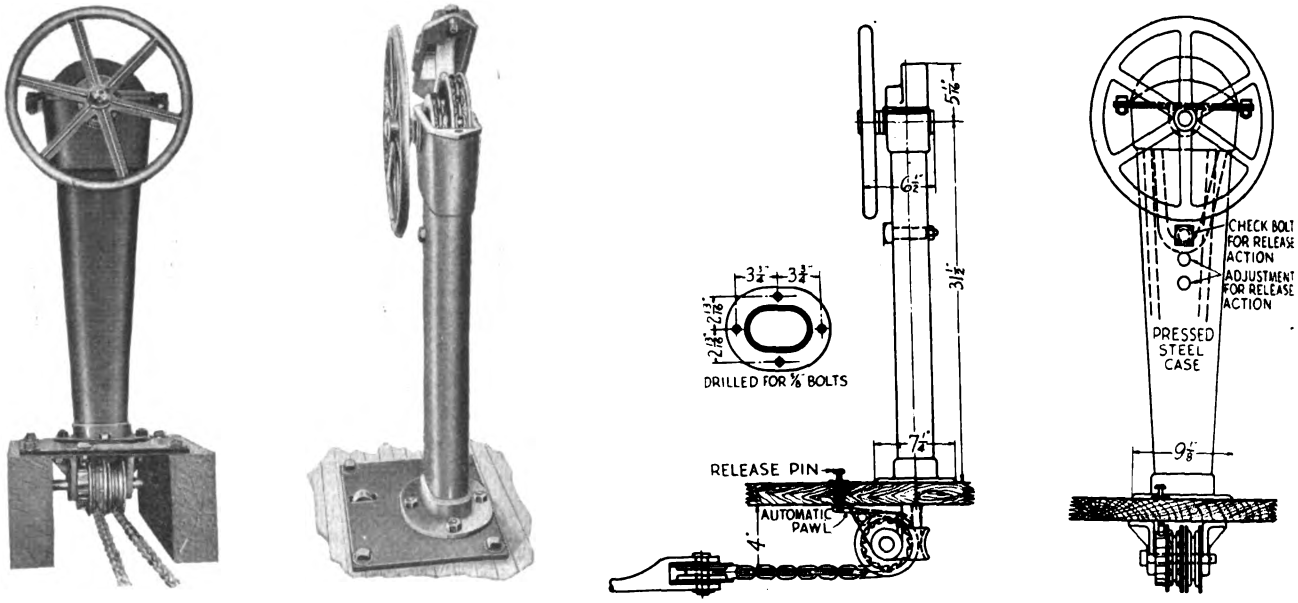
Track Profile	Number of Cars Each Weighing 45 Tons with Load	Maximum Speed, m.p.h.
Straight level track	67	8.5
½ per cent grade	28	8.1
1 per cent grade	17	8.1
2 per cent grade	9	8.1

*On the average road, the load that can be handled is determined by the maximum grade.

DIFFERENTIAL STAFFLESS BRAKE FOR LOW-PLATFORM AND OTHER CARS

The tendency toward more compact and lighter platform equipment is demonstrated anew by the differential staffless brake which has just been brought out by the Lord Manufacturing Company, Brooklyn, N. Y. In addition, this brake exerts powerful leverage with little effort so that it is available equally for the regular braking of heavy cars and for the contingency braking of air-brake cars.

Besides its extreme compactness above and below the platform, as indicated by the dimensions on the accompanying drawings, this brake has the advantage of a direct drive on the shaft of the brake wheel for the application of power to the differentials. The principle involved is that which has been successfully utilized for years in connection with hoisting machinery. It will readily be seen by reference to the accompanying table of brake powers that any degree of hand-brake pressure can be attained by the use of the differential action.



General Views and Drawings of Differential Type Staffless Brake

In the Lord brake very little loss can be attributed to friction, as only one shaft and bearing are necessary. The power is increased through the differentials which are cast *en bloc* and keyed to the shaft of the hand wheel. The bearings are of solid bronze, with oil holes for lubrication. The brake chain is ¼-in. BB electric-welded endless chain. The castings are all of malleable iron, and the pedestal is of pressed steel. Thus the entire brake equipment is very light, but rigid and strong. The application of power direct to the hand-wheel shaft overcomes the necessity of beveled gearing to change from a horizontal to a vertical alignment, as is the case when a vertical brake staff is used in connection with a vertical brake wheel and the ordinary gear and pinion installed under the platform.

The brake is fitted with an automatic pawl which engages with the ratchet wheel when the brake is applied without any action on the part of the operator except the winding of the brake wheel, so that the efficiency of the operator is greatly improved. To release the brake it is only necessary to step on the floor-pin provided to release the automatic pawl. The release action has a positive check to prevent excessive slack in the brake chain, thus eliminating unnecessary effort on the part of the operator and insuring a positive application of the brakeshoes at the first turn of the hand wheel. Three adjustments for brake chain slack are provided in order to conform to the particular requirements of each car and to permit readjustment if desired as brakeshoe wear occurs.

Where the differential brake is used the brake chain can be made to pull in exact alignment, which is impossible when a worm drum is used. If the foundation brake rigging is hung close to the car floor and all possible clearance is needed beneath the platform, the sheave wheels can be set into the crown piece, bringing the brake chain less than 4 in. from the bottom of the floor. If the foundation brake rigging is hung very low, shims can be placed above the sheave wheel hangers to lower the brake chain and conform with the exact alignment required. However, unless otherwise specified, the actual alignment of the brake chain will be 5½ in. below the crown-piece.

Referring to the accompanying drawings, the brakes are usually furnished with dimension "C" 31½ in. and dimension "A" 46 in. Dimension "B" can be adjusted by the railway company or the car builder to conform with requirements. Hand wheels are furnished in either malleable iron or bronze, and for three different diameters, namely, 17 in., 19 in. and 24 in. The 17-in. wheel is of special hollow construction. The 19-in. and 24-in. wheels are solid. The wheels are generally furnished in malleable iron and with "non-ratchet" action, although polished bronze wheels and ratchet action can be obtained. The weight of the brake is 70 lb., of the chain 13 lb., and of the hand wheel 10 lb., a total of only 93 lb. Car builder's standard brake wheels of practically any diameter can be applied to the hand-wheel shaft if desired.

TABLE OF BRAKE PRESSURES

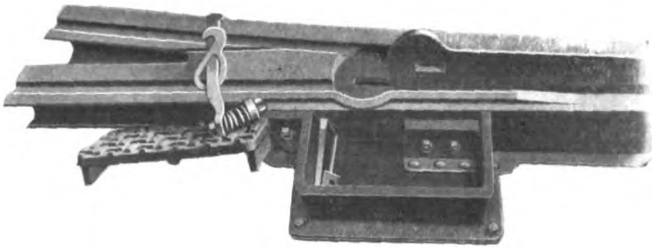
Differentials Links per Wheel		Brake Rod Travel	Pull in Pounds on Brake Rod	
Small	Large		17-in. wheel	19-in. wheel
8	15	6⅛ in. per turn	654	731
8	14	5¼ in. per turn	761	851
8	13	4⅜ in. per turn	916	1023
8	12	3½ in. per turn	1148	1083
8	11	2⅝ in. per turn	1523	1702
8	11	with special 24 in. wheel—2150 lb.		

This brake was designed by Lawrence W. Horne and Warren N. Crane, both of whom have been actively associated in the engineering department of the Interborough Rapid Transit Company and the New York Railways during the past eight years. Mr. Horne has recently been engaged by the Lord Manufacturing Company as car engineer and Mr. Crane will act as consulting engineer.

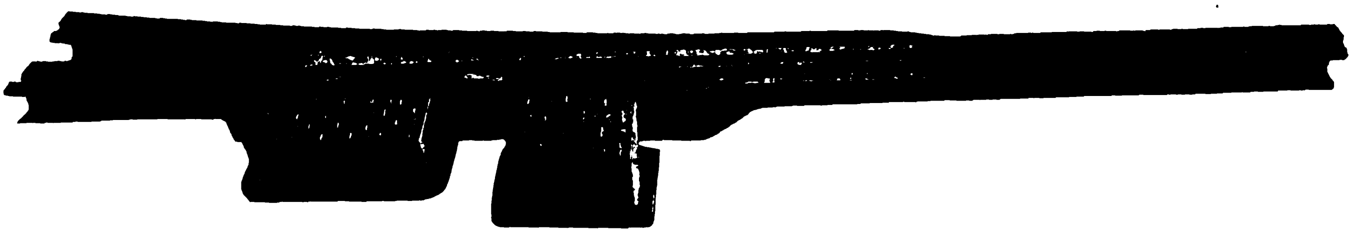
Compilations just completed show that the Pennsylvania Railroad Company had on April 1, exactly 89,602 shareholders who held an average of 111.44 shares. This is an increase of 12,756 as compared with April 1, 1913, and is the largest number of shareholders the Pennsylvania has ever had. There are 30,240 stockholders of the railroad in the State of Pennsylvania, New York has 15,298, New England 16,612, foreign countries 11,784, while 15,668 are scattered.

THE HOOK-HEEL SWITCH

Among the switches of the Pennsylvania Steel Company is the hook-heel switch which has been on the market about one year. Switches of this type are already in use on such important electric railways as the Brooklyn Rapid Transit System, the Pittsburgh Railways, Public Service Railway, Detroit United Railway, Tri-City Railway and the Pacific Electric Company. This switch is of the pinless type. It derives its name from the hook shape of that part of the tongue fastening device that is in immediate engagement with the tongue. Its new features are simply in the pivot and pivot fastenings.

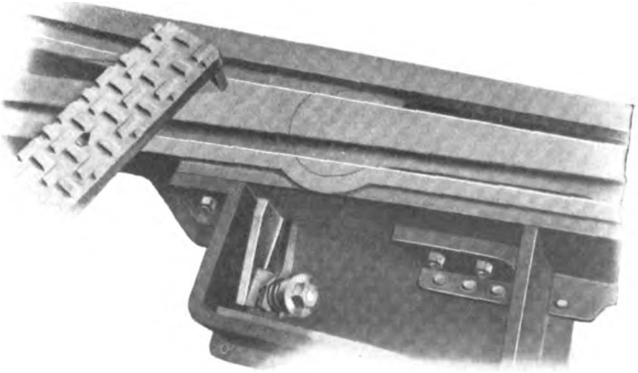


Fastenings of Hook-Heel Switch Tongue



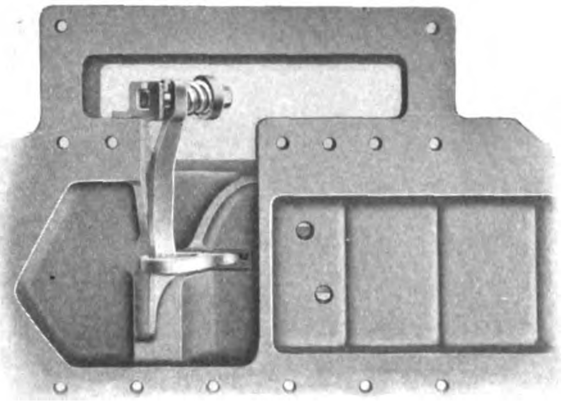
Hook-Heel Iron-Bound Girder-Rail Hard-Center Switch Complete

The distinctive feature of the hook-heel type is the spring in the holding-down device of the pivot fastening which acts so as to take up wear in the various parts automatically; thus requiring less attention in maintenance than any positive type of fastening. The large bottom bearing area, as well as the vertical side bearing at the heel of the tongue, is shown in the accompanying views. The tongue has full bearing throughout its length. The only part of the tongue that does not rest absolutely on the center is where a recess is cut in the base of the tongue to permit the engagement of the hook fastening. The radial bearings, formed by the circular shape of the heel of the tongue in contact with the center, with vertical bearing surfaces of both center and tongue ground to fit, greatly assist in preventing any forward movement of the tongue under trailing cars.



Top View Showing Fastening for Hook-Heel Switch Tongue

The hook is exceedingly simple and effective. The hook enters the recess in the bottom of the tongue and engages the top and front edge of the lip formed by the recess. The large eye in the hook is engaged by a lever which fulcrums on the underside of the switch floor at one end and is flattened at the other end to receive a spring bolt and to form a seat for the holding spring. When the hook has been put in place through the slot in the floor of the switch center and is resting in the recess in the bottom of the tongue, it hangs in a vertical plane parallel to the length of the switch at an angle of about 45 deg. The lever is put through the eye of the hook and easily finds its fulcrum by sliding along a guiding groove formed in the underside of the switch floor, the other end swinging into position, where it is held by a spring bolt. The hook exerts a downward and rearward pressure that holds the tongue firmly to its bearings and insures a close fit. The tongue fastenings are readily accessible and can be assembled and tightened in less than one minute.

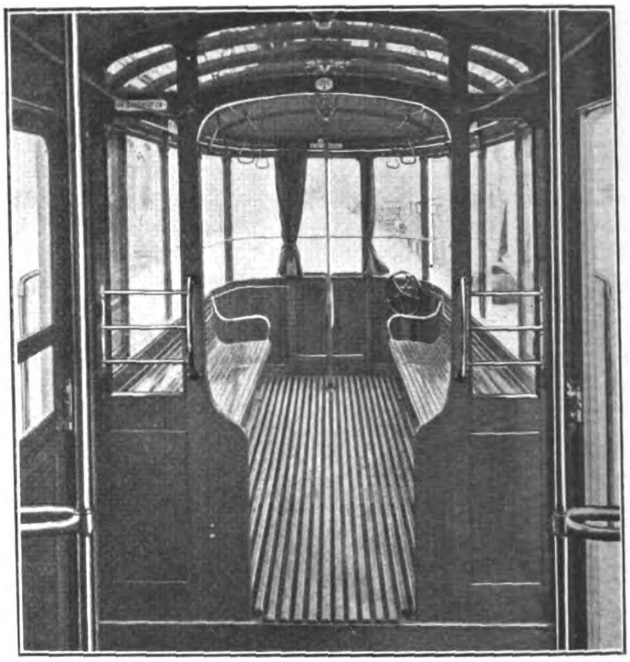


Bottom View of Hook-Heel Switch Tongue Fastening

The Toronto Suburban Street Railway has awarded a contract to the Canadian General Electric Company for substation apparatus and car equipments, for the new line from Toronto to Berlin. This will be the first interurban line in Canada to operate at 1500 volts d.c. The catenary type of overhead construction will be used, and there will be three substations; 1500-volt rotary converters, each of 500-kw capacity, will be used, power being transmitted to the substations at 25,000 volts. The cars will operate on a 600-volt line at approximately half normal speed; and changing from 1500-volt to 600-volt trolley, or vice versa, will involve no loss of time in adjustment of control apparatus. The line with 1500-volt operation will be about 62 miles long.

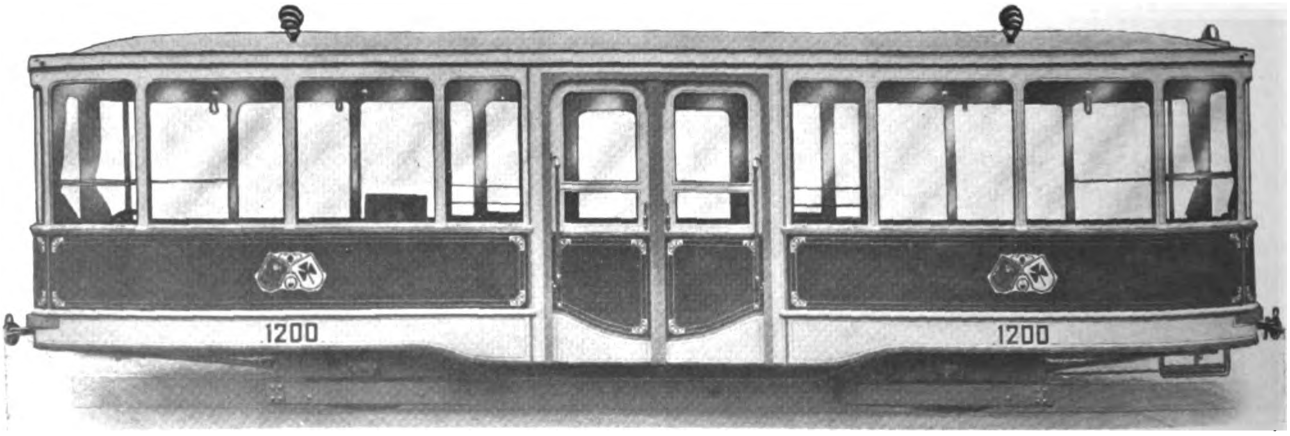
CENTER-ENTRANCE STEPLESS CARS FOR THE NUREMBERG-FÜRTHER RAILWAY

That the introduction of low-level cars in the United States is attracting the attention of European electric railway managers is demonstrated by the accompanying illustrations which show a center-entrance, stepless trailer car built by the Maschinen Fabrik Augsburg-Nürnberg for the Nuremberg-Fürther railway.



Interior View of Stepless Trailer

The well of this car is furnished with a dividing rail for incoming and outgoing passengers, while the main compartments are equipped on each side with a six-passenger longitudinal bench which does not extend to the ends in order to leave room for seven standing passengers. The normal capacity is twenty-four seated and twenty-eight standing passengers, but the car can carry a maximum of sixty passengers. The over-all length of this trailer is 32 ft., the length of the well 5.9 ft. and the distance between the pavement and the car platform 14 in. The weight of the car is approximately 16,500 lb. The front axle is so joined to the draft rigging that it may be operated radially, thus making it possible to secure the very favorable wheelbase of 13.8 ft. Acknowledgments are due to *Elektrische Kraftbetriebe und Bahnen* for the information and photographs of this car.



Stepless Trailer for Nuremberg-Fürther Railway

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES, FRANCHISES

Illinois.—Voting Trust—Assumption of Corporate Name.

Where the majority stockholders of a street railroad company organized a voting trust to control its operation in accordance with the directions of a committee appointed by participation certificate holders who were the beneficial owners of the stock, such agreement was not rendered invalid because the majority stockholders were also owners of other corporations engaged in a similar business. Such ownership is not violative of any law and imposes no liability or disability on the owners in their control of the corporation in question so long as they conducted its affairs honestly.

That the trustees of a voting trust of the shares of a street railroad company assumed the name Chicago City & Connecting Railway Collateral Trust, which was not incorporated, was not a violation of Criminal Code, Sec. 220 (Hurd's Rev. St. 1911, Chap. 38), as an illegal assumption of a corporate name, since the name did not necessarily imply a corporation. (Venner v. Chicago City Ry. Co. et al., 101 N. E. Rep., 950.)

Indiana.—Right-of-way Not Assessable for Municipal Improvements—Eminent Domain.

The statute authorizing a city to impose special assessments on land benefited to pay expenses of constructing a sewer would not authorize the city to assess for that purpose the tracks and right-of-way of an interurban street railway located within the benefited district.

The construction of a street railway in a city street is not an additional servitude for which compensation must be made. (Indiana Union Traction Co. et al. v. Gough et al., 102 N. E. Rep., 453.)

Kansas.—Extension of Railway to Serve Certain Lands.

Landowners who by purchase of stock procured the extension of a street railway and an agreement that it should be operated over their lands for five years, in consideration of their platting and placing such lands on the market, cannot, after failing so to do for four years, maintain injunction to prevent the removal of such extension, the company being solvent and the trial court having determined that the damages, if any, could be recovered in an action at law. (Sentney et al, (State ex rel. Foote) v. Hutchinson Interurban Ry. Co., 135 Pacific Rep., 678.)

Kentucky.—Franchise Tax—Double Tax.

Sec. 4077, Ky. St., requires a railroad to pay an annual franchise tax to the State and also a local tax to any city in which its franchise may be exercised, and Secs. 4078-4080 provide that the corporation shall report to the State Auditor its indebtedness and the interest paid thereon and the amount of its stock and the dividends paid thereon from which the State Board shall capitalize its total earning power, including all its property, tangible and intangible, and deduct the assessed value of its tangible property to ascertain the value of its franchise. A city assessed a street railroad's tangible property at $366,900, on which tax was paid, and afterward the State Board, in fixing the franchise tax therein, deducted the value of its tangible property therein as fixed by the county assessor, which was $36,840 less than the city's assessment thereon. The company tendered a franchise tax to the city, based on the deduction of the city's assessment of its tangible property from the capitalization. Held, that the amount tendered was all that the city could demand, since to have required the road to pay the tax assessed by the State Board would have been double taxation to the extent of $36,840, and illegal. (City of Newport v. South Covington & C. St. Ry Co., 161 S. W. Rep., 222.)

Maryland.—Duty to Repair Paving, Not to Repave.

Where the charter ordinance of a street railway company required it to keep the part of the streets covered by the tracks and for 2 ft. on either side in repair at its own expense, the obligation of the street railway company is merely to repair, and the municipality cannot compel it to repave its portion of the street with a new and different material. (United Rys. & Electric Co. of Baltimore v. Mayor and City Council of Baltimore, 88 Atlantic Rep., 618.)

Massachusetts.—Ejection of Passenger Proper.

Where a drunken person on an electric railway car, who refused to pay his fare, was put off by the conductor on a public highway near a regular stopping place of the car, and it did not appear that, short of his ultimate destination, there was any place where his removal would have involved less danger, the expulsion was not with such a gross and wanton disregard of his rights and of the injurious consequences which reasonably might be expected to result to him as rendered the company liable, though the expulsion was on a bitterly cold night. (Podespik v. Worcester Consol. St. Ry. Co., 103 N. E. Rep., 638.)

Massachusetts.—Rentals Based on Cost.

St. 1902, Chap. 534, provided for the use of the Washington Street Tunnel in Boston by an elevated railroad company at a specified rental. Sec. 7 declared that the value of the property taken for the construction of the tunnel but no longer needed should be deducted from the cost in ascertaining the rental. Sec. 10 provided that the annual rent should be 4¼ per cent of the net cost of the tunnel and defined "net cost" to include all expenditures incurred in acquisition and construction, including damages, expenses, salary of the commission and interest at the rate of 3½ per cent on the debt incurred in construction prior to the beginning of the use. Sec. 16 declared that all rents received from property taken for construction should be applied (1) to meet sinking fund requirements; (2) to meet interest on bonds, and (3) the surplus to the general revenues of the city. Held, that where the city took certain estates for the completion of the tunnel and approaches parts of which thereafter became unnecessary for tunnel purposes and were leased by the city to others the net cost of the tunnel for the purpose of ascertaining the rent should be ascertained as of the time when the use of the tunnel began, and that the deduction for surplus property taken should be made as of that time, since in no other way could the city receive interest on the cost of the tunnel during construction and the rents received from such surplus land be contributed to its sinking fund and other specified uses. (City of Boston v. Boston Elevated Ry. Co., 102 N. E. Rep., 80.)

New Jersey.—Repair of Streets.

An ordinance granting to a street railway company the right to lay its tracks in the streets of a municipality contained two sections. One required the railway company to pave between its tracks on all streets, and the other dealt with the repairs required to be made by the company, under which the company was bound to repair not only between the tracks, but 18 in. outside. This section contained a clause which required the company to pave certain streets from curb to curb. Held, that the obligation thus cast upon the company did not require it to keep in repair the streets from curb to curb, but only to pave from curb to curb, and it did not relieve the company from keeping in repair, even on the streets it was bound to pave from curb to curb, so much of the street as lay between the tracks and 18 in. on each side thereof. (Town of Westfield v. Public Service Ry. Co., 87 Atlantic Rep., 82.)

New York.—Taxation of Viaduct—Burden of Showing Excess.

The viaduct of a street car company was properly treated as tangible property in assessing its special franchise; but the pavement between the rails of its tracks and for 2 ft. outside thereof was improperly considered as tangible property. It is incumbent on a traction company seeking to have an assessment of its franchise reduced to show affirmatively that the assessment imposed by the state board of tax commissioners was excessive and that it is entitled to have the assessment reduced. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Com'rs, 142 N. Y. Supp. 116.)

New York.—Reasonableness of Transfer Regulations.

A street car passenger who accepted a transfer and who boarded a car at a point other than the transfer point could be ejected for his failure to pay fare, though the conductor at first accepted the transfer but subsequently demanded fare, the conductor having no power to waive the reasonable regulations specifying the transfer points. (Rubinger v. New York Rys. Co., 144 N. Y. Supp., 766.)

North Carolina.—Right-of-Way—Additional Burden—Value of Property Taken.

An electric railroad company acquiring a right-of-way could not convey to a traction company the right to impose additional burdens thereon, but the traction company could only acquire the right to impose such additional burdens and to use additional land for its purpose by condemning the same and paying damages to the owners.

In a proceeding to condemn land for a railroad right-of-way, the proper measure of damages is the difference between the market value of the land before and after the appropriation, and hence evidence of specific sales of other property not similarly located or developed was inadmissible, though it was intended to develop the property in question. (Wadsworth Land Co. v. Piedmont Traction Co. et al., 78 S. E. Rep., 299.)

LIABILITY FOR NEGLIGENCE

California.—Injuries to Passenger Alighting at a Non-Stopping Point—Conductor in Front of Car.

A street car passenger who had not notified the conductor of her desire to alight at the next street crossing had no right to assume and act upon the assumption that the car would stop at such crossing merely because its speed for some reason had been diminished, especially where such crossing was one where cars were required to stop only on signal.

A street car conductor was not negligent in going to the forward end of the car for the purpose of collecting a fare from a passenger who had just boarded the car and gone upon the forward platform, as it was his duty to do so, though he was thereby prevented from observing that a passenger was preparing to alight. (Dougherty et ux. v. Union Traction Co. (Civ. 1173), 136 Pacific Rep., 722.)

Indiana.—Duty of Interurban Motorman to Watch for Private Crossings.

A motorman of an interurban car must use care commensurate with the danger to prevent injuries at places where persons are likely to be, and if he has actual knowledge of the existence of a private farm crossing constructed by the company, he must keep a lookout for persons in passing over it. (Hartlage v. Louisville & N. Ry. & Lighting Co., 102 N. E. Rep., 738.)

Maine.—New Trial—Excessive Damages—Conditions.

Where a verdict is excessive, a motion for new trial will be overruled in the event that plaintiff remits the excess, but otherwise it will be sustained. (Blair v. Lewiston, A. & W. St. Ry., 89 Atlantic Rep., 140.)

Maine.—Verdict for Excessive Damages Not Disturbed.

The court will not disturb a verdict on the ground of excessive damages unless it very clearly appears to be excessive upon any view of the facts which the jury was authorized to adopt. (Boyd v. Bangor Ry. & Electric Co., 89 Atlantic Rep., 140.)

Maryland.—Definitions of Liability for Accidents at Crossings.

Where recovery for injuries to a traveler struck by an electric car at a crossing was sought on the sole theory that the collision could have been avoided by the motorman exercising due care, and the court charged that if the motorman could have avoided the accident by the use of ordinary care after he saw, or by ordinary care might have seen, the danger, the verdict must be for him, and the court refused to charge that if the motorman brought his car to a stop in the usual manner and at the usual place for taking on passengers, and if, after he saw, or by ordinary diligence could have seen, the traveler's peril he could not by such care as a reasonably prudent man would have used under like circumstances have avoided the collision, there could be no recovery, was reversible error. (Capital Traction Co. v. Contner, 87 Atlantic Rep., 905.)

Maryland.—Action for Injuries—Release by Person Injured.

Code Pub. Civ. Laws, Art. 67, Sec. 1, provides that whenever death shall be caused by wrongful act, neglect or default such as would have entitled the party injured to maintain an action and recover damages if death had not ensued, the person who would have been liable if death had not ensued shall be liable to an action for damages, notwithstanding the death of the person injured. Held, that where a person injured during his lifetime released the defendant from all and every claim that he might or could have for or on account of his injuries such release was a bar to a subsequent action for his death resulting therefrom. (State to Use of Melitch, v. United Rys. & Electric Co. of Baltimore, 88 Atlantic Rep., 230.)

Massachusetts.—Horse Killed from Stepping on Track—*Res Ipsa Loquitur*.

When a horse stepped on a rail of a street car track on a wet day a spark flashed from the rail and the horse suddenly stopped, fell and died. There was evidence that the rails and electric appliances were in perfect condition on the following morning but that it was possible for the horse to be killed by reason of a short-circuit between the rail and a wire at some point on the track further from the power house than the place of the accident, and that there was more danger on a wet than on a dry day. Moreover, an experienced veterinary surgeon, who made an autopsy, stated that the appearance of the horse's organs indicated that it was killed by electricity. Held, that the circumstances raise an inference of negligence by defendant under the *res ipsa loquitur* doctrine. (St. Louis v. Bay State St. Ry. Co., 103 N. E. Rep., 639.)

Massachusetts.—Alighting from Slowly Moving Car—Contributory Negligence.

A passenger attempting to alight from a slowly moving car is not as a matter of law guilty of negligence, and whether an ordinarily prudent person would have done so under similar circumstances is for the jury.

A street railway company, which does not invite a passenger to alight while the car is moving and is not negligent in bringing the car to a stop, is under no duty to warn or to restrain a passenger alighting until the car shall stop, and it is not liable for injury to a passenger alighting before the car stops. (Mabry v. Boston Elevated Ry. Co., 102 N. E. Rep., 309.)

Missouri.—Alighting at a Non-Stop Point.

A passenger who has signaled the car to stop is justified in assuming that he might alight when the car did stop, notwithstanding it was in the middle of a block.

Where those in charge of a street car know that a passenger is in the act of alighting therefrom it is their duty to exercise such a degree of care as would be exercised by a careful and skilful man under the same circumstances to hold the car stationary. (Gardner v. Metropolitan St. Ry. Co., 152 S. W. Rep., 98, 99.)

Missouri.—Negligence of Driver Not Imputable to Others—"Vigilant Watch"—"First Appearance of Danger."

Where plaintiff in an action against a street railway for personal injuries from a collision was not driving or directing the wagon on which she was riding with her husband, and he was not her agent in so doing, his negligence in driving, if any, was not imputable to her, where she did not concur in or expressly sanction it or, knowing the danger, fail to protect herself.

The doctrine of "vigilant watch," as applying to the operation of a street railway, requires that a motorman on the "first appearance of danger" to a vehicle on the track shall stop the car in the shortest time and space possible, and where he has an unobstructed view of the vehicle either on the track or so near as to be in danger, and he sees, or by due care might see, the danger in time to control or stop his car before collision, the time and place where his duty to do so arose is somewhere between the place of vision and the collision. (Johnson v. Springfield Traction Co., 161 S. W. Rep., 1194.)

North Carolina.—Injury to Passenger from Projecting Screw—Unavoidable Accident.

As the street car on which plaintiff was a passenger approached a certain point plaintiff asked the conductor to slow up so that he could get off, and attempted to get off while the car was going 3 or 4 m.p.h., when he caught a very thin finger ring in a screw at the bottom of the grab handle, 36 in. from the bottom of the step, and his little finger was jerked off by the forward motion of the car. The screw head projected about 1/16 in. from the surface. Held, that the injury was an unavoidable accident for which the street car company was not responsible. (Pendergrast v. Durham Traction Co., 79 S. E. Rep., 984.)

News of Electric Railways

Supreme Court Loan Decision in Philadelphia

Affirming its previous decree that the $8,600,000 and the $12,900,000 municipal loans were invalid, the Supreme Court of Pennsylvania, on May 12, in handing down its opinion thereon, incidentally upheld the constitutionality of the acts of Assembly making the personal property assessments coequal with the realty assessments as the basis of the city's borrowing capacity of 7 per cent of the grand total of such assessments. As compared with the present unused borrowing capacity of about $15,000,000 on the realty assessments, the addition of the personal property assessments as basis of borrowing capacity would increase the city's combined unused borrowing capacity to upward of $57,000,000. In reviewing the decision the Philadelphia Public *Ledger* said:

"Although Director A. Merritt Taylor, of the Department of City Transit, made no statement on the subject, it was said at his office that the opinion held there was that the Mayor and the administration leaders would proceed as speedily as possible to float a loan for a large sum with the personal property assessments as a basis for improved rapid transit projects. It was suggested that the loan would probably be for a minimum of $25,000,000, and possibly as much as $40,000,000, which would be close to the estimated addition to the city's borrowing capacity resulting from the decision sustaining the constitutionality of the act of the Legislature authorizing the personal property basis for permanent bond issues."

Toledo Franchise Committee to Report Before Monday

The special franchise committee of the Council of Toledo, Ohio, must report to that body by May 25. So far no intimations have been made as to what the report will contain, further than a statement of the points agreed upon with Mr. Doherty and a discussion of the question of fare, which resulted in the termination of the negotiations. Vice-Mayor Hassenzahl was quoted as saying that several of the concessions made by the committee during the negotiations were based on the understanding that the company would in the end yield to a low rate of fare, and that if such a rate was not given the committee would not stand by the concessions.

Intense interest has developed in the publicity campaign conducted by Henry L. Doherty, as the representative of the Toledo Railways & Light Company, Toledo, Ohio. While many people have followed the campaign closely from the beginning there has been such an increase in interest since the recent abandonment of the franchise negotiations that the publicity work of the company has become a subject of discussion on all sides. The publicity forum is being conducted in the Toledo *Blade*, Toledo *Times* and other publications.

Mr. Doherty is having the early statements put into the form of folders and distributed from the folder boxes in the cars. At first 10,000 were printed every other day, but it was found that a large number was needed and at present 30,000 are being distributed daily. On May 20 criticism No. 6 had been reached. Only one criticism is printed on each folder. They are being issued to the public just as they were published in the newspapers originally. In addition to the *Blade* and the *Times* the company is using twelve weekly publications in the city and is displaying posters on all the billboards. At the head of Superior Street has been placed an electric sign, "Read our publicity forum on the franchise question in the *Blade* and the *Times*." The Toledo *News-Bee*, which has been hostile to the company's proposition from the start, is not being used, as it was thought that its columns could add nothing to the strength of the forum.

Mr. Doherty has addressed many organizations and assemblages recently by invitation. This development of the publicity campaign has surprised even the officials of the company.

Numerous requests have been received for copies of the publicity forum conducted by Mr. Doherty. These requests have come from attorneys, public utility men and others from almost every state in the Union and include six or seven letters from Texas. Mr. Doherty believes that to receive the greatest amount of benefit from publicity, it should be continuous and the people should be kept well informed at all times of just what is necessary for the operation of a property to furnish good service and what price must be received to support the service which is demanded.

It is said that the city will have 10,000 copies of the last franchise drawn by City Solicitor Thurstin printed and distributed in an endeavor to counteract the effect of the company's publicity. The city inserted a 2-in. advertisement in the Toledo papers recently asking for bids for a franchise on the local streets.

The business men feel that the publicity which the city is receiving in connection with the unreasonable stand taken regarding the rate of fare will have a very unfavorable influence.

Mr. Doherty spoke at the noonday lunch of the Michigan Alumni on May 20. He said that excessively stringent regulation of corporations was equivalent to war against prosperity. A sentiment was developing in Toledo for a reasonable fare and good service. This was the correct view to take of the situation. Poor street railway service dwarfs the prospects of a city.

Kansas City Franchise Negotiations Resumed

Franchise negotiations between the Metropolitan Street Railway, Kansas City, Mo., and representatives of the city were resumed on May 11. O. H. Dean, representing the Commercial Club, the Live Stock Exchange and the Real Estate Exchange, presented the objections to the ordinance drawn by Major Jost. He objected chiefly to the forfeiture clause of the grant, asserting that it provided a penalty only for the management and not for the mortgagees, who are really the owners. He advocated a clause that would inflict a penalty on the mortgagees in case of default. Mr. Dean also objected to the clauses whereby the city will receive 8 per cent of the gross revenue of the company, advocating 2 per cent, to be used exclusively for improvement of parks and sanitary facilities. Six tickets for a quarter also promised to become an issue.

D. M. Pinkerton, who originally was named as one of the city's directors in control of the company, has been appointed to the school board.

An ordinance providing for the construction of double track on Twenty-fourth Street from Main Street to Grand Avenue by the Metropolitan Street Railway, was passed by the lower board of the Kansas City Council on May 11. It was referred in the upper house because of a charter provision which prevents both branches of the Council from passing a grant in one night. The city reserves the right to revoke the grant should it be used separately from the general system, as would be possible in case of the dismemberment of the Metropolitan Street Railway.

Rapid progress was made by the conferees in Kansas City regarding a franchise for the Metropolitan Street Railway during the week ending May 16. The capital valuation of the company's property was placed at $30,000,000, and the physical valuation at $25,962,000. The company will be permitted to receive 6 per cent annually on the capital valuation, until this is reduced to the amount of the physical valuation, after which the city will receive two-thirds of the net income to one-third for the company. The franchise committee agreed to the section giving the company a grant on the streets of the city until 1944. Eleven directors are provided for, six of whom will be selected by the company and five by the city. The circuit court of appeals will name the succeeding city directors, as the terms expire. The three block clause that allowed competing companies three blocks of track on each line or extension was repealed in favor of one allowing such companies six consecutive blocks on any one line. The following schedule was arranged for the week beginning May 18: Monday, extensions; Tuesday, fares; Wednesday, viaduct contention of the Terminal Railway Company; Thursday, organized labor demands, and interurbans. Slightly more than 15 miles of extensions are proposed.

Mr. Mellen Ignored in Westchester Transaction

Charles S. Mellen, formerly president of the New York, New Haven & Hartford Railroad, resumed his testimony before the Interstate Commerce Commission at Washington on May 19. Much of the testimony that day was confined to the negotiations which resulted in the New York, New Haven & Hartford Railroad taking over the New York, Westchester & Boston Railway, a high-speed electric line out of New York. Mr. Mellen had never given serious thought to the suggestions that the New Haven acquire the Westchester line until Oakleigh Thorne presented the matter to him. Mr. Thorne had acquired both the New York, Westchester & Boston and the New York & Portchester Railways, and urged Mr. Mellen to take the matter of their purchase up with the directors of the New Haven road. Mr. Mellen presented the matter to the late J. P. Morgan, who suggested that a committee be appointed to conduct the negotiations. This committee consisted of Mr. Morgan, William Rockefeller and G. MacCulloch Miller, with Mr. Mellen a member ex officio. Mr. Mellen was never taken into the confidence of the committee.

After negotiating fourteen months the committee reported to the board of directors that it had expended $11,000,000 in acquiring the two lines, but gave no details of how the money had been spent or when or to whom it had been paid or any detailed account of how much had been paid for each of the items of the various acquisitions comprising the property. Mr. Mellen told Mr. Morgan that he thought a comprehensive account should be rendered. This was during the panic of 1907. Mr. Morgan refused Mr. Mellen's request harshly and abruptly. The directors accepted the incomplete report, but two of them, Mr. Skinner and Mr. Hemingway, both of Connecticut, questioned the transaction. Mr. Mellen was forced to tell them that he was not acquainted with the details, and suggested that he would appoint either of them a committee to wait on Mr. Morgan. They were all willing that he should go to Mr. Morgan and "bark his shins," but were afraid to go to him themselves.

Notations and memoranda which Mr. Mellen had written on the papers at the time complained that he was not told anything; that the New Haven's money was being spent, and that he did not know where it was going or for what purpose. The total cost of the Westchester properties to the New Haven to this time has been about $35,000,000. In a memorandum written on one of the papers drawn in the course of negotiations Mr. Mellen expressed his fear that reputations would be damaged and that he would be the "goat" before the transaction was at an end. He said that when trouble prevailed in large enterprises somebody had to bear the burden. Others could go to Carlsbad or to some other cure, but somebody had to stay and fight it out. Afterward when Mr. Mellen read the memorandum expressing his fears about the transaction it looked to him as if he were a prophet. The changes which the New Haven wanted in the Westchester franchise related to an extension of time in which the road was to be completed, a change of route and a consolidation with the New York & Portchester. These were all brought about. At the time the negotiations for the purchase were carried on Mace Moulton was the president of the Westchester Company. The arrangements for the changes in the franchise were made through him. Mr. Moulton is now dead.

The hearing on May 20 was devoted very largely to an inquiry into the purchases of electric railway properties in Connecticut and Rhode Island by the New Haven. The Consolidated Railway was originally the Thompson Tramway of Connecticut. It afterward became the Worcester & Eastern Railroad, later the Consolidated Railway and was then merged with the present New York, New Haven & Hartford Railroad. The stock of the Consolidated Railway, which was secured by the New Haven Railroad through purchase, became treasury stock of the latter subject to the disposition of the board of directors, and was in turn exchanged share for share for Boston & Maine Railroad stock to the extent of 109,948 shares. The Consolidated Railway charter was amended by the Connecticut Legislature to enable this amalgamation to be carried out.

Approximately $5,000,000 of Fair Haven & Westville stock was taken up with $10,000,000 of the 3½ per cent New Haven Railroad debentures running for fifty years, not convertible into stock of the New Haven Railroad. After the Fair Haven & Westville Street Railway was purchased the New Haven merged the Stamford, the Meriden and the Fairhaven & Westerville lines into the Worcester & Eastern and changed its name to the Consolidated Railroad. Mr. Mellen thought that the New Haven had paid for the Stamford Railway in cash. In 1905 the New Haven purchased 7718 shares of the stock of the Hartford Street Railway at $285 a share. There was sharp competition for the stock of this company. Mr. Mellen thought that among the competitors of the New Haven in this deal were interests identified with the United Gas Improvement Company, Philadelphia. Subsequently the New Haven took over the electric railways in New London, Montville and Norwich. Control of these properties was thought to be desirable because only a short line had to be built to afford through connections via the Worcester & Connecticut Eastern between New London, Conn., and Worcester, Mass. After the purchase of these properties the New Haven built the link between Central Village and Norwich and electrified the line. The stock of the Norwich Street Railway was acquired at $110 a share; that of the New London Street Railway at $105 a share and that of the Montville Street Railway at $160 a share. In addition to this the company paid $40 a share to a Mr. Kelley for his work in acquiring the stock of the Montville and the Norwich Street Railways. Mr. Mellen thought this a paying deal as the properties at New London and Norwich were leased by him just before he retired from the New Haven to the Shore Line Electric Railway for 999 years at a fixed rental of 5 per cent of the capital stock.

The control of the Connecticut Railway & Lighting Company operating in Bridgeport and Waterbury was negotiated through Thomas Dolan and Randall Morgan, Philadelphia, who are identified with the United Gas Improvement Company. These properties are leased to the Consolidated Railway for 999 years on a graded rental which runs up ultimately to a guarantee of $1,400,000 a year. This lease is guaranteed by the New York, New Haven & Hartford. Mr. Mellen thought the lease had proved profitable. He was not acquainted with the details of the transaction by which the Worcester & Webster Street Railway and the Webster and Dudley Street Railway had been acquired by the New Haven. He had no knowledge that these properties had cost the New Haven more than $1,000,000 and had been turned over to the New England Investments & Security Company for $337,458.

Senator Aldrich of Rhode Island was largely responsible for the New Haven taking over the electric railways in Rhode Island. The properties there were acquired by the New Haven at more than $200 a share. There is a multiplicity of companies in Rhode Island, including the Providence Securities Company, the United Traction & Electric Company and the Rhode Island Company, which last leased the separate companies. Mr. Mellen said that he would be surprised if the loss to the New Haven on account of the purchase of the electric railways in Rhode Island had not amounted to more than $2,000,000 in four years and five months.

Subway Construction Awards in New York

The members of the Public Service Commission for the First District of New York conferred on May 18 with representatives of the Interborough Rapid Transit Company and of the Holbrook, Cabot & Rollins Corporation, to consider a protest made by the former against the possible award to the latter of the contract for the construction of Section No. 6-A of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan. This section covers the connection which will be made between the new subway in Seventh Avenue and the existing subway at Times Square. As the operating lessee of the existing subway, the Interborough Company objects to the award of this work to the Holbrook, Cabot & Rollins Corporation notwithstanding that it is the lowest bidder, on the ground that "the contractor has not the slightest conception of the difficulties involved or of the work to be done to assure the safe and continuous operation of trains during the construction work." This is the second time the commission has opened bids for this work. On the first bidding, in March last, the Oscar Daniels Company was the low bidder at $304,316. At that time the Interborough Company protested against the award of the contract to the Daniels Company for reasons similar to those now given. After due consideration the commission rejected all bids and readvertised. The bids were opened the second time on May 13, when the Holbrook, Cabot & Rollins Corporation was found to be the low bidder at $421,566, the Oscar Daniels Company not appearing in the second competition. In the first bidding the Rapid Transit Subway Construction Company, which is owned by the Interborough Company, was the third bidder at $498,038. In the second competition that company was the second bidder at $468,038.

Bids for the construction of the proposed crosstown subway in Canal Street were opened by the Public Service Commission for the First District during the week ended May 16. This is known as Section No. 2 of Route No. 20. The plans call for a two-track subway from the Manhattan end of the Manhattan Bridge through Canal Street to a junction with the Broadway subway. This line will pass under the existing subway and the Centre Street Loop subway, and will have a deep station running from Centre Street almost to Broadway. It will be operated by the New York Municipal Railway Corporation and used to bring the trains coming over the Manhattan Bridge into the Broadway subway. On account of the character of the ground the commission asked for bids on two different kinds of plans—one according to the usual method of excavating and building the subway structure in the cut, and the other by providing cast-iron tunnels for a portion of the route. The lowest bidder for the usual method of construction was the Underpinning & Foundation Company, at $1,822,994, while the Degnon Contracting Company was the lowest bidder for the method including cast-iron tunnels, at $2,438,258.

Bids for the construction of Section No. 1 A of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan, will be opened by the Public Service Commission for the First District on June 9. This section covers the connection between the new Seventh Avenue subway and the existing subway at the Battery. It will involve work similar to that to be done at the Times Square junction, although on account of the difference in location and the fact that an open park covers the subway at the Battery the difficulty will not be as great. The work involves the building of a new station opposite the present station at South Ferry near the Battery.

Fraud in West Shore Railway Promotion

After a year of investigation the Ontario Railway Board has returned a finding to the effect that false and fraudulent representations secured for John W. Moyes the contract or agreement with the municipalities of Goderich, Kincardine, Ashfield and Huron for the construction of the West Shore Railway, and that false and fraudulent progress certificates gave Moyes the proceeds of the sale of bonds guaranteed by the municipalities. The board summarizes its findings as follows:

That John W. Moyes by the false and fraudulent representation that $12,500 had been paid into the Dominion Bank at Toronto on account of capital stock procured the permanent organization of the Ontario West Shore Railway.

That no permanent capital was contributed to the undertaking beyond the proceeds of the sale of bonds guaranteed by the municipalities, although $15,000 of the unguaranteed bonds were apparently taken by the Provincial Steel Company in part payment of rails.

That Moyes, in breach of the Ontario Railway Act, procured a colorable agreement for the construction of the railway, to be entered into between the company and the Huron Construction Company, which was really Moyes.

That by procuring false and fraudulent progress certificates the promoter withdrew from the Toronto General Trust Company the proceeds of the sale of the bonds guaranteed by the municipalities with a value, with interest, of $402,837.

That owing to the fact that books of account were not kept and that vouchers were missing, the board could not report exactly how much of the amount so fraudulently withdrawn by Moyes was properly expended, but that the records show $228,272.06 to have been properly expended in construction and material.

The board concludes that the $165,000 of unguaranteed bonds supposed to be in the possession of Moyes are valueless. The board bases this on the fact that the Huron Construction Company, to which the bonds were supposed to have been paid, never really existed, that what company there was existed in John W. Moyes. In dealing with the disposal of the moneys, the board finds that there is still $174,565 to be accounted for.

Proposed Block Signal Installations in Indiana

Indiana interurban lines are preparing to install approximately 115 additional miles of block signals during 1914. Contracts for these installations have not yet been let, but the plans of the various companies are about completed. The Union Traction Company of Indiana will install automatic block signals on its Tipton Division between Broad Ripple and "Strawboard" siding, a distance of 15.08 miles, and on the Anderson Division between "Summit" siding and the south side of Jonesboro, a distance of 8.77 miles, or a total installation of 23.85 miles.

The Terre Haute, Indianapolis & Eastern Traction Company will install a total of 25.35 miles, as follows: on the Terre Haute Division, from Terre Haute city limits to Brazil, a distance of 11.25 miles; on the Brazil Division, from Plainfield to Bridgeport, a distance of 4.6 miles, and on the Crawfordsville Division, from Dye's siding to Brownsburg, a distance of 9.5 miles.

The Fort Wayne & Northern Indiana Traction Company will install approximately 25 miles. The greater part of this installation will be put in between LaGro and Peru, about 22 miles, closing up the unprotected section between Huntington and Logansport; and about 3 miles will be installed at Delphi.

The Chicago, South Bend & Northern Indiana Railway will install about 9 miles of the semaphore type of signal during the present year, but the locations have not yet been announced.

The Indianapolis, Columbus & Southern Traction Company proposes to install approximately 24 miles of absolute block signal system between Taylor and Seymour.

The Indiana Railway & Light Company, operating the line from Kokomo to Marion, will install about 8 miles during this year.

No plans have yet been made for the extension of the Simmen system to the Greensburg Division of the Indianapolis & Cincinnati Traction Company, but it is understood that this matter will be taken up later in the year between the company and the Public Service Commission.

Prospects of Agreement on Seattle Purchase by City

Mayor Hiram C. Gill, of Seattle, Wash., who as Mayor in 1910 approved the ordinance revoking the franchise of the Seattle, Renton & Southern Railway, before the finance committee of the City Council recently endorsed the plan proposed for the purchase of the property of the company by the city, qualifying this endorsement only by limiting the purchase price to a reasonable figure. This endorsement followed a review of the offer made by the receivers through Harold Preston immediately to transfer the property within the city to the municipality, to be paid for at the rate of 25 per cent per year of the gross earnings for a period of twenty-five years. Mr. Preston explained to the committee that this value had been worked out with a view of just paying the indebtedness. When it was shown that, with an annual 4 per cent increase in the earnings of the system, this plan would mean the payment by the city in twenty-three years of $1,200,000 for the property, Mayor Gill suggested that a maximum value be placed on the property, beyond which point the city should not be required to pay. Mr. Preston is said to have expressed the belief that the Superior Court and the creditors, all of whom have agreed to the plan for purchase as proposed, could reach some agreement satisfactory to the Council and to those who have invested in the property. The whole matter was laid over by the committee for two weeks pending the return to Seattle of Scott Calhoun, the other receiver of the property, who has been in the East.

Rapid Transit Construction Progress in Brooklyn

The physical connection between the Myrtle Avenue and the Broadway elevated lines of the Brooklyn Rapid Transit System will probably be ready for operation about July 1. Only a small amount of reinforcement in the existing girders and the installation of track and signals remains to be done at this point. With the completion of this physical connection, the second of the important rapid transit improvements in Brooklyn under the new contracts with the city will have been accomplished. The first work which was finished was the opening of the Centre Street loop. This was equipped for operation by the New York Municipal Railway immediately after the dual contracts were signed in March, 1913. The Myrtle Avenue and Broadway connection will eliminate the change of cars at Myrtle Avenue for those who are going down on the Broadway line across the Williamsburgh Bridge and through the Centre Street loop. The approach toward completion of the Lutheran Cemetery extension, which connects with the Myrtle Avenue elevated road at the upper end of the route, indicates that the existing congestion at the Ridgewood point of transfer will disappear as soon as the Lutheran line is ready for operation.

On the Lutheran Cemetery line 1400 lineal ft. of steel elevated structure was erected during April, making a total of 3000 lineal ft., erected to April 30. All of the concrete is practically finished. Eighty-one per cent of the steel has been delivered and 70 per cent has been finished. On the first section of the Lutheran line the entire work involved in the reconstruction is within 23 per cent of completion. On the second section, extending from Fresh Pond Road to the terminus of the line, about 33 per cent of the required concrete has been laid and 46 per cent of the column excavation had been finished up to April 30. The work of rearranging the yard and erecting a trainmen's and dispatcher's building at Fresh Pond Road is under way. Bids for stations to be built on the Lutheran line will be invited in the near future.

On the Sea Beach line 50 per cent of the excavation has been finished between Fourth Avenue and New Utrecht Avenue, 18 per cent of the excavation between New Utrecht Avenue and Twenty-second Avenue and 39 per cent of the excavation between Twenty-second Avenue and Eighty-sixth Street. This represents a total of 346,000 cu. yd. of material excavated. About 2000 lineal ft. of retaining walls had been constructed between Fourth Avenue and New Utrecht Avenue and 12,000 yd. of concrete had been placed on different sections along the line. More than 10 per cent of the total steel required for the Sea Beach line has been fabricated and delivered for use of connecting and reinforcing. Plans and specifications have been prepared for four highway bridges between Fifth Avenue and Eleventh Avenue and for the concrete railroad bridge over tracks of the Long Island Railroad between Seventh and Eighth Avenues. This work will be contracted for in the near future. The average daily number of men employed in the Sea Beach work in April was 900. The work done up to May 1 represents about 25 per cent of the total on the Sea Beach contract. On the Liberty Avenue extension 22 per cent of the excavation had been completed May 1 and 15 per cent of the concrete had been laid. The column bases have been excavated from the city line to Huntington Street, and the contractor is preparing to erect the steel. Practically all the rails for the Fourth Avenue subway have been delivered and other track material is being delivered.

Banquet to Newton W. Bolen

More than 500 trainmen and other employees of the Essex Division of Public Service Railway, Newark, N. J., joined in tendering a testimonial banquet to Newton W. Bolen, general superintendent, on the evening of May 20. The banquet took place in one of the largest public halls in Newark, and was attended by a number of the executive officers, including George J. Roberts, first vice-president, and by the supervisory force and platform men. The celebration was designed to mark the completion of ten years' service of Mr. Bolen with the public service property, and also as an expression of appreciation on the part of the men of the improved working conditions and higher rates of pay that have been brought about by the company. Mr. Bolen was presented with a silver loving cup, the presentation speech being made by William Wepner, one of the platform men.

Merger of Systems at Boston Urged

Patrick F. Sullivan, president of the Bay State Street Railway, Boston, Mass., addressed the joint legislative committee on street railways and metropolitan affairs on April 13 in relation to the suggested consolidation of the street railways serving metropolitan Boston. Mr. Sullivan said in part:

"The report of the joint board before you is the best presentation of the rapid transit problem in metropolitan Boston that I have ever seen. As shown in the report you could well consider this subject of taking care of a suburban district outside of what is called the Elevated 5-cent zone. But apart from this matter of 5-cent fare discussion is this great board question—that any consideration of this problem should be one which would consider this commuter business.

"It would not be impracticable to co-ordinate that service with the Boston Elevated service. It would relieve the North and South stations to such an extent as to continue their usefulness for more than twenty-five years longer than at the present commuter service. It would remove the smoke nuisance largely. It would take those unusual crowds of people off the streets leading to and from those two stations to an unusual extent. A solution is possible and practicable by an enabling act which will permit each of the companies referred to in the joint report to come in under it and surrender their respective charters.

"Under present general laws the Bay State, Blue Hill, Middlesex & Boston and Boston & Worcester companies can be consolidated, and if the West End Street Railway were not leased to the Boston Elevated, that company could also be consolidated. But the Boston Elevated is organized under a special act, and cannot, therefore, be consolidated without special legislation. The narrow gage road has also been referred to in the report. A proper solution of the problem would not be complete without including that company. By electrifying its lines, making it a standard gage road, and operating its trains through the East Boston tunnel to Scollay Square, the Revere Beach problem would be solved. The electrification of that road cannot long be postponed.

"The question of merger has never been discussed by the directors or the executive committee of the Bay State Street Railway. If you should prepare an enabling act that would be fair, reasonable and workable, I am prepared to recommend it for favorable action, with reasonable hope of acceptance. I would suggest a few features for such an act: You could prepare an enabling act with a very few directors, with power to increase the number; a nominal small amount of capital stock, with power to increase the amount for purpose of taking over these companies; and as each company came in, that it surrender its charter.

"A street railway should be given broad powers, subject to supervision of some controlling board. It should not be tied up hand and foot in the matter of issuing securities. At present street railways are limited to the same amount of bonds as capital stock and premiums. There should be elasticity as to amount of preferred stock and ordinary stock, also sinking fund securities which could be issued for improvements, and very many improvements will be needed to carry through such a comprehensive plan as outlined in that report. This proposed company should have authority to use the cars of connecting steam railroads. Such a company as is proposed will require assistance to enable it financially to perform this great public service. It should not be unduly loaded with taxes, and at the present time street railways are unduly loaded. In other words, if you are to consider this problem with a view of solving it yourselves and in this Legislature, you should pass such an act, leaving service, rates and every proper function of that corporation subject to the control of proper commissions. If you do this, I believe you will obtain the best co-ordinated metropolitan transportation system to be found anywhere."

Kansas Railway Dynamited.—An explosion tore a rail from the track of the Union Traction Company near Coffeyville, Kan., on May 14. An interurban car was stopped and no further loss was sustained. The explosion is believed to have been caused by former employees, who are on strike.

Detroit Commission Requests Selling Price of City Lines.—On May 13 the Detroit Street Railway Commission asked the Detroit United Railway to submit a selling price to the city by June 1 for the lines of the company within the city. The company has since notified the commission that it will submit a formal reply to this request as soon as possible.

Bus Service in Cleveland.—The Cleveland (Ohio) Railway will probably be authorized by the Council to install a bus service between the terminals of the West Twenty-fifth Street and the Lorain Avenue lines and West Park Cemetery. The buses to be used in Collinwood will be delivered within a short time. It is said that this mode of transportation will be used only until track extensions are made.

Mason City Franchise Granted.—A victory has been scored for the United Light & Railways Company in Mason City, Ia., through a vote of 3 to 1 in favor of the Mason City & Clear Lake Railroad by which it has been granted three franchises. The company waged a war of publicity and submitted the question in controversy to the people to decide, and the election indicated that the opinion of the community was that the best interests of the public would be served by granting the franchises to the company.

Trolley Day in Champaign.—The officers of the Urbana & Champaign Railway, Light & Gas Company, a part of the Illinois Traction System, selected May 21 as the annual trolley days. On that day all of the receipts were turned over to the Julia F. Burnham Hospital, Champaign. Young ladies from Champaign and Urbana acted as conductors during the morning. In the evening fraternity men from the University of Illinois, located between Champaign and Urbana, acted as conductors, although the regular conductors of the company were on duty and in charge of the cars. The women in charge of the hosital usually combine "tag-day" in connection with trolley day.

Cleveland Electrical Exposition.—The Cleveland Electrical Exposition, which is being held in the Coliseum, Cleveland, May 20-30, was started last Wednesday by Thomas A. Edison, who in his laboratory at Orange, N. J., pressed a button which turned on the lights and set the machinery of the exposition in motion. Charles F. Brush gave a short address at the opening ceremonies. The Coliseum and streets in the vicinity had elaborate electrical decorations. More than 105 exhibitors were present and displayed the latest developments in electrical manufacture, appliances for household and office use, as well as lamps, globes, bowls and fixtures. A lecture hall has been provided for experiments, lectures and moving pictures.

Co-operative Electric Railway Testing at Worcester, Mass.—Twenty-two students in electrical engineering at Harvard University will visit the Worcester (Mass.) Polytechnic Institute from May 26 to 29 under the direction of Prof. Harry E. Clifford, to conduct an investigation with the electric railway test car of the Institute. The program includes a two-hour lecture on car operation and testing by Prof. Albert S. Richey of the division of electric railway engineering, and a series of test runs with the car on the Leicester line of the Worcester Consolidated Street Railway. On the test runs graphic records will be made of the current, voltage, speed, motor heating and power input, heating, lighting and air compressor energy requirements.

Post-office Square Terminal Discountenanced at Boston.—The Boston Transit Commission has filed a report with the Legislature recommending the abandonment of the idea to make Post-office Square the easterly terminus of the Boylston Street subway. The board points out that while double terminal system might be desirable by which some cars could complete their trips at Park Street and others at Post-office Square, the cost of building a separate tunnel to the latter point from Boylston Street is not justified by the probable traffic. With the extension of the Cambridge subway eastward from Park Street transfer arrangements can be effected between cars arriving at this point and trains running to the South Station-Post-office Square district, and a comprehensive service is likely to be established which will render unnecessary the proposed diversion of the Boylston Street subway.

Extensions in Seattle.—The deadlock in the City Council of Seattle, Wash., that for five years has prevented the construction of a single street railway extension in Seattle was broken recently by the adoption by the City Council by a vote of seven to one of a resolution fixing it as the policy of the Council that franchises for extensions in residence districts and not of trunk lines or on canyon routes be granted on terms identical with the blanket franchise under which all of the lines of the Puget Sound Traction Light & Power Company are operated. This action on the part of the Council disposes of the objectionable section of the charter under the term of which the company refused to make extensions on the ground that the provisions were unreasonable. Extensions will be made at once of the Ballard Beach, Sixth Avenue, Wallingford, Beacon Hill, Cowen Park line, and Alki Beach line, a total distance of about 8 miles.

A. I. E. E. Business Meeting.—At the annual business meeting of the American Institute of Electrical Engineers, held on May 12, announcement was made of the results of the election of officers. Including the newly elected members, the officers of the Institute for the year beginning Aug. 1, 1914, will be as follows: President, Prof. Paul M. Lincoln; vice-presidents, H. H. Barnes, F. S. Hunting, J. A. Lighthipe, Farley Osgood, C. F. Scribner and N. W. Storer; managers, Comfort A. Adams, Frederick Bedell, B. A. Behrend, J. H. Finney, Bancroft Gherardi, William B. Jackson, Peter Junkersfeld, H. A. Lardner, A. S. McAllister, William McClellan, Lewis T. Robinson and H. Franklin Stevens; treasurer, George A. Hamilton; secretary, F. L. Hutchinson. According to the report of the board of directors, the membership on April 30, 1914, consisted of five honorary members, 439 fellows, 1027 members and 6405 associates; total, 7876, a net increase of 222 since April 30, 1913.

Demands for Extensions in Louisville.—Popular demand from residents of two large sections of Louisville for the extension of the lines of the Louisville (Ky.) Railway has progressed in one case until a franchise-creating ordinance is before the General Council and in the other to a point where a mass meeting of the citizens has been called for the evening of May 26. The more insistent of the demands is from the residents of the West End, between Broadway and Market Street and south of Twenty-eighth Street. The western boundary of this district is composed of Shawnee Park, a public recreation ground, and Fontaine Ferry Park, a private amusement resort, on the line of Forty-seventh Street. Five hundred heads of families signed the petition for the extension, which would mean that the West Chestnut Street line, now halting at Twenty-seventh Street, would be extended north on Twenty-eighth Street to Madison and west on Madison to the park, a distance of 2 miles. In this part of the city Broadway and Market Street lie half again as far apart as in the downtown section. In the eastern part of the city the people want the Oak Street line, recently extended, diverted at Transit Avenue and Bardstown Road so as to run through Transit Avenue and the Workhouse Road to Crescent Hill, opening up a large area in which the service has been regarded as inadequate.

PROGRAMS OF ASSOCIATION MEETINGS

Pacific Claim Agents Association

The Pacific Claim Agents Association will hold its annual convention for 1914 at Spokane, Wash., on July 9, 10 and 11. A program of subjects of interest to the claim departments of all transportation companies is being arranged.

New York Electric Railway Association

The thirty-second annual meeting of the New York Electric Railway Association will be held at Hotel Champlain, Bluff Point, N. Y., on Tuesday and Wednesday, June 30 and July 1. The program of the meeting is now being prepared for distribution.

Financial and Corporate

Stock and Money Markets

May 20, 1914.

In the trading on the New York Stock Exchange to-day price changes of some consequence occurred in a few issues, but the market as a whole was inactive. New Haven after selling down to 67 in the forenoon rallied to 67¾. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 3 per cent; four months, 3 per cent; six months, 3¾ per cent.

In the Philadelphia market to-day trading was irregular. In the early trading Rapid Transit sold at 18 and Philadelphia Electric at 26⅛. Late in the day Philadelphia Rapid Transit sold off to 17½ and Union Traction to 45.

The Chicago market was weak to-day. Bonds held steady. Sales were recorded of Kansas City Railway & Light preferred at 39, City Railway 5's at 100, Union Elevated 5's at 83 and South Side Elevated 4½'s at 94.

The Boston market to-day was again very dull. Prices as a rule were fairly steady.

In Baltimore to-day United Railways issues were the feature, the common reaching a new high mark. Sales of stock totaled 2,872 shares and sales of bonds $94,900 par value.

Quotations of traction and manufacturing securities as compared with last week follows:

	May 13	May 20
American Brake Shoe & Foundry (com.)	86	87
American Brake Shoe & Foundry (pref.)	133	134
American Cities Company (com.)	29	*29
American Cities Company (pref.)	61⅞	64
American Light & Traction Company (com.)	340	340
American Light & Traction Company (pref.)	107	107
American Railways Company	37⅜	37
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	76	77
Boston Elevated Railway	79	80½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	a55	a55
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	91⅝	93
Capital Traction Company, Washington	100	98⅝
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg, ctf. 1	98	a98
Chicago Railways, ptcptg., ctf. 2	33	34
Chicago Railways, ptcptg., ctf. 3	5	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	102½	*102½
Cleveland Railway	104	104¼
Cleveland, Southwestern & Columbus Ry., (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	13	*13
Columbus Railway (com.)	53	*53
Columbus Railway (pref.)	79½	*79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	a80
General Electric Company	145½	148
Georgia Railway & Electric Company (com.)	119⅞	119
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14⅝	14½
Interborough-Metropolitan Company (pref.)	62¼	62¼
International Traction Company (com.)	*40	*40
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	18	18
Kansas City Railway & Light Company (pref.)	37	37
Lake Shore Electric Railway (com.)	6	6
Lake Shore Electric Railway (1st pref.)	92	92
Lake Shore Electric Railway (2d pref.)	22	22
Manhattan Railway	131¼	130½
Massachusetts Electric Companies (com.)	10	11
Massachusetts Electric Companies (pref.)	59	60½
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25½	25½
North American Company	76½	76¼
Northern Ohio Traction & Light Co. (com.)	70	70
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	39⅞	40
Philadelphia Company, Pittsburgh (pref.)	38½	38½
Philadelphia Rapid Transit Company	17	*17
Portland Railway, Light & Power Company	50	50
Public Service Corporation	112	112
Third Avenue Railway, New York	41	42½
Toledo Traction, Light & Power Co. (com.)	20	20
Toledo Traction, Light & Power Co. (pref.)	70	70
Twin City Rapid Transit Co., Minn. (com.)	104½	107
Union Traction Company of Indiana (com.)	11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	26⅝	28
United Rys. Inv. Company (com.)	15	15
United Rys. Inv. Company (pref.)	42	42½
Virginia Railway & Power Company (com.)	a53	49
Virginia Railway & Power Company (pref.)	94	98¼
Washington Ry. & Electric Company (com.)	86½	87¼
Washington Ry. & Electric Company (pref.)	84½	84
West End Street Railway, Boston (com.)	67	67¼
West End Street Railway, Boston (pref.)	85	87
Westinghouse Elec. & Mfg. Company	74	76
Westinghouse Elec. & Mfg. Co. (1st pref.)	120	122

* Last sale. a Asked.

ANNUAL REPORTS

Geary Street Municipal Railway

The financial report of the Geary Street Municipal Railway of San Francisco, Cal., for the period between Dec. 28, 1912, and Dec. 31, 1913, contains the following balance sheet as of Dec. 31, 1913, prepared in compliance with charter provisions for the purpose of comparison with privately owned utilities:

Assets		Liabilities		
Cost of road and equipment	$1,657,251	Funded debt — bonds sold		$1,969,000
General expenditures	181,890	Contribution from premium on bonds		2,342
Municipal bonds owned	93,300	Contribution from taxes		238,692
Cash in city treasury	547,627	Current liabilities		161,313
Other current assets	43,229	Obligatory charter reserves		116,646
		Depreciation	$80,055	
		Taxes	35,454	
		Insurance	1,137	
		Surplus		45,304
	$2,533,297			$2,533,297

It will be noticed that the above statement conforms in general to standard railway practice except that the railway, unlike a private corporation, has no capital stock. There are, however, contributions to capital from premiums on bonds and from taxes, direct and indirect, used to meet interest on funded debt, cost of elections and legal and clerical service. The charter also requires that depreciation, insurance and taxes shall be accounted for although the municipal railway has no taxes to pay. Therefore, the deduction from income on account of taxes appears on the balance sheet as a credit to one of the obligatory charter reserves. The city's equity in the property may be said to comprise the contribution from premium on bonds, the contribution from taxes, obligatory charter reserves and surplus, a total of $402,984 as of Dec. 21, 1913.

As noted in the ELECTRIC RAILWAY JOURNAL of Oct. 11, 1913, page 688, the total cost of construction of the road, according to the official statement to the Board of Public Works, for the first six months of operation ended June 30, 1913, was $1,680,255. In the report for the year the cost of road and equipment account has been slightly readjusted to $1,657,251, and various general expenditures amounting to $181,890 have been capitalized. These expenditures include certain organization and development items as shown by the following list:

Interest on funded debt during construction:	
Total interest on Geary Street bonds sold to June 30, 1913	$187,785
Total interest on Market Street bonds sold to June 30, 1913	1,552
	$189,337
Deduct accrued interest received from bond buyers	20,134
Total net interest accrued to June 30, 1913	$169,203
Less amount deducted from income	29,584
Net amount of interest capitalized	$139,619
Cost of elections:	
Bond election held Dec. 30, 1909	$15,222
Market Street agreement referendum, April 22, 1913	14,406
Total cost of elections	$29,628
Legal services:	
City attorney to Dec. 31, 1912, at $3,000 per year	$7,500
City attorney's trip to Washington and special appropriation	2,500
Dillon & Hubbard opinion	1,200
H. A. Mason, salary, August, 1910	250
Total legal services	$11,450
Miscellaneous:	
Engraving bonds	$620
Bond books	115
Bond circulars and advertising sales	107
Installation of accounting procedure	350
Total miscellaneous	$1,193
Total	$181,890

The three following schedules are amplifications of the accounts on the balance sheet under the headings of funded debt and contribution from taxes, and of the account appearing in the income statement for interest on funded debt.

Funded Debt Dec. 31, 1913

4½ per cent bond issue of July 1, 1910:		
Geary Street Railway—West from Kearny Street:		
Authorized, issued and outstanding		$1,900,000
Geary Street Railway—Kearny Street to Ferries:		
Authorized	$120,000	
Not issued	51,000	
Authorized, issued and outstanding		69,000
		$1,969,000

Serial bonds maturities 1915 to 1934, redemption $101,000 each year.

Contribution from Taxes, Dec. 31, 1913

Taxes collected to meet interest on funded debt:	
Fiscal year 1910-1911	$45,710
1911-1912	34,465
1912-1913	90,285
1913-1914	27,302
	$197,764
Cost of bond election Dec. 30, 1909, and of referendum election April 22, 1913	29,628
Legal expense—services of city attorney	10,500
Clerical service—Board of Public Works and Supervisors	800
	$238,692

Interest on Funded Debt, Dec. 31, 1913

Interest on amount invested in that part of the road actually in operation for the period from Dec. 28, 1912, to June 30, 1913, computed semi-monthly upon the amounts expended as per records of the bookkeeper, Board of Public Works	$29,584
Interest on $69,000 Market Street Railway bonds for six months ending Dec. 31, 1913, at 4½ per cent	1,552
Interest on $1,900,000 Geary Street Railway bonds for six months ending Dec. 31, 1913, at 4½ per cent	42,750
	$73,886

The complete income statement of the Geary Street line for the period from Dec. 28, 1912, to Dec. 31, 1913, follows:

Operating revenues:		
Passenger revenues		$444,393
Rent of buildings		354
Total		$444,747
Operating expenses:		
Way and structures	$5,659	
Equipment	10,561	
Traffic	82	
Conducting transportation	182,097	
General and miscellaneous	8,390	
General and miscellaneous (comparison charges required by charter)	4,587	
Depreciation—18 per cent of gross revenue	80,055	
Total		$291,431
Net operating revenue		$153,316
Income from municipal bonds owned		1,329
Gross income, less operating expenses		$154,645
Deductions from income:		
Taxes (comparison required by charter):		
Municipal franchise 3 per cent on passenger revenue		$13,332
Municipal car license		548
State franchise 4¾ per cent on gross revenues		21,125
Federal income 1 per cent on net income		449
Total taxes		$35,454
Interest on funded debt		73,887
Total deductions		$109,341
Net profit for year		$45,304

The operating ratio for the period was 65.5 per cent. The operating expenses included a reserve for depreciation and renewals computed at 14 per cent of the gross operating revenues and for injuries and damages at 4 per cent on the same amount. On a basis of the operating expenses, including depreciation, the expenses for maintenance of way and structures constituted 1.9 per cent; maintenance of equipment, 3.6 per cent; conducting transportation, 62.5 per cent, and general and miscellaneous, 4.5 per cent. On a basis of operating expenses, excluding depreciation, the expenses for maintenance of way and structures were 2.7 per cent; maintenance of equipment, 5 per cent; conducting transportation, 86.2 per cent and general and miscellaneous, 6.1 per cent.

The total passenger revenue per car mile was $0.34189 and per car hour $3.446. The total operating expenses per car mile were $0.15896 and per car hour $1.6024, taxes and depreciation not being included. The operating expenses, depreciation and taxes per car mile were $0.25128 and per car hour $2.533, giving a net income from operation of $0.0906 per car mile and $0.9133 per car hour. The total single track mileage is 16.18 and the number of cars owned 43. The total passengers carried numbered 9,723,177, including 8,882,996 full fare revenue passengers, 49,935 half fare revenue passengers, 49,543 revenue transfer passengers, 631,363 non-revenue transfer passengers and 110,240 non-revenue passengers.

Westinghouse Electric & Manufacturing Company

The consolidated statement of income, profit and loss of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., and subsidiary companies in the United States for the year ended March 31, 1914, follows:

Gross earnings:	
Sales billed	$43,733,645
Cost of sales:	
Factory cost, including all expenditures for patterns, dies, new small tools and other betterments and extensions; also depreciations of property and plant, inventory adjustments and all selling, administration, general and development expenses	39,016,423
Net manufacturing profit	$4,717,222
Other income:	
Interest and discount	$454,999
Dividends and interest on sundry stocks and bonds owned	718,282
Miscellaneous—royalties, etc	107,575
Total other income	$1,280,856
Gross income from all sources	$5,998,078
Deductions from income:	
Interest on bonds and debentures	$1,042,192
Interest on collateral notes	591,259
Interest on long term notes and mortgages	72,554
Proportion of expenses incidental to bond and note issues	133,750
Miscellaneous	99,514
Total deductions	$1,939,269
Net income available for dividends and other purposes	$4,058,808
Profit and loss credits:	
Profit and loss—surplus, March 31, 1913	$7,348,522
Profit on bonds purchased	3,010
Profit on sales of sundry investments (net)	591,964
Total credits	$7,943,496
Gross surplus	$12,002,304
Profit and loss charges:	
Dividends on preferred capital stock	$279,909
Dividends on common capital stock	1,405,989
Depreciations and adjustments (net)	2,286,589
Miscellaneous	370,687
Total charges	$4,343,174
Surplus, March 31, 1914, per balance sheet	$7,659,130

The gross earnings-sales billed amounted to $43,733,645 in 1914, a record figure for the past five years, comparing with $39,977,565 in 1913, an increase of 9.4 per cent. The cost of sales, including all selling, administrative and general expenses, increased from $35,406,293 in 1913 to $39,016,423 in 1914, an increase of 10.2 per cent; net manufacturing profits from $4,571,272 in 1913 to $4,717,222 in 1914, or 3.2 per cent; other income from $996,564 in 1913 to $1,280,856 in 1914, or 28.5 per cent, and gross income from all sources from $5,567,836 in 1913 to $5,998,078 in 1914, or 7.7 per cent. The ratio of manufacturing profit to sales billed decreased during the year on account of severe competition and depreciation charges this year included in the cost of sales. During the previous accounting period the depreciation charges were deducted from income.

Owing to a large decrease in inventory adjustments, scrap charges and bad account deductions, the net income applicable to interest and other charges showed an increase of from $4,776,448 in 1913 to $5,764,814 in 1914, or 20.7 per cent; interest charges from $1,612,416 in 1913 to $1,706,005 in 1914, or 5.8 per cent, and the net income available for dividends and other purposes from $3,164,032 in 1913 to $4,058,808 in 1914, or 28.2 per cent. The amount available for dividends amounted to 10.75 per cent on the common stock, compared with 8.2 per cent for the previous period. The value of unfilled orders on March 31, 1913, was $12,061,473; on March 31, 1914, the corresponding amount was $7,951,385. The average number of employees during the year was 18,635 as compared with an average of 20,542 for the previous year.

The surplus as of March 31, 1913, was $7,348,522. This was increased by the net income for the year and various items detailed in the statement of profit and loss to a gross surplus of $12,002,304. By charges for dividends on the preferred stock at the rate of 7 per cent, amounting to $279,909, and on the common stock at the rate of 4 per cent, amounting to $1,405,989, and by miscellaneous charges aggregating $370,687, the total surplus was reduced to $9,945,720. This surplus was so much larger than in either 1913 or 1912 that it was possible to charge off depreciation

and adjustments of investments or other assets amounting to $2,286,589, leaving a surplus as of March 31, 1914, of $7,659,130. Not only are all the foregoing figures indicative of the success of the Westinghouse Company during the past fiscal year, but they also reflect the enlarged earnings and increased prosperity of the public service corporations served by the Westinghouse products.

One of the interesting facts in connection with the balance sheet of the company is the fact that the property and plant account decreased $412,649 on account of the fact that the credits for depreciation of buildings and equipment exceeded the charges for additions to plant. The report states that it is a matter of considerable satisfaction to the company that it was able to show a large increase in the sales billed during the year and at the same time this actual net decrease in the property and plant account.

There was a net decrease in the total investments in foreign companies, chiefly accounted for by the depreciation of $1,000,000 in the book value of the debentures of the Russian Company. During the year remittances aggregating over $900,000 were received in reduction of the amount due for advances made by the American Company. Advices from the liquidator indicate that there will be realized an amount sufficiently large to pay the greater part of the present book value of the company's investment in the debentures of the Russian Company. The liquidation proceedings are progressing most satisfactorily, and it is expected that they will be completed during the current fiscal year. The reports of the British Company reflect a continued improvement, a dividend of 5 per cent on its preference shares (the first since 1904) being declared out of the results of operation for 1913. The net income of the French Company for the past fiscal year exceeded that of any previous year in its history. The Italian Company received additional orders for locomotives from the government and now has orders in hand sufficient fully to occupy its facilities during the current year.

The total of the investments in traction and power companies was reduced during the year almost $2,000,000. This was partly due to depreciations, but chiefly to the sale of the securities of the Niagara, Lockport & Ontario Power Company, resulting in a net profit over the book value as of March 21, 1913. Since the close of the fiscal year covered by the present report the directors of the company have approved the sale of the investments in bonds and a majority of the capital stock of the Scranton & Wilkes-Barre Traction Corporation, the successor to the Lackawanna & Wyoming Valley Transit Company, the reorganization of which has been previously referred to in the ELECTRIC RAILWAY JOURNAL. The cash to be realized from the sale of these securities is approximately the book values as of March 31, 1914, and will be used for the retirement of the two-year 6 per cent collateral notes of the company.

The total liabilities of the company showed a decrease of over $5,000,000 as compared with the previous year. Its funded debt decreased over $500,000, owing to the payment of the outstanding balance of debenture certificates due July 1, 1913, and the sinking fund payment. The five-year notes aggregating $429,500, issued to creditors under the plan for the discharge of the receivers in 1908, matured Jaan. 1, 1914, and were paid. The collateral notes aggregating $3,500,000 placed during the previous year were paid in full during the current year. An additional collateral loan of $1,250,000 was placed during the year and will be paid at maturity on June 29, 1914. The issue of three-year 6 per cent collateral notes due Aug. 1, 1913, was renewed to the extent of $3,250,000 for two years. The payment of these notes aggregating $4,500,000 will be made from the proceeds of the sale of securities and will not deplete the working cash capital of the company. Furthermore, their payment will return to the treasury a large amount of surplus securities pledged thereunder and will leave outstanding but one issue of collateral notes—namely, the ten-year 5 per cent notes due Oct. 1, 1917, amounting to $2,720,000.

Values of New Haven Collateral

The Boston *News Bureau* says that of the various New York, New Haven & Hartford Railroad securities pledged in that company's latest financing, Central New England Railway stocks and two public utility stocks, purchased at bargain prices with the properties in a bad state of development, were advanced in value over the figure at which New Haven carries them. New York City 4s and 4¼s, as well as short term subsidiary notes endorsed by the New Haven, maintained for collateral purposes what they cost the New Haven. American Telephone stock also went in at its cost price. The value of steam railroad stocks, purchased by the New Haven above the market to serve special purposes, was marked down heavily for collateral purposes. Bonds of New York, Westchester & Boston Railway, although guaranteed by the New Haven, were likewise reduced, as was stock representing the electric railway properties in Rhode Island and Connecticut. Railroad bonds put up by New Haven as security for the notes were also generally marked down. The difference between the price paid by the New York, New Haven & Hartford Railroad for the paper of the electric railways and the value of that paper now as collateral as contained in the table prepared by the *News Bureau* is as follows:

	Value as collateral	What N. H. paid	Dec., per cent
Rhode Island Company	37	251	80
Connecticut Company	50	100	50
Vermont Company 5s	50	100	50
Providence Securities 4s	55	84½	35
New England Investment & Securities 4s	65	99½	35
New York, Westchester & Boston 4½s	72	100	28
Providence & Danielson 5s	66 2-3	85	21½
Seaview Railroad 5s			
Connecticut Railway & Lighting 4½s	93	109.3	15
New York & Stamford Railway 4s	75	88½	15

Ardmore (Okla.) Traction Company.—The Ardmore Traction Company has been taken out of the hands of C. L. Byrne as receiver and is now owned by the Ardmore Electric Railway. The officers of the new company are: George S. Cravens, president; John F. Easley, secretary; James C. Mort, treasurer.

Bay State Street Railway, Boston, Mass.—The $285,000 of Boston & Northern Street Railway and $760,000 of Old Colony Street Railway 4 per cent bonds which William A. Read & Company purchased on competitive bidding are being offered by the bankers at 89 and interest to yield 4.60 per cent. These are first mortgage refunding bonds. The mortgage securing the Boston & Northern Street Railway bonds will be closed, except for refunding purposes, upon the issuance of only $2,265,000 of additional bonds, and under the Old Colony Street Railway mortgage only $1,389,000 bonds may be issued for other than refunding of prior liens.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—At the annual meeting of the stockholders of the Buffalo, Lockport & Rochester Railway E. I. Edgecomb, Syracuse, was elected a director to succeed W. K. Pierce.

Central New York Southern Railroad Corporation, Ithaca, N. Y.—Commissioner Decker of the Public Service Commission for the Second District of New York held a hearing on May 18 upon the application of the Central New York Railroad Corporation for the approval of its first and collateral trust mortgage and the issuance of bonds and stock, amounting to more than $2,000,000; the application of the Ithaca Traction Corporation for the approval of an issue of $488,000 of its first refunding mortgage bonds and $400,000 of capital stock; and the application of Central New York Southern Railroad Corporation as to construction, exercise of franchises and transfer of franchises. These applicants are inter-related and the purposes were set forth in a lengthy explanation by Charles E. Hotchkiss, Syracuse, attorney for the applicants. Herbert A. Clark, third vice-president of the Central New York Southern Railroad Corporation, went into the details of constructing the proposed line, the terminals of which are Ithaca and Auburn. The commission reserved decision.

Cities Service Company, New York, N. Y.—In regard to the report that the bankrupt firm of Cramp, Mitchell & Company was heavily interested in securities of the Cities Service Company, Henry L. Doherty & Company state that the Philadelphia bankers did not hold a share of stock in any of the Doherty enterprises, and that Howard E. Mitchell, of the failed firm, had tendered his resignation as a director of the Cities Service Company some time ago.

Cleveland (Ohio) Railway.—The Cleveland Railway has been authorized by the Council to purchase its own stock for investment purposes. Peter Witt, street railway commissioner, explained that it was proposed to invest the unused portion of the interest fund in this manner. The company has arranged to dispose of a portion of its private right-of-way between Lexington and Superior Avenues, and a resolution has been introduced in the Council authorizing the sale of land for $12,750.

Dallas (Tex.) Electric Company.—Stone & Webster, Boston, Mass., are offering for sale at 96¾ and interest to yield 6.20 per cent $1,500,000 of three-year 5 per cent gold coupon notes of the Dallas Electric Company, dated June 1, 1914, and due June 1, 1917. These notes are in the denominations of $500 and $1,000, interchangeable, and may be registered as to principal. They are callable as a whole at 100 and accrued interest upon thirty days' notice. The interest is payable June 1 and Dec. 1 at the office of the American Trust Company, Boston, Mass., trustee. The proceeds from the sale of the notes will provide funds to retire the company's floating debt incurred for extensions to the carhouses and shops, to purchase additional rolling stock equipment to build an extension to the company's power station. The property at Dallas has been under the management of the Stone & Webster organization since 1902.

Dedham & Franklin Street Railway, Westwood, Mass.—Harry M. Verrill, Portland, Maine, and Reginald H. Johnson, Cambridge, Mass., who purchased the property of the Dedham & Franklin Street Railway, have filed a petition with the Public Service Commission of Massachusetts setting forth that the petitioners, with fifteen associates, propose, if the sale is confirmed by the court, to organize a company to be named the Dedham & Medway Street Railway, to hold, own and operate the property purchased. The petitioners ask the commission to determine the fair replacement cost of the railway and to approve an issue of capital stock to that amount. The court has since confirmed the sale.

Delta Electric Light & Traction Company, Greenville, Miss.—The Delta Electric Light & Traction Company is said to have concluded the negotiations which have been pending for some time for the purchase by it of the Greenville Electric Light & Street Railway, controlling the Riverside Transmission Company, the Lake Village Light & Power Company, Lake Village, Ark., and the Chicox Light & Power Company. The following are the officers of the new company: Frank Robertshaw, president of the Citizens Bank, Greenville, Miss., president; L. K. Saulsbury, Memphis, vice-president; Ralph Claggett, Greenville, Miss., secretary, treasurer and general manager. The Greenville Electric Light & Street Railway Company includes an electric light plant which supplies the entire city of Greenville and 10 miles of street railway and equipment. The Riverside Transmission Company operates a supply cable from Greenville to Arkansas and Mississippi points and supplies cotton gins, mills, etc. The Chicot Light & Power Company furnishes electric light and power for Chicot County and the Lake Village Light & Power Company supplies the city, which is located in Chicot County.

Des Moines Railway & Light Company, Des Moines, Ia.—The Des Moines Railway & Light Company, which is the holding company for the electric light plants in Des Moines, Oskaloosa, Colfax, Valley Junction, New Sharon, Montezuma and Prairie City, in Iowa, controlled by the McKinley interests, has filed with the Secretary of State a certificate changing the name of the company to the Des Moines & Central Iowa Electric Company and increasing the capital stock of the company from $500,000 to $1,000,000.

Glendale & Eagle Rock Railway, Glendale, Cal.—The Railroad Commission of California has authorized the Glendale & Eagle Rock Railway to issue $50,000 of 6 per cent first mortgage bonds to be sold so as to net the applicant 90 per cent of the par value.

Halifax (N. S.) Electric Tramway, Ltd.—The bill to enable the Nova Scotia Power Company to acquire the Halifax Electric Tramway, Ltd., was passed by a committee of the whole Legislature on May 14.

Jersey Central Traction Company, Keyport, N. J.—The Jersey Central Traction Company has authorized a new general and refunding mortgage for $5,000,000 in favor of the Girard Trust Company, Philadelphia, Pa. The new mortgage will replace a general and refunding mortgage for $1,500,000 in favor of the Fidelity Trust Company, Newark, N. J., under which $1,147,000 of bonds is outstanding and $353,000 reserved to retire a similar amount of first mortgage 5 per cent gold bonds now issued, for which the Colonial Trust Company, Philadelphia, Pa., is trustee. It is reported that part of the new issue will be sold at this time to provide funds for improvements and extensions to the property of the Middlesex & Monmouth Electric Light, Heat & Power Company.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—The Menominee & Marinette Light & Traction Company has certified to the Secretary of State an increase in its capital stock from $1,000,000 to $1,250,000.

Michigan Railway, Jackson, Mich.—The Michigan Railway, created to take over the operation of the Michigan & Chicago Railroad, now under construction between Kalamazoo and Grand Rapids, Mich., organized on May 12, 1914, as follows: J. F. Collins, general manager of the Michigan United Traction Company, manager; O. W. Dobbins, secretary of the Michigan United Traction Company, secretary, and J. B. Glendeming, treasurer of the Michigan United Traction Company, treasurer of the new company. The vice-presidents of the new organization include G. W. Mechem, Battle Creek; B. C. Cobb, New York; W. A. Foote, Jackson; and Frank Silliman, Jr., Philadelphia.

Northern Electric Railway, Chico, Cal.—The Sacramento & Woodland Railroad and the Northern Electric Railway have joined in an application filed with the Railroad Commission asking for an order authorizing an agreement by which the Sacramento & Woodland Railroad will be operated by the Northern Electric Railway.

United Railways Investment Company, San Francisco, Cal.—Henry Almstedt, of Almstedt Brothers, Louisville bankers; C. H. Bean, of C. H. Bean & Company, Philadelphia; Henry J. Bowdoin, Baltimore capitalist; James D. Callery, president of the Pittsburgh Railway; Frank R. Ford, of Ford, Bacon & Davis; Sidney March, of Ladenburg, Thalman & Company; F. S. Smithers, of F. S. Smithers & Company; Edwards Whitaker, of Whitaker & Company, St. Louis, Mo., and President Mason B. Starring have been named to comprise the committee, authorized at the annual meeting of the United Railways Investment Company, which will map out a plan for readjusting the finances of the company.

Washington (D. C.) Utilities Company.—The Fidelity Trust Company, Baltimore, has purchased from the Washington Utilities Company $1,500,000 of one-year 5 per cent collateral trust notes dated May 1, 1914, which are being offered on a 6.25 per cent basis. The notes are secured by the deposit of 27,500 shares of common stock of the Washington Railway & Electric Company. The Washington Utilities Company agrees in the note indenture to limit the payment of dividends on its stock during the life of the notes to 2 per cent a year. The earnings of the issuing company applicable to note interest are about three times the amount required to meet the interest on the notes.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—Interest on the $1,900,000 collateral trust 5 per cent bonds of Wilkes-Barre & Hazleton Railroad, due on May 15, was not paid by the Guaranty Trust Company. The bonds are part of an authorized issue of $2,500,000 and are due May 15, 1951. In lieu of paying the interest, the company is asking the bondholders to surrender their May 15 certificates and all other certificates up to and including the Nov. 15, 1916, coupon. In return the company will issue non-interest bearing certificates for the different coupons when they become due. The company has issued a circular to the bondholders asking them to accede to the plan. The company owns the entire $1,500,000 stock and $1,500,000 first mortgage 5 per cent bonds of the Wilkes-Barre & Hazleton Railway and these securities are deposited as part collateral for the bonds on which the interest has just been defaulted. In addition the railroad company owns a large majority of the $1,000,000 capital stock of the Lehigh Traction Company. The operating companies, the Lehigh Traction Company and the Wilkes-Barre & Hazleton Railway, together operate about 52 miles of electric railway in and around the cities of Wilkes-Barre, Hazleton, Yorktown and the contiguous territory.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

Citizens' Traction Company, Pittsburgh, Pa., $1.50.

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., 1½ per cent.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Pensacola (Fla.) Electric Company, 3 per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$433,073	......	......	......	......
1 " " '13	374,986	......	......	......	......
10 " " '14	4,580,747	......	......	......	......
10 " " '13	4,240,713	......	......	......	......

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

1m., Apr., '14	$25,154	$21,818	$3,337	$651	$2,686
1 " " '13	23,639	22,155	1,484	615	869

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Mar., '14	$67,531	*$83,972	$16,441	$15,931	†$32,372
1 " " '13	74,882	*73,406	1,476	12,983	†11,507
9 " " '14	753,384	*682,339	71,045	138,262	†67,217
9 " " '13	728,758	*662,159	66,599	113,528	†46,929

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., Mar., '14	$619,684	*$431,518	$188,165	$88,370	$99,795
1 " " '13	622,586	*442,576	180,009	86,494	93,515
9 " " '14	6,203,728	*4,464,075	1,739,653	802,263	937,390
9 " " '13	5,850,244	*4,028,884	1,821,360	778,869	1,042,491

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Mar., '14	$182,628	*$119,754	$62,874	$63,543	$669
1 " " '13	171,116	*103,150	67,966	56,808	11,158
12 " " '14	2,388,970	*1,367,661	1,021,309	734,602	286,707
12 " " '13	2,178,838	*1,214,865	963,973	661,608	302,365

GRAND RAPIDS (MICH.) RAILWAY

1m., Mar., '14	$103,555	*$66,575	$36,980	$13,629	$23,351
1 " " '13	106,423	*62,229	44,194	15,063	29,131
12 " " '14	1,299,756	*819,257	480,499	162,918	317,581
12 " " '13	1,255,172	*718,972	536,200	175,728	360,472

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Mar., '14	$48,720	*$39,858	$8,862	$15,503	†$6,641
1 " " '13	48,595	*32,882	15,713	14,596	1,117
12 " " '14	674,232	*446,630	227,602	182,207	45,395
12 " " '13	637,214	*390,124	247,120	173,296	73,824

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., Mar., '14	$22,730	*$22,722	$98	$7,800	†$7,792
1 " " '13	25,035	*23,616	1,418	7,480	†6,062
9 " " '14	275,521	*224,679	50,842	69,494	†18,652
9 " " '13	275,234	*248,496	26,738	64,308	†37,570

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Mar., '14	$33,394	*$47,627	$14,234	$12,246	†$26,478
1 " " '13	28,567	*44,959	16,392	13,992	†30,384
9 " " '14	317,256	*438,679	121,423	88,236	†209,659
9 " " '13	229,830	*416,917	187,088	115,925	†303,013

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Apr., '14	$2,042,320	$1,206,899	$835,421	$808,317	$27,104
1 " " '13	1,998,246	1,193,400	804,846	762,445	42,401
10 " " '14	20,016,913	11,829,473	8,187,441	8,012,337	175,104
10 " " '13	19,711,038	11,832,115	7,878,924	7,624,964	253,960

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Mar., '14	$393,127	*$302,571	$90,556	$111,264	†$20,708
1 " " '13	409,957	*288,214	121,742	102,056	19,686
9 " " '14	4,078,712	*2,996,339	1,082,373	969,435	112,938
9 " " '13	4,037,648	*2,632,845	1,404,803	918,502	486,301

WESTCHESTER ELECTRIC RAILROAD, MOUNT VERNON, N. Y.

1m., Mar., '14	$16,259	*$23,422	$7,164	$1,164	†$8,328
1 " " '13	18,071	*20,364	2,294	987	†3,281
9 " " '14	185,863	*193,549	7,686	9,907	†17,593
9 " " '13	178,570	*188,506	9,936	7,715	†17,651

*Includes taxes.
†Deficit.

Traffic and Transportation

Decision in Puget Sound Electric Railway Rate Case

In an order handed down on May 12 the State Public Service Commission of Washington vacated the order of the old Railroad Commission, made in April, 1910, and will allow the Puget Sound Electric Railway to file a new schedule of passenger rates to take the place of the present rates, as provided in the 1910 order. As a result, it is expected that the company will file the same rates, or nearly so, as were in effect at the time that the former commission entered the order reducing the rates in effect up to 1910. The finding of the commission shows that during the period since the order of the old commission a gradual reduction in the net earnings of the Puget Sound Electric Railway has been experienced until during the first six months of 1913, when an actual deficit was recorded in the operation of the railroad and the power and light property.

The commission sets forth that the cost of reproduction of the property of the company on June 30, 1913, would have been $4,139,490; that the actual cash investment at that date was $3,527,817; that in the year 1909, the last year that the company operated under the old rates prior to the reduction order by the railroad commission, the net earnings of the railroad property of the company were $239,000; that each year since that date a decrease has been recorded until the first six months of 1913 the net earnings amounted to only $3,886; that in the year 1909 the rate of net income on the average annual investment on the entire railroad and the light and power property, not considering depreciation of property, was 7.87 per cent; that during each succeeding year this rate of net return decreased until the first six months of 1913 showed only 0.42 per cent, and that if the customary 2 per cent be allowed for depreciation each year, the earnings during the three and a half years' operation under the orders of 1910 would have decreased from 5.87 per cent in 1909 to an actual deficit of 1.58 per cent in the first half of the year 1913.

In the findings of fact the commission cites at length and in detail the estimates made by the Railroad Commission as to the business that would be done by the company, and shows that in practically every instance these estimates have proved excessive. In this regard the findings read:

"The overwhelming evidence in this case proves conclusively that the theories upon which the Railroad Commission based its orders have not come to pass. The foundation of those orders being now shown not to exist, it follows that those orders can no longer stand. The vacation of those orders will have the effect of restoring to the company the power to establish rates for itself. It will still remain the duty of the company to establish none but just, fair, reasonable and sufficient rates, taking into consideration the value of the service as well as the cost of the service. At the hearing the company indicated its intention, if relieved from the present orders, of re-establishing the same rates put in force by the tariff of Oct. 17, 1909.

"Such a tariff will principally affect the Seattle interurban zone. The Tacoma zone will be given some decreased rates. The two zones will be placed on an equality. In neither zone will the rates per passenger-mile found reasonable for the Tacoma zone be exceeded. The through rates will remain as they are, and rates between intermediate points will be changed but little and principally by slight reductions. In permitting the schedule to go into effect, the commission does not wish to be understood as finally approving it. If any unlawful feature develops, the jurisdiction of the commission remains to correct any abuses. As to the proposed tariff: All we say is that *prima facie*, at least, it appears generally to be approximately fair, in view of the evidence in the record. We have serious doubt about the provision limiting the fifty-ticket commutation books to thirty days after date of sale. If the company in filing its tariff shall unreasonably limit as to time tickets issued to take care of suburban traffic, the commission will inquire further into that feature of the case."

A statement made by the company to the public in regard to its application to the commission for a change in the rates was published practically in full in the ELECTRIC RAILWAY JOURNAL of May 9, 1914, page 1059.

Indianapolis Arbitration Board Decided Upon

An arbitration board to serve during the life of the recent award of the Public Service Commission of Indiana in the adjustment of grievances of the employees of the Indianapolis Traction & Terminal Company arising out of the strike of November, 1913, has finally been decided upon to the satisfaction of both the company and its employees. When the Public Service Commission handed down its award in the controversy over wages and working conditions, provision was made for an arbitration board to settle all matters which might arise in the future during the lifetime of the award. The power of appointing this board was delegated to the chief judge of the State Supreme Court, the chief judge of the Appellate Court, and the judge of the United States District Court. These jurists, when notified of the action of the commission, declined to appoint such an arbitration board as provided. Relations between the employees and the company became strained again, the men insisting on a three man arbitration board to be selected by the parties, and the company contending that the Public Service Commission should continue to act as arbitrators after the failure of their original plan.

Governor Ralston was appealed to and he suggested that the men name any three members of the Public Service Commission to act as a board of arbitration. The men, being directed by international officers of the Amalgamated Association, refused to accede to this plan, and at a mass meeting voted to strike on call of the union officials. Mayor Bell, of Indianapolis, promptly notified J. J. Thorpe of the Amalgamated Association that if any further trouble was caused by him in Indianapolis he would be held personally responsible and arrested. The union leaders then appealed to the Department of Labor at Washington, and Secretary Wilson sent A. L. Faulkner of the board of conciliation to Indianapolis to confer with Governor Ralston. Mr. Faulkner coincided with the Governor in the matter of naming Public Service Commissioners as arbiters, and after a conference Chairman Duncan and Commissioners John F. McClure and Charles A. Edwards were suggested to the company and the employees as a board of arbitration. The company stated its willingness to accept these men as a board of arbitration to take up such matters of dispute as might arise in the future, and after mass meetings of the employees were held they finally agreed to accept these three members of the commission as constituting an arbitration board under the award of Feb. 12.

Railway Efficiency Department in Tacoma

O. C. Mathis, formerly claim agent of the Tacoma Railway & Power Company, Tacoma, Wash., has been appointed superintendent of efficiency, a new office created recently. The bureau will work toward presenting to the trainmen the problems which the company faces and helping them to eliminate accidents.

A safety committee has been appointed composed of about twenty employees, including twelve trainmen and representatives from the machine shops, the power, line and track departments. At meetings which are to be held once each month suggestions for eliminating dangerous practices will be taken up and acted upon. Suggestions from the employees will be secured at first hand. Cards to be used by the men in reporting anything which in their judgment will prevent accidents, lengthen the life of the equipment, lessen power consumption or better the service have been posted in numerous places on the company's property. That the full co-operation of every employee may be obtained, the officials have guaranteed to the trainmen that no information on the cards will be used as a basis for discipline. In this way the men are assured that in reporting any seemingly dangerous practices they are not endangering the position held by any fellow employee. Although the plan has been in effect only a short time, 118 practical suggestions have been turned in by the men. Two meetings of employees are to be held each month. Addresses will be made on different subjects and the suggestions for improvements received by the company will be laid before the men. Among the topics which have been discussed at the semi-monthly meeting held so far have been "Courtesy," "Loyalty," "Honesty" and "Economy." Personal appearance will be discussed at an early meeting.

In connection with this work a safety first organization, including a safety committee and headed by the superintendent of efficiency, has been organized among the employees of the Puget Sound Electric Railway, the Tacoma Railway & Power Company and the Pacific Traction Company. The safety first signs have been displayed in the Tacoma Railway & Power Company's cars for some time. A safety first club is being organized among the trainmen. Emblems bearing the Stone & Webster triskelion and the club name are being prepared. Every man with a clean accident record for a period of three months will be presented with an emblem of the club by the company.

Readjustment of Schedules Demanded in Cleveland

On May 19 the street railway men of Cleveland, through George R. Davies, president of the local union, and W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees, presented their demands for a readjustment of schedules to John J. Stanley, president of the Cleveland Railway, and Peter Witt, street railway commissioner. The complaint has to do principally with the question of time men being compelled to wait at the carhouses in order to get a run. Mr. Stanley told the representatives of the men that the company operated the cars under a schedule devised by Mr. Witt to keep within the franchise allowance. Mr. Witt told the men he would recommend that the company be allowed to spend an amount of money sufficient to grant the demands of the men. A committee composed of a representative of the Amalgamated Association, a member of the local branch and a representative of the company was scheduled to meet on May 21 to consider the preparation of new schedules for all lines.

New Schedule Between Philadelphia and Allentown.—The new express schedule of the Lehigh Valley Transit Company between Philadelphia and Allentown, which reduces the running time by twenty minutes below the former schedule, to one hour and fifty-eight minutes, is now in effect.

Demand for Commutation Tickets on Missouri Line.—John Kennish, of the Missouri Public Service Commission, has been instructed to take evidence in Kansas City on May 27 in an application of residents of Clay County to require the Kansas City, Clay County & St. Joseph Railway to issue commutation tickets.

Working Agreement in Connecticut.—The working agreement between the officers of the Connecticut Company, New Haven, Conn., and the representatives of the men on its various divisions expires on June 1. It is expected that negotiations will soon be begun looking toward a renewal of the agreement for two years.

Accident Fakers Sentenced.—Julius Cohen and Frank Cohen, brothers, whose apprehension as accident fakers by the Public Service Corporation of New Jersey, Newark, N. J., was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, page 334, have been sentenced to serve three months and from one-and-a-half to three years, respectively.

Wage Arbitration Board in Pittsburgh.—An arbitration board of three has been agreed upon to draw up a new contract under which the motormen and conductors of the Pittsburgh (Pa.) Railways will work. The old agreement expired on April 30. The men are asking a maximum of 35 cents an hour, with other concessions in the matter of pay for holidays and overtime.

Knocking Down Fares.—A few weeks ago one of the Chicago Surface Lines' standard registers disappeared from a carhouse. In the search for the lost register it was found that one of the conductors was carrying it around with him on his car in a suitcase. Between certain points on his run he would remove the regular register and replace it with the one he had stolen and ring up the fares on it.

New Rates for Electric Parlor Car Accommodations.—The following rates per ticket, in addition to the regular passenger fares, have been adopted by the Otsego & Herkimer Railroad, Cooperstown, N. Y., for chair, couch or seat accommodations in parlor cars running between local stations: for distances less than 40 miles, 25 cents; for distances of 40 miles or over, 50 cents. These are new rates effective on May 30, 1914, and expire on Oct. 1, 1914.

Traffic Rules in Columbus.—Orders concerning traffic have been issued to motormen on the Columbus Railway, Light & Power Company's lines. Traffic officers will give one blast of a whistle to denote that cars running east and west may proceed in their respective directions and that cars running north and south are to remain at a standstill. Two blasts from a whistle will permit motormen operating cars north or south to proceed. Three blasts from an officer's whistle will mean that all cars are to remain at a standstill, as an indication that a vehicle which has the right of way is coming.

Accidents in Ohio.—On May 13 a special car on the Cleveland, Painesville & Eastern Railway filled with members of the Pythian Sisters, left the track at the Shore Line junction, just west of Willoughby, Ohio, and after striking a pole turned over on its side. Thirty-five women and four men were injured but none seriously. On May 15 a collision occurred between a limited car on the Cleveland, Southwestern & Columbus Railway and a work train on the Lorain, Ashland & Southern Railroad at a grade crossing near Ashland. Forty laborers on the train were injured. The railroad work train consisted of a coach and two flat cars.

Increase in Wages in Grand Rapids.—The Grand Rapids (Mich.) Railway announced an increase of pay for its old conductors and motormen, effective on May 15. Last year the company made a general increase for all the motormen and conductors, making the scale 23 cents an hour for the first six months; 24 cents for the second six months; 25 cents for the two-year men and 26 cents for those who were in their third year with the company, or longer. At that time it was unofficially stated that if business warranted additional grades would be made for the older employees. The new schedule provides for a scale of 26½ cents for the fourth year in the service and 27 cents for the fifth year and thereafter.

Toronto's Transportation Problem.—Toronto's transportation problem was discussed at a meeting of the Ontario Railway & Municipal Board on May 14. Commissioner of Works R. C. Harris and others represented the city, R. J. Fleming and experts looked after the company's interests. The application of the city made many months ago to the board, asking for 350 additional cars on the company's service, was the principal subject discussed. The city's experts differed in their last report with the experts employed by the company. The railway board could not reach any decision on the data presented by the two sides, as it was so conflicting. So the board also engaged experts. It is expected that the board will hand down its finding by June 1.

Record Traffic in Louisville.—The Louisville (Ky.) Railway on Derby Day, the opening of the spring horse racing season hauled some 24,000 people from the city to Churchill Downs and back again, without a single mishap. This is approximately 2000 people more, or 4000 fares more, than the company ever hauled heretofore on a single similar occasion. The crush outbound was distributed between noon and 2 o'clock. To handle the crowd the company pressed 190 cars, including thirty-eight trailers, into service on the Fourth Street line, meaning that practically all of the available rolling stock was in use in the city that day. The Downs lie 4½ miles from the city proper, so the company could count on only a few cars and crews making the round trip more than once.

Question of Free Transportation in Massachusetts.—William A. Bancroft, president of the Boston (Mass.) Elevated Railway, in a letter to the Public Service Commission of Massachusetts under date of May 2, declares that the road does not intend to furnish any free rides this summer. This refers, it is understood, to the free service which the company has been giving in years past to charitable organizations, fresh air funds, Sunday schools and churches in the way of tickets for trips to the park systems, picnic grounds and trolley excursions. The commission some time ago requested a list of the organizations to which the company desired to furnish free or reduced rate service for charitable purposes. Similar requests were sent to all the other street railways and steam roads in the State preparatory for some ruling by the commission as to what constitute charitable purposes.

Personal Mention

Mr. Alvin Dunlap has resigned as superintendent of the railway lines of the Reading Transit & Light Company, Reading, Pa., to engage in other business.

Mr. William Loos has been appointed superintendent of the railway lines of the Reading Transit & Light Company, Reading, Pa., to succeed Mr. Alvin Dunlap, resigned.

Mr. C. C. Gallaher has been appointed acting general manager of the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., to succeed Mr. H. H. Archer, resigned.

Mr. C. B. King, manager of the London (Ont.) Street Railway, was elected president of the Canadian Electric Railway Association at the meeting at Ottawa, Ont., on May 13 and 14.

Mr. C. M. Clark, of E. W. Clark & Company, Philadelphia, Pa., has been elected president of the Nashville Railway & Light Company, Nashville, Tenn., a subsidiary of Tennessee Railway, Light & Power Company.

Mr. O. C. Mathis, formerly claim agent for the Tacoma lines of the Stone & Webster Syndicate, has been appointed superintendent of efficiency, a new office, to which reference is made elsewhere in this issue.

Mr. F. W. Hoover, vice-president of the Chattanooga Railway & Light Company, a subsidiary of the Tennessee Railway, Light & Power Company, has been made vice-president and general manager of the Nashville Railway & Light Company.

Mr. John Davis has been advanced to the position of paymaster with the Illinois Traction System, Champaign, Ill. Mr. Davis was formerly clerk and stenographer with the company. Before becoming connected with the Illinois Traction System he was with the Illinois Central Railroad.

Mr. W. B. Potter, who has been chief clerk in the transportation department of the Illinois Traction System, Champaign, Ill., has been appointed passenger traffic agent at Springfield to succeed the late A. L. Jefferis. Mr. Potter entered the employ of the company four years ago as a timekeeper.

Mr. Tracy Lynn, who has been timekeeper and paymaster of the Illinois Traction System, Champaign, Ill., has been appointed chief clerk in the transportation department to succeed Mr. W. B. Potter, whose advancement to the position of passenger traffic manager at Springfield is noted elsewhere in this column.

Mr. John E. Wilkie, vice-president of the Chicago Railways, has in addition been appointed assistant to President L. A. Busby, of the Chicago Surface Lines. Mr. Wilkie will take up the work formerly under the supervision of Mr. Williston Fish, who resigned as vice-president of the Chicago Surface Lines, effective June 1, 1914.

Mr. S. B. Irelan has been appointed manager of the Bartlesville (Okla.) Interurban Railway, which operates the electric railway between Bartlesville and Dewey and also supplies electric lighting service in Bartlesville. Mr. Irelan was formerly stationed at Fremont, Neb., with H. L. Doherty & Company, who are also the owners of the Bartlesville property.

Dean Mortimer E. Cooley, of the engineering department of the University of Michigan, has signified to the Street Railway Commission of Detroit his inability to serve as chief counsel to the commission in connection with the appraisal of the property of the Detroit United Railway within the city. He gives as his reason the pressure of his work at the university.

Mr. W. T. Woodroofe, formerly superintendent of the Edmonton (Alberta) Radial Railway, is engaged in making a report upon electrolysis conditions in the city of Vancouver, B. C. This report will be presented to the city electrician. Mr. Woodroofe contributed an article on "Electrolysis Mitigation in Edmonton" to the ELECTRIC RAILWAY JOURNAL of April 25, 1914.

Mr. J. G. Hayden has been elected secretary of the Detroit Street Railway Commission. Mr. Hayden was born in Cassopolis twenty-nine years ago. He was educated in the schools of that city and attended the University of Michigan for two years. After serving in the post office at Cassopolis Mr. Hayden engaged in newspaper work in Escanaba. He has been connected with the Detroit *News* for the last seven years.

Mr. George Kidd, whose appointment as general manager of the British Columbia Electric Railway, Ltd., Vancouver, B. C., was referred to briefly in the ELECTRIC RAILWAY JOURNAL of May 16, succeeds Mr. R. H. Sperling, who has been promoted to the position of assistant to the chairman of the board and has also been elected a director of the company. The field of operation of the British Columbia Electric Railway covers the southwestern portion of British Columbia and the southern portion of Vancouver Island. The system embraces a total of 303.5 miles, of which 148.7 miles is city track and 154.8 miles interurban track. The company also furnishes power for lighting and commercial purposes. Mr. Kidd has long been identified with the company, having been connected with its offices both in London and British Columbia. He was appointed secretary of the company in connection with its London work and in January, 1908, was transferred to British Columbia. He has since been located at the head office of the company in Vancouver, filling the position of comptroller.

George Kidd

Mr. George C. Graham has been appointed general foreman in charge of inspection of the rolling stock on the city lines of the Detroit (Mich.) United Railway. Mr. Graham resigned as master mechanic of the United Traction Company, Albany, N. Y., in January, 1910, to become superintendent of car equipment and shops of the Los Angeles-Pacific Company, Los Angeles, Cal. He has lately been engaged in work outside the railway field.

Mr. A. F. Elkins, auditor of the Columbus, Delaware & Marion Railway, Columbus, Ohio, has been appointed an accountant in the division of valuation of the Interstate Commerce Commission, with headquarters at Chicago. He tendered his resignation from the railway to Mr. Eli M. West, receiver of the company, to be effective May 21. Mr. Elkins has been auditor of the company for the last ten years, during nearly five of which he has been associated with Mr. West. Mr. Elkins has always been active in the affairs of the Central Electric Accounting Conference, and was elected president of the conference in 1911 in recognition of the service which he performed in his former office of secretary and treasurer of that body.

Mr. E. C. Gaumnitz has resigned as purchasing agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash. Mr. Gaumnitz was born in St. Cloud, Minn., on Feb. 24, 1882. He went to Seattle with his parents in 1890, and was educated in the public schools. Mr. Gaumnitz entered the employ of the Western Union Telegraph Company about 1896 and remained in its employ until 1899, when he accepted a position in the office of the general superintendent of the Seattle Electric Company. After remaining in that department for a short period he was transferred to the purchasing department to assist in the purchase of supplies and take charge of the stationery stock under Mr. L. H. Bean. He was next made chief clerk to the purchasing agent, which position he held until 1904, when he was appointed acting purchasing agent. In 1905 he was appointed purchasing agent.

Mr. Montague Ferry has been appointed Commissioner of Public Service for the city of Chicago. The work placed in Mr. Ferry's charge results from the combination of several bureaus in the City Hall which are now dealing with public-service corporations and complaints relating to public service. An important part of the work will be the compiling of statistics which may later be valuable in the preparation of rate-regulation ordinances. Mr. Ferry has been connected with the department of gas and electricity of the city of Chicago. He is thirty-three years of age and an engineer by profession. He obtained his collegiate training in Yale University and the Massachusetts Institute of Technology. He has been connected with a number of telephone companies and at one time was in the office of McMeen & Miller, engineers, Chicago. He is an associate of the American Institute of Electrical Engineers and a member of several societies and clubs.

Mr. Robert Colgate Wood was nominated on May 19 by Governor Glynn as a member of the Public Service Commission for the First District of New York to succeed Mr. John E. Eustis, whose term expired on Feb. 1. The Senate confirmed the nomination. Mr. Wood is forty-four years old. He was graduated from Harvard University and has lived at Riverdale in the Borough of the Bronx practically all his life. After leaving Harvard Mr. Wood engaged in the banking and brokerage business with Mr. J. Craig Havemeyer. He was one of the organizers and a director of the New York City Interborough Railway, a crosstown surface line in the Bronx which served as a feeder to the subway and elevated lines. The company is now included as part of the system of the Third Avenue Railway. As stated in the ELECTRIC RAILWAY JOURNAL of May 16, Mr. George M. S. Schulz, the first nominee of Governor Glynn for the position, declined the appointment.

Mr. J. K. Punderford, whose appointment as vice-president of the Connecticut Company, New Haven, Conn., in addition to general manager, was noted briefly in the ELECTRIC RAILWAY JOURNAL of May 16, has been identified with electric railway work for twenty-two years. He was graduated from Sheffield Scientific School in 1892. Upon graduation he entered the employ of the Winchester Avenue Railroad in New Haven, Conn., and assisted in equipping the power station and later operating the plant. He left the service of the Winchester Avenue Railroad and entered the expert course of the General Electric Company, Schenectady. He next entered the employ of the New Haven Street Railway in the track department and later was engaged in equipping the cars. In 1894 he resigned from the New Haven Street Railway to enter the track department of the Fair Haven & Westville Railroad, New Haven, and in 1901 took over the supervision of the shop and line work. In the spring of 1903 he was appointed general manager of the Fair Haven & Westville Railroad, which took over all the other street railways operating in New Haven. When the electric railways in New Haven were purchased by the New York, New Haven & Hartford Railroad in 1904 Mr. Punderford continued in the same capacity, his office being made to cover all the electric railway properties acquired by the New Haven road in Connecticut and New York State.

J. K. Punderford

Mr. F. M. Hamilton, who has been freight traffic agent of the Seattle division of the Puget Sound Traction, Light & Power Company, has been appointed purchasing agent of the company to succeed Mr. E. C. Gaumnitz, resigned. Mr. Hamilton was born at Grafton, W. Va., on Oct. 15, 1875, received a graded and high school education and continued his studies under a private tutor. He studied medicine for two years, but abandoned the idea of becoming a physician to enter the service of the Baltimore & Ohio Railroad. From 1900 to 1905 he was with the Jones & Laughlin Steel Company, Pittsburgh, Pa., which owns and operates the Monongahela Connecting Railroad, successively filling the positions of yardmaster, assistant trainmaster, special agent and chief clerk to the general superintendent. Mr. Hamilton resigned from the Jones & Laughlin Steel Company to become manager of the American Car Tracing & Shipping Company, a private traffic organization. He removed to

Seattle in 1907 and worked jointly for the Northern Pacific Railroad and the Pacific Northwest Demurrage Association, resigning to accept the appointment of traffic manager for the Alaska-Yukon-Pacific Exposition. At the close of the exposition Mr. Hamilton became assistant sales agent for the Roslyn Fuel Company, covering the States of Idaho, Oregon and Washington. Mr. Hamilton was appointed freight traffic agent of the Seattle division of the Puget Sound Traction, Light & Power Company on Sept. 1, 1911. Sound Traction, Light & Power Company in September, 1911.

G. W. Knox

Mr. George W. Knox, president-elect of the Gas, Electric & Street Railway Association of Oklahoma, is vice-president and general manager of the Oklahoma Railway, which operates the street and interurban electric railways of Oklahoma City and vicinity. He is also president of the Knox-Heskett Engineering Company, Chicago, and is largely interested in the Chisholm (Minn.) Electric Lighting Company, of which he is a director. Mr. Knox's experience in the electric railway and lighting field dates from the pioneer days of the late '80s. He was graduated from the Northern Illinois College in 1885. He first engaged in steam railroad work, but in 1887 he was employed by the old Thomson-Houston Company to install the street railway system at Omaha, Neb. Two years later he joined the staff of the Sprague Electric Company, Chicago, but in 1891 his services were engaged by the Edison General Electric Company, and for the latter he carried out the complete electrification of the horse-car lines in Milwaukee. In 1892 he converted the battery driven street railway system in Dubuque, Ia., to the overhead trolley. Returning to Chicago he next superintended the electrification of the 160 miles of track of the Chicago City Railway, and then continued as electrical and construction engineer of the company until 1899. In 1901 he organized the Knox Engineering Company, Chicago, the name of which has been since changed to the Knox-Heskett Engineering Company. Among the executive positions which Mr. Knox has held in the electric railway and lighting fields are those of president of the Choctaw Railway & Light Company, McAlester, Okla., and general manager of the Freeport Railway & Light Company, Freeport, Ill. Mr. Knox in 1901 made the original study and report on the Oklahoma electric railway situation which resulted in the construction of the present modern system. He first acted as consulting engineer during the construction period, but in July, 1911, transferred his headquarters to Oklahoma City, becoming vice-president and general manager of the system. Mr. Knox is a member of the American Institute of Electrical Engineers and of the American Electric Railway Association. During 1913 he served on the committee on power generation of the latter association, and is this year a member of the committee on taxation of that association.

OBITUARY

Alva A. Jefferis, who has been passenger traffic manager for the Illinois Traction System in Springfield since May, 1912, died recently of Bright's disease at St. John's Hospital in Springfield. Mr. Jefferis began his railroad work with the old St. Louis & Chicago Railroad at Thomasville, Ill., in 1887. In 1889 he became agent of the same road at Litchfield, and two years later accepted a position as secretary of the Litchfield Brick & Tile Company. Later he took up railroad work again at Waverly and Jacksonville, Ill. For more than twenty years he served the Chicago, Peoria & St. Louis Railway, beginning as agent at Jacksonville. Later he was made chief clerk in the passenger department of the company in St. Louis, but left in 1912 to join the Illinois Traction System.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

San Francisco & Northern Railway, San Francisco, Cal.—Application for a charter has been made by this company, presumably to succeed the Petaluma & Santa Rosa Railway, and to build a 42-mile electric railway from Point San Quentin, Marin County, to Santa Rosa, giving Richmond and the rest of the east shore connection by ferry and rail with the north of bay region. Capital stock, $2,500,000. Incorporators: Allen L. Kittle, Ross; Archibald Borland, Oakland; Frank A. Brush, Santa Rosa; William L. P. Jackson, San Francisco, and John C. Kittle, Ross. [E. R. J., March 21, '14.]

***Tennessee Traction & Light Company, Nashville, Tenn.**—Incorporated in Tennessee to build an electric railway. Capital stock, $10,000. Incorporators: R. G. Sparrow, S. E. Godwin, W. H. Parrish, Jr., C. H. Smith and J. N. Vaughan.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has asked the Council for a thirty-year franchise in Montgomery.

Fresno, Cal.—J. B. Rogers, promoter of the Fresno Interurban Railway, has received a franchise from the Board of Supervisors for a ½-mile line along Fresno Avenue from the city limits in Fresno to a point on Mahoney Avenue in Fresno. After extending ½ mile out Fresno Avenue the line will turn and run on private right-of-way to the Esmeralda vineyard. Later it is the intention of the promoter to continue the railway on private right-of-way to Clovis.

Lafayette, Ind.—The Lafayette & Northwestern Traction Company has asked the County Commissioners for a franchise through White, Newton, Jasper and Benton Counties. This is part of a plan to build an electric line from Lafayette to Kankakee via Wolcott, Remington and Rensselaer. G. J. Thomson is interested. [E. R. J., May 9, '14.]

Clarksdale, Miss.—The citizens of Clarksdale have asked the Council for a twenty-five-year franchise to build an electric railway in Clarksdale. This is part of a plan to build an electric line to connect Lyon, Clarksdale and Friars Point, Miss. No names are yet given of those interested in the project. [E. R. J., May 2, '14.]

Orange, N. J.—The Public Service Railway has received the approval of the Mayor for a franchise for an extension of the Central Avenue line in Orange.

Middletown, Ohio.—The Dayton, Middletown & Cincinnati Railroad has received a twenty-five-year franchise from the Council in Middletown. J. G. Miller, Westchester, Ohio, president. [E. R. J., April 25, '14.]

Astoria, Ore.—The Pacific Power & Light Company has asked the Council for a franchise to extend its line 1 mile in Astoria to the top of Smith Point.

New Hope, Pa.—The Bucks County Electric Railway has received a franchise from the Council for an extension on North Main Street in New Hope.

Spokane, Wash.—The Spokane & Inland Empire Railroad Company has received a franchise from the Council over certain streets in Spokane.

Dallas, Tex.—John T. Jones and associates have received a franchise from the Council for an electric railway on Fitzhugh Avenue from Columbia Avenue to Grand Avenue in Dallas. [E. R. J., May 2, '14.]

Fulton, W. Va.—The West Virginia Traction Company has received a franchise from the Council of Fulton, W. Va., to make the necessary improvements to its line on Bow Street in Fulton.

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—Material is being assembled for the extension of this company's line from Burnside Road to Harriet Road in Victoria, B. C. It is planned to begin work soon.

Northern Electric Railway, Chico, Cal.—Plans are being prepared by this company to resume work on its line in Vallejo. A large quantity of ties and rails is to be sent to Vallejo, and track laying will be begun.

Fresno (Cal.) Interurban Railway.—J. B. Rogers, president of this company, recently asked the County Commissioners on behalf of the company for permission to issue $48,000 of common stock and $120,000 of ten-year 6 per cent bonds. He stated that Mahoney Brothers, the contractors, had agreed to accept the proposed stock issue at 80 and the bonds at 90, and build the line, which will be 9 miles long, with one terminal at the Belmont and Fresno Avenues in Fresno, and the other at the Southern Pacific Railway yards at Clovis.

Pacific Electric Railway, Los Angeles, Cal.—This company has purchased nearly the entire right-of-way between Lordsburg and North Pomona for the cutoff on the San Bernardino line, and the work of clearing it is in progress. This cutoff is to leave the Pomona division at the LaVerne Heights packing house, passing through the Yorba and Lord acreage tracts and paralleling the Santa Fé Railroad tracks eastward. By thus avoiding the detour to Pomona a saving of twenty minutes in running time between San Bernardino and Los Angeles will be effected.

Marin County Electric Railway, Mill Valley, Cal.—Surveys have been completed by this company for 1¼ miles of its line from Cascade Reservations to the Northwestern Pacific Railroad depot. Grading will be begun within the next sixty days. Headquarters: 320 Market Street, San Francisco, W. Wesley Hicks, 320 Market Street, San Francisco, chief engineer. [E. R. J., May 2, '14.]

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Plans are being considered by this company to straighten its line in Ygnacio Valley between Walnut Creek and Concord.

Mexico & San Diego Railway, San Diego, Cal.—Surveys have been completed on the 3-mile section of this railway from Imperial Beach to International City, and 2.53 miles of track laid. This 17-mile line will connect National City, Chula, Vista, South San Diego, Imperial Beach and International City. E. S. Babcock, San Diego president. [E. R. J., May 3, '13.]

San Francisco-San Mateo Right-of-Way Company, San Mateo, Cal.—This company, which was organized by the San Mateo County Development Association to build an electric railway from San Francisco to Palo Alto, has elected the following officers: H. C. Tuchsen, Redwood City, president; D. G. Doubleday, Millbrae, vice-president; E. M. Moores, Burlingame, treasurer, and F. Eksward, secretary. [E. R. J., May 16, '14.]

Waterbury & Milldale Tramway Company, Waterbury, Conn.—The Public Utilities Commission has approved the method of construction for an extension from Byram Road, over the Meriden-Southington turnpike to the top of Southington Mountain, thence across the turnpike by a bridge and into the towns of Cheshire and Wolcott.

***Wilmington, Del.**—A company is being formed in Wilmington to be operated in connection with the Wilmington & Philadelphia Traction Company, to build electric lines in various sections of Wilmington. No names are yet given of those interested in the project.

Savannah (Ga.) Electric Railway.—This company is asked to consider plans to build an extension to White Bluff, Rose Dhu and adjacent points.

Illinois Traction System, Peoria, Ill.—This company is asked to consider plans for a branch line from Georgetown out to the new mine.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company is now setting 5 miles of poles between Rantoul, Ill., and Ludlow, Ill., and is soon to begin with the overhead work. It is thought that this line will be constructed from Rantoul to Paxton this year, a distance of 10½ miles.

Evansville & New Harmony Traction Company, Evansville, Ind.—Surveys will be begun at once by this company on its line from Evansville to New Harmony, a distance of 30 miles. It is said it is the intention of the promoters to extend the line from New Harmony to Mt. Carmel, a short distance, in order to connect with the traction line that is now being built from Mt. Carmel to Olney. It will be necessary to build a bridge across the Wabash River at Mt. Carmel, Ill. W. F. Laubscher, Evansville, is interested. [E. R. J., May 2, '14.]

Public Utilities Company, Evansville, Ind.—During the next few weeks this company plans to relay its line on Second Avenue in Evansville with 100-lb. rails.

Indianapolis & Delphi Traction Company, Indianapolis, Ind.—Arrangements are being made by this company to secure financial backing in order to begin the construction of this line to connect Delphi, Flora, Burlington and Sheridan in the near future. Henry L. Smith, general manager. [E. R. J., Dec. 6, '13.]

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Plans are being made by this company to extend its line on South Eighth Street from H Street to Beallview Park, and on Nineteenth Street from North E Street into Morton Park in Richmond.

Keokuk (Ia.) Electric Railway.—Materials have been ordered and arrangements are being made to begin work at once on the extension of the McKinley Avenue line in Keokuk to the baseball park, a distance of 1 mile.

***Jeffersontown, Ky.**—Right-of-way for a projected new electric line from Jeffersontown, where connection could be had with the Louisville & Interurban Railway line, to Taylorsville, the county seat of Spencer county, has been pledged by practically all of the property owners who would be concerned, according to I. F. Jewel, Taylorsville, who is engaged on the project. The line would extend for something like 25 miles and it is asserted that an Eastern company has agreed to build it.

Maysville Street Railroad & Transfer Company, Maysville, Ky.—The new West End loop of this company in Maysville has been completed and will soon be placed in operation.

Bangor Railway & Electric Company, Bangor, Maine.—Improvements that will mean the expenditure of nearly $200,000 will be made this year by this company and controlled companies. The directors have voted to expend $191,063, and the items have been apportioned among the Bangor Railway & Electric Company, Bar Harbor & Union River Power Company, Bangor Power Company, and Orono Water Company, for the installation of the latest equipment and improvements in other particulars.

Brandon (Man.) Municipal Railway.—The Council in Brandon has decided to connect two of the existing routes in Brandon and make them into a loop line, the distance is only 2000 ft. The other work it proposes to do is to put down heavier rails for a distance of twelve blocks where it is planned to pave the street.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—This company has bought from the Granite State Land Company of Hampton, for $75,000, the nearly mile-long bridge which spans the mouth of Hampton River.

Detroit (Mich.) United Railway.—Work has been begun at Junction Avenue and Fort Street by this company on the construction of the 16-mile workingmen's belt line in Detroit.

Michigan United Traction Company, Jackson, Mich.—This company is asked to consider plans to extend its Washington Avenue line in Battle Creek to Washington Heights.

Muskegon-Casnovia Land & Development Company, Muskegon, Mich.—A conference of the stockholders of this company will soon be held to organize a company to construct a 67-mile electric railway from Muskegon to Stanton, Saginaw, Egelston, Moorland and Casnovia. The course of the route has been mapped out and all the right-of-way secured. Norman B. Lawson, Muskegon, is interested. [E. R. J., Feb. 28, '14.]

Park Point Traction Company, Duluth, Minn.—During the next two weeks this company will award contracts to rebuild 3000 ft. of main track in Duluth.

Electric Short Line Railroad, Minneapolis, Minn.—This company has accepted the subscriptions voted by the township of Lake Crystal and will build its line through Lake Crystal in the near future. It is also considering plans to build a line through Butternut and Lincoln.

St. Louis & Jennings Railway, St. Louis, Mo.—A branch line along Helen Avenue from near Jennings to Pine Lawn, a distance of 2½ miles, is being built by this company. Another branch from Jennings to a connection with the Broadway line at Baden is being projected.

Springfield (Mo.) Traction Company.—Plans are being considered by this company for an extension of its Center Street line to the new State Pythian home in Springfield.

***Billings, Mont.**—A. J. Showalter, Billings, and associates are making plans to build a 55-mile electric railway in Carbon and Stillwater Counties via the towns of Lindsay, Luther and Absarokee.

New York State Railways, Rochester, N. Y.—During the summer this company plans to build about 3½ miles of new track on the Solvay line, using 91-lb. rails with creosoted pine ties, sandstone block pavement with specially cut granite block next to rail, and concrete foundation under pavement 6 in. thick.

Cape Breton Electric Company, Sydney, N. S.—Plans are being made by this company for a line to Florence.

Dayton, Middletown & Cincinnati Railroad, Middletown, Ohio.—Surveys have been completed by this company for the section of its line from Middletown to Cincinnati, 32 miles, and surveys are now under way from Dayton to Middletown, 20 miles. It is expected to begin grading early in the summer. Estimates on all work and material being worked out by J. G. Miller, the company's engineer. E. H. McKnight, 328 Main Street, Middletown, chief engineer. [E. R. J., April 25, '14.]

Tulsa (Okla.) Railway.—Plans are being made for a new loop in Tulsa that will extend around Central Park, Belleview School and near Oaklawn Cemetery.

***Berlin, Ont.**—Surveys are being made for the proposed Hydro-Electric Radial Railway from Berlin to Woodstock via New Dundee and Tavistock. After completing that route surveys will be made on the Berlin, Wellesley, Elmira proposed routes.

***Brampton, Ont.**—A meeting of the Board of Trade was held on May 11 when the matter of a Hydro-Electric Radial Railway from Brampton to Toronto was discussed. A committee of Messrs. Wegenast, Beck and Dawson was appointed to ask the Hydro-Electric Power Commission of Ontario regarding this proposed line. It is the intention of the Board of Trade to endeavor to induce the people of Brampton and of the other municipalities through which the railway will pass, to construct a line from Brampton to connect with the proposed line from Guelph to Toronto.

Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont.—Plans are being made by this company to double track its line on Princess Street in Kingston at once.

Oshawa (Ont.) Railway.—This company is now building a 1000 ft. siding in Oshawa.

Sudbury-Copper Cliff Suburban Electric Railway, Sudbury, Ont.—Surveys have been made for the proposed routes of an electric railway at Sudbury to be constructed between Sudbury and Copper Cliff. For about 1 mile through the town limits, where a concrete base is to be laid, the track will be of permanent construction, with girder rails set in cement. The remainder of the line will be of ordinary T rail and tie construction. L. L. Forest, Sudbury, is interested. [E. R. J., May 2, '14.]

Pacific Power & Light Company, Astoria, Ore.—Work will be begun at once by this company on the extension of its lines in Astoria around Smith's Point to Hammond mill.

Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.—It is stated that this company plans to extend its line from Lebanon by way of Watertown, Alexandria, Liberty and Smithville to Sparta and operate cars between these towns and between Lebanon and Nashville. This announcement followed the presentation to the Lebanon Board of Commissioners of an ordinance granting the railroad a right-of-way over South Cumberland Street, one block from the public square in Lebanon.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company for an extension south from Waco to Austin. If this extension is made, a different route will be selected from that which is to be occupied by the Southwestern Traction Company.

Dallas-Denton Interurban Railway, Dallas, Tex.—This railway, projected and surveyed by a company composed of business men of both Fort Worth and Denton, has been sold conditionally to the Stone & Webster syndicate, and the papers will be signed soon. This is part of a plan to build an electric railway to connect Dallas, Denton, Carrollton, Lewisville, Grapevine and Irving. [E. R. J., July 12, '13.]

Galveston, Harrisburg & San Antonio Bay Railway, Houston, Tex.—Work has been begun by this company for a 12-mile extension which will connect with the main line at Strang and extend through Morgan's Point, Laporte, Seabrook and along the Bay Shore so as to furnish quick communication with Houston. The company will operate gasoline motor cars over this line.

McKinley, Bonham & Paris Interurban Railway, McKinley, Tex.—Financial arrangements have been made by this company to begin surveys and securing right-of-way for its 74-mile electric railway between McKinley, Bonham and Paris. Officers: L. A. Scott, president; R. L. Waddell, vice-president; J. W. Russell, Bonham, treasurer and Mark McMinnis, Bonham, secretary. [E. R. J., May 16, '14.]

San Antonio, San Jose & Medina Interurban Railway, San Antonio, Tex.—This company will build a 100-ft. span bridge across the Medina River in connection with its 15-mile line between San Antonio, San Jose and Kirk. A. D. Powers, San Antonio, president. [E. R. J., May 9, '14.]

Southwestern Traction Company, Temple, Tex.—This company is making extensive repairs to its line on Seventh Street and Avenue G. New ties and ballast are being placed and the tracks straightened. All of the lines within the city limits will be placed in first-class order as soon as the material and location of paved streets in Temple has been decided by the citizens' committee.

Uvalde & Northern Railroad, Uvalde, Tex.—Preliminary arrangements are being made to build this 55-mile railway from Uvalde to Barksdale, via Nuesces Canyon. A branch line will be built to the Kaolin mines near Leakey, in Real County. L. J. Wardlaw, Sonora, Tex., is interested. [E. R. J., April 4, '14.]

Logan (Utah) Rapid Transit Company.—Plans are being made to begin grading immediately for a line from Brigham to Colliston, from Colliston to Smithfield, from Smithfield to Lewiston, Utah, and on to Preston, Idaho. Work will begin at Colliston and Smithfield simultaneously.

***Virginia-Blue Ridge Railway, Lynchburg, Va.**—Plans are being considered to build a 25-mile electric railway along the Tye River and Piny River via Lowesville, with the terminus at Massie's Mills in Nelson County. Application for a charter will soon be made.

Washington Electric Railway, Chehalis, Wash.—Surveys are being made by this company for a 10-mile extension from its present terminus on Newaukum Prairie into eastern Lewis County. Two possible routes are under consideration, one being to continue the present survey over Jackson Hill to Ethel, thence easterly to Salkum; the other being to turn east on Newaukum Prairie and go up the Newaukum River by way of the proposed mill of the Onalaska Lumber Company, to a point northerly from Salkum, 2 or 3 miles. A decision will be made during the month.

Ohio Valley Electric Railway, Huntington, W. Va.—This company plans some new track construction this season. Contracts for sand and gravel have been let.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—Work has been begun on the extension from Cassville to Blacksville, a distance of 13 miles.

Janesville & Madison Traction Company, Madison, Wis.—Right-of-way has been secured by this company on its line from Madison to Stoughton. This line will extend from Madison to Janesville, and to Edgerton, Stoughton, McFarland, Hoboken Beach and around the eastern part of Lake Monona to Last Chance in Fair Oaks, where it will connect with the lines of the Southern Wisconsin Railway. It is said that arrangements are being made to run its cars into Madison over the lines of the Southern Wisconsin Railway. G. Pickardt, 409 Washington Building, Madison, president. [E. R. J., April 18, '14.]

SHOPS AND BUILDINGS

Louisville (Ky.) Railway.—This company is in the process of moving into its new shops at Twenty-ninth Street and Broadway, vacating the old shops at Eighteenth and Walnut Streets. The paint and carpenter departments of the shops have already been moved to the new quarters and the men are at work. The company is now engaged in the transfer by degrees of the machinery from the old repair shop to the new, which will require about two weeks longer. The new shops are complete in every way and all the machinery is electrically operated.

Brandon (Man.) Municipal Railway.—This company began the construction of a new carhouse last fall, but only the frame was completed before the winter set in, so that the cars could be housed. The fitting up of the machine shop, offices, etc., is now about completed. The total cost will be about $35,000.

Springfield (Mo.) Railway.—This company has awarded the contract to the W. W. Lindsay Company, Philadelphia, to build new carhouses at Clifton Street and East Street in Springfield.

Binghamton (N. Y.) Railway.—Plans for the construction of a new carhouse on State Street, north of the company's present carhouse and extending to Eldredge Street in Binghamton, is being planned. The structure will be of brick and fireproof construction, several hundred feet long and will practically double the present facilities. Several pits are t obe constructed in the present carhouse in State Street in order that this may be made the principal repair shop for the entire system.

Bucks County Electric Railway, Trenton, N. J.—Plans are being made by this company to build a new freight station on North Main Street in New Hope, Pa.

POWER HOUSES AND SUBSTATIONS

Shore Line Electric Railway, Norwich, Conn.—This company will install new substation apparatus at New London, Conn., and has ordered two 500-kw rotary converters, two 165-kva transformers and a switchboard from the General Electric Company.

Chicago (Ill.) Surface Lines.—This company proposes to install considerable additional equipment in its substations comprising three 4000-kw rotary converters, three 4200-kva air-blast transformers with three 20,000 cu. ft. blower sets, three 600-kva reactances and switchboard panels. All of this equipment has been contracted for with the General Electric Company.

Danville Gas, Electric Light & Street Railway Company, Danville, Ill.—It is believed that this company is preparing to construct a dam across the Vermilion River at Danville. For a number of weeks engineers have been working along the stream and in the bottom lands along the stream ascertaining how much land would be inundated and how much land, if any, would have to be purchased. Options have been secured, it is said, upon all land which will be affected should the stream be dammed.

Bangor Railway & Electric Company, Bangor, Maine.—Among the improvements planned by this company during the summer will be new water wheels and generators at the Veazie power house. The cost is estimated to be about $28,500.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—Contracts will soon be awarded by this company to build a new power house at Stony Mountain. The structure will be of stone or concrete construction.

Metropolitan Street Railway, Kansas City, Mo.—This company will place in operation in its power station a new 10,000-kw Curtis turbo-generator and has awarded the contract to the General Electric Company to build and install the unit.

New Midland Power & Traction Company, Cambridge, Ohio.—This company will add to its substation equipment a 300-kw, two-unit, three-bearing synchronous motor-generator set. The machine has been ordered from the General Electric Company.

Oshawa (Ont.) Railway.—This company has installed a 300-kw motor generator set in its power house in Oshawa. The apparatus was purchased from the Westinghouse Electric & Manufacturing Company.

Manufactures and Supplies

ROLLING STOCK

Havana Central Railroad, Havana, Cuba, is in the market for six motor coaches and six third-class coaches.

Yazoo & Mississippi Valley Railroad is having six gasoline-electric motor cars built by the General Electric Company.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., has ordered five double-truck 20,000-lb. car bodies from The J. G. Brill Company.

Bristol (Tenn.) Traction Company is reported as expecting to buy new cars for operating the Holston Valley Railroad, which it is converting to electric motive power.

Central Illinois Traction Company, Mattoon, Ill., has purchased two single-end double-truck, steel underframe, 48-ft. closed cars from the McGuire-Cummings Manufacturing Company, to be equipped with four 65-hp motors.

Niagara, St. Catherine's & Toronto Railway, St. Catharines, Ont., has ordered six pay-as-you-enter cars for its Wesley Park Division, delivery of which will be made about June 1. This order is in addition to the order for six interurban cars, which was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914.

Springfield (Ill.) Consolidated Railway is expecting to purchase twelve double-truck open Brill city cars, which will be placed in summer use on the company's lines not later than June 15. The cars will have a seating capacity of 84 persons and will be equipped with National air brakes and two GE-57 50-hp motors, capable of negotiating a 15 per cent grade and 40 per cent overload. This additional equipment will be required in order to handle increased patronage expected because of the State fair and other conventions to be held in Springfield.

Philadelphia & Garrettford Street Railway, Upper Darby, Pa., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 21 as having ordered five closed double-truck interurban cars from the Jewett Car Company, has specified the following details for this equipment:

Seating capacity	48	Bumpers	Hedley
Bolster, centers, length	23 ft. 4 in.	Control, type	GE type MK
Length of body	33 ft. 6 in.	Couplers	Tomlinson
Length over vestibule	44 ft. 6 in.	Curtain fixtures	Cur. Sup. Co.
Width over sills	8 ft. 7 in.	Curtain material	Pantasote
Width over all	8 ft. 10 in.	Hand brakes	Jewett vertical
Height, rail to sills	37⅛ in.	Heaters	Consol.
Height, sill to trolley base	9 ft. 2 in.	Motors	GE No. 203, inside hung
Body	wood	Sanders	De France air
Interior trim	mahogany	Sash fixtures	Edwards
Headlining	Agasote	Seats	Hale & Kil.
Roof	monitor	Trucks	Baldwin K
Underframe	steel	Ventilators	Jewett
Air brakes	West.	Special devices	Edwards trap doors
Axles	Baldwin		

Trenton & Mercer County Traction Corporation, Trenton, N. J., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 28 as having ordered ten closed passenger cars from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity	48	Fenders or wheelguards	Philadelphia type
Length of body	31 ft. 4 in.	Gears and pinions	solid gears
Width over sills	7 ft. 8½ in.	Gongs	Brill dedenda, 12-in.
Width over all	8 ft.	Hand brakes	Ackley
Height, rail to trolley board	11 ft. 9 in.	Heaters	Consol.
Body	wood	Headlights	El. Serv. Sup. Co.
Interior trim	bronze	Motors	2 G.E.-210, outside hung
Headlining	Agasote	Registers	Sterling-Meaker No. 15
Roof	monitor	Sanders	DeWitt
Underframe	metal	Sash fixtures	Brill
Air brakes	West.	Seats	Hey. Bros. & Wake.
Axles	heat treated	Seating material	cane
Bumpers	Brill		
Cables	G.E.		

Couplers	Hovey	Retrievers	Earl
Curtain fixtures	Natl. L.W.	Trolley base	U. S.
Curtain material	Pantasote	Trucks, type	Brill 39E
Destination signs	Hunter	Wheels	cast iron

TRADE NOTES

Meirowsky Brothers, Jersey, N. J., have removed their offices to 106-108 Broadway, Jersey City.

C. P. Williams, recently of the National Lock Washer Company, has become connected with The Efficiency Company, Railway Exchange, Chicago, Ill.

Pennsylvania Steel Company, Philadelphia, Pa., at a meeting of its directors on May 15 re-elected E. C. Felton as president. W. H. Donner was appointed chairman of the board.

Flint & Chester, Inc., New York, N. Y., have been appointed selling agents for the National Graphite Lubricator Company, Scranton, Pa., for the East, including the railroads which are in the territory north and east of Buffalo and Baltimore.

Robert W. Hunt, of Robert W. Hunt & Company, Chicago, Ill., at the meeting of the council of the International Association for Testing Materials lately held in Turin, Italy, was selected one of the vice-presidents of the association.

Clark Electric & Manufacturing Company, New York, N. Y., has appointed L. I. Clark assistant engineer. Mr. Clark has wide experience in the testing out of transformers, circuit-breakers, insulators and other high-tension material. He will represent the company on outside work, both in New York and elsewhere.

Swedish General Electric Company is the new name adopted by Kilmer, Pullen & Burnham, Ltd., 1009 Kent Building, Toronto, Can. It was believed that it conveyed a better idea as to the business the company is conducting, that is, that of suplying Swedish generators, motors and other electrical apparatus, for which there is an increasing demand. Frank Pullen is president.

Esterline Company, Indianapolis, Ind., has appointed the firm of Walker & Smith, Baltimore, Md., as factory representatives for the sale of "Golden Glow" headlights for the states of Maryland, Virginia, North Carolina, South Carolina, Georgia and Alabama. This firm will have charge of the sale of these headlights for street railways, steam railroads, steamships and for industrial purposes.

General Electric Company, Schenectady, N. Y., has received orders for the following equipment: Northern Texas Traction Company, four GE-73, 75-hp, two-motor car equipments; Northern Ohio Traction & Light Company, five GE-204, 75-hp, four-motor car equipments; Columbus Railway, Power & Light Company, twenty-two air-brake equipments with CP-27 compressors; Tacoma Railway & Power Company, five GE-233, 80-hp, two-motor equipments and five CP-27 air compressors; Virginia Railway & Power Company, thirteen air-brake equipments with CP-27 compressors; Twin City Rapid Transit Company, twenty GE-200, 40-hp, four-motor equipments and twenty straight air-brake equipments with CP-25 compressors.

Gun-crete Company, Chicago, Ill., has opened its new offices in the McCormick Building. This firm specializes in cement-gun work for engineering, industrial and mining structures. The cement-gun process is of value for street railway construction and reconstruction work, and for waterproofing and fireproofing purposes. This material is also used for the encasing of steel bridges as rust and fire protection. It also reduces noise and vibration in such structures and is therefore serviceable in city districts. Carl Weber, the president of the company, who is a well-known concrete engineer, is the inventor of the reinforced concrete chimney, numerous installations of which have been built in this and foreign countires, and has designed and built a large number of other important engineering structures.

American Rolling Mill Company, Middletown, Ohio, has closed contracts with Richard Johnston & Nephew and the Shelton Iron, Steel & Coal Company, Manchester, England, two iron manufacturers of international standing, for the right to make American ingot iron. Heretofore refinements in processes looking toward the production of products of higher quality have always traveled from England to America. The contracts were closed after a searching investigation by the British firms and after a demonstration in their mills that ingot iron could be made in their furnaces. In fact, heats were put through even to the final products. It is understood that the rights will be availed of largely for rolling rail for third-rail electrification purposes, for which it has an advantage over mild steel on account of its higher conductivity, the advantage being about 25 per cent.

ADVERTISING LITERATURE

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a catalog describing its tramrail systems, trolleys and electric hoists for transporting various kinds of materials from and to cars, boats, storage yards and buildings, and the different floors of buildings. Interesting illustrations are shown of installations in various plants.

Babcock & Wilcox Company, New York, N. Y., has issued a bound 80-page book which treats the subject of superheated steam and superheaters in an interesting and comprehensive manner. Introducing the subject with a short definition of superheated steam the book reviews the history of superheated steam since its early introduction in the beginning of the eighteenth century. This is followed by a mathematical discussion, accompanied by tables, of the properties of superheated steam. The end of the book is devoted to a detailed description of superheaters manufactured by this company, as applied to Babcock & Wilcox, Stirling and Rust boilers. The book is profusely illustrated with large halftones showing installations in actual service, among which are shown installations of the Pennsylvania Railroad, Commonwealth Edison Company, United Electric Light & Power Company, Bay State Street Railway, New York Edison Company, Georgia Railway & Power Company, Capitol Traction Company, Boston Elevated Railway and Twin City Rapid Transit Company.

J. G. White Management Corporation, New York, N. Y., has issued a booklet, reprinting the opinion of a recent decision of the Public Service Commission of the State of Pennsylvania, described in the ELECTRIC RAILWAY JOURNAL of April 25, 1914, page 942, and which denied the application of the Schuylkill Light, Heat & Power Company for permission to carry on an electric lighting business in Ashland, Pa., which territory is already served by the Eastern Pennsylvania Light, Heat & Power Company, a subsidiary company of the Eastern Pennsylvania Railways Company and operated under the J. G. White management. The booklet calls attention to the following important points in the decision: (1) The adoption of the principle that if communities permit competing plants to be installed, it follows from experience that such plants are eventually merged, and then such communities and their citizens are in duty bound to pay such rates as will give a sufficient and proper return on the duplicated investments; (2) that companies giving adequate service at reasonable rates should be protected against competition and that the remedy for inadequate service and excessive rates should be by regulation rather than by competition.

Ohio Brass Company, Mansfield, Ohio, has issued Catalog No. 14, a 606-page book, which contains a complete line of perfected appliances used in the construction, maintenance and operation of electric railways, mine haulage systems and transmission lines. The materials described and listed fall under the general classification of overhead materials, rail bonds, car equipment specialties and high-tension porcelain insulators. Each subject in the book is treated in an interesting way by being supplemented with numerous carefully taken photographs of the actual instalment of the equipment on various well-known electric railways together with accompanying general remarks on the character of each installation. These descriptions include the Chicago, Lake Shore & South Bend Railway, Galveston-Houston Electric Railway, Great Northern Railway (Cascade Tunnel electrification), Maryland Electric Railway, New York, New Haven & Hartford Railroad, Northern Ohio Traction Company, Waterloo, Cedar Falls & Northern Railway. An index to materials at the end of the book serves as a ready reference to this complete compilation. This catalog supersedes and cancels all other catalogues of this company with the exception of Valve Catalog No. 50.

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PUBLIC OWNERSHIP IN WASHINGTON

The American Electric Railway Association has taken prompt action to voice the objections of the industry to the proposal for public ownership of electric railways in the District of Columbia. The plan to municipalize the railways was proposed in a bill introduced by Congressman Crosser, of Cleveland. Preliminary hearings were held by a sub-committee, of which he was chairman, of the committee on the District of Columbia. The sub-committee reported the bill to the full committee, and in the series of hearings before the larger body the association has been represented effectively. The pending measure is of vastly greater significance than any similar measure affecting another city. What is done in Washington may be considered as representing the national policy. Congress has no control over any substantial part of the urban electric railways of the country. Its control is limited to lines that are engaged in interstate commerce. The control of electric railways is left, under the modern policy of regulation, to the states. Yet the bill now pending before the committee proposes legislation radically different from the present settled policies of the country. It proposes public ownership by vote of Congress in a district where the residents have no voice to decide whether or not the innovation shall be introduced. It proposes legislation in the conspicuous capital of the country on a subject that is primarily a function of state or municipal government. Such a step might be of far-reaching effect. Congress is taking up the subject as one of its large number of activities in widely-separated spheres. Its normal function is to legislate in matters that affect the national government, not in those that affect cities or states. The instant that it began, even through a committee or sub-committee, a consideration of public ownership of electric railways it took up as large questions of public policy as any that are before the present Congress. The association did its duty in characterizing the situation as one of national importance.

REASONS FOR CORPORATION PUBLICITY

Although it is fairly well settled that no public service corporation can afford to leave the public in ignorance of its affairs, this doctrine is taken on faith rather than based on conviction by many railway men. But there are fundamental reasons why electric railways in particular must carry their case to the public. One of these reasons was expressed by Mr. Dooley years ago in the assertion that "There is no news in being good." Of course there is news in being good. What the Archey Road philosopher meant to convey was that human nature, and the human nature of newspapers in particular, inclines to the exploitation of what is bad and ignores the commonplace routine of things when they are going rightly. It is for this reason that only the misdeeds and shortcomings of a public utility are exploited. That 10,000,000 passengers are carried in safety and comfort is never made the subject of big headlines unless this fact is woven into a story by someone who is interested in seeing that safety of operation is exploited. On the other hand, if one passenger is killed it is a big story, and the 10,000,000 safely carried are forgotten. Millions of passengers are provided with seats, but the strap-hangers of three hours out of twenty-four are those who get into the newspapers—all of which goes to show that if the good that we do is to be made known along with the bad, an effort must be made to bring the good to the front. It will not come out of its own accord.

DIFFERENT METHODS OF PUBLICITY

An interesting article appears elsewhere in this issue on "Different Methods of Publicity," by W. T. Buchanan, of the Portland Railway, Light & Power Company, Portland, Ore. Mr. Buchanan believes in the efficacy of publicity, but claims that the kind required is principally of a local character and not national and that the chief feature of the publicity should be to attract attention to the readiness with which the company will remove all causes of dissatisfaction where they exist and as far as it can, rather than to discuss abstract principles. We agree with Mr. Buchanan upon the importance of emphasizing the desire of the railway company to please the public and to keep it informed of the character of the service supplied. The publicity should be largely local, as Mr. Buchanan says. At the same time, we do not think that its national aspects should be ignored. A great many of the problems of electric railways are common to all, just as they are in the steam railroad field, and the presentation of the company's case as it exists in one city will answer in many respects for that in another. The united action of steam railroads in their campaign for a 5 per cent increase in their freight rates is a case in point. By telling the facts through all of the agencies available they have made a deep impression on the body politic. The conditions in the electric railway field constitute a harder problem and also probably a more local one. But this, as well as their other difficulties, can be overcome by every railroad that is cleanly financed, well operated and does the best it can for the accommodation of the public—if it lets the public know what it is doing.

CORPORATION BAITING AND MISREPRESENTATION If the exploitation only of the misfortunes and mistakes of the electric railways was the extent of the misrepresentation to which they are subject, they could often afford to be silent where now it is their duty to speak. But in many cases the misrepresentation extends to the publication of statements which are so erroneous as seriously to prejudice the case of the companies with the public. These statements may sometimes be made intentionally, but we are inclined to believe that in most cases they are due to carelessness or ignorance of the real condition on the part of the speakers or daily papers, often accompanied, we admit, by no great effort to learn the facts. One reason for this, of course, is that the habit of corporation baiting for political advantage, unfortunately, has become one of the established customs of the country, and the fact that an electric railroad comes in contact with an enormous number of people under circumstances which are likely to create causes of dissatisfaction makes the corporation an easy mark for the unprincipled politician or newspaper who wishes to gain a cheap notoriety as "champion of the peepul." Corporation baiting as a favorite sport of legislators and newspapers will go out of fashion when, and only when, they generally recognize that it is not popular with the public, and it will cease being popular with the public when the case for the railroads is understood.

TESTIMONY ON MUNICIPAL OWNERSHIP

For some years following the exhaustive report on municipal ownership published by the National Civic Federation in 1907, little was heard in this country about the municipal ownership of electric railways, but the subject has recently been revived in an acute form in several cities, among them in Washington. The agitation in the latter city does not come from the public but is an exotic brought in by a few congressmen, who have no property interest at stake in the District and who wish to exploit their freak ideas at the expense of the taxpayers. It would be very strange if the national government, with all of the other important problems which it has on hand, should now chase the will-o'-the-wisp of municipal ownership at the recommendation of Representative Crosser. It is not surprising that the proposal has brought out a series of vigorous protests from men throughout the country whose opinion must carry a great deal of weight with the House of Representatives, to whom the District Committee will report.

We have already commented at length upon the address of Mr. McCarter, and last week published abstracts of the addresses of Mr. Crawford of Reading, who was a member of the investigating committee of the National Civic Federation in 1906, and of W. D. Kerr, director of the bureau of public service economics of New York. General Harries, whose remarks are published in this issue, addressed the committee not only as a railroad man of long experience but as a resident for many years of the District of Columbia. Speaking from his knowledge in the latter capacity, he showed clearly that the committee was trying to force the residents of the district into a false economic plan which was not desired by them. He quoted extensively from the records of various municipal plants which had failed from a financial standpoint, and from authorities on civic government who utterly condemn the plan of municipal operation of public utilities. These arguments were reinforced by Mr. Rosecrantb, of Milwaukee, who added further testimony not only in regard to the errors in judgment to which the operators of municipal plants are liable, but showed by the experience in Milwaukee how the public could retain all of the advantages of direct control over the service and charges of a public utility through a regulatory commission and yet avoid the dangers of direct ownership and operation.

According to William J. Clark, the great objective in the creation and operation of public utilities is to secure a maximum of facilities and effective service at a minimum of capital investment and operating cost. On the basis of the numerous and carefully compiled statistics presented by him, it is undeniable that America has more adequate public utility facilities and better service than any other country, while the actual investment and the cost of service are less than in other countries, provided due allowance is made for difference in wages and construction prices. A large portion of Mr. Clark's data was obtained from foreign sources, but when he came to the point of showing the disastrous effect of public ownership he had only to quote from the history of our own country. As he says, an instructive volume on this subject alone could be compiled from the records of our oldest states, whose experiments with publicly owned canals and railroads have been appalling sink holes for the public money. Georgia, North Carolina, Missouri, Indiana and Pennsylvania have all had their fling, and the inevitable result has been conversion to private operation. It is unfortunate that the body politic is not more generally acquainted with the disasters that have overcome government ownership in this country. Manifestly it is not in the power of the average citizen to acquire at first hand the statistics setting forth these facts, but the public can and should heed the voice of those leaders who have thoroughly studied this question. When the last three men chosen as the first citizen of this nation can unanimously agree, as shown by Mr. Clark's quotations, that private enterprise should be permitted to carry on public utilities under proper regulation rather than that the government should attempt to own and operate the utilities, it is time for the average citizen to listen to the voice of wisdom rather than to the rabid cries of those who seem not to learn from bitter experience.

Many other points were brought out. The testimony presented before the committee is not only a convincing argument upon the unwisdom of the plan in Washington but forms a valuable addition to literature on municipal ownership of public utilities which should be of great assistance in other cities where this same issue may arise.

OPERATING RESULTS OF SAN FRANCISCO'S MUNICIPAL RAILROAD

In last week's issue we discussed at length the capital items of the report of the Geary Street Municipal Railway, San Francisco, Cal., for its first year of operation, ended Dec. 31, 1913. As stated at that time, there are important omissions from the capital account of the railway, but even on the basis of the report as rendered the rate of return is appreciably lower than that which a privately owned company in California would be required to earn. Facts no less striking than these are readily ascertainable in regard to the operating accounts of the line during the past year. In the light of these facts, the ability of the line to earn an adequate profit on the investment is open to serious doubt.

The present receipts per car mile and per mile of track on the municipal line indicate that the few miles of track which it possesses are in a favorable situation from a traffic standpoint. This was to be expected because the line began operations in a fully developed territory with a large riding clientele already available. It is taking the "fat" without any "lean." But with an extension of its lines into the suburbs the indications are that the revenue passengers will increase only at a rapidly decreasing rate. This limitation of future increases in revenue becomes of greater importance when the probable increase in operating expense is examined. This is not because operating expenses are intrinsically of greater weight in determining the net income but because the revenues of any electric railway depend largely upon business and economic conditions, whereas the operating expenses are subject to managerial control and indicate very closely the attitude of the management on the questions of the up-keep of property and the wages paid to employees.

In these respects the results for the past year on the Geary Street line are illuminating. At the present time the maintenance expenses are very low, as would naturally be expected with a new road. For way and structures they are only 2.7 per cent of the operating expenses as compared to 10.1 per cent on standard city roads as reported for the thirteen principal city properties in the United States Census report for 1907, and for maintenance of equipment they are only 5 per cent as compared to the standard 13.5 per cent. To be sure, the municipal line in addition charges 14 per cent of its gross receipts to depreciation, but even with this sum it is very doubtful whether the maintenance charge will be sufficient. The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for example, sets aside 22 per cent of the gross operating revenues to cover these items on its railway property, exclusive of power plants and substations, which makes it comparable with the Geary Street line. On this basis the latter line would be required to expend for maintenance and depreciation of track and equipment $97,844, which is $19,360 in excess of its present provisions.

The maintenance expenses of the municipal railway are highly interesting in themselves, but they assume a position of increased importance when considered in the light of expenses for conducting transportation. Already these are 86.2 per cent of the total operating expenses, as compared to the standard 59.3 per cent shown by the thirteen city roads quoted in the 1907 Census report. The employees of the municipal line are receiving 37½ cents per hour for an eight-hour day. Nevertheless, as noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, they are already clamoring for increased wages and special privileges, such as one day off with pay every week, ten hours on call for eight hours work and free uniforms. T. A. Cashin, superintendent of the line, has submitted to Mayor Rolph four schemes for complying with the ten-hour demand of the men, the most economical of which would increase the operating expenses $32,850 a year. The expense of giving the platform men a day off every week would be $20,280 a year, while the same privilege allowed to the shop and other employees would necessitate an expenditure of $15,015 additional. The employees of the road may not obtain all these demands, but it is well to bear in mind one of the great criticisms against English municipally owned traction lines—that with approaching elections the English papers refer to the great pressure brought to bear upon those holding office by bodies of municipal employees to secure any desired end, particularly a limitation of hours and an increase in compensation. It is almost inevitable that the wage scale on the Geary Street line must soon be altered certainly in favor of the older employees, who naturally will expect a higher wage than the new men, as on privately owned electric railways. Especially will this be the case since the $3 per day now paid the men is less than the rate per day which is paid the senior men on the United Railroads of San Francisco, or $3.67.

We have seen how time will increase the maintenance and transportation expenses of the line and thus cut down the net income even if no extensions were built. Let us now consider the effect of the extensions already proposed. The present Geary Street line runs from the park and beach to the Market Street ferries, a route that provides good patronage on Sundays as well as during the week, and traverses a territory already developed during the operation of the old Geary Street Railway. The line is straight for nearly the full length, and the grades comparatively low. The road has the privilege of transferring to crosstown lines of the United Railroads of San Francisco at four points so that it has the advantage of serving a large territory while maintaining only a profitable trunk line. The proposed extensions of the municipal system, however, are not situated under such favorable conditions. Several of them are on grades so heavy that the operating expenses will undoubtedly be much higher, and on the Union Street line, certainly, the problem of new equipment with special trucks or other safety provisions must be solved.

As extensions are made, also, pressure will be brought to bear to have the municipal system extended through light-traffic districts with a view of developing real estate. As with other Western cities the speculative real estate interests in San Francisco are powerful, and the wire pulling, political bickering and sectional disputes which will follow any plan for extensions will not only complicate the management of the municipal system but may seriously hinder its operation. The decision to build new lines should be based entirely on the opinion of traffic experts as to whether the probable traffic would make the extension good business policy. If any other principle is followed private land owners would be benefited at the expense of the road. Traffic experts of private companies are better qualified than the public to pass on the advisability of extensions, even assuming that the public has not been misinformed by private interests and that there are no political forces at work to influence votes.

To sum up the whole matter, there is no doubt that the Geary Street line has not yet encountered the most difficult obstacles on its path to success. Certainly the question as to whether the extensions of the municipal system can be built, maintained and operated at a profit is not determined by the results of operation up to the present time. In reality, no profit is being made even with the present high receipts and only partly developed operating expenses, and much less favorable traffic conditions are to be expected as a result of the future. We should not close without mentioning one beneficial result which has accrued from municipal operation in San Francisco. There are fewer complaints to the United Railroads of San Francisco since the municipal line began. The public is beginning to realize that such matters as no-seat, no-fare ordinances and over-crowding during rush hours are not being solved by a municipal road.

USELESS WEIGHT IN STEEL CARS

In a communication in our last issue F. M. Brinckerhoff calls attention in a distinctly striking manner to the evils of unnecessary weight in steel cars. Solely from the standpoint of power consumption the matter is, of course, no new one, but Mr. Brinckerhoff has gone a step further in pointing out that the cost of the steel work which is in excess of requirements may amount, even in a small order of cars, to a considerable sum.

The point which is raised cannot be well gainsaid. Fabricated steel of any given class has been found by long experience to cost almost directly in proportion to its weight, and every car in which are incorporated steel members that are either unnecessary or else fail to develop their full strength not only increases operating costs in the power house but also burdens the railroad with fixed charges that have a direct and deleterious influence upon the profits of the enterprise. Indeed, as indicated by our correspondent, the difficulty of even finding capital is so great to-day that it would constitute still another important reason for eliminating useless weight if those already quoted were not sufficient.

This point of the cost of useless weight is one which has, apparently, been realized but vaguely heretofore. It has, no doubt, been obscured by the fact that, with wooden cars, cost and weight are not proportional when very light constructions are employed. With wooden cars the labor cost rises so rapidly, as the construction is lightened, that it more than offsets the saving in material, and in the end the total cost of the very light car may be even greater than that of one which is somewhat heavier. The same condition does not apply to steel, at least in the class of construction that is commonly used for electric railway cars. A heavy member will require more and larger rivets to hold it in position than will a lighter, thinner piece, and except in the case of rough castings, where the only labor required is that to handle the material, the lighter piece will never fail to involve a smaller cost of labor for installation.

Of course, one of the stock arguments against light car weight has been that of high maintenance cost, and with wooden cars this is probably sound to a certain extent. The same argument, however, by no means applies to the properly designed, light steel car, and in support of this statement we can point to the communications from P. V. See and R. R. Potter, published elsewhere in this issue, both of which have reference to the maintenance cost of the steel car bodies of which the writers are in charge. In neither case has anything more than the most incidental repair work been found to be necessary, and as both of the types of car referred to are light in weight, the experience with them may safely be taken as evidence that high maintenance cost is by no means a necessary accompaniment of light car construction.

As a matter of fact, it is high time for this subject of steel car design to be scrutinized with more attention to the analysis of the expected strains and stresses than it has received in the past. Years of experience with wood and with the rule-of-thumb methods suitable for a material of such variable quality have been the cause of some most unfortunate designs in steel, and so long as the old methods of design are followed steel cars will continue to carry around, incorporated in their framing, metal for which they have no more real need than a bird has for ballast.

The major part of this tendency seems to be due to a willingness to accept complication in design, to permit the existence of filler blocks or their equivalent through lack of foresight, and to allow for various purposes the use of metal which does not and cannot do its full share in resisting the strains of service. Certainly the steel car is here to stay, but, even so, its inherent advantages of light weight and low maintenance cost will be of very little benefit to the industry until the fact is recognized that it cannot be designed by guesswork, in the way that the wooden car has been and, indeed, is designed to-day. If the requisite time and effort cannot be devoted to a study of the factors involved, electric railways may just as well penalize themselves by adhering to the wooden car with all its disadvantages.

The Tri-City Railway's New Carhouse in Rock Island, Ill.

A Fireproof Concrete and Brick Structure of Which Four of the Seven Bays to Be Contained in the Complete Building Have Been Finished

The old adage which states that some events are blessings in disguise applies to the fire which destroyed the old carhouse and shops of the Tri-City Railway & Light Company in Rock Island, Ill., in the spring of 1913. Unfortunately, however, at the time of the fire the old building contained approximately all of the company's new type pay-as-you-enter cars, and all but a few of these were destroyed. Much of the framing of the old building was of the slow-burning type, but peculiar conditions surrounded the origin of the fire which destroyed this building in that a bolt of lightning seemed to pierce its entire length, resulting in such a widespread and instantaneous blaze that a sprinkler system or other fire-fighting apparatus was of little avail. In addition to this the lightning interrupted the supply of energy to the carhouse trolley circuit. This made it impossible to remove cars except by hand, although a number of employees were in the building.

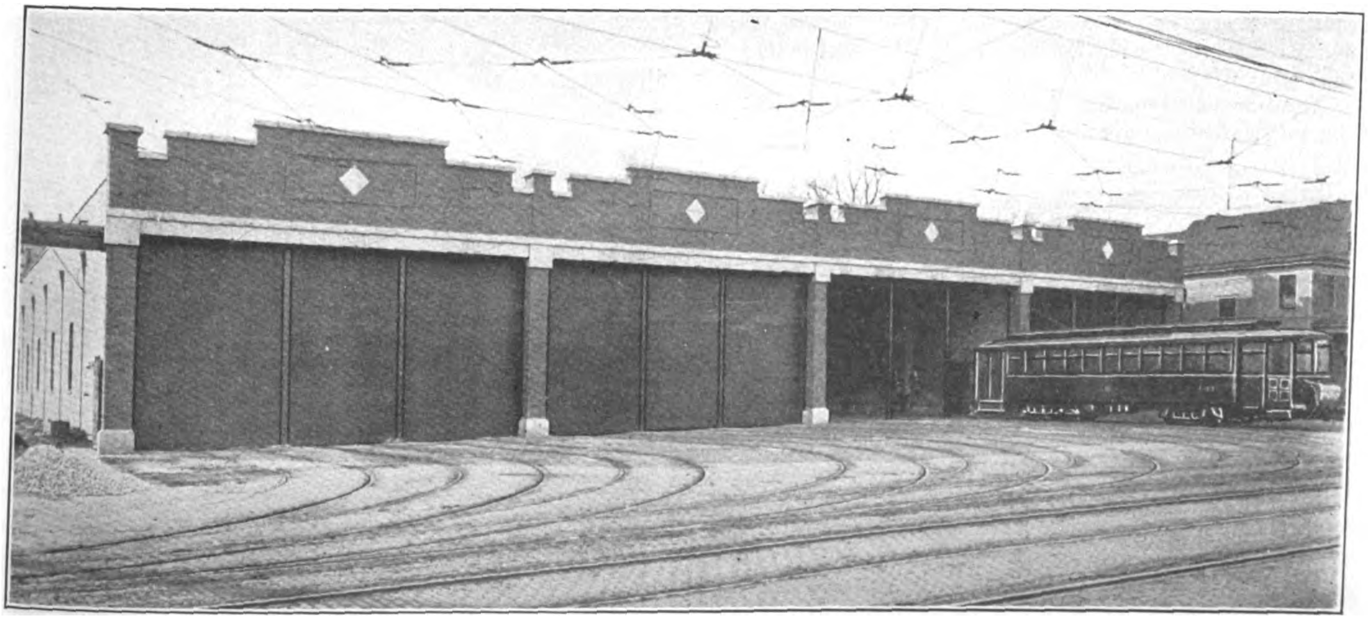
The new building was built on the proposed site of the Rock Island repair shops, which were to have been constructed during the summer of 1913. This property is located centrally from an operating standpoint and is separated from the steam road right-of-way, where a track connection may be had, only by an intervening street. The portion of the carhouse completed represents four bays of a seven-bay structure, over one bay of which will be provided a two-story section. The first floor of this two-story portion of the carhouse will be occupied by the receiver and storerooms, and the upper portion will provide quarters for the trainmen's club. In plan that part of the new structure which has been completed is 150 ft. in width by 296 ft. 6 in. in length, with the rear end of one of the outside bays 95 ft. 6 in. shorter than the others. Each bay is of sufficient width to provide three storage tracks at 10-ft. 6-in. centers, all of which lead into the building from a ladder track paralleling the double main tracks in the street in front of the building, and stub end at the rear of each bay. Under each storage track is a 34-ft. inspection pit. At the present time one storage bay is being used temporarily as a repair shop and is provided with concrete pits 183 ft. 4 in. in length, under the three tracks, as well as additional skylight area.

BUILDING CONSTRUCTION DETAILS

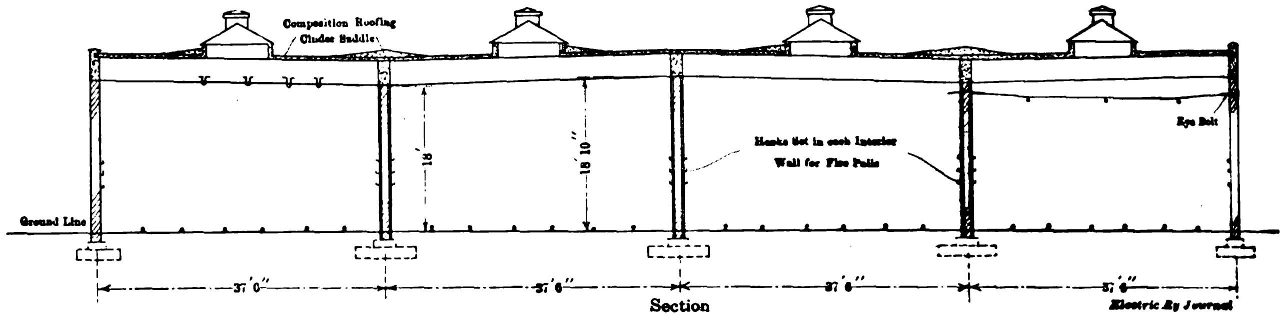
This carhouse was constructed on the site of an old stone quarry which had been filled, hence the roof was not carried by the side walls. Essentially the structure consists of a reinforced-concrete building frame and foundation, surmounted by a reinforced-concrete slab roof and enclosed with brick curtain walls. The footings under the columns are carried well below the property level and have a unit loading of 1 ton per square foot maximum. The interior reinforced-concrete building columns are 16 in. square, and the 12-in. x 32-in. reinforced-concrete beams spanning the bays and supporting the concrete slab roof alternately rest on the building columns or are cast as a monolith into the 16-in. x 36-in. girders between the columns along the curtain walls which separate the bays.

As shown in the building cross-section, the roof is of solid 4-in slabs with ribbed metal reinforcing, poured on a solid forming, after which cinder-concrete ridges and valleys were constructed to provide proper roof pitch to the downspouts. Over this a five-ply tar and gravel roof was laid and flashed with 14-ounce copper at the fire walls and along the skylight wells. All brick except those in the building front are Purington paving block laid in lime and cement mortar. The front is built of a special pressed face brick laid in black mortar and trimmed with white terra cotta.

The face of the building is 45 ft. back of the street line and the entire areaway between it and the street is paved. By setting the building inside of the property line, sufficient space was provided to store a car without blocking the street or sidewalk. All tracks in



Tri-City Carhouse—Front View of Building


Composition Roofing
Cinder Saddle
18'
18' 10"
Hooks Set in each Interior Wall for Fire Pails
Eye Bolt
Ground Line
37' 0"
37' 6"
37' 6"
37' 6"
Section
Electric Ry Journal

Tri-City Carhouse—Cross-section of Building

the building are laid with 70-lb. A. S. C. E. rail fastened to 6-in. x 8-in x 8-ft. ties embedded in concrete in a trench below the floor. The floors are of concrete sloped from a 1½-in. crown in the aisle between tracks to a 1-in. depressed valley between the rails of each track, in the repair bay and to the rear of the pits in the storage bays. That part of the floor back of the pits in the three storage bays is laid with paving brick. At the low points in the floors track drains are provided at sufficiently frequent intervals to insure the proper drainage of the entire floor area of each bay.

PIT CONSTRUCTION

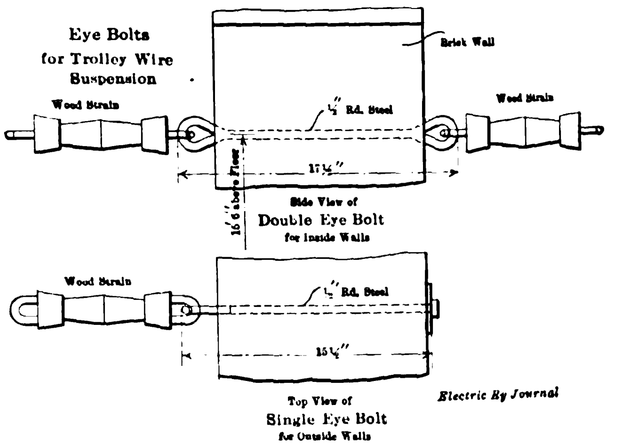
The inspection and repair pit construction is somewhat unusual. Concrete pedestals 14 in. square are supported on spread footings and the pedestals support a 14-in. x 16-in. reinforced-concrete beam to which the 70-lb. A. S. C. E. rail is securely anchored. Rail anchor bolts are placed in pairs spaced at intervals so as to provide sixteen bolts per rail in the beams over the short pits and seventy-six bolts per rail in the long pits in the repair bay. As shown in the detail, these bolts are ¾ in. x 6 in. in size, and fitted with ¾-in. cut washers at the end embedded in concrete, and cast-iron rail clips and hexagon nuts serve as the fastenings for the base of the rail.

A 9-in. reinforced-concrete slab spans the space between pit walls forming the aisles between tracks. This slab rests on the reinforced-concrete beams carrying the track rails and is built with two 3-in. x 10-in. jack planks embedded in the top surface so that the top of the plank is flush with the floor. These planks are set 4 ft. 3 in. from the center of each track, which places them approximately under the side sills of the cars. The space between pits under the aisle floor, as well as that in them, has been provided with concrete floors which slope to drains installed along the center line of each pit.

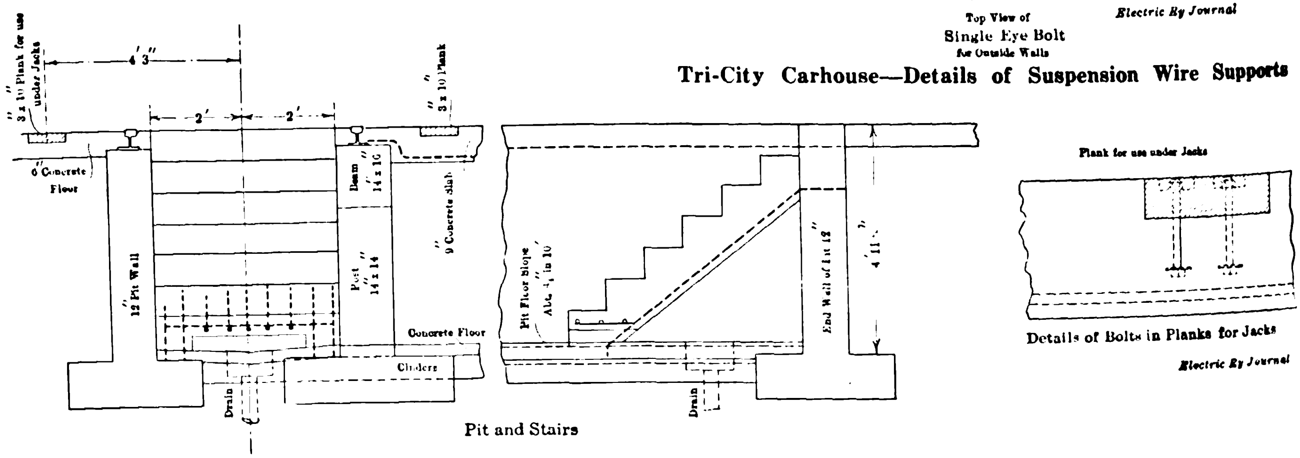
Another construction detail of interest is found in the manner of supporting the overhead trolley wires in the building. In the three storage bays the span wires are connected to eyebolts embedded in the brick building walls. In the interior walls these eyebolts are ½-in. round steel, set in the 13-in. brick walls and provided with eyes on both ends. In the exterior walls the ½-in. round steel eyebolts extend through the wall, and the outer ends are fitted with 3-in. square washers, ¼ in. thick. Each beam spanning the four bays is provided with cast-steel inserts over the center of each track for protection against a flying trolley, and the beams over the repair bay are provided with five ½-in. loops in addition to the inserts to serve as points for attaching hoists used in handling repair parts.

As shown in one of the half-tone illustrations, combination skylights and ventilators were installed along the center line of each bay. The wells with 8 ft. in clear width were cast in the reinforced-concrete roof and provided with 6-in. curbs projecting 18 in. above the roof line. Lupton steel skylights glazed with wire-glass and fitted with 36-in. Burt automatic ventilators are set over these curbs. Tungsten lamps with wide reflectors were swung from the beams supporting the roof.

The entrance ends of all bays are inclosed with Kinnear rolling steel doors, and provided with posts


Eye Bolts for Trolley Wire Suspension
Brick Wall
Wood Strain
Wood Strain
½" Rd. Steel
17¼"
16' 6" above Floor
Side View of Double Eye Bolt for Inside Walls
Wood Strain
½" Rd. Steel
15¼"
Top View of Single Eye Bolt for Outside Walls
Electric Ry Journal

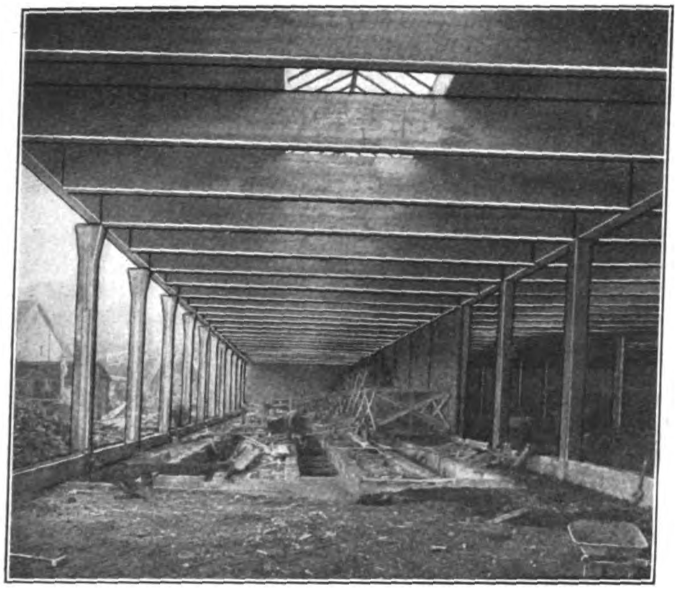
Tri-City Carhouse—Details of Suspension Wire Supports


3" x 10" Plank for use under Jacks
4' 3"
2'
2'
3" x 10" Plank
6" Concrete Floor
Beam 14" x 16"
9" Concrete slab
12" Pit Wall
Post 14" x 14"
Concrete Floor
Cinders
Drain
Pit Floor Slope Abt. 4" in 10'
End Wall of 1 in 12
4' 11"
Drain
Plank for use under Jacks
Electric Ry Journal

Pit and Stairs

Details of Bolts in Planks for Jacks

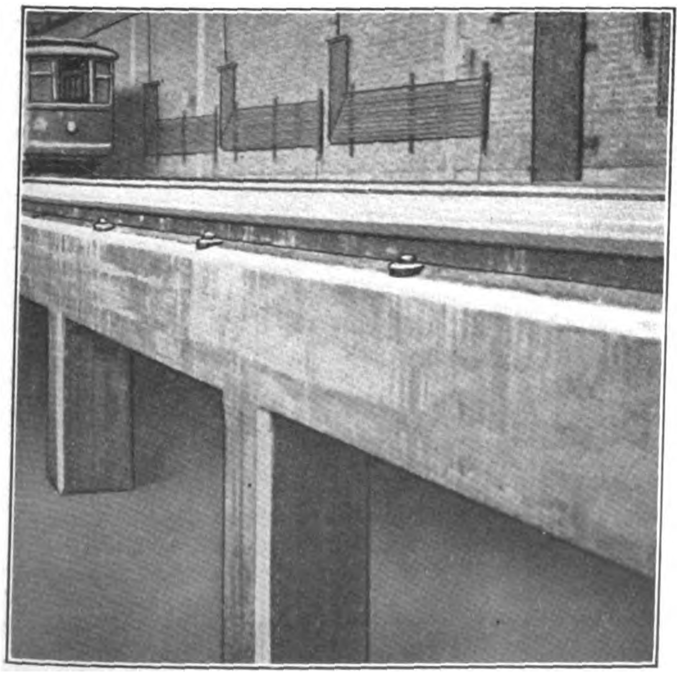
Tri-City Carhouse—Details of Pit Construction



Tri-City Carhouse—View Showing Concrete Construction

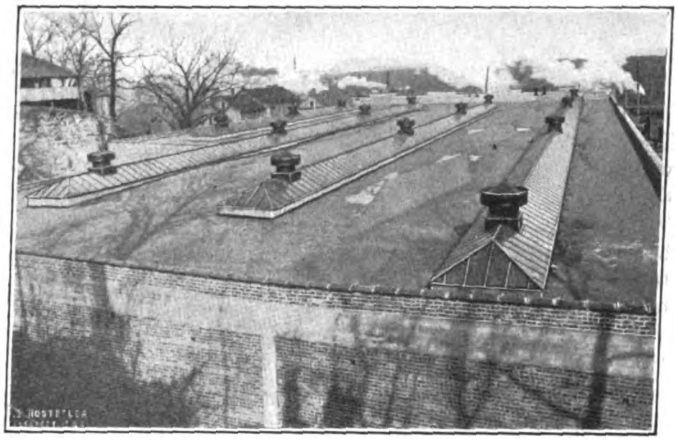
hinged at the top so that they may be raised to give a clear opening between partition walls. Each entrance is fitted with three rolling doors giving an 18-ft. clear headroom. All other doors, which include those in the partition walls between bays, are standard, tin-clad fire doors constructed to meet the underwriters' specifications. Each opening is provided with a pair of doors, one for each side of the wall and arranged to close automatically. All of these doors excepting those in the bay used temporarily for repair purposes, are designed to remain normally open, those in the latter are to be normally closed.

Owing to the character of building construction employed, which carries a low insurance rate, as well as the limited overhead clearance, it was considered unnecessary to install a sprinkler system. Three hydrants were installed in the partition walls of each bay. In addition four hose connections were set in iron boxes in the floors of each bay about 26 ft. inside the entrance doors. These are located in the aisles between tracks and along the building walls. Fifteen standard sand pails and six chemical fire extinguishers are placed for convenient access.



Tri-City Carhouse—Inspection Pit Construction

Steam heat is provided by built-up pipe coils supported in short sections on the building walls. These are fed from mains also supported on brackets on the walls just below the trolley span wires and drain to the return system in a concrete conduit under the floor and adjoining the walls. The heating plant proper is housed in an adjoining building, but when the remaining three bays are added it will be included in the new structure.



Tri-City Carhouse—View Showing Roof

The plans and specifications for this building were provided by the engineering department of the Tri-City Railway & Light Company under the direction of B. J. Denman, chief engineer. The construction work was handled by the Central Engineering Company, of Davenport, and completed in the remarkably short time of seventy days.

NOTES ON BOILER PRACTICE

R. E. Hagenah, superintendent and chief engineer of the Springfield (Ill.) Light, Heat & Power Company, states that a saving of approximately 62.5 per cent is effected by the substitution of flat for sprung arches hitherto used. The flat arches can be constructed for three-fourths the cost of sprung arches and the life of the former has proved to be fully twice as long as the latter. The boilers in the station are all of the water-tube type and fuel is fed to the grates by means of chain-grate stokers. The boilers are of three makes, namely, Stirling, Babcock & Wilcox, and Springfield.

The penalty of operating boilers under too great draft was well exemplified in an instance cited by Charles M. Rogers before the recent Mississippi Electric Association convention. He mentioned a plant situated in an important bituminous coal field where the best grade of fuel was obtainable without freight charges. Its furnaces were arranged for burning about 7 lb. of coal per sq. ft. of grate area, but owing to careless fire-room regulations a draft of 0.55 in. to 0.60 in. of water column was maintained on these boilers, or sufficient to burn 50 lb. to 60 lb. of fuel per sq. ft. of area. The result was that an excess quantity of air was passed through the fire, cooling it and diluting the CO_2 content to about 2.3 per cent. Under these conditions the fuel bill was about $1,000 a month.

Later the draft was reduced to 0.08 in., improving the efficiency and output of the boilers to such an extent that it was possible to cut one unit out of service altogether. Meanwhile the fuel consumption fell to $650 a month, showing a saving of a third of the former bill under conditions of poor draft regulation.

The Training of Platform Men

This Vital Subject Formed the Basis of a Profitable Discussion by the Public Service A. E. R. A. Section on May 21—The Paper Was Followed by a Lecture by Prof. A. S. Richey

At the regular meeting of the Public Service Company Section of the American Electric Railway Association held in Newark on May 21, Charles H. Coe, chief instructor Public Service Railway, read a paper entitled "Training the Trainmen."

He said in part that such training is important because every person who uses the cars deals directly with conductors and motormen. The platform men are the points of contact between the company and the public. They are, in a very large measure, the medium through which the public forms its impressions, and by which the company and its service are judged. It would seem; therefore, that any effort to promote cordial relations between the company and the public must necessarily take into consideration the platform men. If an even headway is maintained; if the conductor and motorman are courteous in their treatment; if the car is properly ventilated and heated; if the motorman starts and stops his car smoothly, complaint or criticism are never heard. If, on the other hand, the conductor has a grouch, or the air in the car is vile, or a long gap exists between cars, or the motorman, when he starts or stops his car, throws the passengers off their balance, then you hear complaints and unfavorable criticism.

PATIENCE IN TEACHING REQUIRED

Patience in teaching is necessary because the class of men seeking employment is not always up to the standard of intelligence required. This is demonstrated when it takes, as it does in some cases, from two to three hours to teach a man how to pull a controller handle around and recognize the points. At the present time you can find plenty of men to handle big jobs; there is no trouble to get men who can build a railroad, move a mountain, or tunnel a river. We are thoroughly equipped for titanic tasks. We carry a full assortment of trip-hammers, steam shovels and subway drills in our tool kits. If you can pay the bill, there are a thousand quiet, modest men who will undertake a transcontinental tunnel. The civilization of to-day dares to achieve what it yesterday feared to dream. There are a hundred markets from which we can secure competent "wizards." There is a glut of leaders and generals. The school of progress is educating a-plenty of engineers, inventors and scientists to cope with the demands of the times, but we are short of men who do small things in a big way. This is the weak link in our chain of organization.

We pay too much for errors. We have been so eager and absorbed in the perfecting of driving wheels and gears that we have forgotten all about the bolts, nuts and screws. The moment a valuable piece of machinery is entrusted to a man, he becomes a most important factor in the process of operation. If he fails to perform his duty, all the effort and intelligence expended antecedent to that duty are jeopardized. Special trains of thought and instruction are regularly derailed by the mistakes of incompetent subordinates. It is very necessary, therefore, to properly instruct and follow up the platform man. One is very apt to underestimate his capacity for damage, and because he cannot create one is liable to forget his power to wreck. A crawfish cannot build a dyke, but it can dig a hole that will destroy one. A half-wit is not capable of constructive work, but he can do a mighty lot of tearing down. Turning our attention to the lower rank of the organization and safe-guarding ourselves against ignorance and shiftlessness will spell in large letters—"Economy."

Training the trainmen is a subject which is being taken up seriously by the larger companies and some of the smaller ones. You will no doubt recall that some years ago a motorman or conductor was employed by the superintendent of the division without any investigation. He was placed on a car with a motorman or conductor more or less competent, or one who had a number of grievances. About the only thing the instructing motorman or conductor did was to pour into the ear of the student his many imaginary wrongs. Naturally the student became discouraged at the start and the impression he formed was that the company and its officials were his enemies. After breaking in for three or four days, the student was started with a car, if the superintendent happened to be short of men. This was apparently all right so long as the car got back to the carhouse on time and the full complement of cars was on the line, but during the last few years many changes have been brought about.

EARLY INSTRUCTIONAL WORK BY THE PUBLIC SERVICE RAILWAY

On Dec. 1, 1907, our present general manager, who had been on the property but a few months, realized the necessity of training the platform men. A school was started on the second floor of the Miller carhouse in an 8 by 14-ft. room; $150 was the amount to be expended, of which the superintendent of buildings used $110 for benches, leaving a very small margin for equipment. This consisted of four boxes with five lamps on each, representing motors; three boxes of grid resistance on a frame with six lamps to show, step by step, how resistance was cut out; a K-6 controller wired to these lamps, and an overhead switch or circuit-breaker. These were all used to demonstrate how the current passed through the car. The first work was to endeavor to teach the motormen how a controller should be notched to start the car properly. No instruction was given at that time to conductors. One year later the school was enlarged and another school was established at Montgomery Street, Jersey City, to take care of the Hudson division. Both conductors and motormen were instructed. Six months later a school was established at the Newton Avenue carhouse, Camden, to take care of the southern division. Each of these schools was placed in charge of an instructor who reported to the chief instructor. Two chief motormen and two chief conductors were attached to the Miller and the Hoboken schools, and to the Camden school, one assistant instructor who acted as chief motorman and chief conductor.

PRESENT METHODS

At present the superintendent of employment receives applications on stated days in the different divisions. Each applicant's past record is investigated before he is employed, and a doctor's examination is insisted upon.

The day following his employment the "student" reports at the school of instruction at 8 a. m. for preliminary instruction, provided with his breaking-in card and his outfit. A student's primer is handed him to read for the first hour. Conductors are taken in hand first and the following subjects are treated by the instructor: General talk on safety, courtesy, loyalty and honesty; conditions under which the man is going to work; rates of pay; fares, tickets, passes, etc., in use by the company; punching and receiving transfers; how to keep a day card and make out transfer envelopes; how different types of fare boxes are operated; accidents and how to prevent them; how to make out accident reports; how to get witnesses. In the afternoon, at 1 o'clock, the student again reports at the school and is put on the instruction car for actual operation, the car being in charge of a chief conductor. The subjects taken up by the chief conductor are: position, how and where to stand; where the light switches are located; how to handle register and fare box; how to ventilate a car, in summer and in winter; bell signals; flagging railroad crossings; opening and closing doors to prevent accidents, etc. The following day the student reports at the carhouse to which he has been assigned, and is placed on a car with an instructing conductor who has been selected with great care as to record, loyalty, and ability to instruct. This course is followed for from five to six days and if, in the opinion of the instructing conductor, the student is competent at the expiration of that time, he signs the man's breaking-in card. The following day the student again reports at the school at 8 a. m. for final instruction. He is recorded as "reporting for final" and is placed on the instruction car in charge of the chief conductor. If, from a practical standpoint, the chief conductor believes the student is competent, he signs his card; if not, he so reports, and the student is given another chance and is sent back to the carhouse for more instruction. After signing the card, the chief instructs the student to report at the school at 1 p. m. for written or oral examination, covering the following: making out day card, transfer envelope, mailing slip, delay slip, pay slip, punching transfers and stating when and where to receive them. If the student is found competent the chief instructor signs his card and the student is told to report to the supervisor at the carhouse to which he has been assigned. After a satisfactory examination of the student by the supervisor as to the former's knowledge of localities, the supervisor signs the breaking-in card, which is forwarded to the superintendent of employment for filing.

With the motorman a similar course is pursued. For the preliminary instruction he is first taught position, how to stand on the car; how to notch the controller and to use the hand brake. This is done with dummy controllers and brake staffs placed in the same position as on a car. This drill lasts about two hours. The student is shown how to make emergency stops, how to operate a car up or down grade, and the proper use of brakes and power. An explanation is given of the course of the current from the time it leaves the power house until it passes through the car. The names of the different parts of the equipment and their locations are made clear. No technical language is used. For instance; instead of measuring resistance by ohms it is measured by feet, and it is demonstrated to the student that as he notches his controller he cuts out a certain number of feet of grids and permits more current to get into the motors, thus providing more power and causing the car to move faster. These facts are demonstrated by a machine on the floor of the schoolroom and by lamps on a demonstration board. The matter of wiring a car is touched upon only lightly, excepting as to motor leads, trolley, and ground fingers in controller.

In the afternoon the student is placed on the instruction car with the chief motorman, where he is taught practical operation. All parts of the equipment are shown and their use explained. He is told how a car will act under different conditions; with motors cut out, up and down grade, without brake or power, etc. The following day he reports at the carhouse to which he has been assigned and is placed on a regular car with an instructing motorman. The student motorman generally puts in four days of daylight and three nights on trial. When the instructing motorman judges him competent, his breaking-in card is signed and he is told to report at the school the following day for final examination. Upon reporting he is placed on the instruction car in charge of the chief motorman, who allows him full swing, correcting any mistakes he may make. If he is found not up to the standard, the chief motorman so reports to the chief instructor and if the latter agrees with the motorman he is sent back for further instructions. If found competent by the chief motorman, the student's card is signed and he is ordered to report at the school at 1 p. m. for a final written and oral examination. If he passes, the breaking-in card is signed by the chief instructor, and the student is ordered to report to the carhouse to which he has been assigned, to be examined by the supervisor as to local conditions. If he is found competent, the supervisor signs his card and it is forwarded to the superintendent of employment for filing.

Instructing motormen and conductors receive extra compensation of twenty-five cents per day when imparting knowledge to students.

FOLLOWING UP THE TRAINMEN

The follow-up instruction is given by chief conductors and chief motormen and, as time will allow, by the chief instructor. Each day the traveling chiefs are given a list of students who have qualified on the previous day. A list is also kept on file in the schoolroom and checked each day by the chiefs. A daily report is also made by the chiefs, giving student's name, badge number, time of boarding and leaving car, remarks as to progress, etc. The rides taken by the chiefs are of from one to three hours' duration and are kept up for from ten to fourteen days, or even longer if a student is backward. Mistakes and omissions are pointed out to the student in a quiet manner by the chief. Frequently it is found that the student lacks confidence in his own ability and this the instructor endeavors to restore.

To be effective this instructor must have the support of the men in charge of the carhouses. If loose organization, an indefinite policy, unjust, irrational or inconsistent treatment of men prevails, any advantages obtained by the best system of training ever instituted will be offset.

OTHER USES OF THE SCHOOLS

The schools are also used when men are to be disciplined. For instance, a man suspended for any cause, such as abuse of equipment, accident, or a violation of rules, is ordered to spend one or more days there. This is much better than having him spend the day in idleness. Inspectors and station masters promoted from the platform are required to qualify both as conductors and motormen, that is, if a promoted man has been a motorman he is required to qualify as a conductor, and vice versa. Supervisors, inspectors and station masters are required to report at the school every thirty days to keep in touch with changes in equipment and new developments.

RESULTS OF THE WORK

During the year 1913 there were 2092 conductors and motormen appointed, 449 reappointed and 29 reinstated. Of this number 2138 qualified, being a decrease from the year 1912 of 392. For disciplinary reasons 1866 platform men attended the school. The number of rides given students by the chief motormen and chief conductors was 8644. For the first three months of 1913 there were 106 motormen appointed and 40 reappointed. During the first three months of 1914 64 motormen were appointed and 29 reappointed; conductors, first three months of 1913, 362 appointed, 62 reappointed; conductors, first three months of 1914, 230 appointed, 38 reappointed. This is a decided decrease. The proportion of reappointments in 1914 is larger than in any preceding year, showing that more of the men who had left the service desire to return.

DISCUSSION

In commenting on Mr. Coe's paper several officials of the company stated their practical agreement with the points made, and amplified some of those bearing directly on operation. L. T. Baurhenn, representing the transportation department, emphasized the fact that cordial relations between the company and the public must necessarily depend upon the platform man. He commended the follow-up system, especially as a factor in preventing discouragement of new men. In a large system the local conditions under which the men are to work should be considered in instructing them. Mr. Baurhenn agreed that the chief motormen and conductors should have the cordial support of the road officers and division superintendents, who should not do anything to offset the results obtained by the system of training. He is personally glad to have the chief motormen and conductors ride with the new men in his division, the Bergen division, and to spend as much time as possible with them. He knows that the new men are safe when thus accompanied and he has no anxiety concerning them.

G. L. Walsh, of the Passaic division, discussed Mr. Coe's paper from the standpoint of the claim department. He assumed at the outset that the men under discussion are strong, healthy and possessed of ordinary common sense. Without these requirements no method of instruction is satisfactory. When a new man is employed he is evidently "green," and is apt to be timid with respect to his new duties. The chief instructor, therefore, should endeavor to make the new recruit his friend or little can be expected from him. The first impression is lasting. In regard to the dullness of brain referred to by Mr. Coe, it should be said that with proper attention nine times out of ten these dull applicants can have their wits sharpened and with proper coaching can be ultimately developed into good men.

While it is true that certain men can remove mountains, build railroads, etc., it took them a long time to acquire the requisite knowledge. Outside of these specialties some of these men have as much difficulty learning new things as does the man who is learning to operate a trolley car. The proper instruction of platform men has an important relation to operating troubles. For example, a motorman may not know what to do when a finger on his controller "sticks." It causes a tie-up of the line and it is quite possible that he may have difficulty in securing the proper assistance. Again in the case of a derailed car one sometimes sees the crew seated comfortably but making no effort to replace the car on the rails, waiting for the wrecker and not at all concerned that the whole line is blocked. Motormen should be so instructed that they will handle their cars as if they were their own property. The best possible organized shop force will not prevent high maintenance cost if cars are operated by poorly instructed or careless motormen.

Instruction has important relations to the reduction of the number of accidents. Among the most common of these are the derailings caused through failure of motormen and conductors to observe the proper precautions at steam railroad crossings, and the opening of the doors of pay-as-you-enter cars before the cars stop, or giving the bell signal to start the cars before the rear doors are closed. Well-trained crews can also assist the claim department in securing the names of witnesses after an accident.

N. W. Bolen, superintendent of transportation, emphasized the importance of the follow-up system and stated his belief that even more than fourteen days of this should be allowed for. J. W. Brown, assistant general superintendent, called attention to the great opportunity for accidents that is presented by a property like the Public Service Railway, where the daily mileage is 136,000 and the number of passengers carried 1,000,000. He wittily reversed an old adage stating that "A company is known by the men it keeps." He said that all men are not qualified to become trainmen, and referred to the experiments made by Professor Hugo Münsterberg. He believes that the professor's experiments will ultimately be very helpful in electric railway work.

R. E. Danforth, general manager, illustrated how men can be educated to save money for a company. Accidents can be easily avoided if the men know how to do so, but they are easy to produce through ignorance. Men who are older in the service should instruct the new ones. While there are certain instructors appointed, the inspectors have an opportunity to extend the educational work. New men are very liable to become conceited after a month or so of work and to think that they know all that is to be known. Mr. Danforth gave a number of illustrations of the points made by previous speakers and related them particularly to the work of the Public Service Railway.

POWER REQUIREMENTS AND ENERGY CONSUMPTION IN ELECTRIC RAILWAY WORK

The second feature of the meeting was a lecture by Professor A. S. Richey, of the Worcester Polytechnic Institute, in which he discussed the mechanics of car operation. He showed that energy is used up in starting a car, in friction, in overcoming grade resistance and in momentum. He explained how energy can be saved by proper control of the speed of a car, particularly by the use of quick acceleration and as much coasting as possible. He discussed the typical time-speed curve, showing that it consists of four parts: straight line acceleration while resistance is being cut out; acceleration on the motor curve while the counter electromotive force is coming up; coasting, and braking.

He showed how coasting recorders and other devices designed to call attention to the energy saving which could be made by proper handling of cars, serve to accomplish the desired results.

The interest with which Professor Richey's lecture was followed shows that practical operating men are glad to have the theory of their work explained in terms of that work. At the close of the lecture the speaker was given a unanimous rising vote of thanks by the section.

At a recent dinner of the Rotary Club, Rock Island, Ill., John G. Huntoon, general manager Tri-City Railway Company, read an interesting paper on the evolution of transit facilities and the mergers which resulted in the present Tri-City Railway Company. The paper gave a complete history of the changes from horse, mule and steam dummy power to electricity, and reviewed the increases in population in the communities which the company serves after electrification of the Tri-City system.

Hearing on Public Ownership of Street Railways in Washington

The Following Report Covers a Continuation of the Hearing Held at the Request of the American Electric Association, Abstracted in Part in Last Week's Issue

Since the publication of last week's issue of the ELECTRIC RAILWAY JOURNAL, additional testimony has been offered in Washington on the Crosser bill providing for public ownership of the electric railways in the District of Columbia. As in the previous week, the testimony was presented before the committee on the District of Columbia of the House of Representatives. The speakers, with one exception, represented the American Electric Railway Association. The exception was a representative of the National Electric Light Association, who attended the hearing at the request of the public policy committee of that association in view of the importance of the issue involved. Abstracts of the testimony presented at the hearings on May 22, 26 and 27 follow.

TESTIMONY OF GEN. GEORGE H. HARRIES

Gen. George H. Harries, vice-president of H. M. Byllesby & Company, said that he appeared as past-president of the American Electric Railway Association and for the committee on federal relations of that association.

General Harries said that there has been no popular support in the District of Columbia for government ownership of the electric railway lines here. This lack of public initiative, he declared, was most significant. He said that it might be due to the lack of necessity for such a change in ownership or the result of the belief of the community in the efficiency of the present system. He declared that he had yet to hear the first suggestion from any body of citizens for such a proposal as that contained in the Crosser bill. Usually, he declared, one would expect a community to initiate such a movement; that it would come from the people most vitally interested. The taxed, but unrepresented, people of the District of Columbia, he declared, have one thing in common with the citizens of other communities—the privilege of speech. But on this subject, he insisted, they had voiced no demand.

The thirty-five citizens' associations in Washington, said General Harries, had been silent on this question. although they have always been the first to discuss questions of real public interest. They have not asked Congress, or any other source of power, he maintained, for the municipalization of the electric railway lines. The Chamber of Commerce of Washington and the Washington Board of Trade, both representative organizations of business men, had not asked for the passage of such a measure. As far as the traction facilities of Washington were concerned, those who have compared it with similar service in other cities would have to admit that in the matter of track distribution, of equipment, of rolling stock and of general relations between the companies and their employees as well as with the public, Washington had no ground for complaint. He insisted that the local service was excellent and cheap.

BURDEN WITHOUT RESPONSIBILITY

General Harries added that the measure proposed to lay a great financial burden upon people who have not asked for it and that it sought to make them bear the entire responsibility for the experiment. The bill required the United States government to use its power to compel the District of Columbia to buy and to operate the electric carriers of the District. The government in this measure not only failed to indorse the project it undertook to inaugurate, but expressly disavowed all responsibility for it. The bonds to be issued would not be government bonds and the government would not endorse them. The bill makes the bonds purely a District of Columbia matter, and the District had nothing to do but to accept what a superior power imposed upon it.

Representative Prouty, of Iowa, asked the witness why there has been no greater public interest in the District in the pending measure. General Harries replied that he thought the District had not awakened to the importance of the measure and that apparently its residents did not take it seriously. The bonds proposed in the bill would not even have a fixed financial status because they would be subject to future legislation. The District of Columbia would have no power over them, it could only accept what was given to it and do what it was told to do.

General Harries cited a report that one of the District commissioners, in a speech, had declared that the railroad regulation within the District, now imposed upon the commissioners as members of the Public Utilities Commission, required too much of their time, and that the proposition was too large for them. Representative Crosser interrupted to say that he was the author of that statement. The witness declared that he would not dispute its truth, but suggested that the regulation of public utilities never could be looked upon as a task for dilettante or for occasional doctrinaires. If matters of this kind could be managed even by the most intelligent of the inexperienced, then careful study and expert knowledge were wasted in all undertakings.

REGULATORS THAT DO NOT WORK

As for the allegation that regulation would not work, he declared that if in the plants of his companies a piece of regulating machinery failed to perform its functions properly, a new regulator was installed. The principle of regulation was not abandoned.

The attitude of electric railway managers in favoring regulation, said General Harries, was not entirely an unselfish one. The managers had found that when a public service commission passed upon a complaint and ordered certain things done, it left the companies in a much better position toward the public by relieving unnecessary friction and by furnishing assurance that compliance with the commission's orders would result in public satisfaction.

The witness declared that the nation might be headed for government ownership, but that he was one of the many who did not believe that. He declared that he had too much confidence in the ultimate good sense of the American people, and that he could not look forward to a day when questions of the detail of electric railway management should figure in the political issues of a campaign.

With government ownership accomplished, General Harries declared, there would be political battles over details of technical operation. On one side would be found a party that pledged itself to four-motor rolling stock because it wanted speed. On the other side would be those who favored two-motor equipment because it was economical in its consumption of energy. In one city a mayor would fail of re-election because he favored trailers. In another city aldermen would be elected on the relative merits of longitudinal and cross-seats. Votes for women might destroy a candidate who had male and heretical views on the height of car steps. Then there would be party platforms that pointed with pride to the uniforms of their trainmen or viewed with alarm the style of equipment of a competing party. A President of the United States might put himself out of the running because he had ordered cars painted green or yellow, and thereby alienated a vast and important section of the vote. Nothing in the world could be made more productive of campaign issues than the transportation business.

MUNICIPAL OWNERSHIP IN EDMONTON

Figures of deficits in municipal ownership properties in Australia, as well as a comparison of the government and private telephone companies were presented by General Harries, who, however, laid chief stress on detailed figures of the experience of Edmonton, Alta., as a "wonderful exhibition of what municipal ownership will do." This new city of the great Canadian northwest had taken up municipal ownership at the beginning in almost all of its departments of public service. There has been no question of dishonesty, for all of its officials have been capable, clean-handed men whose absolute honesty, however, had been coupled with an inability to make municipal ownership and operation pay. He read from the official publications of the city the figures of the accounts for the last year. In its street railway department, these figures showed a deficit of $405,934. Part of this was the result of the fact that a new carhouse scheduled to cost $100,000 had cost $170,000. Despite the fact that the enterprise was an exceedingly new one and that it had not been compelled to take over an inheritance of antiquated machinery the service was hampered by obsolete apparatus. In the waterworks department of Edmonton, the deficit totaled $100,574. In the telephone department of the municipality the deficit was $69,000.

FURTHER EXTENSIONS IMPOSSIBLE

General Harries also read from the report of the commissioner in charge of the electric railway department of Edmonton the statement that the maintenance charges as well as the capital charges had shown such a heavy increase that it would be impossible to make further extensions. In addition to this he recommended an increase in the fares, and these had to be put into effect. The witness emphasized the fact that all of these difficulties confronted a municipally owned corporation which had all the advantages of being in a new community with no superimposed indebtedness as the result of experiments with bob-tailed cars, with two-horse cars, and with the early efforts of electrical conduit systems, and of cable and pneumatic systems before the present trolley or underground service had been installed.

Without any of these burdens, declared General Harries, and without any of the problems that hamper companies in older cities, the municipal commissioners of Edmonton had been compelled to advise against the construction of further extensions until the finances had improved. He also read from the reports of the City Council which adopted the increased fare rates, the statement that the paving work chargeable to the street railway system in Edmonton would be paid in the future out of the general revenue of the city.

"This is but a sample," said General Harries, "to show how they must toil somehow or other to make a showing. It is a confession of the results, but it is an interesting exhibition of municipal honesty and frankness."

DEFICIT IN MUNICIPAL FERRIES

The witness then took up the figures of the Staten Island ferry system operated by the city of New York. The city's loss, he declared, had exceeded $2,000 a day since it had taken over these ferries. These boats, he said, had been operated profitably by private corporations until the demand of the people of Staten Island for better service than the business would justify resulted in the establishment of municipal ferries. Now the whole community has to pay the bill. One result of the municipalization of the ferries which had much to do with the deficit was the big increase in the payroll. This, he declared, was to be expected in any municipal operation in this country.

As one of the chief arguments of the proposed municipal ownership had been the operation of waterworks by cities throughout the country. General Harries made a comparison between the work of the Consolidated Gas Company of New York and the waterworks system in that city. The gas company was able to purchase its coal and oil, to transport them to New York, to produce and distribute the product through a complex system of mains to consumers throughout the city at a price of 80 cents per 1000 cu. ft. New York City, he said, sells its metered water at $1 per 1000 cu. ft. or 20 cents more than the price of gas, which it is so costly to produce.

OPINION OF HALFORD ERICKSON

General Harries read a letter written by Halford Erickson, a member of the Railroad Commission of Wisconsin, whom he described as one of the ablest commissioners in the United States. The letter was addressed to Frederic W. Fleitz, vice-chairman of the Water Supply Commission of Pennsylvania, Harrisburg, Pa. Mr. Erickson declared:

"From my personal experience in the matter, as well as from experience of this commission, I have come to the conclusion that state regulation of public utilities should cover municipally owned plants as well as privately owned plants. In fact, it is fully as necessary that it should cover municipally owned plants as well as any other. There are several reasons for this. Municipally owned plants are not managed with any greater efficiency and enterprise than prevail in other work that is usually performed directly by cities. That is, the service is usually defective, and the rates either unreasonably low or unreasonably high, as well as unjustly discriminatory. This commission receives relatively a greater number of complaints affecting municipal owned than privately owned utilities. These complaints do not only cover service matters and extensions of such service, but they cover rates and all other practices that are usually subject to regulation. Investigation also discloses that the complaints are all well taken. In fact, the commission finds it necessary in the case of almost all of these complaints to order into effect improvements in the service and equitable rate schedules.

"In my judgment the question of the ownership of utilities should not be the basis of the application of state regulation. If municipally owned utilities were exempted from such regulation, then the inevitable result would follow that customers who are served by such utilities are likely to receive not only a lower class of service but they may have to pay rates that were unjustly discriminatory in almost every respect. One dislikes to write such matters as this, especially in view of the fact that there seems to be a widespread impression to the effect that municipal ownership is a guarantee of good service and equitable rates. Nevertheless, what I say seems to be the fact, and not only in this state but in many other places where I have had occasion to look into the situation."

In reply to a question from Representative Crosser, General Harries declared that the companies tried to live up to the demands of public sentiment. He said they tried to be right and fair in their dealings with the public and to treat the public as partners.

PARTNERSHIP AND CO-OPERATION

"It is a comfortable feeling to be your partner," said Representative Crosser.

"Yes," replied the witness. "You have no responsibility, financial or otherwise. If there is a failure you are not to blame; if the financial machinery topples over you are not hurt. But I want to ask of you the co-operation we are entitled to as partners. You cannot expect all the privileges and none of the responsibilities of partnership. What we want is that spirit of partnership, and I think that when the public realizes that, it will go far towards making satisfied customers, and they are the only kind of customers worth having."

INCREASE IN REALTY VALUES

General Harries quoted statistics to show the enormous increases in realty values which had resulted from electric railway extensions throughout the District of Columbia. In eight years, he said, the electric railways of the District had added $46,000,000 to the taxable values, and had been responsible for continuing increases as high as 100 per cent a year. At the same time, he said, the railroads that had accomplished this had accumulated deficits of $1,000,000. He presented these figures to show the fallacy of the belief that the electric railway business had been extremely profitable as the result of the lavish giving away of charters in earlier days.

The witness also cited decisions of the United States Supreme Court to prove that franchises were property, and that the contract embodied in them between the government and the companies were inviolable despite the clause reserving the right "to alter, amend, or repeal." These reserve powers, he declared, the courts had held must be exercised only to carry into effect the original purposes of the grant and to protect the public. The alterations must be reasonable and made in good faith.

GOVERNMENT RED TAPE

General Harries then declared that public utilities demanded instant operation at all hours of the day. Everything must move with promptness. This, he said, could not be accomplished under any government the District of Columbia had ever had. In government management the form and substance of all essentials were so concealed in windings of red tape that it would be impossible to recognize the thing itself. No public utility, he declared, could ever be operated under such a system. If the government went into the electric railway business, he declared, it would have to change its methods or go into bankruptcy. To demonstrate this he cited at length reports of investigation into the Post-office Department and the Government Printing Office.

With reference to the labor conditions under government ownership, General Harries cited the fact that the government does not pension its employees, while private electric railway companies not only do that but maintain elaborate systems of relief associations, death benefits, free medical attendance and profit sharing. All of this resulted in the bonds of human sympathy which made it possible to secure effective results from the employees of the company. The government could hope for no such results. For one thing, no government official would be permitted to remain in office long enough to establish such relations with the employees under him. The same difficulty, he pointed out, lay in the peril of the injection of politics into the selection of employees. He told the committee that all members of Congress could testify how often they found places for men in the government service without reference to their fitness.

General Harries also cited as "a new witness" the testimony of President Wilson, who had argued for government control as preferable to government ownership in "The State."

TESTIMONY OF CLARKE M. ROSECRANTZ

Clarke M. Rosecrantz, counsel for the Milwaukee Electric Railway & Light Company, the Milwaukee Light, Heat & Traction Company, and the Wisconsin Gas & Electric Company, said that he appeared for the American Electric Railway Association at the request of the association. The great difficulty in a question of this kind, he said, was to get all the information bearing upon it without prejudice or bias, to proceed on facts rather than on theories.

Mr. Rosecrantz recalled that the hearing during the previous week, one of the members of the committee asked why other companies than those directly affected were represented. He then explained the magnitude of the electric railway industry and the large membership of operating companies in the association. The association felt that if the bill should be reported and favorable action should follow in Congress, the result would be considered by the municipalities as a decision of men who had given careful study to the subject. The question was a large one, and it should receive a most careful investigation. It ought to receive an even more careful investigation than the committee, which had a multitude of matters before it, could give.

While he represented the utilities, Mr. Rosecrantz said that if he could not look on both sides of a question fairly he would think that he could not perform the service which he owed to his companies. If his judgment were so warped that he could not give consideration to both sides, he would think that he was not rendering good service. He suggested that a question of this kind should receive the investigation that a commission like the Monetary Commission would give.

MUNICIPALITY GOES TO OTHER BUSINESSES

Continuing, Mr. Rosecrantz declared that it has been his experience that where a municipality engaged in public enterprises it did not stop at one form of business. The natural steps after public utilities were in the direction of bakeries, mines and other forms of business. Rates were so made as to favor the project owned by the municipality or state over competing properties. Anyone who proposed a change in the District of Columbia should be required to show that this would result in a general betterment. If the operation of electric railways by private companies was not satisfactory to the public, how could the municipality secure more capable men? Companies always sought men of ability to manage, develop and create. If any man had demonstrated ability he was sought by the company.

One great objection to municipal ownership and operation of a public utility was that it did away with the mainspring of human endeavor—the hope of gain. When an employee hoped by his effort to succeed another who held the job a little higher if a change came about, and he was able to secure promotion, he did a little for himself but a great deal more for the general public. Practically every position in the electric railway was secured by promotion. How could this policy prevail in a municipal plant? All that the city employee could do was to hold his job. Efficiency had no effect on the retention of a city employee. He lost his place because of a change in political power. Such conditions existed in all cities of the country. The heads of the city departments knew that they could not hope for continuity of office. There was no incentive for city employees to do better.

CONTINUITY OF SERVICE IN PRIVATE COMPANIES

Mr. Rosecrantz asked how results were secured in business. Were they obtained by frequent change or was continuity of service desired? In privately managed companies a definite policy was continued without unreasonable change or for sufficient time to determine whether or not it was the best one to follow permanently. A city engineer would introduce one system of sewers, but this would be succeeded by another system as soon as there was a change in office. Mr. Rosecrantz said that in private companies there was a desire for advancement and an anxiety to serve efficiently, and a feeling that if progress was shown promotion would follow.

Responsibility meant better management and service, Mr. Rosecrantz declared. In a city there was no one to whom the head of a department was directly responsible. Employees of a city sought jobs because of political influence, and tried to hold them by the same means. They felt that they held their places through pull, and that they could not be discharged. Under former conditions railways found that they could not get anything unless they were in politics and that they could not, in fact, keep alive unless they were. From the time when Mr. Rosecrantz became identified with the Milwaukee properties until the present, they had not been in politics. It was the practice and effort of the management to keep out of politics. In earlier years the sole issue of every campaign was the question of what the candidates were going to do to the railways. The railway was always the object of the attack of the "outs." All of these conditions have been changed. Every effort was made to render good service, and to lead every employee to be courteous. Private ownership was giving good service as nearly as it was possible for any human agency to do.

Representative Igoe said that in the District of Columbia appointments were made by the President, and the question of political influence was not present.

POLITICAL INFLUENCE IN MUNICIPALITIES

Mr. Rosecrantz said that in practically every municipality throughout the country, employees obtained their position through political influence. The conditions promoted changes in office, not continuity, and made for wasteful operation. Government work was always more expensive than private work, and took longer to do. In mentioning an experience with piles of dirt in front of his home in Milwaukee, which remained through the entire winter and until June, Mr. Rosecrantz said that if any electric railway company had been responsible, some one would have been arrested. In speaking about his experiences abroad, he referred to a cotton broker in England who used a cab in traveling from office to office rather than to rely on the slow and uncertain government telephone. He also said that this broker could obtain Liverpool quotations more quickly by cabling to New York and having the message repeated to Liverpool than by a direct communication by government telegraph with Liverpool. He declared that the condition of the subway in Paris was very much worse than anything that had ever been seen in this country.

COMPARE RATES AND SERVICE

In calling attention to quotations from the recent book of Yves Guyot, Mr. Rosecrantz said that it was conceded that publicly owned railways were not operated economically. Many of the statements that were made in regard to public systems were not accurate. For instance, it had been said that foreign telegraph rates were lower than rates in this country. This was not accurate, because a charge was made abroad for the address and the signature. It was not possible to make a fair comparison of rates unless wages paid to employees and costs of construction and operation were taken into account. Rates could not be compared unless service was compared. Cities never showed their accounts in such a way as to permit analysis.

A quotation from the sixth annual report of the Railroad Commission of Wisconsin was read by Mr. Rosecrantz to show the difficulty which the commission had experienced in adjusting the accounts of municipal plants. Referring to the argument that because municipalities had done well with water systems they should be able to conduct other utility services, Mr. Rosecrantz said that there was little capital cost in a water plant after the initial expenditure for the system. It was the easiest utility to operate, whereas the electric railway was the hardest.

One of the members of the committee referred to the practice of gas and electric companies in asking for deposits. Mr. Rosecrantz said that the companies with which he was familiar paid interest on such deposits, and that the practice was a necessary one owing to the large number of persons in a city who, like the Arabs, silently folded their tents and faded away.

EXTENSIONS NOT MADE BY MUNICIPALITIES

Extensions were not made satisfactorily by foreign municipalities which operated electric railways, Mr. Rosecrantz continued. The citizen who had a home with a garden was a better man, and the development of electric railways in this country had promoted the decentralization of the population with great advantage to the community. The result of the English policy of making no extensions or very short extensions was a serious congestion of population. The average city had no intention of building up its suburbs.

CONTROVERSY BETWEEN CITY AND SUBURBS

Mr. Rosecrantz then referred to the situation affecting Milwaukee and its suburbs. A number of the interurban and suburban lines did not pay for a long period of years. There was a constant agitation over the rates of fare. The ink was hardly dry on the signatures of the bill giving the Railroad Commission control over rates when the city filed a petition for a reduction. During the hearings the point was made that the urban lines should bear some proportion of the expense of the unprofitable suburban lines. The position taken by the city of Milwaukee, however, was that it did not care about the suburbs. It wanted a low fare within the city limits. It was willing to let the suburban districts get the service that their traffic would warrant. On the other hand, the suburban residents wanted frequent service at low rates. They declared that they spent their money in Milwaukee and that the city lines should bear some proportion of the cost of operation of the outlying properties until the districts developed. The result of the complaint was that the city fares were reduced and the suburban fares had to be raised.

One member of the committee had suggested, Mr. Rosecrantz added, that the companies wanted regulation because they feared municipal ownership. He said that this was not feared in Wisconsin. He said that before the period of regulation in Milwaukee the railway was harassed constantly by the city authorities. If a car was not available immediately for some passenger, a resolution would be introduced in the City Council requiring more service on a line. Mr. Rosecrantz asked whether such matters should be determined by revenge or impulse, or by mature judgment. The case should be decided, not by a prejudiced jury but by men who were not subject to local influence. It should be decided by men who could give consideration to the matter and decide what was right or wrong. The object of a public service commission law was to provide a proper, disinterested, able commission to pass upon the differences between the city and the company.

DENSE TRAFFIC ON SAN FRANCISCO LINE

During his testimony Mr. Rosecrantz mentioned the municipal railway in San Francisco. He said that this line had a large amount of travel with a 5-cent fare, that it gave no transfers, and that its results were really those of a line operating in a district of good density of traffic. The average railway company performed a public duty in affording service on unprofitable lines as well as on profitable lines. All the earnings of the system were combined, and the excess from some lines provided reasonable proper service for lines that did not pay. If a municipality or a state operated a railway, the property would not be conducted commercially. When the costs were in excess of the income the difference would be met from taxes. Men who did not use the cars paid for those who did. When a property was owned and operated by a private company any loss was borne by investors and not by taxpayers. Companies went into the enterprise with the idea of efficient service and gain, and no business could be operated unless an incentive was provided.

HOPE FOR THE FUTURE

Many electric railways were unprofitable, the speaker declared, but they were held because of the "eternal" hope that improvement would take place in the future. In Milwaukee residents along the lines of the interurban system had declared that they believed the owners were entitled to a reasonable return and that they would consent to an increase in rates. The interurban lines had been constructed economically, but no part of the interurban system paid 4 per cent on the actual money expended, as determined by the Railroad Commission.

In referring to the Cleveland situation, Mr. Rosecrantz said that the control of operations was not removed sufficiently from local conditions. The old form of regulation under the earlier railroad commissions was not really regulation at all. He believed that if a question could be taken directly to the people it would be found that they were fair. It was difficult, however, to get the people to take enough interest to vote. In Milwaukee it has been found that people would not take the trouble to vote on the question of needed bridges. If a private company had been responsible, the bridges would have been built.

The witness declared that much of the feeling that existed between the public and the electric railway companies was due to the discourteous, discreditable management of some properties. He said that in the early days of railroad construction rights were disregarded, and this created a feeling which was now coming to the surface. In the old days accounts were not kept properly. It took a good deal of courage to say that a large amount should be set aside for depreciation. Bankers wanted dividends. To-day, however, it made no difference what capitalization was outstanding, rates were based upon the actual amount of the investment used and useful for the convenience of the public. They provided for a reasonable return and the up-keep of the property. It had taken a long time to reach this condition.

Mr. Rosecrantz mentioned the welfare work of the Milwaukee system, including the pension provision and the benefit and building and loan associations. He then discussed the question of the public attitude toward municipal ownership, and said that there was not a great public desire for this innovation. He declared that the Milwaukee system was able to furnish better and cheaper service on account of its combination of utilities than if the utilities of each class were operated separately. He described the conditions existing in Superior, Wis., and declared that the threat of municipal ownership made for bad service because the company was not able to raise capital for improvement. He could not see how it would be possible to prevent political corruption if a great property which concerned everyone in the city was placed where every election would affect it. The question affected every utility in the United States and in the world. It was not a question to be decided in an idle moment. The government should control and not serve the public. Everything that was desirable under municipal ownership could be better obtained under regulation without the chance of loss that went with ownership.

SERVICE BETTER UNDER STATE REGULATION

Since the utilities of Wisconsin had been removed from the strife of local politics the people were better satisfied, and the service was better. If a complaint went to the commission, the company made its case and accepted the decision. It had appealed in only one case, the 3-cent fare case. That was on the question of whether or not the Milwaukee franchise constituted a contract.

Mr. Rosecrantz discussed the question of so-called "special privileges." He said that the electric railway had the right to invest its money and to receive a reasonable return that was a small increase over the interest return of a bank or a mortgage rate. It stood all the risk of loss. When it operated under a franchise, it could not discontinue an unprofitable line. Any other business man could always discontinue any part of his business that was unprofitable. It would not be possible to operate a railway more satisfactorily through a man who knew nothing about it than through an employee who had been brought up in the service. It would not be possible for a municipality to get lower fares unless it either operated the company more economically or subsidized it. Public ownership and operation had always been more expensive than private ownership. The employee of a private corporation was paid more than an employee of a public plant, but there were more men than were needed in the public plant.

FRANCHISE WITHOUT LIMITATION

Under present conditions, Mr. Rosecrantz continued, it was hard for honestly managed corporations to get money. It was not a question of the bankers or of

Wall Street, but of the bond buyers who did not buy because they did not know what was going to happen. The question of franchises was brought up. Mr. Rosecrantz said that the best form of franchise for the public was one without any date of expiration. With a limited franchise the company would and must set aside a certain sum from gross receipts for amortization. With a perpetual franchise there was no excuse for a sinking fund of this character. The public wanted to receive the best service for the lowest possible rate. It could not get that if a company was entitled to set aside a fund for retirement of its capital investment because of a maturing franchise.

CITY AND SUBURBAN FARES

Referring again to the issue between the city of Milwaukee and the suburbs, Mr. Rosecrantz declared that the suburbs were interested in the question of fares in the city. If the Railroad Commission of Wisconsin could set aside the Milwaukee franchise and make a lower rate, it could set aside the outlying franchises and make higher rates. He explained the zone system of fares introduced on the outlying lines, the effectiveness of stock and bond regulation by the Wisconsin commission, and the thorough system of accounts established under the law. He said that the basis of regulation was that $2 should not be spent where $1 would perform the service. He thought that the government should not go into anything except governing. No railway or plant could be built in Wisconsin unless it was needed to serve the public.

Mr. Rosecrantz said that he did not pretend to be uttering the last word, but that he had convictions that he wanted to express. He thought that no property should be condemned and taken unless there was taken into consideration in the valuation the fact that it was in place and operated as a going concern. He read extracts from the paper presented by him before the 1913 convention of the American Electric Railway Association on "Other Elements of Value." Some allowance had to be made for intangible value. The price had to assume a transaction in a market where no one was compelled to sell and no one was compelled to buy. It had to be a reasonable market value. In the case of the Washington Railway & Electric Company there was a property in existence pursuant to a direct act of Congress. The act gave the company the right to engage in an undertaking. The right might be taken away, but the property could not be taken away. Part of the value of the property was what the right was worth in the market. Whether the value was called franchise value or something else, there was an element of value for which payment must be made.

Representative Igoe quoted the section of the act which reserved to Congress the right to alter, amend or repeal.

FRANCHISE CONVERTED TO PROPERTY

Mr. Rosecrantz said that having reduced the franchise to use, the company had converted it to property and the value could not be seized. The language quoted by Representative Igoe was the result of the decision in the Dartmouth College case. While this seemed very broad and conclusive, it meant that the right to regulate was preserved. The Supreme Court had said that the alteration, amendment or repeal could not be used so as to destroy property. The change must be reasonable in the case of a public undertaking.

Referring again to the matter of extensions under municipal ownership, Mr. Rosecrantz said that changes were likely to be made to suit the man who had the greatest pull. If the zone system should be introduced, people would save a penny and walk to the nearest fare point. The public would gain nothing, but would lose money by municipal ownership. If the municipality should assume the obligation of the electric railways, it would not stop at that, but would assume others. Private enterprises should be left to private effort.

TESTIMONY OF WILLIAM J. CLARK

William J. Clark referred to his long connection with the electrical industry and the General Electric Company. His testimony was supplemented by discussion of some of the points. An abstract of Mr. Clark's testimony follows:

Foreign governments, with their facilities for securing information and the making of investigations, have been struggling with the problem of public utility ownership and operation for years, and the great economists of the earth, free from capitalistic influence, so called, are likewise giving the subject the most thorough consideration. It is perhaps not generally understood that almost all unbiased economists, other than those of the socialistic school, concede that America has come closer to an effective solution of the problem through private ownership and effective government regulation than has been elsewhere accomplished. True, the perfection of the system has not yet been attained, but within the past few years more has thus been accomplished along sound economic lines than in almost the entire history of public utility development. By means of the American regulatory system it has become possible to continue private ownership with its great advantages of individual initiative, ambition and desire for profit, unhampered by "red tape" and cumbersome methods, all of which tend toward progress and development, and at the same time provide protection for investors and the public against uneconomic or dishonest financial manipulation in the creation and operation of private companies.

On the other hand, the inherent characteristics of public ownership and operation and results therefrom stand as they have for generations, presenting, with rare exceptions, uneconomical illustrations of political influence and manipulation and a lack of initiative, personal effort and desire for efficiency. All these, too, are bound together with "red tape" and conducted under complicated and cumbersome systems, comparatively free from any effective supervision of accounts by any superior authority. Human nature is much the same everywhere and operates similarly with individuals who dictate the policies of governments and companies and those who carry out the practical details of policies, so that the unchecked accounting in particular presents a strong temptation for the manipulation of figures.

OPINIONS OF LEADING MEN

1. The President of the United States. (From his work entitled "The State."):

> Society can by no means afford to allow the use for private gain and without regulation of undertakings necessary to its own healthful and efficient operation and yet of a sort to exclude equality in competition. Experience has proved that the self-interest of those who have controlled such undertakings for private gain is not coincident with the public interest; even enlightened self-interest may often discover means of illicit pecuniary advantage in unjust discriminations between individuals in the use of such instrumentalities. But the proposition that the government should control such dominating organizations of capital may by no means wrested to mean by any necessary implication that the government should itself administer those instrumentalities of economic action, which cannot be used except as monopolies. In such cases, as Sir T. H. Farrar says, "there are two great alternatives: (1) ownership and management by private enterprise and capital under regulation by the State. (2) ownership and management by government, central or local." Government regulation may in most cases suffice. Indeed, such are the difficulties in the way of establishing and maintaining careful business management on the part of the government that control ought to be preferred to direct administration in as many cases as possible—in every case in which control without administration can be made effectual.

2. William H. Taft, ex-President of the United States. (From his special message to Congress, Feb. 22, 1912):

This presents the question of government ownership of public utilities, which are now being conducted by private enterprise under franchise from the government. I believe that the true principle is that private enterprises should be permitted to carry on such public utilities under due regulation as to rates by proper authority, rather than that the government should itself conduct them. This principle I favor, because I do not think it in accordance with the best public policy thus greatly to increase the body of public servants. Of course, if it could be shown that telegraph service could be furnished to the public at a less price than it is now furnished by telegraph companies, and with equal efficiency, the argument might be a strong one in favor of the adoption of the proposition. But I am not satisfied from any evidence that if these properties were taken over by the government they could be managed any more economically or any more efficiently, or that this would enable the government to furnish service at any smaller rate than the public is now required to pay by private companies.

3. Theodore Roosevelt, ex-President of the United States. (From his speech at Raleigh, N. C., Oct. 19, 1905):

I do not believe in government ownership of anything which can with propriety be left in private hands, and in particular I should most strenuously object to government ownership of railroads. But I believe with equal firmness that it is out of the question for the government not to exercise a supervisory and regulatory right over the railroads; for it is vital to the well-being of the public that they should be managed in a spirit of fairness and justice toward all the public. Actual experience has shown that it is not possible to leave the railroads uncontrolled.

(From Mr. Roosevelt's speech at Indianapolis, Ind., May 30, 1907):

There has been plenty of dishonest work done by corporations in the past. There will not be the slightest let-up in the effort to hunt down and punish every dishonest man. But the bulk of our business is honestly done. In the natural indignation the people feel over the dishonesty, it is all essential that they should not lose their heads and get drawn into an indiscriminate raid upon all corporations, all people of wealth, whether they do well or ill. Out of any such wild movement good will not come, cannot come and never has come. On the contrary, the surest way to invite reaction is to follow in the lead of either demagogue or visionary in a sweeping assault upon property values and upon public confidence, which would work incalculable damage in the business world, and would produce such distrust of the agitators that in the revulsion the distrust would extend to honest men, who, in sincere and sane fashion, are trying to remedy the evils.

4. Champ Clark, Speaker of the House of Representatives. (From New York *Tribune*, Sunday Magazine, Feb. 2, 1913):

Champ Clark, Speaker of the House of Representatives, once said to a young man from his district: "My boy, you can do better for yourself by going back to the woods at home and mauling rails, than by taking a clerkship under the government; you'll get no job from me."

5. Franklin K. Lane, Secretary of the Interior. (From his article in the New York *Journal of Commerce*, Jan. 3, 1912):

Are we to have government ownership and operation of railways? To this question no one is justified in giving either an affirmative or a negative answer. Those who contend that such ownership is inevitable point to the history of railroads of continental Europe and prophesy that such result is inevitable. When asked why it is necessary their reply is that it is the only solution of the problem that will bring satisfaction and contentment on the part of the people. Certainly this is not true as to railroad "operation," for no one who has experience with governmental affairs will be bold enough to say that the government of the United States could now operate 250,000 miles of railroad with as much satisfaction to the people as those railroads themselves are at present being administered.

What, then, is the necessity for government ownership? The answer is given that through government ownership alone can the railroads be properly subservient to the public welfare. And when asked in what respects the railroads are delinquent as to the public, the answer comes that their rates are too high and their practices are unjustly discriminatory. This answer, it will be seen, carries with it the idea that by some peculiar method of magic rates will become automatically just, reasonable and non-discriminatory by the mere fact that the government owns and operates the carriers. Manifestly such an assumption is absurd. Ownership by the government implies regulation by the government. If to-day all the railroads of this country passed into the possession of the United States and were administered in the most efficient manner possible there would still remain a railroad problem.

What rates should the government charge? What policy should the government pursue? Should rail rates be made to meet water competition? Should higher charges be allowed at intermediate points? Should market competition be permitted as a railroad policy? Should lumber be carried as cheaply as coal? Should rates from and to all points be blanketed under a uniform rate per hundred pounds? Should all articles move under a well-devised system of class rates, or should certain heavy traffic be taken out of the classification and exceptions made so that it will move to distant markets? Should there be any lower rate to or from the ports of export than on local traffic? What should the relation between the rate when applied to a carload and the rate when applied to a hundred pounds? Is it advisable to hold rates down to a mere return upon the present value of property used? Is it right to impose upon certain kinds of traffic a much greater burden than on other kinds because the former is not only of greater value, but because in transporting it the railway renders a greater service? Is it best and wisest that rates shall be so adjusted as to promote the longer haul or so as to develop near-by markets of consumption? Shall we regard our industries as serving only our immediate neighborhood, or as serving the country at large or as serving the world?

These are among the problems that would remain for governmental solution if we had national ownership. Congress or some other authority would be required to deal with them as matters of policy or as matters of justice, and practical men would divide upon them as they are divided now. Germany has not escaped from the perplexing problems of rate-making, rate adjustments and rate policies by the ownership of her own lines, nor has any other country. Doubtless it is easier for a government board to deal directly with a property which the government owns, but no one is as yet justified in saying that regulation by the government is destined to failure or that such regulations will not bring about conditions as satisfactory to the shippers of the country and as beneficial to the nation's progress as would exist if the government owned the lines itself.

As Mr. Sidney Brooks, the English economist, says, we have invented what appears to be practical machinery for such railroad regulation. European countries sought to deal with this problem by blanket legislation and not through administrative tribunals. Their embarrassments accumulated until they sought refuge in what appeared to them to be the only resort—taking the properties in their own hands. The United States, however, realizing the disadvantages that would arise from destroying individual initiative operation and control, and recognizing entirely the right of the public effectively to control these highways, refused to accept government ownership as the only way of escape and instituted a plan of administration based upon policies declared by the national legislature. This is an experiment of which European countries did not have the advantage and which for the present promises well. Whether it is more than a temporary expedient depends to no inconsiderable degree upon the temper and wisdom of the railroads themselves and the judgment of the governmental authorities in whose hands the regulative power is placed. If, however, Congress and the Interstate Commerce Commission fail, what assurance can there be that Congress and some other commission regulating a government system of railroads will succeed? The problem of railroad regulation will always be with us, no matter in whom the ownership of the property used may be vested. And to those who are familiar with the character of the disputes that at present arise between rival communities and rival industries and competing sections of the country there does not seem to be any overwhelming benefit to be gained by throwing such contests into politics.

6. Joint Commission of Senate and House of Representatives on the business method of the post office department and postal service. (From report submitted Feb. 10, 1908):

It appears too obvious to require argument that the most efficient service can never be expected as long as the direction of the business is, as at present, intrusted to a Postmaster-General and certain assistants selected without special reference to experience and qualifications and subject to frequent change. Before the Postmaster-General and his assistants can become reasonably familiar with the operations of the service, they are replaced by others, who, in turn, are called upon to resign before they can, in the nature of things, become qualified by knowledge and experience to perform their allotted tasks. Under such a system a large railroad, commercial or industrial business would inevitably go into bankruptcy, and the Post-office department has averted that fate only because the United States Treasury has been available to meet deficiencies.

7. Sir Thomas Henry Farrer, formerly permanent secretary of the British Board of Trade. (From his testimony before the Royal Commission on Civil Establishments):

20,012........There is a certain difficulty in the softheartedness of heads of departments and of ministers. But there is a very much greater difficulty in the pressure which is put upon them by members of the House of Commons. That is the real difficulty; the real difficulty of the public service is getting rid of bad men, and the real difficulty of getting rid of bad men is that no minister will face the pressure which is put upon him from the outside.

20,013. (Mr. Hanbury). "Have you had much personal experience of that?"

"Yes, I have, because I have been plagued all my life at the Board of Trade with inefficient men that I wanted to get rid of, but have been unable to do so."

20,014. "Has Parliamentary pressure been your main difficulty in getting rid of them?"

"Parliamentary pressure is the main difficulty."

20,015. (Mr. Harvey). "May we say this, that if the minister puts his foot down the agitation comes to nothing? The difficulty is, I suppose, to get the minister to be willing to provoke the criticism or resentment perhaps, of a large body of members of Parliament?"

"Members are economical in general; but in particular cases they think more of their constituents than of the public service. No doubt with a little thinking I could find a very great number of instances, but two or three occur to me. Not very many years ago there was a clerk of whom perpetual complaints were made to me; he was in a hard-worked department, and the heads of it told me repeatedly, 'We can do nothing with him.' At last we got it arranged that he should go. My back was turned—I was away on a holiday—and when I came back there, I found that Parliamentary pressure, by which I mean applications from members, had been put on; and in spite of us all, the man was back in the place to the detriment of our own credit. Let me mention another case. I was engaged upon a reorganization of the department under one of the strongest men that I have ever served. What the president said to me in effect was, 'We must have new blood; we are getting crowded up with effete men; I will back you in anything you do, only you must undertake not to get me into a difficulty in the House of Commons. I cannot afford it; the government cannot afford time for it; they cannot afford strength to fight battles of that kind.' We set to work about the reorganization with our hands tied, and we were obliged to say to these men, 'Well, if you stay here we will make it very uncomfortable for you; we will put you in the very worst places in the office.' The treasury offered good terms of retirement, and in that way, after a good deal of fighting, we got rid of most of them."

20,016. (Chairman.) "Did you have to give them abolition terms?"

"Yes, very high terms. I may mention a case which has happened even since then. I refer to the official receivers in bankruptcy. They were men who were appointed only a few days ago under the most stringent conditions imposed by the Treasury and by the Board of Trade. In the first place they were paid by fees, which generally does not give any vested interest; they were told that they were appointed upon trial, that they might be removed at any moment if the Board of Trade desired for the mere good of the service. Fortunately most of them have turned out extremely well. One turned out bad,' perhaps more, but one certainly turned out very bad. Perpetual complaints were made to me by the head of that department when I was there that he could do nothing with this man, and that the business was being badly conducted. After a good deal of trouble since I left, it was determined to remove this man. The members of the county, as I am told, came and put pressure upon the president, till he was obliged to say, 'I cannot remove him; he must stay.' "

8. Jonathan Bourne, ex-United States Senator. (From Boston *Evening Transcript*, Dec. 19, 1913):

"Bureaucratic paternalism, dry rot and inside of a century governmental dissolution," are foreseen by former Senator Jonathan Bourne, Jr., as an eventuality of government ownership of telegraph and telephone lines as advocated by Postmaster-General Burleson. Mr. Bourne for six years was a member of the committee on post-offices and post roads, and for two years its chairman, and even now he is engaged as chairman of a special congressional commission in a study of railway mail pay and second-class rates.

Senator Bourne states that he has not a dollar's interest in telephone or telegraph securities and that he is theoretically in favor of government ownership, though practically bitterly opposed to it.

The ex-senator's most startling deduction is that government ownership would result eventually in complete domination of the government by its own employees, who would vote themselves such hours and pay as they chose. Mr. Bourne submits the following figures:

	Number.
1911—Government civil employees	410,332
1912—Telephone employees	221,000
1912—Telegraph employees	40,000
1911—Railway employees	1,669,000
1909—Electric employees	209,729
1904—Water transportation	188,000
1907—Express companies	79,284
Total	2,818,345

Under government ownership and operation there would soon be more than three million governmental employees, Mr. Bourne says. He continues: "Taking into consideration the fact that in the last ten presidential elections the President has been elected by a plurality varying from 7000 plus to a little over 2,500,000, the thought naturally arises that three million governmental employees could absolutely control the government under our political machinery, the tendency being more pay, less service in governmental employment, resulting in resistless efforts on the part of outside labor to secure government employment, because less onerous and more remunerative, with accumulative dissatisfaction and irritation in all private enterprises."

9. Porter J. McCumber, United States Senator. (From *Congressional Record*, Jan. 19, 1914):

It costs the government of the United States fully 100 per cent more to operate any line of business than it costs any private concern to operate a similar line of business. And as the operating expenses must be paid out of the earnings, the cost to the people must again be practically doubled. Therefore, instead of government ownership and operation being a benefit to the people, it is a curse to them and not only adds so much more to their burdens but also deprives them of their lawful opportunities. The fact that the burden is distributed over all the people does not make it less a burden. * * *

Government ownership of railways, followed by government ownership, as it must be, of other public utilities means that the army of employees, organized as they always will be, will become the complete masters of the government but the subservient tool to the interests of this great army. That army will be powerful enough to dictate every policy of government. No man in any district in the United States would be strong enough to make his race as a member of Congress if his ideas of the value of the wages of these government employees did not correspond with their ideas of the worth of their services. Whenever the government puts itself in the position of owner of public utilities it becomes the prey of an organized class of people, which will result in legislation against the mass of the unorganized people of the country.

No one will deny that we cannot expect the same personal interest, the same curtailment of expenses, the same unfailing watchfulness when the government has to pay the bills, as when we must pay them ourselves. Government ownership of railways, telegraph lines and other public utilities means bad service, extravagance and a menace to the rights of all the people.

10. John H. Bankhead, United States Senator. (From Washington *Post*, Dec. 11, 1913):

Senator Bankhead, of Alabama, Chairman of the Senate committee on post offices and post roads, is a pronounced opponent of government ownership.

"I recognize it is the tendency of the times, but it is a dangerous tendency," he said. "I don't want to see the government go into any business that can be transacted as well or better by individual enterprise."

"More serious than the problem of raising the tremendous aggregation of capital that would be required to take over the railroads and telegraph and telephone companies, would be the problem presented by the vast army of government employees that would be created. * * * Their influence as a political factor must be considered."

11. Filippo Turati, member of the Italian Parliament. (From pamphlet of Italian Postal Telegraph Clerk's Association, 1910):

The (telegraph) service will continue on its road to ruin, and the country will endure the losses and the jests. The Ministry of the Post and the Telegraph will then perhaps decide to send its telegraphic functionaries to Canada and Venezuela in order that they may learn there the great progress of the science. * * *

Even the foreign press has occupied itself with this problem [of the telegraph service] laughing at us merrily. The government, on the other hand, has inverted things; pays less for overtime labor; has done even more: paying everyone badly, it has forced the workers to struggle among themselves for this overtime work, and to become "Krumiri" of themselves. And the government is convinced that it will win much in this affair, and will make an excellent speculation. The workers have understood, and everyone knows that the masters have nothing to gain by killing and exhausting the blood of the workers. But the government does not yet understand these elementary matters, does not understand the dangers that accrue to industry from tired and discontented workers, which renders fraud inevitable.

STATISTICS ON GOVERNMENT AND PRIVATE OWNERSHIP

In the public interest the great objective in the creation and operation of public utilities is to secure a maximum of facilities and effective service at a minimum of capital investment and operative cost. The comparative use and extent of public utility facilities is perhaps the best possible evidence as to whether or not the methods followed in their creation and operation are economically sound.

Authorities differ slightly as to the exact line mileage of the world's railways. "Whittaker's Almanac" (a well recognized British authority) gives the total of such mileage in the world as 670,000, of which 255,000 is located in the United States. Many authorities, including statisticians of this government, show the total population of the world's civilized countries to be approximately 1,000,000,000. Therefore, the United States with slightly less than one-tenth of this total population, has approximately two-fifths of the world's entire mileage of railroad lines.

In 1912 the Prussian Minister of Public Works printed an interesting statement in detail of the world's railroad mileage, segregating that owned by governments. It is shown in Table I.

TABLE I—TABLE SHOWING LENGTH OF STATE OWNED AND OTHER RAILWAYS

	Total Mileage	State Owned
Europe	207,432	107,718
America	327,070	12,194
Asia	63,320	36,730
Africa	22,892	13,670
Australia, etc.	19,267	18,032
Grand totals	639,981	188,344

It should be noted from the foregoing that slightly over 70 per cent of the world's entire railroad mileage is privately owned.

Since the comparative cost of creating public utilities is a most important essential in the determination of the net operating results, the fairly incomplete tabulation shown in Table II has been prepared from British Board of Trade figures, published in 1914:

TABLE II—CAPITALIZATION OR COST OF RAILROADS PER MILE OF LINE IN YEARS 1909, 1910 OR 1911

Country or System		Capitalization Per Mile
United States	Private ownership	$63,631
United Kingdom	Private ownership	274,766
Prussia-Hesse	Government ownership	110,727
France	Mixed ownership	141,301
Belgium	Government ownership	197,036
Austria (state lines only)	Government ownership	135,230
Hungary (state lines only)	Government ownership	106,330
Denmark	Government ownership	60,926
German Imperial	Government ownership	160,312
Italy	Government ownership	151,063
Holland (state lines only)	Government ownership	105,764
Sweden (state lines only)	Government ownership	55,285
Switzerland	Government ownership	156,267

Seemingly, the above demonstrates that steam railroads of the United States are not grossly over-capitalized.

Table III is also illuminating as showing the superior railroad facilities existing in this country. The seemingly lower passenger rates in Europe are principally accounted for by the fact that the great bulk of the passenger traffic there is other than first class, the average rate for such class of traffic being higher than in this country where other than first-class traffic is insignificant. European rates of fare are illustrated by Table IV from page 215 of the "World Almanac" for 1914.

TABLE III—SHOWING COMPARATIVE STATISTICS FOR WORLD'S RAILROADS

Countries	Miles of Line per 10,000 Inhabitants	Miles of Track per 10,000 Inhabitants	Population per Square Mile	Miles of Line per 100 Square Miles	Miles of Track per 100 Square Miles	Total Number Freight Cars	Aggregate Capacity of Freight Cars	Freight Car Capacity per 10,000 Inhabitants	Average Receipts per Passenger Mile, Cents	Rate per Ton Mile, Cents
United Kingdom	5.17	8.80	370.8	19.18	32.55	745,348	(1)	.....	....	2.31
France	6.35	9.08	189.6	12.04	17.22	319,788	4,159,565	1,059	1.11	1.21
Prussia-Hesse	5.67	8.11	297.0	16.83	24.08	405,900	6,280,260	1,537	0.9	1.24
Entire United States.......	26.05	28.77	181.8	22.14	31.11	2,071,338	73,137,546	8.093	1.94	0.75

[1] Data not available but capacity small.

According to a report of the Interstate Commerce Commission made in 1912, the railroads of the United States were operated at about 60 per cent of their gross receipts, an exceedingly low percentage in view of the low rates imposed upon them. Their total available net revenue was $1,124,603,490, of which $113,122,509 was expended for taxes, and $1,011,481,981 to pay the interest on their bonded indebtedness, rentals, dividends and betterments and extensions. This sum averaged about 5.73 per cent upon the total capital investment and, as is generally understood, this figure has materially decreased during the past two or three years. Hence, railroad investments are not particularly attractive at present, and railroad maintenance, betterments and expansions are practically, per force, neglected up to the danger point, if not beyond.

TABLE IV—SHOWING RATES OF FARE ON EUROPEAN RAILROADS

Ownership	Class 1, Cents	Class 2, Cents	Class 3, Cents
Germany (government)	2.73	1.75	1.16
Belgium (government)	2.91	1.98	1.17
France (government)	3.16	2.35	1.53
France (private)	2.48	2.34	1.53
Holland (government)	3.29	2.47	1.65
Holland (private)	3.29	2.47	1.65
Italy (government)	3.60	2.52	1.62
England:			
Great Eastern Railway, min.......	4.02	3.02	2.01
Great Eastern Railway, max....	6.03	4.02	2.01
Southeastern & Chatham Railway	4.02	2.51	2.01

CANADIAN RAILWAYS

According to the 1913 British Board of Trade Report entitled "State Railways, British Possessions and Foreign," the total capital expenditure made by the Dominion government, in connection with the Intercolonial Railway, which it owns and operates, aggregates $94,745,820. Upon this investment no financial return has ever been received. The total gross receipts from operation in 1912 were $10,593,786, but the net earnings, after deducting operating expenses alone, were only $2,750. The Canadian government has an investment of $8,687,727 in the Prince Edward Island Railway, upon which it has always shown a large deficit, amounting for 1910, 1911 and 1912 to $273,393.

The Province of Ontario has invested $17,204,922 in the Temiskaming & Northern Ontario Railway, which it operates. The system has a comparatively large traffic in the cobalt district, yet its net earnings in 1911 were but $387,632, which, it will be noted, is but 2.2 per cent on the capital invested. Until within the last year or so the Province of New Brunswick has owned and operated the New Brunswick & Coal Railway, which has since been leased to the Canadian Pacific Railway. The investment of the province in the property is not stated, but the deficit in its operation during the last two years under government management was $43,379.

CONDITIONS IN FRANCE

The railroad condition in France is so mixed between public and private ownership of the properties, which are mostly operated by private companies, that it is well-nigh impossible to state accurate figures thereon. One striking illustration of government ownership is in connection with the Western system, the management of which was taken over by the government in 1908. In 1912 it was operated at a loss to the extent of $16,000,000, and the government's estimate of a similar deficit for 1913 is $17,350,700.

TELEPHONE AND TELEGRAPH

Now to review the telegraphic facilities of the world and features incident to their utilization.

"Whittaker's Almanac" for 1914 states that the mileage of telegraph lines in the world amounts to 1,360,000, of which 260,000 is in the United States. Another authority sets the miles of wire erected in such lines at 5,444,000. It should be remembered in this connection that with about one-tenth of the civilized population of the world, the United States has almost doubled its proportionate share of operative telegraph wire. According to statistics compiled by the Western Union Telegraph Company, the average number of telegrams sent per capita of population of the United States in 1909 was 10.76, and in all of Europe the similar average was 7.98.

As to the telephone facilities of the world and their utilization, most comprehensive statistics have been prepared by the American Telephone & Telegraph Company. Some of the more important telephone statistics contained therein are shown in Table V. and Table VI.

TABLE V—TELEPHONE DEVELOPMENT OF THE WORLD, JAN. 1, 1911

Division	Telephones Jan. 1, 1911	Per Cent of Total	Telephones per 100 Population	Population per Square Mile
United States	7,595,938	67.4	8.1	30
Canada	284,373	2.5	3.7	4.7
Europe	2,966,553	26.3	0.7	119
South America	85,744	0.8	0.2	6.5
All other countries...	339,285	3.0	0.03	28
Total World.......	11,271,893	100	0.6	30

POSITION OF THE UNITED STATES IN PUBLIC UTILITY SERVICE

On the basis of the foregoing tables, which could be greatly amplified, the broad assertion can be made that America has more adequate public utility facilities of every description than any other country. Viewed as a whole, the service rendered by American public utilities is superior to that rendered in other countries, while the capital investment and the cost of service are less than in other countries, provided due allowance is made for lower rates of wages and less cost of other essentials to construction and operation.

EXPERIENCE WITH PUBLIC OWNERSHIP IN AMERICA

There has been no lack of experience in regard to public ownership in this country. Certain minor ventures of this character were made as far back as colonial days, but most, if not all, were financial failures. Almost from the formation of our present federal government it has participated in and has at various times undertaken small ventures of this character, independent of subsidies, land grants, etc., to canal, railway and similar companies. Prior to 1860, appropriations to the extent of approximately $12,300,000 had been made by Congress for the construction of governmentally owned transportation projects. If any financial success resulted from their operation it is exceedingly difficult to ascertain such fact.

The ventures of the older states in this same direction have been far more extensive and have possibly resulted much more unfortunately, in a financial way, than have those of the federal government. An instructive volume on this subject alone could be compiled from the records of the older states. Their expenditures for publicly owned and operated canals were almost appalling. For example, the great majority of canal projects outside of New York State have either been abandoned or have been turned over to private ownership. In New York, other than in respect to the incidental advantages secured by internal development, no one would venture to state that the state canals have been other than a gigantic financial failure.

TABLE VI—SHOWING STATISTICS OF EARNINGS (PARTLY ESTIMATED) AND INVESTMENT FOR WORLD TELEPHONES

Division	Gross Earnings (in thousands), 1909	Average Earnings per Telephone, 1909	Investment (in thousands), 1911	Investment per Telephone, 1911	Investment per Capita, 1911
United States	$221,471	$32.87	$956,700	$126	$10.27
Canada	6,752	31.87	36,700	129	4.76
Europe	91,331	35.40	518,377	175	1.18
All other countries.	9,163	30.00	50,000	118	....
Total World.....	$328,717	......	$1,561,777	$139	....

Certain American states, and even one municipality (Cincinnati) have owned and operated railroads. At present the only American publicly operated railroads are the Panama road, owned by the federal government, and the Short Penitentiary Line, so called, in the State of Texas. Georgia and North Carolina have and still own important railroads that were constructed at comparatively early dates, but these are now leased and operated by private companies. As is shown by the official records, the experience under state operation was most unfortunate financially.

The experience of North Carolina can best be illustrated by quoting from an article by T. B. Womack, formerly Judge of the Supreme Court of that State, published in the *World's Work*, December, 1906:

> It was part of Governor Morehead's dream that North Carolina should have a great through system of railroads, from mountains to seashore. To carry out this idea a charter was obtained for a road from Goldsboro, the eastern terminus of the North Carolina Railroad, to the coast at Morehead City, a place named in honor of the Governor and then considered a great city of the future. The State took 12,000 of the 18,000 shares of stock, appointed a majority of the directors and has had absolute control.
>
> This road has now been operated by the State of North Carolina for nearly half a century, in war and peace, by Democrats, by Republicans and by Fusionists—each with varying degrees of failure. The private stockholders for years have pleaded for a lease or for anything to avoid a continuance of political mismanagement. During these many years no dividend has been earned, though one or two presidents declared dividends of one or two per cent per annum for political effect, when every cent should have been used in betterments. The stock value ranged from ten to twenty-five cents.
>
> Finally, under the administration of Governor Aycock, it became known that the administration had determined to heed the cries of the private stockholders and the sound business judgment of the people of the State, and lease this last of the State's railroads. A great sigh of relief went up from mountains to sea. The lease was not effected until after an attempted sensational receivership in the federal courts and litigation by those who wanted to hold on to the teats. During this litigation many evils of political management were made public, among others, the fact that every administration for years had employed prominent politicians in various sections remote from the railroad as "local counsel," thereby enabling them to receive free passes within the letter, but against the spirit, of the State statute prohibiting free passes.
>
> The effects of the lease were immediate. The first year of private management improved the roadbed and equipment to a point never before approached. The road is being extended and new connections made, and is run upon business, as opposed to political methods. The service, both passenger and freight, has been nearly doubled. Favoritism has been abolished. The stock has advanced to from sixty to seventy cents, and would be higher but for the fact that certain politicians, many of whom participated in making the lease, have instituted litigation in an endeavor to annul it, for want of power and the like.

The experience of the city of Cincinnati, which owns the Cincinnati Southern road, has been similar to that of Georgia and North Carolina. The past experience of Missouri in railroad construction and operation has been still more unfortunate. Indiana, has a similar unfortunate experience with the so-called Madison & Lafayette line, as far back as the later thirties, when after a year's operation it gave the road to a private company and pocketed a loss of $1,500,000. The State of Pennsylvania is said to have lost altogether $20,000,000 in connection with its past ventures in railroad ownership and operation, principally in connection with the old Philadelphia & Columbia Railroad. Concerning this the historian of the Pennsylvania Railroad writes as follows:

> The individual transporter who did not dance when the politicians in charge of traffic piped was placed at a great disadvantage. His cars were not moved until after the cars of his competitor, who was a partisan, reached market; classifications were interpreted against him and his cars were condemned by inspectors; every effort was made to compel his adherence, failing in which he was run out of business or badly crippled. The free-pass system originated on State works and grew out of the assumption by public officials that they had a right to pass over the public highways, in going to and from the capital, free of tolls. County officials soon claimed that they were entitled to the same immunity in going to and from their respective county towns, and political hangers-on * * * enrolled themselves under the banner of free transportation. * * * It became a potent factor in corruption and reached such an extent that transporters who would do certain political work at an election would have their tolls rebated to an extent that nearly always reached a refund of the entire amount paid. The State debt grew and grew until bankruptcy stared the people in the face.

ELECTRICAL INDUSTRY IN AMERICA

The creation of electric central stations began in this country about 1880, and since then their development has been both rapid and extensive. Speaking broadly, we may say that such development has been encouraged by the public and its governing bodies. According to the 1912 census, the average revenue per kw-hr. secured by private companies was 2.40 cents and the cost of its generation 1.98 cents, showing that the companies received an average profit of only 0.42 cent per kw-hr. The revenue secured by the municipal stations averaged 4.22 cents and the cost of its generation was 3.15 cents, leaving a profit of 1.07 cents. It is equally interesting to note that the kilowatt hour output per employee in the company stations averaged 154,008, while the similar figure in the municipal stations was only 67,698. It is generally conceded that the current used for power service is of greater benefit to the public at large than that used for lighting purposes only. Consequently, it should be noted that the capacity of motors operated on private companies' own circuits was approximately 57 per cent of the total primary horse-power installed in such stations, whereas on the municipal circuits the similar figures are but 29.5 per cent.

The growth in all features of the central station industry has been enormous since the first statistics were available in 1902, but the briefest and best manner in which to illustrate this is to state that in 1902 the total output of all the company stations was 2,311,146,676, whereas in 1912 it increased to 10,995,436,276. In 1902 the total municipal plant output was 195,904,439 and in 1912 it was 537,526,730, the total in 1902 being 2,507,051,115 and in 1912 11,532,963,006. The total output of all electric power stations using franchise rights, including electric railways, was not ascertainable until 1907, when the figure was 10,621.406,837. These enormous figures by no means cover the total generation of electric current in this country, for no complete enumeration has ever been made of what are known as isolated plants operating without franchise rights. Many claim that the total capacity of these plants is nearly as great as that of all the central stations.

ELECTRICAL INDUSTRY IN UNITED KINGDOM

At the outset the British were even more ready than were Americans to furnish capital for the establishment of central stations. In fact, prior to 1883, approximately $80,000,000 had been subscribed as capital for electricity supply companies. Since the period thus referred to British municipalities up to the past few years have been endeavoring to control electric lighting within their respective jurisdictions, with generally unsatisfactory financial results and strangulation of the industry. This last statement is corroborated by a series of resolutions adopted some years since by the British Institution of Electrical Engineering.

Official statistics have been available for a number of years on British electric central stations, but have been compiled upon a different basis than has been done here. The total kilowatt capacity of dynamos installed in all central stations of the United Kingdom in 1907 was 732,748, and in 1912 this had increased by 338,103 to 1,070,851, or approximately 46 per cent. During this same period the kilowatt capacity in the stations of the United States had increased 2,425,384, or at the rate of approximately 89 per cent. The ownership of the British dynamo capacity in the years taken was in 1907, 492,538 municipal, and 240,210 private company. In 1912 municipalities owned 696,673 and companies 374,178. The total plant output in 1912 was but a trifle over 10 per cent of the total central station output in the United States. The total of the output of British central stations and tramway plants in 1912 was 1,784,208,142, which is also about 10 per cent of the similar output in the United States.

In 1912 municipal stations of the United Kingdom developed practically but 3.55 kw-hr. for each dollar of capital invested therein, whereas in the United States the company stations developed approximately 5.23 kw-hr. for each dollar of their investment. The average revenue per kw-hr. secured by all of the British municipal central stations in 1912 was 3.38 cents and its cost was 1.74 cents, so they netted a profit thereon of 1.64 cents. British companies secured a revenue of 4.08 cents per kw-hr., and their cost amounted to 2.32 cents, netting a profit of 1.76 cents.

Since the commencement of the British municipal tramway movement and the electrification of such lines, which was about ten years later than railway electrification was well under way in the United States, municipal central stations were not showing large financial returns. Consequently it was felt that the municipal electrification of tramways would afford most profitable customers for the central stations. This was undoubtedly one of the principal incentives to tramway municipalization. Almost ever since any considerable number of tramway properties became municipalized and electrified, however, most of the municipal tramway managers and others have maintained that the tramways were charged unduly high prices for current to make a better showing for the central stations than they were justly entitled to.

CONCLUSION

Complete statistics upon the great electrical industry as related to the distribution of current for lighting and power purposes or as applied to transportation are not available for the entire world, but it is conceded by all familiar with the industry that the production of electrical machinery and appliances in this country is greater than in all the rest of the world combined. It is also a fact that there is more electrical energy generated in this country than is produced in all other countries, and that the mileage of electric railways in this country is greater than in the remainder of the world.

The development of street and electric railways has been very similar to that of the central stations as described, and as early as in 1888 electrification and expansion of our street railways was being actively undertaken, and by 1896 approximately 90 per cent of the then existing street railway mileage of this country had been electrified. Since then the expansion of mileage and improvement of facilities has been marvelous.

The British history of such development reveals even greater difficulties and obstacles than that described in connection with the central stations, especially as the result of an unlooked for legal interpretation of the tramway act of 1870. Prior to such legal decision having been made almost everyone in the Kingdom supposed that if municipalities ever did take over the tramways it would be as going concerns, for such had previously been the practise as regards all other forms of public utilities. Much had been purchased by the municipalities, but with the fact established that the municipalities could obtain the developed properties at the expiration of their franchises at a normal price, coupled with the fact that they could take advantage of ten years' experience and advancement of the art in this country, a terrific impetus was given to tramway municipalization.

How little the municipalities paid for properties which they acquired and for some of their forms of obsolescence, which have since occurred, is shown in the Parliamentary Return on Tramway and Light Railways for 1912 under the item "Capital expended on construction or purchases of old lines and works now superseded." Its total for the entire Kingdom was the equivalent of $30,331,781, a sum which is not the equivalent of what several American street railway companies have paid for similar purposes.

It is regretted that the total of all such expenditures by the electric railway companies in the United States cannot be ascertained, but whatever their sins of omission and commission may have been, they have never confiscated the property of those who preceded them. In 1912 the net capitalization per mile of track in the United States was $104,851. At the same date the capitalization of British tramways per mile of track was $87,324. Probably no other industries in the world have ever gone through such an experience as to extensive scrapping of apparatus and material to afford better facilities to the public than has been done in connection with the development of American central stations and electric railways, which fact has legitimately increased their capital accounts proportionately.

TESTIMONY OF F. C. HENDERSHOTT

F. C. Hendershott, manager of the Bureau of Education of the New York Edison Company, testified that he appeared at the request of the National Electric Light Association, which desired to be represented because of the importance of the question involved. He outlined the scope of the electrical industry of the country, saying that more electrical machinery was manufactured in the United States than in all the rest of the world combined and that more electric energy was generated in this country than in all other countries of the world combined.

Mr. Hendershott said that he would not have appeared on behalf of the association had it not been for the fact that the proposal provided for public ownership in the national capital. If the bill should be passed and signed the change which it proposed would be generally accepted as the policy of the party in power; or, if it should be passed without regard to party lines, it would be considered as an expression of national policy.

EDUCATION OF EMPLOYEES

In reply to a question as to the nature of the bureau of education of which he was manager, Mr. Hendershott said that it was formed to educate employees to render a better grade of service. It was not intended to educate the public. There was no doubt that to a certain extent the corporations were to blame for the prejudice against them that existed in some places. Corporations had begun to realize in recent years that there had been mistakes in their attitude toward the public.

It was Mr. Hendershott's opinion that the country would not go far with a system of private ownership and public operation. Where a public utility corporation was an essential monopoly regulation was necessary. The alternatives, the witness thought, were private ownership and management with regulation or government ownership and management. The former was much the better. It would assure a higher degree of efficiency in service.

COMMISSION SHOULD CONTROL

An objection to municipal ownership was the fact that it forced taxpayers to do what they did not want to do. Mr. Hendershott cited an instance of a municipal plant which gave a low rate to a factory and finally reached a point where its plant was worn out and there was no fund for replacement. He mentioned the situation in Cleveland, where a municipal plant had been established to compete with the company system. So long as regulation by State commission was the policy of Ohio a situation like that in Cleveland should be under the control of the commission.

Representative Crosser thought that the remote control of a state commission was less satisfactory than local control.

Mr. Hendershott, continuing, said that the utilities had some customers that were unprofitable. The New York Edison Company had 35,000 of these. He could not concede that regulation would necessarily fail. The commissions stood well. There was no doubt in his mind that when the Interstate Commerce Commission rendered its decision in the railroad rate advance case the public would accept the decision as fair. The railroads would have to accept the decision. The commissions were beginning to establish harmonious relations between themselves and to determine bases on which to build their work of regulation.

COMPLAIN OF SERVICE, NOT RATES

The witness said that he had made an investigation to determine the primary cause of agitation for municipal ownership in a number of cases. In 80 per cent of the cases it was the service, not the rates, against which the public complained. It was not possible to attain perfection under private operation, but there was a greater degree of efficiency than could be secured under public operation. It would be difficult to get rid of unsatisfactory employees under public operation, especially if civil service rules prevailed.

SAFETY AND WELFARE WORK

Mr. Hendershott described the work of the American Museum of Safety and the efforts of private companies to promote safety of employees. He said that the methods of welfare work recommended by the public policy committee of the National Electric Light Association had been adopted by many companies, and that the number that introduced systems for the benefit of employees increased each year. The National Association of Corporation Schools was then mentioned by the witness. The purpose of the movement was the education of employees. In the New York Edison Company the number of daily telephone calls averaged 20,000. This meant 20,000 opportunities each day to make friends or enemies or lukewarm customers. The company believed in training its employees so that they would be courteous in their dealings with the public. Of the 6000 employees in its schools those who came in direct contact with the public attended the schools during the hours when they were paid by the company. The company realized that favorable public sentiment was the most valuable asset it could have.

TESTIMONY OF FREDERIC NICHOLAS

Frederic Nicholas testified that he was connected with different publications of the McGraw Publishing Company, Inc. He was associate editor of the ELECTRIC RAILWAY JOURNAL, associate editor of the *Electrical World* and editor of the *McGraw Electric Railway Manual*. He also had an indirect connection with the *Engineering Record*. He was present at the request of the American Electric Railway Association, of which he was a member.

Representative Cary asked if companies of the kind that were affected by the bill advertised in these papers. The witness replied that they might do so to a very small extent, but that the large body of advertisers were the manufacturers of apparatus.

AN ERA OF REGULATION

Mr. Nicholas said that there were many sharply-marked movement or periods in the business growth of the nation. In earlier years there was an era of railroad construction, when every effort was made by the nation and the various states to induce those who had capital to invest in railroad development. In the lighting industry the use of electrical energy had followed gas. With the street railways the horse car had been succeeded in many cities by the cable car and later by the electric car. The present was an era of regulation. He was very glad to have an opportunity to discuss the subject before the committee. The present relations of the public utilities and the public were those of private ownership with complete public regulation. Although regulation was of long standing in Massachusetts, it had been adopted by other states only within comparatively recent years. The best known of the later regulative laws were those of Wisconsin and New York. Laws in other states had followed rapidly until at the present time about thirty states had commissions holding generally broad powers of regulation. The states were making a serious attempt to perfect methods of regulation that would give adequate protection to the public and would attract capital investment. The list of commissions would be increased by the addition of more states in the near future.

PRIVATE OWNERSHIP WITH PUBLIC REGULATION

Mr. Nicholas added that the policy of private ownership with complete public regulation should give fair protection to both company and consumer. In trying to express in a few words the principles that underlie regulation he said he did not of course assume to speak for the policy of any individual commission or to read into the laws or policy of any commission anything that was not there. As he saw it, regulation was an effort to retain the advantages of initiative and enterprise which private ownership and management fostered, and to introduce a rigid state control in order that there might not be excessive exactions on the part of the public or financial abuses or inadequate or discriminatory service on the part of the company. It was, in theory, a kind of a partnership relation between the company and the consuming public, but with the public released from the responsibility that rested on a partner. It was a purpose to substitute for the loose relation of the past a definite control which gave to the state the rate-making power and the control of service conditions within the reasonable limitations provided by the constitution. Fairly directed, it would protect the company from the public and protect the public from the company.

Continuing, Mr. Nicholas said that the country was passing through a period during which it was adjusting itself to the new conditions. There had been companies that had abused the entire freedom of action which they enjoyed in the past. There had been cities in which undue exactions had been imposed upon the companies. The modern policy of state regulation provided a new platform upon which both interests could stand to work out a better relationship for the future. In the judgment of the witness the public interest would be served if both sides united to give this policy a fair test. A fair test could be assured only if all corporate dissatisfaction and movements toward public ownership were deferred until the possibilities of this policy as a permanent feature in the government could be determined. Any departures that were made from this policy now would weaken the conditions of the trial.

WITHHOLDING ANOTHER CHANGE

The country came to the point where it was perfectly clear that private ownership without public regulation of utilities which are natural monopolies was not in the public interest. An advance was made then to the era of regulation. In the opinion of Mr. Nicholas it was not time to pass judgment upon that policy. The commissions to which power had been given and upon which hopes had been based could not conduct their work successfully and determine fairly the workability of the laws unless they were given time and were supported in their acts. It was not a matter of letting well enough alone to give the commissions time and opportunity to test the laws. It was a matter of withholding another change until it was justified by fair regard for all of the interests concerned. There was still a feeling of intolerance of regulation on the part of some corporation officials. There was a feeling of impatience on the part of some elements of the public. Either one of these feelings, if not curbed, would be fatal to the policy of regulation.

In a discussion of this subject, Mr. Nicholas added, a reference to the public was generally taken as meaning the consuming public. There was, however, another element of the public whose interests should be considered. This was the security holding public. In the main the present security holding public had been as innocent of knowledge of the abuses of corporations which the policy of state regulation was designed to prevent as the consuming public itself. Security holders had suffered as much as consumers from those practices which state regulation was overcoming. Their interests should not be lost to sight now.

SECURITY HOLDERS' POSITION

Without regard to the previous financial history of the properties their securities in the main, the witness said, were in the hands of those who paid fair value. They bought in the expectation of continuing working relations between a company and the municipality served and without any idea that their interests would not receive reasonable protection. Of course, where there had been undue exploitation of a property it could scarcely be expected that any plan for the full protection of the unfortunate security holders could be worked out. Where, however, there had been a normal development of the property, conducted with due regard to the proprieties of corporate accounting and management, every effort should be made by all interests to perfect a scheme which would give reasonable protection to the securities. It was not just that the community should have all the benefits of the development of the art, which had been revolutionary, and escape all of the responsibility for the cost of this development. If the state commissions would, they could do much to work out a basis of permanent satisfactory settlement. In the case of the International Railway Company, of Buffalo, the New York Public Service Commission of the Second District, which had before it a plan for reorganization of the property, directed the gradual amortization of underlying bonds amounting to $12,651,500. The cost which this sum represented was considered by the commission as a part of the fair cost of developing the property.

In conclusion Mr. Nicholas urged that commission regulation, fairly directed under strong laws, offered a satisfactory and wholesome solution of the problem.

BULK OF LAWS FAIR AND STRONG

In reply to a question from one of the members of the committee concerning the effect of regulation on the New York, New Haven & Hartford Railroad, the witness said that while he was not familiar with the details he understood that this company was not incorporated under Massachusetts laws and therefore had not been regulated by the Massachusetts commission. A question was asked in reference to the reported employment by the New Haven company of a man to draft a commission law. The witness said that he could not express an opinion on such a measure unless it was before him. He added that he had understood that in the drafting of the Illinois law professors of the University of Illinois were consulted and he supposed that it was the practice to get information wherever it was available. The bulk of the public service commission laws were fair and strong.

Another member of the committee spoke of the relative merits of state and local regulation. Mr. Nicholas said that he believed in state regulation. He thought that the states could legislate with fair regard for the rights of the cities within their borders just as the national government could legislate with fair regard for the interests of the states which composed it.

In replying to a question from one of the members of the committee bearing upon the intensity of the desire of public utility corporations for regulation Mr. Nicholas said that he could not speak for the companies. He could give only his own opinion, which was that the best utilities did not seek what was inconsistent with the public interest.

The first exhibit of the Panama-Pacific International Exposition, a 500-hp. Diesel engine, manufactured by the Busch-Sulzer Brothers Company of St. Louis, was installed in the Palace of Machinery of the Panama-Pacific Exposition on May 27. State and city officials and executives of the exposition participated in the ceremonies. The engine will be used at present in the work of construction which is now nearing completion. Miss Heger, daughter of W. S. Heger, Pacific Coast manager of the Busch-Sulzer company, pulled the lever which set the engine in motion.

Convention of the Southwestern Electrical & Gas Association

Completing the Account of That Part of the Proceedings of the Galveston Meeting Having Bearing on Electric Railway Work Begun in Last Week's Issue

As stated in the ELECTRIC RAILWAY JOURNAL last week, the tenth annual convention of the Southwestern Electrical & Gas Association was held at Hotel Galvez, Galveston, Tex., from May 20 to 23. The program arrangement provided various parallel sessions during the four-day meeting, most of the time of the convention being devoted to the discussion of practical organization, commercial and operating problems.

G. H. Clifford, of Ft. Worth, Tex., president of the association, presided. He explained, in his opening address, that as general technical topics are well covered in the engineering journals and in the transactions of the national scientific and engineering societies, state and sectional associations may best profit from the discussion of local problems. He recommended that the association hold mid-winter meetings in addition to the present annual conventions. His proposal was well received.

The attendance at the Galveston meeting numbered 350. The delegates were welcomed to "the Atlantic City of the Southwest" by Morris Stern of the Galveston Commercial Association. W. L. Wood, Jr., Texarkana, Ark., responded to the welcome on behalf of the association.

President Clifford then announced the following committees: On the president's address—R. B. Stichter, Dallas, Tex.; F. G. Murphy, Brownwood, Tex., and J. C. Kennedy, Brenham, Tex. Finance—J. P. Griffin, Dallas, Tex., chairman. Resolutions—C. W. Kellogg, Dallas, Tex.; W. B. Head, Dallas, Tex., and E. J. Emerson, Beaumont, Tex. Nominating committee—E. T. Moore, Dallas, Tex.; F. Lege, Jr., Galveston, Tex.; F. R. Slater, Dallas, Tex.; John Carpenter, Corsicana, Tex., and T. T. Malone, Plainview, Tex.

ELECTION OF OFFICERS

Saturday's session was given over to business discussion, and the following officers were unanimously elected: President, D. G. Fisher, Dallas; first vice-president, W. L. Wood, Jr., Texarkana; second vice-president, C. W. Kellogg, Jr., Dallas; third vice-president, F. R. Slater, Dallas; secretary, H. S. Cooper, Dallas; treasurer, J. B. Walker, San Angelo.

Executive committee—G. H. Clifford, D. G. Fisher, W. L. Wood, C. W. Kellogg, W. B. Tuttle, D. Daly, F. J. Storm, W. B. Head, H. C. Morris and F. R. Slater.

Advisory committee—W. S. Rathell, W. A. Sullivan, F. G. Murphy, E. D. Kelly, A. W. Wallace, F. A. White, E. S. Fletcher, J. W. Carpenter, M. J. Loftus, J. E. Cowles, W. V. Wainwright, W. A. Guthrie, P. A. Rogers, R. Merriwether, R. C. Brooks, J. L. Stevenson, E. J. Emerson and V. W. Berry.

Finance committee—H. S. Potter, G. W. Cushman and C. E. Calder.

SECRETARY'S REPORT

The report of the secretary, H. S. Cooper, showed that the membership of the association now comprises every operative interurban railway in the State of Texas, every street railway of importance, with one exception, in the State, and all of the important electric light, power and gas plants. He explained the efforts which have been made to render the secretary's office more useful to the membership, and stated that since the last convention more than 150 inquiries had been received from its own members and a number from non-members. This has required the writing of more than 1100 individual letters, besides other correspondence. Among the topics considered which are of interest in electric railway work were: agreements with labor unions, uniform accounting, rights-of-way for pole line, assessment of tracks, street-car advertising rates, rule-books for street railways, taxation of public utilities in Texas, strap hangers in cars, carrying packages on passenger cars, liability insurance, fire insurance, depreciation charges, bonding track, live grounds, electrolysis, use of crude oil in internal combustion engines, speed of street cars, paving tracks in city streets, creosoting poles and ties, power factors, load factors, stokers for burning lignite, track-oiling cans, and joint occupancy of poles.

ECONOMY IN THE USE OF POWER IN STREET RAILWAY SERVICE

In the paper entitled as above, George G. Morse, superintendent of railways, El Paso Electric Railway Company, described the success of his company in using energy meters on the cars. Watt-hour meters were placed on cars in December, 1911. Mr. Morse explained that the energy used per car mile and per 1000 passengers formed the basis of comparison of the performance of different motormen. He insisted that the success of any method depends upon the manner in which individual men are followed up in connection with their records. The plan followed was this: on installing the meters the cars were classified as to weight and motor capacity.

Test runs were made on each line with each class of cars, and certain figures were determined to form a basic rating for different classes and lines.

Records of the performances of all motormen were furnished to the inspectors within twenty-four hours of the completion of the work, and with these the inspectors were able to take up with the motormen the causes for excessive energy consumption while the matter was still fresh in their minds. Complete performance sheets for each line and each class of car were prepared and the men were rated according to their records. By fostering a spirit of friendly rivalry among the men it was soon possible to cut down the basic energy consumption.

Among the advantages which have resulted from the use of the plan were the direct saving of energy, the more intelligent use of the apparatus by the men, the spirit of friendly rivalry produced among the men, and more careful use and inspection of equipment.

The energy saving is shown in the following table:

Average kw-hr. per car mile in 1911 without meters	2.61
Average kw-hr. per car mile in 1912 with meters	2.39
Saving per car mile, 1912 over 1911	.22
Total miles, 1912	1,423,104
Total saving, 1912	313,083 kw-hr.
Average kw-hr. per car mile in 1913	2.41
Saving per car mile, 1913 over 1911	.20
Total miles, 1913	1,582,801
Total saving, 1913	316,560 kw-hr.
Total saving two years' operation	629,643 kw-hr.

In comparing the figures given above it should be remembered that there was no particular change in service conditions after the meters were put in. The number of passengers handled per car mile averaged seven for three years and varied only between 6.9 and 7.1. Somewhat more mileage was made by double-truck cars in 1913, making this year's service a little more severe. Mr. Morse's belief is that operation for two years under the present system has demonstrated a saving sufficient to justify the expense. He believes that railway companies should check energy consumption as carefully as they now check other details of the business.

In the discussion of Mr. Morse's paper E. J. Emerson, Beaumont, Tex., reported reducing the energy consumption on his line from 2.8 kw-hr. to 2.02 kw-hr. by applying watt-hour meters to the cars. E. E. Nelson, Fort Worth, Tex., pointed out the advantages of coasting-time recorders over the watt-hour meter method, and reported obtaining an immediate saving of 19 per cent of energy through the use of the former device. The coasting-time recorder, is, however, open to the objection that it takes no cognizance of operation on the series points of the controller. The motormen also failed to show interest in or understanding of these devices. Such a recorder is more easily checked than a meter, since the observer need only get on the car with a watch.

C. W. Kellogg said that in El Paso, Tex., the Sangamo mercury-type meters used had proven entirely successful, although the formation of a mercury salt has been found with time to introduce friction into the instruments so affected. H. S. Cooper, Dallas, Tex., said that the first test, made at Schenectady, N. Y., with a watt-hour meter on a street car resulted in reduced accuracy of the meter caused by the jolting it experienced. In the city on level track, said Mr. Cooper, it is important to give credit for operation on the series positions, although a coasting clock might be well adapted for interurban cars with heavy rolling stock and steep grades.

DISCUSSION ON ELECTRIC RAILWAY TOPICS

Following the discussion on Mr. Morse's paper several general topics were presented for discussion. A digest of the resulting contributions is given below.

COMPETITION BY MOTOR BUSES

H. S. Cooper, Dallas, Tex., opened the discussion on the subject of competition by motor buses and quoted from a Dallas newspaper voicing the protest of citizens against the use of the heavy gasoline-propelled vehicles now employed in that city. The buses were declared to be noisy, dangerous to pedestrians and children, and extremely destructive to the pavement. New York engineers who have made a study of London's traffic conditions, said Mr. Cooper, have found that the streets of the British metropolis are badly congested by the use of motor trucks, which have increased the number of accidents and involved heavy expenses for paving repairs. The average life of a motor bus is six years. The Dallas bus company has no franchise and claims that none is necessary for the operation of its vehicles.

R. Merriwether, Dallas, said that the Dallas bus line is now doing a pretty good business, and hauls half as many passengers as the street-car line with which it competes. Many persons first rode on the new line as a novelty, but the buses have an advantage over the street cars in that stops are made at any place to take on passengers, drawing up to the curb if necessary. Recently, however, the buses have suffered engine breakdowns caused by abuse by inexperienced operators. On one day, for example, two of the three buses were in the shop and the third was withdrawn from its route. The buses have also become stalled on the hills and grades, requiring passengers to alight and board street cars. The bus company furnishes no proportion of the street paving as does the street railway; indeed the buses operate on the paving laid by the railway company.

E. J. Emerson, Beaumont, Tex., said that another bus company had attempted to operate a line in Dallas several years ago, but this proved a failure after a few weeks of service.

John Benham, Chicago, recounted the experience with the buses which were put on to connect the Chicago west side railway stations with the department stores on State Street. At first a five-cent fare was charged and the buses were crowded, but the receipts did not pay expenses. Later the fare was raised to ten cents, but patronage rapidly waned under the competition of the street cars operated on the same thoroughfare, and the buses were finally withdrawn altogether.

WOOD-BLOCK PAVING

The discussion on wood-block paving was opened by H. S. Cooper, Dallas, Tex., who read from the question box the digest of answers received in reply to inquiries sent out by the secretary's office. These answers are abstracted as follows:

R. Merriwether, Dallas, Tex., described the method recently adopted by his company in laying wood-block paving. The sand laid on the concrete base is mixed with a small quantity of cement, sufficient to cause it to stand up under the "crown" form given it. The blocks are then laid on this cushion, and the joints filled with pitch to permit free expansion.

H. T. Edgar, Boston, Mass., said that despite the heavy grades and rainy weather encountered in Seattle, wood-block paving has there been proved safer than asphalt.

H. B. Sewall, Houston, Tex., reported trouble with the creosote "bleeding" out of the impregnated blocks under the hot sun.

R. T. Sullivan, Houston, Tex., described the two methods used in laying wood-block pavement in Houston, and declared that after service of four or five years no repairs were needed.

John A. Walker, San Angelo, Tex., explained how the sun "boils" the creosote out of the pores of the wood blocks, and later rain and moisture enter the blocks, causing them to swell, "rise," etc.

SINGLE-CAR VERSUS TRAILER OPERATION

In discussing single-car versus trailer operation, R. T. Sullivan, Houston, Tex., spoke of the excellent results obtained with trailer operation at Houston during peaks in the local passenger service. These trailers permit a reduced number of men to be carried over the peaks and also require a smaller number of units in service. No trouble is experienced in making schedule time with trail-car trains. It is now planned to employ trains of two motorcars each, equipped with multiple-unit control. Combination "conductor motormen" are now being trained for service on the second cars, which will be attached during rush-hour periods. Acting as motormen these men will run the cars from the carhouse to the points of coupling behind the regular cars, and will then serve as conductors during multiple-unit operation, later returning their cars to the carhouse at the close of the rush hour. Two-motorcar trains will avoid the objection made to trailer operation by which the motors cannot be operated at their points of highest efficiency under both single car and trailer conditions. Few accidents have occurred with the trailer-car trains used at Houston.

G. H. Clifford, Fort Worth, said that trailer-car trains have been employed with satisfaction in Fort Worth, but that in the future it is planned to operate multiple-unit trains of two motorcars each.

NEAR-SIDE AND FAR-SIDE STOPS

In comparing the advantages of near-side and far-side stops, R. Merriwether said that after two months of experience with the near-side stop at Dallas in obedience to a city ordinance, he feels that it presents no disadvantages in operation, although he added that he would advise discouraging any agitation for a change to it from far-side operation. While the near-side plan cuts out many stops, he expressed doubt whether it would reduce accidents. With the near-side stop in use, drivers of vehicles on cross streets too often assume that the street car is going to stop anyway, and so attempt to cross ahead of it. If the car does not stop, an accident may result. At the time the near-side stop was proposed for Dallas, Mr. Merriwether wrote to twenty operating companies asking their opinions of the plan, and two-thirds of the replies received favored it.

R. T. Sullivan said that in Houston, despite liberal advertising to acquaint the public with the near-side plan, the near-side stop has resulted in many delays which offset any saving in time made by cutting out stops. Local merchants whose stores were not favored by the change in stopping places have complicated the situation by appealing to the city council to amend the recent ordinance.

H. S. Cooper, Dallas, Tex., pointed out the danger to passengers while approaching or leaving the car. Use of front-entrance cars in near-side operation would, however, be practically equivalent to a return to the original condition of far-side stops.

C. W. Kellogg said that in Texas the race-separation requirements have practically precluded the use of front-entrance cars.

SAFEGUARDING THE STEPS

R. T. Sullivan said that the use of small wheels on cars is directly related to the matter of step heights, and he reported that one of the large manufacturers is now ready with a compactly built motor which will make possible lower steps.

R. Merriwether declared that in the experience of his company the closed door and folding step have practically eliminated step accidents. All cars of the Dallas system are to be thus equipped.

C. W. Kellogg, in comparing the relative advantages of gate and door closures, added the comment that gates are chiefly applicable in climates where the cars do not need to be heated. The doors can be fitted with lower glass panes, if desired.

P. L. King, San Antonio, Tex., mentioned an unusual accident in which a man had his finger crushed by thoughtlessly resting his hand on the top of the door just as the conductor closed it. The folding step, he added, has produced a new type of accident. If the step is not seated firmly when a passenger steps upon it, a slight noise is made as it settles under the passenger's weight. At this sound, some nervous women passengers have supposed the car was about to start and in attempting to move quickly, have fallen.

R. T. Sullivan declared that his conductors seemed to prefer closed-door cars even to more desirable runs, despite the extra work involved. When the door is closed, he explained, they feel that their sense of responsibility is at an end, and that they need watch the step no more until the next stop.

P. W. Gerhardt, Dallas, Tex., also added his own testimony that men will give up better runs to operate cars equipped with gates or fare boxes. Gates should open outward so that when closed, passengers will be pushed into rather than out of the car.

W. A. Sullivan, Shreveport, La., described the method followed in flagging at railroad crossings. Closing the rear doors the conductor removes the operating levers and carries them with him through the car to the front exit, from which he drops to the ground.

D. A. Hegarty, Houston, Tex., described the delay which was experienced with the use of release switches.

The question box contained a number of topics of special interest to electric railway men. The replies to the most important of these will be published in a latter issue.

OTHER CONVENTION TOPICS OF RAILWAY INTEREST

At the electric light session of Thursday morning, W. L. Wood, Jr., presiding, H. T. Edgar, of the Stone & Webster Corporation, Boston, Mass., read a paper outlining the extent of energy transmission and distribution from the great Keokuk, Iowa, water-power plant.

On Friday morning Homer R. Mitchell, Dallas, delivered an address on the Texas Employers' Insurance Association which was created by the recent Texas employers' liability act to insure employers at cost. The plan is modeled after that of the Massachusetts statute, and the operation of the law, declared Mr. Mitchell, has been attended by savings for both employers and men.

In his address at the "Safety-First" session of Friday afternoon, W. L. Wood, Jr., Texarkana, Tex., made an appeal for better fire-prevention methods in utility properties, through the protection of plants and equipment from hazards both external and internal.

ENTERTAINMENT FEATURES AND JOVIAN EVENTS

An opening reception and ball, a card party, boat rides, fishing expeditions and bathing parties were features of the entertainment program of the convention.

On Friday evening the Jovian Order held its parade, rejuvenation and banquet. Visiting Jovians and others were frank in conceding this procession and initiation ceremony to be the most elaborate and handsomely staged of their kind ever attempted anywhere in the United States. Five huge electric trucks carried floats depicting the evolution of the lighting art, the development of electrical inventions, the apotheosis of Jovianism, etc. Not only were the floats themselves elaborately illuminated, but cables from the truck batteries led to 160 banners, each carried by a red-clad marcher and lighted by eight 11-volt, 5-watt sign lamps in series on the 90-volt battery circuits. In all some 2000 battery-fed incandescent lamps were in service during the parade which measured five city blocks in length. The parade, rejuvenation and electrical effects were arranged by the local Jovians led by W. R. Phipps, Claude Matthews, K. E. Mason, W. D. Masterson, Max Levy, J. B. Harris and A. E. Kirk. At the banquet which followed the rejuvenation, Past-Jupiter H. B. Kirkland, Pittsburgh, Pa., was toastmaster and there were addresses by Jupiter W. N. Matthews, St. Louis, Mo.; W. B. Head, Dallas, Tex.; F. R. Slater, Dallas, Tex., and Max Levy, Galveston, Tex.

Employees of the Salt Lake & Ogden Railway Company had an outing on May 16 at Lagoon Resort, which is on the company's lines. The day was spent in outdoor sports of all kinds, including a baseball game between the train service employees and the office force, which was won by the former.

Publicity for Electric Railways

The Writer Cites Cases Where Publicity Has Been Unsuccessful in Eliminating Trouble—He Then Discusses Different Kinds of Publicity Service and Gives Suggestions Upon Those Which He Considers the Most Effective

BY W. T. BUCHANAN, PUBLICITY MANAGER PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Someone has defined publicity—in its modern application—to be the act of telling the facts as they exist for the purpose of securing favorable consideration on the part of the public. In other words, it is asserted that truth telling is publicity, and that falsehood and deception are not publicity, although it would seem that falsehoods have seven-league boots and truth the pace of a snail.

It is conceded that where results are measured by a mental process, acquired by analysis of a theory, writers and publicity doctors are permitted to revel in words to their own supreme enjoyment largely without fear of being controverted.

The "science of publicity" has not yet been defined with any sort of mathematical nicety. There are all kinds of theories, and it would seem that there is just as much divergence of opinion upon this present-day theme as there has been in Scotland over the theory of infant damnation. It is a notable fact that the public as a whole has never been united upon the tariff question. There are still believers of the "16 to 1" theory, and the "nebula hypothesis" furnishes volumes upon volumes for the man who loves to revel in the mire of words.

It has been suggested that what the public utilities of the country need is a national publicity campaign, fostered by a national association and with plenty of means to pay the bills. What is to constitute the national campaign? What of its character? Its methods? Will it be advertisements similar to those presented daily by the American Telephone & Telegraph Company, or such a campaign as was conducted by the Sugar Trust some time ago? Or is to be a series of articles in the magazines?

True it is that there are instances where publicity of a given cause has been conducted to an advantage when the fundamental facts justify the application, but in the world of publicity there are more failures than successes. The writer is not going into the question of the "publicity of sales" but will define his views of the "publicity of acts performed" and in particular "of policy" as applied to a public utility corporation.

IS THE TRUTH ALWAYS CONVINCING?

One writer, who has given the matter deep meditation and writes with freedom, presents a solution—his solution, however—for all of the ills that beset the public utility cause. His cure-all is to tell the truth. But will the truth do it? Let us see how the truth works out. In Detroit they sell seven tickets for 25 cents. The campaign against this iniquitous measure, as conducted, consisted of half pages in the newspapers, literature by the barrel and arguments before all manner of clubs—every bit of which was truth telling. What was the result? The truth did not even make a dent into the cranium of Mr. Public of Detroit. In Cleveland, all manner of publicity has been given to the street railway situation, before the measure passed and since. Has anyone discovered a desire on the part of the Cleveland people to recant? Not that you can notice perceptibly.

In Toledo, truth telling was spread broadcast through the press. Big paid advertisements told the public the facts and thousands of dollars were expended in a campaign of education. It was conducted along broad lines, ably written, and yet what was the result? The city has gone right along with its apparent determination to force confiscation of the street railway property.

Milwaukee is another case where truth telling was flaunted in big advertisements before the public. Had it not been for the State Railroad Commission it is doubtful if even the present result would have been obtained—which, by the way, is a reduction over what was extant previous to the agitation.

Seattle is still another case where big "ads" are being placed prominently before the public. Economic truths regarding public operation are presented in the newspapers daily and have been for a year or more. Has anyone noticed any change in the public policy of Seattle? Not that you are aware of.

Los Angeles is another instance where the power and light companies have been fighting the establishment of a municipal distribution system. Thousands and thousands of dollars have been expended in telling the truth. The proposed bond issue was defeated a year ago, but only by a narrow margin and due to the requirement of the city charter—that three-fourths of all votes cast at the election was necessary to carry. The truth-telling campaign apparently had no effect.

Denver is another instance of truth-telling advertisements; San Francisco has had an experience, Kansas City had another, and so on down the list. There are plenty of them. Almost universally—in the cities where advertising campaigns have been conducted against a proposed restrictive measure—the result has been a failure.

In fact, the writer is ready to make the statement that in nine-tenths of the cities of the country where "truth telling" has been indulged in by means of big advertisements nothing has been accomplished.

THE TROUBLE USUALLY DUE TO NEGLECTED COMPLAINTS

Why do these "truth-telling" campaigns fail? It is evident, where an examination has been made of the various factors involved, that each particular situation is the outgrowth of years of controversy. Some day in the dim past the agitation started from a trifling incident which might have been adjusted without any great amount of difficulty. Experienced managers who have spent a lifetime in the business declare that 90 per cent of the present difficulties are the growth of neglected complaints—that if the complaint had been taken in time and adjusted that the agitation would have never gained the momentum which it later attained. And yet back of it all is the fundamental fact that the public utility is a political issue in every community.

And this gets us back to the proper analysis of public utility corporation publicity. It is my conviction that in the main the publicity involved is of a local character—not territorial or national to any large degree. Take any corporation, and its chief difficulty lies with the local controlling bodies, the city council, the newspapers, the improvement clubs and the legislature, but mainly the local legislative body. The council decides to reduce the fare, provide seats for all, regulate the service, demand extensions—all these are purely local and affect the gross earnings. The national aspect of the situation is intermingled with the railway and industrial corporation strife which is rampant in the country at the present time. The local company, of course, is involved in this to the extent of its proportion of the whole industry. But the company's difficulties are in the main local—90 per cent of them. The action of Congress, the views of statesmen, the European municipal ownership situation have all a bearing, but distinctively minor compared with the troubles of the local field.

What are the chief factors involved in the local situation? First, the local legislative body; second, the newspapers; third, the improvement clubs; fourth, the reformer and politician.

What should be done in each of the above factors where trouble arises is only to be determined when the facts are known, but the most important feature is that the difficulty be immediately adjusted before it has a chance to secure sufficient momentum to be dangerous. Explanations should be made, liberal treatment extended and a hearty co-operation manifested. It is unnecessary to go into details of what should be printed in the newspapers regarding the incident, of what should be the character of the presentation before the city council or what should be said to the improvement club. All these are mere details which have been gone over time and time again, but out of it all comes this "writing upon the wall." Attend to it at once and see that the facts are early presented and do not wait until the mind of the public is made up upon a statement of alleged facts presented by the opposition. Get to the public first and early in the game.

In answer to the above will come the cry of those who are deep in difficulties seemingly insurmountable. What of the company threatened with municipal ownership; with a physical valuation which will wipe out much of its stock, and with a review of its financial operations? Are not these national questions worthy of national publicity? It is not the writer's purpose, even if he could, to present the cure of these very important ills. The national aspect of the situation is not one which will lend itself to publicity with any great amount of ease. Take the American Telephone & Telegraph Company. Its publicity campaign every year must cost a million dollars or more. Has anyone noticed that any headway is being made against the attitude of the government? If judgment is to be given as to the situation it would be that the government is gaining ground in its apparent intention to absorb a telephone system.

THE RAILWAYS AND THE POLITICIANS

Why is it that the public is so chary of believing what the public utility corporation has to say upon any subject? Usually the answer is that it is due to the experience of the public with the company in the past. But while this is possibly true, it is the judgment of many that the real reason is that the public utility in America is a political question. Corporations have been the politician's chief instrument to push him into office for years. He has foamed at the mouth, roared at the public and held his hands up in holy horror when describing the acts of the corporations as against the interests of the people. As a result the public has been educated to accept the utility as a political issue—the same as he does the City Hall or anything pertaining to it. If the city owns the water works it is a part of the political machinery, to be involved as the time warrants its use in discussions to gain the end coveted—the job. So long as this condition exists so long will the publicity campaigns of truth telling, of direct methods and of indirect methods, be thwarted. The railways of the country—from the voter's standpoint—are a political issue. They are not regarded as a commercial enterprise by the politician. His viewpoint is one of political aggrandizement. What of the efforts of the railways of the country—organized and otherwise—along publicity lines during the past fifteen years to gain a respectful hearing and an honest consideration of the facts? Has any headway been made by the railways? If they get the 5 per cent increase now being asked, it will be the first instance of successful publicity in a national campaign.

The writer is aware that he is stepping upon dangerous ground and that he will find many who will disagree with him, particularly those who in their mind's eye see a strong organization perfected for the expenditure of a large sum of money in a national campaign. It may be that the writer's views are not within the scope of the facts, but whatever may be the situation the views expressed are the result of observations and experience sifting through a somewhat ordinary mentality.

THE RIGHT KIND OF PUBLICITY WILL WIN

It is not to be understood that the writer does not believe in publicity, for he does. He believes in the game of taking care of each day as it comes and of each incident as it appears upon the surface—local as well as national. He believes that it is better for the company to be out of the newspapers than in, but in so believing asserts that it is essential to be in when the incident arises and the circumstance warrants it. But to become a leader in a discussion, to take a hand in local and national affairs upon every possible occasion, for its officers to be interviewed frequently and present economic "truths," is all harmful and only prepares the way for a debate which usually ends to the injury of the corporation—along certain lines.

It must be conceded that organized publicity has not been effective in the public utility field when exploiting "policy." The advertising of appliances and commodities is another matter and has been and is being conducted by many public utilities with a fair measure of success. Such a campaign is in nowise related to the broader field of public policy. The economics of a public utility has much of the political in its make-up. Even if the politician does eagerly grab the opportunity to make capital out of the utility, there are many real political elements involved in the relation of the company with the public through its franchise rights.

AVOID DEBATES—GIVE NEWS

Then what sort of a campaign can be conducted when you are pitted against the politician? Were the field open and unopposed as it might be were your cause a religion, or a cure of disease, or the establishment of a new product, then it would be only a matter of extensive publicity to secure converts. In the public utility field to present direct arguments simply opens up the way for a public discussion and a chance for the politician to come in with his usual tirade. It is not to be understood that because of this that the companies should be silent. Not at all, but in the public utility field the experience is that the presentation of a doctrine—usually—is productive of a discussion wherein the reformer and the politician "with ideas" weaves out a different theory—usually to the disadvantage of the utility concern. Let the politician start the debate.

Newspapers—and the writer is familiar with the newspaper game—will not print all that is offered them. In these days of the press agent the city editor is prone to look over copy frequently with considerable suspicion. He is not taking chances of having something put over on him. He is by nature a seeker of sensations. Copy which has the earmarks of the "unique, odd and curious" will find its way into the columns of a paper frequently quite unrecognizable. The man who accuses the corporation of being a thief has a better chance in its columns than the man who desires to exploit a good deed of the company. That is not due to any prejudice against the public utility corporation, but for the reason that the newspaper man of to-day regards news value as the primal feature of copy when he passes judgment upon it. For that reason the words "Stop Thief" have a higher news value than "Brotherly Love." Still the newspapers are inclined to be fair, and when copy of real news value is presented to them it will find its way into the columns—perhaps not just as you hoped, but partially recognizable.

In presenting the above views it is not to be understood that the "gum-shoe" method is favored. The "gum-shoe" plan is obsolete. This is a progressive age—we are told many times a day—and it is reasonable to assume that the future of public utility operation lies in good service and an honest administration of affairs. Regulation through commission has already cleared the atmosphere of many of the difficulties experienced with the public, and that it will continue to do so is also a truism worthy of acceptance by all. But when the national publicity campaign is mapped out care should be taken to avoid the errors of the past and examine thoroughly into the effect of the "direct system" of big advertisements and telling the "truth" to the voter, as experienced by most of the large companies of the country.

STUDY OF ENGINEERING MATERIALS

Among the general subjects to be treated before the International Engineering Congress, 1915, to be held in San Francisco Sept. 20-25, 1915, probably the one having the broadest interest is that of materials of engineering construction, which enters into all phases of engineering activity.

The list of topics which will be treated in this section is as follows: (1) timber; (2) preservative treatment of timber; (3) substitutes for timber in engineering construction; (4) brick in engineering structures; (5) clay products in engineering structures; (6) probable and presumptive life of concrete structures made from modern cements; (7) aggregates for concrete; (8) slag cement; (9) waterproof concrete; (10) cements containing additions of finely ground foreign material; (11) economics of the world's supply of iron; (12) the life of iron and steel structures; (13) the employment of special steel in engineering construction; (14) the place of copper in the present engineering field and the economics of the world's supply thereof; (15) alloys and their uses in engineering construction; (16) aluminum in engineering construction; (17) the influence of the testing of materials upon advances in the designing of engineering structures and machines; (18) cement testing; (19) testing of metals; (20) testing full-sized members; (21) proof testing of structures.

The Wichita Falls Traction Company, Wichita Falls, Texas, has put in service an electric car equipped with a primary battery, the invention of two local engineers, J. J. Krohn and John McGivney.

COMMUNICATIONS

FUNDAMENTAL FACTS REGARDING ELECTROLYSIS

COLUMBUS, OHIO, May 23, 1914.

To the Editors:

By way of comment on the present electrolysis situation, I wish to call attention to the following fundamental and incontrovertible engineering facts.

1. All the street railway systems in the United States, with the exception of those in Washington, D. C., Cincinnati, Ohio, and New York City, use the running rails in contact with the ground as a whole or part of their return electric circuit.

2. Where such running rails are used on improved city streets as part of the return electrical circuit it is not feasible to insulate the rails entirely from the ground, and there will always be a tendency for part of the return current to shunt off the rails into the ground and then on to adjacent underground metallic structures. However, on private rights-of-way it is entirely practicable, with standard clean-rock ballast roadbed construction, where the rails are entirely free from the ballast, to provide and maintain an operating condition of practical electrical insulation of the return circuit from ground.

3. It is a universal law that there can be no electrical current flow unless there is a continuous or closed circuit of metallic or electrolytic conductors. That is, just as much current must return to the generator as was sent out from it. There is no such thing as a "lost" current. The losses arise from the resistance encountered as the current is coming back to its source.

4. Electrical currents do not merely take the line of least resistance. They follow all paths in inverse proportion to the resistances of such paths.

5. In accordance with the preceding law, the tendency of currents to shunt off the rails is governed by the relative resistances of the rails as an electric circuit and the adjacent ground as an electric circuit. As underground water and gas mains and lead sheaths of cables may form relatively easy paths for the return current to travel through, there will always be a tendency of the current from the grounded rails to shunt off and go on to the underground network of other utility structures. If the resistance of the return electric circuit is kept down so that during any ten-minute period the average over-all voltage drop in the tracks shall not exceed seven volts, and the average potential gradient shall not exceed one volt per 1000 ft., in most cases the percentage of current that will stray off on to other underground metallic structures will be so small as to make the electrolysis damage negligible.

6. Where current travels on an underground metallic conductor, such as a water or gas main or lead sheath of a cable, and goes into the adjacent soil, the metal will always be corroded at the point where the current leaves the metal to go into the soil, regardless as to whether it is merely a temporary shunting around a high-resistance joint, or is a permanent leaving of the underground structure.

7. Underground water and gas mains or lead sheaths of cables are not installed as electrical conductors, and the water and gas lines cannot be made into, and maintained as, continuous electrical conductors.

8. Where corrosion of underground structures takes place the amount of corrosion depends directly upon the number of amperes of current flowing, and the duration of the flow.

9. The placing of metallic connections between underground structures and the return circuit of a railway, while preventing the corrosion of such under-

ground structures at the point where such connection is made, will materially increase the current flow on such structures, thereby producing new and unknown hazards back of where the electrical metallic connection is made.

10. Where water and gas lines are corroded they produce a serious fire hazard, and the corrosion of gas mains, in addition, produces a serious personal injury hazard from gas explosions.

11. Where underground metallic structures are used as carriers of electrical current there will always be more or less interchange of current between such structures.

12. There are adequate engineering remedies to successfully cope with the operating conditions and hazards above outlined.

13. The cost of installing such remedial measures, considering the hazards to be guarded against, is not excessive.

If the preceding facts would be faced squarely by all parties interested in electrolysis prevention there would be no chance for litigation, and a satisfactory solution would be reached at a reasonable cost.

SAMUEL S. WYER, Consulting Engineer.

MAINTENANCE OF ALL-STEEL CARS

NEW YORK, WESTCHESTER & BOSTON RAILWAY
NEW YORK, May 26, 1914.

To the Editors:

The question as to the behavior in service of all-steel cars, which was raised in your last issue, may be answered according to the experience of the New York, Westchester & Boston Railway by saying that our car bodies have required absolutely no repair work whatsoever during their two years of service. Interior fittings such as sash, doors, seats and fixtures have, of course, required a normal amount of attention, but the steel car body proper, as well as the trucks, has been free from maintenance charges.

These cars are 70 ft. 4 in. long over platform endsills. The weight of the body, including foundation brake rigging and interior fittings such as seats, lights and other equipment required to place the car in condition for operation, is 60,676 lb. The motor-truck, which is equipped with 42-in. wheels, weighs 15,500 lb. and the trailer truck 12,580 lb. The air compressor and the single-phase motors and control equipment weigh 30,266 lb. As the car body and trucks exclusive of the electrical equipment weigh 88,756 lb., the weight per foot length amounts to 1260 lb., the car being 9 ft. 8 in. wide.

As the cars are operated in both express and local service, maintaining speeds up to 56 m.p.h., and as they are subjected to the vibration caused by the acceleration of single-phase motors, it might be expected that some trouble would be experienced with loosening rivets or distortion of members during two years of constant service. From close observations of the equipment, however, it has been demonstrated that no deterioration of any kind has taken place.

The ability of the cars to withstand shocks and collisions has been demonstrated in one instance. Prior to the opening of the road for service a work-train, composed of an electric locomotive weighing 80 tons together with two flat cars loaded with 120 tons of rails, collided with two of the passenger cars which were at a standstill. The locomotive was moving at the rate of about 15 m.p.h.

The effect of the collison was to break the drawbar and its fastenings on the car which was struck, and the car mounted the locomotive end-frame. However, the damage done to the car was confined entirely to the platform, not even a single pane of glass being broken in the car body. The repair work was a simple matter as the parts that were badly bent were cut out and new members riveted in place, the latter consisting of steps, corner posts, and an end-door frame, which were purchased from the manufacturer. The sills were not badly bent and were straightened in place. This work was all done by the shop blacksmith and helpers, and the procedure appeared in strong contrast to the work that would have been required if the car had been constructed of wood, as a large force of carpenters would then have been necessary.

Invariably I have found that the repairs on steel cars are simpler and easier to make than those on wooden cars, and a careful selection of the steel entering into the construction, together with a thorough first painting of the car, will permit the operation with very little trouble from rusting. Our cars ran for approximately one and one-half years, and were then given one coat of color and two varnish coats on top of the original paint. Notwithstanding the fact that the cars are subject to the effect of steel dust from the overhead wire and pantograph shoe, which falls upon the car roof and turns to rust, no sign of deterioration has been found, although this condition requires very frequent cleaning of the car sides with a consequent wear upon the paint surface. Inspections of the paint prior to the application of the new coats show invariably that the original ground coats of paint are in good condition, and there is absolutely no indication of rust under the old paint. Summed up, I have no hesitation in saying that a well-designed steel car is infinitely preferable for all classes of service to cars that are constructed of wood.

R. R. POTTER, Superintendent of Car Equipment.

HUDSON & MANHATTAN RAILROAD COMPANY
NEW YORK, May 27, 1914.

To the Editors:

A communication in your last issue brings up the question of the maintenance of steel cars, and with reference to this I would say that the all-steel car bodies on the Hudson & Manhattan Railroad have involved practically no maintenance costs during their six years of service. Roughly speaking, we have spent about $300 per year on this work during the past four years, or an average of about $1 per car per year. These cars are 48 ft. long over all, and the body, ready for service, but exclusive of control equipment, weighs 30,000 lb. The trucks weigh 21,890 lb. and the electrical and air-brake equipment 17,730 lb.

The cars are operated mostly in tunnels in which the temperature remains constantly at about 60 deg., so that when the cars come into the tunnels from the yards or surface extensions the change in temperature is very rapid, thus subjecting the steel work and its protecting paint to extreme expansion and contraction. The road has many curves and grades, and fast schedules are maintained, a number of the cars being geared to 65 m.p.h.

The first of the cars went into service in February, 1908, 286 now being in operation. Up to the present time very little sheet metal work has been done on the bodies, the heaviest work being the renewal of the sheet-metal roof plates on a few of the first cars which were subject to the salt water drip during the tunnel construction period. There is no appearance of corrosion of the sills or rivets that would indicate that future repairs will ever become heavy.

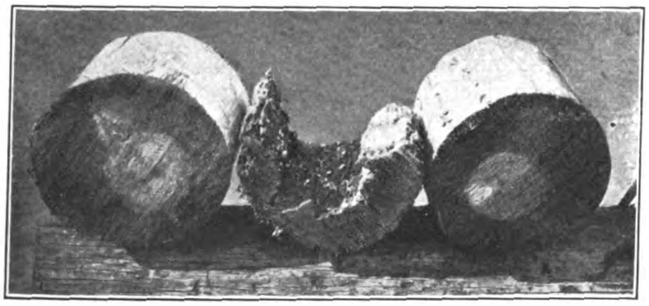
The maintenance of these cars does not require the employment of any high-paid structural steel workers nor is any special machinery installed. The ordinary car repairman soon learns to drill steel and drive rivets, while the lighter work is done by a tinsmith with a cornice brake.

Of course, a steel car, if properly designed, will be much less damaged in a wreck than a wooden car, and when badly damaged it is no more difficult to repair. The bent members can usually be straightened into shape by applying proper strains and heats to the distorted parts. Indeed, from my experience with tunnel, elevated, interurban and city equipments, the all-steel car, when properly constructed, appeals to me as being the best suited for all classes of electric car service.

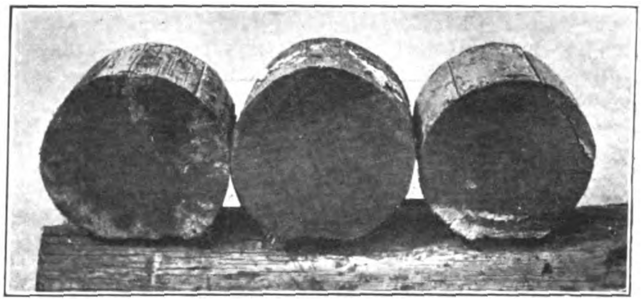
P. V. SEE, Superintendent of Car Equipment.

PROTECTIVE EFFECT OF CREOSOTE ON YELLOW PINE AND CEDAR PILES

In the proceedings of the tenth annual meeting of the American Wood Preservers' Association, F. B. Ridgway, in charge of the department of chemistry and tests of the International Creosoting & Construction Company of Galveston, Tex., gives the results of creosoting piles used in the Santa Fé railway bridge across Galveston Bay. The information is of remarkable value in that it relates to treated piles some of which were in place for thirty-eight years. The recent dismantling of this bridge gave an opportunity to study the relative service ability of untreated, inadequately treated and thoroughly treated piles in Southern waters. For the first bridge, built in 1875, creosoted piles were used, but the amount and character of the creosote, as well as the amount of previous seasoning, are unknown. In 1895 the trestle was reconstructed, the piles being treated according to the best practice of that period. Many of the piles of the original trestle were left standing between the bents of the new structure. When the causeway was started in 1909, increasing temporarily the demands upon the old bridge, it was decided that some reinforcements were needed for the trestle, and some untreated pine piling was put in. When the old structure was dismantled last summer it was found that the thoroughly treated piles were almost all in good condition; that, while the majority of those lightly treated in 1875 were almost completely eaten away from mudline to waterline, a few were still in good condition, and that the untreated piles were practically destroyed.



Air, Water and Mud Sections Creosoted Pile Treated in 1875



Air, Water and Mud Sections Creosoted Pile Treated in 1895

PILES TREATED IN 1875

The data regarding the treatment given the original piles thirty-eight years before their removal are very meager. It is estimated that from 8 to 12 lb. of creosote per cubic foot was absorbed. On removal it was found that the air sections had lost almost all outward signs of having been treated. While the hearts were in many cases badly decayed the outsides were sound. In other cases, even where no more than half of the stick had been penetrated, both heart and outside were in good condition. The variations were attributed to the amount of butt cut off after driving and the consequent varying amount of untreated wood exposed. In the majority of cases the water sections were more or less attacked by the teredo and limnoria. Air, water and mud sections of a typical pile driven in 1875 are shown in the accompanying figure. The pile from which the sections are taken was 11 in. in diameter and showed a 3½-in. penetration and a 4-in. untreated center with a very sharp line of demarcation.

PILES TREATED IN 1895

The piles driven in 1895 were treated by Riker-Lee & Company of Galveston, now the International Creosoting & Construction Company, and were guaranteed for ten years. They were pine piles direct from the stock, seasoned by steaming. When removed these piles were found to be in good condition, at least 90 per cent being fit for use elsewhere. Most of these piles were penetrated throughout with the preservative, and in no instance, even where the amount of oil absorption is less thàn the average, is there any sharp division line between the treated and untreated portion of the stick.

The oil used in the piles treated in 1895 was what was then known as "heavy oil," not on account of its high specific gravity but because at ordinary temperatures it contains a large percentage of solid matter. It was imported English oil, which, as extracted from the mud section, was found to have a low boiling point, containing 60 per cent of naphthalene and something more than 12 per cent of tar acids. Among the piles treated in 1895 were 110 of red cedar. These were found on removal to have been attacked only slightly in spite of the difficulty of injecting a large amount of oil into this timber.

EFFECTS OF BORERS ON UNTREATED AND TREATED PILES

The effects of borers on the untreated pine poles driven in 1909 for the purpose of reinforcing the old structure were very severe, many of the poles being completely eaten through by limnoria, with evidences also of the toredo. These borers work from the water line to the mud line.

While the borers attack treated piles also it is noted that in many instances where the treated piles have been attacked the borers have entered through knots. Most of the 1895 piles that have so suffered are very resinous. It is very difficult to force oil into knots or resinous pieces of timber, and from the analyses made Mr. Ridgway thinks that the pieces that were attacked received less than the average amount of oil on account of their refractory character. Untreated piles examined indicated that the knots were less attacked than the softer wood around them, hence the resistance of knotty and resinous piles to all penetration is to blame, rather than the structure of the wood itself, for the vulnerability of this class of timber.

American Association News

An Educational Course Has Been Arranged in Accounting—Reports of Meetings of Sub-Committees on Car Wheels, Gears and Pinions and Lighting Protection—Meetings of Company Sections

The committee on education of the American Electric Railway Accountants' Association has made an arrangement with Prof. John R. Wildman, head of the accounting department in the New York University School of Commerce, Accounts and Finance, by which a course on electric railway accounting by mail is offered to members and employees of member companies of the association. A letter announcing the extent of the course, which extends over a period of two years, has just been issued by the committee on education of the Accountants' Association, consisting of F. J. Prior, chairman, F. B. Lasher, G. G. Whitney, J. L. Conover, Jr., and N. E. Stubbs. The letter follows:

"The committee on education of the American Electric Railway Accountants' Association has completed arrangements with John R. Wildman, C. P. A., professor of accounting, in the New York University School of Commerce, Accounts & Finance, to supervise a systematic course of instruction in electric railway accounting.

"The business of life requires of us as individuals that we equip ourselves for our work. If our work lies in the field of business, proper equipment requires that we have a knowledge of economics for the science of business. If we have to do with accounting, it is essential that we should study it as a science as well as be familiar with the rules whereby the science is made operative.

"Education for business is no longer an experiment. It is not at all improbable that the near future will find it one of its essentials of success in the business field. It not only contributes to that peace of mind which is conducive to long life, but it paves the way to the material comforts which help to make life pleasant. Hundreds of young men who in the last ten years have graduated from the university schools of commerce testify to this fact. Where hundreds of men have attended such schools, thousands have craved the opportunity, but have been prevented by considerations such as distance, lack of time, etc.

"To overcome distance and time, we propose to carry the material to our members, have them study and resolve upon it, and submit their results.

"The course will extend over a period of two years, the terms running from October to May, with eight lectures in each year.

"The work of the first year will embrace the study of the theory of accounting, with sufficient application to street railway work through applied theory tests and simple problems to sustain the interest and make the work of practical value. The topics taken up will be as follows:

"1. The purpose and scope of accounting.

"2. The relation of accounting to allied subjects such as economics, law, finance, and organizations.

"3. The method of keeping books and the media for recording financial transactions.

"4. Accounts; their philosophy, construction and classification.

"5. Discussion of the balance sheet accounts.

"6. Discussion of the revenue and expense accounts.

"7. Preparation, interpretation and use of balance sheets, income statements, etc.

"8. Graphs, charts and statistics as aids to operation and management.

"The work of the second year will embrace a series of corporation problems built around street railway organizations and into which will be woven the principles of corporation law.

"1. Organization and development.
"2. Operation.
"3. Merger.
"4. Consolidation.
"5. Holding company.
"6. Receivership.
"7. Reorganization.
"8. Dissolution.

"It is proposed that the papers submitted by the subscribers shall be critically reviewed, rated and a record kept of the marks. A certificate of proficiency will be given to each individual who shall have satisfactorily completed the two years course. Furthermore, two monetary prizes will be annually awarded during the continuance of the course; one to the first-year and the other to the second-year student.

"Professor Wildman is authoritatively fitted to direct the course outlined above. He is a professor of accounting in New York University School of Commerce, Accounts & Finance; a certified public accountant of New York State; member of the American Association of Public Accountants; member of the committee on terminology of same; formerly editor, department of practical accounting of the *Journal of Accountancy;* an author of a number of works on accounting, and now also engaged in private practice.

"The course is operative only on the securing of 400 subscribers by Sept. 1 next. The ultimate success of the committee's work now lies in the assistance which your company will consider proper to encourage, your employees who may be interested in the subject."

The letter is accompanied by subscription blanks for the lectures in accounting by mail. The committee requests that these should be filled in and mailed to the chairman of the committee, 29 West Thirty-ninth Street, New York City, where additional blanks can be had upon request.

MEETINGS OF SUB-COMMITTEES ON CAR EQUIPMENT

STEEL WHEELS

On Tuesday, May 26, a meeting of the sub-committee on specifications for solid wrought carbon wheels for electric railway service was held for the purpose of preparing recommendations for changes in the wheel specifications to be reported to the equipment committee at a meeting to be held in the near future. The sub-committee meeting was attended by J. P. Barnes, chairman, general manager Syracuse & Suburban Railroad Company, Syracuse, N. Y.; W. E. Johnson, engineer of car equipment Transit Development Company, Brooklyn, N. Y., representing W. G. Gove, and the following representatives of manufacturers of steel wheels: G. Aertsen, Charles Tietze and Howard C. Myers, Midvale Steel Company; H. P. Tiemann and L. W. Conroy, Carnegie Steel Company, and A. A. Stevenson, Standard Steel Works Company. The Pennsylvania Railroad was represented by Mr. Waring.

The sub-committee on steel wheels met on Jan. 6, and made a number of revisions of the working specifications of 1913. These specifications as revised were submitted to the committee on equipment on Jan. 29 and were there further revised. A circular letter was then sent to engineers interested in either of the committees, embodying the results of the two revisions and asking for criticisms. The meeting held this week was for the purpose of discussing these criticisms.

As a result of the suggestions and the conference a number of important changes were decided upon. In the first place the phraseology of machined and unmachined contours is dropped and instead two sets of tolerances are allowed, one being more rigid than the other. The less rigid tolerances are adapted to ordinary construction under usual operating conditions. They are the ones which, presumably, will be generally specified. The more rigid tolerances are to be used for specifications where local conditions require greater accuracy in dimensions. As an example of where they might be specified the committee suggests the case of steel wheels put into city service and used over old special work in which small grooves are found.

Another change in the specifications is the extension of the limit of chemical content to include acid steel. The physical limit, of course, remains the same.

The manufacturer's representatives present at the committee meeting agreed to the furnishing of wheels mated from the same heat as far as possible. This will insure, within reasonable limit, the same chemical composition for the two wheels of a pair.

GEARS AND PINIONS

A meeting of the sub-committee on gears and pinions was held on Wednesday, May 27. It was attended by W. E. Johnson, Transit Development Company, Brooklyn, N. Y.; Norman Litchfield, Interborough Rapid Transit Company, New York, and J. P. Barnes, Syracuse & Suburban Railroad, Syracuse, N. Y. The committee finds from its investigations that few railway companies are buying gears and pinions in accordance with specifications for material. There is little knowledge as to which material gives the best results as to wear and general service. The committee desires to secure the practical co-operation of users and manufacturers of gears and pinions with a view to ascertaining present conditions. The committee will not try at present to prepare specifications for report to the equipment committee, but will conduct correspondence with engineers who are experimenting with different types of gears and pinions. The committee will endeavor to outline the fundamental conditions of service and to get in touch with men who have secured good results with certain types of gear under certain conditions. Results of unsatisfactory service under definite conditions are also to be studied. The committee will analyze the condition of the various cases and will try to relate them to the material and construction of the gears. Manufacturers will also be approached for the purpose of securing data on various gear and pinion materials and to enlist their co-operation in the study. The committee will appreciate information from any railway men who have had marked success or failure under any conditions of service. In sending information the request is made that details of the material used and the service conditions be given. Such matters as gear ratio, pitch, weight of cars, schedule speed, stops per mile, etc., will be very valuable for purposes of analysis.

When the data have been thoroughly studied the sub-committee will make a report to the equipment committee, but it is hardly probable that there will be any definite recommendation in this year's report. It is expected, however, that very valuable material will be accumulated for the use of future committees.

LIGHTNING PROTECTION

The sub-committee of the committee on equipment which is making studies of lightning protection held a meeting on Wednesday, May 27. It was attended by J. P. Barnes, chairman, Syracuse & Suburban Railroad, Syracuse, N. Y., and D. E. Crouse, Maryland Electric Railways Company, Annapolis, Md. The sub-committee had framed a list of questions designed to bring out current practice in regard to the installation of lightning protective equipment and to learn the results of the use of such equipment. The committee is taking up the question of the interdependence of line protective equipment and car protective equipment. Replies to the questions have been received from 120 companies and these are now being tabulated and the results are being analyzed.

It is interesting to note that of the companies reporting on the matter of car wiring about one-half use conduit. This feature was taken up by the committee with a view to determining the relation of the method of wiring to the effectiveness of the protective equipment. Of those using conduit also, about one-half have trouble from lightning while the other half do not. The committee is also studying the relation of the nature of the soil to lightning troubles.

After the analysis has been conducted far enough to indicate some tendencies, another meeting of the committee will be held and lightning protection specialists from outside the committee will be invited to attend. It is expected that ultimately an ideal set of answers to the committee's questions can be formulated. While this is an unusual form for a committee report, it is expected that it will summarize effectively the result of the canvass and analysis and will make the information readily accessible.

MEETINGS OF COMPANY SECTIONS

The regular monthly meeting of the Denver Tramway Company section was held at the auditorium on May 21. The subject in the evening was "Safety, Its Recognition and Enforcement," by Howard S. Robertson, of the Legal Department. This is the last regular meeting of the present season. At the previous meeting held April 18, Mr. Swift, tramway instructor, gave a talk on "Modern Methods of Instructing Street Railway Employees."

A meeting of the company section of the Washington Railway & Electric Company was held May 18. It was a joint meeting with the commercial department of the Potomac Electric Power Company and partook more of a social than a business character.

The May meeting of the Public Service section, held at Newark, N. J., is reported at length elsewhere in this issue.

NATIONAL EXHIBITION IN SWITZERLAND

The Swiss National Exhibition, which is held in Berne up to Oct. 15, had a brilliant opening on May 15. This is only the third exhibition arranged by Switzerland, the two preceding having been held in Zürich in 1883 and in Geneva in 1896. Among the many exhibits is one of interest to the electric railway industry. In this branch the Swiss Federal Railroads is the largest exhibitor, showing among its rolling stock the first locomotive (now about seventy years old) and the newest and most modern locomotives employed for express trains on the St. Gothard line. The new Lötschberg Railway shows its 2500-hp electric engines, which are the most powerful of their kind in the world. There are also on view railway carriages for invalids, rotary snow plows, mail and luggage vans, and vans for the transport of wine, beer and meat and other perishable articles. An electric railway circulates over the entire exhibition grounds, which comprise an area of 500,000 sq. m.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

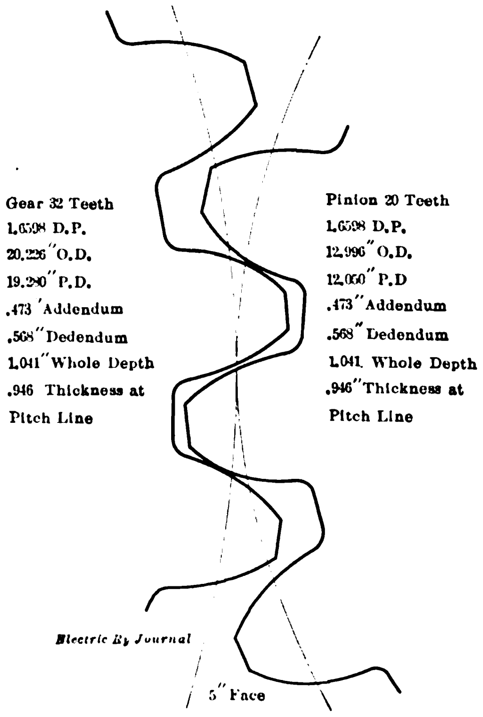
(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

STUB-TOOTH BULL-NOSE GEARS

BY E. F. GOULD, ASSISTANT TO GENERAL MANAGER AND ENGINEER AURORA, ELGIN & CHICAGO RAILROAD COMPANY, WHEATON, ILL.

The train service operated by the Aurora, Elgin & Chicago Railroad on its third-rail line demands high acceleration and high running speeds. The severe operating requirements have made it necessary during the past few years to increase the strength of the gear and pinion teeth in every available way. The type of tooth recently adopted as standard and one which has given excellent results is illustrated.

The rolling stock of this road includes thirty-two four-motor cars, fourteen two-motor cars and ten trail cars. Trains are made up with an average of three motors per car. The motors are the GE-66-B, rated at 125 hp at 500 volts. With 37-in. wheels and full voltage the equipment is geared to about 65 m.p.h. This is a high-speed gear ratio, and as the power feeder conditions are exceptionally good, due to the use of a 100-lb. conductor rail with substations only 8 miles apart, the motor gearing is called upon to transmit relatively large amounts of power during acceleration. During sleet storms, also when collector shoes do not always make continuous contact, exceptional strains are thrown on the gearing.



Tooth Outline of Gear and Pinion for GE-66 Motor

In the development of the present gears the old ratio of 1.6 has not been changed. The first gears used were three pitch, having fifty-eight teeth in the gear, thirty-six teeth in the pinion and a 5-in. face. As traffic developed and the service requirements became more severe, breakage of teeth in these original gears called for a design with a stronger tooth, and accordingly the pitch was changed to 2.489. This gave forty-eight teeth on the gear and thirty teeth on the pinion. Although this latter type gave a larger tooth section trouble from breakage still was experienced.

The latest type of tooth has been in service on a number of cars for a period of nine months and no breakage has occurred. This gearing has a diametral pitch of 1.6589 and has an exceptionally big blunt tooth which is very rugged. The characteristics of the gearing are shown with the outline illustrated herewith. These gears and pinions are made by the Tool Steel Gear & Pinion Company, of Cincinnati.

BINOCULARS TO DETECT LINE TROUBLES

BY C. L. CADLE, ELECTRICAL ENGINEER NEW YORK STATE RAILWAYS

The New York State Railways had much trouble on the Rochester & Eastern transmission line, which parallels the trolley line from Rochester to Geneva, N. Y., a total distance of approximately 40 miles. This line was built in 1903. Our interruptions were caused by all manner of defects. The transmission line is on the top of a 35-ft. pole line, carrying trolley and feed wire. We found that the vibration of the poles due to the cars loosened the pins from the arms and the insulators from the pins. This vibration also had a tendency to loosen the tie wires on the insulator. A great many interruptions occurred because these defects allowed the wires to come off the poles. A very close examination was made by an inspector once each two weeks, but the trouble did not seem to be entirely eliminated.

Later we conceived the idea of using high-powered binoculars. We, therefore, obtained from the Bausch & Lomb Optical Company, Rochester, a number of field glasses. After testing these out, we found that an eight-power glass was by far the most satisfactory. We started the high-tension line inspector over the line and instructed him to use all the time he wanted to locate troubles. He covered the complete inspection in approximately ten days, or about 4 miles per day. With the aid of the glasses he located 161 individual cases which could not have been seen by the naked eye, but which might have caused an interruption in each case. Repairs were completed by March 6, since which date we have not had any interruption due to line trouble. The glasses cost us $45, and we feel that the expenditure has brought to our company the largest interest on any investment that it ever made.

A summary of the defects found are as follows:

Loose sky pins	81
Insulators loose on the pins	34
Loose pins on cross-arms	20
Broken insulator	1
Broken tie wires	2
Broken cross-arm pin	1
Locations where one strand of the wire was broken	16
Locations where two strands of the wire were broken	2
Locations where three strands of the wire were broken	4
Total	161

The cable composing this transmission line is seven-strand aluminum and is giving excellent service with proper care.

SPECIAL WORK SERVICE RECORDS

BY M. BERNARD, ASSISTANT ENGINEER WAY AND STRUCTURE DEPARTMENT BROOKLYN RAPID TRANSIT SYSTEM

Data concerning the performance of special work are very rare. Engineers, as a rule, favor some particular type of manufacture for almost any other reason than the efficiency ratio of that type selected. In order to get an idea of the relative service value of different types of special work in use a comparison of service (not length of service) of a representative number of crossings (90 deg. skew and curved), branch-offs and connecting curves has been made. The reference letters in the accompanying table refer to the four types of manufacture in common use.

The information required was recorded in the form reproduced. The average life in terms of cars operated over each layout for various types of special work was found to be as shown approximately in the table.

M'f'r..	A	B	C	D	Type
Car-life	750,000	1,000,000	1,250,000	1,250,000	90 deg. crossing
Car-life	600,000	1,000,000	1,000,000	1,000,000	Skew crossing
Car-life	750,000	1,250,000	1,250,000	1,250,000	Curved crossing, long rad.
Car-life	1,250,000	2,000,000	2,000,000	2,000,000	Branch-off, long rad.
Car-life	1,750,000	1,500,000	1,500,000	1,500,000	Branch-off, short rad.
Car-life	600,000	1,000,000	1,000,000	1,000,000	Curved crossing, short rad.

The information thus gathered and many personal observations lead to the following conclusions:

The life of crossings, if straight, does not depend on the wear of the rail but on the compactness of the castings and of the joints; the life of curved crossings, however, depends more upon the wearing quality of the rail and of the center than upon the quality of the joints.

Long radius curved crossings last as long as right-angle crossings; their life is a little more than that of skew crossings. This might be attributed to the fact that the resultant of the bearing load is divided into horizontal and vertical moments while that on a straight crossing is only vertical.

The life of a sharp radius crossing is generally much lower than any other type of special work, due probably to the fact that the rails are worn out before the casting is broken up under the impact of the load of the cars. The life of a branch-off with a radius of 100 ft. or thereabout for the curve is generally equal to the life of a 90-deg. crossing. The life of a branch-off with a radius of 40 ft. or thereabout is generally higher than a curved crossing, due probably to the slower moving of cars over branch-offs than over crossings.

Connecting curves, which are to be used for emergency only and which therefore consist of jump frogs, if placed inside the crossing as much as possible appear to strengthen the crossing; the rails of connecting curves so placed seem to act as braces between the rails of the crossing. The scrapping of curved frogs with sharp radius when the casting is still good, because of the gouging out of the rails, would indicate that it would be economical to bring the life of the component rails nearer to the life of the casting proper by using an alloy steel for the rails. The writer concludes from the available data that the present practice of using rail of the same composition for both curved and straight crossings is wrong; it would be better to use, for the former, rails of some alloy-steel, which would bring its wearing value nearer to that of the hardened steel center and thus prolong the life of the special work.

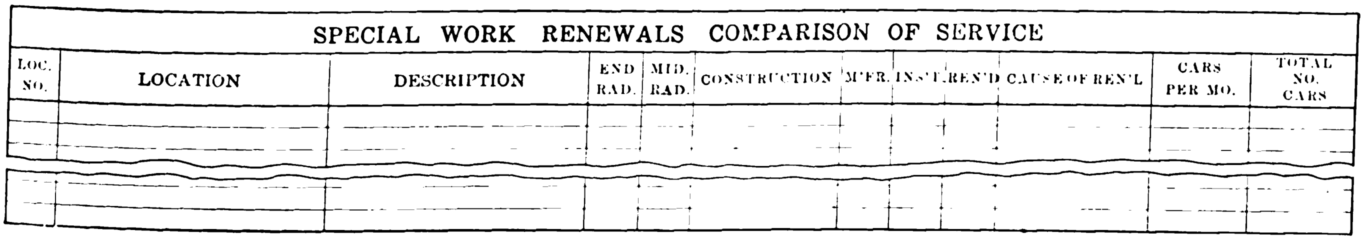
Because of the terrific force of impact exerted by a moving load on the castings of straight crossings, the use of soft steel centers is advocated in place of the hardened steel centers now in universal use. It is the theory of the writer that centers made of medium steel would absorb part of the shock which in the general type of castings is transmitted entire from the hardened steel center to the hardened steel floor, and from this to the binding metal itself. As is well known, cast iron is not a very good shock absorber. If these centers are made of an easily renewable type, such construction should last longer than any other type of crossing. On account of the relative cheapness of the metal the renewal of the centers would be of minor importance from an economic standpoint. The use of bolted joints with reamed holes is also considered important for straight crossings; the numerous "dutchmen" to be found at interior joints of straight crossings prove that ordinary channel bar joints with track bolts are not the correct type for the purpose.

The foregoing comments refer to iron-bound manganese steel center construction only, which is the standard construction on the Brooklyn Rapid Transit System. These centers are specified to be of the renewable type.

NEW CARS FOR OLD IN PITTSBURGH

The Pittsburgh Railways Company has been splicing together pairs of its old 20-ft. car bodies to form center-entrance cars 48 ft. long. The completed cars are equipped with new "low-floor" trucks and motors and with standard Pittsburgh folding doors. With these new features the cars have been made into thoroughly modern equipments. The limited width of 7 ft. 2 in. over all is, however, a somewhat objectionable feature, although the seating capacity of sixty-five passengers would seem to offset this for all practical purposes.

The splicing is effected by running 5-in., 9.75-lb. I-beams between the ends of the three center sills on each old car body, the platforms being removed from both ends of the old cars. In addition two 3-in. x 3-in. x 3/8-in. angles are bolted to the side sills and are bent down to form the edge of an interior step for the 6-ft. well or vestibule at the center of the rebuilt car. A 3/8-in. x 3-in. plate is fastened to each letter board, extending across the well and stiffening the construction. The bulkheads are of course removed from the old car bodies, and extensions are made at the ends to round off the outline of the rebuilt car. The floor of the car is 27 in. above the rail, and it is reached by three steps, the first one being 15 in. from the ground. The interior step to the floor of the well is 10 in., and



SPECIAL WORK RENEWALS COMPARISON OF SERVICE

LOC. NO.	LOCATION	DESCRIPTION	END RAD.	MID. RAD.	CONSTRUCTION	M'FR.	INS'T.	REN'D	CAUSE OF REN'L	CARS PER MO.	TOTAL NO. CARS

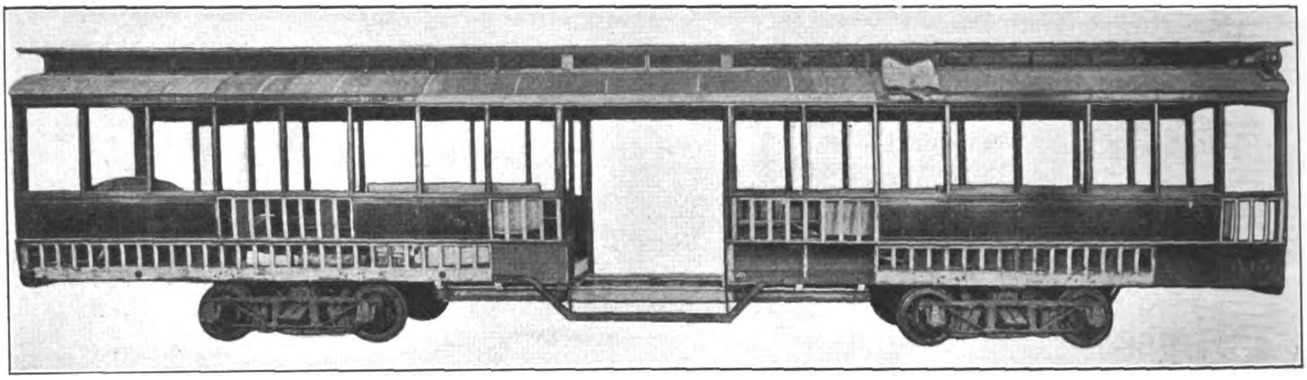
Special Work Record, Brooklyn Rapid Transit System

Electric Ry Journal

the step out of the well is 6 in., the well floor having a ramp of 1 in. toward the center line.

The cost of splicing the old car bodies together and fitting up the doors and end extensions is $400. The electrical equipment and trucks cost about $2,100, making a total cost of $2,500. As there is a salvage value amounting to about $700 on the old motors and truck frames the net cost amounts to only $1,800, although the car when rebuilt appears to be a thoroughly satisfactory, modern, center-entrance car.

The weight complete is 39,350 lb. or about 600 lb. per seat, including two couplers weighing together 1100 lb. The car is, however, operated single end. Three of these rebuilt cars are in operation and one is under construction. Others are to be constructed in the near future for trailer service, thus reducing the investment in electrical equipment, as P. N. Jones, general manager Pittsburgh Railways, considers that this will be preferable, owing to the fact that the spliced bodies, while at present in satisfactory condition, may be subject to more rapid deterioration than would be true of a strictly new car.



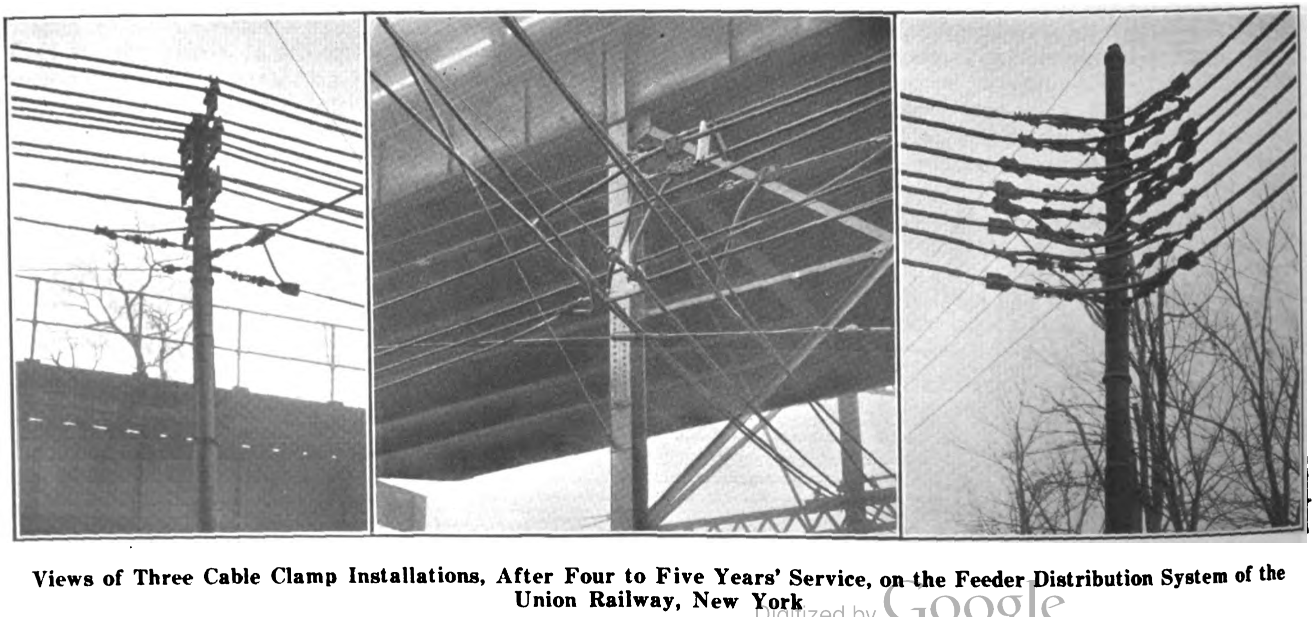
Rebuilt Pittsburgh Cars—Old 20-ft. Car Bodies Spliced Together Ready for Construction of Ends and Application of Center Steps and Doors.

Interesting information and data showing the progress of the wood preserving industry is supplied by the recently issued report of the proceedings of the Tenth Annual Meeting of the American Wood Preservers' Association, held in New Orleans, La., Jan. 20, 21 and 22, 1914. Abstracts of the papers of electric railway interest which were presented at this meeting were published in the ELECTRIC RAILWAY JOURNAL of Feb. 7.

A MAINTENANCE RECORD IN CABLE CLAMPS

During the year 1909-1910 the Union Railway, New York, installed under the direction of James D. Kent, electrical engineer, a large number of Matthews cable clamps as described in the ELECTRIC RAILWAY JOURNAL for July 2, 1910. In order to show how effectively these clamps have done their work a number of photographs were taken of several of these installations a short time ago. While only three of the locations are shown in the accompanying views, it is proper to state that although a total of 500 clamps were installed not one cent has been paid out for their maintenance. This type of construction has been made standard by the Union Railway. In many cases where quick jobs had to be carried out with the intention of keeping the work temporarily, the installations proved so satisfactory that no changes have been made since. A description of the work at the three locations follows.

The installation illustrated in the right view is considered unique on account of the vertical arrangement of the cables on the iron poles, which is somewhat different from the general method of supporting cables on poles. The size of the cables is 500,000 circ. mils. The insulation removed, as shown on the left side of the picture, was not caused by an error in the original cutting of the cable but was due to the fact that when the pole was replaced in 1910 it was not possible to put it on exactly the same spot as the original pole. The bolts and clamps have not rusted, as galvanized clamps were used.



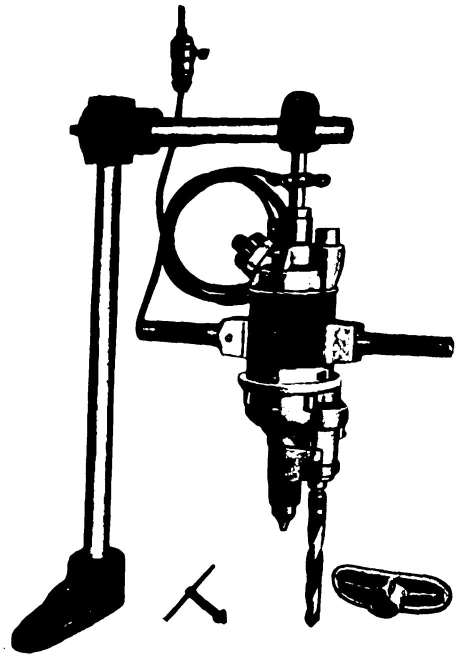
Views of Three Cable Clamp Installations, After Four to Five Years' Service, on the Feeder Distribution System of the Union Railway, New York

The left illustration shows the clamps as used on No. 0000 conductors. On the right side of the view will be seen the right-angle turn which was made without cutting the main cable. The left side of the view shows the use of the cable clamp as a strain clamp for a dead-end tap.

The middle illustration shows a corner turn made in the air with 500,000 circ. mil. cable. The conditions at this point made it impossible to use a pole for this turn. Owing to the great length of the span, 170 ft., it is almost impossible to pull the cables taut enough to support them. This accounts for the presence of the wooden block shown in the view. The installation was considered temporary, yet it has served its purpose to date. This fact certainly speaks well for the holding power of this clamp on so great a span.

A TWO-SPINDLE DRILL

To avoid the need for several sizes of drills in one shop, the Stow Manufacturing Company, Binghamton, N. Y., has brought out the two-spindle drill shown in the accompanying half-tone. This machine will serve for all sizes up to ¾ in. inclusive, and for either straight shanks or Morse taper. The No. 1 spindle runs at 950 r.p.m., is fitted with a Jacobs chuck and takes straight shank work up to ½ in. The No. 2 drill for the larger work is run at 225 r.p.m. The chuck from the smaller spindle can be transferred to the larger one if desired. The machine is especially suited for light tapping, for the tap can be backed out by a simple and easy reversal of the motor. This tool may be operated on either alternating or direct current circuits.

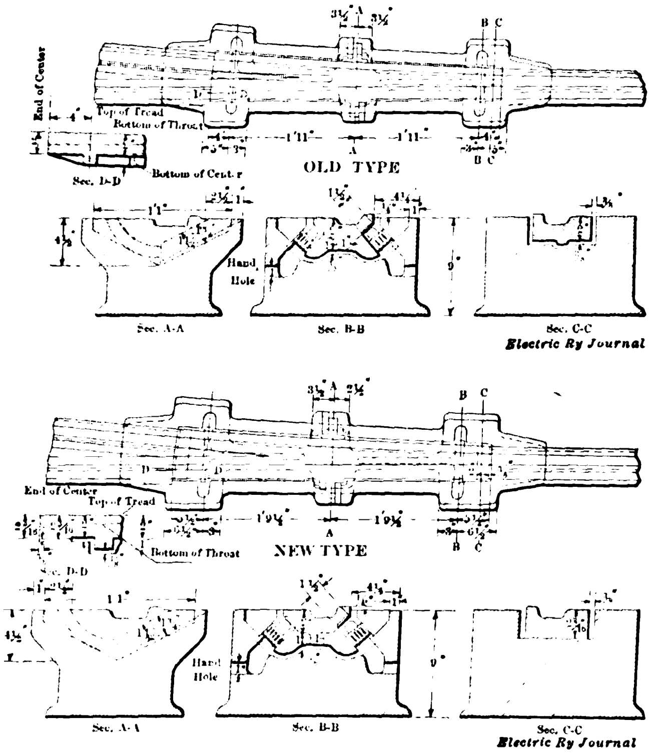


Two-Spindle Drill

The Louisville (Ky.) Railway is engaged on no less than seven extensive pieces of reconstruction work. Main Street is seeing progress made on laying of new track begun a month ago. Two sections on Broadway, one on Fifteenth Street, another on Barret Avenue, another on Madison and some ten blocks on Market Street are undergoing renewal. The work of the company on West Market Street has had to wait the construction of a new trunk sewer and the company faces the prospect for a large part of the coming summer of having to handle traffic on this line over a temporary track and temporary switches.

HARD CENTER MATES WITH SOLID SUPPORT AT ENDS

The accompanying illustrations show both the old and new types of the Pennsylvania Steel Company's iron-bound "Manard" hard center mate, to give the clearest possible idea of the improvements which this company has recently devised in electric railway mate construction. Heretofore, mate centers have been supported throughout the entire length on a bed of spelter. With this kind of support, the pound of heavy traffic tends to force the ends of the center down, and even tends to produce a flat spot on the rails at the run-off end. This condition, of course, should not be allowed in well-maintained track. A comparison of the corresponding sections *C-C* and *D-D* in the accompanying cuts will indicate that a big improvement is made in supporting the ends of the center on the solid iron itself. With this support it is impossible for the center to pound down.



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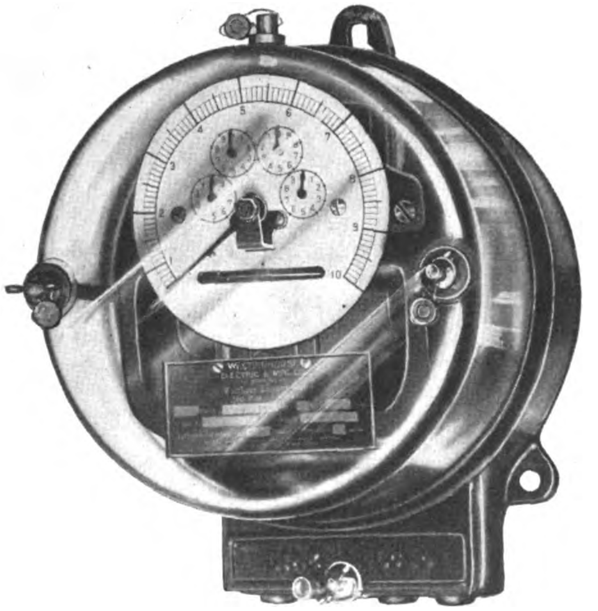
Old and New Types of Hard-Center Mates

Attention is also called to the type of fastenings used with the hard center mates. As indicated in the cut, these consist of rapidly-renewable bolts and nuts at the ends of the center and of the key fastening at the center. It is believed that the combination of the two types is more advantageous than the lone use of either. The use of the renewable bolts at the ends permits the center to be drawn down solidly on the supports. The bolt exerts a much greater downward pull than the wedge-shaped key. At the same time the force exerted by the bolt is applied only at the edge of the center. On the other hand, the wedge-shaped key, when driven, exerts a pull on the center for its full width, wedging the center tightly against the iron, as shown at section *A-A*. This is of distinct advantage, for wheels exert a peening action which tends to stretch the surface of the casting and to make it bow up, convex laterally, away from the spelter. The key fastening counteracts this tendency and holds the center rigid.

In Berlin, Germany, mirrors have been attached to the sides of cars at the height of a passenger's head when standing on the lower step. It is hoped by this means to reduce "run-down" accidents.

WATT-HOUR DEMAND METER

A demand meter, known as Type RO, has been recently placed on the market by the Westinghouse Electric & Manufacturing Company, and is shown in the accompanying illustration. This is a single meter that records without the use of a clock mechanism both the kw-hr consumed and the maximum kilowatt demand, thus providing the readings needed on systems that base their charges on maximum demand and power delivered. Both readings can be taken monthly. The meter records the maximum demand of the connected load but not the time at which the maximum occurs.



Watt-Hour Demand Meter

The maximum demand is indicated by a pointer sweeping over a 4-in. dial, and the watt-hour load is recorded on a four-dial counter.

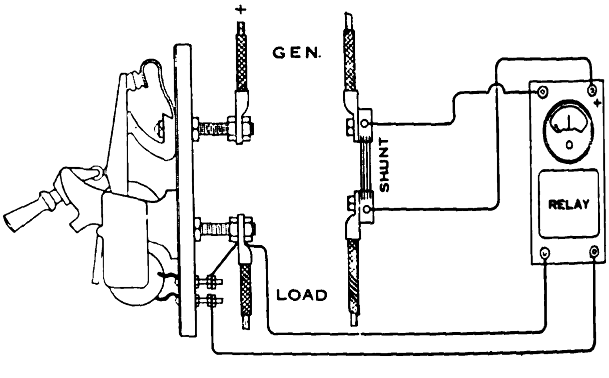
The instrument has no clock, contacts or other delicate parts. It is a combination of an induction watt-hour meter, an induction wattmeter and an escapement form of time element. In addition to the usual watt-hour meter movement, including electromagnet, permanent magnet, and aluminum disk, the instrument contains an auxiliary disk sector supported on a jewel-and-ball bearing so that it can move in the air gap of the electromagnet in such a way that it does not interfere with the accuracy of the main disk, which always rotates at a speed proportional to the load. The rotation of the auxiliary disk is restrained by a spiral spring, making its final deflection proportional to the watt load. The auxiliary disk with its spring and pointer constitute an indicating wattmeter.

The shaft of the auxiliary disk is geared to an escapement wheel, and the claw restricting this wheel is oscillated by an eccentric on the main shaft. The auxiliary disk therefore advances step by step at a speed determined by the speed of the main watt-hour meter disk, that is to say, at a speed proportional to the load. It continues to advance until the spring tension balances the torque produced in the auxiliary disk. The demand mechanism is then in equilibrium and the pointer indicates the watts. As the total deflection and the rate of deflection of the auxiliary disk vary in direct proportion, the time required to reach the maximum position when any constant load is passed through the instrument is a constant. For example, if a load of 500 watts is supplied to a 5-amp 100-volt meter with a fifteen-minute time element, the demand mechanism will reach equilibrium at the 500-watt point in fifteen minutes. If instead a load of 1000 watts is applied to the meter, the demand mechanism will have to move twice as far to the 1000-watt point to reach equilibrium; but the double load will move the watt-hour disk twice as fast, causing the escapement to allow the demand disk to move twice as fast, and it will cover the double arc in the same time.

The auxiliary disk drives the demand pointer through a dog, and a fine-toothed ratchet and pawl holds the demand pointer in the position of maximum deflection, until released by hand. A second ratchet and pawl allows the auxiliary disk to fall back to equilibrium under its spring tension if the load falls below that corresponding to its position at any moment, but prevents it from advancing except as controlled by the escapement as before. The maximum demand pointer can be reset instantly by pressing a sealed button on the top of the cover.

REVERSE CURRENT RELAYS FOR D.C. CIRCUITS

A reverse current relay for d.c. circuits, designed for use in connection with shunt trip circuit-breakers, as shown in the accompanying diagram, has been put on the market by the Roller-Smith Company, New York. The instrument has a platinum contact attached to its needle, which contact co-operates with a similar one carried by an adjustable pilot needle. The circuit established on the engagement of the contacts energizes an electromagnet contained in the rectangular casing mounted below and on the same slate sub-base with the instrument. The electromagnet then establishes whatever external circuit closure the relay is to effect. By connecting the instrument in circuit so that for the normal direction of current flow the needle deflects backward from zero, the trip circuit is maintained open until a reverse current flow occurs, whereupon the circuit-breaker will be opened. As the relay is of the separate shunt type its dimensions are independent of the volume of the current or the capacity of the breaker to be controlled. If ammeters or shunted wattmeters are installed on the circuits to be protected the same shunts serve for the relays. The relay may be mounted on the circuit-breaker board or as far away as desired, since the connections comprise but four small wires.



Reverse-Current Relay Circuit Diagram

The Ohio Brass Company, Mansfield, Ohio, has recently applied for a patent on its style O-B Type X strain insulator. This device is made of high-voltage porcelain, which is denser and stronger than the dry ware commonly used for this class of insulator. Because of its high mechanical strength and long leakage path this insulator is claimed to be ideal for dead ending and guy wire service.

DIFFICULTIES IN THE MANUFACTURE OF MANGANESE STEEL CASTINGS

Since the publication of the article entitled "Chicago's Experience with Solid and Insert Manganese Steel Special Track Work," on page 970 of the ELECTRIC RAILWAY JOURNAL for May 2, 1914, a representative of this paper has had talks with experts prominent in the manufacture of manganese steel. The following statements set forth some of the difficulties experienced in the manufacture of manganese steel castings:

Manganese steel foundry practice is, in many ways, similar to ordinary steel foundry practice, but the successful production of manganese steel castings involves a number of factors, not vital in ordinary work. It is of prime importance, if good results are to be obtained, that attention be given to the excessive shrinkage of manganese steel, in both pattern shop and foundry. From the molten state to the solidified casting, manganese steel shrinks approximately 5/16 in. in 12 in. as against 3/16 in. to ¼ in. in 12 in. in ordinary steel and iron castings. The provision made for shrinkage is not confined to that allowed in the dimensions of the patterns. Careful feeding is necessary to insure proper distribution of the metal in the casting. This is important since the heat treatment and solidification in the mold produce not only internal strains, which must be provided for, but variations in the density of the finished casting also. This variation in density, so serious a fault in the wearing surfaces of track special work, has done much to make many engineers dissatisfied with manganese steel for this purpose. In castings having thin webs it is necessary to increase the feeding sections to at least ¾ sq. in., and in many instances good results necessitate the temporary addition of metal to enable the weak sections to withstand the shrinkage strains.

Other elements entering into the manufacture of manganese steel which may develop critical conditions are the maximum and minimum limits of the manganese content and its relation to the maximum and minimum limits of the carbon content. An ideal average analysis of cast manganese steel is about as follows: Carbon, 1.25 per cent; silicon, 0.30 per cent; manganese, 12.50 per cent; sulphur, less than 0.02 per cent, and phosphorus, about 0.08 per cent.

If the proportion of manganese rises above 14 per cent or falls below 7.5 per cent, the effect of the annealing process on the finished casting is to make it brittle or otherwise undesirable for the uses for which it was designed. When the manganese is 12.5 per cent and the carbon is higher than 1.45 per cent, the annealed casting is too brittle for practical purposes. In order to keep the chemical composition uniform, the content of each heat is limited to about 3 tons.

The proper composition of each heat is obtained by weighing the metal from the primary melting cupolas before it is poured into the converter ladle. The 80 per cent ferro-manganese, with which the steel is alloyed, is melted in crucible furnaces, carefully weighed and placed in the bottom of a converter ladle. To insure accurate proportioning of steel and manganese alloy, the empty ladle is first weighed and afterward the slag skimmed off, and that remaining in the ladle after the metal has all been poured out is also weighed. This procedure results in a chemical composition sufficiently uniform for practical purposes.

The principal difficulty with the finished product seems to be caused not so much from a lack of uniformity in the chemical composition as in a lack of the necessary care in the preparation and feeding of the molds. As the excessive shrinkage makes large gates and risers necessary, the castings must be fed liberally to assure a uniformly dense finished product. The location of the points of feeding, and the thickness of the channels through which the heavier sections are fed have an important relation to the quality of the finished product. Too rapid cooling of thin sections must be prevented as this creates internal stresses and affects the density of the heavier sections, especially when the latter are at the bottom of the mold, as is the ball of the rail in the case of track special work.

When the finished casting is taken from the mold it is very difficult to discover the internal strains and the variations in density of the metal, because the outer surfaces solidify as they come in contact with the mold and mask the internal conditions. The cold rolling and cupping referred to in the discussion of Chicago's experience with manganese steel special work were presumably due to this variation in density. It is probable that the marked cupping at joints and at intersecting acute-angle flangeways was due to low density, in turn chargeable to improper feeding. In many instances track special-work pieces are poured from the

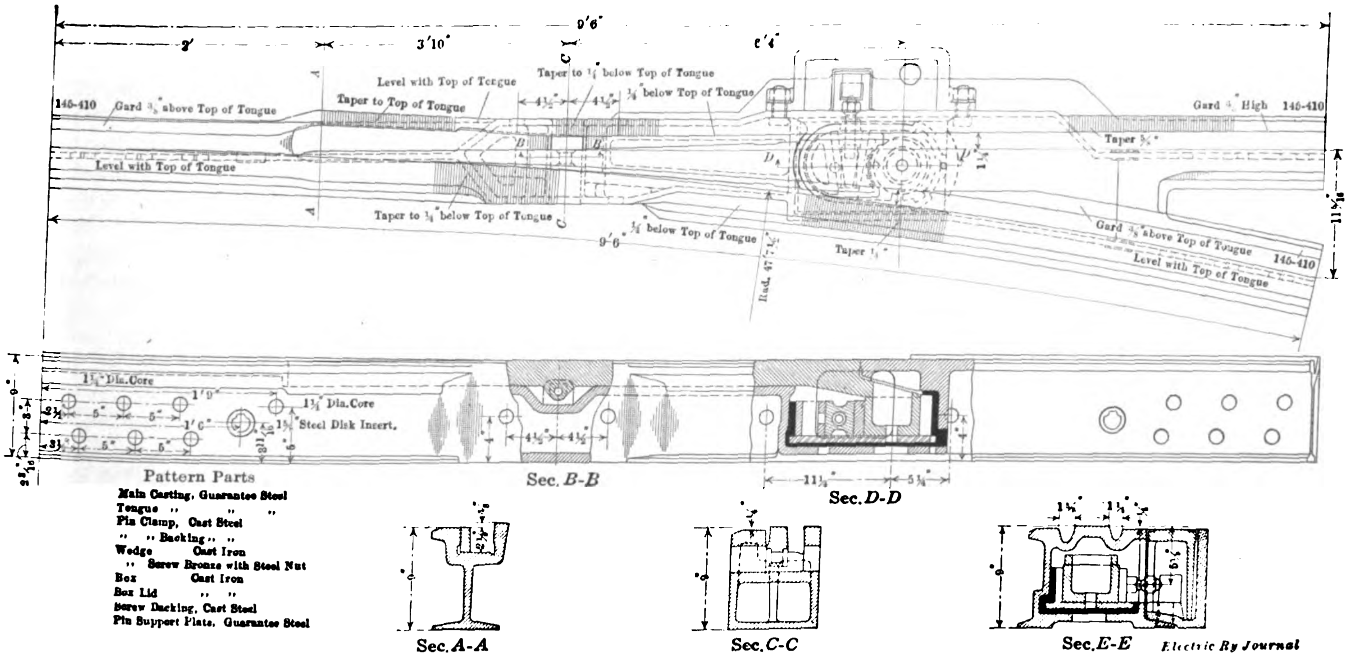

9'6"
2'
3'10"
6'4"
Level with Top of Tongue
Taper to ¼" below Top of Tongue
Taper to Top of Tongue
¼" below Top of Tongue
146-410
Gard ⅜" above Top of Tongue
Gard ⅜" High
Level with Top of Tongue
Taper to ¼" below Top of Tongue
¼" below Top of Tongue
Taper ⅜"
Taper ¼"
Gard ⅜" above Top of Tongue
Level with Top of Tongue
11¼"
Rad. 47'
1¼" Dia. Core
1'9"
1'6"
5"
1¼" Dia. Core
1⅝" Steel Disk Insert.
4½"
Sec. B-B
11¼"
5¼"
Sec. D-D
Pattern Parts
Main Casting, Guarantee Steel
Tongue " " "
Pin Clamp, Cast Steel
" " Backing " "
Wedge Cast Iron
" Screw Bronze with Steel Nut
Box Cast Iron
Box Lid " "
Screw Backing, Cast Steel
Pin Support Plate, Guarantee Steel
Sec. A-A
Sec. C-C
Sec. E-E
Electric Ry Journal

Fig. 1—Example of Solid Base Single and Double Web Support

ends, and the shrinkage strains develop at the gates or risers or else the metal in the finished casting immediately adjoining either the gate or the riser is spongy or not of proper density. Conditions of this kind, it is believed, account in a large measure for pronounced cupping at joints. The effects of the use of too few gates and risers and of improper feeding are similar to those met with in ordinary foundry practice, exaggerated by the excessive shrinkage of manganese steel.

While it is believed that the presence of soft or spongy metal, resulting in cold rolling and serious cupping, is due to improper foundry practice, chipping and crumbling are attributable principally to the annealing and quenching process. All castings, after removal from the molds and cleaning, must be annealed before they are of use for practical purposes. An exception to this rule, however, is in the case of very thin castings which are sufficiently chilled in the molds to become properly tempered. Annealing and quenching make the castings ductile and tough. The temperatures required for the process vary from 1600 to 2200 deg. Fahr., the ideal value being approximately 1800 deg.

All rough castings, as they come from the mold, are placed in annealing ovens, where the temperature is raised to approximately 1800 deg. When all the castings have been uniformly heated they are removed from the oven and immersed in a quenching tank. At this point in the process an opportunity arises for improperly tempering. Particularly in small castings it is possible that the time required to remove them from the annealing oven to the quenching tank may be sufficient to allow the temperature to drop to a value at which the quenching process makes them somewhat brittle.

Depending on the size and character of the castings, which may vary in thickness up to 5½ in., it requires from four to twenty-four hours to accomplish the annealing properly. Even with the most careful annealing, however, it is impossible to eliminate the effect of segregation at intersecting flangeways of solid manganese-steel crossings. Internal stresses and blowholes may also occur at these critical points, thus lowering the elastic limit of the material.

The physical characteristics of good quality manganese steel are similar to those of any high-grade steel, its elastic limit being approximately 58,000 lb. per square inch, the tensile strength, approximately 92,000 lb., the per cent elongation in 2 in., 26.9, and the per cent reduction of area, 27.02. In the early stages of the use of manganese steel for track special work it was believed that advantage could be taken of its excellent physical characteristics and that the sections of metal could be less than those necessary with ordinary steels. This was a mistake, however, as such procedure interfered with successful foundry practice. Recent development along this line has included the limiting of the supporting web thickness to at least ¾ in. In fact, in the standards recently issued by the Manganese Track Society for solid and rail-bound steam railroad frog designs, the limitation of dimensions was the most important factor presented. On the other hand, it is evident from Chicago's experience, that the limiting dimensions are not the only factor responsible for the lack of uniformity in castings. It is believed, however, that if the webs are thickened to a ¾-in. minimum limiting dimension, the foundry operations will be facilitated.

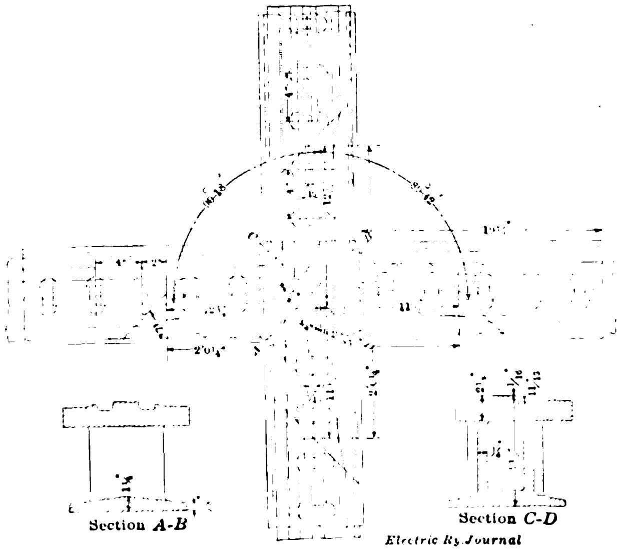


Fig. 2—Solid Base With Double Web Support

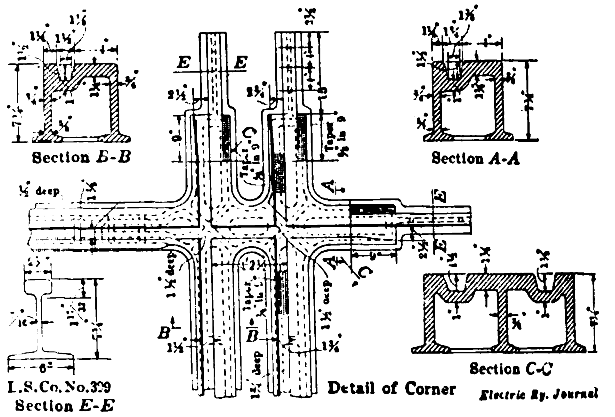


Fig. 3—Channel Web Supported Hard-Center Crossing Installed by Pacific Electric Railway at Los Angeles

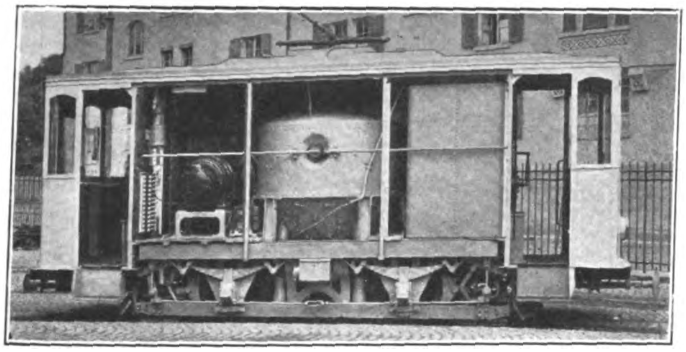
The accompanying figures illustrate some of the important points made in the above paragraph. Fig. 2 is an example of a right-angle crossing, supported as shown in section *C-D*. While the web thickness is here ¾ in., it is believed that internal stresses of a more or less serious nature will develop in the solid base which forms the top of the casting in the mold, unless great care is taken to feed the casting properly. In contrast to this, in Fig. 3 is shown the ideal method of supporting a right-angle intersection. This is the boxed-web-support construction used for three years successfully by the Pacific Electric Railway at Los Angeles, Cal. This boxed-in, supported flangeway type, or channel, construction, was adopted in order to get a more uniform distribution of the metal in the castings and to obviate bending of the castings at the intersections. It was believed that non-uniformity and bending contributed to crystallize the metal, resulting in cracks and breakage. Since the design was changed no breaks have occurred after service of three years, whereas failures had occurred in the unsupported intersections under similar service.

Fig. 1 shows a solid manganese switch of the sections shown at *A-A*, *C-C* and *E-E*. While in actual service this type of construction has proved superior to insert work, evidences of spongy metal or low proper density in the wearing surface have been common in individual pieces. This is principally attributed to the use of the single-web support in portions of the piece, as well as of the completely boxed-in support at other points. Here again the proper feeding of the casting is very important in bringing about satisfactory results. As an aid to improving foundry practice, however, a channel support throughout the casting, with transverse webs, is considered more desirable.

ZURICH SUCTION CAR FOR CLEANING GROOVED RAILS

Since May, 1913, the Zurich Municipal Railways have used the suction type rail cleaning car shown in the accompanying illustrations. The car was furnished by the Vereinigte Isolatorenwerke A-G, Berlin-Pankow, Germany, in accordance with the specifications of the railway. The car is equipped with one pair of scrapers for each direction of running. The scrapers are under the control of the motorman so that the necessary variations in height may be made in clearing special work. The intakes above the scrapers cover the head and groove of the rail so closely that while the suction is powerful enough to take up stones as large as a man's fist it will not disturb loose pavement adjacent. The motor exhauster is operated at 500 volts d.c. with a range in speed of 1150 r.p.m. to 1680 r.p.m., corresponding to outputs of 8½ hp to 16½ hp. The capacity of the dirt tank is about 32½ cu. yd., which is sufficient for a trip of 6 to 6½ miles.

A sprinkler tank of 5 cu. yd. capacity is also provided to prevent dust. The degree of sprinkling is under the control of the motorman. Measuring devices show the amount of water in the tank and the vacuum in the suction system. An electric alarm advises the motorman when the debris tank is full. The traction equipment consists of two 38-hp Oerlikon motors, two controllers with electric braking features, hand brakes and electro-magnetic track brakes. The car carries the dirt some distance out of town, whereas formerly the material was piled up at various places in the streets waiting removal by the street cleaning department.



Side of Rail-Cleaning Car Removed to Show the Mechanism, the Refuse Tank, etc.

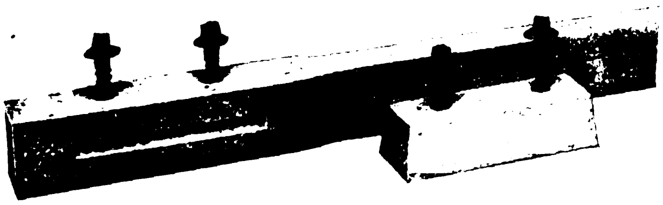
The Zurich system comprises about 48 miles of single track, of which one-third is cared for by this car during a normal working day. As the car is operated at an average speed of 9.3 m.p.h. it does not interfere in any way with the regular passenger service. According to F. Largiader, manager of the system, the total cost of the completely equipped car was approximately $6,600. Its weight when empty is 13 metric tons. Mr. Largiader figures the annual saving at $4,500, after making proper allowance for capital and renewal costs.

C. W. Mallins, general manager Liverpool (Eng.) Corporation Tramways, has prepared a plan for the construction of a system of underground electric railways in Liverpool, estimated to cost $63,310,000. The plan provides for a belt system of tube railways encircling the city by junctions with the overhead railway; for radial lines running through the most populous districts; for an extension of the Mersey Railway to the Haymarket and for railway and general traffic tubes to Birkenhead and Seacombe forming junctions with the Wirral Railway.

REINFORCED CONCRETE TIES AND BLOCK FASTENINGS

Another important step toward more substantial electric railway track construction in both paved and open track is offered by the reinforced concrete tie and block rail fastening designs of the Percival Concrete Tie & Socket Company, Inc., New Orleans, La. In this system the rails are carried on intermediate blocks as well as on ties, with the result that the tie spacing can be made as great as 8 ft. without any likelihood of spread rails.

The block is 12 in. long, 4 in. thick and 3½ in. deep, is reinforced with 1 lb. of wire or miscellaneous steel and weighs 19 lb. Its two metallic non-corrosive sockets are said to be as permanent as the concrete itself. The block is firmly attached to the base of the rail by means of ⅞-in. x 5-in. wide flange head screw spikes. The concrete ties for paved streets are 6 ft. to 7 ft. long. They are 5 in. thick and 3½ in. wide in the center, but for 14 in. at the ends they flare out to a width of 4 in. and a thickness of 5 in. This tie is reinforced with two ⅜-in. x 5½-ft. to 6½-ft. corrugated steel bars, and its total weight is 135 lb.



Reinforced Concrete Tie with Intermediate Block Fastenings to Permit 8 ft. Tie Spacing

For open track construction on interurban lines, bridges and viaducts, a 280-lb. to 300-lb. tie is used. This tie is made with a V-shape center to prevent center binding, and is reinforced with three ½-in. and one ⅞-in. corrugated steel bars which are wired together in the form of a truss. A 2-in. creosoted wood cushion is inserted between the rails and the tie and the rails are secured by a ⅞-in. x 7-in. wide flange head screw spike that passes through the wood cushion into a non-corrosive metallic socket which is imbedded in the concrete tie.

A most valuable feature of this form of reinforced concrete construction is that the ties and blocks may be made by unskilled labor along the right-of-way at whatever shelters the railway stores its equipment. In this form of construction the rails can be held in surface and alignment while the roadbed is under construction. The completed job is a monolith composed of the ties, blocks and of the concrete which was poured around them.

CONVENTION OF THE OKLAHOMA ASSOCIATION

A meeting of the annual convention of the Gas, Electris & Street Railway Association of Oklahoma was held in Oklahoma City May 13 to 15. There was an attendance of about one hundred delegates. The subjects discussed related almost entirely to electric lighting. The officers elected for the ensuing year were: President, George W. Knox, Oklahoma City; vice-presidents, W. J. Dibbins, Guthrie, and H. S. Cooper, Weatherford; secretary-treasurer, Prof. H. V. Bozell, Norman; directors, the officers and Lincoln Beerbower, Enid; C. S. Dawley, Okmulgee, and W. R. Molinard, Oklahoma City.

News of Electric Railways

Council to Get Kansas City Franchise June 1

As a result of recent developments in the Metropolitan Street Railway situation in Kansas City, it is probable that the franchise will go to the City Council about June 1. The grant, it is expected, will be in Council about twenty days before a special election is called for the purpose of having the people vote on it. Several questions were tentatively settled recently. The question of how much the Metropolitan Street Railway should contribute to the cost of the viaducts built by the Terminal Railway is pending. The receivers for the company agreed to pay one-third of the cost, in lieu of one-half, as provided for originally. This settlement, however, is not satisfactory to the city representatives and probably will be decided by the courts. Fares for adults will continue at 5 cents. Six tickets for a quarter is the rate probable for all children more than seven years old and less than fourteen years. Children under seven will ride free, according to present indications. The sentiment of the conferees was that service is the paramount question at present and that reduced fares for adults must come later, if at all.

The labor question was discussed and the following clause adopted: "In the employment of its servants the company shall not discriminate either in favor of or against any one because of his affiliations with labor organizations. This clause may be enforced in any appropriate proceedings by any person affected."

Consideration of extensions brought delegations from all sections of the city. If the franchise is awarded to the company the following extensions, aggregating 15.71 miles, will be constructed:

Twenty-fourth, Brighton to Hardesty	.50
Broadway, Fourteenth to Twenty-fourth	1.80
Brooklyn, Thirty-ninth to Forty-third	1.00
McGee Street, Nineteenth to Twenty-fourth	1.07
Prospect, Fifteenth to Independence, to Chestnut to Lexington	2.22
Main Street, Nineteenth to Twenty-seventh	1.52
Station Plaza, Main to Broadway	.54
Twenty-fifth, Broadway to Summit	.46
Broadway, Twenty-fourth to Twenty-fifth	.16
Mail spur	.14
Twenty-fourth Street, Main to McGee	.38
Woodland Avenue, Missouri to Tenth	.50
Blue Valley line, Fifteenth to St. John, Belmont, single track	1.45
Indiana Avenue, Thirty-sixth to Forty-third	.875
Thirty-first, Indiana to Jackson	2.00
Jackson to Raytown Road, single track	.233
Twenty-fifth, Troost to Grand Avenue, single track	.611
Brooklyn Avenue, Forty-third to Forty-fourth	.250
Total	15.71

The methods of handling interurban traffic into Kansas City also provided much discussion, without any definite agreement as yet. Mayor Jost's plan was to authorize some private corporation, or some company as yet non-existent, to build a central interurban depot, without designating the location. The interurban representatives opposed the plan until the location should be decided. The interurbans, it was decided, should charge a 5-cent fare in Kansas City, all of this to go to the Metropolitan Street Railway. If a company other than the Metropolitan Street Railway builds the interurban depot, this company will receive 1 cent of this 5-cent fare.

The kind of cars to be operated by the interurban railways also caused some friction. Representatives of these companies objected to the specifications contained in the franchise, while the city representatives refused to allow the interurbans to use their own discretion in constructing or operating cars. A committee of three men, representing the Metropolitan Street Railway, the interurban railways and the city, finally was appointed to decide this question. The attitude of the interurban railways was that the kind of cars operated should be left to the Missouri State Public Utilities Commission. It was definitely decided that interurbans shall carry only passengers whose destinations are outside of the city limits. In exchange for the concession of the 1 cent of the fare the interurbans have received up to the present, the Metropolitan Street Railway will take entire charge of interurban cars entering the city and will be liable for damages of any kind which arise from their operation.

Robert P. Wood, electric railway engineer, will succeed L. R. Ash on the city board of control to be named under the proposed franchise for the Metropolitan Street Railway.

Toledo Franchise Committee Reports

At a meeting of the Toledo City Council on the evening of May 25, the special franchise committee reported its failure to reach an agreement with the Toledo Railways & Light Company on the rate of fare. Henry L. Doherty, the report stated, has steadfastly refused to accept a fixed rate of fare of 3 cents for the entire period of the franchise and has insisted upon the plan of operating for one year at that rate with a provision for a readjustment at the end of each five-year period thereafter. The committee stated its reasons for insisting upon a 3-cent fare for the full twenty-five-year period as follows:

"First. The proposed 3-cent fare for one year would not afford a practical test of such a rate of fare, for the reason that the contemplated new rearranged street-railway system, including the elimination of competing lines and the completion of the cross-town lines and needed extensions of various lines, which would greatly reduce the cost of operation and the handling of business would not be completed and in operation. Without this no actual and practical test could be made.

"Second. At this time the city is dealing with a company operating practically all its lines by sufferance and can continue to operate its lines only with the consent or indulgence of the city, whereas a year hence, under the company's proposal, the city would then be dealing with a company vested with and enjoying all the rights and privileges of a franchise, clothed with the right to appeal to any jurisdictional court to determine and fix the fare for any subsequent five-year-period, if the fare which Council should fix should prove unsatisfactory to the company, and thus place the responsibility and right of fixing fare entirely in the hands of the company, leaving the city powerless to protect itself. The company, in attempting to meet this objection of the committee, suggested a referendum vote to the people on the rate of fare ordinance whenever adopted by the Council, but this would not protect the carriers should the company wish to go into court and have the court determine, from the company's books and the company's own method of charging up expense, what the rate of fare should be.

"Third. The committee further rejected the company's proposal on the fare question, because it would keep the franchise question constantly in politics and induce the company to become an active and probably a controlling factor in the election of councilmen, especially in the years of a revision of the fare.

"Fourth. At the present time the company is operating without any substantial franchise rights, thus placing the city in the most favored position to deal with the company in exercising authority and judgment in determining the terms and conditions of a franchise to be granted the company, and therefore the committee considers the existing conditions under which to determine the fare question better than to postpone such an important question to a date when the company would be vested with the full franchise privileges, which would necessarily place a great handicap upon the power and authority of the city to deal with the question."

Some of the concessions made by the committee were enumerated and it was stated that these steps were taken on the assumption that the low fare would follow. Special stress was placed upon the right to be granted to the company to carry freight over the city lines between the hours of midnight and 5 a. m. and the authority to make such contracts with the interurban railways as seemed best to the management.

It was finally agreed that the Council should resolve itself into a committee of the whole to consider the franchise question further and that negotiations should be resumed if possible. The special franchise committee will be retained to take up any new questions that may arise in connection with the matter.

The first meeting of the Council committee of the whole took place on the following evening, with Vice-Mayor Hassenzahl in the chair. Many phases of the street railway question were dismissed, although a resolution was adopted in the beginning to confine the discussion to the rate of fare. The session ended with a promise from the president to call another meeting on the evening of May 28.

At the meeting on May 26 it was announced that H. W. Jones, Cleveland, representing local and foreign capital, was prepared to enter a bid for a franchise on the basis of 3-cent fare. It is understood that A. K. Detwiler, Toledo, is to head the group represented by Mr. Jones. Mr. Detwiler qualified this by stating that he was arranging his affairs so as to retire from active business, but that he would probably be willing to join a syndicate for this purpose.

Henry L. Doherty was the first speaker at this meeting. He reviewed the work done by the franchise committee and representatives of the company and referred to the necessity of having an agreement on all other questions first, if the city insists upon a fixed fare for the franchise period. The only source of increased revenue to be found in the concessions of the franchise committee of the Council was the right to carry freight at night. The return this privilege would yield was uncertain. The tendency under it would be to bring factories into the city rather than for them to locate along the railroad lines in order to secure freight facilities. Mr. Doherty said that asking for 3-cent fare with the city in control of operation, the committee sought to impose a condition that has not been exacted anywhere else in the United States. He further expressed the belief that the people wanted good service. If they could have it at a fare of 3 cents, they would be pleased, but if not, they were willing to pay more. Speaking further on the question, he said:

"If we accept a fixed 3-cent rate and service is placed in control of the city, we will not be able to borrow money to build crosstown lines and make improvements, because people will not lend money on a thing not proved possible. Under our ordinance we will be able to get this money and you will get 3-cent fare, if additional revenue makes it possible."

It is possible that the company will abandon its plan of carrying people free when they refuse to pay the old rate of fare. Only the rougher element is taking advantage of the free rides now. Considerable disorder is created by hoodlums, especially on Sundays. Conditions at Walbridge Park last Sunday are said to have been particularly bad.

Mr. Doherty says that the steps taken recently indicate that negotiations will now proceed with the Council as a committee of the whole in much the same way as with the special committee, but with the rate of fare as the principal topic.

The publicity forum being conducted by the company, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL, was resorted to by it "so the people may know and then judge for yourself." In opening the forum the company said that it "hoped to demonstrate that this method can be used to bring about the best solution of every problem which the future holds for Toledo." In all its advertisements the company asked for letters of criticism of its franchise proposal and not for letters of commendation, but in spite of this less than 10 per cent of the great volume of letters that has poured in to the company have been letters of criticism.

The company published the proposed ordinance in full and then invited criticism, offering prizes for the best statement of objections. In announcing the plan for the forum the company said that the first thing that confronted it was to find a plan that would insure both good service and low fares. The second was the matter of determining what the public wanted as to service and fares. Good service could not be had at the lowest possible fare nor could the lowest possible fare be had with the best service. The real object was to determine the relation between fares and service that would suit the people best. And so the company has since been answering in full page advertisements in the papers the criticisms leveled at it.

It is quite impossible fairly to convey a general idea of the lines which the critics have followed. They have directed their darts from all angles. Even the few scurrilous attacks have been met by the company. It was no doubt a rude shock to one man who attacked the company without reason to have his letter reprinted in full. In this particular case the company expressed its wonder at the number of people in Toledo who were likely to be led and influenced by men of the character of the writer.

On May 22 the company answered an editorial in the *News-Bee*, which has been hostile to the company's proposition from the start. The company reproduced at the side of its answer to this criticism the masthead of the *News-Bee* and the editorial in question, together with other editorial matter of no bearing on the franchise situation. This editorial went on to say that the question of fare was a big thing to guess on. It quoted the varying rates of fare in Cleveland, Columbus, Detroit and Cincinnati and asked: "Who is wise enough to make terms that will be equitable for twenty-five years." The editorial plainly indicated the influence for good which the company's campaign has exerted even on the editor of a hostile paper, and Mr. Doherty said as much in his reply. Mr. Doherty said that he had always contended that the city officials had no way of knowing what the correct rate of fare should be. He then proceeded to show that the plan which he advocated provided for periodic fare adjustments and that the control of service determined in a large measure what the rate of fare should be.

The Dublin Strike

At the recent general meeting of the shareholders of the Dublin (Ireland) United Tramways William M. Murphy, chairman, presiding, reviewed the story of the Larkinite effort last year to bring about a strike on the company's system at a time when the Syndicalist conspirators believed they could accomplish the greatest amount of injury to the company's service and inflict a maximum of discomfort and annoyance on the general public. Owing to the combined troubles arising from the strike movements in Dublin the total receipts in 1913, as compared with those in 1912, were reduced by £21,099 16s. 11d., the company having had to work under abnormally difficult conditions for about four months of the year. The chairman recalled the speech he delivered to the men in the company's service on July 19 last before Larkin delivered his "word of command" for a strike. On that occasion the chairman warned the men that if such a strike were attempted it would prove "Larkin's Waterloo." Mr. Murphy said that every warning he gave the men that night came literally true. Continuing he said:

"Though the company was amply provided with men after the first few weeks to carry on its full services, it was some time before the cars could be safely run when it became dark, and a good deal of the loss in receipts was due to this cause. The general strikes and unrest added greatly to our losses, which are probably twice as much as if the disturbance had been confined to the tramways alone. However, the result was worth all the sacrifice forced on the company. It has proved in a most striking manner the impossibility of Syndicalism succeeding under any circumstances if it is boldly grappled with. In this case there were unstinted monetary and food supplies from the organized workers of an industrial country with a population of 40,000,000 of people supporting a Syndicalist movement confined to Dublin in a fight against a handful of employers, and yet the Syndicalists failed.

"The net result of Larkinism during the last six months is that, after keeping this city in a state of turmoil and disturbance and nearly ruining its trade, there is not a single working man or woman in Dublin whose wages or conditions of employment have been improved in the least degree. So far from bringing any benefit to the working men, Larkin's campaign has brought nothing but untold misery on them and their families.

"I have no feeling of triumph over the utter defeat of the disruptionists, but I have the greatest commiseration for the victims of Mr. Larkin's ambition and their own folly. I get letters every day of the most pitiable character from men whom we should have readily re-employed if they applied in time, but who delayed so long that their places were filled and their names can now only be put on a waiting list.

"Though we have gone through such a trying time I have some satisfaction in the belief that it will be many a day before another strike takes place in this company. This consideration, however, will not prevent the directors from always giving sympathetic consideration to the just claims of their employees."

Mr. Mellen's Testimony Concluded

When the inquiry into the affairs of the New York, New Haven & Hartford Railroad was resumed on May 21 before the Interstate Commerce Commission Charles S. Mellen, former president of the company, was questioned by Mr. Folk in regard to the details of the purchase of the electric railways in Rhode Island. Mr. Mellen said that the New Haven did not want to buy the lines in Connecticut controlled by the interests identified with the United Gas Improvement Company, but that it did want to buy the lines in Rhode Island controlled by these interests. The lines in Connecticut were at Bridgeport and Waterbury, more than 100 miles from the lines in Rhode Island.

The negotiations for the purchase of the properties after being suspended were resumed at the instance of Senator Aldrich of Rhode Island. The New Haven finally purchased from the United Gas Improvement interests for $250 a share about $8,000,000 of the stock of the Rhode Island Company, the entire capital stock of which was originally owned by the Providence Securities Company. Previous to putting through this deal the New Haven had secured by purchase 25 or 30 per cent of the securities of the United Traction & Electric Company which owned all the principal companies in Providence and leased them to the Rhode Island Company. Mr. Mellen said that this was a very involved transaction and "enough to give a man a headache to think of it." Under the agreement with the owners of the Rhode Island Company they were to assess themselves so as to leave $1,200,000 of cash in the treasury out of which the New Haven was from time to time to meet the assumed or estimated deficit. This was absorbed at the end of half a year instead of five years. Mr. Mellen estimated the cash deficit of the Rhode Island trolleys since their purchase eight years ago by the New Haven to be approximately $2,500,000, or about $300,000 a year.

In attempting to acquire all of the electric railways in Rhode Island, Mr. Mellen was trying to obtain control of the trolleys contiguous to the lines of the New Haven Railroad. He believed that the railroads were going to be operated by electricity and that great economies could be worked by erecting large power houses to furnish electricity for both systems of transportation, meaning those already conducted by electricity and those conducted by steam. The two systems of transportation were closely related and should be supplementary, and not competitive. The electric railways took from the railroads a certain class of business that was unprofitable to the railroads. Mr. Mellen was confident that he was right, but he was opposed by the public because of the fear that too much power would be put into one man's hands and the public be injured. In this respect the public was acting against its own best interests.

According to Mr. Mellen the cost of separate units in a large system was not material. It was the aggregate cost per mile on the whole proposition when completed that should be looked at. If authority and economy were to be had the control of the transportation systems in the United States must be in large units such as was contemplated in New England or the inevitable result would be control by the government. Mr. Mellen thought that he had been working toward government control, perhaps unconsciously. It would not be good from the public standpoint for one railroad to own stock in another except by authority of some public body after an investigation and determination of the public interest.

Mr. Mellen thought the first electric railway which the New Haven company bought in Massachusetts was the Worcester & Southbridge in 1904. The road was then in the hands of a receiver. After that the company bought the Springfield Street Railway. It then built the link connecting the Worcester & Southbridge line with the Springfield system. The railway system in Worcester was next taken over. The purchase of the Berkshire Street Railway followed this. These lines comprised the electric railway systems acquired by the New Haven Railroad up to the time of the decision of the Massachusetts court. They were all held by the Connecticut Voluntary Association. This association had $4,000,000 of preferred stock and $100,000 of common. The $4,000,000 of preferred stock elected three trustees and the $100,000 of common stock elected four trustees. In this way the New Haven elected four of the seven trustees and so controlled the property. Mr. Mellen said that he controlled the Connecticut Voluntary Association personally, notwithstanding the decision of the Supreme Court of Massachusetts. Mr. Mellen affirmed that his ultimate aim in bringing about all these consolidations was better service at lower rates. He believed the public was better served by a monopoly of transportation than in any other way. The only thing necessary in case there was oppression was action by the government.

Mr. Mellen tried to keep clear of the legislators. He said there was not half the attempt on the part of railroad people to control legislation and to have relations with the members of the elected legislatures that there was on the part of the members of the elected legislatures to have relations with the railway officials. The rest of the testimony on May 21 had to do largely with the New Haven maritime transactions.

The examination of Mr. Mellen was concluded on May 22. He told first about the financing of the Tarrytown, White Plains & Mamaroneck Electric Railway. The New Haven acquired this property for $953,000. Much of the purchase price represented franchise value, and while the road had been piling up a deficit yearly its future possibilities were excellent. In acquiring the electric railways at Worcester Mr. Mellen thought that $10 a share more was paid to William A. Read & Company for their holdings in the company than was paid for the holdings of others in the company. Mr. Mellen referred to this deal as a "hold-up." During his testimony in regard to the purchase of the electric railways Mr. Mellen said that sometimes he went to bed at night and thought over the things that might have come out at the investigation and did not and that he sighed and turned over and was glad these things did not come out.

The Interstate Commerce Commission on May 26 postponed its further examination into the affairs of the New York, New Haven & Hartford Railroad until June 3. In the meantime Commissioner McChord says the books of J. P. Morgan & Company and personal papers of the late J. P. Morgan will be inspected in behalf of the commission. Commissioner McChord has accepted the offer of Lewis Cass Ledyard to testify without immunity.

William A. Read & Company have issued a statement in regard to the Worcester purchase in part as follows:

"We and our clients, who are large holders of Worcester Railway & Investment Company stock, declined the offer of $105 a share made to all holders of the stock at the time that the New Haven road purchased the majority of the stock. Several years later, when the New Haven road introduced a bill in the Massachusetts Legislature to permit that road to own the Massachusetts electric railways we notified the company, through counsel, that we intended to oppose this bill, because it would be detrimental, in our judgment, to the interest of the minority stockholders. We were advised by counsel that the proposed legislation was unconstitutional and we proposed to oppose it upon that ground. Thereupon the New Haven road agreed that if we would withdraw our opposition to the proposed legislation, they would purchase our stock at the price which had been paid several years before to other stockholders, plus the interest which had accrued in the meantime—equivalent to about $115 a share. This agreement was made, but the transaction never went through."

Underground Railway Resolution Adopted in Detroit

The Detroit Street Railway Commission has adopted the following resolution:

"*Resolved*—That the officers of this board be instructed to proceed at once with all steps necessary to the preparation of plans for a subway system in Woodward Avenue from Jefferson Avenue to Milwaukee Avenue, in Michigan Avenue west to Junction Avenue, and in Gratiot Avenue east to Chene Street, to connect with the workingmen's belt line now in course of construction, and be it further

"*Resolved*—That such subway be constructed by the city of Detroit and placed in operation as soon as possible."

The board has instructed Secretary Jay G. Hayden to prepare a communication to the Common Council, asking that body's approval of the plans for the system. Another resolution which has been adopted directs the officers of the commission to locate at once a site for a municipal power house to generate electricity for the municipal subway lines.

Contracts for Construction of East River Tunnels

Bids for the construction of the most important contracts of the dual system of rapid transit were opened by the Public Service Commission for the First District of New York during the week ended May 23. These were for the two East River tunnels from downtown Manhattan to Brooklyn. One is for operation by the New York Municipal Railway Corporation and the other for operation by the Interborough Rapid Transit Company. The former runs from Whitehall Street, Manhattan, to Montague Street, Brooklyn, and will connect the Broadway subway in Manhattan with the Fourth Avenue subway in Brooklyn. The latter runs from Old Slip, Manhattan, to Clark Street, Brooklyn, and will connect the Seventh Avenue subway in Manhattan with the existing subway in Brooklyn. Seven bidders filed proposals, five of them bidding for both tunnels. The lowest bid was that of Booth & Flinn, Ltd., and the O'Rourke Engineering Construction Company, who offered to construct both tunnels for about $12,444,725. On May 27 they were awarded the contract by the commission. The next lowest bidder was the Holbrook, Cabot & Rollins Corporation, which offered to build both tunnels for about $12,677,000. The other bidders were the Degnon Contracting Company, Smith, Hauser & McIsaac, the Rapid Transit Subway Construction Company, the Oscar Daniels Company, all of New York City, and the Keystone State Construction Company and Paul G. Brown, Philadelphia, Pa.

The commission has awarded the contract for the construction of Section No. 2 of Routes Nos. 4 and 36, the Broadway subway in Manhattan, to the U. S. Realty & Improvement Company, for $2,657,004. This is that part of the Broadway subway lying between Twenty-sixth and Thirty-eighth Streets, and includes a local station at Twenty-eighth Street and an express station at Thirty-fourth Street. The line, which will be operated by the New York Municipal Railway Corporation, is already under construction south of Twenty-sixth Street.

During the week ended May 23 the commission opened bids for the work of installing the tracks in the Fourth Avenue subway in Brooklyn. On the official totals the Thomas Crimmins Contracting Company was the lowest bidder, at $212,880.

The commission has adopted the form of contract for the construction of Section No. 1 of Route No. 12, and has authorized the chairman and secretary to advertise for bids thereunder, to be opened on June 16. Route No. 12 is the Eastern Parkway subway, and Section No. 1 begins at the present terminus of the existing subway, at Atlantic and Flatbush Avenues, Brooklyn, and runs thence under Flatbush Avenue to a point about 274 ft. southeast of St. Marks Avenue, where it joins Section No. 1-A, the contract for which has already been awarded.

The commission has adopted the form of contract for the construction of Section No. 7 of Route No. 5, the Lexington Avenue subway in Manhattan, and has authorized the chairman and secretary to advertise for bids thereunder, to be opened on June 12. Section No. 7 begins near the southerly line of Forty-third Street and extends northerly under Lexington Avenue to a point about 50 ft. north of the center line of Fifty-third Street. North of the latter point the Lexington Avenue subway is entirely under contract.

The contract for the construction of Section No. 6-A of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan, has been awarded to the Holbrook, Cabot & Rollins Corporation, at $421,566. This section covers the connection between the new Seventh Avenue subway and the existing subway at Times Square. The Commission advertised for bids twice for this section. The first bids were opened in March, when the Oscar Daniels Company was the lowest bidder, at $304,316. After those bids were received the Interborough Rapid Transit Company protested against the award of the contract to the Daniels Company, on the ground that it had not a proper conception of the work and had not allowed a sufficient amount for the protection of the traffic in the existing subway. In the first bidding the Rapid Transit Subway Construction Company, which is owned by the Interborough Company, the lessee of the subway, was the third bidder. Bids were opened again on May 13 last, when the Holbrook, Cabot & Rollins Corporation was the lowest and the Rapid Transit Subway Construction Company the next bidder. Following the opening of these bids the Interborough Company again protested against the award of the contract to the Holbrook, Cabot & Rollins Corporation for the same reasons as advanced against the Oscar Daniels Company. The commission conferred with all parties in interest, and then decided to award the contract to the Holbrook, Cabot & Rollins Corporation.

On May 27 the commission also awarded the contract for the construction of Section 2 of Route 20, which is a part of the Canal Street crosstown subway in Manhattan to the Underpinning & Foundation Company, the lowest bidder at $1,822,994. This section will connect the Fourth Avenue subway tracks on the Manhattan Bridge with the Broadway subway and will be operated as a part of the Brooklyn Rapid Transit system. There will be a station extending from Centre Street nearly to Broadway.

Mayor Dahlman on the Omaha Low-Fare Ordinance

Mayor Dahlman of Omaha, Neb., was quoted as follows recently in regard to the injunction secured by the Omaha & Council Bluffs Street Railway restraining the city from enforcing the ordinance requiring the Omaha & Council Bluffs Street Railway to sell seven tickets for 25 cents recently voted on under the initiative and referendum law:

"I am not in sympathy with these socialists or others who seek to reduce the fares charged by the company. In the first place, I do not believe that seven fares for a quarter can be established as a fair rate, sufficient to give the company a fair return upon its investment. I think any money spent to uphold that ordinance is so much money wasted. In any case, I am not in favor of lower fares. As I see it, many fares are paid by transients. If the company is making an excessive profit, the thing to do is to levy a higher occupation tax. Let the company collect the 5-cent fare from all its patrons, transients and citizens, and then we will collect the excess profit in the form of an occupation tax. My own interest in this seven-for a quarter case was to affirm the city's right to regulate the company. I am not in favor of having the power to regulate given to a board at Lincoln. The city should have the right and the court has said we've got it. That's all I care to say about the seven for a quarter case."

H. T. Clarke, Jr., chairman of the Nebraska State Railway Commission, in referring to the possible valuation of the property of the company by the commission, said:

"If the court grants our right to value the property of the company we will not hesitate in going about it at once. It is the only property in the State that we believe we have a right to value, upon which we have no figures in our records."

Philadelphia Transit Agreement Submitted

A. Merritt Taylor, head of the department of city transit of Philadelphia, Pa., submitted the agreement upon transportation improvements in Philadelphia at a conference on May 27 of the Council committee and a meeting of the directors of the Philadelphia Rapid Transit Company. Mr. Taylor also made public the terms of the tentative agreement between the city and the company under the proposed contract for a modern high-speed system of subway and elevated lines. The program provides for the expenditure of $63,000,000. As summarized in the Philadelphia *Ledger* of May 28 the agreement provides for the construction and ownership by the city of the Darby and Frankford extensions of the Market Street elevated and the Broad Street subway. These lines are to be equipped and operated by the company. In addition, a tunnel under the Delaware to Camden is to be built by the holders of the franchise and leased to the Philadelphia Rapid Transit Company, which will operate it in connection with the Market Street service, but with an additional fare of three cents.

This contemplates an outlay by the company of about $12,000,000 and by the city of about $45,500,000. From the net earnings of the high-speed lines there will be deducted certain preferential payments, namely, an amount equal to 6 per cent on the company's investment for equipment, and after ten years a further 1 per cent to go into a sinking fund to extinguish the cost of this equipment, the payments to cease on the extinguishment of the debt; also a carefully guarded payment to reimburse the company for any falling off in the net income of the present system due to the diversion of traffic to the city-owned high-speed lines. After these deductions, the city will receive its interest and sinking fund accruals, and any surplus will be divided between the city and the company in proportion to their relative investments therein.

The next important point is the abolition of exchange tickets and the establishment of practically universal free transfers between the surface lines and between the surface and high-speed lines, the design being to enable a passenger to make a forward journey between any two points in the city for 5 cents, fares involving transfers from city-owned to company-owned lines and vice versa to be divided half and half. The elimination of exchange tickets is to be effected on Jan. 1, 1916, in all excepting the "delivery district," that is, between Arch and Walnut Streets, and the Delaware and Schuylkill Rivers; and in the entire city on Jan. 1, 1920.

Future extensions are provided for by an agreement that the company is to equip and operate the Chestnut Street subway for the service of the Darby line when the overcrowding of the Market Street lines makes the construction of that subway a necessity, and the city is to have the right to require the equipment and operation on the above basis of any other rapid transit lines which the city may build, and to require the extension of surface lines. The Public Service Commission is made the arbitrator to decide whether such extensions as the city may order are likely to be reasonably remunerative.

For the facilitation of the plans the contract of 1907 is to be extended seven years; all dividends accrued on Rapid Transit stock up to Dec. 31, 1914, under the terms of that contract, are to be waived and canceled (they will amount to about $12,000,000), and the city in turn is to surrender to the company the accrual in sinking fund and permit the company to postpone payments to the sinking fund for ten years, the amount so surrendered and postponed to be made up by such larger payments after the ten years as will be required to produce the full amount in the sinking fund at the expiration of the extended contract. Further, the city is to relieve the company of the payment of tax on dividends, approximately $116,000 a year, for six years beginning Jan. 1, 1915.

The company is to have the privilege of re-routing its lines to enable it to take advantage of the economies that can be gained from the substitution of free transfers for exchange tickets; and the city is to have free access at all times to the books and accounts of the company and the right to audit the same. For the advantage of the abolition of exchange tickets the city pays about $700,000 in all.

Municipal Line Opened in Seattle.—Operation of the first division of Seattle's municipal railway system was begun on May 23. The line extends from the business part of the city to Ballard, a manufacturing district 4 miles south. Twenty-five tickets are sold for a dollar, but the cash fare is 5 cents. As noted previously in the ELECTRIC RAILWAY JOURNAL the city is negotiating for the purchase of the Seattle, Renton & Southern Railroad, which connects with the line that has just been opened.

Proposal for Elevated Road in Los Angeles.—The Board of Public Utilities of Los Angeles, Cal., has approved the notice of sale for a forty-year franchise for the proposed elevated railroad to be constructed from the rear of the Pacific Electric Railway's Sixth Street depot to San Pedro Street. The proposed franchise provides that the city may purchase the railroad at the expiration of the forty-year term. In the event the city does not exercise this option to purchase at the end of forty years it is provided that the franchise shall be extended for ten years, the city reserving the right to purchase during this ten-year extension of time upon two years' notice.

Proposed Municipal Line Extension in Seattle.—The City Council of Seattle, Wash., has authorized an issue of utility bonds in the sum of $500,000 to be used to construct an electric railway to parallel the Seattle, Renton & Southern Railway. Councilman Erickson and others take the attitude that the negotiations between the city and the officials of the company have dragged too long. They urge the immediate use of the general bond issue to the amount of $500,000 for the first part of the work. In case the deal for the purchase of the existing line is concluded soon, the proposed line will not be built.

Result of East Liverpool Arbitration.—The board of arbitration appointed to pass upon the questions in dispute between the East Liverpool Traction & Light Company, East Liverpool, Ohio, and its employees submitted its report and made its award on May 23. Motormen and conductors receive an advance of 1 cent an hour. The shop and powerhouse men receive no increase. Some slight changes were recommended in the operating conditions. F. A. Boutelle, Canton, Ohio, represented the company as its arbitrator, E. H. Farrell, Lisbon, Ohio, represented the men, and H. J. Eckley, Carrollton, Ohio, J. S. McNutt, Salem, Ohio, and C. C. Connel, Lisbon, Ohio, were appointed by the court.

Lexington Jovians.—The Lexington (Ky.) Jovian League held its first luncheon at Hotel Phoenix on May 16. Sidney G. Vigo, of the Middle West Utilities Company, Chicago, was the guest of honor and chief speaker. The activities of the order will for the present be devoted to the promotion of electric power in the great coal mining and agricultural sections of Kentucky, of which Lexington is the hub. The luncheons will be held on the second Tuesday of each month, and a "Kentucky Welcome" is extended to all traveling Jovians to stop over on that date. The officers of the local Lexington league are Prof. W. E. Freeman, president; C. J. Eaton, statesman, and J. B. Fitzgerald, who is secretary and treasurer of the Lexington Utilities Company, vice-president.

Accomplishments of Washington Commission.—Conrad H. Syme, corporation counsel of the District of Columbia, delivered an address recently in which he reviewed the work of the Public Service Commission of the District. In concluding his remarks Mr. Syme said: "I do not know how long it will take to solve the problems and to correct whatever evil may exist in our public utilities. I do know that the people of this District have a right to the very best and most adequate service that can be rendered and at the lowest cost, consistent with a fair return to the utilities on whatever money has been honestly invested in them and properly expended by them. It is our part to have faith and hope and courage and patience—to work and search earnestly and faithfully for what is right and just, and we need never fear the result."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The bill requiring members of the Public Service Commission to give all their time to the work of the board has been read a third time in the House. The discussion centered upon the desirability of preventing its passage in order to retain the services of Commissioner George W. Anderson, reputed to be the most radical member of the board. The bill authorizing street railways to issue bonds, notes, etc., to a total 20 per cent in excess of their outstanding stock has been killed in the House.

PROGRAM OF ASSOCIATION MEETING

New York Electric Railway Association

Frank Hedley, president of the New York Electric Railway Association, has appointed the following committee to arrange the entertainment for the thirty-second annual meeting of the association which, as announced in the ELECTRIC RAILWAY JOURNAL last week, is to be held at Hotel Champlain, Bluff Point, N. Y., on Tuesday and Wednesday, June 30 and July 1: John J. Dempsey (chairman), Brooklyn; Charles R. Ellicott, New York; H. N. Latey, New York; Charles C. Castle, New York; W. T. Stanton, Schenectady, and H. N. Ransom, New York.

Financial and Corporate

Stock and Money Markets

May, 26, 1914.

The trading on the New York Stock Exchange to-day was the smallest of the year. The tone, however, was steady. On advices from Washington of possible criminal action in connection with the New Haven, that issue declined more than a point. Reading also shaded off slightly and Westinghouse Electric lost ½, selling down to 77⅝. Rates in the money market to-day were: Call, 2 per cent.; sixty days, 2¼@2½ per cent.; four months, 2¾@3 per cent.; six months, 3@3½ per cent.

The tone of the trading in Philadelphia to-day was steady. Odd lots of Philadelphia Rapid Transit sold at 17.

The Boston market to-day was extremely dull and narrow. Small sales were recorded of Boston Elevated, West End Street Railway and Massachusetts Electric preferred.

In the trading on the Chicago Stock Exchange to-day price changes were irregular. Bonds were firm.

Trading was fairly active in the stock market in Baltimore to-day. The sales of stock totaled 2697 shares, the great bulk of which were United Railways issues. The bond transactions totaled $47,000, par value.

Quotations of traction and manufacturing securities as compared with last week follows:

	May 20	May 26
American Brake Shoe & Foundry (com.)	87	87
American Brake Shoe & Foundry (pref.)	134	135
American Cities Company (com.)	*29	*29
American Cities Company (pref.)	64	65
American Light & Traction Company (com.)	340	337
American Light & Traction Company (pref.)	107	107½
American Railways Company	37	37
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	77	77
Boston Elevated Railway	80½	82
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	a55	a55
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	93	93
Capital Traction Company, Washington	98⅝	100
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	a98	95
Chicago Railways, ptcptg., ctf. 2	34	34¾
Chicago Railways, ptcptg., ctf. 3	5	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	*102½	102
Cleveland Railway	104¼	104¼
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	*13	13
Columbus Railway (com.)	*53	53
Columbus Railway (pref.)	*79½	79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	a80
General Electric Company	148	149
Georgia Railway & Electric Company (com.)	119	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14½	14⅜
Interborough-Metropolitan Company (pref.)	62¼	62
International Traction Company (com.)	*40	*40
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	18	18
Kansas City Railway & Light Company (pref.)	37	37
Lake Shore Electric Railway (com.)	6	*6
Lake Shore Electric Railway (1st pref.)	92	*92
Lake Shore Electric Railway (2d pref.)	22	22
Manhattan Railway	130½	130½
Massachusetts Electric Companies (com.)	11	10
Massachusetts Electric Companies (pref.)	60½	60
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25¼	25½
North American Company	76¼	76½
Northern Ohio Traction & Light Co. (com.)	70	a70
Northern Ohio Traction & Light Co. (pref.)	101	a101
Philadelphia Company, Pittsburgh (com.)	40	39¾
Philadelphia Company, Pittsburgh (pref.)	38½	38½
Philadelphia Rapid Transit Company	*17	17
Portland Railway, Light & Power Company	50	50
Public Service Corporation	112	112
Third Avenue Railway, New York	42½	42½
Toledo Traction, Light & Power Co. (com.)	20	a20
Toledo Traction, Light & Power Co. (pref.)	70	a70
Twin City Rapid Transit Co., Minn. (com.)	107	106
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	28	28¼
United Rys. Inv. Company (com.)	15	15½
United Rys. Inv. Company (pref.)	42½	42
Virginia Railway & Power Company (com.)	49	49
Virginia Railway & Power Company (pref.)	98¼	98
Washington Ry. & Electric Company (com.)	87¼	87¼
Washington Ry. & Electric Company (pref.)	84	83½
West End Street Railway, Boston (com.)	67¼	66½
West End Street Railway, Boston (pref.)	87	88
Westinghouse Elec. & Mfg. Company	76	77¾
Westinghouse Elec. & Mfg. Co. (1st pref.)	122	123

*Last sale. a Asked.

ANNUAL REPORT

Mobile Light & Railroad Company

The income statement of the Mobile Light & Railroad Company, Mobile, Ala., for the year ended Dec. 31, 1913, follows:

Revenue from transportation:	
Passenger	$610,704
Special car	1,662
Mail	260
Freight	1,767
Total	$614,393
Revenue from other operations:	
Station and car privileges	$1,764
Rent of buildings and other properties	1,400
Miscellaneous	45
Total	$3,209
Total operating revenue	$617,602
Total operating expenses	338,859
Net operating revenue	$278,743
Less taxes	33,416
Operating income	$245,327
Other income:	
Income from securities owned	$5,868
Miscellaneous	210
Total	$6,078
Gross corporate income	$251,405
Deductions from income:	
Interest on funded debt	$99,470
Interest on floating debt	458
Interest on unpaid paving assessments	4,568
Total	$104,496
Net corporate income	$146,909

The gross earnings from transportation for the year 1913 failed to show the increase expected; the increase was $9,832, or 1.63 per cent above the preceding year. Up to Sept. 1, the gross earnings showed an increase of $12,100, or 3.03 per cent; but the last four months of the year showed a decrease of $2,268, or 1.11 per cent.

The policy of the company for several years past has been continued, namely, to give the best service, pay good wages and protect the bondholders by putting a large amount of the earnings into improvements. During the year the company paid one dividend of 2 per cent on its capital stock. This brought the total dividend paid since the organization of the company in 1901 up to 8 per cent for the twelve and one-half years. While the cash dividends have been small, the value of the property has increased by the policy of paying for improvements out of earnings. The company is largely locally owned by resident stockholders and the bonds of the company are nearly all held in Mobile. During the year the company purchased eight single-truck and four double-truck steel cars, paid for out of the depreciation fund. The new cars have doors enclosing the platform, the doors on the rear platform being operated by the conductor and those on the front platform by the motorman. White passengers enter the cars by the rear doors, deposit their fare in registering fare boxes on the rear platform, and leave by the front exit door on the front platform. Negro passengers leave by the rear exit door.

The question of increase in taxes continues to be a serious one. The company paid in taxes and licenses for the year the sum of $33,188, and in addition paid $22,981 for paving taxes. Franchise taxes, licenses, corporation taxes and paving taxes amounted to $56,170, which divided by forty-one, the average number of cars operated, gives $1,367, which is the franchise and privilege tax paid on each car for the year.

The comparison of passenger car service statistics for 1912 and 1913 contained in the report is as follows:

	1912	1913
Revenue passengers	12,174,116	12,382,898
Transfer passengers	2,297,214	2,394,884
Free passengers	31,794	30,443
Employees	248,056	268,970
Percentage of revenue passengers transferred	18.9	19.3
Average fare per revenue passenger	.0495	.0494
Average fare per revenue and transferred passenger	.0416	.0414
Average fare all passengers	.0408	.0406
Car miles operated	2,543,312	2,456,537
Car hours operated	275,636	271,487
Passenger earnings per car mile	$.2368	$.2493
Passenger earnings per car hour	2.18	2.26
Passenger earnings per car trip	.65	.67

Chicago Elevated Railways Financing

Samuel W. Insull, president of the Commonwealth Edison Company, Chicago, Ill., refused on May 25 to indicate the plans for financing the elevated railways in connection with the notes soon to fall due. In this connection he said:

"This is a big undertaking, and it would be impossible for me to give out any information in advance of the actual consummation of all the plans. I should say that within the course of a few days an official statement would be made, but this should not be taken as a certainty."

Following the meeting of the directors of the Chicago Elevated Railways, Henry A. Blair, one of the trustees, said that nothing new had developed at the meeting in regard to the plan for refunding the $30,000,000 notes due on July 1, and the plan to have members of the common stock syndicate accept ten-year 6 per cent debenture bonds, in lieu of cash, for their common stock holdings.

According to the Chicago *Economist* the Commonwealth Edison Company has not performed any act recently by which it has acquired control of the Chicago Elevated Railways, but it is coming into control by virtue of an agreement dated June 1, 1911. Under this agreement it covenanted that if the amalgamation of the elevated roads and the Chicago City Railway and the Chicago Railways "shall not be accepted within said three years, it shall pay or cause to be paid to the stock syndicate the sum of $6,000,000, less a sum equal to $30 per share of the common shares taken by and distributed to the depositors, provided that the Edison Company shall have the right and privilege during a period of thirty days after the making of such an agreement to purchase from the stock syndicate all the preferred shares of the new company (other than those distributed to the depositors) at a price equal to $125 per share plus any unpaid and accrued dividends thereon, from which purchase price shall be deducted the total sum so paid by the Edison Company to the stock syndicate."

The stock syndicate referred to is the organization formed by the National City Bank, New York, to purchase the elevated roads of Chicago and consolidate them in the Chicago Elevated Railways.

The *Economist* says that it is not intended that the Commonwealth Edison Company shall remain in control. The only purpose the Commonwealth Edison Company has is that of selling power to these transportation interests. To 1927, when the franchises of the surface roads expire, and to 1937 in the case of the elevated roads, it is estimated that these properties will require electrical energy costing not less than $125,000,000. The Edison has short term contracts with these companies but evidently intends to secure contracts for long terms. Samuel Insull, being questioned on this subject, stated unequivocally the purpose of his company to "dominate the power interests of Chicago, to effect the greatest economy in production and the lowest possible price to everybody with the best results to the investor."

In an endeavor to bring about a consolidation or operating merger of the surface and the elevated railway interests the local transportation committee of the City Council of Chicago called a meeting on May 26. Speaking before this body Henry A. Blair, representing the surface lines, stated that he thought an operating merger was desirable. There were certain limits, however, to which the contemplated 5-cent fare will not reach, but the surface lines were willing to coöperate to the fullest extent toward securing unification. Samuel Insull, representing the elevated interests, indicated that any scheme leading to unification would receive the support of the owners of the elevated railroads. He thought that an operating merger would probably bring the quickest results. He stated further that the company would be willing to accept any other plan which could be shown to be easier of accomplishment. In regard to the 5-cent fare Mr. Insull said the negotiations would probably have to be based upon valuation of the property as indicated by actual cash invested. Alderman Henry D. Capitain moved that the negotiations be referred to a committee on service betterment with instructions to report to the committee on local transportation.

Argenta (Ark.) Railway.—The Argenta Railway has been taken over by C. C. Kavanaugh and his associates. New officers have been elected for the company as follows: C. C. Kavanaugh, president; E. W. Jackson, vice-president, and W. A. Cantrell, secretary-treasurer. C. C. Kavanaugh is a director of the Little Rock Railway & Electric Company.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—Bertron, Griscom & Company, New York, N. Y., are offering for subscription 6 per cent debenture gold notes of the Birmingham Railway, Light & Power Company dated July 1, 1913, due July 1, 1915, but callable at 101 and interest on any interest date. The total authorized issue is $2,500,000. The par value of the notes is $1,000 and the interest is payable in January and June in New York.

Butte, Anaconda & Pacific Railway, Anaconda, Mont.—The report of the Amalgamated Copper Company for the year ended Dec. 31, 1913, says in regard to the Butte, Anaconda & Pacific Railway: "The electrification of the Butte, Anaconda & Pacific Railway from the mines at Butte to the reduction works at Anaconda was completed during the year, and the officials in charge of the road have reported that the resulting economies are exceeding expectations, and that the operations in general are much more satisfactory than when the road was operated by steam. The railway transported during the year 5,842,944 tons of ore and freight, and 304,138 passengers. The gross earnings were $1,422,317 and rental of tracks and miscellaneous receipts $20,092; operating expenses, $1,107,412; taxes, interest and rental of leased lines $102,576; net income $232,421, which was carried to surplus for the year."

Dedham & Franklin Street Railway, Westwood, Mass.—The Massachusetts Public Service Commission has approved $35,000 as amount of stock of the proposed new corporation which is to take over the Dedham & Franklin Street Railway, recently acquired at receiver's sale.

Fort Wayne & Springfield Railway, Decatur, Ind.—The property of the Fort Wayne & Springfield Railway, which has been in the hands of French Quinn as receiver since September, 1912, was offered for sale at Decatur on May 15, but no bids were received. The upset price as fixed by the court was $200,000.

Hagerstown & Frederick Railway, Frederick, Md.—The Hagerstown & Frederick Railway has filed amendments to its charter increasing the authorized capital stock of the company from $3,000,000 to $4,200,000. The $4,200,000 of authorized stock consists of $2,000,000 of common stock and $2,200,000 of preferred. Of the common $2,000,000 is outstanding and of the preferred $635,000. The Fidelity Trust Company, Baltimore, Md., as syndicate managers, is receiving subscriptions for $800,000 of thirty-year first and refunding mortgage 6 per cent bonds, redeemable at 105 and interest. These bonds are part of an issue of $10,000,000. The bonds are being sold at 98½ and interest. The common stock of the company has been placed in a voting trust, of which Van Lear Black and Frank A. Furst, Baltimore, and Emory L. Coblentz, Frederick, vice-president of the company, are the voting trustees. Sanderson & Porter, New York, N. Y., will be in control and personally operate the properties.

Springfield (Ohio) Railway.—E. H. Rollins & Sons, Boston, Mass., are placing $1,244,000 of first mortgage 5 per cent serial gold bonds of the Springfield Railway at prices to yield 5 per cent to 5.40 per cent. The bonds are dated May 1, 1914. From Sept. 1, 1914, to 1923, inclusive, $12,500 of the bonds are due per annum; from Sept. 1, 1924, to 1934, inclusive, $25,000 of the bonds are due per annum, and on Sept. 1, 1935, $844,000 of the bonds are due. The principal and interest are payable at the office of the Real Estate Title, Insurance & Trust Company, Philadelphia, Pa., trustee. The bonds due between 1914 and 1923 are in the denominations of $500 and $1,000; those due between 1924 and 1934 are in the denomination of $1,000, and those due in 1935 are in the denominations of $100, $500 and $1,000.

United Railways & Electric Company, Baltimore, Md.—A special meeting of stockholders of the United Railways & Electric Company will be held on June 1 to consider the sale of $1,000,000 of two-year collateral trust 5 per cent coupon notes, convertible into common stock at $33.33 per share. Stockholders of record at noon June 1 will be given preference in allotment of $100 of notes or multiples thereof for every forty shares of stock or multiples thereof.

Virginia Railway & Power Company, Richmond, Va.—The directors of the Virginia Railway & Power Company have declared a regular semi-annual dividend of 3 per cent on the preferred stock, payable on July 10 to holders of record of June 13. This places the stock on a 6 per cent annual basis, an increase of 1 per cent.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—A committee consisting of W. Frederick Snyder, George P. Bissel and Henry M. Watts has been formed for the purpose of finding out why the net earnings of the Lehigh Traction Company are insufficient to pay interest on the company's bond issue. Recently the president of the company asked holders of mortgage bonds to surrender their coupons falling due on June 1, 1914, and on the five succeeding interest periods, and to accept in lieu thereof the company's non-interest bearing scrip. The committee mentioned advises bondholders to deposit their bonds with the Northern Trust Company, taking in exchange the trust company's receipt containing the following provisions: First, that each depositor may withdraw his bonds at any time; second, that no depositor shall incur any expense whatever by reason of the deposit; third, that the committee will, after investigation, report to each depositor what course is most likely to prove protective of the interests of bondholders.

Dividends Declared

Chicago (Ill.) Elevated Railways, quarterly, $1.50, preferred participating certificates.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2¼ per cent, common.

Northern Ohio Traction & Light Company, quarterly, 1¼ per cent, common.

Tennessee Railway, Light & Power Company, Memphis, Tenn., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO.					
1m., Mar., '14	$97,317	$63,364	$33,953	$32,462	$1,491
1 " " '13	87,172	61,470	25,702	31,329	†5,627
3 " " '14	274,298	178,031	95,367	95,946	†579
3 " " '13	259,992	173,476	86,515	92,976	†6,461
DETROIT (MICH.) UNITED RAILWAYS					
1m., Mar., '14	$990,532	$681,874	$308,658	$180,629	$128,029
1 " " '13	1,046,699	683,465	363,233	180,309	182,924
3 " " '14	2,834,631	1,977,718	856,912	541,522	315,390
3 " " '13	2,972,211	1,984,760	987,450	537,413	450,037
FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.					
1m., Mar., '14	$148,238	$88,219	$60,019	$52,009	$8,010
1 " " '13	136,970	80,276	56,694	48,734	7,960
3 " " '14	457,412	259,022	198,390	151,804	46,586
3 " " '13	428,542	232,234	196,308	142,718	53,590
KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.					
1m., Mar., '14	$62,815	$33,193	$29,622	$20,731	$8,891
1 " " '13	61,309	30,540	30,769	19,396	11,373
9 " " '14	599,721	303,249	296,472	184,143	112,329
9 " " '13	574,417	305,762	268,655	167,739	100,916
NEW ORLEANS RAILWAY & LIGHT COMPANY, NEW ORLEANS, LA.					
1m., Mar., '14	$609,943	$317,294	$292,649	$205,851	$86,798
1 " " '13	583,008	298,852	284,156	191,333	92,823
3 " " '14	1,844,654	940,115	904,539	616,342	288,197
3 " " '13	1,777,637	897,354	880,283	573,055	307,228
NEW YORK RAILWAYS, NEW YORK, N. Y.					
1m., Feb., '14	$982,546	$647,350	$335,196	$370,586	†$35,390
1 " " '13	1,074,890	675,622	399,268	373,882	25,386
8 " " '14	9,549,885	5,836,059	3,713,826	2,971,126	742,700
8 " " '13	9,562,410	5,775,455	3,786,955	3,011,245	775,710
REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.					
1m., Apr., '14	$253,728	*$142,756	$110,973	$47,071	$63,902
1 " " '13	229,717	*145,239	84,478	45,883	38,595
12 " " '14	3,066,882	*1,850,794	1,216,088	531,014	685,074
12 " " '13	2,779,613	*1,682,090	1,097,523	535,375	562,148
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.					
1m., Mar., '14	$751,175	$412,021	$339,153	$232,636	$106,517
1 " " '13	710,623	365,363	345,261	239,349	105,912
3 " " '14	2,177,027	1,216,999	960,027	675,385	284,642
3 " " '13	2 036,455	1,095,378	941,677	698,438	242,639
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.					
1m., Mar., '14	$420,995	$205,120	$215,875	$134,542	$81,333
1 " " '13	403,953	199,425	204,528	126,526	78,002
9 " " '14	3,928,027	1,930,977	1,997,051	1,208,990	788,061
9 " " '13	3,693,661	1,815,241	1,879,740	1,117,232	762,508

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*Includes. †Taxes.

Traffic and Transportation

Commission Decision Affecting Indianapolis Terminal

The Public Service Commission of Indiana on May 22 issued an order in which the various interurban lines centering in the freight yards of the Traction Terminal Station at Indianapolis were authorized to close the doors of their freight houses at 5 o'clock each evening if they so desired. The order also sets out that the freight handling facilities in the terminal at Indianapolis have been rendered inadequate by the growth of the business, and suggests that the only remedy lies in the enlargement of the present houses and yards, which cannot be accomplished in the present location of the freight houses.

The case is one in which the wholesale grocers of Indianapolis petitioned the commission to issue an order compelling the interurban railways to keep the doors to their freight houses open until 6 p. m. This was formerly done, but the interurban lines centering at the Terminal Station in Indianapolis found that shippers were delaying sending their shipments to interurban lines until after the steam road freight houses closed at 4.30 p. m., using their trucks and drays to haul shipments to the steam roads first and leaving the interurban shipments until the latter part of the afternoon, thus causing great congestion of traffic.

All the interurban roads coming into Indianapolis enter over the tracks of the Indianapolis Traction & Terminal Company and all freight cars discharge and receive freight at four freight station buildings located on the west half of the block bounded by Illinois, Market and Ohio Streets and Capital Avenue. These freight houses are about 200 ft. long and 20 ft. wide. Two of the houses have tracks on both sides and two have tracks on one side only. The tracks by the side of and between the freight houses hold twenty-two cars. When cars are standing on these tracks only the two houses with tracks on one side are available for platform delivery, and shipments to the other houses are loaded directly onto the freight cars.

Most of the freight handled during the forenoon is delivered at the freight-house platforms for loading onto the cars on their arrival. However, only a small per cent of the freight shipped is delivered before noon, the greater part of the shipments being from wholesale houses in filling orders received in the morning mail. Freight cars over the various lines begin to arrive at Indianapolis about 11 a. m., and by 2 p. m. the tracks at the freight stations are filled with cars.

The only remedy suggested in the complaint was to move some of the tracks in the freight yards so as to leave one side of each freight house clear of cars at all times and have platform delivery at all hours of the day. Investigation showed that the cost of this change would be $25,000, and that it would provide no enlargement of the freight houses, no increase in the width of driveways, nor any betterment of facilities for handling trucks and drays. On the other hand, it would decrease the trackage for cars. Passing all freight through the freight houses would perhaps enable trucks and drays in many instances to unload all their freight at a single door and thus save time and inconvenience in moving from one car or unloading place to another, as is the case now when the truck has shipments for more than one line, but on account of the present narrow freight houses it would be impossible to receive the freight from trucks and drays and place it as rapidly as it is now received.

The commission stated that it was quite apparent that the only remedy for the difficulties under consideration would be in enlarged freight houses and yards, which could not be had at the present location. The commission suggested that the freight terminals of all or nearly all of the interurban roads should be moved from their present location to some place where each road could have its freight house of ample size for a complete platform delivery and its own yard, the limits of which would be entirely apart from the yard limits of any other interurban road. The present location could not, in the opinion of the commission, by any change be made to approach adequate facilities for handling the interurban shipping of Indianapolis, even at its present volume, to say nothing of taking care of the growth of shipping in the future. The commission said that the question of relocating and enlarging the depots and the station facilities is not open for its consideration at this time in the case under hearing.

Brief in Washington Fare Case

The brief of the respondent filed with the Interstate Commerce Commission in the Washington, D. C., suburban fare case points out that the only question to be determined by the commission in the so-called Somerset rate case is whether or not the Washington & Rockville Railway and the Georgetown & Tenleytown Railway have proved that the proposed increase to and from Somerset, Md., was just and reasonable, and that an examination of the testimony of William F. Ham, vice-president of the company, "will show conclusively that the proposed increased rate to Somerset, Md., is not only just and reasonable, but is lower than other rates upon electric lines giving a similar character of service." The case grew out of the filing of tariffs by the respondents proposing to collect an additional 5-cent car fare between the District line and Somerset, Md., whereas residents of that section now pay either 5 cents or a car ticket for the ride either way. The brief compares rates on the line to Somerset with the rates collected on the lines to other suburbs similarly situated, as, for instance, Silver Spring, which is 0.4 mile across the District line, while Somerset is 0.5. It costs Silver Spring residents 5 cents additional to get to their homes. The necessity for the establishment of the system of fare zones within whose limits a passenger may travel at a flat rate or unit of fare is too well settled to require comment. Several opinions of the commission on rates to suburbs of the District are cited as grounds for higher Somerset rates. The proposed increases are lower than any of the rates for substantially the same distance from Washington, D. C., to the following points: Gregory, Md.; Vanderwerken, Va.; Brook, Md.; Torrison, Va.; Alexandria, Va.; Veitch, Va.; Riverdale, Md., and Silver Spring, Md.

Schenectady Fare Case Decided in Favor of Company

The Public Service Commission of the Second District of New York has dismissed the case brought by the city of Schenectady against the Schenectady Railway to require the company to resume the sale of six tickets for 25 cents. Two opinions were filed, one by Commissioner Emmet and another by Commissioner Decker. All of the commissioners concurred in the decision. Commissioner Emmet's opinion, after stating that the only real question in the case is whether the 5-cent rate of fare now in force does or does not produce an unreasonable income upon the capital invested in the company's urban business, goes on to say:

"If it should appear that the return upon the capital invested is not under present conditions an unreasonable one, all things considered, then the question whether these profits might not be cut down somewhat without actually wrecking the company need not, we think, be gone into very deeply. As we understand it, the law contemplates that public service corporations shall enjoy a larger latitude in the matter of fixing their rates than they would have if they were held down to rate schedules so calculated as to enable these corporations just to avoid insolvency. To apply this last-named test to the rates of fare charged by street railway corporations in New York State would be to drive private enterprise out of this portion of the public service field at a very early date. Again, if we should determine that the company's present rates of fare produce no more than a reasonable return upon the capital invested within the 5-cent fare zone, we need not pass upon the question whether lower fares might not so stimulate the business of the company as in the end actually to swell its revenues rather than to reduce them. As to what will be the result of lower fares in any given instance depends upon many uncertain factors, and must be viewed rather as a fertile field for speculation than as a problem susceptible of exact demonstration."

Discussing the figures produced at the hearings in the case, showing the value of the company's property, the number of passengers carried and the amount of the company's present income, Commissioner Emmet concludes that even if the city's views as to the value of the company's property were all correct, its present net income would only represent a yield of between 8 and 9 per cent on such valuation, which percentage would be reduced further if any considerable portion of the cost of complying from time to time with the provisions of the public service law and with orders of the commission were to be met out of current earnings instead of out of capital. He expresses the opinion that some at least of such expenses should be paid out of annual income, and that even a slight charging off against income of such betterments and replacements as must be made every year under the present system of vigilant supervision over public service corporations would bring the net income of the Schenectady Railway to an amount which, under existing conditions, could not justifiably be characterized as an excessive income yield. The opinion of Commissioner Emmet goes on to say in this connection:

"Our present public service law was intended not merely to permit corporations of this character to accumulate such scant earnings as would keep them out of the bankruptcy courts, but actually to allow them under good management to attain positions of reasonably assured prosperity. The fact, therefore, that the Schenectady Railway seems to have attained that kind of a position does not alter our opinion that such a decision as is asked for by the complainants here would be regarded throughout the State of New York, and perhaps over a larger area, as the equivalent of a warning to private enterprise and capital that these are not particularly wanted any longer in the street railway field. We do not think it well to issue such a warning, or what might with some degree of justice be construed as such, at the present time. The result of driving private capital from the work of extending and improving the transit facilities our people now enjoy would, in our opinion, be quite as deplorable from the standpoint of the general public as from that of the financially courageous individuals whose money is now invested in good faith in public service enterprises throughout the United States."

The opinion of Commissioner Emmet closes as follows:

"The truth is, it is not a particularly happy time, in our judgment, for government to intervene with a heavy hand in cases like this, where the rate that is complained of is, after all, merely the well-known and widely prevalent charge of 5 cents for each passenger. If industrial conditions in Schenectady and elsewhere were different we might be willing to apply in this particular case a somewhat more rigorous test as to the justice of the rates involved than we are now applying. But the conditions to which we refer seem to justify us in construing an admittedly doubtful point with some degree of librality toward the respondents in this case—leaving the way open at some future time, after a change in conditions has occurred, to consider the fundamental question involved in this controversy afresh, if by that time voluntary action has not been taken by the railway company to adjust its differences with the citizens of Schenectady on some basis that will be satisfactory to both parties."

Commissioner Decker's opinion states in substance as follows:

"The fact that the six tickets for a quarter were formerly in general use by the respondent, with no showing that their continuance in sale would have severely crippled the company's net revenues, is persuasive to an extent and tends to throw a burden of justification upon the respondent. The company contended that a reasonable average return upon the value of its property used in this service and the necessity of making reservation out of income for surplus and contingencies which the commission must consider in connection with the proposed restoration constitute upon the facts shown a bar to the relief demanded by the complainant."

The opinion finds that for the year ended June 30, 1913, the company earned over operating expenses and taxes $260,084 upon so-called city traffic. The company claims a total cost for the property as used in the so-called city traffic of $4,562,932, while the city claimed a total cost of $3,157,809. Using the city figures, a 6 per cent rate gives a money return of $189,468, which deducted from the year's revenue over operating expenses and taxes leaves $70,616.

It appears from the testimony that the six tickets for a quarter rate would reduce the revenue by $100,227. That would produce a deficiency on the year's business (after allowing for the return on investment) of the difference between that amount and $70,616, which is $29,610. This, the opinion states, takes no account of any increase in business due to natural increase or to the lower rate, but against that must be applied the fact that there has been no allowance made for depreciation of the property or for contingencies or for surplus. Upon these facts it is declared in the opinion that if on the investment cost claimed by the city itself a 6 per cent return is applied the balance of revenue remaining is insufficient upon any theory to justify the reduction in rate demanded in the complaint against the company.

It is further stated in the opinion that the commission knows from a separate investigation that the company must make additions to its property both in cars and trackage and that there must be improvement in service which adds to the expenses. The opinion concludes that while theoretically it may be said that with the six for a quarter tickets on sale it would have been wise on many grounds for the company to continue such sale, and it is even doubtful whether spread over future years their adoption would now constitute serious loss to the company, the commission is bound in its determination to be guided by the controlling record facts and the tests and considerations fixed by the laws of the State.

I. C. C. Accident Bulletin

Accident Bulletin No. 49 of the Interstate Commerce Commission for the three months ended September, 1913, contained the following statement of collisions and derailments on electric railways for the period covered:

No.	Classes	Number	Number of Persons		Damage to Road and Equipment and Cost of Clearing Wrecks
			Killed	Injured	
	Collisions:				
1	Rear	19	14	429	$13,343
2	Butting	8	..	68	6,318
3	Trains separating	..	..	...	......
4	Miscellaneous	14	1	72	2,724
	Total	41	15	569	$22,385
	Derailments due to—				
5	Defects of roadway	10	..	25	$1,075
6	Defects of equipment	2	..	1	211
7	Negligence of trainmen, signalmen, etc.	4	..	5	150
8	Unforeseen obstruction of track, etc.	8	..	29	3,250
9.	Malicious obstruction of track, etc.	1	..	4	45
10	Miscellaneous causes	6	1	71	5,278
	Total	31	1	135	$10,009
	Total collisions and derailments	72	16	764	$32,394
	Total for same quarter of—				
	1912	77	8	335	$54,009
	1911	62	3	459	21,905
	1910	78	46	458	36,355

Near-Side Stop in Little Rock.—The amended traffic ordinance, recently passed by the City Council of Little Rock, Ark., requiring cars of the Little Rock Railway & Electric Company to stop at near crossings, was put into effect on May 1.

Hearing in Ouster Case.—The hearing of the case of Stark County against the Northern Ohio Traction & Light Company, Akron, Ohio, to oust it from the Canton-Massillon highway, was begun before Master Commissioner McCarty recently at Canton.

Complain of Reduced Service.—Residents of Cincinnati, Ohio, have complained to the Public Utilities Commission about the reduction of service proposed by the Interurban Railway & Terminal Company. The commission has taken the matter up with the company.

Rate Schedules in Pennsylvania.—The Public Service Commission of Pennsylvania has issued an order requiring the companies under its jurisdiction to file with the commission not later than June 1, 1914, all tariffs which were in effect on Jan. 1, 1914, together with all supplements or amendments, etc.

Free Rides for Children.—Children under fourteen years of age were transported free over the lines of the Springfield (Ill.) Consolidated Railway to the Gaiety Theater recently, the only requirement being that they exhibit their "fly campaign" tickets. A delegation of mothers met all of the cars and saw that order was maintained at the theater.

Interurban Railroads Will Aid in Advertising Home Products Show.—The Ohio Electric Railway, the Scioto Valley Traction Company and the Columbus, Delaware & Marion Railway have all agreed to aid in advertising the home products show to be held in Columbus, Ohio, in June. They will put posters into their stations and distribute advertising matter from the car boxes, it is said. The Central Passenger Association has also agreed to place posters in the railroad stations.

Service Increased at Niagara Falls.—The meeting of the A-B-C mediators in Niagara Falls, Ont., has prompted the International Railway and the Suspension Bridge Electric Railway to increase the number of cars operated between Buffalo and Niagara Falls and the service over the Suspension Bridge spanning the gorge. Many of the mediators and delegates from South American countries are living on the American side while some of the newspapermen representing press associations throughout the civilized world are at Buffalo hotels.

Kentucky Rate Legislation.—Passenger rate legislation by the last Legislature fixing the maximum rate per mile at 2½ cents affects common carriers with lines more than 50 miles in length. The electric railways in the State are shorter, as a rule, though in any event the new rate would not affect the prevailing electric line rates. The "Beargrass" lines of the Louisville & Interurban Railway, several in number and averaging, it happens, about 12½ miles to the line, collect a fare which is approximately 1¼ cents a mile for the maximum distance. In other words, the rate from the central station to the end of the line on virtually all of these lines is 15 cents straight.

Complaint Against Schenectady Railway.—B. B. Johnson, Schenectady, appeared before the Public Service Commission of the Second District, New York, recently, in behalf of residents of Aqueduct who complained against the Schenectady Railway as to service rendered the public. Lewis E. Carr and Hubbell Robinson, of Naylon & Robinson, Schenectady, appeared for the railway company. There was a delegation of business men from Aqueduct who testified as to the car service, condition of cars operated, and the condition of the waiting room at Aqueduct. An adjournment was taken until June 4, at Albany. In the meantime the complainants will take the matter up with the representatives of the company to see whether or not the conditions complained of cannot be rectified without a formal order of the commission.

New Brooklyn Transfer Provisions.—Instructions have been issued to conductors by the Brooklyn (N. Y.) Rapid Transit Company in regard to the new transfer system in Brooklyn, which becomes effective on June 1, by order of the Public Service Commission. Under the new system there will be 1008 transfer points in Brooklyn, as against 721 at present, an increase of 287 transfer points. On no single line will more than six different kinds of transfer tickets be in use, and on many of the lines only three or four different kinds of tickets will be required according to the plan. The Fulton Street line, which is a line having the maximum number of tickets, the passenger may receive either a buff ticket on payment of his cash fare eastbound, or a green ticket on payment of his cash fare westbound. These tickets are good in all instances for transfers to intersecting feeder lines. On the back are listed the intersecting lines at which there may be either an extension of the general privilege of a single transfer, or a limitation of such privilege in accordance with the plan devised by the commission to prevent looping. The conditions with respect to these cash fare transfers is substantially the same throughout the system. Otherwise than as specified on the back, the transfer is good for a single ride on any intersecting line, but not good for a re-transfer.

Personal Mention

Mr. H. U. Mudge, president of the Chicago, Rock Island & Pacific Railway, has been elected president of the American Railway Association for the ensuing year.

Mr. J. L. Richards, president of the Middlesex & Boston Street Railway, Newtonville, Mass., has withdrawn his name as one of the trustees or liquidators of the Boston & Maine Railroad.

Mr. L. C. Dimmer has been appointed traveling auditor of the Illinois Traction System. For the past five years he has been employed in various clerical capacities in the Champaign office of Mr. B. E. Bramble, general auditor of the company.

Mr. A. H. Ford, who has been president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., for the last seven years, has resigned from the company to become vice-president and general manager of the Cumberland County Power & Light Company, Portland, Maine, succeeding Mr. E. T. Munger, who has retired on account of ill health.

Mr. W. H. Foster has been appointed superintendent of the New York Division of the New York, New Haven & Hartford Railroad, vice C. H. Motsett, resigned. Mr. Foster was born on June 8, 1866. He began railroad work on the Pennsylvania Railroad as an operator in 1882, and entered the service of the New York, New Haven & Hartford Railroad as an operator in March, 1888. Since then he has been successively dispatcher, and chief dispatcher of the New York Division, trainmaster on the Old Colony Division, superintendent of the Old Colony Division and superintendent of the Shore Line Division.

Mr. Edward R. Graham has resigned as assistant to the president of the Bangor Railway & Electric Company, Bangor, Maine, to become associated in the Frank Ridlon Company, Boston, with Mr. Harry B. Ivers, former general manager of the Cumberland County Power & Light Company. Mr. Graham's resignation takes effect on July 1. From 1907 to 1911 Mr. Graham was in the employ of the Bay State Street Railway, Boston. Then for a year he was president and general manager of the Brunswick & Yarmouth Street Railway, and on July 1, 1912, he became assistant to the president of the Cumberland County Power & Light Company. On Feb. 19, 1913, Mr. Graham was appointed as assistant to the president of the Bangor Railway & Electric Company.

Mr. Daniel G. Fisher, president-elect of the Southwestern Electrical & Gas Association, is assistant general manager of the Texas Traction Company and the Southern Traction Company, with headquarters at Dallas, Tex. Mr. Fisher's first railway experience was with the Santa Fé Railroad as assistant trainmaster and chief clerk to the division superintendent at Cleburne, Tex. Later he held a similar position with the Houston & Texas Central Railroad at Ennis, Tex. In 1908 he joined the staff of the J. F. Strickland Company, Dallas, Tex., and in 1912 was appointed assistant to Mr. R. B. Stichter, the general manager. In January of this year Mr. Fisher was made assistant general manager, as above noted, of the Strickland traction system, which comprises interurban electric railways operating from Dallas to Waco, Corsicana and Denison, Tex. The president-elect has long been active in the affairs of the Southwestern Electrical & Gas Association and was for several years its secretary. In recognition of his services in this capacity he was in 1911 elected a vice-president, and last year was advanced to the position of first vice-president. President-elect Fisher is a member of both the Dallas Advertising Club and the Dallas Rotary Club, also serving the former as editor of its publication *Ok'd Copy*.

D. G. Fisher

Mr. E. S. McLean has been appointed superintendent of the Boston & Worcester Street Railway, South Framington, Mass. This is a new position with the company, and Mr. McLean will be in charge of the operation of cars, maintenance of car equipment, track and roadbed. Mr. McLean began his electric railway career as a motorman with the Milford & Uxbridge Street Railway. Upon the opening of the Boston & Worcester Street Railway eleven years ago he entered its employ as a motorman. After serving in that capacity for two or three years he was made foreman of the Westborough carhouse. He was subsequently made foreman of the Framingham carhouse and later was appointed chief inspector. About five years ago he was promoted to the position of master mechanic, which place he has held up to the present time.

OBITUARY

H. J. Wickham, formerly general manager of the Hartford, Manchester & Rockville Tramway, Rockville, Conn., now included in the system of the Connecticut Company, is dead.

Edward Prescott Weeks, assistant treasurer of the Exeter, Hampton & Amesbury Street Railway, Exeter, N. H., is dead. Mr. Weeks was born in Exeter in 1865. At the opening of the Exeter, Hampton & Amesbury Street Railway in 1897 he entered the employ of the company as a motorman, and was promoted through various positions with the company to assistant treasurer.

W. S. Libbey, who was interested in a number of public utility properties in Maine, among them the Portland, Gray & Lewiston Railroad, of which he was at one time treasurer, is dead. Mr. Libbey was born in Avon, Maine, on Aug. 27, 1851. He was educated in the common schools at Oakland and at Coburn Classical Institute. Early in life he learned telegraphy and secured a position in the Western Union office in Lewiston in 1876. He was soon promoted to manager of the Lewiston office of the Western Union Telegraph Company, and remained as such until 1880. Following the successful handling of a small woolen mill at Vassalboro which he acquired while still manager of the Lewiston branch of the Western Union Telegraph Company, and the later purchase of a mill at Dover, Mr. Libbey in 1880 bought the Cumberland mill, and in 1893 the Lincoln mill with all of which properties he has made a great success. In 1901, Mr. Libbey secured control of the American Light & Power Company, and the Lewiston & Auburn Electric Light Company, and consolidated them under the latter name. Five years later, he bought the property of the Mechanic Falls Electric Light Company, and later built a dam across the Androscoggin River at Deer Rips. Mr. Libbey was a director of the Manufacturers National Bank, Portland, Maine, was a trustee of Coburn Classical Institute, and was a member of Governor Cobb's Council.

Public Service Railway Games

On the afternoon of May 27 rain brought to a sudden ending what started as a successful field day of the Public Service Railway employees at Hilton Oval, Hilton, N. J. At 1 o'clock when the games began there were about 2000 people on the field, most of whom were employees and members of their families. The latter travelled from all parts of the system, including Essex, Hudson, Bergen, Passaic, Union, Middlesex and Camden Counties in special cars and several of the delegations were accompanied by brass bands. The representatives from Paterson alone had five cars. At 3 o'clock, when all but the relay race had been run, the storm broke and put an end to the sport, including the baseball game between the Miller-Harrison and the Paterson teams. This game was to have marked the opening of the Public Service Railway Baseball League season. After the games the prizes won in the pocket billiard championship were awarded. The Paterson team won the general trophy and one of its members also captured the gold watch for high run. The Bergen team captured the Essex Division prizes and a member of this team won the Donecker gold watch for high average. All the winners in the athletic contests received gold watches. The second men were rewarded with silver watches.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Rock Falls & Southern Traction Company, Rock Falls., Ill.**—Incorporated in Illinois to build an electric railway, through Rock Falls, Sterling, Deer Grove, New Bedford to Kewanee. Capital stock, $2,500. Incorporators: B. G. Neville, William L. Batteau, William Usburne and George F. Young.

***Grand Falls & Limestone Railway, Grand Falls, N. B.**—The New Brunswick Legislature has incorporated this company to build an electric railway from Grand Falls, on the St. John River, to Limestone, on the boundary between New Brunswick and Maine.

FRANCHISES

Birmingham, Ala.—The Birmingham Rapid Transit Company has asked the Council for a franchise in Birmingham.

Birmingham, Ala.—The Tidewater Power Company has asked the Council for a franchise in Birmingham.

Sausalito, Cal.—The Marin County Electric Railway has received a franchise from the Council in Sausalito to build an electric railway along Water Street from the gate of the military reservation to the northern town limits in Sausalito. The company will secure a county franchise to extend the line from that point. [E. R. J., May 23, '14.]

Wilmington, Del.—The People's Railway has asked the Council for a franchise to extend its Church Street line from Fourth Street along Front and Poplar Streets to Second Street in Wilmington.

La Salle, Ill.—The Chicago, Ottawa & Peoria Traction Company has received a franchise from the Council on Joliet Street, Eleventh Street and St. Vincent's Avenue in La Salle.

***Great Bend, Kan.**—G. Arnutt, Great Bend, has asked the Council for a franchise to build an electric railway in Great Bend.

Louisville, Ky.—The lower board of the General Council has acted favorably upon a measure which would create a franchise for the extension of the tracks of the Louisville Railway for some 2 miles from the present terminus of the West Chestnut Street line at Twenty-seventh Street. The territory which would be served by the line is 2 square miles in area. Lack of adequate service is said to have held back its development. The officers of the Louisville Railway have not expressed themselves on the project. The Aldermen have yet to act on the franchise-creating measure.

Middlesboro, Ky.—In connection with the recent sale of a franchise for the construction of an electric railway in this city, a much more extensive project is being discussed by local capitalists. This includes the construction of a series of electric lines out of Middlesboro, into the surrounding settlements. [E. R. J., May 16, '14.]

Paxton, Ky.—The Kankakee & Urbana Traction Company has received a fifty-year franchise from the Council in Paxton. The company plans to extend its line from Lodlow to Paxton. Work is being completed on the 5-mile extension from Rantoul to Ludlow.

Fort Garry, Man.—The Fort Garry Municipal Railway has received the approval of the Council for an extension of its line in Fort Garry from the present terminus to the end of Pembina Highway, near the village of St. Norbert.

Lewiston, N. Y.—The Village Board of Lewiston has denied the application of the Niagara Gorge Railway to lay additional trackage through that village on the grounds that the company offered no compensation for the further privilege.

***Waterford, N. Y.**—The Erie Southern Railway has received a franchise from the Council in Waterford. This is part of a plan to build an electric line between Waterford and Erie.

Portland, Ore.—After eliminating the monetary value of the franchise intended to be granted to the Portland Railway, Light & Power Company for the use of the Portland bridges for cars at the rate of 3-cents a car, the franchise was formally adopted by the City Council recently and sent up for official advertising. It will be advertised for twenty days, after which a public meeting will be held to hear objections. After this the franchise will come before the Council for final passage. It will take sixty days after being passed finally. The measure wipes out all present contracts between the city and the company for use of the bridges and places the entire proposition on a flat rate of 3 cents a car.

***Schwenksville, Pa.**—The Borough Council has been asked to grant a franchise to build a trackless trolley through Schwenksville. The Council of Collegeville and the supervisors of Perkiomen township have already granted franchises for a trackless trolley line in Collegeville and in Perkiomen. This is part of a plan to build a trackless trolley line through the Perkiomen Valley, via Collegeville, Perkiomen and Schwenksville. No names are yet given of those interested in the project.

***Dallas, Tex.**—The J. Mercer Carter franchise for electric railway lines in the city of Dallas has been sold to E. P. Turner of the Dallas & Southwestern Traction Company and Dallas & Northwestern Traction Company, for $15,000. The deed conveys the J. Mercer Carter franchises in Dallas procured through a city ordinance of July 26, 1906, and also all of their rights and interest in the county franchise granted to John T. Witt and associates for interurban line on the West Dallas pike, west of the city limits, and the Commerce Street bridge over the Trinity River.

***Orange, Tex.**—Augustus M. Hodges, Orange, has asked the Council for a franchise to build an electric railway in Orange.

Terrell, Tex.—The Stone & Webster Engineering Corporation, Boston, Mass., has received a fifty-year franchise from the Council in Terrell. This is part of a plan to build an electric line between Terrell and Dallas, 30 miles.

TRACK AND ROADWAY

Fresno (Cal.) Interurban Railway.—Surveys have been completed and grading is now under way on the 9-mile electric line to connect Fresno and Clovis. J. B. Rogers, Fresno, president.

San Francisco & Northern Railway, San Francisco, Cal.—This company, which has succeeded the Petaluma & Santa Rosa Railway, plans eventually to build a line from Petaluma south to San Francisco Bay. In the near future a direct line between Petaluma and Santa Rosa will be constructed, to replace the long distance route by way of Sebastopol. Another early probability is a line from Santa Rosa to Healdsburg, 13 miles distant. Other extensions are also planned.

San Francisco-San Mateo Right-of-Way Company, San Mateo, Cal.—Preliminary arrangements are being made by this company to build its electric line from San Francisco to Palo Alto. H. C. Tuchsen, Redwood City, president. [E. R. J., May 23, '14.]

Wilmington & West Chester Railway, Wilmington, Del.—This company is being formed to be operated in connection with the Wilmington & Philadelphia Traction Company, to build electric lines in various sections of Wilmington. T. W. Wilson, president of the Wilmington & Philadelphia Traction Company, is reported as confirming previous public announcements concerning plans of the Wilmington & West Chester Railway to give additional railway facilities in the Ninth ward in Wilmington. Ward, Gray & Neary are representing the incorporators of this new company in securing incorporation papers. [E. R. J., May 23, '14.]

Western Illinois Railway, Carthage, Ill.—This company has surveyors in the field surveying the route between Niota and Beardstown. They are now between Powellton and Elvaston. The route out of Niota extends towards Powellton, thence east 1 mile, thence south to Elvaston. From Elvaston two routes will be surveyed. One to Carthage, Bentley, Augusta and Beardstown, and the other from Elvaston to Basco, Denver, Plymouth and Beardstown. Right-of-way men will follow the surveyors and make estimates upon the cost of right-of-way. The estimates on the cost of right-of-way, cost of construction and prospects for future business will determine the route to be selected. Offices will be opened in Carthage in the Foulds' Building. A. M. Milstid will probably have charge of the office. Gasoline-electric cars will probably be used for passenger traffic, while steam engines will probably be used for freight traffic.

Chicago (Ill.) Surface Lines.—This company has received permission from the Park Commissioners to extend its Sixty-ninth Street line from its present terminus at East Marquette road and Stony Island Avenue east to Yates Avenue. The construction of this line will afford the residents of Englewood and Woodlawn through service from Western Avenue to the lake.

Decatur Railway & Light Company, Decatur, Ill.—Plans are being made to begin work at once double tracking North Water Street, extending the Condit Street line to the new locomotive shops and the extension of the Edward Street line to the new hospital in Decatur.

Illinois Traction System, Peoria, Ill.—This company has opened its park for the summer near Homer and known as Homer Park. Plans are being made to build the extension from Georgetown to Bunsenville.

Woodstock & Sycamore Traction Company, Sycamore, Ill.—Complete reorganization of this company and early resumption of operations is promised by T. E. Ryan, St. Charles, representing a large number of bondholders. It is expected to begin operation again early in June and the line will be extended to Woodstock this year and on through McHenry and tc Fox Lake in the near future. This railway ceased operating April 1.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company is asked to consider plans for an extension to Joplin and to Miami, Okla.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company contemplates the extension of its lines from Newton to Canton and McPherson, completing the round trip via Moundridge.

New Orleans Railway & Light Company, New Orleans, La.—This company is asked to consider plans for an extension of its line in New Orleans in the rear of Claiborne Street, up and down through the wards. It is planned to make a belt line, returning to Canal Street through the three wards.

Mexico Investment & Construction Company, Mexico, Mo.—This company has secured the co-operation of the Mexico Commercial Club in a project for an extension from Moline north to Santa Fé and from Mexico south to Champ. The Commercial Club will subscribe for $13,000 in stock, payable when the extensions are in operation.

***Erie, N. Y.**—John S. Rilling, Harrisburg, representing the Erie Construction Company, has asked the Public Utilities Commission for permission to build an electric railway from Erie to Waterford and Corry. Application for a charter will soon be made. The company will probably be known as the Erie Southern Railway.

Schenectady (N. Y.) Railway.—Plans are being made by this company to begin work on the extensions of its lines to South Schenectady, Carman and the Grand Boulevard sections.

Asheville Power & Light Company, Asheville, N. C.—Work has been begun by this company on the South Main or Biltmore Road lines. The company will prepare the lines so that the work of paving the street for 2 miles can be done by the city.

Elizabeth City, N. C.—Right-of-way and franchises are being obtained and financial backing is being secured to build an electric line from the mouth of Little River near the Albemarle Sound, making water connections with Columbia and the lower part of Perquimans County, Weeksville, Nixontown, through Elizabeth City to South Mills and from South Mills by way of Deep Creek to Norfolk, a distance of about 70 miles. Thomas J. Markham, First National Bank Building, Elizabeth City, is interested. [E. R. J., May 16, '14.]

Dayton, Middletown & Cincinnati Railway, Middletown, Ohio.—Surveys are now under way between Middletown and Cincinnati, 29 miles, and construction will be begun as soon as surveys are completed on this 50-mile line to connect Dayton, Germantown, Middletown, Monroe, West Chester, Sharonville, Reading and Cincinnati. James G. Miller, West Chester, president. [E. R. J., April 25, '14.]

Ardmore & Western Interurban Railway, Ardmore, Okla.—Plans are being made by this company to begin work on the first 10 miles of its proposed electric line to connect Ardmore, Springer, Joiner City, Glenn, Wodford, Milo, Oil City, Cornish, Orr and Brock. The first section to be constructed will be between Joiner City and Oil City, Okla. F. B. McElroy, Ardmore, president. [E. R. J., March 14, '14.]

Ardmore (Okla.) Electric Railway.—This company, which has taken over the lines of the Ardmore Traction Company, plans to improve and extend some of the lines in Ardmore. The following officers have been elected: George S. Cravens, president; John F. Easley, secretary, and James C. Mort, treasurer. [E. R. J., April 4, '14.]

Fort William (Ont.) Street Railway.—The extension of this municipally owned electric railway was begun a short while ago. The first work to be undertaken will be the construction of the new belt line along North Syndicate and Pacific Avenues, and Victoria Avenue west to Franklin, and Franklin Street south to Walsh Street. The street railway extension to the Island across the bascule lift bridge is practically completed.

Canadian Northern Railway, Toronto, Ont.—It is stated that the J. Z. Lajoie Company, which was recently incorporated, is a subsidiary of the Canadian Northern Railway Company to develop the Lajoie Falls to supply power for the operation of this company's tunnel now under construction.

Toronto Suburban Street Railway, Toronto Junction, Ont.—Grading has been completed and track is being laid by this company on its line from Toronto to Guelph.

Pacific Power & Light Company, Astoria, Ore.—This company has announced its intentions to build 2 additional miles of electric railway in Astoria, work to begin as soon as materials and equipment can be placed on the ground. Chief Engineer William H. Galvani is making the preliminary surveys. One extension 1 mile long will be made from the west side terminus to a point in Taylor's Astoria. The other mile extension will be made on Date Street in the east end of Astoria.

Seattle, Port Angeles & Lake Crescent Railway, Seattle, Wash.—This company advises that its proposed 70-mile line to connect Seattle, Oak Bay, Sequim and Port Angeles will be operated by steam. [E. R. J., May 16, '14.]

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—The following statement has been made by the directors of this company: "A contract has been made with Stone & Webster, by which Stone & Webster are to be given the right-of-way located, surveyed and secured by the Fort-Worth-Denton Interurban Railway, and a bonus of $75,000, conditional that they shall begin at once the construction of the line, and after the constructing to operate it. The payment of this bonus and the expense already incurred will require between 15 and 20 per cent of the subscription of each stockholder."

Guadaloupe Water Power Company, Seguin, Tex.—Plans are being considered by this company to build an electric line to connect Seguin, Lockhart and San Antonio. G. C. Simpson, San Antonio, chief engineer. [E. R. J., April 13, '12.]

***Southwestern Traction Company, Temple, Tex.**—Surveys have been obtained and right-of-way secured for the line between Waco, Temple and Austin. Plans are being made to begin work soon.

Sturgeon Bay, Wis.—Arrangements are complete for the construction of the new electric railway through Door County from Sturgeon Bay to Ephraim. E. E. Galle & Company, Minneapolis, is interested. [E. R. J., Nov. 22, '13.]

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—The report is current that in the near future the electric lines entering Sacramento will unite in the erection of a union passenger and freight terminal to be located on the river front in West Sacramento below the M Street bridge. It was said that the companies which will join in the undertaking include the Northern Electric Railway, the Oakland, Antioch & Eastern Railway, the Central California Traction Company, the Vallejo & Northern Railway and the West Side Railroad.

St. John (N. B.) Railway.—This company has awarded a contract to build a new carhouse, in St. John, to A. R. C. Clarke & Son. The building is to be 115 ft. x 58 ft. and of steel and brick construction.

Niagara Gorge Railroad, Niagara Falls, N. Y.—It is reported in Buffalo, N. Y., that an agreement has been reached whereby the Niagara Navigation Company, which controls the boat line between Lewiston, N. Y., and Toronto, Ont., and the Niagara Gorge Railroad, will unite in constructing a large modern terminal in Lewiston. The present terminal facilities have long been inadequate.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Plans are being made by this company to construct a new office building in Justin. A material yard will also be established. Contracts for this work have just been awarded.

Pacific Electric Railway, Los Angeles, Cal.—A new substation will be built by this company on Rialto Avenue between E Street and F Street in San Bernardino. The structure will be of corrugated iron and wood and is to be only temporary.

POWER HOUSES AND SUBSTATIONS

Boston Elevated Railway, Boston, Mass.—This company will install an equipment of new substation apparatus comprising two 2000-kw rotary converters and six 700-kva air-blast transformers with two 14,000 cu. ft. pressure blower sets. The order for the equipment has been placed with the General Electric Company.

Holyoke (Mass.) Street Railway.—All contracts for the repairs and improvements on the power house of this company in Springdale have been awarded, and the undertaking is now expected to be completed in October. The last contract to be awarded was for the mechanical stokers, this contract having been given to the American Engineering Company. The contract for the economizers have also been awarded, this going to the Green Fuel Economizer Company. Both of these complete the list of supplementary equipment needed to complete the improvements planned in the power station. The proposed improvements will double the capacity of the railway. The company is spending about $150,000 on the improvements.

Big Horn Canyon Irrigation & Power Company, Billings, Mont.—Included in the plans of this company is the construction of a hydroelectric plant on the Big Horn River to develop 25,000-hp. J. J. Harris, Hardin, president. [E. R. J., May 2, '14.]

Morris County Traction Company, Morristown, N. J.—This company will place in operation in substations at Wharton, Morristown, Milburn and Boonton, N. J., new apparatus comprising seven 300-kw rotary converters, twenty-one 100-kva transformers and four switchboards. The contract for all the equipment has been awarded the General Electric Company.

Interborough Rapid Transit Company, New York, N. Y.—This company has installed two 4000-kw rotary converters and transformers in its substation at 110th Street and Eighth Avenue, New York, N. Y. The apparatus was

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company will add to the equipment of its substation a 200-kw rotary converter, three 65-kva transformers and a switchboard. The apparatus has been ordered from the General Electric Company.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—During the next four weeks this company expects to purchase a 1000-kw, sixty-cycle, three-phase generator and engine for its power house in Ashland.

Manufactures and Supplies

ROLLING STOCK

Vicksburg Railway & Light Company, Vicksburg, Miss., has ordered two single-truck (St. Louis No. 72) cars from the St. Louis Car Company.

Pier Railway, Port Arthur, Tex., has ordered four single-truck cars from the St. Louis Car Company. These cars will have the St. Louis No. 72 truck.

Marine Railway, Brooklyn, N. Y., has ordered two closed single-truck, 30 ft. 6 in. storage-battery cars from the Railway Storage Battery Car Company, to be equipped with Brill standard trucks and GE-1022 two-motor equipments and control.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., noted in the ELECTRIC RAILWAY JOURNAL of May 23, as having ordered six pay-as-you-enter cars, has placed this order with the Preston Car & Coach Company. Destination signs of the Electric Service Supplies Company are specified.

Sanderson & Porter, New York, N. Y., who are operating the properties of the Springfield (Mass.) Street Railway and the Worcester (Mass.) Consolidated Street Railway, have been making a traffic study of these properties with a view of determining the question of providing future rolling stock equipment. Though no definite plans have as yet been made in regard to the equipment, it is likely that a number of open cars will be converted into closed cars, and in addition, new cars may be purchased.

Washington-Virginia Railway, Washington, D. C., noted in the ELECTRIC RAILWAY JOURNAL of March 28, as having ordered five closed cars from the Southern Car Company, has specified the following details for this equipment:

Seating capacity	64
Weight (car body only)	23,000 lb.
Bolster centers, length	28 ft.
Length over vestibule,	49 ft. 4 in.
Width over sills	8 ft. 6 in.
Width over all	8 ft. 9 in.
Height, rail to sills	34 in.
Height, sill to trolley base,	9 ft. 1 in.
Body	metal
Interior trim	cherry
Headlining	Agasote
Roof	arch
Underframe	metal
Curtain material	Pantasote
Gears and pinions	West.
Motors, type and number,	4 West., outside hung
Paint	Sherwin-Williams
Registers	Ohmer
Sanders	Ohio brass
Sash fixtures	Edwards
Seats, style	H. & K.
Seating material	rattan
Trucks, type	Standard 55-C
Varnish	Flood & Conklin
Ventilators	Ry. Utility

Morris County Traction Company, Morristown, N. J., noted in the ELECTRIC RAILWAY JOURNAL of March 28, as having ordered ten all-steel interurban cars from the Cincinnati Car Company, has specified the following details for this equipment:

Seating capacity	50
Weight (car body only)	17,500 lb.
Length of body	36 ft.
Length over vestibule	47 ft.
Width over sails	8 ft. 3¾ in.
Width over all	8 ft. 6¼ in.
Height, rail to sills	34¼ ft.
Height sill to trolley base,	8 ft. 4½ in.
Body	metal
Interior trim	mahogany
Headlining	carline finish
Roof	arched
Underframe	metal
Air brakes	West.
Bumpers	5 in. steel channel
Car trimmings	Dayton
Control	Type K
Couplers	Cin. Car Co. radial
Curtain fixtures,	Nat'l L. W. Co.
Curtain material	Pantasote
Destination signs,	illuminated dash signs
Gears	solid gears
Gongs	14 in.
Hand brakes	Giant
Heaters	Peter Smith
Headlights	Crouse-Hinds
Journal boxes,	3¾ x 7 in., M. C. B. type
Motors	G. E., inside hung
Registers	Internat'l R-7
Sanders	Ohio brass
Sash fixtures	Dayton
Seats,	Hey. Bros. & Wakefield
Seating material	rattan
Step treads	Mason
Trolley catchers,	Earll No. 5
Trolley base	Ohio brass
Trucks, type	Taylor L. B.
Ventilators	Cincinnati
Wheels	34-in. rolled steel
Special devices,	Monitor signal bells, O-B elec. signal equip., Rico sanitary hand straps

TRADE NOTES

Hubbard & Company, Pittsburgh, Pa. have appointed Victor L. Crawford to a position with the company. Mr. Crawford was formerly connected with W. L. Matthews & Brother.

Clark Electric & Manufacturing Company, New York, N. Y., is putting on the market a new type of overhead protective clamping set for use at overhead line crossings. This set is designed to protect the conductor against arcs and to prevent any section of the conductor from becoming strained, due to severe tortional and possibly alternate stresses.

Industrial Works, Bay City, Mich., announces that its Chicago agency, which has been with Mudge & Company, has been discontinued. For the present the Chicago territory will be handled from the main office in Bay City, but in the near future a sales office will be opened in Chicago under the name of the Industrial Works.

Galena-Signal Oil Company, Franklin, Pa., has been conducting an extensive advertising campaign in the daily newspapers by the publication of an official letter of the company recently issued to its stockholders. The letter, among other things, calls attention to the extent of its business, and states that the Interborough Rapid Transit Company and the Manhattan Elevated Railway have been its customers since these two companies were formed; also all the companies operating street cars in New York City and all the lines of the Brooklyn Rapid Transit. The street car department commenced supplying oils to trolley lines and street railways in 1890 and is now supplying the lubricating oils for about 75 per cent of the total street car mileage in this country.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has appointed J. D. Fidler, formerly secretary of the Acme Cement Plaster Company, as traffic and office manager. Mr. Fidler's railroad experience dates back to 1889, when he entered the Dayton and Union Railroad service at Arcanum, Ohio. Until 1908 Mr. Fidler was connected with commercial or traffic railroad work for such roads as the Big Four and Detroit Southern, Toledo, St. Louis & Western, Baltimore & Ohio Southwestern and the Frisco Railroad. In May, 1908, he became traffic manager for the Acme Cement Plaster Company, being appointed secretary in 1910, and leaving that company, on Jan. 1 to join the Walter A. Zelnicker Supply Company. G. H. Dixhold, for twelve years advertising service manager for the Simmons Hardware Company and formerly editor of *Hardware*, New York, N. Y., has been appointed advertising and publicity manager of the Zelnicker Supply Company.

ADVERTISING LITERATURE

Ford Manufacturing Company, Brooklyn, N. Y., has issued Bulletin S describing the company's differential staffless brake.

T. C. White Company, St. Louis, Mo., has issued a catalog describing and illustrating the company's porcelain strain insulators.

Mesta Machine Company, Pittsburgh, Pa., has issued a catalog describing and illustrating its rope drives for steam engines, dynamos and motors.

Link-Belt Company, Chicago, Ill., has issued a catalog describing and illustrating its link-belt portable wagon and truck loaders for loading coal, sand, stone, gravel and other loose materials from ground storage.

Independent Pneumatic Tool Company, Chicago, Ill., has issued a circular describing its Thor portable electric drill for sheet metal work. It may be equipped with d.c. or a.c. motors, and with breast plate, grip handle, screw feed or button handle, as desired.

Barrett Smith, Boston, Mass., has issued three advertising leaflets relating to three patrons of this advertising management, Stone & Webster Engineering Corporation, Boston, Mass., Lombard Governor Company, Ashland, Mass., and Daigneau & Company, Salem, Mass.

Chance Manufacturing Company, Centralia, Mo., has issued Bulletin No. 3, describing its never-creep anchor for use in connection with trolley spans on curves. This anchor pulls entirely against solid and undisturbed earth. All the disturbed and moisture affected earth is below and behind the anchor.

Gold Car Heating & Lighting Company, New York, N. Y., has issued a catalog describing and illustrating its various types of ventilated core electric heaters, electric heater fronts and cases, spring clip terminals, improved rod type electric heaters, thermostatic control apparatus and ventilators for railway cars.

Industrial Works, Bay City, Mich., has issued Bulletin No. 212 describing its power wheel and high-power clamshell buckets used by contractors, coal dealers, power houses, railways, steel plants, ore docks, cement mills, chemical works and smelters for handling earth, coal, coke, ashes, ore, rock, ballast, gravel, sand, etc.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued its sixth bulletin giving comparative results of tests on standard open-hearth rail and on titanium-treated rail. The bulletin contains the remarkable series of sulphur prints, etchings and micrographs that have characterized the previous bulletins and presents a detailed discussion on the results obtained from the chemical analyses and from the physical tests on strength, elongation, hardness, impact resistance and endurance that were made upon the samples which were sent in by a large eastern steam railroad.

Texas Employers' Insurance Association of Taxes, Dallas, Tex., created in accordance with the employers' liability act, has issued a prospectus describing the organization, rates, legal aspects and probable cost of administration of the association. This association was formed for the sake of providing employers in the State of Texas protective insurance against injuries to workmen coming under the new compensation law. It is restricted in membership to employers of labor in the State and to those employers who elect to provide workmen's compensation instead of standing on the three old common-law defences. Membership in the association results in an injured employee having no cause of action against the employer but against the association. Moreover, if an employee brings suit against an employer for common-law damages instead of compensation the employer is protected, for he can recover from the association the amount of judgment and costs. It is estimated that the cost of administration will not exceed 15 per cent. of the premiums and probably not half that percentage after its costs and benefits are fully understood. The rates of the association are about 35 per cent less than those filed and approved by the stock companies of the State prior to the organization of the association.

NEW PUBLICATION

The Careful Investor, by Edward Sherwood Mead, Ph.D. J. B. Lippincott Company, Philadelphia, Pa., 283 pages. $1.50 net.

The author is professor of finance in the Wharton School of Finance and Commerce, University of Pennsylvania. Two previous books by him, "Trust Finance" and "Corporation Finance," are classics of their kind and indispensable to the student of corporation problems. The present volume differs materially from the others. It was contributed in part originally for magazine publication. This accounts, perhaps, for the chapter heading "A Lamb in the Stock Market," with which the book is introduced. The author has clearly described the different forms of investments, showing the advantages of some over others, the dangers to avoid, etc. There is much information in the book of value to the younger men in the electric railway industry, particularly in the chapters "A Reasonable Return," "Public Service Corporations," "The Public Utility Company" and "The Public Service Corporation and the City." Few of Professor Mead's statements seem to be open to criticism. He has illustrated briefly by citing the Chicago, Philadelphia and New York franchises how the problem of the relations between the cities and the public service corporations are being worked out. He has also used the electric railway industry to illustrate the law of increasing returns. Professor Mead says that there is only one sure test of the character of a banking house—its record of flotations. His advice to the investor in short is that before buying he investigate the record of the house which offers the securities.

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MR. MELLEN ON GOVERNMENT OWNERSHIP

Charles S. Mellen, formerly president New Haven Railroad, has added to the extraordinary testimony which he has recently given before the Interstate Commerce Commission by declaring that public ownership of railroads is inevitable, and from the context of his remarks it seems as if he considers that such a result would be desirable. Mr. Mellen, whose opinion on this subject is quoted in the New York *American* for last Sunday, reaches this conclusion by the following system of logic: Public utilities are naturally monopolies; monopolies mean power, and power in private hands is practically always accompanied by abuse. The boards of directors of large railroad corporations only nominally represent the stockholders. Actually they are under the control of financial bosses who make enormous profit from their control of the railroads. The present "exorbitant" salaries paid to the executive officers of railroads are given to keep them quiet and subservient to these bosses. If the possibility for this abuse was stopped and if there was full publicity of the accounts, those who control the railroads would be willing to have public ownership come, and the men who are now operating the lines would be willing to remain as operators in the service of the public. The service which the public enjoys would therefore be the same as at present, while the management would be free from the pressure above and other temptations.

THE IRRESPONSIBLE POLITICAL BOSS

We agree with Mr. Mellen that there have been evils in private ownership, a conspicuous example being that of the road of which he had charge. But if he had put into force ten years ago the rules which he now recommends of strict accounting, of making the directors direct and of full publicity in regard to all matters connected with his property, many, if not most, of the evils which the New Haven Railroad has undergone would not have occurred. On the other hand, with public ownership there would be the same troubles, but multiplied a thousand times, as those to which Mr. Mellen calls attention in his excoriation of private ownership. It may be true that absolute power is usually abused, but the possibilities of such abuse by the executive under private ownership is prevented in a number of different ways. The power which he can exercise is checked by the financial interests in control of the property, by directors who direct, by the regulatory commissions, by the officers of the law, and by public opinion, provided there is publicity so that all action by the railway officials is known. But it would be difficult to conceive of a more arbitrary and irresponsible body than a political organization in power under the present system of American politics. The regulatory body, if there was any, would be of the same political stripe, and it is hard to make public opinion effective in any political contest where the patronage is considerable, as has been shown in many instances in the case of Tammany Hall and other well-intrenched political organizations. There are many objections to the government ownership of public utilities, but one of the greatest is the power which it would confer on the irresponsible political leader. There is good precedent for the rule that until our elected officials can show a good stewardship over the few things which they now have committed to their direction, it would be the height of foolishness to make them stewards over many things.

A BASIS FOR COMPARING CAR WEIGHTS

In a communication on another page of this issue, J. R. Harrigan, general manager, Kansas City, Clay County & St. Joseph Railway, makes some interesting comparisons of weight between the all-steel cars with which his road is equipped and the sample car for the Michigan Railway which was described in our issue of May 16. Mr. Harrigan's figures lead him to a conclusion that is almost exactly the same as that drawn by F. M. Brinckerhoff in a communication published last week, and he cites the fact that on the basis of weight per seated passenger the Michigan cars are almost twice as heavy as those of his own line. This basis of comparison is, of course, always productive of interesting results. The business of most electric railways is the transportation of passengers, and in the end the passenger is the unit upon which comparisons must rest. But in the case in question, where space in the car has to be provided for baggage and express, this condition does not hold, and the seated-passenger basis becomes misleading. Of course, this unit has survived regardless of numerous attempts to displace it, and for city cars it is admittedly the best possible universal basis for comparing car weights. Nevertheless we cannot pass by this opportunity to call attention to its weakness when applied to interurban cars and to urge again the use, in such cases, of the more accurate unit available in the weight per foot of length of car body, exclusive of trucks and equipment. With the steel car, which is now coming prominently under consideration, the body alone offers a fertile field for analysis, and the inclusion in a question of weight of the trucks and equipment certainly does not clarify the issue.

SCHEDULES IN STEAM FOLDERS

At this season when electric railways are making up their time-tables and other advertising literature for the summer business, they should not overlook the publicity channel afforded by the similar publications of the connecting steam railroads. An excellent example of such enterprise as initiated by a steam railroad is afforded by the useful booklet which has been issued this spring by the Lehigh Valley Railroad on the transportation service of all the electric railways within its territory. Within the compass of twelve pages, the schedules and rates of fare are given in alphabetical order for several hundred towns. This compactness and convenient form of reference is obtained through the use of a simple key. Thus numerals opposite the locality correspond to the name of the electric railway, while letters are used to indicate the headway which obtains for the greater part of the day. In this way practically all the information that the prospective passenger needs is in one pocket folder so that he can plan for more extensive trips than if he had to look for individual time-tables as he traveled from line to line. It is not to be expected that a steam railroad should advertise a paralleling electric service, but it serves its best interests when it gives the widest possible publicity to the fact that hundreds of attractive spots can be reached best by a combination of long-distance steam railroading and short-distance trolleying.

DOING LITTLE THINGS IN A BIG WAY

In the paper by Charles H. Coe abstracted in last week's issue of the ELECTRIC RAILWAY JOURNAL, the writer showed a Lamb-like tendency to bring our popular adages into contempt. Said he, in substance, "We have a-plenty of leaders but not enough good men in the ranks." If this is true, what is to become of "There is plenty of room at the top" and other familiar letters in the alphabet of progress? And yet Mr. Coe must know of what he is talking about, for he has the task of instructing hundreds of men each year in the duties of platform men, who have to do little things well. Granting for the sake of the argument that he is right, it is fair to ask why it is so difficult to get men to do little things in a big way—that is, to do them well. Is it not because some workers fail to realize the dignity and importance of their work? There is certainly no more important work in the transportation field than the proper operation of a car. When one considers that the owners of a car place in the care of two men a piece of property worth from $3,000 to $15,000 and assume the moral and financial responsibility for the damage which these men can cause, the latter should feel a great sense of responsibility. While it may be true that it is difficult to get men to do this our observation leads us to believe that a large proportion of them do take their work and themselves seriously. As in other cases, it is the conspicuousness of the occasional exception which proves the existence of the rule.

THE NEW YORK CENTRAL SHOPS

The Harmon shops of the New York Central Railroad, which are described elsewhere in this issue, consist of a combination of general schemes which is unique in both electric and steam railroad practice. The shops are designed to care for electric locomotives and motor cars, and the advantages of overhead cranes for the latter purpose have been combined with the use of drop pits for handling the heavy driving wheels of the locomotives by extending the transfer pits in the locomotive shop so that they are served by the cranes in the car shop.

The arrangement is, of course, adapted peculiarly to the needs of the New York Central locomotives which are characterized by having armatures mounted directly upon the driving-wheel axles, but with such equipment it is singularly effective, because with locomotives of this simplified design there is nothing of great weight that requires lifting when repairs are made except the air compressor and heater boiler. These can be taken out of the cab by one of the overhead cranes in the car shop and promptly replaced by new pieces without holding the engine on a car-shop track for more than a few hours.

The car-shop arrangement with through tracks and bays running transversely with the length of the building is unique only in the number of tracks housed under the single roof. The scheme of having an overhead crane to serve two tracks along which it moves longitudinally has been used elsewhere in several instances, but by limiting the track length to 180 ft. and by adding two-track bays with cranes to give the required track space the designers have provided a compactness of arrangement and a rapid means for transporting material that is most desirable.

Contrary to the usual custom, the shop floors are depressed alongside the tracks as is generally done only in the case of inspection sheds. This scheme, however, has been found to work out very satisfactorily in practice. The general movement of material to and from the machine shop and storeroom is, of course, at right angles to the pit tracks, but as passageways with floors at rail level are provided at each end of the pits and connected to the depressed portions of the floor by ramps, no difficulty of transporting material is experienced.

Power is supplied within the shops by overhead trolleys, of which some carry reduced voltage. These have pendant connections, and the general use that is made of this convenience could be copied to advantage in many electric railway shops throughout the country. Workmen are never seen pinching or pushing trucks from place to place. Invariably temporary connections are made to the motor leads, and the trucks are made to move themselves as desired. An enormous amount of time and trouble is saved in this way, and it is undoubtedly due in part to this as well as to the other labor saving devices, such as individual traveling cranes for the machine tools in the machine shop and the telpher operating in the machine shop, storeroom and car-locomotive shops, that such rapid and satisfactory work is turned out by the shop force. Hand trucking and the use of slow and costly hand jacks seem to have been absolutely eliminated.

A STRIKING EXAMPLE OF THE VALUE OF PUBLICITY

When the thirty-five railroad systems that are appealing to the Interstate Commerce Commission for permission to increase freight rates prepared to present their case, one of the first things done was to arrange that the arguments and evidence should reach the public ear as well as the ear of the commission. To accomplish this, bulletins were prepared and have been sent out two or three times a week to the newspapers and other publications of the country, to legislators, members of Congress, governors, college professors, commercial organizations, shippers and everyone else who would have an interest in, or whose opinion would be likely to influence the case for or against, the railroads. These bulletins set forth the railroads' cost of living, and from every possible point of view presented the reasons why the railroads should be allowed to increase rates. The bulletins are confined to matter filed with the commission either in the form of testimony or argument; they are broken up into brief paragraphs with an ample number of subheads and black type to bring out, so that he who runs may read, the important points in the case.

Senator La Follette thinks that this effort to lay the case for the railroads before the public was a crime, and he proposes to prohibit by law anything of the sort in the future. So far as heard from there is no one but the Wisconsin Senator who holds this view. On the other hand, the railroads have been congratulated upon the frankness and effectiveness with which they have set forth their case. A newspaper editorial before us says that "One of the very best things the railroads have done recently was to inform the public about their own business. They did this through the issue of a great number of statements. It was a campaign of education that shed light upon rates and needs, wages and earnings, income and outgo, about which the public, which foots the bills, was ignorant."

There is no danger that this form of public education will be prohibited. It is, in fact, encouraged by common sense and approved by the sense of fairness which has not disappeared from the earth, even with respect to railroads. Even the murderer and the burglar are entitled to their day in court. But this phase of the case hardly requires affirmative argument. The methods and successes of the steam roads' campaign in behalf of increased freight rates is referred to more for the purpose of emphasizing the value and necessity of this kind of public education on behalf of the electric railways of the country. In some respects their need for higher rates has been overshadowed by the demands of the steam railroads, but the necessity in their case is certainly no less.

THE OPERATING RATIO

One of the most common units of comparison presented in electric railway financial reports and used by the investor is the operating ratio—that is, the percentage which the operating expenses bear to the gross operating revenues. There are, however, two strong objections to the use of this figure for comparative purposes. In the first place, different companies pursue various methods for the inclusion of certain items in operating expenses, such as taxes and depreciation charges. It is unnecessary to say that the operating expenses of two roads are not comparable unless items identical in character are included therein.

In the second place, the operating ratio considered by itself is useless for comparison even in cases where the operating expenses do contain analagous items unless full allowance is made for differences in operating conditions. For instance, when one realizes that the operating ratios vary as greatly as from 36.4 on the Hudson & Manhattan Railroad and 41.76 on the Interborough Rapid Transit Company to 66.1 on the Detroit United and 69.02 on the Boston Elevated Railway, the necessity of a knowledge of all of the qualifying factors is evident. Differences in length of track, character of roadbed and rolling stock, grades, equipment used, character of territory traversed, cost of labor, relative importance of allied industries and many other factors have more or less effect on the amounts expended yearly for operating expenses and hence on the operating ratio. Moreover, the financial policies of the companies may make comparisons ineffective, as, for example, when one railway charges as much as possible of permanent improvements to maintenance and the other as little as possible.

The operating ratio is of value, however, as affording a means of approximately judging the performance of two companies operating under approximately the same conditions or of the same company during a series of years if the same general policies in regard to the accounts are followed. It will not tell, of course, where any differences lie, but a very high or a very low operating ratio will often call attention to the necessity of detailed comparisons. Hence, in making a comparative analysis of the operating ratio from year to year, it is wise to consider separately the main features of the operating expenses, for only in this way can the trend of fluctuations in the various groups be traced. The value of this method may be seen, for example, in the case of the conducting transportation expenses, where as low an increase as possible in connection with increased traffic and increased passenger revenues is an important measurement of operating efficiency.

In some cases where there is a large rise or fall in the gross operating revenues it is better to base efficiency percentages simply on the operating expenses. The reason for this is that the change in the gross operating revenues renders percentages based thereon unserviceable for comparison unless there is a corresponding change in the operating expenses. Under such conditions it is preferable to use the relation of each operating expense division to the total operating expenses. Then, if there is a radical change in the individual group percentages during the period with only a slight change in the total operating expenses, the indications point to something wrong.

These are points which a railway desiring to publish a complete annual report may well bear in mind. By giving an analysis in the body of the report to show the changes during the period in the component parts of the operating expenses, on one basis or the other, the company would afford the stockholder and the investor a better opportunity to judge the efficiency of the management. Some railways at present show these increases or decreases in amounts, but it would be better to show them in percentages, for these show variations to a finer degree.

THE WASHINGTON HEARING AND THE ASSOCIATION

The hearing in Washington on the subject of the proposed municipal operation of the electric roads in that city and the protest made by the American Electric Railway Association on the proposed bill furnish an example of what can be done by united action. With the exception of President King of the Washington Railway & Electric Company, all of the speakers who protested against the bill before the House committee were in no way directly connected with the immediate issue. They went to Washington because they believed, correctly, that the principle of private ownership and operation in other cities in the country might be affected by the plan suggested for Washington, and they were willing to contribute their experience for the benefit of the railway companies and the citizens of that city so that no mistake would be made. It was a situation which demanded prompt and co-operative action, and the services of those who understood best the fallacies of the municipal ownership propaganda were promptly volunteered. The different speakers were promptly notified that the request for a hearing on the merits of the bill had been granted by the committee in charge, and for six days, two days during each of the past three weeks, representatives of the railway industry in different sections of the country went to Washington and presented the most comprehensive collection of statistics on the subject of the municipal operation of electric railways which had ever been prepared. Such a series of statements cannot but have an important influence upon any unbiased set of men who read them, and should have their effect upon the committee and upon the House of Representatives to which the committee will report.

The situation at Washington may be duplicated at any time in any one of a large number of cities in this country, perhaps not in regard to municipal ownership but upon some other important question. This is one reason for the maintenance of the American Electric Railway Association. It is the agency through which the specialized knowledge of the country in regard to matters which arise can be made available for the use of any member company. What was done in Washington can be done in any other city if the occasion arises and the call for help comes.

INNOCENCE AT SAFFRON HILL

We are loath to believe in metempsychosis, yet ever and anon come stray bits of evidence from the circumambient ether or elsewhere that almost persuade us to confidence. Just now comes a projection of odic force or something like that, from an etheric vibrator, or its kin, at Saffron Hill, which suggests with convincing force the reincarnation of the late Prof. Keeley. A French gentleman with a long enough American experience to acquaint him with the commercial value of publicity, has been weaving spells about the London daily press in a way to suggest the finest efforts of the lamented M. Svengali. By tradition one looks upon the London newspaper man as partaking somewhat of the hard-headed materialism usually attributed to his country, but in this instance he appears in the genial confiding rôle of a Wall Street lamb.

The inventor of the latest traction marvel, 300 miles an hour at no particular expenditure of energy, seems to have taken his cue from the alleged exploit of the Fish Commission of crossing the shad with the jelly fish to avoid bones, and has produced a fearsome blend of the late New England Portelectric system with the principles of electric dynamic repulsion enunciated by Prof. Elihu Thomson in a notable lecture before the Institute some twenty-odd years ago. His car, cigar-shaped as befits all of its kind, is hurled through space by the attraction of a series of solenoids distributed along the track. Meanwhile it is booted out of contact with the supporting structure by a series of alternating current magnets which impel it as it flies through space. It has no wheels save those supplied by the inventor and the admiring reporters. The result is, according to the inventor, that it practically eliminates all friction by floating in the air and can be driven at almost any speed desired with the expenditure of very little power. Besides such an achievement as this the Brennan monorail system and all that has gone before it sinks into utter insignificance. If two sets of wheels imply formidable friction and one set of wheels very little, then surely no wheels at all should bring complete escape from all the confines of dynamics. And the most delightful feature of the invention is that reporters, politicians, a worthy admiral or two, and other non-technical persons seem to have taken it with true British seriousness. A friendly acquaintance with our engineering confrères on the other side of the water had almost persuaded us that the supposed inability of the Briton to see a joke was baseless slander, but the incident of Saffron Hill brings us grave evidence to the contrary. We have looked in vain for a telltale "Adv." at the bottom of the newspaper accounts of this marvel, and have wondered.

To be serious, we do not fancy that our American readers, hardened as they are by a long series of epoch-making inventions that have not worked, will attach very much importance to this latest marvel, nor do we think that American tramways will be denied sufficient capitalization to lay tracks and run motors thereon for some time to come. The American investor now hails from Missouri, although to judge from these latest reports, a sanitarium in that exhilarating climate might profitably be colonized from London. We shall await further details of the hypnotic project from Saffron Hill with vast interest. In the meantime we shall only suggest that those who think that M. Bachelet has discovered a new principle in transportation might look up with advantage the history of the other systems which have been proposed along this line. The same objection applies to them all and is expressed in our comments on the Albertson car about ten years ago, when we said editorially, "Why this struggle to avoid the smallest item of resistance at high speeds? Has not the Professor ever heard of air resistance, or does he plan to run his train in vacuo? If rolling friction, due to weight on the wheels, and track resistance properly so called, were the only obstacles to high speed, railroading would be a joy forever. The hundred-mile-an-hour train would be a back number, and no up-to-date witch would ride anything so slow as a broomstick."

THE NEW YORK MUNICIPAL CAR

Elsewhere in this issue is published the first of several articles on the remarkable car which the New York Municipal Railway Corporation has developed for rapid transit subway and elevated service. A large number of new features have been embodied in the design, construction and equipment of this car, and these will be described in proper course, but the departure which stands out most prominently as compared with previous cars for like service is the use of a width of 10 ft. and a length of 67 ft. to produce a vehicle which will carry a total of 270 passengers under the care of one trainman.

It is a remarkable fact that when the Public Service Commission of the First District, New York, was criticised at an open meeting of engineers held Oct. 17, 1910, for adopting a greater width for future subways not one of the speakers referred to the possibility of wider rapid-transit cars being used to advantage in them. Even the Commission defended the greater width on the ground that it permitted the use of the subway by electrified suburban lines operating cars narrower than Pullmans but say 2 ft. wider than the usual city rapid-transit car. It was, therefore, a most original and happy conception on the part of the New York Municipal Railway Corporation to adopt the widest possible car and thus make really effective use of the more liberal clearance. Furthermore, as the existing lines were to be operated in conjunction with the new ones, the decision for a wide car involved also the unusual procedure of adjusting the old lines to accommodate the new car, but the changes thus required will be a minimum because the new car will impose no appreciably greater wheel loads on the present elevated structure than many of the smaller cars now running over it. The net gain of the change thus made is 25 per cent in possible track capacity alone. To be sure, no one can foretell when the ultimate track capacity of the new routes will be reached or on what sections it will first come, but it goes without saying that a 25 per cent increase over the present rush-hour saturation capacity of the New York subway would be a boon indeed.

Those who have followed interurban and electrified suburban car development are aware that cars of equally large dimensions have been built before, but so far as we know this has never been the case with such a combination of low weights, modest motor equipment, high schedules and enormous passenger capacity. The low weight is a revelation of the merits of the side-girder construction, for here is a high-speed motor car that in pounds per seated or standing passenger actually weighs less than surface cars constructed within the last decade. The use of only two 140-hp motors to propel a car weighing 61.4 tons when fully loaded at express schedules of 25 m.p.h. and maximum speeds of 50 m.p.h. is startling in comparison with the previous use by the same management of two 200-hp motors under an elevated car weighing 46.6 tons. No better proof could be found of the merit of the new tap-field motor than this comparison of equipments.

The impressive dimensions of the N. Y. M. car certainly have been utilized to the best possible extent. Obviously end doors alone were out of the question in a car 67 ft. long. The first thought would be to add a center door, but in this instance three pairs of double side doors are used, and these are located so as to divide the amount of passenger interchange as evenly as possible. Even during the hours of light traffic passenger movement will be faster than in other rapid-transit cars, for one-half of each doorway will still be available. In this connection, also, it should be stated that many of the stations will be furnished with ticket offices and stairways at each end instead of at the center only. This arrangement will avoid the common defect of long-train loading at many of the older designs of subway and elevated railway passenger stations where the middle cars of trains are crowded at the very time that the end cars are not even filled to their full seating capacity. Thus there is no question about the feasibility of this high-capacity car from the standpoint of quick station loading and unloading. Furthermore, as the present Brooklyn trains are never operated with less than two cars, it cannot be said that the new car will be too big for the minimum service requirements.

The comparisons with earlier types of city rapid transit cars as made in the article are offered in no invidious sense. Each car represented an advance in the art at the time that it was built, but its dimensions were usually fixed by ironclad limitations. The N. Y. M. design, however, incorporates with splendid advances in car construction and equipment a degree of foresight that makes it stand out among the cars of to-day as the new *Vaterland* and *Aquitania* do among the giants of the sea.

Harmon Shops of the New York Central Railroad

The Repair Work for the 192 Motor Cars and the Fifty-seven Electric Locomotives in Service on This Road Is Handled in a Single Shop Possessing Numerous Original Features of Design—A Description of the Shop and Its Equipment Is Published

All of the repair work on the electric locomotives of the New York Central & Hudson River Railroad is done in a single shop located at Harmon, N. Y., and as the shop buildings and their equipment possess many original features of design which undoubtedly assist in producing the remarkably low maintenance costs obtained by this company, a description of the installation is given in the following article.

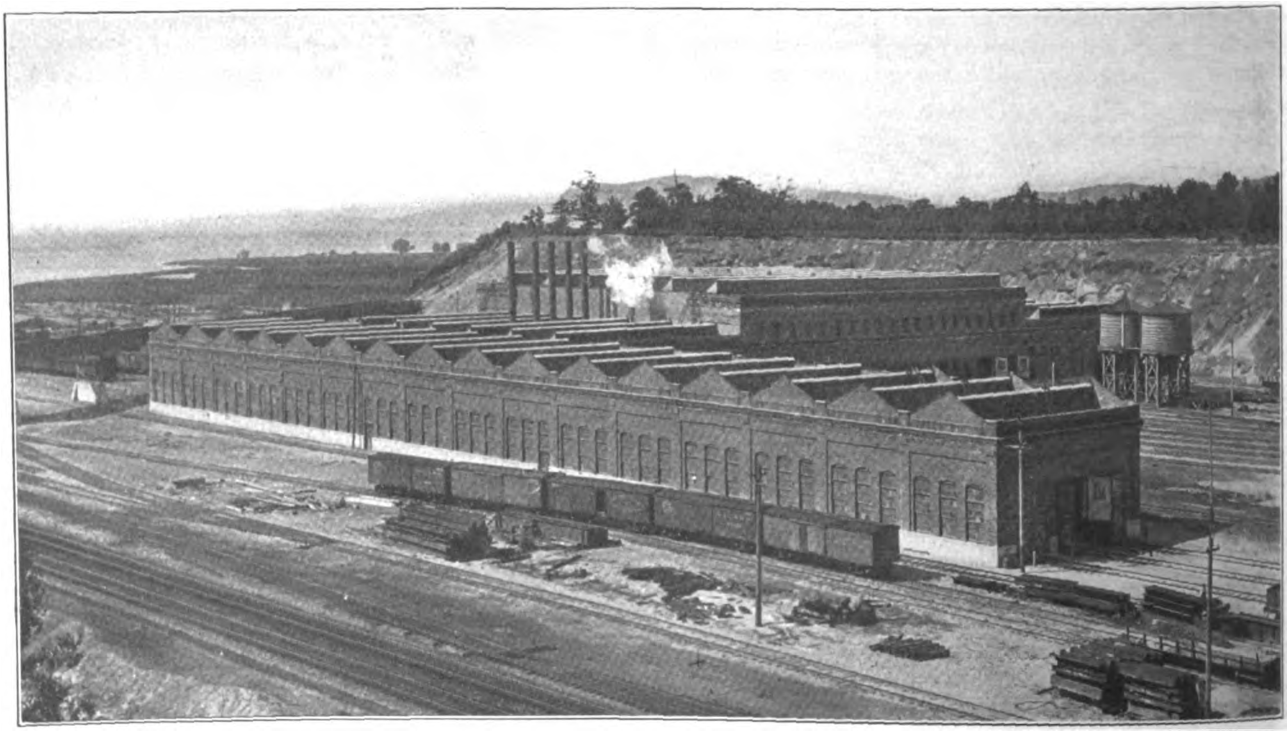
The shop is located at the approximate end of the main line electric zone, and at this point is made the change of motive power from electricity to steam. In consequence, the installation at Harmon includes a large roundhouse with complete terminal facilities for steam locomotives as well as the repair shop for the electric locomotives and cars. However, the organization for the care of the steam locomotives is entirely separate from that for the electric equipment, the electric zone being considered as a separate division. The shop facilities for the electrical equipment include, in addition to the main repair shop, a running-inspection shed through which pass all electric locomotives on their arrival at the Harmon terminal, and a local power house which supplies both the steam locomotive roundhouse and the electric locomotive shops with power, heat and light. This is under the jurisdiction of the electric division.

RUNNING-INSPECTION SHED

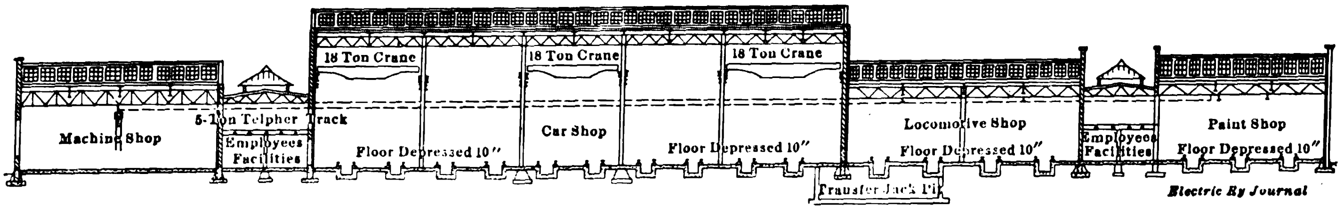
The running-inspection shed, which is 400 ft. long x 25 ft. wide, is of wood-frame construction covered with corrugated galvanized iron, this temporary design being used on account of the possible extension of the electric zone. It houses a single track with a pit which extends for practically the full length of the building, and the floor, which is of concrete, is depressed about 8 in. below the top of the rail. The rails are fastened to longitudinal wood stringers with screw spikes. At 20-ft. intervals in the sides of the pit are compressed air connections and lighting plugs for portable lamps. The building is heated by forced circulation of hot water through pipe coils on the wall, a hot-water heater being installed at one corner of the shed. Tungsten lamps of 250-watt capacity are used for lighting, power being supplied from a local lighting circuit.

As all engines go through the running-inspection shed upon arrival at Harmon, sand, oil and water for the heater boilers are supplied to them at this point, and space is provided in the building for oil cans as well as storage for oil and waste. There is a sand bin over the center of the building and the sand boxes on the engines are filled from this by gravity, a pair of hoses extending downward from each side of the bin. The bin is supplied by a sand elevator of the bucket type which raises the sand from a pit alongside of the building, the latter in turn being supplied direct from the steam-locomotive sand-drying plant by sand cars which are emptied into the pit.

No third-rail is installed in the running-inspection shed. There is, however, a contact device which consists of an insulated pipe hung by offset brackets from a board, which is in turn attached to the roof trusses. The pipe contains a cable carrying 600-volt current, and the cable is bonded to the pipe at frequent intervals. On the pipe runs a small trolley with two wheels above and one below the pipe, and from this hangs a flexible cable incased in rubber hose. At the end of the cable is a long wooden handle with an iron shoe at the end that is connected to the flexible cable by means of a wire run through the center of the handle. This device is used for moving the locomotives in the running-inspection shed, the iron end being placed in contact with the third-



Harmon Shops—General View of Main Shop Building


18 Ton Crane
18 Ton Crane
18 Ton Crane
Machine Shop
5-Ton Telpher Track
Employees Facilities
Floor Depressed 10″
Car Shop
Floor Depressed 10″
Locomotive Shop
Floor Depressed 10″
Transfer Jack Pit
Employees Facilities
Paint Shop
Floor Depressed 10″
Electric Ry Journal

Harmon Shops—Cross-Sectional Elevation of Main Shop Building, Looking North

rail shoe on the locomotive, thus supplying it with power. Two of these trolleys and cables are installed in the shed.

GENERAL SHOP ARRANGEMENT

As shown in an accompanying line cut, the shop arrangement is a transverse one with yard tracks extending direct between the running-inspection shed and a ladder track that serves the various doors in the main shop building, which houses all of the departments under a single roof. It should be noted that a large part of the work done in this shop is necessitated by the 192 motor cars and nineteen trailers used for the local trains on the electric zone, and that the work on the fifty-seven electric locomotives necessitates only a small portion of the shop area actually provided.

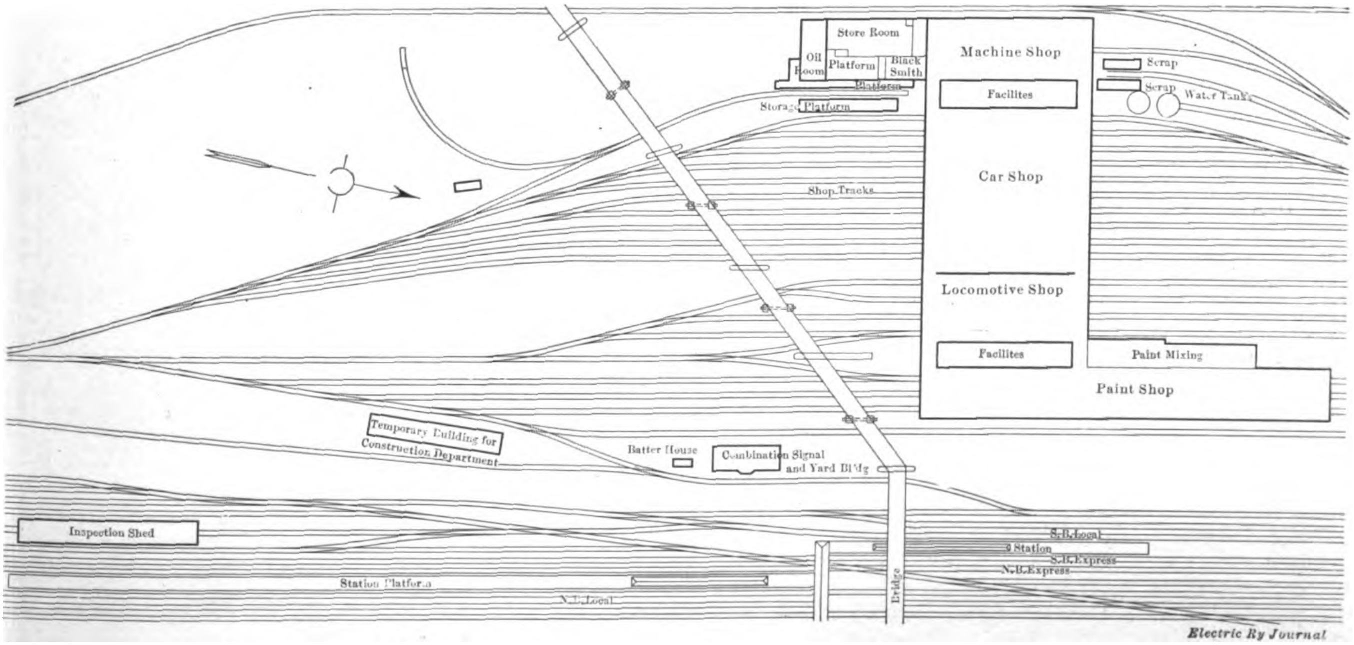
As shown in the general plan, the building includes a paint shop at the east side which is provided with three longitudinal tracks and has space for eighteen cars. Next to the paint shop is the locomotive repair shop, provided with four tracks extending through the building, and beyond the locomotive shop is a car shop which has ten tracks, both shops being 182 ft. long. All of these tracks are provided with pits and the floors are depressed 12 in. Passageways extend along the doors at both ends of the building. The floor here is at the elevation of the top of the rail, being connected by ramps to the depressed portion of the floor. West of the car shop is a machine shop 182 ft. long and 66 ft. wide, and south of the latter is an addition 140 ft. long and 66 ft. wide which houses the storeroom, oilroom and blacksmith shop.

The various shops are heated by an indirect, hot-air system which has two separate fan and steam-coil rooms located at different ends of the structure. The artificial lighting is effected by tungsten lamps, and ample natural lighting is provided through the saw-tooth roof construction that is a characteristic of all the buildings. Steam for heating is furnished from a power house located to the west of the main shop building. This supplies steam also to the steam locomotive roundhouse, in which are housed the locomotives for handling trains north of Harmon. There are no third-rails in any of the shops, but overhead trolleys with flexible hanging connections similar to those used in the running-inspection shed are installed for all tracks, including the transverse track in the passageway at the north side of the locomotive and car shops.

In the locomotive shop the two tracks at the east side are used for inspection only. The two tracks at the west side of the shop are provided with transfer pits in which are jacks that travel on rails under the floor to the car shop. The jacks are thus served by an overhead electric crane which is in the east bay of the latter shop.

Facilities for transporting material to the various pieces of apparatus between the different shops are provided by the passageways that extend along the north and south sides of the locomotive and car shops as these are continued into the machine and paint shops. Over the south passageway a 5-ton telpher track is installed, and this is connected in the machine shop through a switch to another track running longitudinally through the machine shop and storeroom. In the passageway at the north side of the locomotive and car shops there is a standard gage track. This extends into the machine shop across a turntable 13 ft. 8 in. in diameter and furnishes a means for handling wheels and trucks between the machine shop and the various tracks in the other shop buildings.

In the paint shop, which is 448 ft. long, are installed the customary adjustable scaffoldings for the use of the painters. Along the west side of this shop are a series of rooms providing employees' facilities, a small wood-


Store Room
Oil Room
Platform
Black Smith
Platform
Storage Platform
Machine Shop
Facilites
Scrap
Scrap
Water Tanks
Car Shop
Shop Tracks
Locomotive Shop
Facilites
Paint Mixing
Paint Shop
Temporary Building for Construction Department
Batter House
Combination Signal and Yard Bl'dg
Inspection Shed
S.B.Local
Station
S.B.Express
N.B.Express
Station Platform
N.B.Local
Bridge
Electric Ry Journal

Harmon Shops—General Plan of Shop Buildings and Tracks mill, space for the fan and coils of the heating system, for paint mixing, and for sash and door storage.

The storeroom, which is located south of the machine shop, is of moderate size although all stores required for the electric equipment are maintained at this point, except a small stock at North White Plains and another still smaller stock at the Grand Central Terminal. At the north end of the machine shop are two scrap platforms each elevated 2 ft. above ground level and both served by a single track between them which is depressed about 2 ft. below ground level. Each platform is 30 ft. long x 10 ft. wide but the amount of scrap on hand is normally small in amount, the material consisting mainly of old tires, brakeshoes and resistance grids.

SHOP EQUIPMENT

No overhead cranes are installed in the locomotive repair shop, but as previously mentioned there are two transfer jacks in deep pits. One of these is of 40 tons capacity and it has a short platform for use in dropping single pairs of wheels. The other is a 75-ton jack with a platform long enough to handle the truck of one of the new type of articulated locomotives. Both of the transfer-jack pits are carried under the wall between the locomotive and car shops, and they extend for 10 ft. into the east bay of the car shop so that wheels or trucks may be transferred by the jacks into this bay, picked out of the transfer jack pit by the 18-ton, overhead traveling crane and placed on the transverse track at the north side of the car shop for transfer into the machine shop.

In each of these jacks the platform under normal conditions is locked in place on cast-steel guides that hold the platform at the ends, so that the rails crossing the platform surface are maintained in line with the rails at each side of the pit. On the under side of each platform is a cap into which fits the top of the ram on the jack when the platform is to be dropped, but when the jack is not supporting the platform the latter is supported at floor level by hand-operated dogs that lock into the vertical guides.

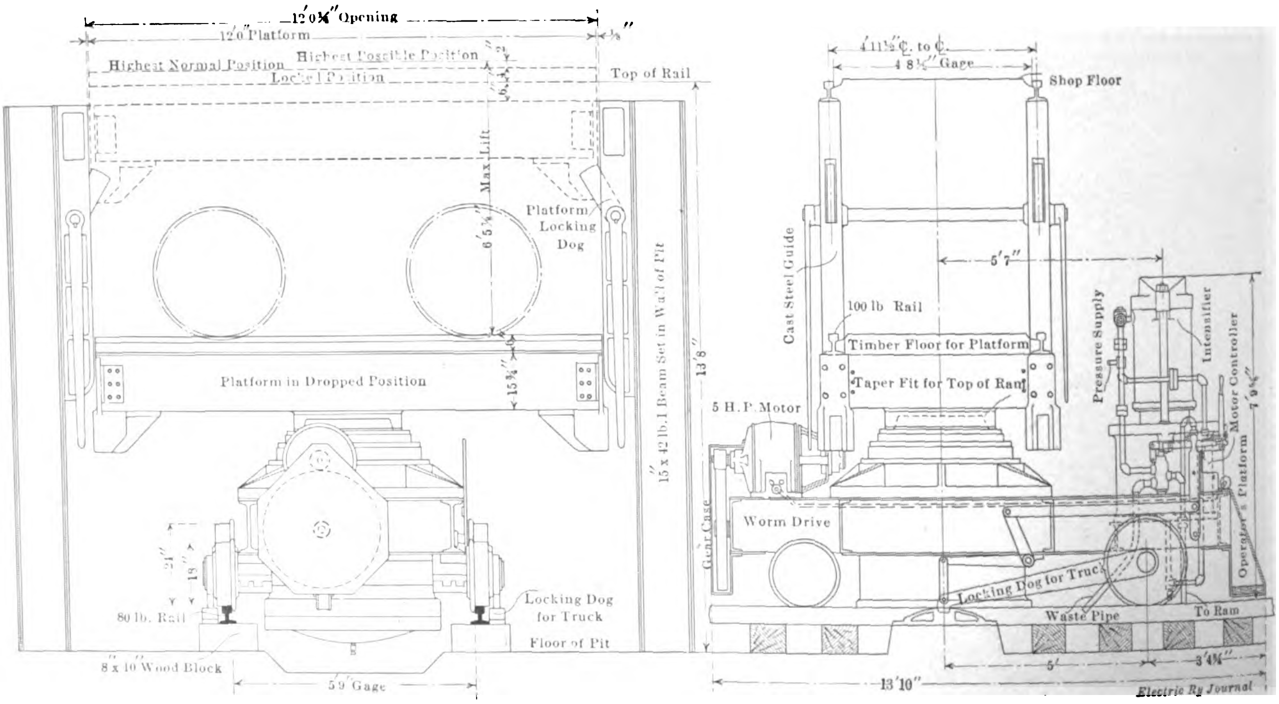
The rams of the jacks telescope in three parts and are operated by water supplied from the shop system at a pressure of 100 lb. per sq. in. The ram is carried on a truck which has one of its axles geared to a driving motor so that the truck may be moved along the pit as desired. Current is supplied to the motor by a flexible cable which can be connected to the lighting circuit by plugs in the sides of the pit. The transverse movement of the jack is effected at the low speed of 9 ft. per min., and the motor is geared to the truck axle through a worm. The truck is locked in position for operating by dropping a dog connected to one of the axles into a notched shoe alongside of the track, the cast-steel guides above mentioned extending only part way down into the pit so that when the platform is fully lowered the guides do not prevent its horizontal movement in the pit.

These jacks enable the shop force to remove and replace a pair of wheels in about three hours. Each of them is equipped with an intensifier that triples the pressure on the ram when desired, so that the springs of the engine from which the wheels are removed may be compressed 6 in. and blocked. In consequence, provision is made for the platform to be raised 6 in. above the shop floor level. The normal pressure is, however, used for all ordinary movements of the ram, which are made at high speed without use of the intensifier. The arrangement of the 40-ton jack is similar to that of the 75-ton jack shown in an accompanying line cut.

Overhead, 18-ton, traveling, electric cranes are provided in alternate bays of the car shop. These are operated by pendant cords from the floor. Crane girders are, however, provided in all bays so that those bays not now equipped may be provided with cranes in future. All three cranes travel for the full length of each bay and include the wheel track at the north end and the space served by the overhead telpher at the south end of the shop.

In the machine shop there are two turntables. One of these, as previously mentioned, connects with the track extending along the north side of the car shop. The other is used for handling wheels between a short storage track to the wheel press and to the wheel lathe, and it also provides a passageway for trucks carrying material along a track that extends longitudinally with the machine shop.

The previously mentioned overhead trolleys with flexible connections carry 600-volt current at all times except in the case of the line serving the transfer track


12′ 0¾″ Opening
12′ 0″ Platform
⅛″
Highest Normal Position
Highest Possible Position
Locked Position
2″
6¼″
Top of Rail
Max. Lift
6′ 5¾″
Platform Locking Dog
15¾″
Platform in Dropped Position
15″ x 42 lb. I Beam Set in Wall of Pit
13′ 8″
21″
19″
80 lb. Rail
Locking Dog for Truck
Floor of Pit
8″ x 10″ Wood Block
5′ 9″ Gage
4′ 11½″ ℄. to ℄.
4′ 8½″ Gage
Shop Floor
Cast Steel Guide
5′ 7″
100 lb Rail
Timber Floor for Platform
Taper Fit for Top of Ram
Pressure Supply
Intensifier
Motor Controller
7′ 9⅝″
5 H. P. Motor
Operator's Platform
Gear Case
Worm Drive
Locking Dog for Truck
Waste Pipe
To Ram
5′
3′ 4⅜″
13′ 10″
Electric Ry Journal

Harmon Shops—Front and Side Elevations of 75-Ton Drop-Pit Jack at the north side of the locomotive and car shops. This line is sectionalized and supplied through switches mounted on the north building wall, the voltage being cut down by two 110-volt incandescent lamps in series with the switch. This arrangement is used for moving trucks along the transfer track to and from the machine shop, as connections can be made at the truck motor leads to the flexible cables depending from the trolleys and the trucks moved by power whenever the wall switch is thrown. The same scheme is used for moving trucks from under motor cars, and a great deal of heavy manual labor is thus eliminated.

DETAILS OF CONSTRUCTION

Ample provision for future extension has been provided for in the building arrangement. It is the plan to extend toward the west from the paint shop a second transverse shop similar to the present locomotive and car shop. This will be separated from the present locomotive shop by a transfer table and its construction will double the capacity of the shop in general. As shown in the illustration on page 244, the present paint shop at the east side of the main shop building is lighted by a saw-tooth roof, so that an extension can be made on the east side of this building without interfering with painting operations. This addition, when installed, will be used for a motor-car inspection shed. Extension of the present machine shop may, of course, be effected by making additions either at the north end of the present machine shop or at the south end of the present storeroom.

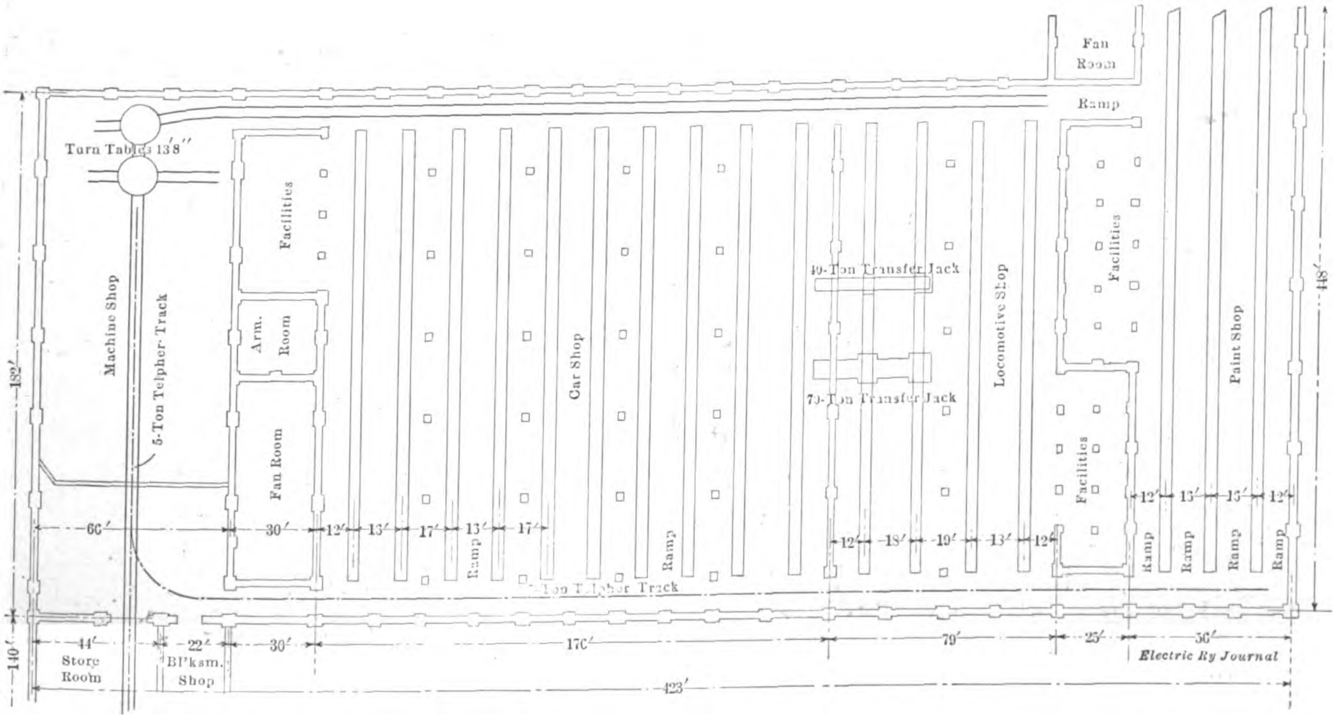
One of the most ingenious of the novelties introduced in the details of construction of the building will be found in the arrangement of the rails for the various shop tracks. In every case the concrete that forms the floor surface is beveled off so that for about 3 in. back from the rail there is a slight downward slope. The concrete at the side of the rail is therefore about ¼ in. below the rail tread, and in consequence a truck or wheelbarrow passing across the track does not touch the concrete adjacent to the head of the rail, this being the point at which chipping or crumbling is most likely to start. Therefore, the floors along the shop tracks are in perfect condition to-day notwithstanding the seven years of service since the installation of the shop.

Flangeways for the track rails are formed in all cases by pieces of old rail set in a horizontal position with the head against the vertical web, the flange of the horizontal rail forming a guard for the flange groove. The horizontal rail is set at such a height that the top of the flange is at the same level as the top of the rail for the shop track. The plan of beveling off the concrete floor finish, so that the metal extends ¼ in. above it, is used also in the case of the guard as well as for the outside of the shop-track rail.

The doors for the ten tracks extending through the locomotive and car shop are all of the swinging wooden type similar to those used in standard steam roundhouse practice. They are held open by latches on posts set in the ground or are held closed by wooden bars extending across the doorways. This type of door was adopted in preference to the rolling or lifting type because it was believed to be much more effective in case a fire should necessitate quick movement of equipment out of the shop. At the same time the simplicity of the design was considered to be an advantage from the standpoint of maintenance. The objection to the design which is most commonly made, namely, the difficulty of opening and closing the swinging doors when snow is on the ground, is of minor importance at Harmon on account of the small annual snowfall.

As mentioned before, the floor in the locomotive and car shop is depressed 1 ft. alongside of the track pits. This is a great convenience for exterior inspections and repairs to the trucks. However, the space between two of the tracks in the car shop was left at rail level for experimental purposes, but the experience of several years has gone to prove that the depressed floor is much more convenient in every way for both inspectors and repair men. The overhead cranes in the car shop and the transfer jacks in the locomotive shop naturally eliminate practically all of the necessity for using hand jacks. Nevertheless, to provide for emergencies jacking stringers have been installed alongside of each rail. These are set level with the depressed floor and are made up of wooden stringers resting upon a bed of sand to distribute the concentrated load.

On the second floor of each of the two low bays provided at each end of the locomotive and car shop are located the offices for the various foremen. The gen-



Harmon Shops—Plan of Main Shop Building, Showing Arrangement of Various Departments eral foreman is located at the west side of the car shop so that his office overlooks the car shop and machine shop as well. In the offices in the low bay at the east side the building are the locomotive inspection foreman and the paint-shop foreman, a location which enables them to overlook their departments direct.

Contrary to the usual custom of having a single crane which spans the complete machine shop, a system of several small cranes has been installed. In general the facilities for transporting material in the machine shop consist of a longitudinal, 5-ton, telpher track hung from the roof trestle above it, together with a series of transverse 2-ton electric cranes of short span. The latter are installed over those machines that require crane service and they transport material between the center aisle and the machines as required. All are operated from the floor by pendant cords. The obvious advantage of this arrangement is that where each of the small transverse cranes serves but one or two machines it is always available for use when needed, and the machine operators never have to wait for crane service. When a single crane is installed to serve the whole shop the opportunity for lost time from this cause is, of course, greatly increased. The longitudinal telpher track, and a standard gage track which is installed beneath it, run through the machine shop into the storeroom so that raw material may be handled from the storeroom to the various machine tools, and on the other hand finished material handled from the machines direct to the storeroom.

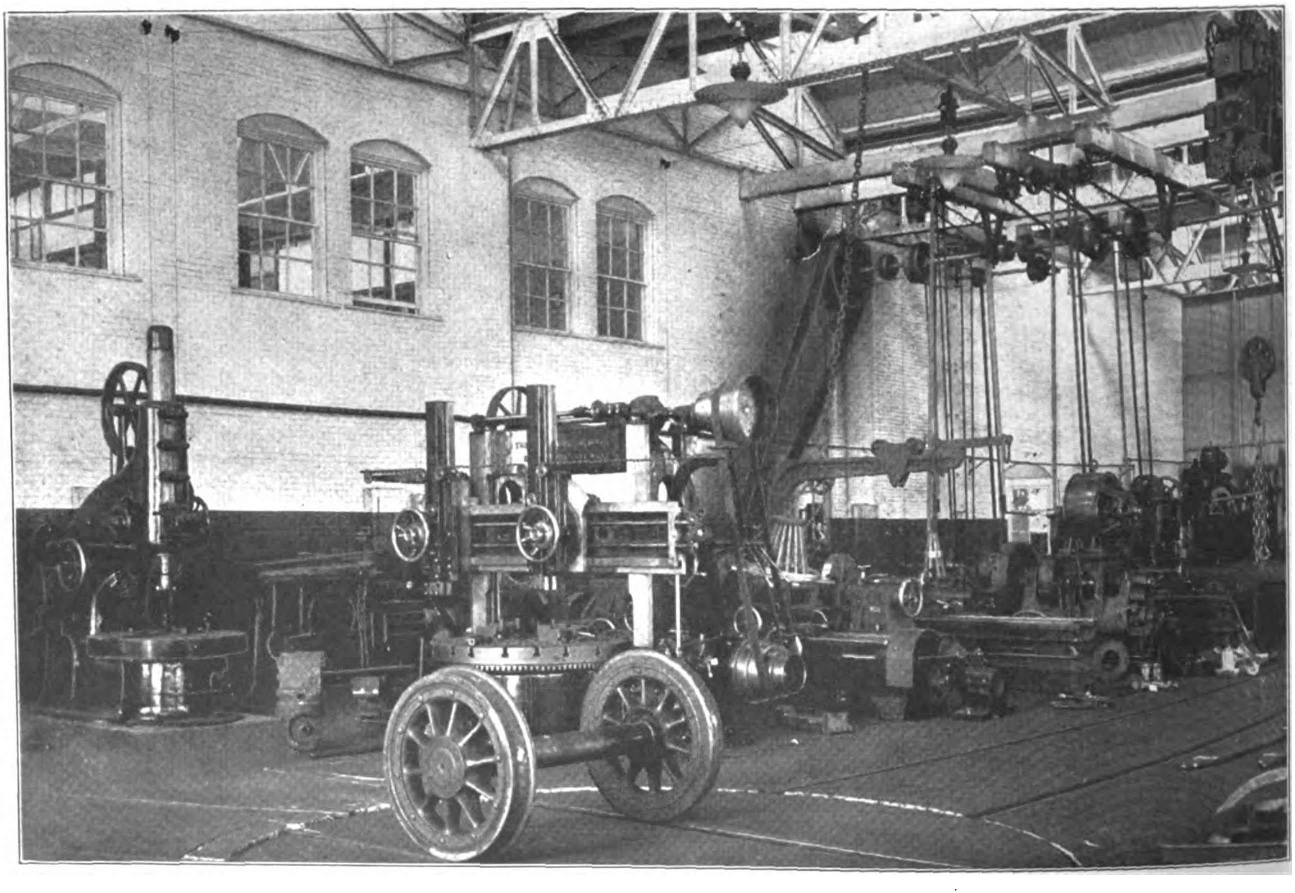
The floor in the machine shop, in accordance with the usual custom, has been surfaced with wood to provide an easy footing for the machine tool operators. This floor has been constructed with spruce stringers set in tar-concrete and with spruce planking nailed on top of the stringers. Above the spruce planking a finish of maple has been nailed and the results of the construction are shown by the fact that the floor is still in excellent condition notwithstanding its seven years of use. At the time when the floor was laid conduits were placed under it to provide for future installations of electric-driven machine tools. The ends of the conduits are located by circles of nails in the floor, and in case it is desired to make use of these electrical connections at any time all that is necessary is to cut a hole at the points indicated by the circle of nails. Another feature in the construction of the machine shop is the use of corrugated glass windows at the west side of the building. This is exposed to the afternoon sun, but the special glass diffuses the light so that no direct rays of sunlight enter the shop.

MACHINE SHOP EQUIPMENT

The machine shop is small when judged by steam railroad standards and the machine tools installed in it are limited in number. The list includes the following:

42-in. end-drive, hollow faceplate, carwheel lathe
60-in. old-style driving-wheel lathe for banding armatures
60-in. radial drill press
36-in. plain drill press
4-spindle sensitive drill
Grindstone
51-in. vertical boring mill
Carwheel borer
400-ton wheel press
30-in. planer
24-in. shaper
Center-drive axle lathe
30-in. patent head engine lathe
Centering machine
Bolt drilling machine
Single-head bolt cutter
Double-head bolt cutter
15-in. Dill slotter
Large punch and shear, 36-in. gap
24-in. engine lathe
16-in. engine lathe

A section of the shop is partitioned off by wire netting for a toolroom and this contains a toolmaker's lathe, a small drill press, a flat grinder, a universal grinder and a tool grinder. This department supplies



Harmon Shops—Interior View of Machine Shop, Showing 5-Ton Telpher at Right only the incidental needs of the shop at Harmon, as the manufacture of tools is carried on in one of the larger shops on the railroad.

At the present time the armature room is also partitioned off from the floor of the machine shop. However, space for this department has been provided in the bay between the machine shop and the car shop. In the armature room is a coil winder and the usual benches and tools, although in general the electrical parts for replacement in the armatures and fields are purchased from the manufacturers, and only assembly work is carried on except in the case of air compressor motors.

The storeroom is provided with an elevated section which extends over approximately one-third of the floor space. This section is at the side of the storeroom adjacent to the loading platform along the storehouse track, and, in consequence, incoming material is handled from the car across the loading platform and into the storeroom without change of elevation. This elevated section, it should be said, is served by the same telpher track that extends longitudinally through the machine shop. Provision has been made for a mezzanine floor in case the future growth of the shop requires additional floor space. This floor will be hung from the roof trusses of the building, as these have been designed with sufficient strength to carry the additional load.

The blacksmith shop, which occupies a corner of the addition in which the storeroom is housed, contains four forges, a 1200-lb. steam hammer, a double dry grinder and an air-operated bulldozer. There is also a small furnace for use with the latter machine.

Originally a set of straightening rolls was installed as it was thought that when the steel motor-car equipment and the steel-housed locomotive cabs were placed in service much plate work would have to be done. However, it was found that there was very little work that involved the use of the rolls and for this reason they were taken out. A 36-in. center-drive carwheel lathe was also installed, but because this naturally cannot be used for turning tires on wheels that have armatures mounted upon the axles it is available only for turning tires for the motor cars and engine trucks. As the end-drive carwheel lathe is capable of turning out all the work required at the present time the old machine will be removed and set up in one of the other shops on the system, where the demand for a center-drive machine is sufficient to keep it in use all the time.

The vertical boring mill mentioned in the list above is kept fairly busy boring tires, and in addition it is used for a considerable amount of job work. The carwheel borer is not operated to any great extent, although it is used, of course, whenever wheel centers require boring. The same thing applies to the axle lathe, although this machine can only be used for axles upon which no wheels are mounted. In consequence, the installation of a 42-in. engine lathe which will swing a pair of mounted wheels has been considered owing to the fact that such a machine would not only provide a means for turning journals but would be, also, a substantial tool for heavy miscellaneous work. The Dill slotter mentioned in the list is used only on occasional jobs and for this reason its universal features and ease of adjustment for the work are obvious advantages.

The machine shop, it may be said, does a considerable amount of outside work in addition to that involved by the repairs to motor cars and electric locomotives. All of the machine work for the car-axle lighting systems on the through passenger trains of the New York Central which would ordinarily be done at Mott Haven is transferred to Harmon. In addition the machining of third-rails required by the third-rail department is carried on and also general work for the contractors who have been occupied for several years past in various pieces of construction work on the line. This includes drill press, planer, punching shear and bolt threading work.

ACCOUNTING FOR POWER IN CHICAGO

An interesting consideration of the plan for accounting for power in Chicago is contained in the recent statement made by B. J. Arnold in regard to the methods of keeping the books of the Chicago City Railway according to the provisions of the 1907 franchise ordinance. Some other portions of this statement were published in the issue of this paper for May 23.

The accountants criticised the removal of $230,208 from the renewal and depreciation fund, the main item being a proportion of the payment to the Commonwealth Edison Company for power, amounting to $199,278. The 1907 ordinances contemplated that the company would build and maintain its own power plants and that renewal and depreciation upon the entire property, including power plants, would be covered by the 8 per cent of the gross receipts. Prior to the expiration of the rehabilitation period, the Chicago City Railway Company found it more economical to purchase its power than to manufacture it, and accordingly on June 1, 1908, the company entered into a power contract with the Commonwealth Edison Company to furnish its entire supply. The cost of the power, according to the contract, was composed of two items—the "primary charge" representing the investment cost of the plant producing the power, such as interest, taxes, insurance, renewals and depreciation, and the "service charge," covering the cost of producing the power.

Inasmuch as the power bill rendered to and paid by the company included this "primary charge" composed in part of the renewal charge, it was deemed equitable by the board that the company, in lieu of renewing its own power plant, was entitled to charge to renewals such a proportion of the power bills as the company would have had to pay for renewals and depreciation of its own power plant had such been built. This amount was ascertained by the board and the company was authorized to charge that proportion of its power cost against the renewal fund. The question remained in abeyance until the ordinance for the unification of the surface lines was taken up, and now it is considered that the passage of the unification ordinance by the Council has confirmed the basis of accounting adopted by the Board of Supervising Engineers.

Another aspect of the accounting for power criticised by the public accountants was the fact that a portion of the power purchased by the Chicago City Railway was sold to the Calumet & South Chicago Railway at the same price paid for the power by the Chicago City Railway, but that the sale of the power was credited to the income account rather than deducted from operating expenses. In answer to this, Mr. Arnold states that the board followed the standard practice approved by all other accountants employed by the city since the 1907 ordinances and also approved by the Interstate Commerce Commission as set forth in Case 433. If, as the accountants intimate, this item should not be credited to the income account, Mr. Arnold remarked that they should deduct from the amount paid by the company for the renewal fund 8 per cent upon the cost of power so sold. In other words, under the practice followed by the board, the result is to place in the renewal fund annually 8 per cent upon the cost of the power sold by the Chicago City Railway to the Calumet & South Chicago, resulting in an increase each year to the renewal fund of the Chicago City Railway of approximately $16,000.

Publicity Forum in Toledo

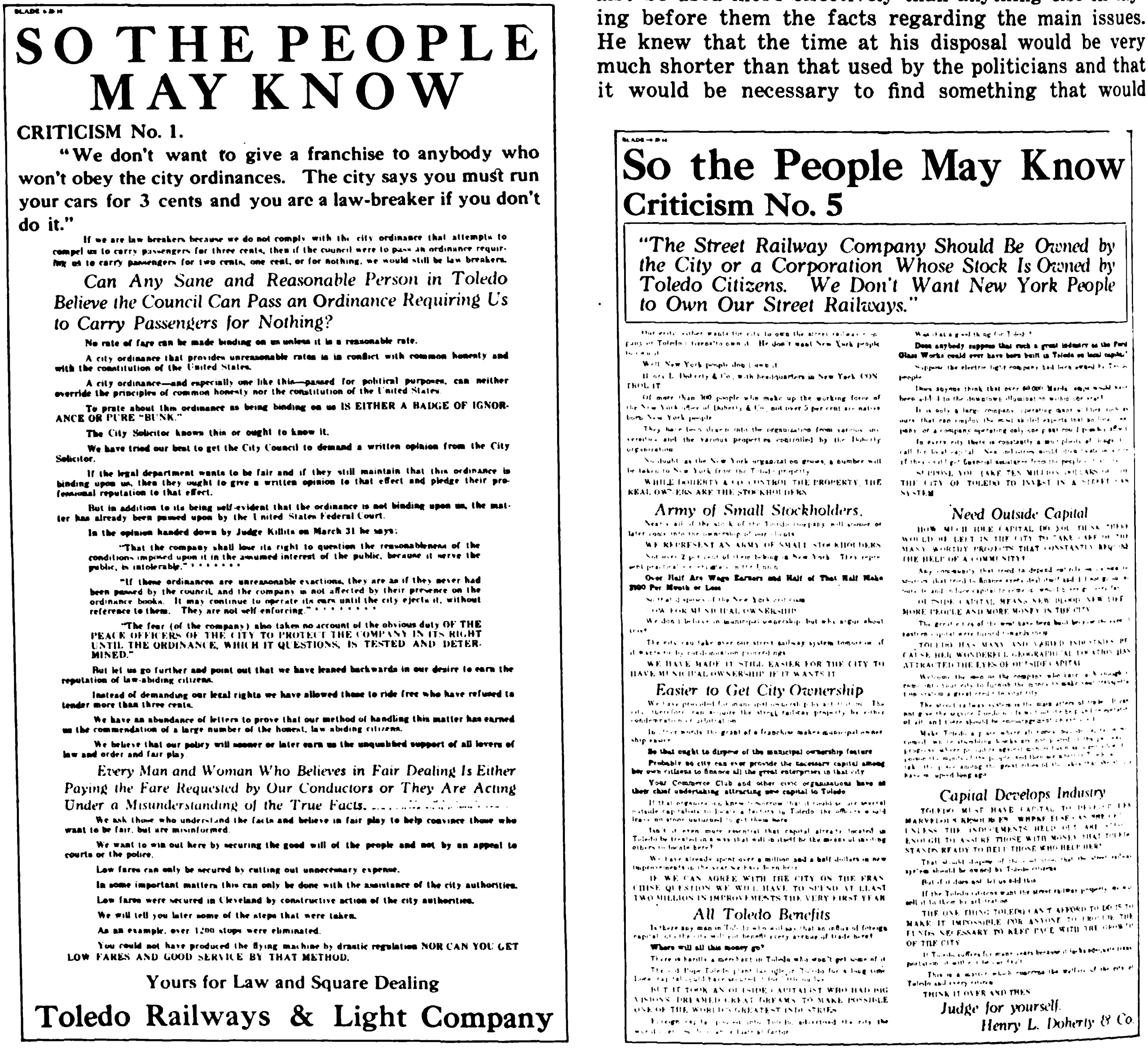
An Account of How Mr. Doherty Has Appealed to the People—Criticisms Requested and Answered in the Daily Papers and Through Leaflets in the Cars

The "publicity forum," as adopted by Henry L. Doherty to bring out every phase of the street railway situation at Toledo, Ohio, is attracting the attention of public utility men throughout the country. When Mr. Doherty went to Toledo to negotiate for a renewal of the franchise for the Toledo Railways & Light Company, he found that the people had, through continuous pounding by politicians and newspapers for the past twelve years, been almost completely converted to the 3-cent fare idea, without giving any thought to the class of service that can be offered at this rate in a city located as Toledo is. Looking upon the street railway business as entirely different from any other in existence, they had taken it for granted that 3 cents is sufficient because they had been told so over and over again through all these years, although nothing has been done to prove the truth of the assertion. They had simply taken it for granted.

Mr. Doherty realized that a franchise on any other basis would be difficult to secure, with the people holding this belief. He, therefore, studied the situation carefully and analyzed the conditions existing, not as respects the city officials and the administration in general, but surely as regards the people. After all, he knew they hold the balance of power and have the final approval or veto of every proposition, and he determined to go to them directly with this question. The problem was how to reach them in the most effective manner and lay before them facts for their consideration, rather than mere assertions, such as they had been accustomed to read and hear from the other side. That they could not digest pages of figures he knew very well, but if something could be presented that would excite their interest and cause them to take up the different phases of the business and study them, the rest would be easy.

COMMENTS AND CRITICISMS REQUESTED

Mr. Doherty reasoned that the methods used to impress the 3-cent idea so firmly upon the people could also be used more effectively than anything else in laying before them the facts regarding the main issues. He knew that the time at his disposal would be very much shorter than that used by the politicians and that it would be necessary to find something that would



SO THE PEOPLE MAY KNOW

CRITICISM No. 1.

"We don't want to give a franchise to anybody who won't obey the city ordinances. The city says you must run your cars for 3 cents and you are a law-breaker if you don't do it."

If we are law breakers because we do not comply with the city ordinance that attempts to compel us to carry passengers for three cents, then if the council were to pass an ordinance requiring us to carry passengers for two cents, one cent, or for nothing, we would still be law breakers.

Can Any Sane and Reasonable Person in Toledo Believe the Council Can Pass an Ordinance Requiring Us to Carry Passengers for Nothing?

No rate of fare can be made binding on us unless it is a reasonable rate.

A city ordinance that provides unreasonable rates is in conflict with common honesty and with the constitution of the United States.

A city ordinance—and especially one like this—passed for political purposes, can neither override the principles of common honesty nor the constitution of the United States.

To prate about this ordinance as being binding on us IS EITHER A BADGE OF IGNORANCE OR PURE "BUNK."

The City Solicitor knows this or ought to know it.

We have tried our best to get the City Council to demand a written opinion from the City Solicitor.

If the legal department wants to be fair and if they still maintain that this ordinance is binding upon us, then they ought to give a written opinion to that effect and pledge their professional reputation to that effect.

But in addition to its being self-evident that the ordinance is not binding upon us, the matter has already been passed upon by the United States Federal Court.

In the opinion handed down by Judge Killits on March 31 he says:

> "That the company shall lose its right to question the reasonableness of the conditions imposed upon it in the assumed interest of the public, because it serve the public, is intolerable." * * * * * * *
>
> "If these ordinances are unreasonable exactions, they are as if they never had been passed by the council, and the company is not affected by their presence on the ordinance books. It may continue to operate its cars until the city ejects it, without reference to them. They are not self-enforcing." * * * * * * * *
>
> "The fear (of the company) also takes no account of the obvious duty OF THE PEACE OFFICERS OF THE CITY TO PROTECT THE COMPANY IN ITS RIGHT UNTIL THE ORDINANCE, WHICH IT QUESTIONS, IS TESTED AND DETERMINED."

But let us go further and point out that we have leaned backwards in our desire to earn the reputation of law-abiding citizens.

Instead of demanding our legal rights we have allowed those to ride free who have refused to tender more than three cents.

We have an abundance of letters to prove that our method of handling this matter has earned us the commendation of a large number of the honest, law-abiding citizens.

We believe that our policy will sooner or later earn us the unqualified support of all lovers of law and order and fair play.

Every Man and Woman Who Believes in Fair Dealing Is Either Paying the Fare Requested by Our Conductors or They Are Acting Under a Misunderstanding of the True Facts.

We ask those who understand the facts and believe in fair play to help convince those who want to be fair, but are misinformed.

We want to win out here by securing the good will of the people and not by an appeal to courts or the police.

Low fares can only be secured by cutting out unnecessary expense.

In some important matters this can only be done with the assistance of the city authorities.

Low fares were secured in Cleveland by constructive action of the city authorities.

We will tell you later some of the steps that were taken.

As an example, over 1200 stops were eliminated.

You could not have produced the flying machine by drastic regulation NOR CAN YOU GET LOW FARES AND GOOD SERVICE BY THAT METHOD.

Yours for Law and Square Dealing

Toledo Railways & Light Company

So the People May Know

Criticism No. 5

"The Street Railway Company Should Be Owned by the City or a Corporation Whose Stock Is Owned by Toledo Citizens. We Don't Want New York People to Own Our Street Railways."

Well, New York people don't own it.

WHILE DOHERTY & CO. CONTROL THE PROPERTY, THE REAL OWNERS ARE THE STOCKHOLDERS.

Army of Small Stockholders.

WE REPRESENT AN ARMY OF SMALL STOCKHOLDERS.

Over Half Are Wage Earners and Half of That Half Make $100 Per Month or Less.

WE HAVE MADE IT STILL EASIER FOR THE CITY TO HAVE MUNICIPAL OWNERSHIP IF IT WANTS IT.

Easier to Get City Ownership

So that ought to dispose of the municipal ownership feature.

Probably no city can ever provide the necessary capital among her own citizens to finance all the great enterprises in that city.

Your Commerce Club and other civic organizations have as their chief undertaking attracting new capital to Toledo.

IF WE CAN AGREE WITH THE CITY ON THE FRANCHISE QUESTION WE WILL HAVE TO SPEND AT LEAST TWO MILLION IN IMPROVEMENTS THE VERY FIRST YEAR.

All Toledo Benefits

Where will all this money go?

Does anybody suppose that such a great industry as the Ford Glass Works could ever have been built in Toledo on local capital?

Need Outside Capital

OUTSIDE CAPITAL MEANS NEW BLOOD, NEW LIFE, MORE PEOPLE AND MORE MONEY IN THE CITY.

Capital Develops Industry

THE ONE THING TOLEDO CAN'T AFFORD TO DO IS TO MAKE IT IMPOSSIBLE FOR ANYONE TO PROVIDE THE FUNDS NECESSARY TO KEEP PACE WITH THE GROWTH OF THE CITY.

THINK IT OVER AND THEN

Judge for yourself.

Henry L. Doherty & Co.

Publicity Forum—Statements Nos. 1 and 5

attract attention quickly. After careful consideration, he concluded that criticisms of the company and the proposition it had to make to the city would at once attract the attention of almost every citizen of the municipality. He, therefore, published a request in the newspapers for criticisms, favorable or unfavorable, as the case might be, of any point in the proposition the company had made to the city, or of anything else in connection with the company and those connected with it. He promised to publish these criticisms in large type in the papers, together with his replies and comment upon them, however bitter they might be.

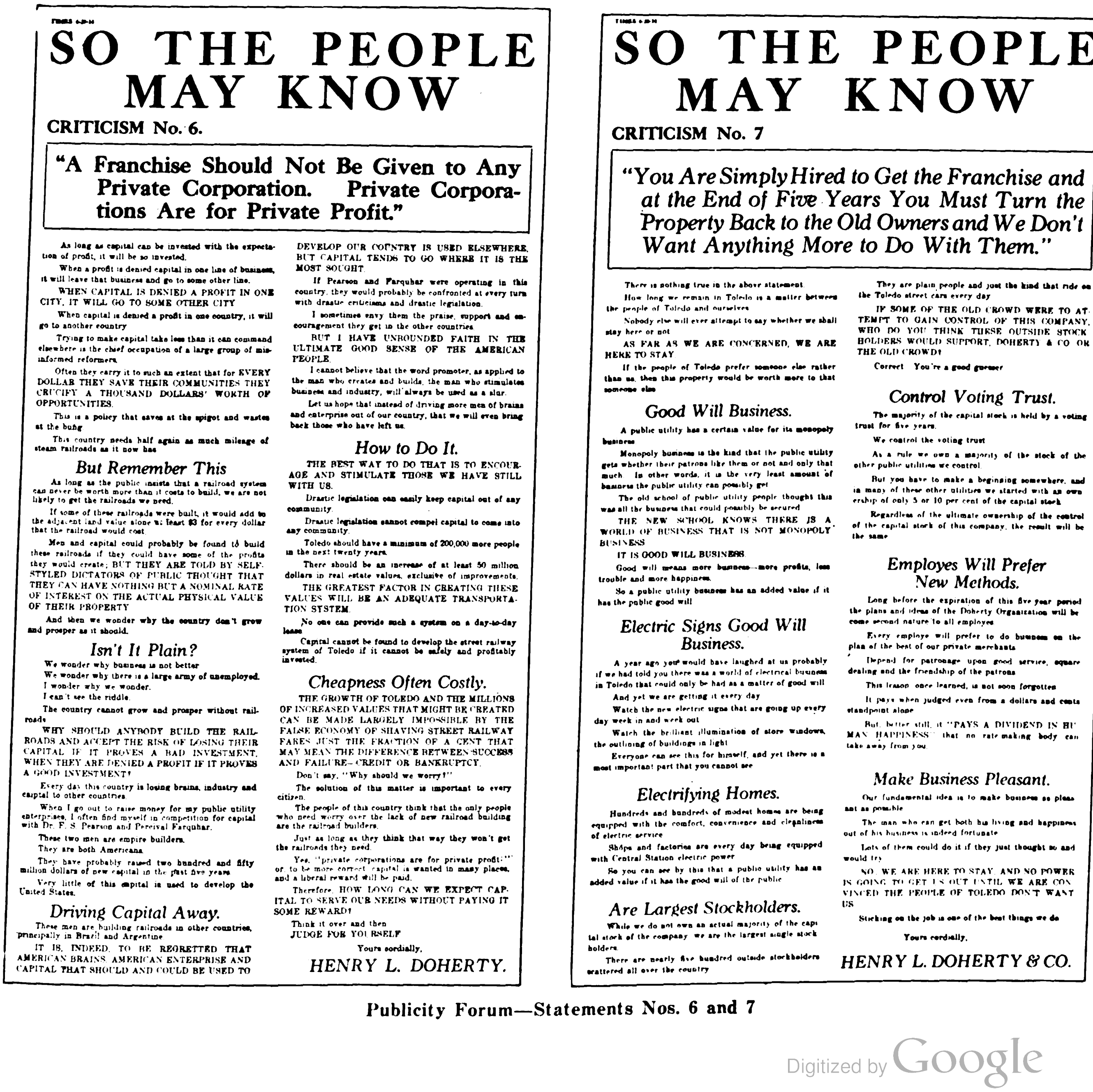
Space was secured in the two leading newspapers of the city, the Toledo *Blade* (evening) and the Toledo *Times* (morning), and as soon as the first criticism arrived, it was published, together with the reply, which was couched in language that was blunt and to the point. The second criticism received the same treatment, and this plan has been continued right along until the number on May 27 had reached thirty-five. The caption over most of these discussions, printed in large letters, is "So the People May Know." The space has varied from five columns to a page, but it is always sufficiently large to bring out the matter in good style.

In addition to the two daily papers, the company is using twelve weekly publications for this publicity. It has been found that they reach people who are particularly interested in them and often they are read in the evening, on Sunday or some other time when the reader has plenty of time to digest the statements and arguments they contain.

In a brief manner this describes the publicity forum. Mr. Doherty desired to adopt a plan which would give him the largest audience, and he felt that greater interest could be aroused in this way than by public speaking, and that people would remember more of it than from merely hearing it repeated. In many ways this work has been supplemented. Mr. Doherty has taken advantage of all opportunities to speak to societies and organizations, in this way becoming personally acquainted with many of the city's people.

Within the past few weeks attention has been called to the forum by a large electric sign placed at a vantage point in the city. Billboards have also been used for the same purpose. The large bills, printed in colors, may now be seen in many parts of the city, all of them urging people to read the publicity forum.

Feeling that many people had not read the first criticisms printed in the newspapers, the company began placing reprints of them in the car boxes some time ago. At first 10,000 of them were printed every two days, but later on 30,000 were required to keep the boxes



SO THE PEOPLE MAY KNOW

CRITICISM No. 6.

"A Franchise Should Not Be Given to Any Private Corporation. Private Corporations Are for Private Profit."

As long as capital can be invested with the expectation of profit, it will be so invested.

When a profit is denied capital in one line of business, it will leave that business and go to some other line.

WHEN CAPITAL IS DENIED A PROFIT IN ONE CITY, IT WILL GO TO SOME OTHER CITY

When capital is denied a profit in one country, it will go to another country

Trying to make capital take less than it can command elsewhere is the chief occupation of a large group of misinformed reformers.

Often they carry it to such an extent that for EVERY DOLLAR THEY SAVE THEIR COMMUNITIES THEY CRUCIFY A THOUSAND DOLLARS' WORTH OF OPPORTUNITIES.

This is a policy that saves at the spigot and wastes at the bung

This country needs half again as much mileage of steam railroads as it now has

But Remember This

As long as the public insists that a railroad system can never be worth more than it costs to build, we are not likely to get the railroads we need.

If some of these railroads were built, it would add to the adjacent land value alone at least $3 for every dollar that the railroad would cost.

Men and capital could probably be found to build these railroads if they could have some of the profits they would create; BUT THEY ARE TOLD BY SELF-STYLED DICTATORS OF PUBLIC THOUGHT THAT THEY CAN HAVE NOTHING BUT A NOMINAL RATE OF INTEREST ON THE ACTUAL PHYSICAL VALUE OF THEIR PROPERTY

And then we wonder why the country don't grow and prosper as it should.

Isn't It Plain?

We wonder why business is not better

We wonder why there is a large army of unemployed.

I wonder why we wonder.

I can't see the riddle.

The country cannot grow and prosper without railroads

WHY SHOULD ANYBODY BUILD THE RAILROADS AND ACCEPT THE RISK OF LOSING THEIR CAPITAL IF IT PROVES A BAD INVESTMENT, WHEN THEY ARE DENIED A PROFIT IF IT PROVES A GOOD INVESTMENT?

Every day this country is losing brains, industry and capital to other countries.

When I go out to raise money for my public utility enterprises, I often find myself in competition for capital with Dr. F. S. Pearson and Percival Farquhar.

These two men are empire builders.

They are both Americans.

They have probably raised two hundred and fifty million dollars of new capital in the past five years.

Very little of this capital is used to develop the United States.

Driving Capital Away.

These men are building railroads in other countries, principally in Brazil and Argentine.

IT IS, INDEED, TO BE REGRETTED THAT AMERICAN BRAINS, AMERICAN ENTERPRISE AND CAPITAL THAT SHOULD AND COULD BE USED TO DEVELOP OUR COUNTRY IS USED ELSEWHERE, BUT CAPITAL TENDS TO GO WHERE IT IS THE MOST SOUGHT.

If Pearson and Farquhar were operating in this country, they would probably be confronted at every turn with drastic criticisms and drastic legislation.

I sometimes envy them the praise, support and encouragement they get in the other countries.

BUT I HAVE UNBOUNDED FAITH IN THE ULTIMATE GOOD SENSE OF THE AMERICAN PEOPLE.

I cannot believe that the word promoter, as applied to the man who creates and builds, the man who stimulates business and industry, will always be used as a slur.

Let us hope that instead of driving more men of brains and enterprise out of our country, that we will even bring back those who have left us.

How to Do It.

THE BEST WAY TO DO THAT IS TO ENCOURAGE AND STIMULATE THOSE WE HAVE STILL WITH US.

Drastic legislation can easily keep capital out of any community.

Drastic legislation cannot compel capital to come into any community.

Toledo should have a minimum of 200,000 more people in the next twenty years.

There should be an increase of at least 50 million dollars in real estate values, exclusive of improvements.

THE GREATEST FACTOR IN CREATING THESE VALUES WILL BE AN ADEQUATE TRANSPORTATION SYSTEM.

No one can provide such a system on a day-to-day lease

Capital cannot be found to develop the street railway system of Toledo if it cannot be safely and profitably invested.

Cheapness Often Costly.

THE GROWTH OF TOLEDO AND THE MILLIONS OF INCREASED VALUES THAT MIGHT BE CREATED CAN BE MADE LARGELY IMPOSSIBLE BY THE FALSE ECONOMY OF SHAVING STREET RAILWAY FARES JUST THE FRACTION OF A CENT THAT MAY MEAN THE DIFFERENCE BETWEEN SUCCESS AND FAILURE—CREDIT OR BANKRUPTCY.

Don't say, "Why should we worry?"

The solution of this matter is important to every citizen.

The people of this country think that the only people who need worry over the lack of new railroad building are the railroad builders.

Just as long as they think that way they won't get the railroads they need.

Yes, "private corporations are for private profit;" or, to be more correct, capital is wanted in many places, and a liberal reward will be paid.

Therefore, HOW LONG CAN WE EXPECT CAPITAL TO SERVE OUR NEEDS WITHOUT PAYING IT SOME REWARD?

Think it over and then
JUDGE FOR YOURSELF

Yours cordially,

HENRY L. DOHERTY.

SO THE PEOPLE MAY KNOW

CRITICISM No. 7

"You Are Simply Hired to Get the Franchise and at the End of Five Years You Must Turn the Property Back to the Old Owners and We Don't Want Anything More to Do With Them."

There is nothing true in the above statement.

How long we remain in Toledo is a matter between the people of Toledo and ourselves

Nobody else will ever attempt to say whether we shall stay here or not

AS FAR AS WE ARE CONCERNED, WE ARE HERE TO STAY

If the people of Toledo prefer someone else rather than us, then this property would be worth more to that someone else

Good Will Business.

A public utility has a certain value for its monopoly business

Monopoly business is the kind that the public utility gets whether their patrons like them or not and only that much. In other words, it is the very least amount of business the public utility can possibly get

The old school of public utility people thought this was all the business that could possibly be secured

THE NEW SCHOOL KNOWS THERE IS A WORLD OF BUSINESS THAT IS NOT MONOPOLY BUSINESS

IT IS GOOD WILL BUSINESS.

Good will means more business—more profits, less trouble and more happiness.

So a public utility business has an added value if it has the public good will

Electric Signs Good Will Business.

A year ago you would have laughed at us probably if we had told you there was a world of electrical business in Toledo that could only be had as a matter of good will

And yet we are getting it every day

Watch the new electric signs that are going up every day week in and week out

Watch the brilliant illumination of store windows, the outlining of buildings in light

Everyone can see this for himself, and yet there is a most important part that you cannot see

Electrifying Homes.

Hundreds and hundreds of modest homes are being equipped with the comfort, convenience and cleanliness of electric service

Shops and factories are every day being equipped with Central Station electric power

So you can see by this that a public utility has an added value if it has the good will of the public

Are Largest Stockholders.

While we do not own an actual majority of the capital stock of the company we are the largest single stockholders.

There are nearly five hundred outside stockholders scattered all over the country

They are plain people and just the kind that ride on the Toledo street cars every day

IF SOME OF THE OLD CROWD WERE TO ATTEMPT TO GAIN CONTROL OF THIS COMPANY, WHO DO YOU THINK THESE OUTSIDE STOCKHOLDERS WOULD SUPPORT, DOHERTY & CO OR THE OLD CROWD?

Correct You're a good guesser

Control Voting Trust.

The majority of the capital stock is held by a voting trust for five years.

We control the voting trust

As a rule we own a majority of the stock of the other public utilities we control.

But you have to make a beginning somewhere, and in many of these other utilities we started with an ownership of only 5 or 10 per cent of the capital stock

Regardless of the ultimate ownership of the control of the capital stock of this company, the result will be the same

Employes Will Prefer New Methods.

Long before the expiration of this five year period the plans and ideas of the Doherty Organization will become second nature to all employes

Every employe will prefer to do business on the plan of the best of our private merchants

Depend for patronage upon good service, square dealing and the friendship of the patrons

This lesson once learned, is not soon forgotten

It pays when judged even from a dollars and cents standpoint alone

But, better still, it "PAYS A DIVIDEND IN HUMAN HAPPINESS" that no rate making body can take away from you.

Make Business Pleasant.

Our fundamental idea is to make business as pleasant as possible

The man who can get both his living and happiness out of his business is indeed fortunate

Lots of them could do it if they just thought so and would try

NO, WE ARE HERE TO STAY, AND NO POWER IS GOING TO GET US OUT UNTIL WE ARE CONVINCED THE PEOPLE OF TOLEDO DON'T WANT US

Sticking on the job is one of the best things we do

Yours cordially,

HENRY L. DOHERTY & CO.

Publicity Forum—Statements Nos. 6 and 7

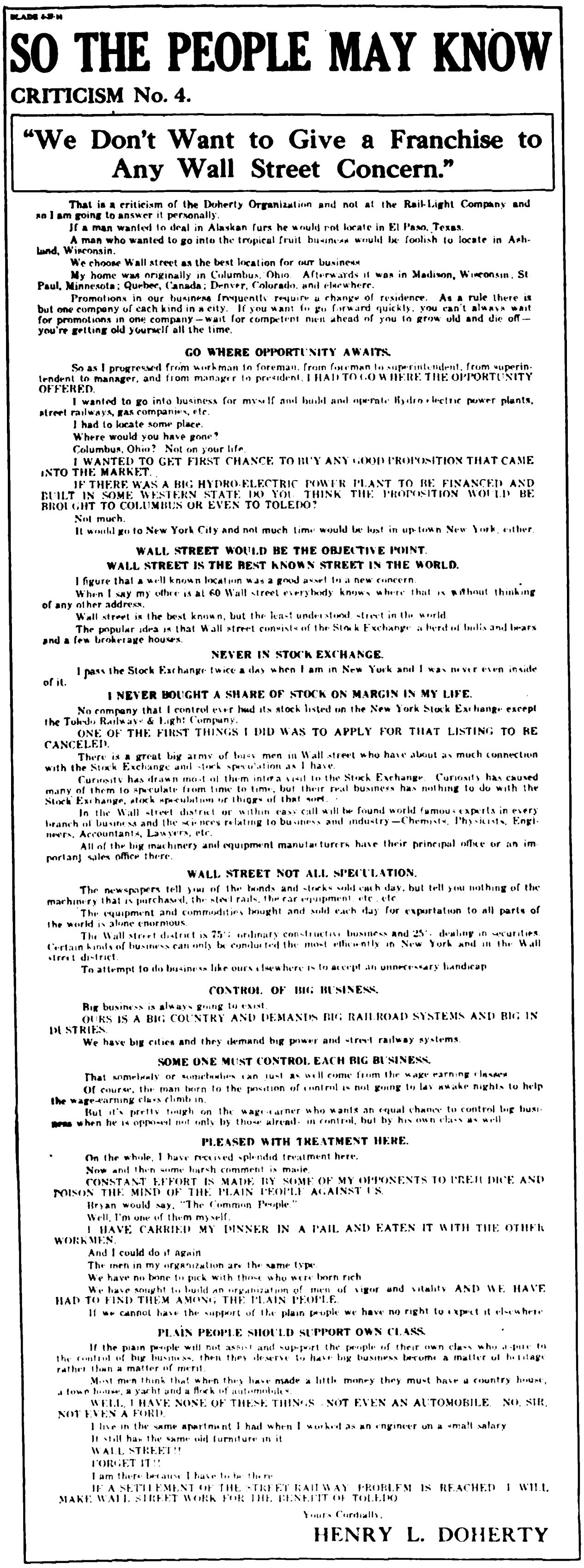
supplied. It is interesting to watch patrons take them from the boxes and read them. They are accomplishing their purpose and will be furnished until it is certain that they are no longer needed.

THE EFFECT

The publicity thus given has caused wide discussion of the street railway question. This has been noted in all public places, even in the poorest saloons. The explanations have continued to win friends by their simplicity and frankness. It is believed to be the most efficient method of attracting public attention to a subject of this kind and it certainly is a source of education to all who have followed it.

Henry L. Doherty has written the greater part of the matter that has been used so far, but he has had able aids in George Williams and E. R. Kelsey.

Among the illustrations shown herewith are both the original criticisms, as they appeared in the newspapers, and the reproductions of the early issues, which are now being distributed on the cars. Criticisms 1, 4, 5, 6 and 7 are from leaflets; No. 35 from the *Times*.



SO THE PEOPLE MAY KNOW

CRITICISM No. 4.

"We Don't Want to Give a Franchise to Any Wall Street Concern."

That is a criticism of the Doherty Organization and not of the Rail-Light Company and so I am going to answer it personally.

If a man wanted to deal in Alaskan furs he would not locate in El Paso, Texas.

A man who wanted to go into the tropical fruit business would be foolish to locate in Ashland, Wisconsin.

We choose Wall street as the best location for our business

My home was originally in Columbus, Ohio. Afterwards it was in Madison, Wisconsin, St Paul, Minnesota; Quebec, Canada; Denver, Colorado, and elsewhere.

Promotions in our business frequently require a change of residence. As a rule there is but one company of each kind in a city. If you want to go forward quickly, you can't always wait for promotions in one company—wait for competent men ahead of you to grow old and die off—you're getting old yourself all the time.

GO WHERE OPPORTUNITY AWAITS.

So as I progressed from workman to foreman, from foreman to superintendent, from superintendent to manager, and from manager to president, I HAD TO GO WHERE THE OPPORTUNITY OFFERED.

I wanted to go into business for myself and build and operate Hydro-electric power plants, street railways, gas companies, etc.

I had to locate some place.

Where would you have gone?

Columbus, Ohio? Not on your life.

I WANTED TO GET FIRST CHANCE TO BUY ANY GOOD PROPOSITION THAT CAME INTO THE MARKET.

IF THERE WAS A BIG HYDRO-ELECTRIC POWER PLANT TO BE FINANCED AND BUILT IN SOME WESTERN STATE DO YOU THINK THE PROPOSITION WOULD BE BROUGHT TO COLUMBUS OR EVEN TO TOLEDO?

Not much.

It would go to New York City and not much time would be lost in up-town New York, either.

WALL STREET WOULD BE THE OBJECTIVE POINT.

WALL STREET IS THE BEST KNOWN STREET IN THE WORLD.

I figure that a well known location was a good asset to a new concern.

When I say my office is at 60 Wall street everybody knows where that is without thinking of any other address.

Wall street is the best known, but the least understood, street in the world.

The popular idea is that Wall street consists of the Stock Exchange, a herd of bulls and bears and a few brokerage houses.

NEVER IN STOCK EXCHANGE.

I pass the Stock Exchange twice a day when I am in New York and I was never even inside of it.

I NEVER BOUGHT A SHARE OF STOCK ON MARGIN IN MY LIFE.

No company that I control ever had its stock listed on the New York Stock Exchange except the Toledo Railways & Light Company.

ONE OF THE FIRST THINGS I DID WAS TO APPLY FOR THAT LISTING TO BE CANCELED.

There is a great big army of busy men in Wall street who have about as much connection with the Stock Exchange and stock speculation as I have.

Curiosity has drawn most of them into a visit to the Stock Exchange. Curiosity has caused many of them to speculate from time to time, but their real business has nothing to do with the Stock Exchange, stock speculation or things of that sort.

In the Wall street district or within easy call will be found world famous experts in every branch of business and the sciences relating to business and industry—Chemists, Physicists, Engineers, Accountants, Lawyers, etc.

All of the big machinery and equipment manufacturers have their principal office or an important sales office there.

WALL STREET NOT ALL SPECULATION.

The newspapers tell you of the bonds and stocks sold each day, but tell you nothing of the machinery that is purchased, the steel rails, the car equipment, etc., etc.

The equipment and commodities bought and sold each day for exportation to all parts of the world is alone enormous.

The Wall street district is 75% ordinary constructive business and 25% dealing in securities. Certain kinds of business can only be conducted the most efficiently in New York and in the Wall street district.

To attempt to do business like ours elsewhere is to accept an unnecessary handicap

CONTROL OF BIG BUSINESS.

Big business is always going to exist.

OURS IS A BIG COUNTRY AND DEMANDS BIG RAILROAD SYSTEMS AND BIG INDUSTRIES.

We have big cities and they demand big power and street railway systems.

SOME ONE MUST CONTROL EACH BIG BUSINESS.

That somebody or somebodies can just as well come from the wage earning classes

Of course, the man born to the position of control is not going to lay awake nights to help the wage-earning class climb in.

But it's pretty tough on the wage-earner who wants an equal chance to control big business when he is opposed not only by those already in control, but by his own class as well

PLEASED WITH TREATMENT HERE.

On the whole, I have received splendid treatment here.

Now and then some harsh comment is made.

CONSTANT EFFORT IS MADE BY SOME OF MY OPPONENTS TO PREJUDICE AND POISON THE MIND OF THE PLAIN PEOPLE AGAINST US.

Bryan would say, "The Common People."

Well, I'm one of them myself.

I HAVE CARRIED MY DINNER IN A PAIL AND EATEN IT WITH THE OTHER WORKMEN.

And I could do it again

The men in my organization are the same type.

We have no bone to pick with those who were born rich

We have sought to build an organization of men of vigor and vitality AND WE HAVE HAD TO FIND THEM AMONG THE PLAIN PEOPLE.

If we cannot have the support of the plain people we have no right to expect it elsewhere

PLAIN PEOPLE SHOULD SUPPORT OWN CLASS.

If the plain people will not assist and support the people of their own class who aspire to the control of big business, then they deserve to have big business become a matter of heritage rather than a matter of merit.

Most men think that when they have made a little money they must have a country house, a town house, a yacht and a flock of automobiles.

WELL, I HAVE NONE OF THESE THINGS—NOT EVEN AN AUTOMOBILE. NO, SIR, NOT EVEN A FORD.

I live in the same apartment I had when I worked as an engineer on a small salary

It still has the same old furniture in it

WALL STREET!!

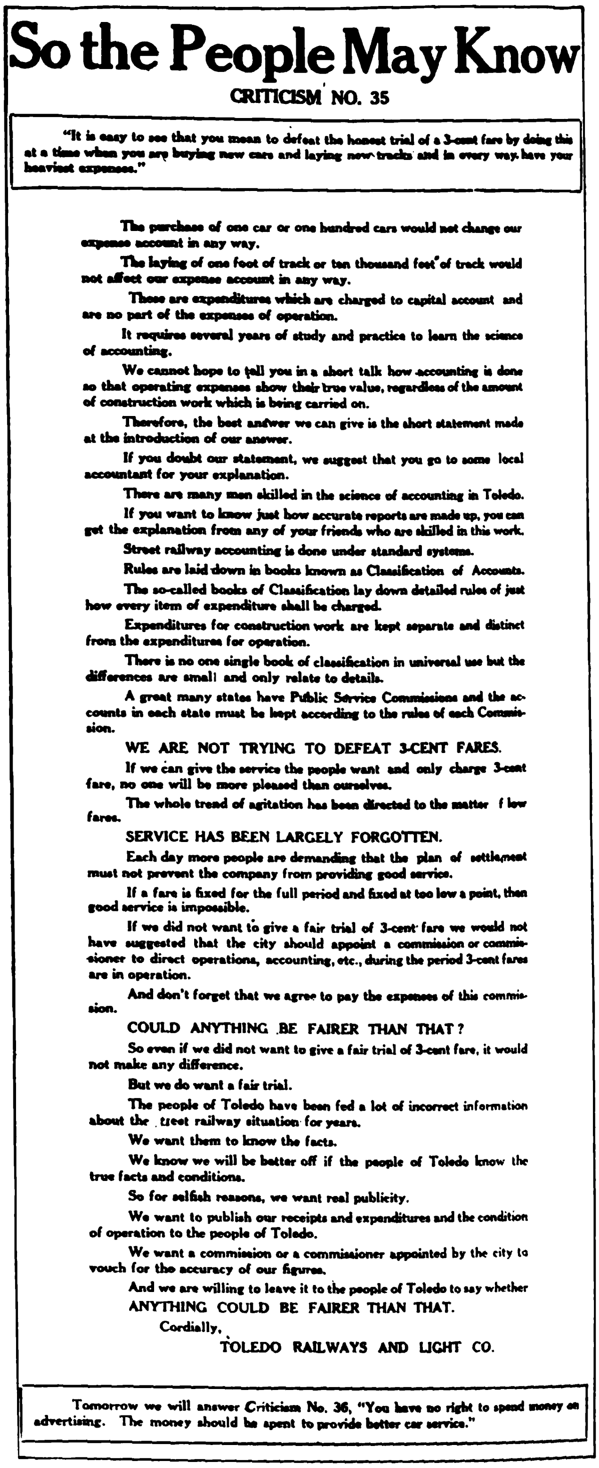
FORGET IT!!

I am there because I have to be there

IF A SETTLEMENT OF THE STREET RAILWAY PROBLEM IS REACHED I WILL MAKE WALL STREET WORK FOR THE BENEFIT OF TOLEDO

Yours Cordially,

HENRY L. DOHERTY



So the People May Know

CRITICISM NO. 35

"It is easy to see that you mean to defeat the honest trial of a 3-cent fare by doing this at a time when you are buying new cars and laying new tracks and in every way have your heaviest expenses."

The purchase of one car or one hundred cars would not change our expense account in any way.

The laying of one foot of track or ten thousand feet of track would not affect our expense account in any way.

These are expenditures which are charged to capital account and are no part of the expenses of operation.

It requires several years of study and practice to learn the science of accounting.

We cannot hope to tell you in a short talk how accounting is done so that operating expenses show their true value, regardless of the amount of construction work which is being carried on.

Therefore, the best answer we can give is the short statement made at the introduction of our answer.

If you doubt our statement, we suggest that you go to some local accountant for your explanation.

There are many men skilled in the science of accounting in Toledo.

If you want to know just how accurate reports are made up, you can get the explanation from any of your friends who are skilled in this work.

Street railway accounting is done under standard systems.

Rules are laid down in books known as Classification of Accounts.

The so-called books of Classification lay down detailed rules of just how every item of expenditure shall be charged.

Expenditures for construction work are kept separate and distinct from the expenditures for operation.

There is no one single book of classification in universal use but the differences are small and only relate to details.

A great many states have Public Service Commissions and the accounts in each state must be kept according to the rules of each Commission.

WE ARE NOT TRYING TO DEFEAT 3-CENT FARES.

If we can give the service the people want and only charge 3-cent fare, no one will be more pleased than ourselves.

The whole trend of agitation has been directed to the matter of low fares.

SERVICE HAS BEEN LARGELY FORGOTTEN.

Each day more people are demanding that the plan of settlement must not prevent the company from providing good service.

If a fare is fixed for the full period and fixed at too low a point, then good service is impossible.

If we did not want to give a fair trial of 3-cent fare we would not have suggested that the city should appoint a commission or commissioner to direct operations, accounting, etc., during the period 3-cent fares are in operation.

And don't forget that we agree to pay the expenses of this commission.

COULD ANYTHING BE FAIRER THAN THAT?

So even if we did not want to give a fair trial of 3-cent fare, it would not make any difference.

But we do want a fair trial.

The people of Toledo have been fed a lot of incorrect information about the street railway situation for years.

We want them to know the facts.

We know we will be better off if the people of Toledo know the true facts and conditions.

So for selfish reasons, we want real publicity.

We want to publish our receipts and expenditures and the condition of operation to the people of Toledo.

We want a commission or a commissioner appointed by the city to vouch for the accuracy of our figures.

And we are willing to leave it to the people of Toledo to say whether ANYTHING COULD BE FAIRER THAN THAT.

Cordially,

TOLEDO RAILWAYS AND LIGHT CO.

Tomorrow we will answer Criticism No. 36, "You have no right to spend money on advertising. The money should be spent to provide better car service."

Publicity Forum—Statements Nos. 4 and 35

Question Box at Galveston

An Abstract Is Published of the Answers to the Questions of Electric Railway Interest at the Recent Convention of the Southwestern Electrical & Gas Association—The Topics Considered Included Timber Preservation, Fuels, Publicity and Wood-Block Paving.

At the convention of the Southwestern Electrical & Gas Association held recently at Galveston, Tex., and reported in the last two issues of the ELECTRIC RAILWAY JOURNAL the "question box" proved to be the source of much valuable information. That portion which was most directly applicable to electric railway work is abstracted in the following paragraphs:

TIMBER PRESERVATION

In reply to questions as to the causes of timber decay and the effect of painting poles above or below ground line the fundamental principles of timber preservation were pointed out. The deterioration of timber is caused by the growth, in the cells and fibers, of parasitic fungi, plants of the order of mildew and mold and, ordinarily, microscopically small. These live on the sap and tissue of dead wood, and by the chemical action accompanying their growth destroy fiber tissue and cells. Perfectly dry woods will not rot or decay. Moisture, heat and air are absolutely necessary to the growth and action of the fungi that cause decay. If they are deprived entirely of any one of these necessities, decay will not ensue.

The seeds or spores from which these fungi are propagated are microscopically small and very light, so that they float in currents of air like dust. These spores are given off by the fungi in countless numbers so that the air in the vicinity of decaying wood is apt to contain them and to deposit them on and in dead wood where conditions for growth may be favorable. Many of the spores have great vitality and longevity and it takes great heat or intense cold to kill them, although they may lie dormant in wood for many years awaiting favorable conditions for growth.

To protect timber from decay several things are necessary: *a*, all spores or plants already in the timber must be killed; *b*, the entrance of new spores must be prevented; *c*, the growth of new spores which enter must be prevented, and the spores must be deprived of air and moisture or warmth.

The mere painting of timber even with the so-called creosote brush treatment does not kill spores already within the timber, nor does it give effectual and lasting repellant of air and moisture. It does not effectually prevent the entrance and growth of new spores. This is especially true of ordinary oil paints as applied to timber. These are not as a rule poisonous to the spores already within the wood, nor do they make an absolutely airproof and waterproof covering for any length of time, no matter how well applied. Painting with compounds, such as creosote, which are actually poisonous to the spores is more efficient in two ways; the vapor and fumes may be drawn into the wood and tend to kill the spores or to retard their growth, and any new spores trying to enter will be killed by coming in contact with the outer coat of the poison. It is for these reasons that certain active mineral poisons, such as compounds of zinc, copper, lead and arsenic are used as wood preservatives; not for their effect on the wood itself, but simply as "fungus poisons."

Nearly all mineral poisons are more or less soluble in rain water or in the moisture contained in the ground and they are, therefore, leached out into the surrounding soil or by rain and fog until they become so diluted as not to be fatal to the spores or sufficiently strong to retard their growth. Ordinary creosotes and many of its adulterants have also a certain solubility in water and are driven off as vapor under high sun heat. A thin outside coating of such material, therefore, is liable to furnish only temporary protection.

If, in connection with the brush treatment, some fine and permanent neutral matter, such as slaked lime, dead cement, barytes, fullers' earth, etc., is rubbed in so as to completely fill the outside pores of the timber, the effect of the brush treatment will be more lasting. The weakness of the treatment, even with this improvement, is that nearly all timber has cracks and crevices which it is not possible to fill by surface application, and such cracks and crevices may develop after treatment.

The ordinary painting of poles, even with good quality of creosote, is only a temporary remedy and it is entirely a question of local conditions as to whether or not it pays for the labor and materials involved. Any considerable number of poles can be treated by the open-tank method profitably if there is time enough to use it. The apparatus need consist only of a shell of an old boiler, 8 ft. long, made water-tight and sunk into the ground; a tripod of three 40-ft. poles firmly erected over it, and a tackle for lowering the poles in the tank. With this equipment two, or at most three, men can haul up any poles under 45 ft. long, set them into the tank and take them out again with fair speed and without danger.

The time necessary for a useful absorption of the creosote varies with the size and character of the timber, its freedom from sap and moisture and its fluidity, which often depends on its temperature. In very cold climates or in cold weather it may be necessary to heat the creosote, which can be accomplished by steam coils or by the introduction of masses of heated metal. Open fires are not to be recommended, as creosotes are often very inflammable. In all treatments the timber must be free from moisture; the nearer it is to bone-dry the quicker and greater the absorption of the compound. In poles the absorption will be quicker if the portion to be treated is shaved.

VALUE OF VARIOUS FUELS

In reply to questions as to the relative values, as boiler fuels, in dollars and cents, of bituminous coals, lignite, fuel oil and natural and manufactured gas, the following suggestions were given.

The heat value of each fuel should be determined by analyses, and the cost of delivering a quantity of the fuel sufficient to contain 1000 B.t.u. to the fire room should be estimated. In comparing the quantities of heat available for steam-making, a combined boiler and furnace efficiency of 75 per cent may be assumed for fuel oil, of 70 per cent for gas, of 68 per cent for coal and of 55 per cent for lignite. Furnace repairs will average 25 per cent higher for oil and coal than for gas and lignite. The character of grates is also important, as proper air space and the use of rocking grates facilitate economical combustion of lignite. It must be remembered that the draft required for lignite and coal is greater than that for oil and gas. The cost of labor for handling coal and ashes must be taken into account. Among other factors involved in the question are the conditions of operation, that is whether the load is intermittent or continuous, how great the value of the peak load is, etc. Cleanliness of plant is also often important. Finally the character of coal must be considered, particularly as some coals which show a relatively high heat value by calorimetric tests tend to fuse and clinker badly in the furnace, rendering the cost of extra labor to handle them no inconsiderable item.

PRESERVATION OF PIPE

A member asked if there was any method of coating or covering iron and steel pipes to prevent rusting, corrosion, splitting or electrolysis when used under ground or water or when exposed to dampness, smoke or acid fumes.

The reply stated that there is not yet any absolutely dependable covering, although perfect galvanizing probably comes nearer to it than any other process. This, however, is a protection only against moisture and certain acids and only as long as the zinc covering is absolutely intact. So-called protective coverings are more or less failures in absolutely preventing corrosion or rusting for any length of time because a pinhole orifice is just as liable to cause pipe to be rusted to destruction as if it were not protected at all.

The great difficulty in the use of all protective coatings is to obtain absolutely perfect contact between the clean surfaces of the body metal and the coating. Mill-scale, rust, grease and moisture all tend to prevent such perfect contact without which cracking, blistering and peeling will inevitably ensue. One manufacturer has attempted to obviate the difficulty by wrapping pipe tightly with two layers of burlap impregnated with a waterproof and acidproof compound and then applying by dip or brush a filling coat of the same compound. The joints of such pipe, when laid, are also wrapped by hand with the impregnated burlap and painted with the compound over all. This method of protection would seem to have mechanical as well as chemical advantages, but sufficient data are not yet available to warrant one in specially recommending the method.

FEED WATER PURIFICATION

In response to a question as to whether or not a feed-water heater will purify any kind of water for boiler use, the answer is made that it will not, even when the feed water is brought to 212 deg. Fahr. in the heater, for two reasons: First, there are some substances, deleterious to the interior of a boiler that are not precipitated at or under boiling point; second, there are other substances on which the heat possible to give water even under boiler pressure has no effect.

If the feed water foams, deposits extra scale inside the boiler, pits the metal of or opens up leaks in the boiler after such water has been preheated to boiling point, or near it, and has been given ample opportunity to deposit its impurities, then it is necessary to treat it chemically, so as to disperse, filter out or deposit the injurious matter. Chemicals may be injected into the water while it is being preheated, or even afterward. The use of soda ash, lime water, crusted soda, sodium fluoride, bi-sodium phosphate, compounds of tannin and starchy materials, are all examples of the methods of aiding free heat in freeing the water from injurious qualities. It must be remembered, however, that the ordinary boiler is built to generate steam and not intended to play the part either of an experimental chemical laboratory or a precipitation plant. All purifying should be done outside of the boiler.

No rule-of-thumb for water treatment is possible and the first thing necessary is the correct qualitative, quantitative and combinative analysis. The results of this analysis should then be placed in the hands of a reliable expert in water purifying, one who is not tied up to any system or patent method of purifying. The most economical way of handling this matter is to first find out what is really wrong with the feed water and then to treat it specifically and intelligently so as to neutralize or to get rid of the destructive matter before it goes into the boiler.

NEWSPAPER ADVERTISING

A correspondent asked if it is advisable to advertise in local papers when a public utility is the only one of its kind in the city, especially if it owns or operates all or most of the different utilities, such as electric light and power, gas and railway. The answer is given that it is always safe to advertise in the right way. There are more reasons why a utility should advertise than a private business. The latter has only one reason for advertising, namely, the direct increase of its sales. The public utility has four reasons: increase of sales, public policy, publicity and education of the public. The utility must bring its service to the attention of the public, and in addition to making this service complete, continuous, uniform, prompt and courteous it should advertise freely in the local press, paying for everything that it desires to have published that inures to its personal benefit. Not only does the fact of such advertising favorably affect the local press but it also has a favorable effect on the general public. It tends to take away from the utility its isolation. Every public utility should make itself one of the group of commercial businesses of its community in everything, newspaper advertising among the rest.

A utility should court favorable publicity and should accustom its community to believe that it has nothing to hide. Secrecy always begets curiosity, while candor prevents or allays it. The public may not always agree with the utility as to action, cause or reason, but it will be much less liable to antagonize and interfere than if an action has been sprung upon it without previous explanation. The utility should use the same vehicle as does its enemies and detractors and it should explain to its community what it really is, what are its rights, its limitations, its duty. A major portion of the present hostile attitude of the public toward its utilities is because it is really ignorant of what they are, of the real relation between them and it, of the actual mutual benefits that can accrue to each by a greater understanding, a wider tolerance, a more mutual co-operation.

In its dealings with its local press, the utility should be liberal, standard and courteous. It should ask no favors because, if properly operated, it can give none, for it must never even hint that it advertises as a favor to the paper. It should give the paper everything publishable and it can then ask that, for good reasons given, certain matters be not published or be not published in a certain way or at an inopportune time.

WOOD-BLOCK PAVING

The Association was asked to learn what has been the experience with wood-block paving in street railway work. In reply the statement is made that wood-block paving of proper materials, properly prepared, and properly laid on proper foundation has given more satisfaction than any other kind of pavement laid between or among street railway tracks in paved streets. The proper requisites seem to be: that the rails be of such section and depth as to allow the use of a block not less than 3 in. deep when new, that the rail be of such section as to allow rigid paving up to and against its sides, that the wood be of such a kind that it will not swell or readily decay and that it be so treated as to avoid these faults; that any treatment for this purpose be such as to tend to preserve the wearing qualities of the wood and, if possible, to increase its holding properties for animal or vehicle traffic; that a sufficiently strong and rigid foundation or base be made under the block so that the block itself can be considered as simply a travel cushion and not as a weight-supporting or resisting portion of the pavement; that the block be so laid as to equalize the weight thrust of animal or vehicle in the direction of maximum traffic, and that the separate blocks be bound together and surrounded by some binder or filler. Nothing less than a 6-in. depth of rail should be used, and the filler blocks should be cut to provide a rigid vertical surface to pave against. The kind of wood to be used seems to be an entirely local matter. No convincing data have yet been collected as to the advantage of any particular kind of woods.

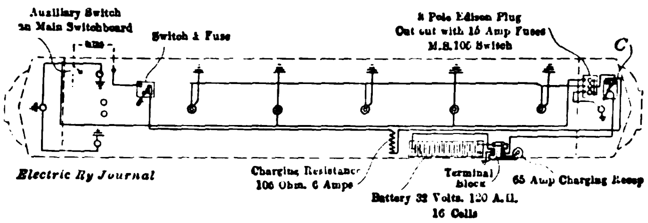
The advantages claimed for proper wood-block paving are elasticity, noiselessness, adaptability to the inequalities of varying types of rail and structural work and comparative ease and cheapness of maintenance, repair and renewal. Against it are urged its original cost when properly laid, its tendency to swell and its further tendency to become dangerously slippery to animal and vehicle in extremely hot or cold weather unless covered and kept covered with some frictional material like sand or fine gravel or fine crushed rock.

STORAGE BATTERY LIGHTING ON NEW YORK CENTRAL CARS

The New York Central & Hudson River Railroad has recently put into service a straight storage battery lighting system on a number of the multiple-unit cars operating over the electric zone between New York City and Croton. The reason for using this novelty in lighting equipment is found in the fact that while the electrified track ends at Croton the extreme end of the commuting zone is at Peekskill, about 7 miles further north. To the latter point several trains are run each day, and since there is no third-rail between Croton and Peekskill the multiple-unit cars are hauled over this section by steam locomotives. The regular electric lighting system for the cars, in which current is obtained from the third-rail, is not available, therefore it is necessary to provide some other means for lighting cars over this part of the route.

The use of Pintsch gas, a small turbo-generator lighting set in the baggage car, the axle-lighting system and the extension of the third-rail for the 7 miles between Croton and Peekskill were each considered, but were rejected in favor of the storage battery system.

The installation on each car consists of an auxiliary system of five 32-volt lights placed along the center line of the ceiling, 50-watt tungsten lamps being used. The original Pintsch gas fixtures were completely removed. Twenty-five-watt tungsten lamps are also placed over each vestibule and in each of the two saloons. All of these lamps are connected in multiple across a sixteen-cell pasted-plate battery. Current for charging the battery is obtained direct from the third-rail through a fixed resistance of 105 ohms. In the vestibule is a two-position inclosed switch with magnetic blow-out, which in one position connects the battery with the lighting circuit, and in the other position connects the battery to the third-rail through the charging resistance. When the car is in the third-rail zone this switch is kept in the charging position and the batteries are charged continuously. But when the cars leave the third-rail at Croton the trainmen throw the switches to discharge position on all cars in the train so that the batteries discharge through all of the nine lights of the auxiliary lighting system.


Auxiliary Switch on Main Switchboard
Switch & Fuse
3 Pole Edison Plug Cut out with 15 Amp Fuses M.S.100 Switch
C
Electric Ry Journal
Charging Resistance 105 Ohm. 6 Amps
Terminal block
65 Amp Charging Recep
Battery 32 Volts. 120 A.H. 16 Cells

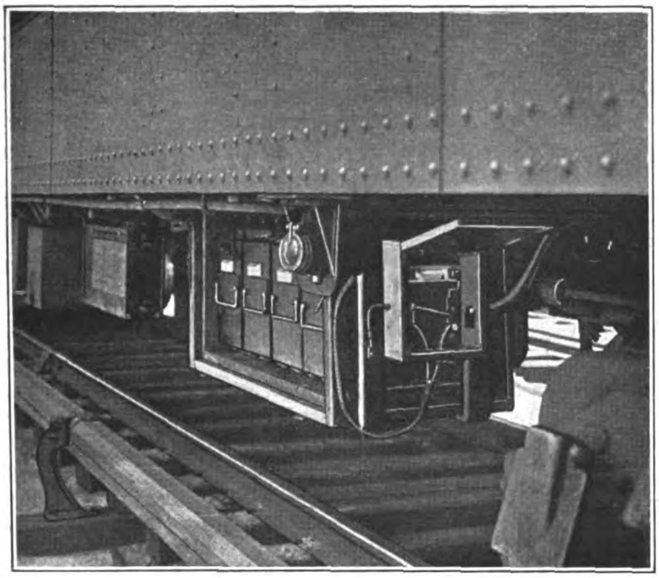
New York Central Car Lighting—Wiring Diagram Showing Arrangement of Auxiliary Lights and Storage Battery Equipment

No automatic device is used for cutting the battery in or out, because this was considered to be unnecessary. The battery and resistance were designed to operate automatically in accordance with calculations which were made to determine the average amount of time that the car was in service within the third-rail zone and the amount of time during which the lights had to be operated. To prevent overcharging of batteries when cars are laid up in electrified territory the battery charging connection has been made on the negative side of the main switch. As this is always opened when the car is standing idle, the battery is cut out while the car is laid up.

The run to Croton is made in about seventy-eight minutes, and, including say twelve minutes in which the car is under power at the New York terminal, the charging period may be said to be ninety minutes, or one and a half hours. During this time the batteries are being charged at a rate of about 5.4 amp, this being based on a third-rail voltage of 600 and a charging voltage of about 2.5 volts per cell, giving a net voltage across the 105 ohms resistance of 560. This gives a battery input, during the charging period, of 8.1 amp-hr. At an ampere-hour efficiency for the battery of 90 per cent this is the equivalent of 7.3 amp-hr.

The battery supplies five 50-watt lamps and four 25-watt lamps, making a total of 350 watts for the battery output. This at a voltage of 2 volts per cell, or 32 volts for the battery, gives a discharge rate of 11 amp. As the run from Peekskill takes about eighteen minutes and as there is an average lighting period during the

New York Central Car Lighting—Interior View of Car, Showing Auxiliary, Storage-Battery Lights Along Center Line of Ceiling lay-over of some six minutes in addition, the trips when lights are required have a discharge period of twenty-four minutes. About half of the round trips made by each of the twenty-one cars in the service to Peekskill occur during the time of day when lights are required, so that the average daily discharge period per trip amounts to twelve minutes. In addition there is a period during the night when the cars are cleaned that averages about eight minutes when prorated against each one-way trip made by the cars. Therefore the total discharge period per one-way trip averages twenty minutes, or 0.33 hr., and at the discharge rate of 11 amp the output of the batteries per trip amounts to 3.3 amp-hr. The equivalent input per trip of 7.3 amp-hr. exceeds, in consequence, the output by 4 amp-hr. per single trip, or an average of 16 amp-hr. per day, about 29.2 amp-hr. being put in and 13.2 amp-hr. being drawn out of the battery. This amounts to a daily overcharge of 13 per cent of the battery capacity, but in view of the fact that the charging rate is only 5.4 amp, whereas the normal charging rate is 15 amp, it is expected that no harmful effects will result. On the other hand, the excess charging period eliminates the possibility of the batteries becoming damaged by exhaustion, a much more serious matter than the effect of overcharge.



New York Central Car Lighting—Exterior View of Car, Showing Storage-Battery Box and Charging Receptacle Hung from the Sills

Owing to the fact that the battery is supplied from a 600-volt line, the influence of the increase in charging voltage that occurs as the battery becomes charged is almost negligible. Only 1 per cent less current is put through the battery when it is fully charged than when it is practically exhausted. As outlined above, however, the batteries will be kept continuously but slightly overcharged, and a limit is placed upon this by the fact that the storage battery connection is made on the negative side of the main switch on the cars. An operating rule has been established whereby motormen throw this switch whenever the cars are laid up in the terminals, so that the batteries are not being charged except during the known time that they are running on the road. This is the important feature of the whole scheme.

The wiring arrangement is shown in the diagram on page 1255, the vestibule switch for connecting the batteries either with the lights or with the third-rail being indicated by the letter "C." This shows that the original series wires to the electric lights on the ceiling which were located between the Pintsch gas fixtures in the center of the car have been changed over to the 32-volt multiple system. Two main circuits are thus provided, one of which includes two of the 50-watt interior lamps and the vestibule and saloon lights at one end, and the other includes three of the 50-watt interior lamps. A third circuit is provided for the vestibule light at the No. 2 end of the car. It should be noted from the drawing that this makes what might be called a "one-wire" system, each lamp being separately grounded to the framing of the steel car.

The sixteen cells composing each of the batteries, which were furnished by the Gould Storage Battery Company, are arranged in four crates each having four cells with lead-lined tanks. The four crates are carried in a wooden box that is supported in a strap-iron frame under the car. The capacity is 120 amp-hr. The total weight of the battery is 900 lb. and its normal charging rate is 15 amp, although, as mentioned before, it is actually charged at about 5.4 amp, the charging resistance being 105 ohms and the line voltage 600. The charging resistance also is carried under the car, and there is an Anderson standard swivel charging receptacle for use in cases of emergency to charge the battery from some external circuit.

A set of instructions has been prepared and issued to the motormen, in which is included a description of the apparatus and an explanation of the connections and the operation of the system. Precautionary advice is given to the effect that the change-over switch in the vestibule must be kept in charging position whenever the car is in the third-rail zone and that the battery lights should not be used longer than absolutely necessary. In order to prevent exhaustion of the batteries a caution is also included that if the battery lights burn dim they are to be reported. Another caution to the effect that the handle of the change-over switch must not be left in middle position is included, so that the battery is always connected either to the lights or to the 600-volt third-rail from which it is charged. The standard operating rule for motormen with regard to opening the main switch on the car whenever the car is standing in the terminal is also included.

HANDLING WASTE PAPER AT DETROIT

With a large street and interurban railway system the handling of waste paper may be made a source of income if carefully supervised. The Detroit (Mich.) United Railway has solved this problem in the following manner. At all carhouses or other points where large quantities of waste paper accumulate, sheet-metal receptacles are provided in the shape of 36-in. cubes with counterbalanced lids and one side which may be opened. These fireproof receptacles are fitted with hooks in the four corners at the top. Heavy canvas bags, also in the form of 36-in. cubes and each provided with four loops to correspond with the four hooks in the metal receptacles, are placed in these fireproof metal cases. As paper accumulates it is deposited in these bags, and from time to time thoroughly compressed by hand until the bag is full. Then a rope is passed through the four loops in the bag and tied, after which the lid is raised, the side dropped and the filled bag rolled out. These bags are carried to the repair shops by the supply cars, where all paper is compressed in 300-lb. bales by a machine. The bales are held until there are enough to make a carload, at which time bids are obtained and then the paper is shipped to the highest bidder. Paper baled in this manner usually brings about $6 a ton, and considerable money is saved each year in this way.

Time-tables and Track Construction

The Construction of Time-tables on the Boston Elevated Railway Described by Timothy Connell at a Meeting of the New England Street Railway Club—This Paper Followed by an Extended Discussion of Track Construction by Martin Schreiber

A large and enthusiastic attendance enjoyed the last meeting this season of the New England Street Railway Club at Boston, Mass., on May 28, the principal topic of discussion being "Track Construction and Maintenance," and the chief speaker Martin Schreiber, engineer of maintenance of way, Public Service Railway Company, Newark, N. J. President John T. Conway occupied the chair and in the half-hour prior to the usual dinner, an informal discussion was held upon the topic of "Car Schedules and Time-Tables," led by Timothy Connell, superintendent of time-tables, Boston Elevated Railway, and Prof. Albert S. Richey, head of the time-table department of the Bay State Street Railway, Boston, Mass. Thirteen new members were elected at the business session. Abstracts of the discussions are given below.

CAR SCHEDULES AND TIME-TABLES

Mr. Connell explained the difficulties under which the Boston Elevated Railway is forced to operate on account of the working agreement with the carmen's union and exhibited typical time-tables. During the past month time-tables have been completed in which 40,600 trips were used, involving 5177 scheduled and extra runs. Sixty per cent of the latter must be completed in 11½ hours outside time; 40 per cent cannot exceed sixteen hours total time, and of the foregoing 60 per cent, two-thirds must be completed inside of a nine and eleven-hour period. Traffic counts are made whenever necessary, usually two or three per month on the heaviest riding side of lines to be investigated. In making such counts the routes are usually divided among the observers, and as a rule one man can make an accurate record of cars running on a headway of from thirty to forty-five seconds. A. W. Senter, superintendent of the Charlestown division, Boston Elevated Railway, said that at the Sullivan Square terminal one observer can count traffic in about 100 cars per hour. Mr. Connell said that in laying out runs the day is made as short as possible with both early and late runs, viewing the problem from the aspect of total elapsed time. The mid-day runs are laid out so as to include the forenoon and afternoon peaks so far as possible. Thus, a run starting at 4:50 a. m. will have a lunch relief at 10:15, lasting until 11:45, when duty begins again and extends until 3:02 p. m. Another run at the other end of the day may be from 3:25 p. m. to 6:32 p. m., and from 8:15 p. m. to 1:32 a. m. The company operates mainly a double-track service, a line 2½ miles long on North Beacon Street, Brighton, representing the maximum single-track length on any existing route.

The Boston Elevated has no straight tours of duty of nine hours without a break, the longest run being six hours twenty minutes. As a rule, the men prefer a short noon relief and a correspondingly short day. Recently the time-table department has had prepared some 11-in. x 14-in. photostat copies of its regular 19-in. x 30-in. time-tables, for office and other reference work, and the reduction in size seems to be most convenient.

Professor Richey outlined the methods of plotting car runs against elapsed time familiar to train dispatchers, and exhibited printed time-tables supplied to car service employees on the Bay State system. In the latter, meeting points are printed in heavy-faced type. Each man receives a time-table showing the car movements in and out of the carhouse in which he makes his headquarters, signing for the time-table, which is carried in a specially designed leatheroid case. The company tries to keep down its longest continuous runs to six and one-half hours, although this has to be exceeded in a very few instances. Requests to work nine hours straight have not been granted. Dead mileage is cut down as much as possible by taking passenger traffic counts and cutting off route ends where feasible. Professor Richey said that on occasion a lengthening of a four-minute headway to eight minutes can be done with less trouble than an extension of a fifteen-minute to one of thirty minutes. In certain parts of the day a line having a ten-minute service can have a twenty-minute schedule at the ends, without serious difficulty.

John T. Conway, Bay State Street Railway, described the peak-load conditions at Brockton and Quincy, Mass. At the former city, which is a large manufacturing center, a 120 per cent increase in service is given to meet the peak traffic, which lasts from thirty to thirty-five minutes in Brockton and which is over between 7:20 and 7:30 a. m. Between 7:30 and 4 o'clock all kinds of trades with respect to afternoon runs are made between the men at the various carhouses, with the consent of local operating officials. A similar policy of give-and-take is successful at Quincy, where 3300 employees of the Fore River Shipbuilding Company leave the plant at one time, requiring the running of extra trips lasting from one hour to one hour fifteen minutes. Closing, the speaker pointed out the convenience of indicating turning points of extra cars on dispatching diagrams by appropriately curved arrows. Printed time-tables rather than graphic schedules are given to the men on the Bay State Street Railway.

TRACK CONSTRUCTION

BY MARTIN SCHREIBER

The subject of track construction covers an extensive field. It appeals to us when we consider that some of our modern straight track is costing as high as $48,000 per mile of single track with special work as high as $150,000 per mile of single track. Anyone who has made a careful study of this subject could easily divide it into many parts and each would require more than we have available. For example, spikes constitute about 0.3 per cent of the cost of maintaining tracks in city streets. On recent investigation I find that there were some fifty varieties which were being used by different companies, and each company thought it had good reasons for using a particular type.

I shall limit the discussion to track construction in city streets under four general divisions: (1) plans and specifications, (2) facilities for carrying on the work, (3) inspection and (4) special work.

PLANS AND SPECIFICATIONS

Every railway company should have approved plans and specifications for all the different elements that enter into track construction, as well as a proper organization. The Public Service Railway, through its monthly engineers' meetings, developed such standard specifications, and now has the following printed sets, which accompany orders and requisitions and are a matter of record: open-hearth T-rail; open-hearth girder and high T-rail; joints; rail fasteners; track bolts; nut locks; tie plates; spikes; tie rods; ties; creosote oil; cement and paving.

RAIL

The rail question has been well covered by the American Electric Railway Engineering Association, for both high T and grooved types. An important work was done at the last Atlantic City convention in the final development of standard girder rail for tangent and curved tracks in city streets. The Lorain Steel Company has already prepared rolls for the new 7-in. rail recommended by the Association, and it will be known as Section No. 122-467. Slot rail construction or ordinances may require the use of special rail in some locations, but the new standard rail may be easily substituted in a large number of instances. Our modern present rails all conform in a way to the new design, as in their tendency to offset the gage line to the center of the web, thereby causing the rail to be better balanced when under the influence of wheel loads. The reason for increasing the thickness of the web and the depth of the groove is apparent. The new 7-in. rail closely follows the standard section of the Public Service Railway, and has recently been adopted as a standard by the Boston Elevated Railway surface lines. It also closely resembles the Montreal standard.

When the committee of the Association first began to introduce standard rails for paved streets, it felt the need of considering no less than sixteen standards, including 7-in. and 9-in. rail in grooved and T sections, for both straight track and curved. At that time some 200 rail sections were in actual use. The new standards are only four in number, and it is the writer's belief that the industry will see a further reduction in the types of rail used on account of the tendency to eliminate the 9-in. rail. Primarily the demand for the latter was caused by the use of deep paving blocks and mechanical joints. Both of the latter are disappearing in modern practice, and there is no good reason why the 7-in. rail with welded joints and the more shallow paving will not answer just as well as the 9-in. rail, and the 7-in. construction is unquestionably less expensive. With regard to composition, it is now recognized that the use of open-hearth steel is the best practice, and here again the American Electric Railway Engineering Association has done good work in formulating standard specifications for open-hearth steel girder rail, which have been ratified by the American Society for Testing Materials. These specifications provide for two schedules for carbon content. Many engineers are now strongly indorsing the higher schedule for carbon, but it seems that when welded joints are used, it is better practice to use 0.6 to 0.75 per cent carbon content to prevent breaking near the joint. It might also be well to refer to certain alloys which are now added to the rail to produce a more uniform texture of the metal, titanium for example.

JOINTS

The subject of rail joints is one of the most difficult related to track work, but it has been greatly simplified by the success obtained through modern welding processes. About fifteen years ago there was a general stampede for welded joints, but on account of the large number of breaks, the welds were abandoned to a considerable degree and mechanical joints substituted. To-day welded joints are coming back but with considerable improvement, and more is known about their proper installation. The effect of many of the welds in the past was completely obliterated by failure to grind the joints after the completion of the welds. Good success has also been attained with certain combination welded and riveted joints, and now the industry sees a new joint coming from Europe that consists of ordinary plate electrically welded at the edges. To date, the Public Service Railway has installed about 66,000 welds, and generally these joints have given good satisfaction. Another advantage of the welded joints is the elimination of the bond, the return circuit now being generally recognized as important as the overhead feeder system, not only from an economical standpoint, but as a preventive of electrolytic troubles.

RAIL FASTENERS

With a 7-in. rail the Public Service Railway uses a combination rail brace and tie plate, along with the $5\frac{1}{2}$-in. cut spike. Some electric railways follow too closely the practice of the steam roads, as in the use of the screw spike, and there is a tendency to overlook the differences in loading conditions between a rail exposed to the air and carrying a 200-ton steam locomotive and one carrying a 50-ton car operating on a track which is not only spiked down but which also has a solid incasement of paving.

TIES

Most electric railways now appreciate the economy of using treated ties and other timber. For permanent track construction, the 6-in. x 8-in. x 8-ft. yellow pine tie, treated with 10 lb. of creosote oil per cubic foot, seems to cover the requirements very well, and ties so treated will probably last twenty-five years. If this treatment seems too expensive, at least a superficial treatment with some high-grade oil like Carbolineum should be used. The steel tie is a good competitor of the wood tie, but it is more expensive, and in loosely ballasted track it is necessary to place the ties as close as when wood is used. The wood tie has an advantage in its cushioning effect and in connection with shifting and aligning the rail. These points are very important in the practical side of track construction. A number of concrete ties have been introduced, but so far experience has not demonstrated their practicability. The author has always taken the stand on concrete ties that if enough reinforcement is put in to make the tie stable, one might as well go to the all-steel tie, and if enough concrete is put in the tie and it will not disintegrate, a large expense for foundation is entailed.

TRACK FOUNDATION

In place of the concrete wave, as it were, that swept over the electric railway field a few years ago, we find some companies which formerly laid track on a concrete foundation going back to broken stone, because they find that broken-stone ballast lasts about as well, is just about as satisfactory and is a good deal cheaper than concrete. Broken stone provides an excellent drain for the track, which is an important point in paving maintenance and, on account of being less rigid, is easier on the rolling equipment than the concrete foundation. Last, but not least, a track with broken-stone foundation may be installed under traffic, which is a great advantage. Further, any shifting and alignment of tracks in the future is less expensive with broken stone. In some kinds of soil a sort of beam support must be provided the track through the foundation, but in most cases the sub-grade which has been properly rolled, with stone ballast rolled and carefully tamped under traffic will provide a satisfactory electric railway foundation. About 357 miles of track of this kind has been built by the Public Service Railway in the past eleven years.

PAVING

Although the paving in city streets is often beyond the control of the electric railway management, most municipal engineers now recognize the wisdom of omitting any monolith pavement, such as concrete or asphalt, next to the rail. Experiments have absolutely demonstrated their unsuitable character for this class of construction. If a perfectly smooth pavement is required, it is better to use wooden block in preference to any manufactured block, brick or others. For life and ultimate economy, the granite block appears to stand alone. Although this has been criticised as being too rough to accommodate modern travel, the carefully clipped block, laid with narrow joints, has gone far toward eliminating this complaint. The granite paving which is laid in connection with the track work in Newark is from 8 in. to 12½ in. long, 3½ in. to 4½ in. wide and 4¾ in. to 5¼ in. deep, laid thirty per square yard, with a ⅜-in. joint. In connection with pavement a concrete foundation is required up to at least the top of the ties.

FACILITIES FOR CARRYING ON WORK

It was not long ago that the view was held, even by many officials, that any kind of equipment was good enough for track construction. Absence of adequate storage yards, work cars built out of old and dilapidated rolling stock which can only carry half a load and which is out of order a large part of the time, etc., are still obstacles to success. If the proper facilities are not within the control of the engineer, it is better to do the track work by contract. Proper accounting is greatly neglected. Few companies know just what the track work costs them. Seldom are the cost of power, interest on equipment and overhead expenses taken into consideration, as they should be in comparing costs with contractor's expenses. Even if good construction equipment is available it is well to consider the advisability of contracting out the work, especially where any portion requires skilled labor, such as paving. Ordinarily the railway company has the advantage over the contractor through its improved facilities for hauling material. But aside of this feature, the contractor can economically build the track just as well as a sewer or other structure.

The track work of the Public Service Railway, outside of paving, has been done mainly by the company. Special study has always been made of having the best storage yard and facilities for receiving and delivering materials. Power machinery is used for loading and unloading, and crane cars are employed in delivering rail and special work on the streets, eliminating manual labor wherever possible. The work cars are the best the company can make and are specially designed for their service.

INSPECTION

Adequate inspection is essential to getting the best value for the expenditures along construction lines. All materials used in track work should be carefully inspected. It is surprising how a manufacturer on an order will omit the little things to save a few cents, which materially affects the efficiency of the item. Thus, on a recent track spike order, although printed specifications showed just what was wanted, the manufacturer omitted the flare on one side of the spike; on the other side the reinforcement was obtained by squeezing the metal out of the shank of the spike proper. The excuse for doing this was that if the specifications were followed, two machine operations in place of one would be necessary. Another reason advanced was that no set rules had been observed on previous orders.

When ties are treated it is necessary not only to select the timber but to make a thorough analysis of the oil. A sample tie of each charge that goes into the cylinder should be analyzed; first, for moisture, then the separate oil analysis for proper constituents, including a moisture investigation. Then after the charge is taken out of the cylinder a sample tie should again be analyzed to determine the amount of moisture present and also the number of pounds of oil. If this is not done, it may not be possible to ascertain whether the extra weight gained by the ties is due to moisture caused by the steaming process rather than the creosote oil. Usually the cost of inspection of paving is a paltry sum compared with the gain in usefulness of the final product. Poor inspection is worse than none, however, as more or less responsibility is taken from the manufacturer. It is not to be inferred that generally all those furnishing goods are dishonest, as the manufacturer may be perfectly sincere in his intentions, and the only reason he does not do things in the required way is that he does not appreciate the importance of it, or that the matter is being handled by a representative who is taking unwarranted individual responsibility.

SPECIAL WORK

From experience, the author sees no grounds for the contention that solid manganese special work is not superior to manganese inserts, if it is properly applied. It does not pay, however, to buy solid manganese at a possible increase of 30 per cent in price over the inserts, if traffic does not require it. A great deal of the solid manganese which has been cited as not coming up to expectations, as in Chicago, was the crop of first experiments. The pieces are now made up in sections, instead of the tendency toward a unit casting, so that if a part fails it is not always necessary to throw away the entire piece. At Broad and Market Streets, Newark, one of the busiest electric railway crossings in the country, about 5000 30-ton cars pass over the intersection every twenty-four hours. Previously insert crossings were good at this location for sixteen to twenty months. The first solid manganese crossing which was installed stood about three and a half years. The author has found that a very economical construction for steam road crossings is to use the old bolted type with solid manganese running and bearing rails. This crossing is easy to repair under operation. Nevertheless, the most vulnerable point is of the best known material, as the running and bearing rails in steam track are rolled manganese, and here in the old type breaks generally occur.

The way engineer is much hampered by variations in equipment design: first, by city and interurban flanges; second, old and new cars with wheelbases from 4 to 6 ft.; and third, steel wheels. An ideal curve design is one which is traversed only by cars with the same sized wheel flanges and the same wheelbase. The proper groove of the curve is a function of the contour of the flange, length of the wheelbase and the radii of the curves. Theoretically, the design of the groove should vary with these factors. Again, most modern special work is to-day designed for flange bearing, and it is not possible properly to design special work for two depths of flanges, although the engineer is constantly called upon to do this. Special work designed for a ¾-in. flange will have the floors of frogs, switches and mates cut out by a ⅞-in. flange; whereas if one designs for a ⅞-in. flange and operates a ¾-in. flange upon it, the wheel treads pound and destroy the points in frogs, switches and mates. It is important that the management have a thorough understanding of these points so that all possible difficulties may be eliminated.

MUNICIPAL CO-OPERATION

In closing the formal portion of his paper, Mr. Schreiber emphasized the value of such gatherings as the New England Street Railway Club, and referred to the benefits of association work. He cited the advantages of municipal co-operation, illustrating his point by a meeting called at Philadelphia last month by the Director of the Board of Public Works to consider the proposition of snow removal. The author was impressed that the director sought the opinion of all the representatives of interests concerned with snow removal before making his recommendations to the board. Meetings of such kinds are of much value in the public relations of utilities.

ILLUSTRATIVE FEATURES

A large number of lantern slides was displayed at the end of the paper, showing maintenance of track facilities on the Public Service Railway. Among the points brought out by the speaker in showing the views were that the tie-treating plant of the company handles about 1000 ties per day when in service; that all scrap material as well as rail is handled by electric crane cars and that manual labor is cut to the minimum on the streets, and that labor-saving devices are used wherever possible in the work of the department. Electric drills perform at least four times as much work as can be done by hand. Drills costing about $1 each were formerly sharpened unsuccessfully by hand on an emery stone, there being numerous breakages. A machine now does this work and its cost, about $250, has been more than covered in less than six months. The present average cost of sharpening is from 2 to 3 cents per drill. The company considers all-steel, side-dumping cars better than the bottom-dumping type. Sand is economically handled by clam-shell buckets, and other heavy materials are transported about the system with fullest regard to economy of distribution.

DISCUSSION

H. M. Steward, chief engineer maintenance of way, Boston Elevated Railway, favored the use of screw spikes with a clip, taking care, however, not to let the rail cut the spike. He described the arrangements for adzing ties on the Boston system, as recently outlined in this journal, and spoke of the excellent results attained at Boston by the use of the Indianapolis welding outfit on special work and cupped rail, the life of special work being materially prolonged by this process. Mr. Steward said that in place of twist drills, which made no impression on mangenese steel, the company uses a flat drill made of high-speed steel, which is cheaper, stronger and more easily reshaped than a twist drill, doing ten times the work of the latter. Closing, the speaker referred to the so-called frictionless rail as a desirable equipment for sharp curves subjected to heavy traffic.

Frank A. Barbey, Boston, then spoke informally of the successful use of the frictionless rail in steam railroad service, emphasizing the absence of flange wear secured by the installation of a specially proportioned narrow and deep head on the inside of curves. Not only has the life of curves thus equipped been increased, but the resistance of the track to the passage of locomotives and long trains has been greatly diminished. At the speaker's request, further details are omitted pending a full presentation of the subject at a later time.

The remainder of the discussion was chiefly devoted to the answering by Mr. Schreiber of questions bearing upon road department work. The speaker said that economical temporary maintenance seems to be the best present policy. No trouble of moment has been experienced with driven spikes on the permanent track of the Public Service Railway, and the benefits of the more costly screw spike are not apparent to the company. The heavy annual cost of modern track, including maintenance and depreciation, was touched upon. He did not consider a monolithic construction next the rail desirable, and municipal engineers in the New Jersey territory rarely require such construction, even where the city or town has entire control of the paving. Heavy cars with 6 ft. wheelbase are troublesome to operate on curves of 35-ft. inside radius, and the company does not now install curves of less than 40-ft. inside radius. A brief description was also given of the organization of the Public Service Railway, emphasis being laid upon the good results secured by separating the engineering and construction departments and placing a division engineer and a division roadmaster in charge of way matters in each of the five main districts covered by the system. By this arrangement the division roadmaster is able to spend the greater part of his time outside the office, but the success of the organization depends upon real co-operation. The viewpoint is the essential thing, and the realization that all departments are greater than any one department is the cornerstone of successful service to the company's best interests. Mr. Schreiber said that in his opinion the present standardized girder rail with the gage offset from the web and with a deep groove and welded joint comes close to the T-rail in value to the electric railway. No known mechanical joint is free from pounding after service of four or five years in a paved street, and the welded joint seems to be best adapted to such conditions. Twelve 60-ft. rails can be carried on the Public Service work car, and the crane cars are now designed so that the crane can be swung over the top of the rail, greatly increasing the convenience of the equipment. The Public Service Railway favors the use of broken and suspended joints in track construction.

SWISS STREET RAILWAY REPORT FOR 1912

The railway department of the Swiss Federation has recently issued its steam railroad and street railway statistics for the calendar year 1912. As usual, the report gives very elaborate data on the individual installations. The number of street railway systems was thirty-eight and their combined single-track mileage, 389. The gage was usually 1 meter (39.37 in.). The Altstätten-Berneck (7.5 miles) and the Lugano Tramways (5 miles) were operated at 1000 volts d.c., the Mendrisio Tramways (7.8 miles) at 800 volts, the Lausanne Tramways (51 miles) at 675 volts d.c., the Locarno Tramways (2.3 miles) at 200 volts single-phase, and the Rheinecker Riffelalp and Schwyzer lines (totaling 3.3 miles) at 500 to 550 volts three-phase. All other lines were operated at 500 to 600 volts. The total number of passengers carried was 141,113,028 and the tonnage hauled was 188,243 metric tons.

The earnings from the passenger service were $3,347,178 and from freight $76,653, plus earnings from miscellaneous sources to make a total of $3,463,159. The total operating expenses were $2,739,962, equivalent to 79.1 per cent of the gross earnings. The surplus was $725,898. After making various allowances for depreciation, amortization, etc., $149,084 remained to pay 3.98 per cent on the capital invested. Many of the smaller roads which do not operate throughout the year paid no dividends at all.

The New York Municipal Car—Design

The Present Article Tells Why the New York Municipal Railway Corporation Devised and Adopted a Car of Great Length and Unusual Width for Its Rapid Transit Train Service—Comparisons with Earlier Car Types of Different Railways Show Wherein the New Car Is Superior—One Hundred Cars Are Now on Order, with 500 More Under Option

When the Brooklyn Rapid Transit System offered on March 2, 1911, to operate a part of the vast subway and elevated network then projected by the city of New York, its engineering and operating forces had to face the question of finding a car that would meet the probable service conditions in the most satisfactory way. If the new lines were to be mere fractional additions to existing structures, the answer would have been the very simple one of duplicating the last preceding types of the Brooklyn system. But since the contract made by the Brooklyn Rapid Transit System through the allied New York Municipal Railway Corporation covered 225 miles of elevated line (including fills and cuts) and 68.6 miles of subway, measured as single track, the conditions were absolutely reversed because the new routes alone will be, when complete, nearly twice the present 105 miles of the Brooklyn elevated routes and their surface extensions. Hence the logical thing was to develop a car best suited for the new lines and to alter the old lines to conform to the standard set by the new.

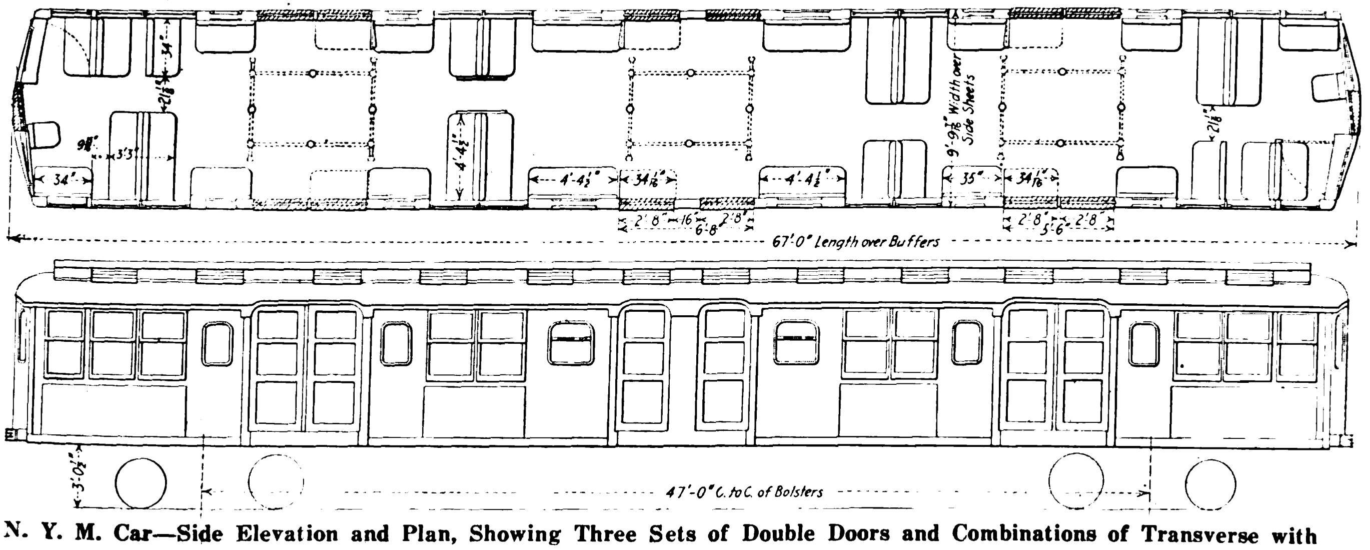
CAPACITY THE BASIC OBJECT

From the moment that the first rough sketches were made for the new car, the prime object was to secure the greatest possible capacity from structure and unit car alike. Studies which had previously been carried out by the Brooklyn Rapid Transit System for surface railways indicated that the all-steel side-entrance car was the most efficient in passenger-carrying capacity. The same principle of design applied to non-surface cars, but with the addition that clearance conditions were usually far more liberal in subway-elevated work than on surface railways. This spatial freedom suggested the possibility of using a car much wider and longer than the ordinary standards.

Aside from any other advantages, the successful development of the wide-car idea means in round but staggering numbers, that a $200,000,000 structure with cars 67 ft. long x 10 ft. wide will carry eventually as many passengers as a $240,000,000 structure with cars 52 ft. 0¾ in. long x 8 ft. 6¾ in. wide, the latter dimensions being those of the cars used in the present subway in New York. The possibility for this enormous saving in structural costs alone may be illustrated by the calculation that in one hour 400 of the present B. R. T. cars, with an average load of 152 passengers per car, would carry only 60,800 passengers past a given point of single track, whereas the same train length (18,863.5 ft.) comprising 280.5 N. Y. M. cars, with a load of 270 passengers per car, would carry 75,735 passengers by the same point—an increase of about 25 per cent in track capacity. Compared with the Interborough car, the increase in track capacity is 21 per cent.

CLEARANCE STUDIES AND STRUCTURAL CHANGES

Before taking up the design of the car in detail it was, of course, essential to make clearance studies of every foot of route over which the proposed car would be likely to run. To be sure, the city of New York had committed itself to a subway profile and an elevated railway clearance which would permit cars of approximately 10 ft. width, but such a dimension had not been contemplated either in the design of the city's existing East River bridges or in the erection of the railway's elevated structures and platforms. The result of the clearance study showed that out of a possible total of 398.35 miles of track, only 57.31 miles could not be operated with the longer and wider cars unless certain changes were made on the bridges and existing elevated lines. Fortunately, these alterations, as a whole, were not prohibitive: First, because the city had already decided to build wide profile tunnels and subways; second, the cost of the new elevated structures would not be affected by the width of car in any event; third, the Brooklyn Rapid Transit System had been rebuilding or reinforcing its elevated structures for some years past, and still more radical changes, like third-tracking, were required in connection with the new rapid transit routes. Thus the expense of adapting the way would be very reasonable in comparison with the advantages of the proposed car.



N. Y. M. Car—Side Elevation and Plan, Showing Three Sets of Double Doors and Combinations of Transverse with Fixed and Folding Longitudinal Seats

One other structural condition had to be met, namely, that of concentrated wheel loads. The Brooklyn elevated lines had been reinforced, beginning in the year 1904, for a maximum wheel load of 10,500 lb. In the succeeding year the wheel load on some cars had risen to 12,900 lb. As time went on the structures had to be reinforced for loads of 14,000 lb. per wheel, as imposed by the company's own rolling stock. A still higher load, 15,000 lb., is imposed during the summer months on certain routes by the Rockaway Beach through cars of the Long Island Railroad.

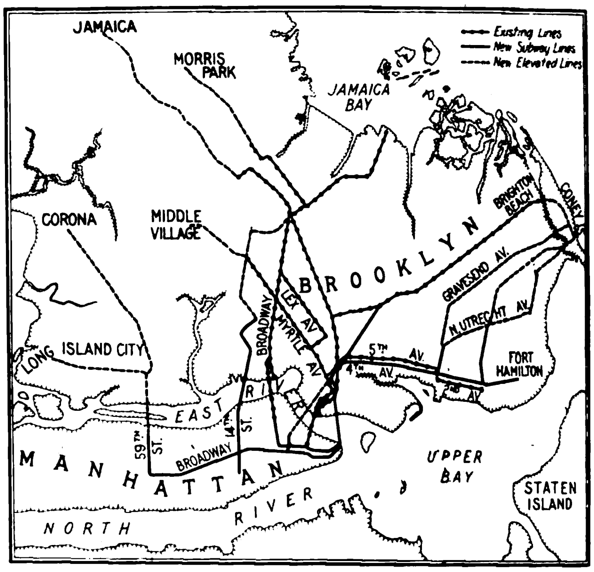
Since 15,000 lb. per wheel, or 30,000 lb. per axle, is also the limit set by the city of New York for its own structures, it was necessary that the loads per wheel of the new car should approximate this figure. Here the problem was solved by a better distribution of weight throughout the car, including the use of eccentrically-loaded trucks. Roughly speaking, the 1400 series B. R. T. elevated car, with its two 200-hp motors on one truck, has a maximum load of 13,500 lb. per wheel; the longer and wider N. Y. M. car with but one 140-hp motor per truck imposes a corresponding load per wheel of 14,950 lb. At the assumed total weight of 122,800 lb. (85,000-lb. car plus 270 passengers at 140 lb. each), the weight per wheel will be 627 lb. (15,577 lb.-14,950 lb.) less than that of a driving wheel on the much smaller Interborough motor car owing to the fact that the two 200-hp motors of the latter car are on one truck. Since every car is a motor car, it was found possible to provide for a higher percentage of weight on drivers than is usual in trailer operation. The rate of acceleration will be 1.25 m.p.h.p.s.

STUDIES OF PREVIOUS DESIGNS

Before deciding on a standard car, the New York Municipal Railway Corporation made a most painstaking study of the constructional, seating and cost features of existing electric rapid transit cars. This study extended even to the seating plans of the suburban cars of European steam railroads. However, one important point which was realized in reviewing the rolling stock of steam or electrified suburban lines was that the operators of such service must perforce give a higher ratio of seating to passenger capacity than operators of short-run city high-speed lines. The suburban passenger pays a fare reasonably proportionate to the distance traveled, and he usually rides an hour or more. Furthermore, as the headway of steam or electrified suburban lines is rarely less than ten minutes, there is generally no reason why a seat cannot be supplied to every passenger at all times.

The seat-use conditions on city rapid transit lines are fundamentally different. The passenger pays a single 5-cent fare for practically any distance he chooses to ride. Although in point of time the average trip may last only half an hour, an equivalent ride on the steam suburban lines would cost two to four times as much. But still more important is the fact that under such conditions as obtain in New York's present subway, it is physically impossible to seat all rush-hour passengers throughout the trip, despite the operation of the maximum train length (ten cars totaling 520 ft. 7½ in.) and the shortest possible headway, ninety seconds. Since, therefore, a city rapid transit line cannot emulate steam suburban roads in supplying seats to all rush-hour passengers, the designers of the present car evolved an arrangement which in providing the maximum standing and seating room for the heavy and light hours respectively would give a most logical and flexible means of handling the variations of city traffic.

To appreciate this real innovation in floor use it will be necessary to look backward over the changes made in the original subway cars of the Interborough Rapid Transit Company. As first built these cars had longitudinal seating except at the center which was provided with pairs of the orthodox back-to-back transverse seats. Although these cars were but 52 ft. 0¾ in. over all, it soon became apparent that end-door passage was insufficient to permit short station stops. Beginning in 1910, after six years of operation, the transverse seats on each side were removed to make way for a center door of 4 ft. 2 in. opening. The efficiency of the vestibule doorways, which were also of this width, was improved by the practical removal of bulkheads. Thus the Interborough car of to-day has none but longitudinal seating, and the loss of the cross seats has been compensated only in small part by the use of hinged seats which are lowered alongside of idle center doors in line with the other seating. The total passage space per side of these rebuilt cars amounts to 24 per cent of the total length. The conditions of door operation, however, do not permit all openings to be used to the best advantage. The guard must stand with one foot on each platform of adjacent cars as he opens the heavy vestibule doors by hand, and he is therefore in a position unfavorable for controlling the movement of passengers at the air-operated center door. With this knowledge of the Interborough Company's experiences, it will be easier to appreciate the radically different plan which the New York Municipal Railway Corporation has devised for the same public and for much the same speeds and schedules.



N. Y. M. Car—Relation of Old Rapid Transit Lines of Brooklyn Rapid Transit System to the Additional Lines, All to Be Operated by the New York Municipal Railway Corporation

The fundamental principle of the N. Y. M. design is to attain maximum seating capacity during hours of normal traffic and maximum standing room plus a reasonable proportion of seating capacity during the rush hours. As the accompanying plan indicates, this has been attained by the use of folding seats just as in the revised Interborough car, but on a wider scale because of the greater number of doors. Furthermore, a great part of the seats are of the more comfortable transverse type. As shown on the plans dated July 15, 1911, the original intention of the New York Municipal Railway Corporation was to use only the center doors during the hours of light traffic, thereby making available for folding seats the space alongside of the end-side doors. Owing to the length of the car it was decided eventually to use during light hours one of the two 32-

in. doors forming each pair of side doors. Consequently, the average walk of the passenger during normal hours will not be much different from that during the rush hours.

HOW MORE CAPACITY WAS OBTAINED

In working out a plan for maximum capacity, the company took a leaf from the book of electrified steam railroad practice in determining to use the widest and longest car possible. The constructional feasibility of such cars was unquestionable, for the Southern Pacific Railroad was using 72-ft. x 10-ft. 6-in. cars on its Oakland (Cal.) suburban lines, while the Long Island Railroad was operating into Brooklyn cars of 65-ft. x 9-ft. 11½-in. body. The point in which the N. Y. M. car differs from these and other designs lies in the better exploitation of the width, due partly to lesser wall thickness but chiefly to seating layout. In the usual suburban cars all but the corner seats are transverse. Each seat cares for two passengers but with several inches to spare, and the aisle is also wider than necessary. In the Brooklyn car, the clear inside width of 9 ft. 1⅝ in. is enough to permit the placing of a triple cross-seat opposite every double cross-seat. As the seating plan shows, the triple seat has 52½-in. clearance for seating while the double seat has 34 in. This space of at least 17 in. per passenger is actually 1½ in. greater than the double cushions of some surface cars. The aisle between the transverse seats is only 21⅛ in. wide but it will be observed that it is hardly an aisle in the usual sense of the word. This arrangement will be referred to later.

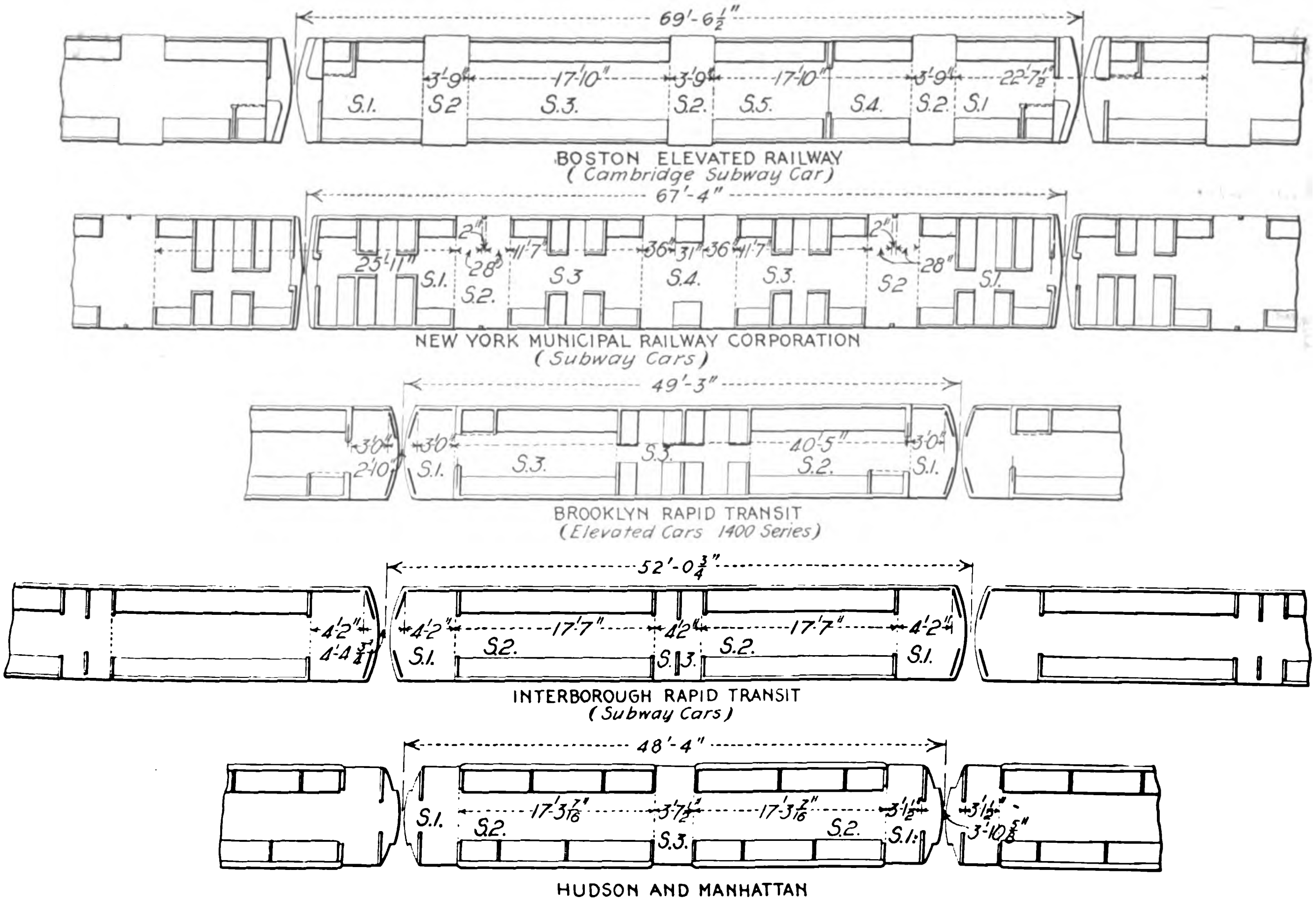
The second means adopted to secure greater seating capacity per car was to use three pairs of side doors and thus eliminate vestibules. These doors take up 24 per cent of the car length, which is practically that of the present Interborough cars. Their efficiency for passenger movement should be greater, however, because

N. Y. M. CAR—ANALYSIS OF DOOR LOCATION RELATIVE TO PASSENGER MOVEMENT

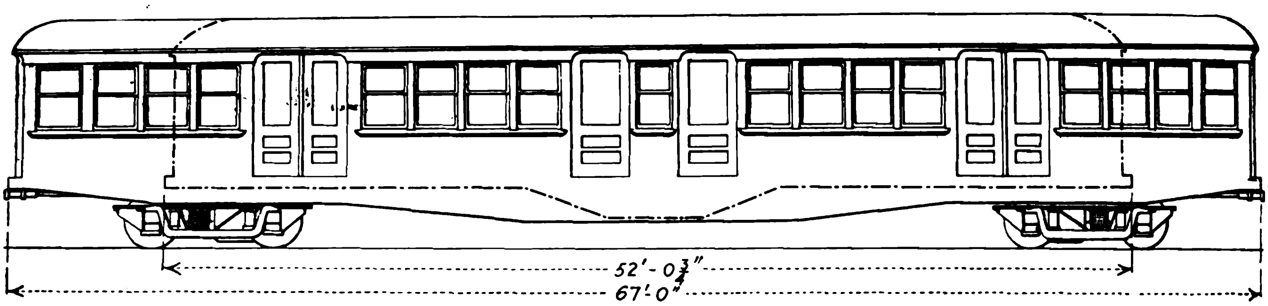
$\frac{nd}{N} = D =$ Average distance to doors per passenger in inches.
$N =$ Total number of passengers (seated and standing).
$n =$ Number of passengers in sections indicated.
$d =$ Average distance of sections to doors in inches.

Road	N	Per Cent Door Opening per Length of Train	Section	n	d	$n \times d$	Average Distance to Doors per Passenger $\frac{nd}{N}$
Boston Elevated Railway...	266	16.2	1	66	96	6,336	91.6
			2	68	57	3,876	
			3	66	114	7,524	
			4	27	90	2,430	
			5	39	108	4,212	
			Total............			24,378	
New York Municipal Railway..................	270	22.8	1	80	114	9,120	82.5*
			2	56	60	3,360	
			3	92	78	7,176	
			4	42	62	2,604	
			Total............			22,260	
Brooklyn Rapid Transit Elevated.................	154	12.2	1	40	50	2,000	146
			2	86	151	12,986	
			3	28	270	7,560	
			Total............			22,546	
Interborough Rapid Transit.	169	24	1	42	51	2,142	90.5
			2	106	114	12,084	
			3	21	51	1,071	
			Total............			15,297	
Hudson & Manhattan......	158	20.4	1	28	53	1,484	87
			2	110	102	11,220	
			3	20	53	1,060	
			Total............			13,764	

*Revised to 83.6 in.


69'-6½"
3'-9⅝" 17'-10" 3'-9⅝" 17'-10" 3'-9⅝" 22'-7½"
S.1. S.2 S.3. S.2. S.5. S.4. S.2. S.1
BOSTON ELEVATED RAILWAY
(Cambridge Subway Car)
67'-4"
25'-11" S.1. 28" S.2. 11'-7" S.3 36" 31" 36" S.4. 11'-7" S.3. S.2 28" S.1.
NEW YORK MUNICIPAL RAILWAY CORPORATION
(Subway Cars)
49'-3"
3'0" 2'10" 3'0" S.1. S.3. S.3. 40'5" S.2. 3'0" S.1.
BROOKLYN RAPID TRANSIT
(Elevated Cars 1400 Series)
52'-0¾"
4'2" 4'4¼" 4'2" S.1. S.2. 17'7" 4'2" S.1. S.3. S.2. 17'7" 4'2" S.1.
INTERBOROUGH RAPID TRANSIT
(Subway Cars)
48'-4"
S.1. S.2. 17'-3 7/16" 3'7½" S.3. 17'-3 7/16" S.2. 3'1½" S.1. 3'1½" 3'-10⅝"
HUDSON AND MANHATTAN

N. Y. M. Car—Comparisons of Door and Seating Layouts of Leading Types of City Rapid Transit Cars Which Were Studied to Work Out the Equal Use of All Side Doors of the New York Municipal Car. (See Table Above in Connection with Division of Cars Into Sections)

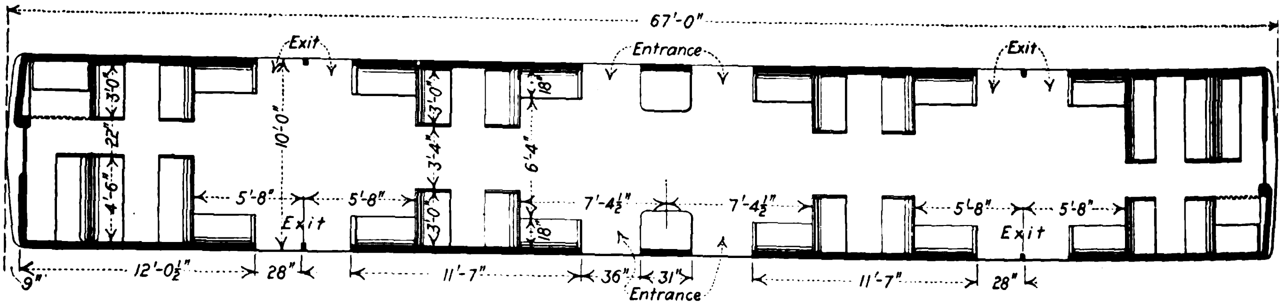


N. Y. M. Car—Comparisons of Side Elevations of the Standard Cars of the Interborough Rapid Transit Company and of the New York Municipal Railway Corporation to Show Differences in Length and Depth

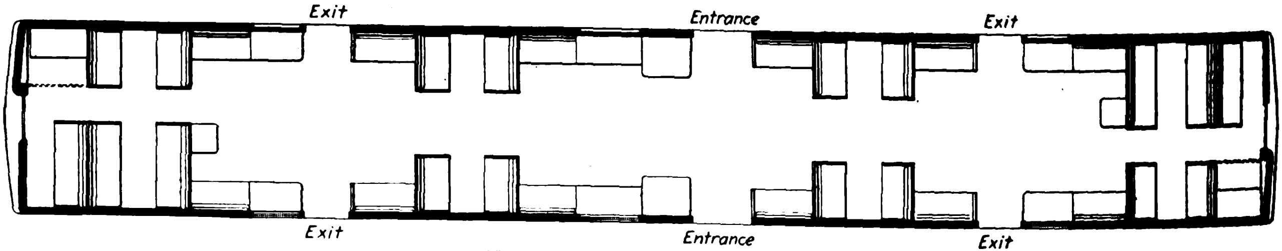
the guard will stand in the center of the car. Further, he will operate all doors pneumatically, so that his attention will not be distracted by the manipulation of heavy door levers. The maximum distance from the guard's position to the end side-doors is about 17 ft. Had end instead of side doors been used on a car of this length, the time of passenger interchange would have been prohibitive.

The use of side doors made it possible to divide the car into sections of such capacity that each doorway will do its fair share of work. As the result of this analysis of door location, the average walk of a passenger during the rush hours will be 83.6 in. compared with 90.5 in. on the Interborough center-door car, 91.6 in. on the Cambridge subway side-door car of the Boston Elevated Railway, 87 in. on the Hudson & Manhattan center-door car, and 146 in. on the B. R. T. end-door elevated car. These figures indicate clearly the superiority of side doors as compared with end doors alone, or with end doors plus center doors. The Cambridge car, which also has three doorways per side, is naturally the nearest to the new N. Y. M. design, and the difference against the Cambridge car is due chiefly to its greater length. The method of obtaining this comparison of passenger movement is shown in an accompanying series of plans with its table of passenger capacities according to car sections and the simple formula of $\frac{nd}{N} = D$ where N equals total seated and standing load, n equals number of passengers in each section indicated on plans, d equals average distance of each section to door in inches, and D equals average distance to doors per passenger in inches.

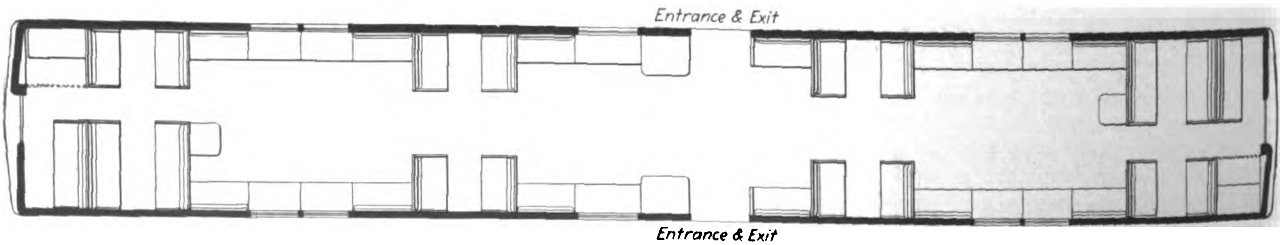
The seating, standing and door layout complete of the new car is intended to meet the essential condition of short station stops on a line with headways as short as 90 seconds. The space opposite each active doorway is free except for vertical stanchions to accommodate standing passengers and for a 34 1/16-in. seat along-



SEATING PLAN NO. 1 FOR RUSH HOUR SERVICE



SEATING PLAN NO. 2 FOR MEDIUM TRAFFIC



SEATING PLAN NO. 3 FOR LIGHT TRAFFIC

N. Y. M. Car—Seat and Door Use Studies Recorded under Date of July 15, 1911, Showing that the Original Idea Was to Permit Separate Full-Width Entrance and Exit in Rush Hours, Half-Width of the Same Passages for Medium Hours and One Central Passage for Light Hours

side one-half of the opposite doorway. Contiguous to this section are facing pairs of 4-ft. 4½-in. longitudinal seats with a 5-ft. 6⅝-in. space between. The triple and double back-to-back cross-seats follow. At the ends of the car, transverse and short side seats are arranged to the best advantage. When not in use the motorman's seat is folded against the wainscoting at the window sill, thereby permitting a two-passenger rattan seat to be drawn forth from beneath an adjoining seat.

In general, the plan of grouping standing passengers on wide square areas is considered more effective than to have them crowd into a long narrow aisle. While end doors are provided, it is expected that the better distribution of the load due to the use of entrances at each end of the station platform and to automatically operated side doors at three points per car length will minimize "bunching" of passengers on station platforms and their later pushing through a car or cars for a seat.

COMPARISONS OF SEATING CAPACITY

The foregoing paragraphs have explained the reasons for adopting a wide, long car with a combination of transverse seats, short longitudinal seats and standing areas for rectangular groups rather than for narrow files of passengers. It is now in order to see what this plan means in actual figures when compared with the car and train capacities of other city and suburban rapid transit companies. The basic figures will be found in the accompanying table of comparative data.

The first point to be noted in this table is that the Interborough and the N. Y. M. cars are the only ones which have some temporary seating. The variation of the Interborough center-door car from minimum to maximum is forty-four to forty-eight seats, while that of the N. Y. M. side-door car is from seventy-eight to ninety. Even under the conditions of minimum seating, the N. Y. M. car will seat 28.8 per cent and the Interborough car 26 per cent of the passengers. In these and any other comparisons for this side-door car, standing capacity is figured on the basis of 9 in. knee room for passengers in the longitudinal seats and a free area of 1½ sq. ft. per standing passenger.

Generally speaking, both the seating and standing capacity of the new car exceed that of all the other cars shown in the table. It is particularly interesting to make a comparison with the Interborough car because the latter design is the one which would naturally be studied most carefully by a neighboring railway. Car for car this comparison will show that in maximum seating and standing capacity the new car exceeds the Interborough by about 60 per cent on the basis of greatest load. The influence of greater width and difference in seating appears by a comparison of the total seated and standing load per running foot of car which gives a figure of 4.0 passengers for the N. Y. M., 3.25 for the Interborough and 3.12 for the B. R. T. elevated car.

A comparison of the cars in the New York metropolitan district was also worked out on the basis of areas as follows:

New York Municipal car, 67 ft. long, equals net area 590 sq. ft.

Long Island car, 64 ft. long, equals net area 544 sq. ft.

Interborough car, 52 ft. 0¾ in. long equals net area 373 sq. ft.

Hudson & Manhattan car, 48 ft. 4 in. long, equals net area 362 sq. ft.

Thus the area of the New York Municipal car is 8.5 per cent greater than the new Long Island car, 58 per cent more than the Interborough car and 63 per cent more than the Hudson & Manhattan car. It should be understood that the areas given are net, namely, they include only the space bounded by the inside dimensions of the car. Taking the maximum seating arrangement of each, the following areas per seated passenger result: Long Island, 7.6 sq. ft.; Interborough, 7.8 sq. ft.; Hudson & Manhattan, 8 sq. ft.; New York Municipal Railway, 6.5 sq. ft.

PLATFORM SAVINGS OF LONG WIDE CAR

It has been stated previously that the gain in track capacity due to adopting the new car would readily outweigh the cost of any structural changes. An enormous saving in platform expense also will follow from using a wide car of great length and with side-door passages exclusively. The following comparison made with the present B. R. T. elevated cars shows this feature in a most interesting manner:

PLATFORM COSTS PER ANNUM

Present elevated equipment—	
Number of cars	928
Average seating capacity per car	53
Maximum capacity seated and standing per car	152
Average cars per train	3
Proposed N. Y. M. equipment—	
Average seating capacity per car	84
Maximum capacity seated and standing per car	270
Average cars per train	3
Operation of Present Elevated Equipment for One Year	
Car hours	2,850,296
Wages of motormen	$315,698.36
Wages of conductors and guards	$593,594.20
Total platform expense	$909,292.56

From this table it was determined that if 600 of the larger cars were used for the same number of car hours (3071 per car a year), the platform cost would be about $700,000 per annum, or a saving of more than $200,000 per annum.

Another advantage which will accrue to the transportation department from the operation of these cars as motor cars only is the simplification and reduction of yard labor concurrent with far more flexible train combinations than are possible with the use of trailers.

COMPARISON OF WEIGHTS AND MOTOR CAPACITIES

As noted in the earlier paragraphs relative to weights on structure, the concentrated loads of the new car will not greatly exceed those of the much shorter elevated cars now in service. The total weight of the N. Y. M. car, of course, is greater, but the advance in design is indicated by the fact that this all-steel side-door car weighs 1268 lb. per running foot (light) of motor car compared with 1455 lb. per running foot (light) of the narrower Brooklyn 1400 series elevated motor car with steel underframe but wooden superstructure. The 1268 lb. per running foot of the N. Y. M. all motor-car train is also much less than that of the other end-entrance and center-entrance shown in the table of comparative data. The end-entrance motor cars are highest with a top figure of 1620 lb. Then follow center-entrance cars with a top figure of 1533 lb. The remodeled Interborough all-steel motor car shows 1496 lb. per running foot, while even its lowest train weight of 1292 lb., obtained by averaging three motors and two trailers, is more than the N. Y. M. all-motor-car train. The Cambridge side-door design of the Boston Elevated Railway is apparently the lightest per running foot (1235 lb.) but actually it is slightly heavier when its lesser width is considered.

On the basis of weight when maximum capacity is carried, the N. Y. M. car shows a saving of 83 lb. to 145 lb. per passenger over the Interborough, depending upon comparison with different combinations of motor and trail cars or straight motor cars. In the new car the estimated weight per passenger on the basis of 270 passengers is the astoundingly low figure of 315 lb. or

but 11 lb. more than the Interborough trailer. Likewise the weights per seated passenger, namely, 1089 lb. and 944 lb. (corresponding to the minimum and maximum seating layouts) are actually below the unit weights of many surface railway low-speed cars. The advance in design and difference in seat arrangement are so great that the new motor car weighs 580 lb. less per seat under minimum and 678 lb. less per seat under maximum seating conditions than the motor car of the Interborough Rapid Transit Company.

Because of the enormous savings in weight and the use of a tap field motor for the varied service conditions, this 67-ft. car will carry only two 140-hp motors, whereas the Southern Pacific cars have four 125-hp motors and the shorter Long Island, Hudson & Manhattan and Interborough cars two 220-hp, two 225-hp and two 200-hp motors respectively. Compared with the Interborough operation, it will be found that the new car's figure of 1.04-hp per passenger on the basis of maximum loading is much below that of the Interborough. Nevertheless, the N. Y. M. all-motor train will amply meet the speed conditions mentioned in the

N. Y. M. CAR—TABLE OF COMPARATIVE DATA FOR VARIOUS ELEVATED AND SUBWAY CARS

Road and Class of Service	Number of Cars in Train			Total Length Over Couplers (Note 1)	Total Capacity				Weight in Pounds							Horse-Power (Note 2)							Per Cent Weight on Drivers	
					Seated				Total			Per Pas. Seat Li't				Per Ton		Per Pass'ger Seat						
	Motor	Trailer	Total		Minimum (Rush Hour)	Medium (Medium Traffic)	Maximum (Light Traffic)	Maximum (Seated and Standing)	Light	With Maximum Pass. Load (Seated and Standing)	Per Foot of Train (Light)	Rush Hour Service (Minimum Seating)	Medium Traffic (Medium Seating)	Light Traffic (Maximum Seating)	Per Maximum Pass. Capacity (Seated and Standing)	Light	Loaded Max. Capacity (Seated and Standing)	Rush Hour Service (Minimum Seating)	Medium Traffic (Medium Seating)	Light Traffic (Maximum Seating)	Per Maximum Pass. Capacity (Seated and Standing)	Total per Train	Light	Loaded (Maximum Capacity)
				Ft. In.																				
Interborough Rapid Transit Subway—Latest steel cars.	*	*	*	52- 0¾	44	46	48	169	77,870	101,530	1496	1769	1693	1622	460	10.27	7.88	9.09	8.70	8.33	2.37	400	59.5	57.3
	**	**	**	52- 0¾	44	46	48	169	51,410	75,070	987	1168	1118	1071	304	...	...	...	...	...	....	...	....	...
	2	0	2	104- 1½	88	92	96	338	155,740	203,060	1496	1769	1693	1622	460	10.27	7.88	9.09	8.70	8.33	2.37	800	59.5	57.3
	2	1	3	156- 2¼	132	138	144	507	207,150	278,130	1324	1568	1500	1439	408	7.73	5.75	6.06	5.80	5.55	1.58	800	44.8	41.8
	3	2	5	260- 3¾	220	230	240	845	336,430	454,730	1292	1529	1462	1403	398	7.13	5.28	5.45	5.22	5.00	1.42	1200	41.4	38.3
	4	2	6	312- 4½	264	276	288	1014	414,300	556,260	1324	1568	1500	1439	408	7.73	5.75	6.06	5.80	5.55	1.58	1600	44.8	41.8
	5	3	8	416- 6	352	368	384	1352	543,580	732,860	1305	1543	1476	1416	402	7.35	5.46	5.68	5.43	5.21	1.48	2000	42.6	39.7
	7	3	10	520- 7½	440	460	480	1690	699,320	935,920	1343	1589	1520	1457	414	8.02	5.98	6.36	6.08	5.83	1.66	2800	46.4	43.5
New York Municipal Railway Corporation—Subway.	***	***	***	67- 3	78		90	270	85,000	122,800	1268	1089		944	315	6.6	4.5	3.3	...	3.1	1.04	280	50.1	(Note 6) 49.9
	2	0	2	134- 6	156		180	540	170,000	245,600												560		
	3	0	3	201- 9	234		270	810	255,000	368,400												840		
	4	0	4	269- 0	312		360	1080	340,000	491,200												1120		
	5	0	5	336- 3	390		450	1350	425,000	614,000												1400		
	6	0	6	403- 6	468		540	1620	510,000	736,800												1680		
	7	0	7	470- 9	546		630	1890	595,000	859,600												1960		
	8	0	8	538- 0	624		720	2160	680,000	982,400												2240		
Brooklyn Rapid Transit—Elevated, series motor car and standard trailer.	*	*	*	49- 3		50		154	71,660	93,220	1455		1433		465	11.15	8.58		8.0		2.59	400	60.4	57.9
	**	**	**	48- 0		48		148	34,500	55,220	719		719		233	....	...		....		....	...	....	....
	2	0	2	98- 6		100		308	143,320	186,440	1455		1433		465	11.15	8.58		8.0		2.59	800	60.4	57.9
	2	1	3	146- 6		148		456	177,820	241,660	1213		1200		390	9.01	6.62		5.41		1.75	800	48.6	44.7
	3	1	4	195- 9		198		610	249,480	334,880	1274		1260		409	9.62	7.16		6.07		1.97	1200	51.8	48.4
	3	2	5	243- 9		246		758	283,980	390,100	1164		1153		375	8.46	6.15		4.88		1.58	1200	45.6	41.6
	4	2	6	293- 0		296		912	355,640	483,320	1213		1200		390	9.0	6.62		5.41		1.75	1600	48.6	44.7
Boston—Cambridge Subway.	***	***	***	69- 6½		72		266	85,900	123,140	1235		1193		323	9.3	6.50		5.55		1.50	400	58	55.6
	2	0	2	139- 1		144		532	171,800	246,280												800		
	3	0	3	208- 7½		216		798	257,700	369,420												1200		
	4	0	4	278- 2		288		1064	343,600	492,560												1600		
	5	0	5	347- 8½		360		1330	429,500	615,700												2000		
	6	0	6	417- 3		432		1596	515,400	738,840												2400		
	7	0	7	486- 9½		504		1862	601,300	861,980												2800		
	8	0	8	556- 4		576		2128	687,200	985,120												3200		
Hudson & Manhattan—Original type. Tunnel service.	***	***	***	48- 4		44		158	74,100	96,220	1533		1684		469	8.64	6.65		7.27		2.02	320	56.4	54.9
	2	0	2	96- 8		88		316	148,200	192,440												640		
	3	0	3	145- 0		132		474	222,300	288,660												960		
	4	0	4	193- 4		176		632	296,400	384,880												1280		
	5	0	5	241- 8		220		790	370,500	481,100												1600		
	6	0	6	290- 0		264		948	444,600	577,320												1920		
	7	0	7	338- 4		308		1106	518,700	673,540												2240		
	8	0	8	386- 8		352		1264	592,800	769,760												2560		
Hudson & Manhattan—New Pennsylvania Newark service.	***	***	***	48- 4		44		158	73,000	95,120	1510		1658		462	12.33	9.46		10.2		2.85	450	54.1	53.1
	2	0	2	96- 8		88		316	146,000	190,240												900		
	3	0	3	145- 0		132		474	219,000	285,360												1350		
	4	0	4	193- 4		176		632	292,000	380,480												1800		
	5	0	5	241- 8		220		790	365,000	475,600												2250		
	6	0	6	290- 0		264		948	438,000	570,720												2700		
	7	0	7	338- 4		308		1106	511,000	665,840												3150		
	8	0	8	386- 8		352		1264	584,000	760,960												3600		
Long Island Railroad Subway—Suburban Flatbush Avenue Division.	*	*	*	51- 4		52		154	79,564	101,124	1550		1530		516	10.05	7.91		7.7		2.59	400	61	58.6
	**	**	**	46- 6		56		136	40,000	59,040	860		715		294	....	...		....		....	...	....	....
	2	0	2	102- 8		104		308	159,128	202,248	1550		1530		516	10.05	7.91		7.7		2.59	800	61	58.6
	2	1	3	149- 2		160		444	199,128	261,288	1335		1245		448	8.04	6.12		5.0		1.80	800	48.7	45.4
	3	1	4	200- 6		212		598	278,692	362,412	1390		1315		466	8.62	6.64		5.66		2.01	1200	52.2	49.2
	3	2	5	247- 0		268		734	318,692	421,452	1290		1190		434	7.54	5.70		4.48		1.63	1200	45.6	42.2
Long Island Railroad Subway—Suburban Pennsylvania Station.	***	***	***	64- 5¼		71		186	104,400	130,440	1620		1470		562	9.0	7.21		6.62		2.52	470	58.7	56.4
	2	0	2	128- 10½		142		372	208,800	260,880												940		
	3	0	3	193- 3¾		213		558	313,200	391,320												1410		
	4	0	4	257- 9		284		744	417,600	521,760												1880		
	5	0	5	322- 2¼		355		930	522,000	652,200												2350		
	6	0	6	386- 7½		426		1116	626,400	782,640												2820		
	7	0	7	451- 0¾		497		1302	730,800	913,080												3290		
	8	0	8	515- 6		568		1488	835,200	1,043,520												3760		

*Single motor car. **Single trailer car. ***Single car.

Note 1—Projection of couplers beyond buffers in case of Brooklyn Rapid Transit, Boston, and Hudson & Manhattan, assumed to be 2 in., and for New York Municipal Railway 1½ in.

Note 2—The horse-power per car of New York Municipal Railway Corporation proposed subway cars, 280 hp.

Note 3—The weight of each passenger assumed to be 140 lbs.

Note 4—Standing capacity figured at 1½ sq. ft. per passenger, allowing 9 in. at longitudinal seats for knee room.

Note 5—No deduction made for motorman's cab in calculating passenger capacity.

Note 6—For latest weights per driving wheel see text.

following paragraph. While the percentage of weight on the drivers is below that of an Interborough motor car (never operated singly in passenger service) it exceeds that of all Interborough train combinations of motor cars and trailers.

Fully loaded trains, according to the specifications of the Public Service Commission, must operate at the required speeds over 3 per cent grades and at reasonable speeds over the 5 per cent grades on the bridge approaches. The motor equipments will permit a schedule speed of 25 m.p.h. for express trains between the terminals of express stations and a schedule speed of 15 m.p.h. for local trains between terminals. The motor specifications provide for a maximum speed of 50 m.p.h.

COSTS

Through the courtesy of several of the electric railway operators previously mentioned detailed total and unit costs of various types of modern steel passenger cars were obtained. These figures are presented in the accompanying table without any identification except that the last set of figures relate to the estimated cost of the N. Y. M. car. This estimate shows that the estimated cost per passenger seat of the N. Y. M. car ready for service is less than of all other designs, and the cost per passenger capacity seated and standing less than of all others but one. Even the cost per running foot is less than that of the Interborough and Hudson & Manhattan motor cars of lesser width. The parallel would be still more favorable to the N. Y. M. car if it had not been equipped with so many new safety and operating features, all of which naturally add to the cost of the car.

COMPARATIVE COSTS—VARIOUS STEEL PASSENGER CARS

Type of Car	Total Cost Completely Equipped	Cost Per Passenger Seat	Cost per Passenger Capacity Seated and Standing	Cost per Lineal Foot
A	$12,236.97	$169.95	$46.00	$175.98
B	18,500.00	260.56	99.46	287.09
C	13,000.00	250.00	84.41	253.25
D	14,500.00	329.54	93.54	300.00
E	12,500.00	284.09	80.64	258.62
F	14,000.00	318.18	76.92	268.91
New York Municipal	15,000.00 (estimated)	166.66*	55.55**	223.88

*On basis of ninety seats.
**On basis of 270 passengers.

Particularly careful comparisons were made with the latest B. R. T. elevated car and Interborough subway car. It was found that the maximum capacity of 600 N. Y. M. (270-passenger) cars, costing $9,000,000 would call for 1070 Brooklyn Rapid Transit (152-passenger) cars at a cost of $13,414,590. The cost of a standard Interborough train of seven motors and three trailers is $234.33 per running foot, while that of the wider N. Y. M. train of any length will be $223.88 per running foot. Assuming the Interborough train make-up stated, the 600 N. Y. M. cars would cost $1,980,000 less than 900 Interborough cars. The N. Y. M. cars would also carry 162,000 instead of 152,100 passengers.

CONCLUSION

The adoption of a car 67 ft. long x 10 ft. wide instead of the smaller type now used by the Interborough Rapid Transit Company on the New York subway system will increase the ultimate carrying capacity of the track by 20 to 25 per cent, save about $200,000 a year in platform costs, save about $2,000,000 on an order for 600 cars and save another $1,000,000 to $2,000,000 in power system capacity because of the decreased energy consumption per passenger carried.

NEW OFFICE BUILDING AT LEXINGTON

The Kentucky Traction & Terminal Company of Lexington, Ky., has recently moved into a new office building which has been specially fitted up for its electric lighting and railway business. The area of each floor is 40 ft. x 110 ft. The first floor is devoted to a general waiting room, display room for electric lighting features, check room and cashier's office. Half of this floor is rented for outside purposes, so that this room is only 19 ft. wide. The second floor is of the same size and is devoted to the quarters of the men. On this floor are located the reading room, billiard and pool room, and in the rear a lunch room and lavatory. The third floor, which has a total width of 40 ft., is occupied by the general offices of the company, including the dispatcher's office.

Passenger Waiting Room in New Office Building—Lexington, Ky.

A view of the ground floor is shown. A large board containing four dials occupies a prominent position and shows when the next interurban car will leave on the four principal lines of the company, namely, those to Frankfort, Paris, Georgetown and Nicholasville.

CONVENTION OF THE MISSOURI UTILITIES ASSOCIATION

The annual meeting of the Missouri Electric, Gas, Street Railway & Water Works Association was held on a steamboat on the Mississippi River May 21-23. A number of papers were presented, for the most part on affairs of public utilities other than electric railways. The following officers were elected: President, A. C. Einstein, St. Louis; first vice-president, G. E. Hayler, Joplin; second vice-president, J. R. Woodfill, Aurora; third vice-president, Hugo Wurdack, St. Louis; secretary and treasurer, F. D. Beardslee, St. Louis. The public affairs committee as elected consists of P. J. Kealy, Kansas City, chairman; C. C. Barnard, Marshall; E. R. Locke, Mexico; L. D. Kelsey, Brookfield; Richard McCulloch, St. Louis; A. Harbut, Kansas City, and S. E. Bronson, Ozark.

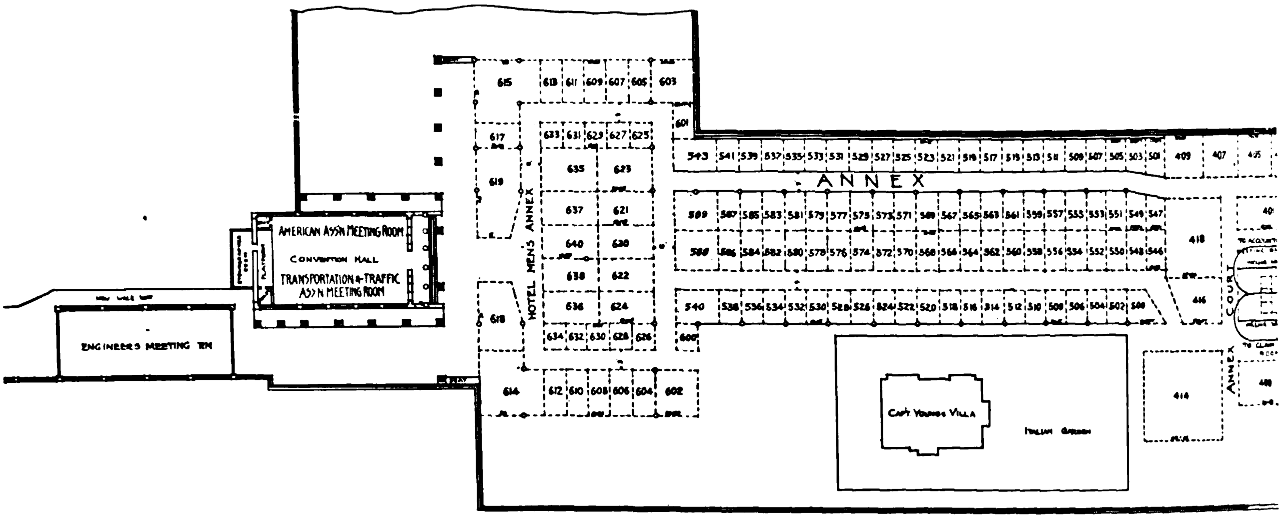
The first annual dinner of the official staff of the London Underground Railways was held on May 2, at the Imperial Hotel, London. A. H. Stanley, managing director, presided. Mr. Stanley announced the granting of free passes to all the employees of the system on the lines under control of the superintendent.

American Association News

Plans are Presented of Young's Million Dollar Pier and an Account is Published of the Arrangements for the Exhibits—Meetings of the Committee on Public Relations and of Power Distribution—Committee Appointments of the Accountants' Association

H. G. McConnaughy, secretary of the American Electric Railway Manufacturers' Association, has just issued a circular giving the rules and other data in regard to exhibit space at the October convention of the American Electric Railway Association. All manufacturers who intend to make exhibits at Atlantic City this year are urged to put in an application promptly. While October is some months away, Mr. McConnaughy says that the Manufacturers' Association must know the needs of the manufacturers promptly if it is to make the necessary arrangements.

The exhibit, as last year, will be held on Young's Million Dollar Pier. This pier has been renovated both inside and outside during the past year and has been repainted. New solid roofs have also been placed on the pier and new side curtains have been purchased for the annex.



Plan of Outer End of Convention Pier

The circular containing the rules and regulations and other information required by those who are planning to exhibit are being mailed now to all members of the Manufacturers' Association. Duplicate blanks are inclosed with the circular, on which the number of square feet of space required at the convention, the names of the representatives who will be present and other data can be entered. The charge to be made for space this year is 35 cents per square foot. The circular says that all applications for space received on or before June 20 will have equal preference as to location, and that all applications received after June 20 will be considered chronologically. The circular issued also contains a diagram of Young's Million Dollar Pier, reproduced herewith, which shows the layout of exhibit spaces.

In connection with the application for exhibits, Mr. McConnaughy states that at the National Electric Light Association Convention in Philadelphia this week some forty exhibitors were unable to obtain space because their applications were received too late. This indicates to him that the manufacturers are more interested in exhibits than ever before, and he anticipates a large demand for space at the October convention. Another reason which leads him to believe that there will be a large demand for space is that the 1915 railway convention will be held in San Francisco at the time of the Panama-Pacific Exposition, and probably there will be no arrangements there for any exhibits other than those contained in the Exposition itself.

For this reason he suggests that those manufacturers who wish to have all the space they require and have it where they want it should apply before June 20. Those manufacturers who have not received the blanks from the Manufacturers' Association can obtain them by applying to the secretary at 165 Broadway, New York.

PUBLIC RELATIONS COMMITTEE

A meeting of the committee on public relations of the American Electric Railway Association was held at the headquarters of the association in New York on June 2. The following were present: Thomas N. McCarter, chairman; C. Loomis Allen, S. M. Curwen, Frank R. Ford, T. S. Williams, J. H. Pardee, Charles N. Black and James H. McGraw. H. C. Donecker, E. B. Burritt, Harlow C. Clark and Frederic Nicholas were also in attendance.

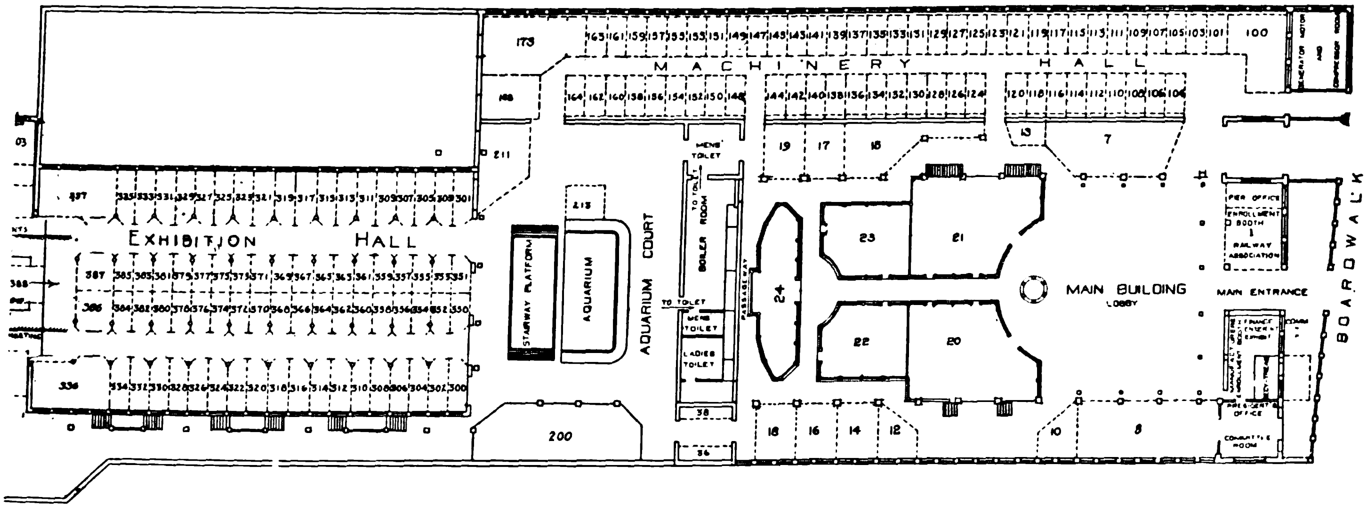
The meeting was called in order to receive a report from the sub-committee appointed on January 29. The members of this sub-committee are as follows: Guy E. Tripp, T. S. Williams, Frank R. Ford, C. Loomis Allen, and James H. McGraw, chairman. H. C. Donecker acted as secretary of the sub-committee. The sub-committee was directed to prepare a code of principles for the association and to outline a comprehensive plan of educational and effective publicity. The report of the sub-committee was read to the committee by Mr. McGraw. It contained a full outline of the steps to be taken to secure the publicity desired by the committee in regard to the attitude of the association on questions of public relation.

The code of principles drafted by the sub-committee was taken up section by section and discussed. Some changes in the tentative code were suggested. It was decided that the code should not be made public until the time of the convention to be held at Atlantic City, N. J.

from October 12 to 16. The code, however, will be printed and submitted to member companies before that time in order that they may have an opportunity to consider the principles.

The report of the sub-committee also outlined a definite program for the prosecution of publicity and educational plans in the interest of the members of the association. It is the desire to conduct a systematic and thorough campaign for the purpose of giving publicity to the affairs of the companies engaged in furnishing electric railway service. Full details of the plan which received the approval of the members of the sub-committee were laid before the full committee.

As addenda to the report there were included some extracts from the address of President Black of the association at the midyear banquet held on Jan. 29, 1914. In that address Mr. Black sounded a call to arms and served notice that any man who failed to volunteer promptly would be drafted without delay. The report of the sub-committee quoted at length from the remarks of President Black on the subject of public relations.



Plan of Inner End of Convention Pier

The sub-committee also quoted in its report the following extracts from the report of the public policy committee of the National Electric Light Association which was presented at the convention held in Chicago in June, 1913.

"Public opinion to-day is largely shaped by the public press. This, of course, is directly accomplished by the men responsible for the preparation of the articles through which public opinion takes shape. There is an undoubted responsibility resting upon the corporations engaged in public service to see that these men of the pen, these writers of our newspapers and magazines, are adequately informed upon the subjects in which we are interested. Any information with which they are furnished should be adequate and truthful. No element of misrepresentation should be allowed to creep in.

"To accomplish this end your committee urges as a definite responsibility that every member of the association have at least one writer—or preferably all writers—upon the local press, newspaper or magazine, receive the publications relating to this subject which we have at our disposal. If each of our members would see that this information were placed in the possession of every local writer, its effect would quickly extend over the entire continent."

After careful consideration of the report of the sub-committee, the committee approved the steps recommended and decided to present the entire plan to the convention in October with a recommendation for adoption by the association. In the meanwhile the sub-committee was directed to make such elaboration of its plans as the members thought desirable. The sub-committee will also consider the report again with the idea of effecting the best possible plan of co-ordination between the ideas outlined and the other active work in which the association is now engaged. It was also decided by the committee that the full report should be printed and placed in the hands of member companies before the convention in order that abundant opportunity for study of the matter may be given.

COMMITTEE ON POWER DISTRIBUTION

The power distribution committee met at Association headquarters on June 4, those in attendance being G. W. Palmer, Jr., Boston, Mass.; A. S. Richey, Worcester, Mass.; Gaylord Thompson, Trenton, N. J.; Charles R. Harte, New Haven, Conn.; R. H. Rice, Chicago, Ill.; J. H. Barnard, New York, N. Y.

The report of the sub-committee on specifications for hard-drawn copper trolley wire was presented by Prof. A. S. Richey. The report stated that the sub-committee had conferred with a corresponding sub-committee of the American Society for Testing Materials and the two sub-committees had agreed on a set of specifications. The full committee of the A. S. T. M., however, decided not to recommend the new specifications this year but to secure further data. The A. E. R. E. A. committee then voted to recommend to the association as standard the specifications as reported by the sub-committee. These are a substitute for the present specifications for 00 round wire and cover also 000 and 0000 round wire and all three sizes of grooved wire.

The chairman reported in relation to the proposed national joint committee on overhead line construction to be composed of representatives of the National Electric Light Association, American Institute of Electrical Engineers, the American Telephone & Telegraph Company and the American Electric Railway Engineering Association.

The sub-committee on copper wire tables recommended certain changes in the wire tables to conform them to the tables of the National Bureau of Standards. This was approved. Changes in the standard wire and cable terminology, definitions 1 and 9, were also recommended to conform them to the definitions in Circular No. 37 of the Bureau. The definitions of all wire and cable terms are to correspond with the recommendations of the Bureau and of the A. I. E. E. The present sag tables and charts are also to be extended to cover a somewhat wider range. In the matter of span-wire sags it was recommended that the factor of safety in span wires be not less than 2.

Certain minor changes in the specifications for galvanizing were recommended to permit the inclusion of sherardizing.

ACCOUNTANTS' ASSOCIATION COMMITTEES

M. W. Glover, president of the American Electric Railway Accountants' Association has announced the following appointments:

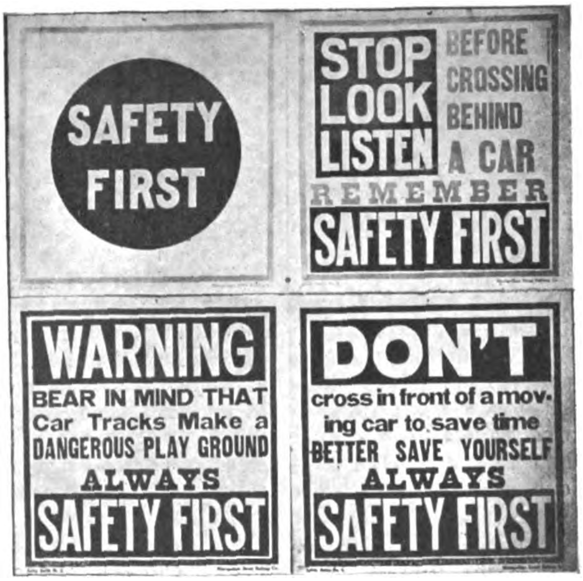
Committee on a standard classification of accounts, R. N. Wallis, treasurer of the Fitchburg & Leominster Street Railway, vice W. B. Brockway, resigned.

Committee on accounting definitions, George A. Harris, general auditor of the Fonda, Johnstown & Gloversville Railroad, vice W. B. Brockway, resigned.

"SAFETY FIRST" FOR KANSAS CITY PUBLIC

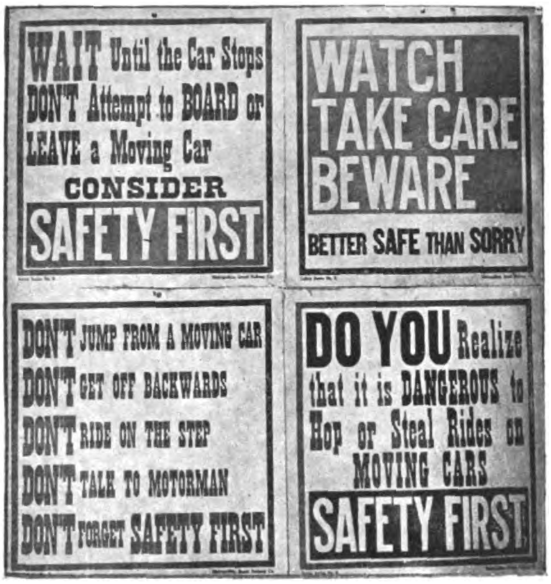
After a prolonged and painstaking campaign among its own trainmen, the Metropolitan Street Railway, Kansas City, Mo., has extended its "safety first" work to the general public. Each of the 600 cars operated by the company has been equipped with "safety first" placards, urging patrons and pedestrians to regard personal safety before all other considerations. A series of twenty-five cards has been arranged, and a new sign will be placed on each car every few days.

While the "safety first" idea is perhaps a bit trite in view of the recent publicity given the work by public and private corporations of all descriptions, the Metropolitan's campaign is notable because of the care with which it has been planned and worked out. Despite the fact that it has only now reached the general public, it has been under way in the company's own organization for more than a year. The movement for "safety first" and a reduction of accidents began with weekly meetings of the trainmen at all division points of the company. The trouble sheets for each past week were read to the assembled crews by a company official who had made a study of this particular line of statistics. Instead of merely calling off the number of accidents and their nature, however, a good deal of time was spent on each by the officer in charge. Each accident, regardless of its size and importance, was analyzed carefully, and the trainmen shown how it might have been avoided by care on their own part. Where the casualties were the result of the passenger's own indiscretion, the employees were urged to do their share toward educating the public, being assured that a reduction in the importance and number of accidents would put the company in a position to do more for its own men.


SAFETY FIRST
STOP LOOK LISTEN BEFORE CROSSING BEHIND A CAR
REMEMBER
SAFETY FIRST
WARNING
BEAR IN MIND THAT Car Tracks Make a DANGEROUS PLAY GROUND
ALWAYS
SAFETY FIRST
DON'T
cross in front of a moving car to save time
BETTER SAVE YOURSELF
ALWAYS
SAFETY FIRST

Specimens of Earlier "Safety First" Dashboard Signs in Kansas City

"Safety first" also has been emphasized at the training school for new men and in every other legitimate way. The question books which must be studied thoroughly by applicants for positions are examples of the company's efforts to impress on its men the new idea. Mottoes aiming at this end are scattered throughout the books, and every employee has thus been sympathetically allied with the company's policy almost without exception.


WAIT Until the Car Stops
DON'T Attempt to BOARD or LEAVE a Moving Car
CONSIDER
SAFETY FIRST
WATCH
TAKE CARE
BEWARE
BETTER SAFE THAN SORRY
DON'T JUMP FROM A MOVING CAR
DON'T GET OFF BACKWARDS
DON'T RIDE ON THE STEP
DON'T TALK TO MOTORMAN
DON'T FORGET SAFETY FIRST
DO YOU Realize that it is DANGEROUS to Hop or Steal Rides on MOVING CARS
SAFETY FIRST

Specimens of Additional "Safety First" Dashboard Signs in Kansas City

As the employees have been made acquainted with the details of the movement, the Metropolitan company now has concentrated its efforts on the public. The placards mentioned are placed in frames on the front of each car. Cards may be slipped in or out in a moment's time. The cards, which are 22 in. x 22 in., are paraffined and thus are impervious to weather conditions. Red is the dominating color in all displays, though green, blue and black are utilized frequently. The first placard shown was one of the most attractive, bearing merely the words, "Safety First," the lettering being white on a red circle. Those to follow are somewhat more elaborate in wording and coloring. Each sign is numbered so that no danger of confusion in changing them is likely. All shifts from one sign to another will be made simultaneously. Several of the placards are reproduced in two accompanying half-tones.

Commercial organizations of Kansas City have viewed the Metropolitan company's efforts with enthusiasm, and many leading bodies will collaborate. It is planned to have competent men lecture in the schools and otherwise carry out the fundamental ideas of the campaign.

More recently, the company has ordered 50,000 buttons for distribution among employees, to school children of the city and the general public. The buttons will say merely, "Safety First," while in smaller letters will be the name of the company. In addition to the buttons and the signs utilized on the front of street cars, the company has issued 2000 booklets to go to trainmen. "Accidents and How to Prevent Them," is the title. The volume is unusual in many respects.

N. E. L. A. Convention at Philadelphia

The Thirty-Seventh Convention Was Held in Philadelphia June 1 to 4—Abstracts of a Number of Papers and Reports Having Relation to Electric Railway Work Are Given

The thirty-seventh convention of the National Electric Light Association was held at the Bellevue-Stratford Hotel in Philadelphia from June 1 to 4. A comprehensive program covering the technical, commercial, accounting and public policy phases of the industry was presented. Several parallel sessions were held, but an endeavor was made to so arrange these that conflicts would not occur in subjects of general interest.

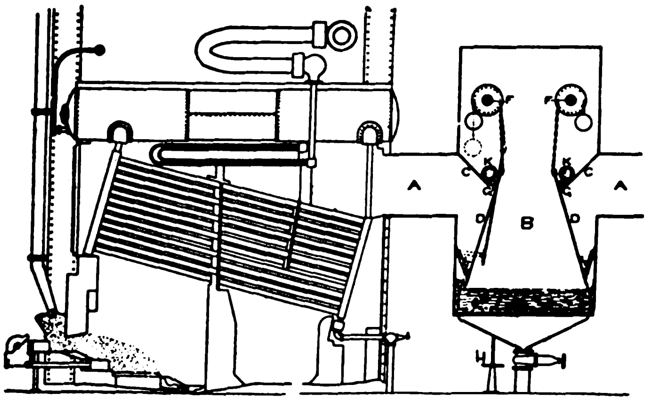
A number of the reports and papers are abstracted in the following paragraphs.

POWER STATION PRACTICE

Some of the papers and reports covering power station practice and tendencies are given below.

REPORT OF COMMITTEE ON PRIME MOVERS

The report of the committee on prime movers, of which I. E. Moultrop is chairman, occupied more than ninety printed pages and treated the topics of steam-power, water-power and internal-combustion engines. For stand-by service at St. Louis the scheme of building rapid-kindling coal fires was found quicker and cheaper than oil-burning. At Boston steam blowers have been used with advantage to secure forced draft on boilers during peak periods, raising the steaming output quickly by 150 to 200 per cent. Cinder particles discharged from the stacks at high draft are collected at New York by impinging the flue gases against a wet baffle plate, the cinders being caught in a water trough. Several stokers have now been in successful use for burning pulverized coal, and in the opinion of the committee deserve greater attention. In view of the high cost of the pit necessary for under-water coal storage and the security of properly selected storage coal against ignition, the committee considers the construction of special pits unwarrantable. A more refractory fire-brick is needed, as modern boiler practice has already approached the limit of temperatures for clay products.



N. E. L. A. Reports—Device for Removing Cinders from Flue Gas

In condenser design the committee is gratified at noting the larger steam passages allowed. Open-hearth seamless-steel boiler tubes are now being largely specified and are used with success. The application of "efficiency instruments" has not been attended by the results contemplated, for the reasons that the instruments themselves easily get out of order and careful study and comparison of the records is required in order to diagnose troubles. Letters from manufacturers describing recently developed apparatus formed a supplement to the section on steam-power practice.

Under the heading of water power reference was made to the paper by O. B. Coldwell presented before the convention. Methods of measuring flow at water-power plants were also tabulated and discussed. While center bearings between runners on waterwheel sets permit of smaller shaft sections, they introduce the disadvantage of inaccessibility and involve the danger of not sharing the bearing load. Forced lubrication is required where bearings cannot be reached. The Kingsbury type of thrust bearing has been giving excellent service at the Keokuk plant.

During the past year there has occurred a continued recedence of the gas engine and producer plant in contrast with the remarkable growth and development of the steam-turbine plant. On the other hand, many prominent engine builders have taken up the manufacture of oil engines. European practice is markedly reflected in American oil-engine design. A commercially practicable gas turbine is shortly to be marketed abroad. Five American firms are now making Diesel-type oil engines, and half a dozen others have acquired rights to other types of similar engines. Appendices to the internal-combustion section of the report give information concerning the location of oil engines in the United States, prices of oil, petroleum production, etc.

ELECTRICAL APPARATUS

The committee on electrical apparatus, of which L. L. Elden was chairman, presented an eighty-two-page report on the design of recent types of generating and converting apparatus, air-cooling devices, switchboard equipment and protective devices. The design of outdoor and indoor stations, and the elimination of personal and fire hazards in electrical systems were discussed. Important advances in the developments of temperature-measuring devices suitable for use in connection with electrical apparatus were also mentioned. Details of standardization work in general, including the N. E. L. A. participation in the revision of the A. I. E. E. standardization rules, were treated at some length in the report.

SELECTION OF HYDRAULIC TURBINES

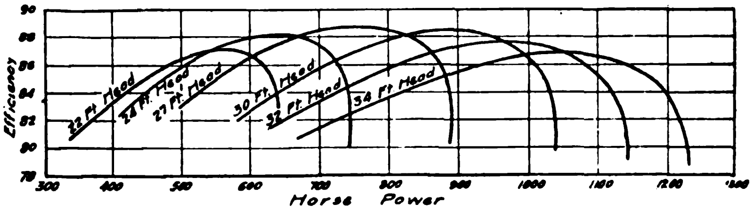
It was pointed out in the paper on "The Selection of Hydraulic Turbines," by Charles V. Seastone, that lack of proper data on the characteristics of different types of waterwheels has, to a certain extent, been the cause of installing turbine equipment which is unsuited to the conditions under which it operates. Tests on the smaller-sized waterwheels compared with the actual results of large installed units indicate that the characteristics of different sizes of machines having homologous parts are essentially the same. Ordinarily turbine units rated at 1.25 per cent of their connected generator should be selected so that they can be operated at about eight-tenths of full gate opening. Careful consideration should also be given to selecting units which will operate at high efficiency under a range of heads. Curves were shown indicating how two machines having the same efficiency at a definite load might have widely differing efficiencies above or below this particular load. Other curves showed how machines made by different manufacturers behave under varying heads. (See figure.)

An interesting method of operating five four-runner turbines was described which allows very flexible operation. The gates of two pairs of runners are operated either individually or together by separate regulating shafts which extend outside the bulkhead wall and are connected to the gate-operating mechanism. These gates may be operated by hand without interfering with the governor control. It will thus be seen that with such an arrangement the number of hydraulic units is practically doubled, with a consequent increased flexibility of operation and efficiency, and without any appreciable sacrifice in efficiency, except in the generators, which is but a small percentage.

WATER-POWER PLANT ECONOMICS

In a paper on "Water-Power Plant Economics" O. B. Coldwell presented curves on investment charges and operating costs for steam and hydroelectric generating plants, and discussed stream and watershed, various types of hydroelectric plants, headwork and intakes, types of conduit, penstocks, pondage, main units and generators, and draft tubes and tailraces.

If there is any choice it is generally preferable to select a stream with a low ratio of flood discharge to minimum flow in order that as much power can be developed as possible without having a large proportion of the equipment lying idle during minimum stream flow. Inasmuch as the majority of streams deliver considerably more water throughout the greater part of the year than is available during minimum stream flow, generating equipment in excess of that capable of utilizing the low flow should be installed. As a valuable treatise on hydroelectric plant economics, Mr. Coldwell recommended Dr. Cary T. Hutchinson's paper on "Economical Capacity of a Combined Hydroelectric and Steam-Power Plant," read at the March meeting of the American Institute of Electrical Engineers.



N. E. L. A. Reports—Efficiency Curves of Hydraulic Turbines

Numerous devices are used to improve the operation of generating plants. Among those mentioned or described were head-water and tail-water level indicators, water-flow measuring devices, hydraulic and motor-operated valves, water-cooling systems, and overspeed safety devices. Standpipes or pressure-equalizing reservoirs are advisable when long penstocks delivering water at high speed are employed. Synchronous pressure regulators may be used when the cost of a standpipe is prohibitive. A plant should be situated with respect to the tailrace so that full advantage is taken of the draft therein. Switchboards should be compactly arranged so that the operator can perform all duties from one locality, thereby saving time during emergencies. Electrically operated headgates were advised.

HIGH LOAD-FACTOR AND NON-PEAK BUSINESS

Two classes of business were discussed in the report of the committee on high load-factor and non-peak business, of which George H. Jones is chairman. The first class relates to those applications which have already been highly developed, including such lines as electric-vehicle charging, ice manufacture, etc. The second class represents industries giving great promise for the future such as electric furnaces, electrochemical processes, etc. Consumption data and actual load curves were presented for amusement parks, bakeries, breweries, brick plants, building construction, cotton mills, dairies, department stores, dredging, vehicle charging, electrochemical loads, flour mills, foundries, electric furnaces, hotels, ice plants, ice-cream manufacture, irrigation, mining, newspaper printing offices, packing houses, pumping plants, stone quarries, electric railways, etc. Descriptions were given of the plants for which data were presented, and the discussion pointed out the desirable load-factor conditions of certain of these applications. In the same connection the committee brought up the question of supplying the summer lighting demand of isolated plants which require steam-heating service in winter time.

TRANSMISSION LINE PRACTICE

OVERHEAD-LINE CONSTRUCTION

The committee on overhead-line construction, of which Thomas Sproule was chairman, presented as its report a revision of the first two sections of the 1911 report, covering primary and secondary line construction. The committee's report is printed in full in a "Handbook on Overhead-Line Construction" prepared by a sub-committee of the main committee.

The handbook contains in addition to the committee's report descriptions of the methods and materials employed in overhead-line construction; also the necessary formulas for the electrical and mechanical solution of the various transmission and distribution problems.

Contained in the handbook are an abridged electrical dictionary and several tables; data on wooden, reinforced-concrete and steel poles and towers; conductors and wire tables; general information on cross-arms, pins, line hardware, insulators, insulator manufacture, insulator characteristics, etc.; information regarding transformers, regulators and lightning in connection with electric circuits and protective apparatus; electrical calculations of alternating-current and direct-current systems; mechanical calculations for wire sag, strength of poles, etc.; general data on wood preservation; recommendations of the National Electric Light Association committee on wood preservation; American and German government data on the preservation of timber; primary and secondary line construction; effects of weather conditions on electrical equipment, and methods of resuscitation.

Attention was also called to a report on joint-pole usage prepared by joint committees of the American Electric Railway Association, the National Electric Light Association, the American Institute of Electrical Engineers, and the American Telephone & Telegraph Company, which will be presented at the fall convention of the first-named association.

ELECTRICAL DISTURBANCES IN TRANSMISSION WORK

In a paper on the "Nature of Electrical Disturbances in Transmission Work," by D. B. Rushmore and E. A. Lof, the disturbances are divided into those caused by high currents and those caused by high voltages. The destructive effects of high currents may be reduced by increasing the reactance in the circuits by providing external reactors and so sectionalizing the system through selective switching devices that the disturbances will be confined to the smallest possible area. With reference to high-voltage disturbances, the authors point out that the regulation of modern transmission systems is generally improved by providing synchronous condensers with automatic voltage regulators. The field is then adjusted so as to make the condenser take a lagging current at no load and a leading current at full load, the first to offset the effect of the line capacity and the second to offset the surplus lagging load current. The aluminum-cell lightning arrester protects against high-voltage disturbances occurring between the phase conductors or between the phase conductors and ground. Overhead ground wires are also very generally used to protect the line against atmospheric changes. Means for protecting against disturbances due to high frequency are being studied and investigated, and since these disturbances are liable to damage the interior of transformer windings, the authors say it is advisable to insulate heavily not only the end turns of the windings but the coil groups as well. Inductances and energy-absorbing devices may also be added for further protection.

INTERNATIONAL MEASUREMENTS AND VALUES

A brief outline of the events leading up to the adoption of an international standard of electrical conductivity for copper was given in the report of the committee on international measurements and values, of which Dr. A. E. Kennelly was chairman. A resistance of 1/58 ohm was adopted for standard annealed copper wire 1 m long and 1 sq. mm in cross-section at 20 deg. C. This value differs only very slightly from the value previously used in England, France, Germany and the United States. The international standard of resistance for standard annealed and commercial copper was appended to the report.

ACCOUNTING MATTERS

CLASSIFICATION OF CONSTRUCTION AND OPERATING ACCOUNTS

In a seventy-page report constituting a working handbook of expense classification the committee on classification of accounts, of which John L. Bailey is chairman, analyzed the principal items of outlay associated with the construction and operation of a modern electric-service system. Detailed lists were given of the items involved in organization, franchise-getting, physical-plant construction, liabilities, assets, income accounts, production, transmission, distribution, utilization, commercial, new business and general expenses and appropriations. Full explanations were given under each account heading as to its inclusiveness, and the subdivisions are carried to a degree of unusual completeness. A few commentary notes were included in the report. One of these emphasized the opposing practices of the New York and Wisconsin commissions with regard to allowing the capitalization of discount on bonds, the former prohibiting and the latter permitting it. The committee is of the opinion that where it is not permitted to capitalize the discount on bonds and the expense of their issue this cost should be charged to an account called "debt discount and expense." In this event it is proper to amortize the cost at a proportional rate based upon the life of the security to maturity. Under the heading "Maintenance of Underground Conduits," the committee held that this cost, including both patrolling and inspecting of underground conduits and subways which carry both transmission and distribution conductors, should be apportioned between this and the account provided for transmission underground-conduit repairs. In the scope of items included and the care with which their separation is affected the report is unusually clear and practicable as a working document.

DISBURSEMENT ACCOUNTS

In an extended paper by F. A. Birch describing the system used in accounting for purchases by the Philadelphia Electric Company, the advantages of the Hollerith method of tabulation were illustrated and a detailed account was given of the handling of each form designed for purchasing and the distribution of charges to the classification expense accounts. The company receives about 6000 purchase invoices each month, covering supplies bought for construction and operation. With the old-style voucher-register system monthly reports were not completed before the twentieth of the month following the expenditure, at the earliest, but with the use of tabulating machines a saving of from a week to ten days is attained. The forms used are comprehensive and clear-cut, and the author sets forth their interdepartmental routing with great precision. A special voucher case has been developed for use where a disbursement is not supported by a purchase invoice. No check book is required in using the voucher check. Verification of bill totals in the tabulating machine is a valuable feature, and instead of keeping details of operating expenses, construction charges and other accounts affected by accounts payable in the voucher register, this information is obtained from the tabulating cards.

The time required to run the accounts-payable cards through the tabulating machine for any month is less by several days than the time formerly needed to add the 140 columns on each of the twenty pages of the voucher register. It is now a matter of but a few moments to assemble and tabulate the vouchers and so obtain complete analysis of any account. The tabulating machines greatly expedite posting to general and auxiliary ledgers and the classification of data desired by public service commissions, boards of directors and executive officers. An example of the detail available from machine cards was given under the handling of customers' deposits. Cards may be sorted to show the amount of guarantee deposits in different sections of the city, the amounts of deposits received from various classes of business, the denominations of money in which they are received, number of deposits transferred, average length of time a deposit is held, amount of interest allowed on deposit, refunds and many other points. The slight disadvantage of the longer time required to analyze a single account with the tabulating machine as compared with the former method of entering each separate item, with an attached explanation in a book is offset by the great saving in time required to itemize all of the accounts in books, when particulars regarding only a few are needed and when very probably none will be asked for. It is contrary to the principles of scientific management to prepare a maximum amount of data for hundreds of items when details will be requested for only a very few, and the tabulating machine method is admirably flexible in this connection.

SUSPENSE ACCOUNTS

In a paper by Frederick Schmitt it was stated that suspense accounts are of two general classes—first, those rightly classified as suspense on account of having uncertain elements, and, second, those commonly representing costs of a definite character, which properly should be called clearance or apportionment accounts. The author described various components of each class, including under the suspense account general suspense and accounts receivable suspense, and under clearance accounts work in progress, storeroom expense, transportation expense, deferred and miscellaneous charges. Under general suspense it is customary in some companies to include cash advanced to employees for expenses to be accounted for later, also cash withheld from wages to satisfy judgments filed against employees.

The author also emphasized the value of a work-order system. He discussed storeroom expense at some length, favoring the clearing of such accounts on a constant or percentage basis added to each requisition for material and criticising the elaboration required in such accounting by the Public Service Commission, First District, New York, in the case of companies using the clearing method. Experience shows that the cost of handling supplies bears a definite relation to their value, and that by an occasional adjustment, practice is more satisfactory than where a minute subdivision is attempted, involving such difficulties as the proportional cost of storage of each kind of supply carried, prorating shelving and counter space, building repairs, etc. The author did not look upon cash discounts recovered through prompt payment as a saving or revenue, but held that supplies should be charged with the full price, charging the discount when not taken to profit and loss. Apportionment of transportation costs should be on a rate per hour for the time of use of each vehicle, the actual sum paid being used for vehicles not owned by the company. Discount on bonds is not held to be a part of the cost of acquiring a property, being a virtual interest charge.

SORTING AND TABULATING MACHINES

In a paper by G. L. Knight and C. V. Woolsey was described the use of sorting and tabulating machines on the distribution system of the Edison Electric Illuminating Company of Brooklyn, N. Y., pointing out the adaptation of code numbers to the classification of material and equipment in transmission and distribution and giving in detail code data applicable to inventories. It was pointed out that the use of code numbers greatly simplifies the taking of an inventory, even in cases where a tabulating machine is not considered, saving time and reducing the chances of errors in making transfers.

The code is designed to indicate only such characteristics of the material as are required to estimate its unit value in reports of physical property. The code is greatly simplified by using a code number consistent with the material represented. Thus, the code number for a twelve-duct subway consisting of fiber conduit laid two ducts wide and six ducts high in the trench would be 1212. The first two figures (12) indicate the number of ducts in the trench, the third figure (1) represents the kind of conduit (fiber), and the last figure (2) shows the number of ducts width. Examples are given of the use of tabulating cards, summaries and other inventory data in a central-station office in which a complete statistical unit consists of two key punches, a gang punch, with quick-set device, sorter, tabulator and card files. The paper forms a working manual within its field and scope of the code submitted, and the clearness of the illustrations entitles it to be classed as a small handbook for the accounting force interested in the economical handling of both original and periodical transmission and distribution system inventories.

PUBLIC POLICY COMMITTEE REPORT

Looking back over the reports of previous years, the committee on public policy stated that it found no reason to retract or modify any of the recommendations of the past. Rather has time proved that they indicate a wise, constructive course which may well be followed to the benefit of the members individually and the industry collectively. The committee made note of an evident and spreading effort throughout the industry to maintain the highest attainable standards of service, to safeguard the health and lives of employees and to conduct affairs generally in a manner to commend the industry to the public at large. The report was signed by the following members of the committee: Nicholas F. Brady, Everett W. Burdett, Henry L. Doherty, Charles L. Edgar, W. W. Freeman, George H. Harries, Samuel Insull, John W. Lieb, Joseph B. McCall, ex officio, Thomas E. Murray, Samuel Scovil, Charles A. Stone, Herbert A. Wagner, and Arthur Williams as chairman.

The committee found little conflict between its own views and those generally recorded by the various public service commissions. It has held consistently that the business of supplying electrical energy from large central stations is essentially a monopoly in the best meaning of the word. If a monopoly and privately owned and operated, but occupying public property to render a public service, it must be regulated by some public authority. Monopoly in public service can be justified only on the ground that some advantages accrue to the public. This position with the public cannot be maintained unless it can be shown that the greater part of the benefit resulting from such monopoly goes to the public and not to stockholders of the corporation. That stockholders are entitled to share in the results of an efficient, well-managed service no one can question. But this must be incidental to and not the principal consideration in the efforts to continue the industry in each given territory along regulated monopoly lines. The committee quoted from a recent decision of the Railroad Commission of California in the San José telephone case which says in part: "Life is entirely too short to be utilized in trying to make natural monopolies do what they say they can and ought to do without competition." The committee believes that the newer commissions are approaching their duties in a broad spirit of fairness and notes the reaffirmation of the newer as well as the older commissions of the general principle of non-competition in the field of regulated public utility enterprises.

In taking up "fair rates and good service" the committee says that usually, but not always, criticism begins with rates. All rate schedules should have the widest publicity. They should never be discriminatory in their nature, and they should be fairly representative of the cost of rendering the various classes of service to which they pertain. The committee stated that there are certain localities within which, while the rates have been reasonable, serious dissatisfaction has arisen because of the unsatisfactory nature of the service, or indifference or ignorance on the part of employees of the company. Reasonable, simple public rate schedules, an efficient, well-trained organization covering every feature of the activities of the company and a service of the highest standards are service features to which every community is justly entitled. If members fail in giving these, they fail in performing their just obligations to the public and to their own stockholders.

One of the purposes in maintaining a regulated monopoly in the electrical industry is to secure to the public and to the corporation the inherent advantages of generating and distributing electrical energy on a large scale to widely diverse classes and conditions of service. The larger the scale and the wider the diversity the greater the obtainable economies. Members are urged to endeavor to combine all of the electric service of the respective communities. The resultant benefits will be shared not only within the industry but with the public to the largest practicable extent.

In speaking of industrial education the committee says that throughout all of the undertakings of the membership special and general training from the elementary to the highest stages should be a continuing effort. The committee believes that, wherever practicable, the so-called continuation schools covering the various activities of the industry should be conducted by the members, that attendance should be within the employers' and not the employees' time, and that the courses should be broad and general as well as specific and individual, so as to be most productive of the highest degree of human efficiency.

Regarding safety and sanitation the committee says that attention should be directed first to the elimination of all possible danger spots in the plants and distributing systems and second to the training of the employees and members to be constantly alert for danger to themselves and their fellow-workers. One of the member companies found that during the last seven years only 7.7 per cent of its accidents occurred as the result of negligence on its own part. The other 92.3 per cent occurred through carelessness and negligence on the part of the person injured or on the part of a fellow employee or an outside contractor. The average number of fatalities per 1000 employees among central stations of the Second District of the State of New York for the three years 1910 to 1912, inclusive, was 4.67, while for the central stations of the First District, which includes most of the larger central stations of the State, the corresponding figure for the years 1909 to 1911, inclusive, was 1.93. The largest central station in the latter group averaged less than one fatality per year per 1000 employees in the last seven years. This would tend to show that the accident-preventive measures which the largest companies have been particularly active in adopting have borne fruit. Several members have well-organized safety departments. One has recently adopted the rule that 10 per cent of its employees shall be appointed to membership upon safety committees for a period of six months. At the expiration of this period another 10 per cent is appointed to these committees and so on, until within a period of five years all of the employees will have served on the safety committees. This plan is commended to members.

Concerning public ownership and operation the report says that perhaps the most serious and unfair instance culminating during the year is that of the municipal electric-light plant in Cleveland. The committee claimed that the membership will recognize that if the price of 3 cents per kw-hr. prevails a very large percentage of the service will be supplied at a serious loss. In the judgment of the committee, with fair public regulation municipal ownership is bound to fail. Approximately 235 plants have been abandoned—in some instances only the plants, and in others both plants and distributing systems. The committee remarked that various municipalities in England are beginning to awaken to the serious burdens imposed by the ownership and operation of public utilities and that signs abound of a general reaction against this policy. Attention was called to the recent book by Yves Guyot on "Where and Why Public Ownership Has Failed," which was translated into English through the efforts of the committee. The committee has also encouraged the organization of the Bureau of Public Service Economics, New York. This bureau is prepared to make reports upon any government or municipal undertaking in this country or Europe on very short notice. The committee adds that it will be appreciated that there is no thought of concealment of the moral support behind the bureau. What little financial support it has needed has been available through its activities and the sale of various publications. The committee feels that with a straightforward statement of the purpose of the bureau this latter point is of incidental importance, as enlightened public opinion would hardly fail to support even material contributions to a purpose which simply sought to inform the public and place the industry before it in a proper light.

One phase of employee relationship highly commends itself to the members of the committee. This is the provision of convenient means to accumulate savings whereby employees of the industry are aided in the purchase of their homes and of the securities of the companies by which they are employed. One of the members whose stock is not upon the market has assisted its employees in organizing a security-holding corporation, the shares of which are purchased upon the instalment plan. The securities behind the shares are the securities of the local electric light and gas companies. The committee commends to members any methods by which their employees are encouraged in the acquirement of either the homes in which they live or the established securities of the corporation by which they are employed.

There are three appendices to the report. A number of decisions were reviewed by Beardsley, Hemmens & Taylor, counsel of the New York Edison Company. In these attention was called to the recognition by commissions of the monopoly character of public service companies, the provision of supplementary service to block-lighting plants and the inclusion of business-building expenditures and going values in appraisals. Another well-established principle which has been reiterated by the courts during the last year, and which to a certain extent affects the large wholesale business of electric-supply companies, is that relating to the resale of merchandise. These decisions are of considerable importance to electric companies in cases where energy is sold in bulk to a customer who may dispose of it as he sees fit. Another appendix contains the unanimous recommendations of the committee on water-power of the Fifth National Conservation Congress. The last appendix contains an article on "Three-Cent Light In Cleveland," written by H. W. Wilson for the Bureau of Public Service Economics.

MUNICIPAL OWNERSHIP HEARING IN WASHINGTON

The hearings being held by the House committee on District affairs in regard to the Crosser bill, which provides for municipal ownership of the electric railways in the District of Columbia, were continued this last week. Previous hearings have been reported in earlier issues of this paper. The testimony presented during the past week was largely from those in favor of the bill. The witnesses included the commissioners of the District of Columbia.

TESTIMONY OF DISTRICT COMMISSIONERS

Oliver M. Newman, chairman of the commission, was the first to testify in support of the measure, and he was followed by Commissioner Frederick L. Siddons and the engineer commissioner, Lieut.-Col. Chester Harding, U. S. A. The first two were vigorous in their support of government ownership, but Colonel Harding was far less certain of its success. Under the terms of the bill the commissioners would operate the local railways under government ownership.

All the commissioners asked to be excused from discussing details of the management, service, and physical valuation of the local railways, because these features are pending in an inquiry before the District Public Utilities Commission. The witnesses were members of this commission.

Commissioner Newman told the committee that he felt that a public service ought to be rendered by the public and not by private corporations as private property. He declared that his experiences as a newspaperman, before President Wilson appointed him a commissioner, convinced him of the value of municipal ownership of public utilities.

Representative Samuel E. Winslow, of Massachusetts, who is leading the opposition to the Crosser bill in the committee, asked the witness if he was "prejudiced" in favor of government ownership before he became a member of the committee.

"I would not call it prejudice," replied Mr. Newman. "I would call it a conviction."

In reply to a question as to the method by which the District commissioners should operate the suburban lines that are now a part of the present Washington systems, Mr. Newman declared that they could get authority from Congress to operate the outside lines, enter into a private contract with the roads now operating, or purchase the properties outright. Mr. Newman presented statistics in regard to municipally owned electric lighting plants from the Census reports. According to him, the municipal plants had increased in number more rapidly than the privately owned plants, and they were showing a good net profit.

Representative Winslow pressed Mr. Newman to tell what specific benefits would accrue to the people of the District of Columbia from the government ownership and operation of railways here. Mr. Newman, however, declined to go into specific details, declaring that because of the pending investigation of the Public Utilities Commission he would have to confine himself to general comment. Finally, however, he said: "In its attempt to regulate the Washington companies, the Public Utilities Commission has already met with so much obstruction and opposition to effective regulation that I seriously doubt that we can regulate them effectively, and for that reason, in addition to general reasons, I urge the passage of the Crosser bill."

Commissioner Siddons said he concurred entirely in the views of Commissioner Newman. He declared that the present regulation of street railways had come not because they conducted their affairs to give general and complete satisfaction but because they failed to do so. He also declined to make specific references to the local situation, but in general declared that private ownership of public utilities was responsible for poor service and equipment, lack of extension, "receiverships to squeeze out small stockholders," and demands for profit on capital not represented by cash invested. Mr. Siddons declared that he was not ready to admit the inability of the Public Utilities Commission to carry out the intent of Congress in the regulation of the local lines but said that he felt it wise to express his doubts whether the public regulation would accomplish the objects expected of it.

Colonel Harding, who is a member of the engineer corps of the army, told the committee that he had not made a study of municipal ownership except in connection with the present bill. He believed, however, he said, that his colleagues were right in their approval of the measure. He thought that, assuming equally efficient managements in private and public operation, a lower fare could be obtained under a publicly owned road. He admitted, however, that public bodies move slowly, when asked whether the municipality would respond more quickly to public demand for better service, extension and other improvements. As a result he confessed that his support of the measure was far less emphatic than that of his colleagues.

TESTIMONY OF CORPORATION COUNSEL

Corporation Counsel Conrad H. Syme also supported the views of the commissioners. He said that he believed in the general principle of public ownership of all utilities. He declared that these were necessary to the proper conduct of a city and should remain "functions of the government." He referred to the Public Utilities Commission as a step toward municipal ownership but expressed the belief that the commission finally would prove inadequate to regulate the operation of privately owned companies.

Several clashes marked Mr. Syme's testimony. First there was a conflict with C. P. King, president of the Washington Railway & Electric Company. Mr. Syme had declared that the entire value of this company would be found to be $5,000,000 or $6,000,000. Mr. King protested to the committee against accepting these figures and declared that when the properties were taken over the mortgages upon them totaled more than $7,500,000.

As a result Mr. Syme made a second appearance before the committee and insisted that the "water" must be taken out of the capitalization when the government takes over the properties. Representative Winslow read to the witness a list of stockholders of this company in 1912 from which it appeared that Mr. Syme, as well as his wife and his father, each had owned ten shares of stock. Mr. Syme explained that he had sold his holdings when he was appointed because the law forbade such ownership. Mr. Syme grew indignant when Mr. Winslow pointed out that if his contentions were correct he had been the owner of the inflated stock against which he inveighed. Mr. Syme declared, however, that he felt that it was necessary that stockholders should suffer for the benefit of the people, if government ownership were made effective.

"When there are two evils," declared Mr. Syme, "it is better to choose that one which might have been guarded against. It is for the interest of the general public that these two corporations should be operated by the public. Then I think we should look out for the many—in other words, bring about the greatest good for the greatest number."

"Then the people who bought this stock have got to suffer when you take over the companies?" asked Representative Winslow.

"It would seem so," was the reply. "They must suffer or the people at large must suffer."

In reply to a question by Representative Caraway, Mr. Syme insisted that the enactment of the Crosser bill would not be an announcement by Congress that it favors the general idea of municipal ownership.

OTHER TESTIMONY

Another Washington official who appeared in favor of the measure was E. W. Oyster, an assistant tax assessor, who appeared also as a representative of the Petworth Citizens' Association. Representatives of various associations came because a plea had been made to the committee that none of these organizations was on record in favor of the government ownership. None of their representatives, however, presented resolutions of support. Mr. Oyster declared that his district wanted better car service. It had failed to secure this from the present companies and therefore wanted government ownership. Such ownership, he said, would mean better service, lower fares and better treatment of employees. He said he could give no data in support of his contention, but he felt that under government ownership citizens would feel a proprietary interest in the lines and that this would result in what was expected.

Thomas E. Will, a real estate operator and a member of the Northeast Citizens' Association, gave similar testimony. Mr. Will admitted that his experience in street railway operation was limited to "riding and paying," but he believed that 3-cent and even 2-cent fares would be profitable under public ownership.

Robert F. Bradbury, of Randle Heights Citizens' Association, also argued for government ownership on the plea that all sections of the city would then be treated alike. He complained that one electric railway company had spent $700,000 in the business district of Washington and had neglected his own suburb. Mr. Bradbury acknowledged that he was interested in the Bradbury

Heights enterprise, which would benefit by the extension he asked, but he insisted that his desire for better service was not a selfish one. He said that he would recommend that the line be built even if it did not pay at once, arguing that eventually it would reach a paying basis.

Dr. Charles M. Emmons, president of the East Washington Citizens' Association, was the only one of these witnesses to object to the bill. He declared that his association objected to government ownership of street railways because the commissioners were not experienced railway men and because they should devote their energies to correcting the present abuses in the District, rather than to assume the additional burdens of running the street railway systems. He said that in his locality the citizens had been paying taxes for sixty years, but still had no sidewalks and no trees, and that many of their streets lacked improvements. He felt that these should be cared for first.

John B. Colpoys, representative of the Central Labor Union of the District, told the committee that organized labor favored government ownership of street railways. This, he declared, represented one-third of the families in the District. He contended that hours could be shortened and wages increased if the Washington street railways were operated by the District. But even if they were to be operated at a loss he declared that he favored their municipalization. He said that the present roads ought to be taken over by the government after a fair valuation of their physical properties. He did not think the city should have to pay for the franchises. However, if a jury decided that other items should enter into the cost than merely the value of the physical property, he would agree rather than see the roads remain in private hands.

PROGRESS OF THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION

Nine of the eleven principal buildings of the Panama-Pacific International Exposition are now completed, and the others will be finished within thirty days. The gates of the exposition will open on Feb. 20, 1915, and will close on Dec. 4, 1915. The department of machinery of the exposition has been actively engaged upon the allotment of space in the completed Palace of Machinery. As so many applicants asked for a large amount of space, the area of the building, 369,600 sq. ft., was far over-applied for and it became necessary to consider each application carefully so that all amounts of space might be appreciably reduced.

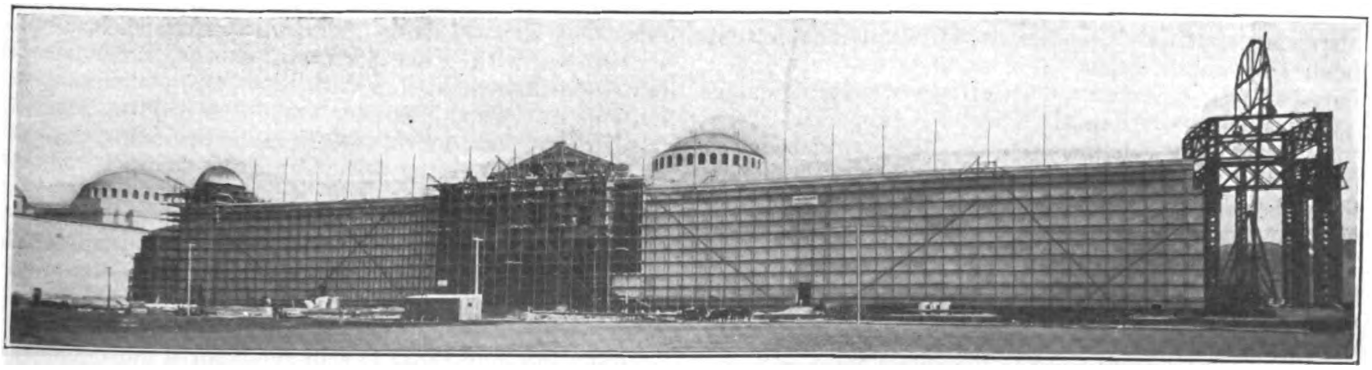
On April 1 preliminary work was started on the installation of the first exhibit, a 500-hp marine Diesel engine, by the Busch-Sulzer Brothers Diesel Engine Company. This installation will cost $70,000. Several of the exhibitors have arranged, through the operation of pumps, etc., beautiful and artistic effects, such as waterfalls and illuminated fountains. The testing of high-potential insulators and transformers is provided for by the arrangements which have been made with the largest manufacturers of high-voltage testing apparatus, and many spectacular effects have been prepared by the use of such instruments.

A feature of the Palace of Machinery will be the arrangements made for the convenience of the visitors. The reception spaces provided in connection with each exhibit will be equipped with suitable fixtures to enable technical visitors to prepare notes on the various features. All of the working exhibits will be equipped with the latest "safety first" devices, and these guards will form one of the most interesting exhibits to the engineer and manufacturer.

The exposition railroad already communicates with the United States transport docks adjoining the exposition grounds. There vessels of the deepest draught may be accommodated, and freight can be unloaded direct upon cars from the steamships, practically within the confines of the exposition. Many of the European countries will send vessels loaded with exhibits from European waters direct through the Panama Canal. As part of the exposition, terminal railway warehouses with a floor space of 50,000 sq. ft. have been provided adjacent to the ferry slip. The railroad yards to the rear of the Palace of Machinery can accommodate 200 cars. Two and one-half miles of the 12-mile system is within the confines of the respective buildings. In the Transportation Palace alone fifteen tracks, each 500 ft. in length, have been laid to carry the great array of locomotives and rolling stock equipment that will constitute the railroad portion of the transportation exhibit. This building is also equipped with transfer tables, 75 ft. in width and having a run of 3000 ft.

The Palace of Transportation is one of the nine great exhibit palaces that is completed and has been accepted. The picture herewith reproduced shows the north wall of the building undergoing the last applications of the imitation Travertine a few weeks before the contractors turned it over to the exposition's division of works. This wall, like the north wall of the other exhibit palaces, is a liberal treatment of the "Plateresque," which is the name for the Spanish architecture of the early Renaissance period and so called because of its likeness to the work of the silversmiths. The east and west walls are after the style of the Italian Renaissance and harmonize with the Palaces of Machinery and Fine Arts. All the ornament and enrichment on the north and south is chiefly concentrated around the doors, windows and entrances.

The structure rising at the right of the wall in the illustration is one of the decorative columns that will mark the entrance to the "Court of the Universe," which is the largest and most brilliant of the five exposition courts. The area is 900 ft. x 500 ft. The Palace of Transportation is 579 ft. x 614 ft.; its floor area is 314,000 sq. ft., and its volume 20,413,000 cu. ft. The average height is 65 ft. The outside height to the ridge is 96 ft., and the height to the dome is 110 ft.



View of the Transportation Palace at the Panama-Pacific International Exposition

COMMUNICATION

CENTER-ENTRANCE STEEL CARS FOR INTERURBAN SERVICE

KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY COMPANY

KANSAS CITY, MO., June 1, 1914.

To the Editors:

I have read the article on the Michigan Railway car in the May 16 issue of the ELECTRIC RAILWAY JOURNAL, and have made some comparisons between its published dimensions and weights and those of our center-entrance, all-steel, interurban cars which were described in your issue of Jan. 18, 1913.

Our cars are 58 ft. long as against 67 ft. for the Michigan cars. They weigh 81,000 lb. as against 131,000 lb., the total weight of the Michigan cars, giving a difference of 50,000 lb. in weight and a difference in length of approximately 10 ft., although our cars have a 25 per cent greater seating capacity, namely, sixty-four passengers, as against fifty-two for the Michigan car. From these figures you will note that our cars have a weight of 1449 lb. per foot of car length, as against 1950 lb. per foot of car length for the Michigan car. Also, our cars have a weight of 1297 lb. per seated passenger, as against 2500 lb. per seated passenger, and they are nearly 50 per cent lighter weight on this basis.

We see no necessity for an increase in length, but we believe that our car could be increased approximately 10 ft. in length with the same weight ratio that we have at present. On the basis of adding 10 ft. extra length to our car at 1448 lb. per foot of car length, making our total length equal to that of the Michigan car, our car would have a total weight of 98,422 lb., as against the total weight of the Michigan car of 131,000 lb. Even allowing an increase of 10 per cent in the unit weight, due to the increased length required to make our car equal the length of the Michigan car, the total weight would be not more than 108,328 lb., and the saving in weight over the other type of car would still be 26,272 lb.

The seating capacity of the Michigan car is given at fifty-two, and I see no arrangement whereby people can be seated in the baggage compartment, although this may be done practically in the same manner as we do; but it occurs to me that the weight per seated passenger, which is given at 2500 lb., is excessive. I might add in this connection that the Cincinnati Car Company, the builder of our cars, has already advised us that it can build a car of the same capacity as our present cars, equally as strong, with approximately 8000 lb. less weight. If this can be done it is my opinion that it would be to our advantage.

On the whole I believe that the Michigan car is carrying an unnecessary weight of from 16,000 to 20,000 lb. Just how this can be obviated I am unable to say at this time, unless they were to follow the same type of car as used by our company, which is a low-step center-entrance design, and enables us to obtain an unusual amount of weight below the floor line, thus insuring a more perfectly balanced car with those easy riding qualities so much desired by the traveling public. It is my opinion that the designers of the Michigan car might have followed out this practice to advantage, reducing the weight of their superstructure very materially and with no sacrifice of strength or durability.

Of course you realize that conditions vary in different localities. For instance, if the Michigan company has a demand for a 66-ft. car only during the peak load and is compelled to carry this extra weight around the balance of the day, this would be objectionable. Even with our heavy traffic we find that after 7 p. m. our cars are far from being loaded, and if we were compelled to carry such a heavy car during the eighteen hours per day which we operate, I feel that it would be a burden upon the operation. Fortunately, our cars are all wired for multiple-unit control, and it is possible in our case to couple on an additional car during the heavy trips and take it off when not needed.

Since we started the operation of this road we have heard some electric railway men say that the center entrance in our car takes up too much space. That is a mistaken idea. We have a car 58 ft. long that will seat sixty-four people. The rear-entrance cars used on the Ohio roads with which I have been connected were 62 ft. long and never seated over fifty-eight people, and, in consequence, I believe that the steel, center-entrance car is the most practical and most efficient design for interurban roads.

J. R. HARRIGAN, General Manager.

WHAT CONSTITUTES A REASONABLE RATE OF RETURN?

MANCHESTER TRACTION, LIGHT & POWER COMPANY

MANCHESTER, N. H., May 29, 1914.

To the Editors:

I have read with interest the discussion of reasonable return upon public utility investments appearing in the ELECTRIC RAILWAY JOURNAL of May 16, and desire to express my pleasure in the treatment of this topic as set forth by Mr. Hockenbeamer. There is no question that the cost of money to public utilities of many kinds is often greatly underestimated, and an article of this kind, emphasizing as it does many items of expense associated with the raising of capital which do not come within the vision of the layman, deserves wide reading, especially by regulating bodies and corporate officers directly concerned with the issue of securities and the closely associated question of a reasonable return upon the investment.

In answering a recent request for my own opinion, I have placed the minimum reasonable return upon total capitalization at 7 per cent, divided, let us say, at 5 per cent on the bonds and 8 per cent on the stock, with the addition of a sufficient amount to care for maintenance, depreciation and sinking funds, and assuming that the company holds an unlimited franchise. In cases where the franchise is limited I believe that a still further amount should be allowed for amortization of the property at the expiration of the franchise. The investor must be encouraged to place his money in such enterprises as well as elsewhere, and the establishment of attractive conditions is just as necessary in marketing the securities of an electric railway or a central station property as in other forms of business. Under modern conditions of regulation the so-called monopolistic advantages of public utilities are often greatly exaggerated, and Mr. Hockenbeamer is strictly within the truth in making the point that the management of such enterprises is constantly beset with hazards and difficulties arising from financial stringencies, from competition with other forms of energy, from actual and potential competition with other like utilities, with municipally owned utilities, from the diminution of earnings through improvements in energy-using devices on the premises of the consumer, from taxes, labor demands, regulation, etc.

The contention that securities should be marketed directly to the purchaser is a fallacy in the cases of all but very small enterprises, say below a minimum of $100,000 capitalization. The specification of capital costs in Mr. Hockenbeamer's discussion is thoroughly illuminating, and there is still room for a more general appreciation of the legitimate and necessary outlays for legal examinations, physical investigations by competent engineers, and for the whole range of expenses associated with the marketing of securities by bankers of established reputation and connections. It is unquestionably desirable that the small consumer, so-called, shall become financially interested in public utilities; but this can only be done by a policy which affords a liberal development along lines of safe financing and conservative management. The entrance of capital can be made more attractive without sacrificing any essential safety in many States. Thus, I believe that the limiting of bond issues to 75 per cent of the cost of improvements contemplated is needlessly severe in the case of a company which is well established, in good physical and financial condition, with a suitable sinking fund and favorable outlook in money matters. This whole subject of a reasonable return is one deserving of wide discussion. If various aspects of it can be frankly considered from time to time, in the press much good will be accomplished.

E. C. FOSTER.

HENRY L. DOHERTY & COMPANY
NEW YORK, May 28, 1914.

To the Editors:

The reasonable rate of return on capital in public utilities should be that rate which will most efficiently and permanently benefit the service.

In making this statement I pass by all arguments for the rights of capital under the Constitution of the United States to a fair return, as I would herein confine the discussion to some of the practical and economic elements which seem fundamental and of general applicability.

The paramount issue in a public service corporation is the permanent good of the service it delivers to the public—not whether the street-car fare this year is 4 or 5 cents, or the list price of current is 7 or 9 cents, or the interest rate on a certain bond issue is 5½ or 6 or 6½ per cent. Adequate and efficient service is vastly more important to the public than any single or many combined items contributory to the service. Quite properly, the public should desire and receive service at as low a price as is compatible with all-round efficiency. But the only public good resulting from minimum rates of return on capital invested is the immediate proportional reduction in the price charged for service. And yet the collateral results of minimum rates of return are heavy sales discounts on bonds and great difficulty in inducing additional capital into the business to meet the extensions of equipment and service demanded by the public.

In fact, one can sum up the entire question of capitalization and rates of return thereon by saying merely that both should be such as to get the capital required by the public service business on as efficient a permanent basis as possible. Private capital is free to invest where it will throughout the world. It cannot be commandeered into this or that business but will go wherever it expects to find the most attractive combination of security and profit.

One cannot consider the public utility business by itself. It has to get its capital from private investors throughout the world, in open competition with all other great businesses. Of necessity, methods of capitalization and rates of return thereon should therefore constantly be adjustable to world-wide financial conditions if truly efficient financing is to be accomplished.

Public demands for more and more service have forced the public service business to more than double its magnitude in the last decade. The present prospects are that during the next few years about $1,200,000,000 per annum of new capital money must be put into the business in the United States—in other terms, $4,000,000 of new money for each working day.

Failure to get most of this vast amount of new money would have collateral effects somewhat detrimental to present investments in the business. But should this new capital not come into the business, the service rendered the public would suffer to a vastly greater extent, as it would be impossible to meet the public requirements for additional service. What would be the public loss if during the next decade none of the new houses, hotels or theaters could be supplied with electric light or if no new railway tracks or cars could be put in operation in our cities and their upbuilding suburbs?

The paramount problem of the public utility business is not that the earnings of its present capital be made as light a burden as possible but that conditions be made such that adequate new capital will seek investment in the business.

It is as impossible to say what the rate of return on capital should be as to say what size of shoes men should wear; the average may be No. 9, but some can wear No. 5, whereas others require No. 12 shoes. Nevertheless, some general figures involving about $30,000,000,000 of capital may be illuminating. The following table shows the average market prices, the net earnings and the relative receivership risks of the designated groups of securities over a considerable period:

	Market Price	Net Earnings Per cent	Risk of Receivership Per cent
Steam railroads	120	4.25	1.84
Industrials	94	7.79	2.07
Public utilities	90	8.45	0.37

If we standardize the railroads (as they are considered standard securities) at 100, then, proportionately, public utilities are selling at 75 (90:120), even though they are five times as safe (0.37: 1.84), and have earned nearly twice as much (8.45: 4.25).

We might apply all the theories of academic finance to these last statements without upsetting the hard fact that such to-day are the prices on which capital estimates the public utility business as compared with the railroad business in the United States. Such facts generally and specifically should be considered when the reasonable rate of return on capital in the public utility business is under discussion. In the light of such facts the reasonable rate should be set at that rate which will get $100 into the business when it is needed, in view of the attractions of other standard businesses, for the $100 sought.

Apart from all other considerations, the rate, or rates, which will do this—which will efficiently attract the $4,000,000 a day of new capital needed—is the reasonable rate of return on the capital. From such a rate, or rates, the greatest permanent good of the public service will result.

W. H. GARDINER.

PUBLICITY FOR ELECTRIC RAILWAYS

DETROIT UNITED RAILWAY
DETROIT, MICH., June 1, 1914.

To the Editors:

One sometimes must go from home to hear the news which accounts for my being startled in reading over the May 30 issue of ELECTRIC RAILWAY JOURNAL.

In a mighty interesting paper on "Publicity for Electric Railways" by W. T. Buchanan, publicity manager of the Portland Railway, Light & Power Company, Portland, Ore., the author is of the belief that the Detroit United Railway carried on a campaign in the newspapers, with circulars and before clubs, against the agreement of Aug. 7 whereby "7-fer" tickets are now sold in Detroit. Mr. Buchanan is very much in error and is evidently confused with a previous street railway campaign.

The Detroit United Railway was a party to all the negotiations leading up to this agreement now in effect and as the very name implies *agreed* to it. There was no campaign carried on against the measure.

It is true that for a year previous to this agreement we used some advertising space in the papers but only to discuss general street railway problems. Rates of fare were never mentioned in that educational campaign, which was simply a prelude to our present system of publicity consisting of a weekly publication called "Electric Railway Service," distributed in boxes in the cars, the issue now being 125,000 copies weekly as against 50,000 for the first number. This newspaper is now our sole means of publicity, and the results have been, indeed, gratifying.

I do not at this time desire to enlarge upon the work being done in publicity by this company as the ELECTRIC RAILWAY JOURNAL in its report of the last convention at Atlantic City very kindly reproduced a paper read by me at that meeting. (See issue of Oct. 16, page 806.)

Personally I am not inclined to favor any nation-wide campaign of generalities. Like Mr. Buchanan I am inclined to the belief that local peculiarities need local treatment. The public *can* be reached by honest railways giving the facts, but years of misunderstanding cannot be wiped out in a few months.

A. D. B. VAN ZANDT, Publicity Agent.

SOLID AND INSERT MANGANESE STEEL SPECIAL TRACK WORK EXPERIENCE

UNITED RAILWAYS COMPANY OF ST. LOUIS
ST. LOUIS, MO., May 23, 1914.

To the Editors:

I have read with a great deal of interest the article on "Chicago's Experience with Solid and Insert Manganese Special Track Work," and in response to your request I will endeavor to describe the results of tests with similar special work in St. Louis.

The rail sections used in a large part of the special work of both solid manganese and insert types are Lorain sections 228 and 333, and with those rail sections the solid manganese has proved much superior to the insert type. The insert type has not been satisfactory on account of the loosening of the rails in the castings supporting the insert, the breaking of the castings and the cupping of the rails on the run-off side of the insert, which cupping is almost always followed by breaking of the rail head.

While the manganese insert frogs, switches and mates were in most cases of the renewable type, it was seldom possible to wear out more than one insert on account of the failure of other parts of that particular piece of special work. The solid manganese pieces have as a rule outlasted the manganese insert pieces used in the same parts of the same special work layouts, and as the price in St. Louis is practically the same for both types of special work, the solid manganese type has been generally used on the heavier layouts during the last three years.

In the solid manganese special work used, the right-angle frogs and crossings chip and acute-angle frogs and crossings cup in a manner similar to that described in your paper, but there has been very little cupping at internal joints in special-work layouts. The small amount of cupping at internal joints is probably due to the fact that a better joint plate fit is obtained in St. Louis than in many other cities. While it is sometimes necessary to renew frogs or crossings on account of the chipping or cupping referred to, the life of manganese insert special work has generally been exceeded before such renewal was necessary.

The Lorain rail section No. 440 is now being used for solid manganese special work, and it is thought that better results will be obtained with this section, but our past experience with the manganese insert special work does not lead us to believe that a change in rail section would have prevented a very large part of the failures found with that type of special work.

C. L. HAWKINS, Chief Engineer.

THE TOLEDO & WESTERN RAILROAD COMPANY
SYLVANIA, OHIO, May 21, 1914.

To the Editors:

Answering your recent letter, as I have already stated, our experience with solid manganese work in Toledo has virtually been "nil." However, I made an especially careful examination of various layouts in Chicago a couple of months ago, and it was my feeling that solid manganese work was not justified except in a few cases. The traffic conditions in Chicago, of course, are very different from those in Toledo, yet we have places in Toledo where the number of wheels and tons over a given point compares very closely with locations in Chicago. It must also be remembered that we run a great many interurban cars into Toledo, and they naturally are much harder on special work than the ordinary city cars, for they will weigh 60 to 100 per cent more than city cars.

On our special work to-day we use a deep flangeway which accommodates the interurban cars. One thing has been brought very forcibly to my mind by the photograph shown as Fig. 2 in your article, which is exactly the same situation that we have here. Such a situation only develops because of weak joint connections. I have found that our joint plates are not considered of as much importance as they should be. It is my opinion that a much stronger joint is necessary. This, of course, would result in more cupping, as we all know that the receiving end of a rail will naturally cup. However, I do not know that the cupping is as bad as the condition shown in this photograph, where the drop is about ½ in. A great deal of our special work trouble is caused by this one particular matter. On T-rail sections, where there is quite a difference in the height of rail at special work, we have required that the compromise joint shall be reinforced at the point where the two rail sections meet, thus giving greater stability to the joint.

I am not satisfied that a welded joint or a riveted joint at the end of special work would be the thing, but I do believe that a higher tensile strength in the joint material is what will solve this problem. We find very few instances where the rail arms at the end of the hard centers in frogs cup or show anything other than the ordinary amount of running wear. We have had a number of instances, however, where an iron-bound mate or tongue would break off directly at the joint between the hard center work and the running rail of the special piece. In my opinion this was due in a good many cases to the excessive heat required to weld the iron-bound material around the steel rail, which made the steel rail a great deal softer than conditions required. In other cases it was due to improper support under the special piece.

The question of foundations and the best method of keeping the water away from the special work piece is one that should receive special consideration when special layouts are being installed. We do not believe in concrete directly under the ties and around them but in a cushion of about 3 in. of stone, placed underneath the tie and on top of the concrete foundation. Thoroughly tamped and rammed between ties this will form a very good surface on which to place the top layer of concrete, on which may be placed the paving materials. The paving should be well grouted, especially where it joins with the special work material, as this will tend to keep the water away from the substructure of the track, thus permitting the least possible amount of pumping.

No special records have been kept as to the life of manganese work as compared with built-up work in Toledo, that is to say, the records have not been kept long enough to determine very much. General conditions, however, lead us to believe that manganese insert work is less expensive and less troublesome in the long run than solid manganese layouts.

We have found that our insert work is more apt to chip, split and granulate than to flow. We find, as stated in your article, that on our 90-deg. crossings chipping or granulating shows up more than in the acute angles, although it seems, after a certain amount of cupping has taken place on our sharp angle frogs, that the metal then begins to chip and crumble away.

Chicago seems to be quite fortunate in as much as in that city there are not many loose inserts in frogs under 90 deg. With us the loose inserts seem to occur about as often in one place as in another.

We have the same results with branch-offs and switch ends as Chicago, namely, where traffic is heavy through the branch-off, the tongues and mates indicate exceptional wearing qualities. We have many places where the traffic is heavy on the straight track and cold rolling has appeared to such an extent as at times not to permit the switch point to fit back into place, thus requiring the rolled material to be cut away.

It is my opinion that the manganese manufacturers are going after this matter quite carefully, as indicated by the report recently put out by them relative to standardizing methods and shop practices. I believe that they are as much interested in the matter as street railway engineers and that they will do a great deal towards bettering conditions.

A. SWARTZ, Vice-President.

OMAHA & COUNCIL BLUFFS STREET RAILWAY COMPANY
OMAHA, NEB., May 19, 1914.

To the Editors:

I have read your article on Chicago's experience with solid manganese special work, with much interest. Solid manganese steel special work has not been used on our system to any great extent. We have within the last two years adopted the use of the solid manganese switch for the reason that we had much trouble with the manganese bedplates of our switch pieces coming loose and found it very impracticable to tighten them ourselves.

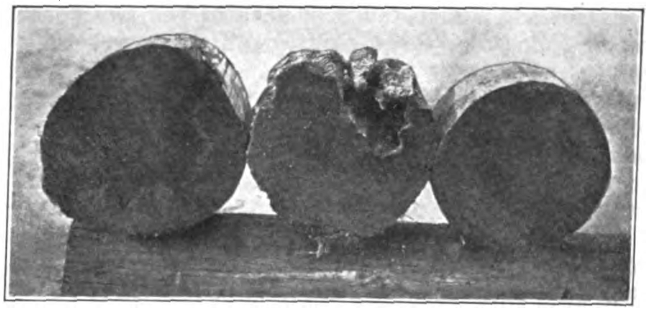
It appears to me that the solid type of switch piece is a more sensible construction and at only a small increase in cost, and we expect better results from this type. With the exception of some switches and a few railroad crossings under heavy railroad traffic on which we find it profitable to use solid manganese construction, our track construction is entirely of the manganese hard center type. We also have a few rolled manganese railroad crossings giving good service. We have some loose center troubles and also chipping of centers, which is very common. We find that special work installed on a solid concrete foundation is too rigid and causes excessive chipping. As our subgrade is of hard yellow clay we use crushed rock ballast from 6 in. to 8 in. under the ties. Wherever the subgrade is soil with low bearing power we use a combination construction of 6 in. concrete and 2 in. crushed rock between concrete and tie. We also use 6 in. x 8 in. white oak switch ties of different lengths on all special-work installations.

Manganese steel has a very low elastic limit, and cold rolling results, which stretches fibers beyond their elastic limit. This low elastic limit is responsible in a great measure for the chipping. If this limit could be raised and still maintain the degree of toughness of the present manganese steel a great improvement would be made. It is a problem for a steel chemist to produce a tough alloy steel with a higher elastic limit, and perhaps some of our troubles would be solved in both hard center construction and solid alloy steel construction.

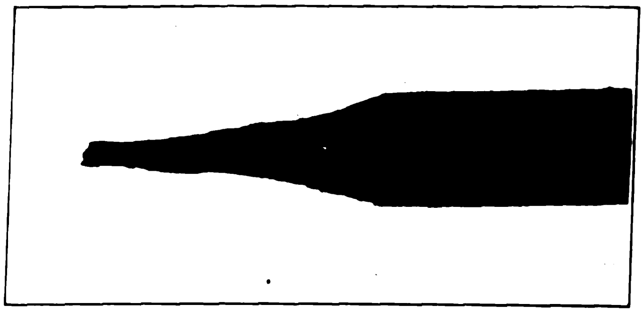
R. H. FINDLEY,
Superintendent Track and Roadway.

EFFECT OF BORERS ON TREATED AND UNTREATED PILES

The accompanying illustrations are taken from a report on the Galveston Bay bridge prepared by F. B. Ridgeway and referred to briefly in last week's issue of the ELECTRIC RAILWAY JOURNAL.



Air, Water and Mud Sections Creosoted Pile—Treated in 1895



Untreated Yellow Pine Pile—Completely Eaten in Two by Toredo and Limnoria

The first figure shows the work of the toredo and limnoria on a pile well creosoted and driven in 1895. This was removed about a year ago. The other illustration shows a part of an untreated pile driven in 1909 and completely eaten through. These cases can be considered typical and speak for themselves.

In a recent issue of *Electrical Engineering* appeared a description of an automatic ticket-issuing machine which has been installed at the Victoria Station, London, England, by the Metropolitan District Railway Company. The machine is set in action by depressing levers, will print any of five different kinds of tickets, and can deal with ten kinds if required. The power is obtained through a chain drive from a 6-hp d.c. series-wound 200-volt motor, which is fed from the d.c. mains, which have a voltage of about 550, through resistances.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

USE OF INSPECTION TEST SET TO LOCATE INCIPIENT DEFECTS

BY E. D. RANSOM, B.E.

Although the inspection of car equipment on a time or mileage basis is acknowledged to be the most efficient and economical practice, there is still room for improvement in this method of maintenance in the nature of locating what might be called near-defects, namely, incipient defects which have not yet matured into troublemakers. In the following article the results obtained in locating such defects by means of inspection test sets and the method of testing will be described. A list of the more common defects will also be given.

A test set was installed at each of the two general repair shops of a large electric railway for use on all cars going through these shops on periodical schedules, such as painting and varnishing. To report the result of each test a standard form was made out in triplicate, one copy going respectively to the equipment office, one to the shop maintaining the car, and one to the shop where the test was made.

For the benefit of those not familiar with this instrument, it might be well to say here that the principle used is that of the Wheatstone bridge, namely, the balancing of a known resistance against the car circuit to be measured. As applied in this case, two dials of variable resistance and an ammeter are inclosed in a portable case which is placed on the car platform. Current is obtained by a pole from the trolley wire through two circuits of five lamps in parallel. The lead connections are made by means of a plug which is inserted in one of five receptacles, according to the test made and the capacity of the circuit measured. There are different values, such as full dial of resistance, equivalent to 1.5 ohms, 15 ohms, 150 ohms, and a connection for insulation resistance where any leakage is accurately shown. The test set is placed on the car platform, the trolley connection is made to the wire, the ground plate inserted under the brakeshoe and then the following tests are made:

1. The resistance of car wiring from trolley wheel to ground on each step of each controller, and from each pole of two-pole cars. This test locates crossed leads, loose connections, poor wiper tension and improperly made up or defective resistance. The following shows standard limits as used for car with K controller, two 55-hp motors and two frames of grid resistance, similar limits being used for each type of equipment.

Controller Point	Resistance in Ohms	Controller Point	Resistance in Ohms
1	5.20 to 5.75	6	2.65 to 3.10
2	3.20 to 3.75	7	1.40 to 1.80
3	2.00 to 2.40	8	0.80 to 1.10
4	1.30 to 1.70	9	0.25 to 0.75
5	0.80 to 1.20		

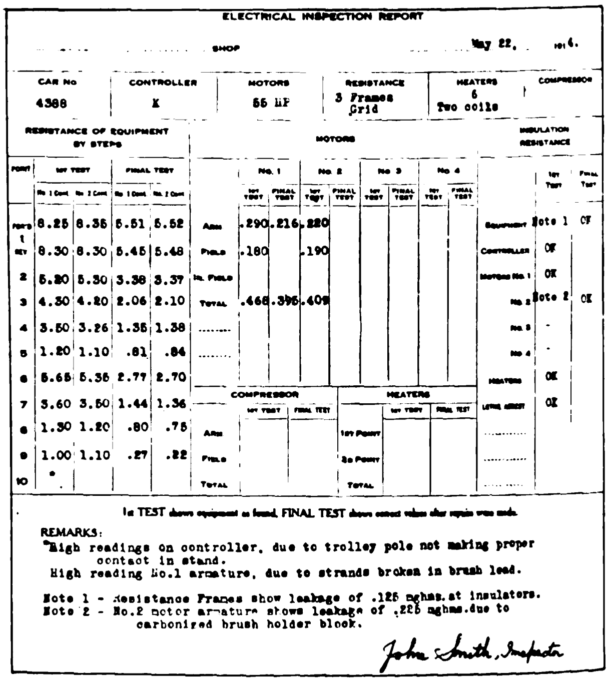
Equipments which give readings within these limits are assumed in good condition, and any above or below are investigated to find the trouble.

2. Resistance of each motor armature and fields locating short or open circuits, poor brush tension, broken brushes and loose leads. Standards for each type of motor were determined, the following being an example of one type: Motor, 55 hp; ohms resistance of armature, 2.50 to 3.25; and ohms resistance of fields, 2.30 to 3.50.

3. Resistance of compressor motor armatures and fields, including governor contact, locating similar troubles, as described in the second test.

4. Resistance of heater circuits locating grounded, crossed and open-circuited heaters, and wrong type and defective coils.

5. Insulation resistance of all wiring, including lightning arresters, lights, etc. This test locates partial grounds, carbonization, defective insulation and all causes of current leakage, which would eventually break down. Out of a large number of cars tested, 50 per cent were found to have one or more incipient defects, that would not be located by regular inspection methods. In general the defects found were of such a nature that they were not causing actual trouble, but eventually they would have broken down or become serious enough to cause more or less expensive damage to equipment or serious delay to service. The following is a list of the principal defects found: Resistance grids short-circuited; resistance grids loose in frames; wrong grids in frames; resistance leads loose in terminals; commutator short-circuited; commutator open-circuited; commutator carbonized; brush broken; brush holder carbonized; brush tension weak; loose connection in motor lead connectors; poor tension in controller wipers; broken strands in cables; poor contact of trolley pole in stand; poor contact between base and stand; trolley stand shunts not making contact; fields short-circuited;



ELECTRICAL INSPECTION REPORT

SHOP May 22, 1914.

CAR No	CONTROLLER	MOTORS	RESISTANCE	HEATERS	COMPRESSOR
4388	K	55 HP	3 Frames Grid	6 Two coils	

RESISTANCE OF EQUIPMENT BY STEPS

POINT	1ST TEST No 1 Cont	1ST TEST No 2 Cont	FINAL TEST No 1 Cont	FINAL TEST No 2 Cont
POS 1	8.25	8.35	5.51	5.52
NEG	8.30	8.30	5.45	5.48
2	5.20	5.30	3.38	3.37
3	4.30	4.20	2.06	2.10
4	3.50	3.26	1.35	1.38
5	1.20	1.10	.81	.84
6	5.65	5.35	2.77	2.70
7	3.60	3.50	1.44	1.36
8	1.30	1.20	.80	.75
9	1.00	1.10	.27	.22
10	•			

MOTORS

	No. 1 1ST TEST	No. 1 FINAL TEST	No. 2 1ST TEST	No. 2 FINAL TEST	No. 3 1ST TEST	No. 3 FINAL TEST	No. 4 1ST TEST	No. 4 FINAL TEST
ARM	.290	.216	.220					
FIELD	.180		.190					
SH. FIELD								
TOTAL	.466	.395	.409					
....								
....								

COMPRESSOR

	1ST TEST	FINAL TEST
ARM		
FIELD		
TOTAL		

HEATERS

	1ST TEST	FINAL TEST
1ST POINT		
2D POINT		
TOTAL		

INSULATION RESISTANCE

	1ST TEST	FINAL TEST
EQUIPMENT	Note 1	OK
CONTROLLER	OK	
MOTORS No. 1	OK	
No. 2	Note 2	OK
No. 3	-	
No. 4	-	
HEATERS	OK	
LTNG ARRST	OK	
....		
....		
....		

1st TEST shows equipment as found, FINAL TEST shows correct values after repairs were made.

REMARKS:

*High readings on controller, due to trolley pole not making proper contact in stand.

High reading No.1 armature, due to strands broken in brush lead.

Note 1 - Resistance Frames show leakage of .125 mghms.at insulators.

Note 2 - No.2 motor armature shows leakage of .225 mghms.due to carbonized brush holder block.

John Smith, Inspector

Typical Report of Test Made to Catch Incipient Defects

fields grounded; heaters open, crossed and short-circuited; wrong coil in heater; leaking insulators.

From the foregoing defects, as listed, it can be readily seen that defects such as wrong coil in heater or wrong grids in resistance frames, which are due to oversights and carelessness, would very likely be overlooked by a visual inspection. In like manner, carbonized brush-holders and commutators, which would not show defective to ordinary inspection methods, would sooner or later result in grounded armatures. Loose connections in motor leads and broken strands in cables were often found in places where they would most probably be overlooked, with consequent fires, because of burning open-circuited. As leakage due to defective insulators, and in fact all sources of leakage, is located before an actual ground occurs, much damage is avoided.

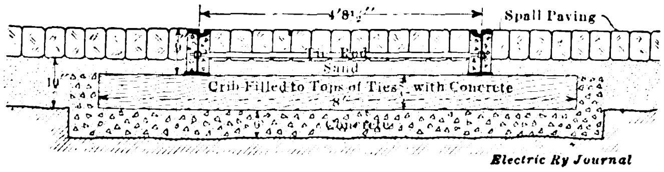
A careful study of the defects presented will plainly show the saving of time, labor and material, to say nothing of serious delays to service, that are saved by testing for incipient defects. Aside from these merits, the test gives an accurate check of the thoroughness of or weak points in methods of inspection at the shop which maintains the car. The standard resistance values for each type of equipment and apparatus have also been found of great worth, as the deterioration from the original rating can be closely followed and compared with the length of time in service. A typical test report is reproduced on the preceding page.

LIFE OF CONCRETE TRACK AT RICHMOND, VA.

BY A. LANGSTAFF JOHNSTON, JR., M. E.

The value of concrete in street railway track construction is well illustrated by the reconstruction of the Broad Street section of the Virginia Railway & Power Company, Richmond, Va. The Broad Street line was originally the property of the Richmond Traction Company and was built under the engineering supervision of A. Langstaff Johnston in 1896. The track was constructed as shown in the attached illustration. Untreated sawed oak ties, 7 in. square and 8 ft. long, were laid in a crib of concrete 6 in. deep and coming flush with the top of the ties. The web of the rail was also incased in concrete.

When this construction was recommended by the engineer, it was opposed as unnecessarily expensive. In practice, however, the many advantages asserted for it by Mr. Johnston have been realized, namely, long life, minimum maintenance of track and cars, no loose rail bonds and no bad effect on the alignment of the track after heavy spring thaws. The track is now being rebuilt after very heavy service for eighteen years. The cross-ties, though not treated, are still in a very good state of preservation. Repairs are being made on account of the wornout rails.



Cross-Section of Concrete Track Construction Taken Up After Service of Eighteen Years Because of Wornout Rails

It is interesting to note that the first 90-lb., 60-ft. girder rails manufactured were first used in Richmond by Mr. Johnston, who also built, in Richmond in 1888, the first commercial electric street railway operated in the country.

CAR CIRCUIT BREAKERS

BY R. H. PARSONS

A most important although often neglected part of the electrical equipment of a car is the circuit breaker. If the breaker is kept in good condition it will protect the motors and car wiring from all overloads by opening the circuit when the controller is fed too fast or from an overload following a breakdown of the insulation. Very little neglect makes the breaker useless.

The principal cause of the failure of a circuit breaker to blow is sluggish action due to the entrance of dust into the movable parts. The consequence is that the tripping levers are prevented from operating. Often the tripping arrangement will release the main contacts, but the dirt will prevent these from parting sufficiently to break the circuit, causing them to hold a heavy arc and to set fire to whatever may be around it. At first thought the answer to this is very simple, namely, clean the apparatus thoroughly on regular inspection. However, on some lines running through dusty territory, a few days suffice for the breaker to gather enough dust to change the blowing point, if not to prevent its blowing entirely.

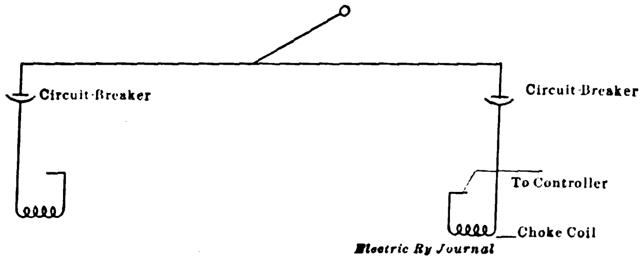


Fig. 1—Wiring When But One Breaker Is Used at a Time

Many cars are wired with the trolley and circuit breaker connected as shown in Fig. 1. The main trolley is connected between the two circuit breakers at opposite ends of the car, and only one breaker is used at a time according to the direction of running. If the cars are wired in this manner, the circuit breaker at the rear should always be thrown off by the motorman when he stops operating from that end of the car. This action leaves open the circuit to the rear of the car and also helps to keep all the parts of the breakers in good working order.

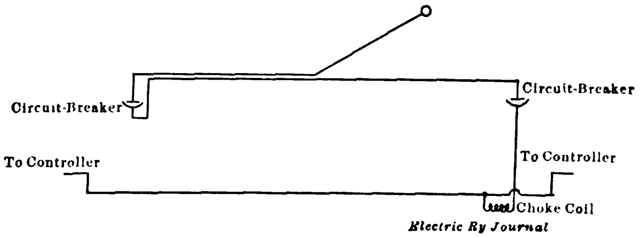


Fig. 2—When Both Breakers Are in Series

Other cars are wired with the two breakers in series, then to a common trolley for both controllers, as shown in Fig. 2. The advantage of the second scheme is that it gives the protection of two circuit breakers; its disadvantage is that line voltage is on the rear controller when it is not necessary, subjecting that controller to the dangers of lightning and also making a double path for lightning to the motor circuit. When cars are wired in this way the circuit breakers should be tripped when the car is stored at the end of the run. This frequent tripping and resetting of the breakers will keep them in better condition to blow when they should.

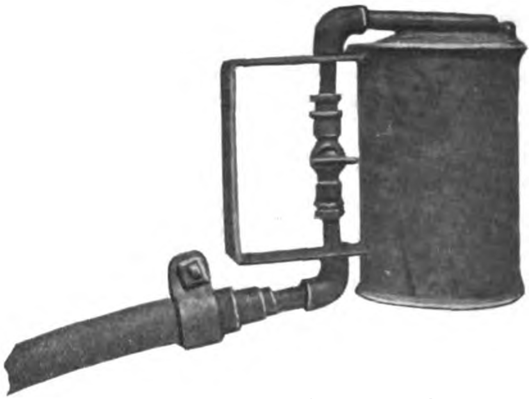
Methods of calibration are all alike in principle although carried out differently. The apparatus consists of an ammeter and a water or grid rheostat controlled to cut resistance in or out for the current at which the breaker should blow. It is important, however, that the breakers should be tested and calibrated at frequent intervals, at least every two or three weeks and even oftener if possible. It is desirable to run the car near a stationary test equipment, but if this is not convenient a portable outfit should be used. The latter may comprise an ammeter, rheostat and an air compressor, rigged up either on a hand truck or an old car. In any event, the testing set should be in constant use to blow out the circuit breakers with air and to keep them calibrated. In many cases the circuit breakers are periodically removed from the cars, repaired at the bench and then tested at a board before replacing them on the car. When this is done they should be tested in the position that they would have on the car, because a variation in position may make a difference of from 20 to 60 or even 70 amp in the blowing point.

Another reason for circuit-breaker failure is mechanical damage to the parts, as when the motorman uses a switch bar instead of his hand for tripping. If the bar does not break the handle, it jars the springs and catches so badly that they are bent and their calibration is destroyed. Severe discipline should be dealt out to motormen who trip the breaker in this manner. Repeated blowing causes holes to be burned into, and sometimes through, the fiber arc chutes at the sides of the contact tips. In some cases it is necessary to change the side plates, but several electric companies have placed on the market a cement with which the holes may be filled after they have been cleaned. When this cement hardens the plate actually becomes a better arc resistor than it was originally. Other troubles naturally arise from worn and broken parts, but modern improved breakers seldom have more troubles than those outlined. Nevertheless, a road with up-to-date equipment does not feel that enough protection is obtained by the use of circuit breakers alone. A fuse, therefore, is installed in the trolley circuit, rated to blow at a current a little greater than that which will trip the circuit breaker.

AIR BRUSH FOR PAINTING MOTOR CASES

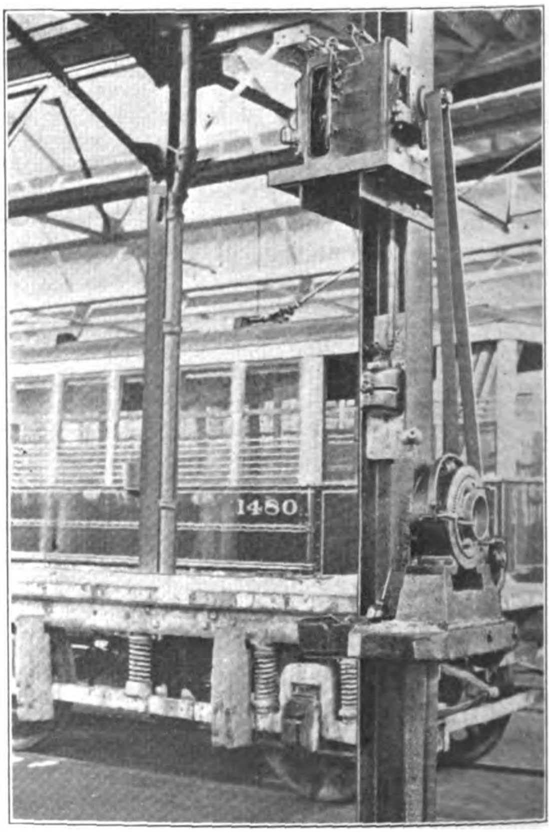
At the main shops of the Illinois Traction System in Decatur, where all of the interurban equipment for the 450 miles of line in central Illinois is repaired, a simple little air brush is used for applying varnish to the inside of motor cases. A picture of the brush is shown. It is connected with the shop air supply system by a hose. The spraying part, or atomizer, is so arranged that there is no pressure on the can which holds the varnish. When using this brush the interior of a GE-222 motor case with coils in place can be thoroughly covered with black air-drying varnish in five minutes.

Probably the greatest advantage of the air-brush method of covering the interior of motor cases is the assurance of obtaining thorough results. With the hand method of painting, even though the motor cases may have been cleaned with the utmost care, nevertheless considerable carbon dust and copper dust will remain lodged in the corners. If varnish is applied by hand this dust, which is a good conductor, gets mixed into the varnish and it is very difficult to coat the motor casing in such a way that the varnish will have any great value as an insulating medium. There are bound to be places where the carbon and copper will stick through the varnish. The air brush sprays the varnish finely but with considerable force, and thus the copper and carbon dust are packed against the steel and thoroughly covered. Also with this brush it is easy to reach behind the commutating poles and the field coils, and thus the whole interior right up to the coils will get a thorough coating. With hand work this practice would be found difficult. The cost of this brush is insignificant compared with the saving in time and the improvement in the work.


Air Brush for Painting Motor Cases

MOTOR-DRIVEN PIPE-THREADER ON COLUMN

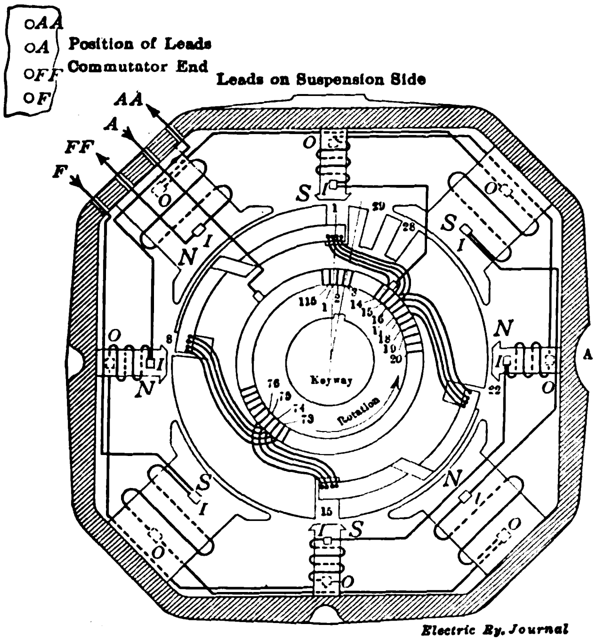
In the Youville shops of the Montreal Tramways advantage is taken of a building column for the mounting of a motor-driven pipe threading machine, as shown in the accompanying half-tone. The machine is located about 5 ft. above the floor on a wooden platform, attached to the column by steel angles, the motor, an old compressor outfit, being similarly situated but about 8 ft. high. The wiring is by conduit carried up to the motor from a small starting switch mounted between the flanges of the column, and the arrangement is unusually compact and convenient for a belted drive.


Compact Motor Drive, Montreal Shops

WIRING DIAGRAMS OF COMMUTATING POLE MOTORS

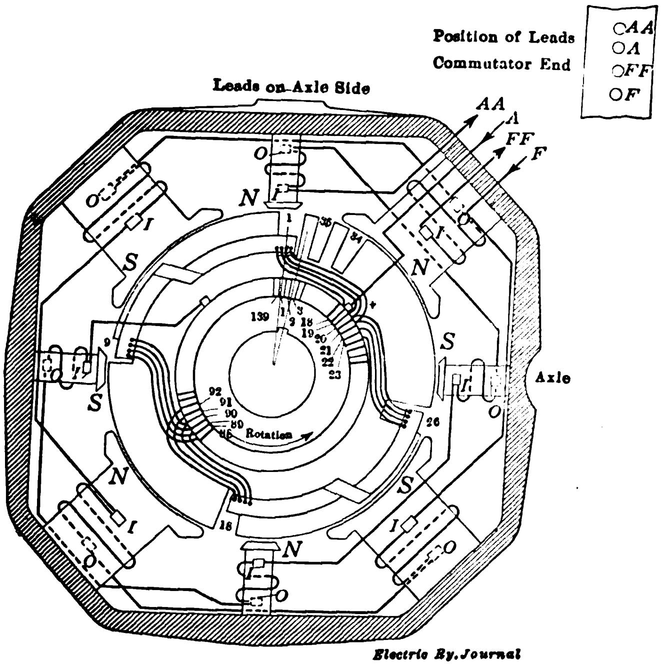
Both the Westinghouse and General Electric companies have prepared simplified diagrams which show the direction of rotation, the throw of the leads and the method of bringing out the leads on different commutating-pole motors. The accompanying cuts are reproductions of these diagrams made to handy notebook size for the convenience of the car maintenance man. The following is a summary of the salient features of the motors shown in the diagrams:

Westinghouse No. 306—Rated 50 hp at 500 volts and 60 hp at 600 volts. The approximate weights are as follows: Motor complete without gear and gear case, 2645 lb.; armature with fifteen-tooth pinion, 595 lb.; gear with sixty-nine teeth, 250 lb., and gear case, 135 lb. Westinghouse No. 321—Rated 110 hp at 750 volts. The approximate weights are as follows: Motor complete without gear and gear case, 3680 lb.; armature with sixteen-tooth pinion, 1050 lb.; gear with sixty-one teeth, 295 lb., and gear case, 175 lb.



AA
A
Position of Leads
OFF
Commutator End
OF
Leads on Suspension Side
AA
A
FF
F
S
N
I
O
Keyway
Rotation
Axle
Electric Ry. Journal

GE-201 Motor

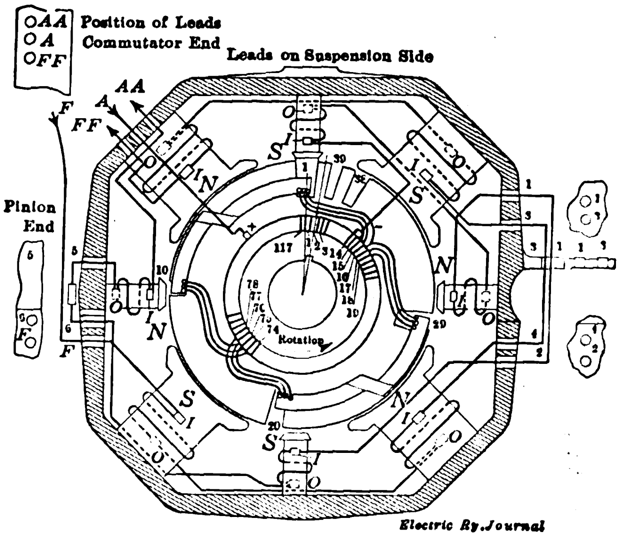


Position of Leads
Commutator End
AA
A
FF
F
Leads on Axle Side
N
S
I
O
Rotation
Axle
Electric Ry. Journal

GE-203 Motor

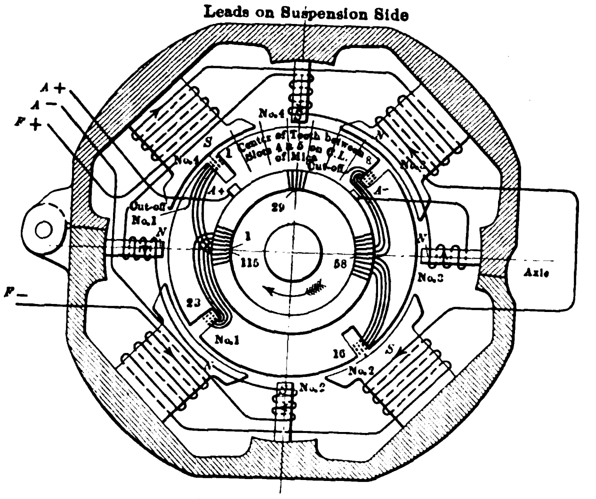
The data on three prominent General Electric motors follow :

	GE-200	GE-201	GE-203
Rated	33 hp 500 volt 40 hp 600 volt	55 hp 500 volt 65 hp 600 volt	40 hp 500 volt 50 hp 600 volt
Weight motor alone—pounds.	1670	2385	2170
Weight motor complete with gear, gear case, pinion, axle lining and axle collar—pounds	2080	2885	2640
Weight armature and pinion—pounds ...	464—14 teeth	635—15 teeth	566—15 teeth
Weight, in pounds, of gear	198—67 teeth	220—71 teeth	200—69 teeth
Gear case—pounds...	170	178	180



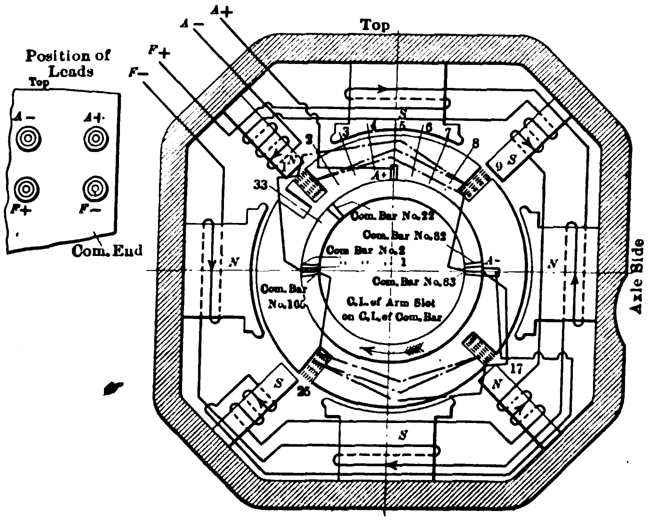
AA
A
Position of Leads
FF
Commutator End
Leads on Suspension Side
AA
A
F
FF
Pinion End
S
N
I
O
Rotation
F
Electric Ry. Journal

GE-200-A Motor



Leads on Suspension Side
A+
A−
F+
No.4
Centre of Tooth between Slots 4 & 5 on C.L. of Mica Cut-off
Cut-off No.1
No.3
Axle
F−
No.1
No.2

West. 306 Motor



Position of Leads
Top
A−
A+
F+
F−
Com. End
Top
Com. Bar No.22
Com. Bar No.82
Com. Bar No.2
Com. Bar No.83
Com. Bar No.100
C.L. of Arm Slot on C.L. of Com. Bar
N
S
Axle Side

West. 321 Motor

Diagrams of Direction of Motor Rotation, Throw of Leads and Method of Bringing Out Leads

PURE INGOT IRON FOR THIRD-RAILS

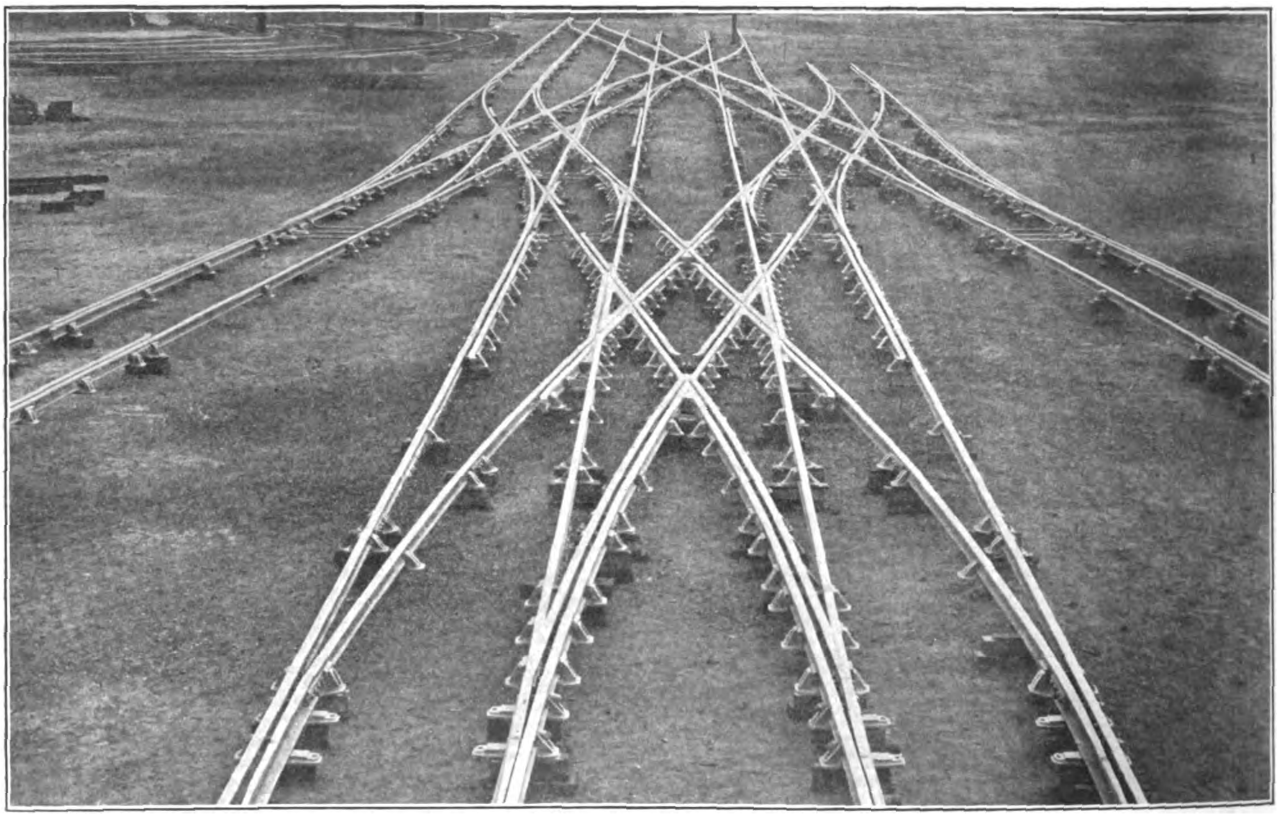
The conductivity of third-rails, especially where there are no feeders, is an important consideration that is dependent largely upon the composition of the metal, it being not unusual to roll third-rails of special steel in order to attain a low specific resistance. In general it has been found that high contents of carbon and manganese produce high resistance, and along this line it has been suggested that third-rail composition should be limited to 0.82 per cent of carbon and 0.40 per cent of manganese, giving a conductivity of 12 per cent of that of commercial copper. This conductivity has been exceeded in the case of the Manhattan Elevated Railway in New York, where the contents are respectively 0.73 and 0.34, giving a rail conductance equal to 13 per cent that of copper. These figures are given on a volumetric basis.

Recently, however, the American Rolling Mill Company has had tested for conductivity a sample of its American "Ingot" iron, a metal of a high degree of purity, with the idea that the absence of foreign material should produce a high conductivity. That this is actually the case is shown by the fact that the conductivity was found to be 16.78 per cent on Mathiessen's standard where the soft-drawn copper is assumed to have a resistance of 0.141729 international ohm per metergram at 0 deg. Cent., a resistance temperature coefficient of 0.0042 per deg. Cent. from and at 0 deg. Cent. and a specific gravity of 8.89 at 0 deg. Cent.

The conductivity was 16.76 per cent based on the international standard for annealed copper having a resistance of 0.15328 international ohm per metergram at 20 deg. Cent., a resistance temperature coefficient at constant mass of 0.00393 per deg. Cent. from and at 20 deg. Cent. and a density of 889 grams per cubic centimeter at 20 deg. Cent. The conductivities on a weight basis were respectively 18.98 and 18.96 per cent.

A PREMIER PIECE OF MANGANESE SPECIAL WORK FOR BUENOS AYRES SUBWAY

What is stated to be the largest piece of manganese steel permanent way in the world was recently completed for the new Buenos Ayres Electrical Subway by Hadfield's Steel Foundry Company, Ltd., Sheffield, England. This great assembly of "Era" manganese steel special work is 520 ft. long and weighs 160 long tons. It will be installed at the Primera Junta station, where two island platforms will be provided to handle a four-track service. The layout is described by its makers as following the standard adopted for heavy British railway service, namely, the rails are of the British standard bullhead section weighing 90 lb. per yard and are to be secured in cast-iron chairs with oak keys. Both the rails and the crossings are of manganese steel. This extensive and complicated layout has sixteen standard single crossings, four special single and eight special compound crossings. The crossings are made throughout of manganese steel but are reinforced with a cast center, bound and securely held in position by rolled rails. The center pieces are castings made from specially prepared patterns and carefully finished to templets. There are no bolts or rivets through the nose piece to work loose and require constant attention.



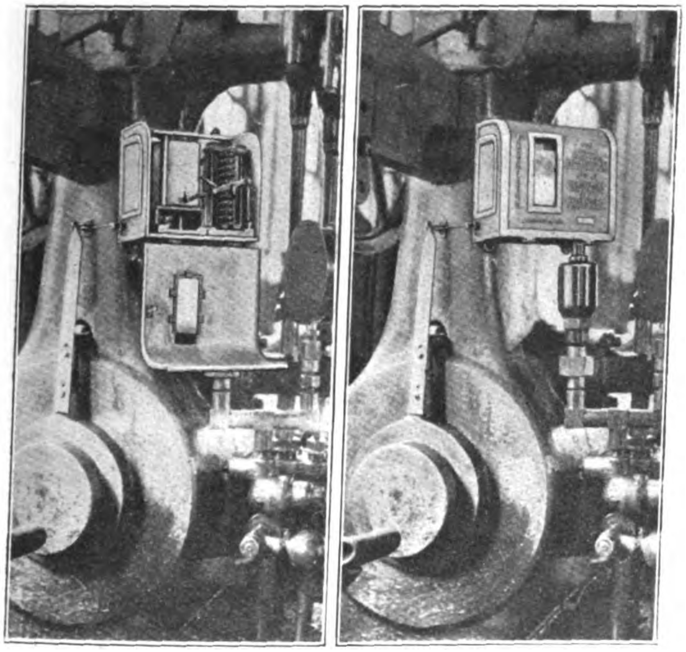
A Remarkable Piece of Manganese Special Work Assembled at the Maker's Yards Before Shipment for Use in Buenos Ayres Subway System

William B. McKinley, president of the Illinois Traction System, Champaign, Ill., has presented a portrait of his father, the late Rev. George McKinley, to the George McKinley Memorial Presbyterian Church in Champaign. About two years ago Mr. McKinley built this edifice at a cost of about $35,000, in memory of his father, who was a pioneer Presbyterian minister in Illinois. After building the church William B. McKinley gave a $6,000 pipe organ of the latest design, and has now placed his father's portrait in the church.

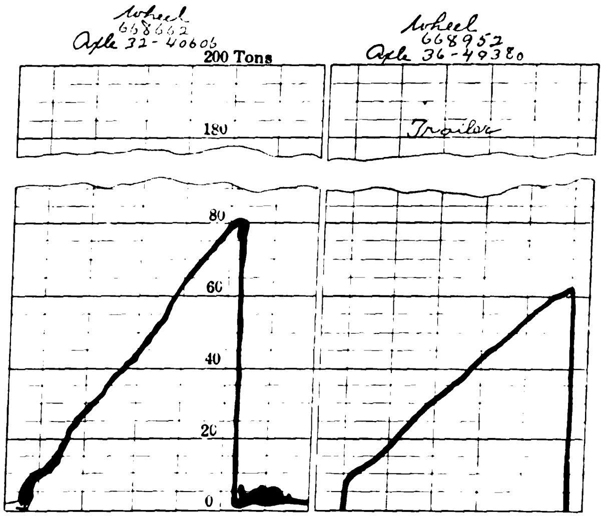
GRAPHIC WHEEL PRESS RECORDS AT BOSTON

In common with many other railroad systems, the Boston Elevated Railway maintains careful records of car-wheel service, and at both the Sullivan Square and Albany Street shops automatically drawn diagrams of wheel-press operation are a regular feature of the work of rolling stock maintenance. The heavier service is performed at Sullivan Square, where the major part of the shopwork for the rapid transit lines is done. The equipment includes a 300-ton Putnam hydraulic wheel press fitted with a hydraulagraph, sample records of the latter being reproduced herewith in connection with the pressing on of a motor truck wheel and a trailer truck wheel used in elevated car service. The hydraulagraph, which was built by the American Steam Gage & Valve Manufacturing Company, Boston, Mass., consists of a cylindrical recording drum and pen, the former being actuated by the movement of the wheel ram in the press and the latter by the liquid pressure in the cylinder of the press. The pen is normally held at zero on the chart carried by the drum by a powerful spring, its travel being controlled by the pressure of the liquid in a system of piping connected with the ram chamber.

Lard oil is used instead of water in the press on account of the valve wear experienced with the latter fluid, and the pressure gage and hydraulagraph connections are taken off a common tee with a central pipe leading to the pressure chamber. The tee was made by the company out of a 1½-in. square steel forging 9 in. long, with a ⅜-in. hole bored in the center for oil or water transmission. The connections leading from the tee to the indicating gage and to the hydraulagraph are bored to an inside diameter of ¼ in. to give a free flow of liquid, one terminating in the gage pipe and the other in a cylinder 3½ in. in diameter. which contains the plunger of the hydraulagraph spring and pen system. In general design, therefore, the apparatus is not unlike the steam engine indicator. The recording mechanism is mounted in a cast-iron case 10½ in. long, 9½ in. high and 5½ in. deep, attached to the frame of the wheel press, and provided with a hinged front in the central portion of which is a 2-in. x 5-in. glass window, with a small slot at the top through which the operator can write in pencil the number and make of each wheel as it is pressed upon the axle. The records are carried on a roll 100 ft. long, the capacity of the roll being 400 records, or 200 pairs of wheels. A padlock on the cover keeps the records intact until removed by the foreman of the department or his authorized assistant.



Hydraulagraph Cover Down and Closed, Sullivan Square Shops, Boston Electric Railway



Electric Ry Journal

Typical Hydraulagraph Records

The movement of the drum is accomplished by a cord passing out of the case and around a 1-in. pulley, the cord terminating in a hook at the top of a piece of strap iron 16 in. long, 1¼ in. wide and ⅛ in. thick, which is attached to the ram. A movement of the latter is thus directly transferred to the drum, and the record is calibrated with vertical lines indicating a horizontal movement of 1 in. between graduations. The ordinates of the records show the total pressure on the ram to a scale graduated in 5-ton steps. Wheels on the rapid transit lines are of steel, with an axle fit 6 in. long, the diameter of the axle being 5⅜ in. with wheels used on steel cars and 5 in. with wheels on wooden cars. Motor truck wheels on the rapid transit lines are 34 in. in diameter and trailer truck wheels 31 in. A difference of 0.017 in. is the company's practice, between the axle and wheel fit diameters. The maximum pressures used in the wheel press are about 85 tons on motor truck wheels and 50 tons on trailer truck wheels. The press is gear driven by a 7½-hp, 550-volt Crocker-Wheeler d.c. motor mounted on the frame.

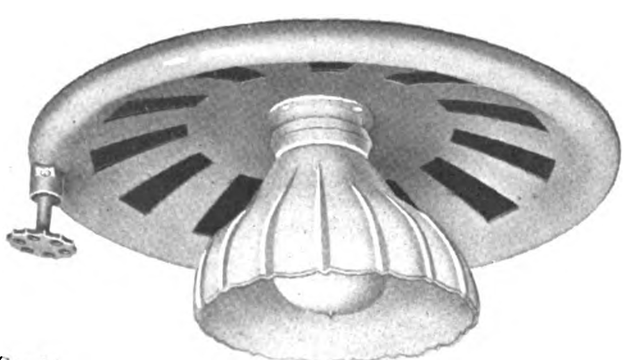
Records are pasted on the backs of the wheel cards used to hold mileage, wear and other data, and when the wheel is scrapped these records are sent to the office of the general foreman of the Sullivan Square shops, for mileage study and tabulation. At the surface car shops on Albany Street the wheel presses are equipped with hydraulagraphs. The maximum pressures applied to cast-iron wheels is from 30 to 40 tons, and that for steel wheels from 40 to 60 tons. The hydraulagraph records are useful in showing the exact conditions of pressure obtaining at the application of every wheel used by the company, incidentally checking the workmen. Furthermore, they indicate unfavorable conditions, such as shoulders, in the wheel fit, and thus forestall loose wheels. In the latter respect, the records are valuable evidence of the thoroughness of the company's shopwork in case of court proceedings.

CAR LIGHTING FIXTURES FOR SERIES TUNGSTEN LAMPS

The rapid progress of scientific car lighting as stimulated by the tungsten lamp is illustrated by some recent car-lighting fixtures of the Dayton Manufacturing Company, Dayton, Ohio. For example, the reflecting shades shown are designed to provide 75 per cent greater effective illumination at a current consumption of 65 per cent below that required by carbon lamps. One of the three accompanying cuts shows a one-light pendant in which the base of the socket used is flush with the base of the fixture, and for which no cutting of the ceiling is required. A second fixture shown is a combination one-light pendant and ventilator register which has been developed for steel arch-roof cars. It is heavily enameled in white and is curved to fit the arch of the ceiling.

One-Light Pendant and Circular Spring Shade Holder

Glassware on car-lighting fixtures must be so well secured that it will not rattle or work loose, while still giving due opportunity for expansion from heat. If screws gripping the neck of the globe at three or four points are used, the tightening of the screws to prevent rattling prevents the glass from expanding evenly with the heat and consequently it is liable to crack. To overcome this trouble the "Flex" holder has been devised. In this holder, the shade, or globe, is held in a flexible manner by a coiled-wire spring which clamps the glass firmly with the same pressure at every point. Thus, the glass may expand and contract again and again without relaxing the grip of the holder. Furthermore, glassware may be removed almost instantly for cleaning by turning a knurled sleeve ring two or three revolutions, and it may be replaced just as quickly. The adjusting sleeve also carries a wire locking ring (shown continuous in the illustration) at its upper edge, which may be removed if it is desired to dismantle the fixtures for refinishing.

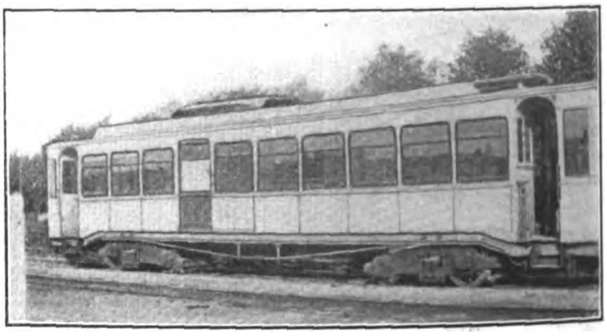


Combination One-Light Pendant and Ventilator Register

TRIAL SERVICE OF THE PIEPER GAS-ELECTRIC CAR AT PARIS

In 1911 the Compagnie Internationale d'Electricité of Liége, Belgium, furnished to the Compagnie des Chemins de fer de la Grande Banlieue of Paris several gas-electric motor cars fitted with the system of Henri Pieper. The first element is a four-cylinder 90-hp gas engine, the power of which is transmitted to the truck axles by means of worms and gears. The second element is a machine which operates either as a generator or motor, according to conditions. The third element is a sixty-cell storage battery.

The principle of the Pieper system is to use the battery for the storage of energy when the full capacity of the gas engine is not required for traction and then to have the battery give up this stored energy to aid the gas engine when the traction requirements are high. In the first instance the electrical machine serves as a generator driven by the gas engine to charge the battery. In the second instance, it serves as a motor driven by the battery to assist the gas engine. The use of a heavy flywheel on the generator aids the return of electrical energy to the cells when the car is descending grades. This method of regeneration also permits automatic braking as soon as the spark is cut off, the gas engine itself acting as a flywheel whose motion is contrary to that of the car. The gas engine is reversible. The mixtures of gasoline and air which are supplied to the engine are varied merely by the movement of the controller handle. The circulating cooling water passes through tubes which in their travel are carried over the roof of the car. Each car has a gasoline tank of 567-gal. capacity which is enough for a trip of at least 62 miles. A meter in the compartment of the motorman shows the electrical condition of the battery.



Gasoline Car with Electric Auxiliary

The cars as constructed by the Société Anonyme Energie of Marcinelle, Belgium, have the following dimensions: Length over all, 48 ft. 6 in.; distance between axles of trucks, 26 ft. 3 in.; truck wheelbase, 5 ft. 8 in.; weight of car empty, 23 metric tons; weight of car loaded, 26 metric tons.

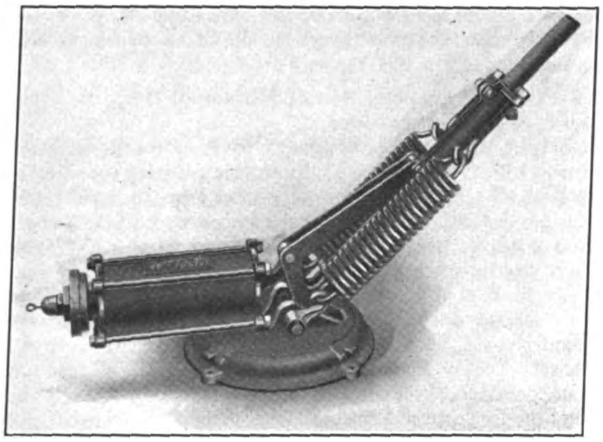
The car has one first-class compartment and one second-class compartment with a total of thirty-three transverse reversible seats, but the total capacity is fixed at fifty passengers. The gas engine is in the baggage compartment. A vestibuled platform with double step is provided at each end.

On trial these cars have made 10.5 m.p.h. to 15.5 m.p.h., according to the load, between Poissy and St. Germain-en-Laye, a distance of 3.4 miles and including a grade of 5 per cent for 1640 ft. On level track a speed of 31 m.p.h. an hour has been obtained. The gasoline per ton mile amounts to 25.6 to 41.6 grams, and the cost of maintenance quoted by the manufacturer is 1.9 cents per train mile.

AIR TROLLEY BASE WITH RETRIEVING FEATURE

The current-collecting merits of the trolley wheel and the non-jumping qualities of the pantograph for high-speed interurban work have been most ingeniously combined in a new type of air-retrieving trolley base which has been developed and put on the market by the Wasson Engineering & Supply Company, Milwaukee, Wis. This novel base is already in service on a number of high-speed and city lines.

The cardinal principle of this device is the combination of an air-operated retrieving cylinder, "4," and auxiliary springs to maintain uniform tension when the pole is in normal position on the wire. It is hardly necessary to point out the value of uniform tension for securing maximum wear from wheel and wire. Furthermore, the application of the power to the pole at a point 26 in. from the fulcrum gives quick, active and resilient tension. The major part of this base is made of cast iron, but those parts which are subjected to the greatest strains are made of annealed carbon steel. Brass, bronze and leather also enter into its construction.



Air-Operated Trolley Base with Retrieving Feature

The air cylinder is cast on the revolving part of the base and is fitted with a cup-shaped piston, "9," which is connected to the pole support castings by a bell crank. Forming a part of the opposite end of the cylinder is the valve "13" which controls the air. This is operated automatically when the trolley wheel escapes the wire, or it may be operated by hand to place the trolley pole under the control of the motorman, who can retrieve it at will. Air used in the retrieving mechanism is obtained from the main air-brake reservoir. A single line of pipe connecting this reservoir to the trolley base is all that is necessary, and this may be run either inside or outside of the car. Air is never required except when the trolley wheel leaves the wire, and even then only a few cubic inches are needed.

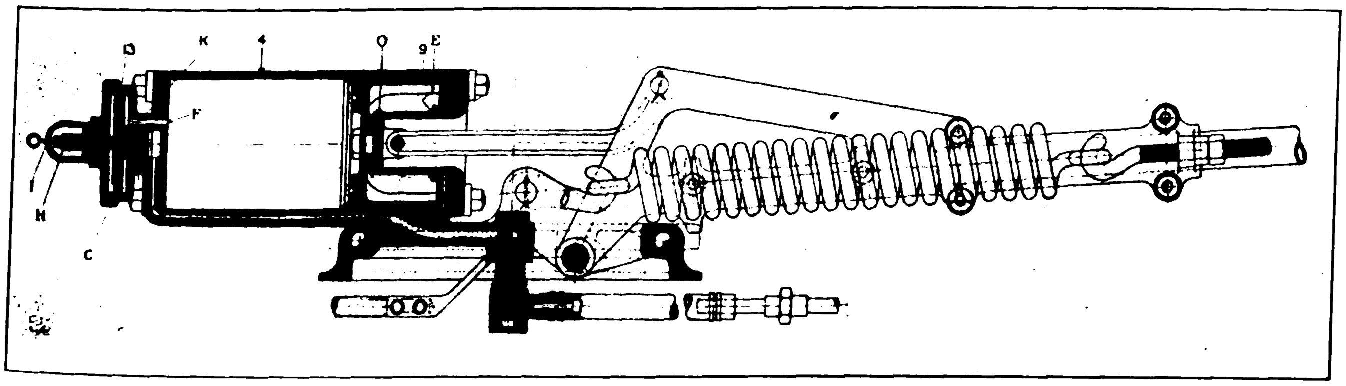
To prevent the piston from working against a vacuum or back pressure as the pole moves up and down to meet the varying heights of wires, thus interfering with the pole tension, "breathing" arrangements or small by-passes *E, F, C, H, I* are placed in each end of the cylinder. When the trolley wheel leaves the wire the pole flies upward. This creates compression in the cylinder which becomes effective over the entire area of the valve. This pressure unseats the valve at *K* and admits reservoir pressure into the cylinder behind the piston. As the air pressure is greater than the lifting power the piston is forced to the further end of the cylinder. Since the piston is connected to the pole, it necessarily pulls the pole down and holds it there firmly until the air is released. The retrieved position of the pole is the same as if it were under the hook.

This combination of valves operates so quickly that as the pole is recovered and thrown back away from the wire, considerable momentum is created which, if not absorbed, might damage the pole and car roof. To prevent this, the piston telescopes a concentric cylinder *O* thereby inclosing a pocket of air which absorbs the shock and cushions the pole to the retrieving point.

The base provides a uniform tension and is designed to meet the requirements of either city or interurban service. It can be used on any car carrying not less than 50 lb. nor more than 110 lb. of air pressure in the main reservoir. The base complete weighs 150 lb. and is 8¾ in. over all in height. Those parts subject to corrosion are either made of brass or lined with it. The pole fulcrum *D*, which is the principal wearing point, is provided with a renewable bushing which takes up all the wear. This base is reversible and has a large ball-bearing base plate which is so arranged that the parts subject to the greatest wear can be shifted from time to time so as to increase the life of the bearing. Still another feature is that the current is conducted through the center of the base instead of the bearing to avoid the pitting of the bearing and the blistering of the balls.

ELECTRICALLY WELDED RAILS ON "THE KEY ROUTE"

A decision to weld the rail joints on the San Francisco-Oakland Terminal Railways by the electrical process was made when A. W. McLimot became general manager of that company, and the work has now been completed. A record was made, it is thought, in assembling equipment on the job from an Eastern point. The welding outfit worked on the tracks of the Grand Rapids (Mich.) Railroad on April 22, and was then shipped to Oakland, Cal., on three gondolas in time to be at work again on May 6, thus losing less than two weeks between jobs 2500 miles apart. The process used is that of the Lorain Steel Company.



Cross-Section of Air-Operated Trolley Base with Retrieving Feature

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES, FRANCHISES

New York.—Taxation—Assessment—Item Wrongly Included—Viaduct.

A traction company seeking a reduction of an assessment of a special franchise tax may not complain of an item erroneously included in the assessment where it concedes that the entire assessment, omitting the improper item, ought to be larger than it is.

A viaduct constructed in a town by a traction company pursuant to a contract with the town stipulating that the cost to the town should not exceed $35,000, while the relator should expend at least $95,000 and should maintain and repair the viaduct and approaches during the term of the franchise, and declaring that the structure should be a public highway, is properly treated as tangible property in assessing the company's special franchises. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Com'rs., 103 N. E. Rep., 778.)

New York.—Taxation—Assessment—Paving.

The pavement which a street railroad corporation constructs and maintains between and near its tracks, as required by the railroad law (Consol. Laws 1910, Chap. 49), Sec. 178, cannot be treated as tangible property in assessing its special franchise defined by tax law (Consol. Laws 1909, Chap. 60), Sec. 2, Subd. 3, to include the value of the tangible property situated in, on, under or above any street in connection with the special franchise, since the cost of the pavement is imposed as an exercise of the taxing power, but the cost of paving may be considered in arriving at the value of the intangible privilege of the corporation in occupying streets. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Com'rs., 103 N. E. Rep., 776.)

New York.—Sufficient Sign—Denial of Transfer.

The placing of the sign "Astor Place" on a street car, without adding the word "only," was not a sufficient notice to passengers that it went only to Astor Place and not to the end of the line to relieve the company of its liability for a penalty for failure to give a passenger a transfer to a through car. (Goodman v. New York Rys. Co., 142 N. Y. Supp., 520.)

New York.—Construction—Consent of Abutting Owners.

Under Constitution, Art. 3, Sec. 18, providing that no law shall authorize the construction or operation of a street railroad except upon the consent of the owners of one-half of the abutting property and of the local authorities having control of the street or highway upon which it is proposed to construct the railroad and that, if the consent of the property owners cannot be obtained, permission may be granted by the Appellate Division of the Supreme Court upon the report of commissioners to determine the necessity of the line, and under the railroad law (Consol. Laws 1910, Chap. 49), Sec. 171, requiring the consent of the owners of one-half of the abutting property, a street railroad whose proposed route extends over numerous streets may be constructed along the streets upon which the property owners have consented, even though the property owners on all of the streets have not given their consent, the provision for application to the Supreme Court being to provide for the contingency of the non-consent of the property owners of part of the proposed line. (Manhattan Bridge Three-Cent Line v. Brooklyn Heights R. Co. et al., 144 N. Y. Supp., 524.)

New York.—Taxation—Mode of Assessment—Franchise Tax—Net Earnings Rule.

In assessing a special franchise for taxation under the net earnings rule, the following rulings were made: The question of what is a fair and reasonable return on the capital invested in tangible property is one of fact. The legal rate of interest may properly be adopted as a fair return on the capital invested in tangible property, in the absence of any evidence satisfactorily showing that this would not be a reasonable return thereon. Where the court allowed 6 per cent as a fair return on the tangible property it should have capitalized the balance of the net income on the basis of 7 per cent to determine the intangible element of the special franchise. The value of the tangible property upon which a return is to be allowed is its present or depreciated value and not the cost of reproducing it new. Development expenses consisting of expenses for legal advice, technical advice, consents of public service commissions, or other public bodies, completing the organization, preliminary surveys, property owners' consents, interest, and taxes during the construction, promoter's profits, and the financial man's charges or broker's commissions for raising the necessary capital or underwriting the securities, are not to be added to the value of the tangible property in determining the amount upon which a return is to be allowed, since the taxes and interest are presumptively given proper consideration in determining the value of the tangible property, and the other expenses do not add to the value of such property, but, if anything is obtained therefor, are represented by the intangible element of the special franchise. In determining the probable life of each item or unit of tangible property suffering depreciation and allowing a deduction for replacements thereof, obsolescence should receive consideration. (People ex rel. Third Avenue R. Co. v. State Board of Tax Com'rs et al. (City of New York, Intervener). People ex rel. Wallace et al. v. Same. People ex rel. Kingsbridge Ry. Co. v. Same, 142 N. Y. Sup., 986, 988, 989, 991.)

New Jersey.—Transportation of Municipal Officers—Reasonableness of Regulations.

The right of municipal officers to free transportation on the lines of street railways in municipalities in this State is limited to uniformed public officers or to police officers acting as detectives whose duties are required to be performed without uniform while engaged in the performance of their public duties.

A regulation by the railway company that all police officers whose duties are required to be performed without uniform should, as a means of identification, produce a book or tickets freely issued by the company to all persons of this description, in order to entitle them to free transportation, is not unreasonable. Otherwise the company could not determine whether the person claiming it was entitled to free transportation. (Public Service Ry. Co. v. Board of Public Utilities Com'rs et al., 88 Atlantic Rep., 818.)

Pennsylvania.—Franchise on Bridge—Rent.

Where a city purchased the entire stock of a bridge company and opened the bridge free to public use, it could not exact rental from a street railway company which was operating under a franchise permitting it to use the streets of the city, including the bridge, in the absence of any provision in the franchise authorizing it to collect such rental.

In the exercise of its police power, a city may regulate the use of a franchise by a street railway company by exacting a license fee sufficient to indemnify the city against additional cost of maintaining a bridge over which the railway tracks are laid. (Point Bridge Co. v. Pittsburgh Rys. Co., 87 Atlantic Rep., 614. Similar case, Monongahela Bridge Co. v. Pittsburgh Rys. Co., 87 Atlantic Rep., 619.)

LIABILITY FOR NEGLIGENCE

Alabama.—Actions for Assault.

In a passenger's action against a street car company for an assault by its conductor, it was proper to charge that the burden of proving its plea of justification was on the company. (Birmingham Ry., Light & Power Co. v. Coleman, 61 Southern Rep., 890.)

Arkansas.—Right-of-Way at City Crossing.

A street car has the right-of-way at a city street crossing, and in a personal injury action by one run down by a car, the giving of a charge that a pedestrian lawfully upon a crossing has equal rights with a street car, both having the same right to use the street to the exclusion of the other, is prejudicial error, for a traveler is required to use ordinary care in crossing the street even at a crossing. (Little Rock Ry. & Electric Co. v. Sledge, 158 S. W. Rep., 1096.)

Massachusetts.—Wheel Guards or Running Board of Open Cars.

While a street railway is bound to exercise a high degree of care in the selection of its passenger cars, it is not required to provide, regardless of expense, every new equipment that can be devised to prevent accidents or to discard those it has always found adequate because they may be a source of possible danger to a passenger using them for purposes for which they were not intended, and hence a common carrier was not guilty of negligence in using open cars which had wheelguards upon the running board, it not appearing that it was customary or feasible to dispense with such wheelguards, and it being shown that they had been in common use for a number of years without accidents. (Adduci v. Boston Elevated Ry. Co., 102 N. E. Rep., 316.)

Massachusetts.—Master and Servant—Injury to Lineman.

An expert lineman directed by his foreman to take down a wire stretched across a street between two poles mounted a ladder adjusted and fastened on one of the poles by a fellow servant, and the ladder fell by the springing of the pole following the severance of the wire. The ladder and ropes furnished by the employer were proper appliances and in good condition. The failure of the fellow employee to do his part of the work properly was due chiefly to the lineman's failure to signal him. The lineman knew that the danger coming from the slipping of the ladder from the jar and jerk of the pole was something to be guarded against. Held, that the foreman, who was a statutory superintendent, was not guilty of negligence for failing to warn the lineman as to such dangers. (Kelly v. Boston Elevated Ry., 101 N. E. Rep., 999.)

Massachusetts.—Company Liable for Damages Due to Improper Treatment by Physician.

Where a person injured by defendant's negligence used due care in applying for treatment to a reputable physician, defendant was liable for the injuries resulting, though they were aggravated by an accidental and improper, but honest, treatment on the part of the physician. (Gray v. Boston Elevated Ry. Co., 102 N. E. Rep., 72.)

Michigan.—Contributory Negligence When Driving on Track Question for Jury.

It cannot be said, as a matter of law, that a driver upon the highway who turns out to avoid an obstruction in his way and in so doing drives onto the track, when he sees an approaching car 595 ft. away, is guilty of contributory negligence, but his contributory negligence is for the jury. (Seebach v. Michigan United Rys. Co., 142 N. W. Rep., 1086.)

Michigan.—"Look and Listen" Rule.

A traveler in an automobile, before crossing the tracks of a street railroad company, where the view is unobstructed, must look and listen before proceeding into danger, and if necessary should stop. (Colborne v. Detroit United Ry., 143 N. W. Rep., 32.)

Missouri.—Duty to Look and Listen at City Street Crossing Private Right-of-Way.

Where an electric company operated a line on a private right-of-way crossing a city street on a curve and at a point where the view of the track was obstructed by a building until a person operating an automobile was very close to the tracks, the tracks themselves were a signal of danger and imposed on the traveler the duty to look and listen before attempting to cross. (Chappell v. United Rys. Co. of St. Louis, 156 S. W. Rep., 820.)

Missouri.—Motorman Looking Back in Car.

Where a street car motorman just before his car struck a pedestrian was looking backward into the car, the jury was justified in finding that his negligence was the proximate cause of the injury, notwithstanding the pedestrian's contributory negligence in standing on the track while another car passed. (Eskridge v. Metropolitan St. Ry. Co., 157 S. W. Rep., 106.)

Missouri.—Negligence May Be Imputed to Infant.

A child of tender years may comprehend certain dangers so as to be guilty of negligence as a matter of law, and will be held negligent if he does so or if the danger is obvious to one of his age. (Battles et al. v. United Rys. Co. of St. Louis, 161 S. W. Rep., 614.)

New Jersey.—Passenger Standing on Platform.

A passenger who voluntarily stands upon the rear platform of a car in rapid motion when a seat inside is available assumes the risk of so doing, and if he is injured he is guilty of negligence which will prevent recovery. (Hodler v. Public Service Ry. Co., 88 Atlantic Rep., 1072.)

New Jersey.—Injury at Crossing.

A pedestrian upon a crosswalk has a right to assume that the motorman of any street car which may be approaching will expect pedestrians to be crossing, will have the car under proper control accordingly, and will respect his right to cross provided he is under a reasonable belief that he can safely do so if both he and the motorman exercise reasonable care. (Devine v. Public Service Ry. Co., 88 Atlantic Rep., 1080.)

New York.—Riding on Platform of Elevated Train.

It was not negligence for a passenger on an elevated railroad train to ride on the platform where the car was crowded and no warning was given or objection made by the guard. (Starkman v. Interborough Rapid Transit Co., 144 N. Y. Sup., 780.)

New York.—Passengers Must Indicate They Wish to Stop.

Where a passenger on a street car had requested the conductor to stop at the next corner the conductor is not bound to foresee that the passenger who stood on the step of the car would attempt to leave it while it was in motion, having the right to assume that the passenger was merely holding himself ready to alight when the stop was made. (Miller v. Brooklyn Heights R. Co., 144 N. Y. Supp., 208.)

Pennsylvania.—Injury to Passenger from Tripping Over Conductor's Foot.

A street car company is not liable for injuries to a passenger from a fall due to tripping over the foot of the conductor while she is going to the platform to alight, where the conductor is guilty of no negligence and his foot merely comes in contact with hers when he turns in the performance of his duties. (Markle et ux. v. Pittsburgh Rys. Co., 86 Atlantic Rep., 204.)

Pennsylvania.—Collision with Bicycle.

Where a person injured from the collision of his bicycle with the side of a street car was riding slowly just before the accident and in no apparent danger until he suddenly guided his bicycle into the rear step of the car, and the proximate cause of the accident was his careless operation of the bicycle, the street railroad company was not liable, though the motorman was negligent in failing to stop on the proper side of the last crossing passed before the accident. (Black et al. v. Philadelphia Rapid Transit Co., 86 Atlantic Rep., 1066.)

South Carolina.—Ejection by Fellow Passenger—Duties of Conductor.

Where in a passenger's action for injuries caused by being ejected from an electric car by a fellow passenger the undisputed evidence was that the conductor saw plaintiff thrown off, if he did not assist in doing it, and saw him thereafter following the car for some distance and did not attempt to stop to let him on again, the court did not err in refusing to modify plaintiff's request of instruction that a common carrier may be held for damages unless it exercises the highest degree of care to protect its passengers from the violence of other passengers by adding thereto that the rule stated applies only when the carrier knows of the danger, or of facts from which the danger may be reasonably anticipated. (Dennis v. Columbia Electric St. Ry., L. & P. Co., 76 S. E. Rep., 711.)

South Carolina.—Punitive Damages Allowed for Injury Caused by Fast Running by Schoolhouse.

Where a car crew ran at a high rate of speed past a crossing before which they were required to stop and which was used by school children, being at the intersection of three streets, punitive damages are properly allowed in an action by a child injured. (Dodd v. Spartanburg Ry., Gas & Electric Co., 78 S. E. Rep., 526.)

Tennessee.—Injuries to Fireman Riding as a Free Passenger.

Where defendant street railway company carried members of the city fire department free without a pass as a matter of courtesy, and plaintiff, a fireman, was injured by the carrier's negligence while riding on a car, he was a passenger, and entitled to recover. Payment of fare is not necessarily essential to the establishment of the relation of carrier and passenger, provided the person carried is accepted for transportation like a paying passenger. (Memphis St. Ry. Co. v. Caviness, 157 S. W. Rep., 64.)

LONDON LETTER

(From Our Regular Correspondent)

The returns of traffic on the London County Council Tramways for the financial year to April 1, 1914, show a slight improvement. The receipts amounted to £2,208,664, an increase of more than £20,000 over the receipts of the previous year, notwithstanding the fact that the Easter traffic was not included in last year's returns. The Board of Trade has authorized the London County Council to run additional trail cars on its tram system. Two hundred cars have been fitted with couplers and 150 cars have been ordered to be used as trailers. The London County Council has arranged with M. Mariage, directeur-général of the Compagnie Générale des Omnibus de Paris, to report on the subject of consolidating and linking all the Council's tram lines. M. Mariage was appointed because he was responsible for both tramway and omnibus services in Paris and had to deal with the problem of "dead-ends." This matter of "dead-ends" is one of the most serious difficulties which the London County Council has to overcome in connection with its tramway system.

The London press has been interested recently in the exhibition of the "flying" train, the invention of M. Emile Bachelet. The laboratory in which the model is situated has been filled from morning until night with visitors. The British Admiralty and the War Office have sent special commissioners and experts to inspect the invention. The new system is described as "a railway that runs on a road-bed of invisible impulses." M. Bachelet's laboratory is at Saffron Hill. All the praise has come from the daily papers. The engineering press has ridiculed the device.

Further progress in the use of escalators has been made by the opening to the public of the new escalators at the Oxford Circus Station of the Bakerloo Railway, and the closing-down of the lifts which have been in use since the tube was opened. Though a number of escalators are now in use in London in connection with the tubes and underground railways, this is the first time that the escalator has actually displaced the now old-fashioned lift. The new escalators are claimed to be the largest in the world, and together have a capacity of 27,000 people an hour. One of the escalators, like that at Paddington Station, has been made reversible, so that at busy hours both escalators may be worked the same way.

The first section of the electrification scheme of the London & Northwestern Railway has been opened, namely, that between Earl's Court Station and Willesden. This section will eventually be an important link between the inner and the outer electric systems of London, providing, as it will, direct electric communication between Charing Cross, Victoria, Earl's Court and the new electric line to Watford, and also a useful link between North London (through Willesden), and Putney and the southwestern suburbs.

The Corporation of Manchester has a bill before a House of Lords committee by which it is seeking permission to erect a new generating station and other works at Davyhulme near Trafford Park. The Manchester Corporation has three stations at present, with a total capacity of about 70,000 kw. The recent rate of development, however, has been about 4000 kw per year, so that in another two years there will be no surplus capacity. The Corporation has decided to erect a new generating station which will eventually have a capacity of 120,000 kw. The new station will be close to the Manchester Ship Canal and the Bridgewater Canal, so that it will be possible to get coal by cheap transit.

The House of Lords committee, however, has refused to allow the clauses in the bill in which the Manchester Corporation desires to include in its area of electric supply the township of Davyhulme and a portion of Stretford, and also power to purchase the already existing Trafford Power Company.

The Bristol Corporation has the option on May 1, 1915, of purchasing the tramway system now operated by a company, of which Sir George White is the chairman. The City Council, therefore, has been advised to procure the necessary Parliamentary powers, and the Bristol Corporation (tramways) bill has accordingly been presented. A select committee of the House of Lords has now passed the bill, so that the Bristol Corporation can purchase the tramways in about a year if it so desires. The option that expires in May, 1915, affects the tramways within the city boundary only, but the bill gives the Corporation further powers to enter into and carry into effect agreements to purchase or lease by the Corporation of the lines outside the present municipal limits, and now also operated by the company. The company regards the bill as premature, and contends that there is no strong view among the ratepayers in favor of the Corporation operating the tramways, and that the bill is not in the public interest.

The Birmingham tramways committee has reported adversely on the proposal for the establishment of an all-night tramway service. It took a census on seven selected routes of the number of passengers walking or driving toward or from the city, and came to the conclusion that the number of nocturnal passengers to be catered to by an all-night service would not justify the city in subjecting residents upon the routes to the annoyance of night cars.

A select committee of the House of Commons has sanctioned the use of trail cars by the London United Tramways, which operates a large system of tramways in the western suburbs of London. The opposition contended that the cars unduly obstruct traffic. It was strongly argued, however, that the trail cars tended to reduce overcrowding and were important revenue earners, and it was stated that in many large cities of Europe the trail car was common and that no bad results had accrued from its use.

The Stirling Town Council, which has declined the offer of Balfour, Beatty & Company to purchase its electric undertaking and run electric cars in place of the present horse-drawn service, is inquiring into the question of constructing, by arrangement with the County Council, the Bridge of Allan Town Council and the Stirling & Bridge of Allan Tramways, a system of electric tramways between Bridge of Allan and Bannockburn.

The success of the system of railless trolley cars established some time ago at Dundee is being keenly discussed. The roadways over which the cars have run have been badly cut up, and a portion of the route is to be paved with concrete bottoming at a cost of $6,000, half of which is to be charged against the tramways department. The cost of dealing with the whole of the route would be £14,000, and the question debated is whether, in the light of this expenditure, the system can be regarded as successful.

A select committee of the House of Lords has rendered another verdict adverse to the bill which the Glasgow Corporation is promoting. The committee decided that the section of the bill proposing the construction of a tramway along University Avenue should not proceed. Several professors were called to show that the scientific instruments of the University and the research work would be interfered with.

Shildon, the center of the North-Eastern Railway's huge sidings, is to be more extensively centralized for the distribution of coal and coke from South Durham, and just outside the network of rails a system of electrification for 20 miles is to be introduced whereby all mineral trains working to Middlesbrough will be propelled by electricity. The overhead system is being installed, but underneath three low-lying bridges the current will be diverted to a third-rail. Electric locomotives are being constructed at Darlington capable of drawing 100 coke or coal wagons, each containing 20 tons of minerals.

A scheme for the electrification of the entire suburban system of the Midland Railway, including the line to Southend, is believed to underlie the bill now before a House of Lords committee. This bill confers power to build a double line of railway between Stepney, on the system of the London & Blackwall Railway, which is controlled by the Great Eastern Company and operates between Fenchurch Street Station and the upper docks, and Bromley-by-Bow, on the Midland Railway, and to widen and equip the Tilbury & Southend line between Barking and Upminster. It is understood that the Midland Railway is considering the electrification of the line between St. Pancras and Barking, which runs through South Tottenham, Walthamstow and Leyton, and connects with the Tilbury & Southend line at Barking. The company proposes to continue the electric line thence to Leigh, Westcliff, Southend, Shoeburyness and Thorpe Bay.

A. C. S.

News of Electric Railways

Report of Toledo Franchise Committee Adopted

The Council committee of the whole of Toledo, Ohio, rejected the franchise proposed by Henry L. Doherty, representing the Toledo Railways & Light Company, on the evening of May 28 and adopted the report of the special franchise committee filed on May 25. From all appearances the vote was strictly along administration lines. On both questions it stood eleven to six.

The communication of H. Whitford Jones, acting as trustee for unknown parties, offering to submit a bid for a franchise to operate a street railway system in the city on the basis of a straight 3-cent fare, with universal transfers and control of operation in the hands of the city, has been received. Mr. Jones assures the committee that he will give a bond of $50,000 to guarantee compliance with the terms of the proposal as made by him.

There is considerable speculation as to the identity of the men represented by Mr. Jones. Aside from A. K. Detwiler, no others have been named. Harry D. Vansickle, advertising man, and S. B. Chambers, former sheriff of Lucas County, have been in conference with Mr. Jones frequently since he has been in Toledo. Mr. Jones in an interview on May 29 said that his principals are prepared to carry through any plan they may undertake and that at the proper time the details will be made public.

The Council will meet on June 8 to consider the action of the committee of the whole in rejecting the proposal of the Toledo Railways & Light Company and the recommendation of the special committee to award a franchise only on the basis of 3-cent fare for a period of twenty-five years. The further plan of advertising for bids will also be considered.

City Solicitor Thurstin is responsible for the statement that if the Toledo Railways & Light Company desires to bid for a franchise, its proposition will have to be made under the same terms and requirements exacted from others. His suggestion is that the city provide for a new grant and that no renewal or extension be considered.

Henry L. Doherty sent a communication to Mayor Keller on June 1, in which he expressed the determination of the company to collect the full fare from all passengers on and after June 3. Advertisements were inserted in the daily papers explaining the steps taken. Mr. Doherty requested Mayor Keller to protect the company from damage from those who might refuse to pay their fares.

After receiving the communication Mayor Keller said that the Schreiber 3-cent ordinance would be enforced, even if the police department was compelled to swear in 500 extra men to man every car and protect those who proffered the low fare.

Mr. Doherty said that the officers of the company believed that the 3-cent ordinance was invalid. This assumption was based upon the opinion of Judge Killitts of the Federal Court. He said that the company has been losing $1,000 a day since March 27 when it began carrying free those who refused to pay the old rate of fare.

City Solicitor Thurstin intimated that a suit might be brought in common pleas court to force the company to accept the ordinance. On the other hand, the company now has a suit pending in the Federal District Court asking for the appointment of a receiver.

Mr. Doherty's letter to Mayor Keller was written partly with a view to securing an expression of the city's policy and partly as a notice as to what the company intended to do. It was as follows:

"We can only interpret the action of the committee meeting of Thursday evening as a move to cause a needless delay in the settlement of the street railway problem. We have heretofore endeavored to have the city officials take some action on the decision handed down by Judge Killitts, but without success. Except that our communications have been read and referred to some committee, they have been otherwise totally ignored. This company has gone to the extreme in its endeavor to meet a trying situation that has been forced upon us, and which cannot be justified from any standpoint. We have patiently accepted everything up to the present. We have been subjected to heavy losses of revenue. Our men have had to put up with the insults of the small but quarrelsome element of the community. The patrons of our cars have been, in many instances, subjected to unnecessary inconveniences. We have been subjected to unwarranted delays in our negotiations.

"We are forced to conclude in spite of protests to the contrary, that if the Council and city officials are acting intelligently they are endeavoring by means of delay to bankrupt our company, or force it to take some drastic action. If this is the real attitude of the city officials, the exercise of further patience on our part will be of no value to anybody. We have been constantly in receipt of numerous protests from all classes of good citizens against the policy of permitting free riding. In view of these protests and the actions of the city officials, we wish you to have notice that we will issue instructions to our conductors to permit no free riding after June 2.

"As the owner of important property interests in Toledo we are anxious to enforce our just rights with as little disorder as possible, and are therefore fixing the date when we will commence to enforce the collection of our fares at a time which will permit plans to be made to avoid anything in the nature of disorder which will reflect upon the good name of Toledo. If the city officials are anxious to prevent the possibility of disorder, we will hold ourselves in readiness to co-operate with them in every way. This letter is not filed for the purpose of making a record, but with the hope of securing a prompt answer. Please advise us what assistance or opposition will be furnished by the city authorities so that we can govern ourselves accordingly."

On June 2 the business men of the city took a hand in the matter. Realizing that the determination of the company to collect fares from all passengers and that the belligerent attitude of the administration toward the company would result in riots and possible bloodshed, forty prominent business men of the city called upon Mayor Keller and advised that he request Mr. Doherty to rescind his order to conductors to collect the fares. They also urged the Mayor to take the lead in matters hereafter and open negotiations in earnest and at once for a settlement of the questions at issue with the company.

Mr. Doherty yielded to the wishes of these men, and agreed to recall his order and allow matters to continue as in the past until another attempt has been made to reach a settlement. Mayor Keller stated, however, in an interview that the city's attitude will remain unchanged. It was due to this stand of the business men that Mr. Doherty was willing to rescind his order until further steps toward a settlement can be taken.

Mayor Keller insists that the Schreiber 3-cent ordinance is valid and that the city's attitude was based upon this. On the other hand, Mr. Doherty asserts that Judge Killitts' opinion is to the contrary and that, under the circumstances, the city has no authority to name a fare which shall be accepted by the company.

Before Mr. Doherty agreed to suspend his order he insisted that negotiations be opened on a new basis. The Mayor assured him that the desired steps toward a settlement would be taken at once. Only the old rates of fare will be accepted during this truce.

The Citizens' Franchise Association, with 150 members, has been organized with permanent quarters in the Second National Bank Building. Frank Mulholland, a well-known attorney, is in charge of the active work of organization. At a meeting on June 2, each member pledged himself to secure five new members and each has written to the Mayor, the City Council as a body and to the Councilman from his own ward, demanding earnest work toward a settlement. The Cleveland sliding scale plan has been discussed.

Henry L. Doherty said:

"I feel that our position has been greatly strengthened within the last few days and I am pleased at the business men deciding to take a hand in the settlement of the rate question. Our company has no new proposition to make, but we are willing to consider any suggestion that may be made by the Citizens' Franchise Association, the Council or any individual."

The Non-Partisan League has been formed to offset the influence of the Municipal Ownership League.

A meeting of the franchise committee of the Council was scheduled for the evening of June 4. It was thought possible that at the meeting Mr. Jones might give some further information as to the bid he expects to make.

A committee of twenty-five from the Citizens' Franchise Association will attend all committee and council meetings, Mayor Keller asserts that no statement as to the position of the city is necessary at this time. The collection of fares from all will be held in abeyance until the administration signifies its attitude toward an early settlement. A number of manufacturing and business concerns have notified employees to apply at the office for tickets if they do not wish to pay the fare themselves.

Conditions of New Philadelphia Agreement

The statement issued by A. Merritt Taylor, head of the department of city transit of Philadelphia, in regard to the agreement between the city and the Philadelphia Rapid Transit Company for the construction of a new high-speed rapid transit system in the city, referred to briefly in this paper last week, is as follows:

"A complete program has been outlined at the conferences, which I have held with the management of the Philadelphia Rapid Transit Company, and it is herewith submitted for consideration.

"This program provides for the construction, equipment and operation of

"1. The Frankford elevated line from a point of connection with the present Market Street subway-elevated at Front and Arch Streets to Frankford.

"2. The Darby elevated line from a point of connection with the Market Street elevated line at Thirtieth and Market Streets to Darby.

"3. The recommended Broad Street subway, with such branches as may be determined on, and the delivery loop.

"4. The Camden tube from a point of connection with the present Market Street subway at or near Front and Market Streets to the Pennsylvania Terminal in Camden.

"The program further provides for the operation of the existing and new transit facilities of the city as a unit, in such manner as will best serve the public, including the elimination of all exchange tickets; and, further, for the issuing of free transfers wherever surface lines intersect high-speed lines (city's and company's Camden tube excepted) at station points, and at all points of intersection between high-speed lines (Camden tube excepted). The intent being to make all high-speed lines (city's and company's) available as a link in a complete journey in a forward direction between any two points within the city for one 5-cent fare.

"Many vital provisions, which are commented on elsewhere, will be found in the program, which provides as follows:

COMPANY'S PROPOSED INVESTMENT

	Estimated cost
Frankford and Darby elevated (equipment)	$4,603,000
Broad Street subway (equipment)	7,393,000
Total	$11,996,000

(The tube under the Delaware River to Camden to be built by interests holding that franchise. This line to be leased to the Philadelphia Rapid Transit Company and operated as an extension to the Market Street elevated service, but with an additional fare of 3 cents. The franchise to be granted by the city enabling the construction of the tube to be for fifty years, and ownership of the tube, subject to bonds issued for the cost thereof, to be vested in the Philadelphia Rapid Transit Company.)

CITY'S PROPOSED INVESTMENT

	Estimated cost
Frankford elevated (structure)	$6,510,000
Darby elevated (structure)	4,390,000
Broad Street subway—delivery loop and extensions (structures)	34,682,000
Total	$45,582,000

Note.—Frankford-Darby line to be operated via Market Street subway between Front and Arch Streets and Thirtieth and Market Streets, pending the time when the city constructs the Chestnut Street subway or other city-built connections or delivery facilities for these two lines.

"Company to agree to provide all necessary equipment for and to operate the above mentioned city-built lines, or any of them, if and when built, and at the option of the city, any or all city-built lines built during the term of this contract, on the following basis:

"From net earnings, deduct items 1, 2 and 3, as follows:

"1. (a) Interest on company's investment at 6 per cent, cumulative. (b) In addition to the 6 per cent return on the company's investment for such equipment, beginning ten years from the date of this contract, the city shall allow, and the company shall pay, to a depository to be designated by the city, for its account, 1 per cent per annum upon the cost of such equipment, for the purpose of amortizing the cost of such equipment during the term of this contract.

"The said depository may invest such amortization fund, as far as practicable, in the bonds which the company has issued to pay for such cost of equipment, at a price not to exceed 110 per cent of their face value, with accrued interest, and the interest on such bonds bought with this sinking fund is to accrue for the benefit of and to be paid to the sinking fund for the purchase of additional bonds.

"The said payment of 1 per cent per annum for such sinking fund on the equipment purchased during each year of this contract shall cease upon completion of said amortization.

"Upon the expiration of the contract period of fifty years, the company shall surrender the then existing equipment of the city-built lines to the city on being paid the cost thereof. Accruals in the aforesaid sinking fund may be used by the city for the purpose of making such payments. When the equipment is so surrendered by the company to the city all reserve, depreciation and amortization funds which may have been established and accumulated in connection with the maintenance and operation of the city-built lines shall be paid to the city.

(2) Preferential payments. The base figure which shall be used in ascertaining the amount of the preferential payments as hereinafter specified shall be that amount which represents 110 per cent of the average annual net income (other than that derived from exchange tickets) of the company from its present system with surface extensions for the two fiscal years prior to the operation of the first city-owned high-speed line, unless during the first of the two fiscal years aforesaid there be some unforeseen, unusual and abnormal occurrence which causes an abnormal decrease in the net income of the company, then the base figure may be taken at 115 per cent of such average annual net income for the preceding and succeeding fiscal year, or if there should be such an occurrence during the last of the two first mentioned fiscal years which causes an abnormal decrease in the net income then the base figure may be taken at 120 per cent of such average annual net income for the two preceding fiscal years.

"If other city-owned high-speed line or lines be placed in operation thereafter while the company is entitled to the preferential payment calculated as prescribed herein, then the base figure of annual net income of the present system with surface extensions prior to the beginning of operation of such subsequent city-owned line or lines should be calculated as prescribed for the first city-owned line, but there shall be added the net income specified diverted from the present system with surface extension by the operation of the said first operated city-owned line or lines.

"If other city-owned lines be placed in operation after a preferential payment ceases to be necessary, then the base figure of annual net income of the present system with surface extensions prior to beginning of operation of such subsequent city-owned lines shall be calculated as prescribed for the first city-owned line.

"If the net income of the then existing system of the Philadelphia Rapid Transit Company (except Camden tube) in any year after the opening of a municipally owned line falls below the base figure the preferential payment shall be the amount required to make up the difference between the net income for such year and the base figure; provided, however, the amount of any such preferential payment shall be limited to and shall never exceed such decrease in the net income of the then existing system of the company (except Camden tube) which results solely from the diversion of such normal net income as may have been gained prior to the opening of municipally owned line or lines.

"In determining the amount of any preferential payment it will be presumed that any decrease in the company's net income below the base figure is due to such diversion of traffic, except to such extent as it may be shown to be due to other causes.

"After the preferential for any year has been so determined it will be reduced by these credits, namely: (a) The net income resulting from the operation of the Camden tube. (b) The difference between the rate paid and 6 per cent on operator's equipment investment. (c) Payment made for the use of the Market Street line between Thirtieth and Front and Arch Streets.

"3. Interest and sinking fund on city's investment, cumulative.

"4. Divide balance of surplus earnings of all city-built lines between the city and company in proportion to their relative investment therein. Market Street subway investment excluded.

"5. Free transfers to be given wherever surface lines intersect high-speed lines (city's and company's) at station points, enabling a passenger to transfer in a forward direction (except to and from the Camden tube), but the aforesaid free transfers shall not be made in the business district until Jan. 1, 1920.

"Free transfers to be given all passengers transferring in a forward direction between all company-owned and municipally owned rapid transit lines at points of intersection where stations exist (except to and from the Camden tube).

"The intent being to make all high-speed lines (city's and company's) available as a link in a complete journey in a forward direction between any two points within the city for 5 cents, but not to compel the company to give a transfer upon a transfer on its own surface system without a high-speed line intervening.

"In all cases where the fare collected covers a ride upon any line or lines of the company and upon any line or lines of the city, the fare collected shall be equally divided between the company-owned and the municipally owned lines—that is to say, 2½ cents to the company-owned lines and 2½ cents to the municipally owned lines.

"Should the result of the aforesaid division of fares appear to be inequitable and unjust to either party, such party may require the question to be submitted to a board of arbitration for determination, one member of which board shall be appointed by the city, one by the company and the third by the Public Service Commission. The findings of the board of arbitration to be subject to final review only by the Public Service Commission of Pennsylvania.

"Such regulations to be established and enforced as may be found necessary to prevent the misuse of transfers.

"6. When the city builds the Chestnut Street subway or other delivery facilities or connections to the Frankford and Darby elevated lines, company to equip and operate the same on the above basis. City to have the right to require company to equip and operate on the above basis additional rapid transit lines or extensions which the city may from time to time build. City to have the right to require the company to extend its surface system from time to time after the Public Service Commission, upon hearing, determines that such extensions are likely to be reasonably remunerative, either separately or in conjunction with the system, to the Philadelphia Rapid Transit Company, provided not more than approximately 4 miles of single track be requested by the city for the years ending June, 1916, and June, 1917.

"The 1907 contracts to be extended seven years. In future division of earnings provided under contracts, city to receive during last seven years of extended contract and thereafter (if property is not purchased at expiration of extended term) all surplus earnings over 6 per cent on par value of Philadelphia Rapid Transit stock.

"Note.—Company to be permitted to capitalize its interest accruals to end of first year of operation. Such accruals as are capitalized shall not be taken out of earnings and shall be considered a proportionate part of the cost.

"During the operation of the Frankford-Darby line through the Market Street subway there shall be charged against the earnings derived from such line under Item I such portion of the fixed charges accruing against that portion of the structure which is used by the Frankford-Darby line as shall bear the same proportion to the whole fixed charge on that portion as the proportion of car miles operated by the Frankford-Darby trains through that portion of the subway bears to the car mileage of all trains operated through that portion of the subway. The fixed charge against the operation of that portion of the subway which is used for surface cars not to be included in the above calculation. The term fixed charge in this paragraph means 6 per cent on cost.

"If the city elects to build the Frankford line first, the operation and fixed charges against the Frankford line shall be calculated on the costs westwardly on Market Street to Thirteenth Street only, subject to the above-mentioned credit. Such Frankford and Darby trains as may be routed through to Sixty-ninth Street or Camden shall only be charged with one-half of the expense and fixed charges which would be due company for the operation of through trains in the section between Front and Arch Streets and Thirtieth and Market Streets.

"The Philadelphia Rapid Transit Company will rely upon the Union Traction Company to aid in securing only such funds as will be required for the normal extension of the existing system, the requirements for which will be greatly lessened by the establishment of the new high-speed lines.

"Wages paid on and charged against the operation of all new high-speed lines shall be reasonably compensatory for services rendered, but shall not exceed the same rate per hour paid for similar services on company's high-speed lines at that time.

"Union Traction and Market Street Elevated Passenger Railway to become parties to and be bound by the terms of the agreement with the city.

"All dividends accrued on Philadelphia Rapid Transit Company stock up to Dec. 31, 1914, to be waived and canceled.

"The Department of City Transit to have free access at all times to the books, accounts and records of the company and the right to audit the same.

"Company to eliminate all exchange tickets, excepting those in the delivery district, which is defined as bounded by Arch and Walnut Streets and the Delaware and Schuylkill Rivers, both of the aforesaid streets inclusive, on Jan. 1, 1916, and the remainder of the exchange tickets on Jan. 1, 1920, when it is hoped that the delivery loop will be in full operation, thus furnishing such added carrying capacity as will avoid any undue congestion in the delivery district.

"On and after Jan. 1, 1916, one free transfer will be allowed in a forward direction to each passenger using surface lines exclusively at any point where surface lines intersect outside of the delivery district as above defined. On and after Jan. 1, 1920, one free transfer will be allowed in a forward direction to each passenger using surface lines exclusively at any point in Philadelphia where such lines intersect. In consideration of which the city will surrender to company accrual in sinking fund, and permit the company to postpone future payments to the sinking fund for ten years from July 1, 1914.

"The amount so surrendered and postponed to be made up by such larger annual payments by the company after the aforesaid ten years as will be required to produce the same amount in sinking fund at the expiration of the 1907 contract extended for seven years as would, with interest included, have been produced by the original sinking fund payments at the end of the fifty-year term. Further, the city will relieve the company of the payment of approximately $116,000 a year, tax on dividends, for a period of six years, beginning Jan. 1, 1915.

"The company to have forthwith authority to make such changes in its routes and lines as will enable it to take advantage of the economies which can be gained from the substitution of free transfers for exchange tickets.

"In case of any trouble arising under the agreement, the question shall be arbitrated by one representative each of city, company and Public Service Commission, whose findings shall be subject to review and final decision by the Public Service Commission."

River Tube Contracts Awarded

During the week ended May 30 the Public Service Commission for the First District of New York awarded rapid transit contracts aggregating more than $14,200,000. The largest single contract let for such work since the $35,000,000 contract awarded to John B. McDonald for the construction of the present subway operated by the Interborough Rapid Transit Company was among the number. This was the contract for the construction of the two tunnels under the East River from downtown Manhattan to Brooklyn to Booth & Flinn, Ltd., and the O'Rourke Engineering Construction Company, on their joint bid of $12,444,725. One of the tunnels will run from Whitehall Street, Manhattan, to Montague Street, Brooklyn, and will be operated by the New York Municipal Railway Corporation; the other will run from Old Slip, Manhattan, to Clark Street, Brooklyn, and will be operated by the Interborough Rapid Transit Company. Of the total bid, which was the lowest submitted, $5,974,809.50 is for the New York Municipal tunnel and $6,469,916.25 for the Interborough tunnel. The contract requires the completion of the work within three and a half years from the delivery of the contract, and provides a penalty of $1,000 a day for each day beyond that limit. The contractors must give a bond of $500,000 for each tunnel. The other contract awarded during the week was that for the construction of Section No. 2 of Route No. 20, the Canal Street crosstown subway in Manhattan. This went to the Underpinning & Foundation Company, the lowest bidder, for $1,822,994. This subway will be operated by the New York Municipal Railway Corporation. It will connect the Fourth Avenue subway in Brooklyn by the tracks coming over the Manhattan Bridge with the new subway in Broadway, Manhattan.

The Public Service Commission for the First District has adopted an alternative route, to be known as the Spruce Street Route, which may take the place of a portion of the Park Place, William and Clark Street route in Manhattan. The route will run north of instead of under the United States post-office property. The route, as it formerly stood, left the Seventh Avenue subway at West Broadway and ran east through Park Place, under the New York Municipal subway in Broadway and thence under the northern end of the post-office property to Beekman Street, through Beekman to William Street, and down William Street to Old Slip and the proposed tunnel under the East River. At the time the old route was laid out Congress, at the request of the commission, passed a special act permitting the construction of a subway underneath the post-office property. Last winter the commission forwarded to the treasury department a form of deed for the proposed easement. Since that time the commission has been negotiating with that department for the necessary easement, but so far without success.

Mayor of Pittsburgh on Transit Problems

Mayor Joseph G. Armstrong of Pittsburgh, Pa., issued a statement to the Council on May 26, in which he said:

"While many experts have been employed and very serious thought has been given to the street railway subject by previous administrations in an endeavor to solve this problem, it does not appear that much has been accomplished to date. Therefore, I am prepared at this time, with the law department, to take up this most serious matter with the railway companies. Your honorable body having passed a resolution on April 21, requesting the law department to take such action as it deemed necessary pertaining to the establishment of a transfer system, better transportation facilities, etc., indicates to me that you, too, are very much interested in trying to bring about improved conditions of the railway service. I at this time invite any suggestions and your most earnest co-operation, either by body or committee."

In reference to the proposed rerouting of South Side cars, a letter from J. D. Callery, president of the Pittsburgh Railways, was read before a sub-committee of the public service and surveys committee in which he stated briefly his objections to the proposed ordinances, saying that they specify the exact routing of the cars all the way into the city and the frequency of the service not only over the three or four switches that would have to be built, but all the way to the city, and impose expenses upon the company for any repairs to the streets in which the tracks had to be altered, by a charge for the actual work, plus 15 per cent for supervision and 25 per cent additional. Incidentally Mr. Callery stated that the curves would cost the company about $8,000 each and would not save the company a cent.

President Hutchins Replies to Detroit Commission

Upon the receipt of a letter from J. C. Hutchins, president of the Detroit (Mich.) United Railway, in which he did not designate the selling price of the properties of the company within the city of Detroit, but indicated the desire to continue negotiations with the city, the Detroit Municipal Street Railway Commission passed resolutions to the effect that engineers and accounting experts be employed as soon as possible to appraise the property of the company in Detroit. The commission had previously written to the company asking for the designation of a sale price by June 1, but Mr. Hutchins, in his letter, pointed out that the company had expected an appraisal along technical and scientific lines and he considered it inadvisable to name any fixed price without following this method.

According to information given to the newspapers, the commission will not abandon its plan to construct a subway system. The acquisition of the surface lines, it is reported, will be placed first in importance. Separate staffs of subway engineers and street railway experts will be engaged to work simultaneously on the plan for a complete surface and subway system.

The public utilities committee of the Common Council has voted to recommend to the Council the adoption of the subway suggestion of the commission and it is considered probable that the Council will agree with the recommendation.

The letter of Mr. Hutchins to the commission is substantially as follows:

"At the first meeting in August of the street railway commission, following the low fare agreement of Aug. 7, 1913, under which we are now operating, it was agreed that the company would as soon as possible supply the commission with inventories and our engineers' estimates of reproduction values of its properties in Detroit. Their inventories, showing a reproduction value of $31,028,982, were filed with the commission on Dec. 15, 1913. The inventories, as was stated, did not for obvious reasons include materials and supplies on hand, with a value approximating $1,000,000, nor did they include work under way, such as a new section of the Highland Park shops, the construction of a new 10,000-hp generating unit in the Detroit power house, the Michigan Central depot extension, and cars under construction; nor did they include franchise values, which were stated by Professor Adams in 1909 to be worth $4,500,000. Since the filing of these inventories the company has continued its developments, and has expended some hundreds of thousands of dollars. It is now progressing with the Junction Avenue extension, and with other works, to cost many hundreds of thousands more.

"We had supposed the engineers for the city would proceed to check these inventories and investments, applying proper standards of depreciation, to determine the value at some given date of the company's properties. We have been advised that the commission, without resorting to the delays of such technical and scientific methods, would like us to name a price at which the company would sell its properties in Detroit. While anxious to meet the wishes of the commission in every way possible, we greatly fear that any figure we might find it possible to name would at once be criticised as being excessive, to the embarrassment both of ourselves and the commission.

"Some sixteen years ago Governor Pingree believed the railway properties in Detroit, as they then existed, were worth $17,500,000, and was willing to pay that amount for them. These properties are in their physical aspects tremendously more valuable now than then, as the result of continuous vast additions. In December, 1900, the Detroit United Railway paid its capital stock to the amount of $12,500,000, subject to $11,000,000 of bonds then outstanding, as the purchase price of all of the railways then existing in Detroit and its immediate vicinity. Aside from the value of the property this stock covered at that time, there has been invested in the company's properties in undistributed earnings by the stockholders since this stock was issued to insure its value, an amount of money approximating its full face of $12,500,000. Had the custom been pursued which is followed by both public and private companies, this stock would have been inflated to cover these expenditures. As a matter of fact, no additional stock has been issued, the stockholders have received in dividends upon their holdings a lower average than they could have got from the savings bank.

"Subsequent to the issuance of this stock, that is, in 1901, the company by the payment of some cash and the assumption of bonds amounting to $4,880,000, acquired the lines outside now known as the Pontiac, Orchard Lake, Flint and Wyandotte divisions. On Jan. 1, 1902, the company executed a mortgage of its properties inside and outside the city, under which bonds to the amount of $25,000,000 were issuable—$15,880,000 so authorized being held by the trustee to pay and retire at maturity the $15,880,000 of underlying bonds above mentioned, that is to say, $11,000,000 in the city and $4,880,000 outside.

"Since then $7,000,000 of these underlying bonds in the city have fallen due and have been refunded, a like amount of the $25,000,000 being issued in their stead. The remainder of this issue of $25,000,000 to wit: $9,120,000, under the terms of the mortgage, were available at the rate of 75 cents in bonds for $1 expended for betterments and improvements, excepting as to $3,000,000 which were set aside under the mortgage and used to pay for developments previously made. Under the terms of the mortgage the bonds were all issued prior to 1910. Since then the company has issued and sold $2,000,000 of its two-year notes partly to pay for additional betterments and improvements in Detroit. The company's properties in Detroit are therefore worth upon an investment basis this $20,000,000 of bonds plus at least $12,500,000 of its capital stock, and plus $2,000,000 in notes; and on an investment basis are additionally worth the amounts otherwise expended by the stockholders in excess of its capital stock, as indicated above.

"I am sure this recital will assist your commission to an understanding of the equities of our situation. Mark you, we say these properties are of such value upon an investment basis. But perchance it may be said these values have been dropping out at the bottom in depreciation and obsolescence faster than the new capital has been poured in. This is the rub! None of the income of the company has been applied to the payment of excessive dividends, nor has any of it been otherwise diverted or misused. Therefore these investments stand intact or else the company has been operating at too low a rate of fare.

"I have no doubt that the creation of a property in Detroit such as the company possesses would cost as much or more than the aggregate of all expenditures to which reference is made. Just what amount these properties would be shown to be worth by the application of existing standards of depreciation and obsolescence, I am unable to say in advance of an analysis by expert engineers representing both ourselves and the city. This could not possibly be determined by our engineers within the time you have mentioned, and, of course, their conclusions should be checked by engineers and experts representing the city, unless indeed you believe as I do, that our property ought to be worth as much as we have invested in it.

"We are willing to sell to the city all of our property in Detroit for just what it is worth now after eliminating everything that comes under the head of obsolescence, wear and tear, and depreciation. We do not wish to discontinue negotiations for the sale of these properties to the city. On the contrary, we will be very glad to negotiate with your commission, as you may point the way, for their sale and early delivery, and we would do so in full faith that the city will deal fairly and honestly with those whose money is invested as shown."

The commission has since resolved immediately to devise plans to accomplish the end suggested by Mr. Hutchins by employing such engineers and accounting experts to appraise the property in Detroit in the shortest time possible.

Kansas City Franchise Committee Completes Its Work

The joint committee handling the franchise negotiations of the Metropolitan Street Railway, Kansas City, Mo., concluded its labors on May 30, and decided to submit the ordinance to a vote of the people on July 7. The conferees met on June 1 and signed the grant, which will go to the Council on June 8. In the meantime copies will be distributed to the voters. As the grant now reads, the location of the proposed interurban terminal is left to the board of control. The City Council must approve the choice. The representatives of the interurban railways asked that the selection of the site be left to them. This request was denied. The fare question was settled during the week ending May 30. Adults will pay 5 cents. Children under eight years of age, when accompanied by a person paying fare, will be carried free. Children between the ages of eight and twelve will be carried for half fare. Children under eight will ride free even if accompanied by another child between eight and twelve, both riding on the single half fare. Tickets will be used on the half-fare payment, each being worth 2½ cents. It was announced that the half fare for children clause meant an annual decrease in revenue to the company of about $50,000. A clause was adopted limiting the board of control in making contracts with electric light companies to five years.

The final sessions of the joint committee were devoted principally to arranging for car service to the new Union depot, and to the dispute between the Metropolitan Street Railway and the Terminal Railway. Under a clause adopted, the Metropolitan Street Railway will build tracks over viaducts in dispute and deed them to the city forever. The company will then keep the tracks in repair. The routing to the new depot will be determined by the board of control. The Terminal Railway has agreed to allow the Metropolitan Street Railway to build tracks across the plaza and to use them for a period of ten years free of charge. The city will remunerate the company for building the viaduct tracks. Several extensions were provided for in additional clauses to the franchise, and the capitalization was raised $250,000 for extensions, making the total capitalization as now allowed $30,250,000. The extensions to be built under the franchise were noted in the ELECTRIC RAILWAY JOURNAL of May 30, 1914, page 1224.

Dividends on Public Utilities

In its issue of May 30 the *United States Investor* says that since the year 1914 opened public utilities have kept up their good record of dividend payments. In the five months that have elapsed thirteen well-known public utility properties have increased their dividends, in each case 1 per cent being added, and eight companies have paid an initial dividend either on their common or preferred stock. One company, United Light & Railway, paid an extra dividend of 1 per cent on its common stock, while another, the Federal Utilities Company, on Feb. 28, 1914, paid the dividend of 1½ per cent which was passed on Nov. 30, 1913, as well as the dividend which was due on that date. The Municipal Service Company and the Bangor Railway & Electric Company, which have been paying dividends on their preferred stock since their organization, both declared initial common stock dividends, the former paying dividend of 1 per cent and the latter one-half of 1 per cent. The American Public Utilities Company increased the annual rate of dividends on its common from 2 per cent to 3 per cent and, as stated, the United Light & Railway Company declared an extra 1 per cent on its common stock. The Central States Electric Corporation, operating in Cleveland, Ohio, declared an initial dividend of 1 per cent and the Manufacturers Light & Heat Company, serving the Pittsburgh district, raised its dividend rate from 7 to 8 per cent. The Cities Service Company increased the dividend rate on its common from 5 to 6 per cent, while the Southern California Edison Company, located in California, increased its dividend from 5 to 6 per cent. The El Paso Electric Company and the Galveston-Houston Electric Company increased the dividend rate on their common stocks, the former from 8 to 9 per cent and the latter from 6 to 7 per cent. The Pennsylvania Water &

Power Company paid an initial dividend of 1 per cent, and the Brooklyn Borough Gas Company an initial semi-annual dividend of 3 per cent. According to the financial statements of these different companies these dividends have been warranted and there is nothing to indicate that they have been paid with the main object in view to aid and facilitate any new financing.

Kansas City Company Accepts Valuation.—The Metropolitan Street Railway, Kansas City, Mo., is willing to accept the valuation of $8,227,551 fixed by the Missouri State Board of Equalization. This is the amount assessed in 1913. Judge John H. Lucas appeared before the board on May 29 and stated the company was satisfied with the valuation.

Purchase of Toronto Suburban Line.—Corporation Counsel Geary, of Toronto, Ont., stated on May 28 that the city had not yet paid over to the Toronto & York Radial Railway the $890,000 voted by the people for the purchase of the portion of the Mimico line between Sunnyside and the Humber because the description of the property had not yet been completed. The company is to restore the carhouse which was damaged by fire before the railway is taken over by the city.

London & Port Stanley Railway Electrification.—Royal assent having been granted at Ottawa to the London & Port Stanley Railway bill, whereby the city of London, Ont., is authorized to expend $700,000 in electrifying its steam road to Port Stanley, Adam Beck, of the Hydro-Electric Commission and chairman of the commission in charge of the electrification plan for the railway, announces rehabilitation work will begin almost immediately, and it is expected that the electrified line will be in operation early next year.

Attitude Toward Sale of United Railroads to City.—Jesse W. Lilienthal, president of the United Railroads of San Francisco, has issued the following statement in regard to settling the present controversy over financial matters mentioned elsewhere in this issue: "If the Mayor and supervisors of San Francisco make an equitable offer for purchase they will find me, as president of the company, in a mood to entertain. Tedious condemnation proceedings to gain control of the lines would not be necessary." Mayor Rolph has stated that he is willing to appoint a committee to confer with Mr. Lilienthal regarding the latter's offer.

Order Requiring Lifting Jacks in Pennsylvania.—An order issued by the Public Service Commission of Pennsylvania on May 23 requires that half the street cars in operation by companies in Pennsylvania must be equipped with lifting jacks by Dec. 1, 1914, and that all must be so equipped by June 1, 1915. Hearings on the subject were held recently. A bill requiring all electric railway cars to be equipped with jacks was passed by both houses in the last Legislature, but Governor Tener vetoed the measure, saying the Public Service Commission had power to prescribe such regulations without special warrant at law.

Injunction in Ohio Fare Case.—Judge Sater has issued a temporary injunction to prevent the city of Cincinnati from putting in force its ordinance providing for a 5-cent fare on the Millcreek Valley line of the Ohio Traction Company between Cincinnati and the villages of Carthage and Hartwell. The court said that the representations and conditions are such as to make it advisable that the status quo should be preserved until the case can be heard upon its merits. As to jurisdiction, the court holds that it has acquired jurisdiction of both the parties and the subject matter. Attorneys for the city contend that the Federal Court was without jurisdiction in the matter.

Commmission Appointment Protested.—Joseph Johnson, formerly fire commissioner of New York, has been appointed chief of the transportation bureau of the Public Service Commission of the First District of New York at a salary of $7,500. The commission was divided three to two over the appointment, Messrs. Maltbie and Eustis protesting the nomination. Mr. Maltbie pointed out that the position had always been held by expert engineers and that in his opinion the place called for the exercise of special knowledge. Mr. Johnson was manager of the campaign conducted by Chairman McCall of the commission last fall for election as Mayor of New York City on the Democratic ticket.

Parr Shoals Development Completed.—The Parr Shoals Power Company's new 30,000 hp hydroelectric development near Columbia, S. C., recently completed by the J. G. White Engineering Corporation, New York, was officially opened on Decoration day. The Parr Shoals Power Company is a subsidiary of the Columbia Railway, Gas & Electric Company, Columbia, S. C., and the new plant supplements the steam and hydroelectric stations of the parent company, which are rated at 14,500 hp. The new station comprises a concrete dam 2200 ft. long across the Broad River about 30 miles above Columbia. The present installation comprises five generating units, operating at 35 ft. head, which will generate 18,000 hp. Current at 60,000 volts will be transmitted to Columbia over a double circuit, steel tower transmission line.

Mr. Mellen Prescribes for Railroad Ills.—Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, in a page interview in the Sunday *American* says that as a cure for railroad ills stockholders should cast their own votes or not vote at all. Voting by proxy should cease. He would oblige the railroads to market their own securities. Meetings of the directors ought to be as open as the deliberations of a board of aldermen or a town meeting. Railroad officials should be compelled to advertise for bids for all purchases. Railroad accounting should be uniform, so that everyone could see at a glance how the property was being managed. Minority stockholders should have the right of dissent from decision of directors, with the privilege of court appeal. According to Mr. Mellen, "public ownership is inevitable and is coming fast."

Decision in Duluth Franchise Case.—The District Court of St. Louis County, Minn., has handed down a decision upholding the franchises of the Duluth Street Railway, a subsidiary of the Duluth-Superior Traction Company, which had been attacked by the city on the ground that the original terms of the franchise granted in 1881 had not been complied with by the laying of 1 mile of track within one year after the passage of franchise by the legislature. The court held that the company is operating under a valid and subsisting legislative franchise granted Nov. 17, 1881; that the city had admitted its validity by assessing taxes against it since 1882, and that in court action in 1912 the validity of this franchise was admitted. The court also held that the company, relying on the validity of the franchise, had issued and sold securities which now amount to several millions of dollars and are widely scattered and held by many individuals who purchased them on assurances as to the validity of the franchise.

Transportation and City Planning.—The effect of transportation on city planning was discussed on the morning of May 27 at the City Planning Conference in Toronto. Among the speakers were John A. McCollum, assistant engineer, Bureau of Franchises, Board of Estimate and Apportionment, New York; George McAneny, president of the Board of Aldermen, New York; J. V. Davies, consulting engineer, Brooklyn Rapid Transit Company, and Edward M. Bassett, formerly a member of the Public Service Commission for the First District of New York. Mr. McCollum's subject was "The Motor-Bus." He said that the great field of this vehicle was as a supplement to the street railway. Unnecessary duplication of the street railway and bus facilities would be inane and unprofitable. Each mode of transportation had its own sphere. Mr. McAneny said that street railway officers had too often been permitted to be the city planners. He outlined the new rapid transit agreement in New York. He also referred to the plan to regulate the height of buildings in New York. Mr. Davies shared with Mr. McCollum the opinion that the motor-bus was really an adjunct to the street railway. He compared the relative costs of construction of electric railways in county districts, city overhead electric railways, underground conduit railways, elevated railways, open cut railroads, subways in city streets, and tunnels under rivers. Mr. Bassett said that by all means the single downtown central terminal for rapid transit lines should be avoided. Preparations should be made early in the history of the city for dealing with the rapid transit problem. High-speed rapid transit lines became imperative when population in a city reached 1,000,000.

Financial and Corporate

Stock and Money Markets

June 3, 1914.

In the trading on the New York Stock Exchange to-day the tendency was toward recovery and the average of closing quotations showed a good net gain. The volume of dealings was still well above the recent low point. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ per cent; four months, 3 per cent; six months, 3 @ 3¼ per cent.

In the Philadelphia market to-day sales of Rapid Transit were recorded at 15¾. Union Traction declined to 44⅞.

In Chicago the only railway issues dealt in to-day were Chicago Railway 2's and Kansas City Railway & Light preferred. Twenty-five shares of the latter were sold at 39. The bond transactions to-day were with one exception all in the railway issues and totaled $59,000, par value.

In the Boston market to-day trading was more active and stronger. Interest centered in the New Haven hearing at Washington.

In the Baltimore market the trading in stocks to-day totaled 717 shares. The bond market was unusually active.

Quotations of traction and manufacturing securities as compared with last week follows:

	May 26	June 3
American Brake Shoe & Foundry (com.)	87	87½
American Brake Shoe & Foundry (pref.)	135	136
American Cities Company (com.)	*29	*29
American Cities Company (pref.)	65	65⅛
American Light & Traction Company (com.)	337	337
American Light & Traction Company (pref.)	107½	108
American Railways Company	37	37
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	77	77
Boston Elevated Railway	82	81½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	a55	a65
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	93	92¾
Capital Traction Company, Washington	100	100⅛
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	62
Chicago Railways, ptcptg., ctf. 1	95	95
Chicago Railways, ptcptg., ctf. 2	34¾	34½
Chicago Railways, ptcptg., ctf. 3	5	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	102	102¾
Cleveland Railway	104¼	104⅞
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	a80
General Electric Company	149	147½
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14⅜	14¼
Interborough-Metropolitan Company (pref.)	62	62
International Traction Company (com.)	*40	*40
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	18	*18
Kansas City Railway & Light Company (pref.)	37	*37
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	22	*22
Manhattan Railway	130½	131
Massachusetts Electric Companies (com.)	10	12
Massachusetts Electric Companies (pref.)	60	60⅛
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25½	*25½
North American Company	76½	76
Northern Ohio Traction & Light Co. (com.)	a70	70
Northern Ohio Traction & Light Co. (pref.)	a101	101
Philadelphia Company, Pittsburgh (com.)	39⅜	39
Philadelphia Company, Pittsburg (pref.)	38½	38½
Philadelphia Rapid Transit Company	17	15¾
Portland Railway, Light & Power Company	50	*50
Public Service Corporation	112	112
Third Avenue Railway, New York	42½	41
Toledo Traction, Light & Power Co. (com.)	a20	a20
Toledo Traction, Light & Power Co. (pref.)	a70	a70
Twin City Rapid Transit Co., Minn. (com.)	106	105
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	28½	28
United Rys. Inv. Company (com.)	15½	14
United Rys. Inv. Company (pref.)	42	38
Virginia Railway & Power Company (com.)	49	49
Virginia Railway & Power Company (pref.)	98	99
Washington Ry. & Electric Company (com.)	87½	87¼
Washington Ry. & Electric Company (pref.)	83½	83½
West End Street Railway, Boston (com.)	66½	66
West End Street Railway, Boston (pref.)	88	85
Westinghouse Elec. & Mfg. Company	77¾	76¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	123	124

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* Last sale. a Asked.

ANNUAL REPORTS

Pittsburgh Railways

The thirtieth annual report of the Philadelphia Company, Pittsburgh, Pa., for the year ended March 31, 1914, contains the following statement of income, profit and loss of the Pittsburgh (Pa.) Railways for the year ended the same date:

Gross earnings from street railway operations	$11,782,860
Operating expenses:	
Maintenance of way and structures	$1,112,627
Maintenance of equipment	794,791
Traffic	24,573
Transportation	4,580,810
General and miscellaneous	1,383,066
Total operating expenses	$7,895,867
Taxes	437,801
Total operating expenses and taxes	$8,333,668
Net earnings from street railway operations	$3,449,192
Auxiliary operations:	
Gross earnings	$133,888
Operating expenses and taxes	98,404
Net earnings	$35,484
Total net earnings	$3,484,676
Other income:	
Rental from investment buildings and real estate	$10,634
Interest and discount	150,569
Miscellaneous income	80
Total other income	$161,283
Total income	$3,645,959
Deductions from income:	
Rent of leased properties	$2,838,531
Interest on equipment trust bonds	22,016
Interest on current liabilities	104,648
Total deductions from income	$2,965,195
Net income before deducting fixed charges	$680,764
Fixed charges—interest on funded debt	341,490
Net income after deducting fixed charges	$339,274
Interest on income debentures	239,274
Balance to profit and loss	$100,000

The report states that while the gross receipts of the company increased during the fiscal year, the operating expenses increased in greater ratio because of many exactions and settlements (such as bridge tolls, paving and street cleaning) with the city of Pittsburgh and various boroughs through which the railway operates, as well as because of an increase in the cost of labor and materials. There was expended during the year $1,114,267 for improvements, betterments and extensions, and in addition large sums were expended for maintenance of roadway, tracks, bridges and overhead construction.

During the year 1910 the general manager designed a light-weight double-truck steel car with low wheels, having a side entrance and a low floor, to be used as a trailer. Fifty of these cars were purchased and placed in service during 1911. They operated so satisfactorily as trail cars that the company endeavored to purchase motors, but were unable to do so until the general manager designed a motor for this truck. During the year 1913 fifty trail cars and fifty of these low-floor motor cars were ordered and are now being placed in service, and a further order was placed for 100 more cars of the same type to be delivered not later than Nov. 1, 1914. Five double-deck cars, each having a seating capacity of 110 people, were also purchased.

The report states that some double tracking was done on the interurban roads. There has been a large increase in population along these routes which promises a future increase in revenue. During the year a contract was made with the Duquesne Light Company for supplying all the electric current to be used by the electric railways. Terminal facilities are being supplied to three interurban roads—namely, the Pittsburgh & Butler Street Railway, the Pittsburgh, Harmony, Butler & New Castle Railway and the Allegheny Valley Traction Company. During the year the municipal improvement known as the "hump cut" was completed and was instrumental in increasing the receipts.

The income, profit and loss statement of the Beaver Valley Traction Company, New Brighton, Pa., which is

controlled by the Philadelphia Company, is as follows for the year ended March 31, 1914:

Gross earnings from street railway operations	$334,670
Operating expenses:	
Maintenance of way and structures	$29,229
Maintenance of equipment	39,358
Traffic	352
Transportation	113,057
General and miscellaneous	31,379
Total operating expenses	$213,375
Taxes	9,327
Total operating expenses and taxes	$222,702
Net earnings from street railway operations	$111,968
Auxiliary operations:	
Gross earnings	$7,905
Operating expenses and taxes	10,734
Net earnings—deficit	$2,829
Total net earnings	$109,139
Other income:	
Rental of real estate and buildings	$462
Interest and discount	145
Total other income	$608
Total income	$109,747
Deductions from income:	
Rent of leased properties	$6,291
Interest and discount	11,613
Total deductions from income	$17,904
Net income before deducting fixed charges	$91,843
Fixed charges—interest on funded debt	76,250
Net income for the year	$15,593

United Railways Investment Company

According to the twelfth annual report of the United Railways Investment Company, San Francisco, Cal., the statement of income, profit and loss for the year ended Dec. 31, 1913, is as follows:

Income:	
Dividends on stocks owned	$1,998,849
Interest on bonds owned	45,400
Interest on bonds in sinking fund	19,393
Interest on notes and accounts receivable	68,097
Interest on bank balances	2,485
Total	$2,134,224
Expenses and other charges:	
Expenses:	
Salaries	$42,745
Corporation taxes	5,570
Tax on bonds held in Pennsylvania	2,024
Transfer agents', registrars' and trustees' fees	2,825
Fees of trust companies for paying coupons, etc.	1,018
Directors' fees and expenses	1,243
Stationery, printing and postage	766
Traveling	2,072
General	5,464
Total expenses	$63,727
Other charges:	
Interest on collateral trust sinking fund 5 per cent gold bonds	$907,500
Interest on 6 per cent convertible gold bonds of 1910	66,200
Interest on 6 per cent notes of 1908	98,999
Interest on dividend certificates	80,256
Interest on loans, notes and accounts payable	11,203
Total other charges	$1,164,158
Total	$1,227,885
Net income	$906,339
Profit and loss surplus at beginning of year	4,256,542
Profit and loss credit—discount on bonds purchased for sinking fund	59,647
Profit and loss surplus, Dec. 31, 1913	$5,222,528

The distribution of net income as shown by the above statement was as follows: Sinking fund for purchase of collateral trust sinking fund 5 per cent gold bonds, $207,023; payment of 6 per cent serial notes of 1908, $400,000; payment of Sierra & San Francisco Power Company second mortgage bonds, series A, $100,000; acquisition of other securities, including bonds received as interest on Sierra & San Francisco Power Company second mortgage bonds, $153,305, and reduction in net liabilities and accrued amounts, $46,010.

The report states that the Sierra & San Francisco Power Company has suffered from a shortage of water for its hydroelectric plant, thus forcing it to fall back upon its steam-generating plants at resulting increased cost. The demand upon the power company by the United Railroads of San Francisco increased 5.56 per cent, and outside of the railroad's contract the gross earnings of the company from the general public increased 39.31 per cent. During the year the power company began the construction at Lower Strawberry, Cal., of an additional dam and reservoir which will store about 762,300,000 cu. ft. of water. By the payment in 1913 of $400,000 of the 6 per cent serial notes of 1908 and the further payment on Feb. 15, 1914, of an additional $200,000 of these notes, the amount outstanding has been reduced to $1,300,000. The final payment of $100,000 of Sierra & San Francisco Power Company second mortgage bonds, series A, has been made in accordance with the agreement of July 29, 1910. The amount of the 6 per cent convertible bonds of 1910 outstanding was reduced during the year from $1,229,000 to $852,000, which amount has since been further reduced to $810,000.

The statement of income, profit and loss of the United Railroads of San Francisco for the year ended Dec. 31, 1913, follows:

Gross earnings:	
Passenger	$8,496,854
Advertising	56,000
Total	$8,552,854
Operating expenses and taxes:	
Maintenance of way and structures	$604,454
Maintenance of equipment	472,912
Transportation expenses	2,946,667
General expenses	644,663
Total operating expenses	$4,668,696
Taxes	495,000
Total operating expenses and taxes	$5,163,696
Net earnings	$3,389,158
Other income:	
Sinking fund earnings	$89,375
Interest	70,440
Rentals	7,306
Miscellaneous	3,489
Total	$170,610
Gross income	$3,559,768
Current income charges:	
Interest on 5 per cent promissory gold notes	$50,000
Interest on income notes	66,200
Interest on equipment notes	16,375
Interest on trustee's certificates	8,564
Interest on bills payable	155,335
Rentals and leases	76,800
Total	$373,274
Net income before bond interest charges	$3,186,494
Bond interest:	
United Railroad's bonds	$964,193
Underlying bonds	699,050
Total	$1,663,243
Net income for the year	$1,523,251

From the net income as shown above, appropriations were made as follows: Depreciation reserve, $257,581; bonds and sinking fund reserve, $474,432, and dividends on first preferred stock, $350,000. The increase in gross earnings was not up to normal during the year owing largely to the general business depreciation on the Pacific Coast. The gross earnings for 1913 increased $80,179 over 1912, but there was a decrease of $203,938 in net income, $318,648 in total income and $427,400 in surplus after the payment of interest charges. There was a balance for the year after all charges, including dividends on first preferred stock, of $441,237, as compared with a balance of $617,949 in 1912, or a decrease of $176,712. The decrease in net income was accounted for in the increase in the wage scale and also in an increase in taxes of $79,000. The ratio of operating expenses and taxes to gross income was 60.38 per cent in 1913 as compared to 57.59 per cent in 1912.

Certificate Issue of United Railroads—Investment in Irrigation Project

The Railroad Commission of California recently authorized the United Railroads of San Francisco to enter into a car-equipment trust agreement by which it will obtain sixty-five new cars for service in San Francisco. The cars will cost the company $378,000. The company will pay $78,000 in cash, and equipment trust certificates with interest at 5½ per cent will be issued for the remaining $300,000. The certificates have been purchased by E. H. Rollins & Sons, Boston.

In the course of its decision authorizing this issue the commission says that the United Railroads would have had funds on hand available for the purchase of the cars if its surplus earnings had been properly conserved. In this connection it states it is informed that Patrick Calhoun, while president of the United Railroads of San Francisco, subscribed for 49,991 shares of common stock of the Solano Irrigated Farms Company, and that the balance sheets of the railway show that $1,096,115.70 was applied from its funds to the Solano project. It then seems, the report adds, that upon the taking of office by Mr. Lilienthal, the present president of the railway, Mr. Calhoun was required to give a one-day promissory note for this amount in favor of the railway, the security being the stock of the Solano project, which note Mr. Lilienthal has since carried on the company's books at the value of $1. In answer to the above charge of the commission Mr. Calhoun issued the following statement from Cleveland: "Everything I did was done with the authority of the board of directors and the stockholders. I invested about $1,096,000 of the company's funds in stock of the Solano Company. I thought it was a sound investment. When criticism was made by some of my associates I assumed the obligation myself and gave the company the stock in the Solano enterprise, which they still have as security for their money."

In connection with the commission's decision Mr. Lilienthal said:

"I regret that the Railroad Commission has deemed it its duty to give publicity to the Solano transaction, because it seriously interferes with my sincere purpose to improve the relations between the company and the public and to build up the credit of the company so that it may adequately perform its duty to the public. I need not add that I am a thorough believer in the Railroad Commission and in the intelligence and integrity of its members and therefore regret my inability to agree as to the wisdom of the course adopted by them in this matter."

On May 29 the commission decided to investigate the entire financial condition of the United Railroads of San Francisco, and a hearing was set for July 17. At that time the directors of the United Railroads will be asked to restore to the funds of the company the amount in question, or present a satisfactory plan for the restoration of that sum. Mr. Lilienthal states that he welcomes the investigation and will heartily co-operate with the commission in throwing as much light as possible on the company's financial affairs.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—The Alton, Jacksonville & Peoria Railway, which has been in the hands of Receiver Edward L. Butler, Chicago, for two years, has been sold under foreclosure for $500,000 to J. C. Van Riper, St. Louis, president of the Title Guaranty Trust Company. Only two bids were received. The first was for $250,000 made by Israel Shrimsky, Chicago. The second and successful bid was made by W. T. Nardin, who said he represented Mr. Van Riper, acting for the bondholders. It is understood that the road which has been sold will eventually be included among the properties of E. W. Clark & Company, Philadelphia, Pa., who control the electric railways in East St. Louis and vicinity.

Big Four Electric Railway, Tulare, Cal.—The Railroad Commission of California has rendered a decision in which it grants authority to the Big Four Electric Railway to issue 392,058 shares of its capital stock at the par value of $1 a share. The sale of this stock is restricted so that no commissions are allowed until $100,000 in cash is realized and deposited to the credit of the company, and thereafter no commissions in excess of 20 per cent shall be allowed stock salesmen. The commission also instructs the board of directors of the company to recover or reimburse the treasury in the sum of $1,798 owed to the company.

Boston (Mass.) Elevated Railway.—The Public Service Commission of Massachusetts has authorized the Boston Elevated Railway to issue $1,000,000 of 5 per cent thirty-year coupon or registered bonds, having determined that the amount is needed to supply working capital.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—Judges Baker, Seaman and Mack, sitting in the United States Circuit Court of Appeals, have affirmed the decree of United States Judge Geiger, entered at Milwaukee on March 24, 1914, for the sale of the Chicago & Milwaukee Electric Railroad. Fayette S. Munro, receiver of the Republic Construction Company, appointed by Judge Landis of the Federal Court on March 9, 1908, has been discharged on the filing of his report under order of March 6, 1912, for turning over $30,000 and all assets to W. O. Johnson, receiver of Chicago & Milwaukee Electric Railroad, in compliance of a motion of the latter company for an accounting.

Clear Lake Railroad, Lakeport, Cal.—The Railroad Commission of California has authorized the Clear Lake Railroad to issue 750 shares of its common capital stock at a par value of $100 a share and $500,000 in first mortgage 6 per cent bonds. The funds are to be applied to the construction of the new railroad between Hopland and Lakeport, which will be approximately 23½ miles long. Of the stock authorized, $50,000 is to be sold at par and $25,000 is to be exchanged for certain lake-front property at Clear Lake of the Yolo Water & Power Company.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company has called a special meeting of the stockholders for June 29 at Columbus, Ohio, to authorize an issue of $3,145,000 of 4 per cent prior preference stock. New stock is to be issued to take up and retire in whole or in part, with the consent of the bondholders, the $3,145,000 of outstanding first consolidated mortgage forty-year 4 per cent bonds of the Columbus Railway due on Oct. 1, 1939. Approval also will be asked of an issue of $450,000 series "A" 6 per cent preferred stock to take up and retire $450,000 of 6 per cent first mortgage bonds of the Columbus Electric Company. The stockholders will be asked to approve an increase in the capital stock of the Columbus Railway, Light & Power Company from $11,550,000 to $15,145,000, including the above issue of prior preference 4 per cent stock and 6 per cent series "A" preferred stock. Stockholders also will be asked to approve an issue of first and refunding sinking fund 5 per cent bonds of an authorized amount not to exceed $25,000,000.

Detroit & Port Huron Shore Line Railway, Detroit, Mich.—Eversz & Company, Chicago, and the First & Old Detroit National Bank, Detroit, are offering at 92½ and interest, to net 5½ per cent, $908,000 of first mortgage 5 per cent gold bonds of the Detroit & Port Huron Shore Line Railway of 1900, due on Jan. 1, 1950, without option of prior payment. The bankers say that $305,000 of these bonds have been purchased from the treasury of the Detroit United Railway and the balance, namely $603,000, refund divisional bonds maturing on or before May 1, 1916. This closes the mortgage of $2,500,000 and will make the bonds a first lien on 113.69 miles of electric railway from Detroit via Mt. Clemens to Port Huron at less than $22,000 per mile. The entire capital stock of the company was acquired by the Detroit United Railway at a cost of $1,436,728, and during the past six years $650,482 has been spent on the property, not including important improvements charged to maintenance, which last year amounted to about 30 per cent of the gross earnings.

Georgia Railway & Power Company, Atlanta, Ga.—The Railroad Commission of Georgia has issued an order granting the application of the Georgia Railway & Power Company for authority to execute a new mortgage to secure the $30,000,000 of bonds authorized by the commission in 1912, and allowing the petition of the company for authority to increase the first instalment of the bonds to be issued from $12,400,000 to $12,917,000. The remainder of the $30,000,000 issue is to be held by the trustee uncertified and undelivered pending future approval by the commission. The Fidelity Trust Company, as trustee, is ordered to certify and deliver to the Georgia Railway & Power Company bonds for the following purposes: $365,000 to reimburse the treasury of the company for expenditures made in the acquisition and construction of the Stone Mountain Railway; $8,865,000 to cancel a $10,000,000 bond issue of the Georgia Power Company secured by mortgage to the Central Trust Company, New York; $1,135,000 to cancel a bond issue of the Blue Ridge Electric Company of $1,370,000 secured by mortgage to the Knickerbocker Trust Company, New York; $1,367,000 to cancel a bond issue of the Atlanta Water & Electric Company, secured by mortgage to the Knickerbocker Trust Company; $550,000 to cancel a bond issue of the Savannah River Power Company, secured by mortgage to the Knickerbocker Trust Company; $650,000 to reimburse the company's treasury for expenditures for construction of power plants and substations and the purchase of equipment between Jan. 4, 1912, and April 1, 1914. Drexel & Company, Philadelphia, Pa., announce that the syndicate formed by them to underwrite $6,860,000 of first and refunding mortgage 5 per cent forty-year sinking fund gold bonds of the Georgia Railway & Power Company due on April 1, 1954, has been closed, all the bonds having been sold.

Glendale & Eagle Rock Railway, Glendale, Cal.—The Railroad Commission of California has approved the trust deed by which the Glendale & Eagle Rock Railway secured the payment of 6 per cent first mortgage bonds in the sum of $50,000.

Idaho Railway, Light & Power Company, Boise, Idaho.—O. G. F. Markhus, receiver of the Idaho Railway Light & Power Company, has filed at Boise, for the inspection of all creditors and others interested, his report approving and allowing certain claims as expenses of operation and supply accounts incurred in the operation of the company within six months prior to the appointment of the receiver and disallowing other claims so presented. All creditors are notified to file any objection that they may have with the court on or before June 13 next, as a hearing thereon is to be had on June 15.

International Railway, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the International Railway to issue $387,000 of capital stock to be sold at not less than par, the proceeds to be used to reimburse the treasury of the company for expenditures from income from July 31, 1912, to May 1, 1914.

Maryland Electric Railways, Baltimore, Md.—The Maryland Electric Railways has applied to the Maryland Public Service Commission for permission to sell 489 bonds secured by a mortgage deed of trust to the Mercantile Trust & Deposit Company, Baltimore, Md., dated Sept. 15, 1906. It is stated that $443,597 of the proceeds will be used for the purchase of new cars; $4,914 for car heaters and $20,490 for a rotary converter.

New York (N. Y.) Railways.—Upon an opinion rendered by Commissioner Milo R. Maltbie, the Public Service Commission for the First District has ordered the New York Railways to restore to its reserve for injury and damage claims the sum of $33,984. In its last report for 1913 the company showed the transfer of this amount from the reserve account to the surplus account, covering a prior period. The commission decided that while the company could fix the amount of such reserve, it had no right to transfer any amount back to surplus until all claims for the period had been liquidated.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—Application has been made by the San Francisco-Oakland Terminal Railways to the Railroad Commission of California for permission to issue $10,000,000 of 5 per cent general and refunding mortgage bonds recently authorized by the stockholders. The applicant, it is stated, has procured underwriting contracts for the sale of $5,125,000 and upwards of its bonds by responsible banking institutions at 80 per cent of their par value. Authorization is sought for the sale of an additional $2,500,000 of the bonds at not less than 80 per cent, and the remaining $2,500,000 at not less than 85 per cent of the par value. Of a floating indebtedness of $4,600,000 in excess of the bonded indebtedness, sums aggregating $3,600,000 are covered by securities with an estimated value of $9,000,000. This includes $5,000,000 of the first-mortgage bonds of the Oakland Terminal Company and all its capital stock, pledged for the repayment of a loan of $1,100,000 due to the Anglo-California Trust Company as trustee. In addition to paying off the floating indebtedness it is proposed to make improvements and betterments at a total cost of $2,400,000. The company has also asked the Railroad Commission for permission to change its name to the California Railways Company. The present name, San Francisco-Oakland Terminal Railways, is considered too cumbersome.

Twenty-third Street Railway, New York, N. Y.—The Public Service Commission for the First District has granted the application of the Twenty-third Street Railway for the execution of a mortgage for $1,500,000 and the issuance of fifty-year 5 per cent bonds in the same amount under such mortgage. The proceeds of the bonds are to be used to liquidate notes made to the Mercantile Trust Company as trustee in 1907.

Waycross Street & Suburban Railway, Waycross, Ga.—H. H. Burnet, auditor of the Waycross Street & Suburban Railway, has been appointed receiver of the company on the application of the Waycross Savings & Trust Company, trustee of the mortgage securing $30,000 in notes, interest on which is in default.

Dividends Declared

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Frankford & Southwork Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Massachusetts Electric Companies, Boston, Mass., $2, preferred.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.						
1m., Apr.,	'14	$56,594	*$25,931	$30,663	$17,541	$13,122
1 " "	'13	57,448	*27,554	29,894	17,130	12,764
12 " "	'14	775,456	*352,822	422,634	208,192	214,442
12 " "	'13	730,006	*330,172	399,834	203,589	196,245
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.						
1m., Apr.,	'14	$248,748	*$154,085	$94,663	$44,615	$50,048
GRAND RAPIDS (MICH.) RAILWAY						
1m., Apr.,	'14	$101,454	*$75,925	$25,529	$13,537	$11,992
1 " "	'13	100,665	*60,865	39,800	15,010	24,790
12 " "	'14	1,300,544	*834,315	466,229	161,446	304,783
12 " "	'13	1,260,986	*724,134	536,852	176,223	360,629
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.						
1m., Apr.,	'14	$3,057,444	$1,086,110	$1,971,334	$1,066,594	$904,740
1 " "	'13	2,905,673	1,132,403	1,773,270	1,101,262	622,008
10 " "	'14	28,353,265	10,737,668	17,615,597	11,034,450	6,581,147
10 " "	'13	27,421,467	11,011,267	16,410,200	10,980,890	5,429,310
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.						
1m., Apr.,	'14	$137,275	$69,693	$67,582	$56,906	$10,676
1 " "	'13	124,493	66,969	57,524	45,818	11,706
12 " "	'14	1,790,096	892,752	897,344	632,643	264,700
12 " "	'13	1,619,396	806,037	813,358	526,906	286,452
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE.						
1m., Apr.,	'14	$49,773	*$37,748	$12,025	$15,567	$3,542
1 " "	'13	49,274	*32,424	16,850	14,659	2,191
12 " "	'14	674,730	*451,953	222,777	183,115	39,662
12 " "	'13	641,473	*393,033	248,440	173,508	74,932
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.						
1m., Apr.,	'14	$287,718	$173,322	$114,397	$50,331	$64,066
1 " "	'13	238,546	154,621	83,926	45,214	38,712
4 " "	'14	1,080,884	668,302	412,582	200,155	212,427
4 " "	'13	925,727	582,406	343,321	180,296	163,025
PORTLAND (MAINE) RAILROAD						
1m., Apr.,	'14	$77,306	*$50,147	$27,159	$21,435	$5,724
1 " "	'13	74,793	*58,209	16,584	10,298	6,286
12 " "	'14	1,039,980	*658,453	381,527	229,184	152,343
12 " "	'13	1,001,573	*702,603	298,970	123,472	175,498
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.						
1m., Apr.,	'14	$533,973	*$286,989	$246,984	$176,595	$70,389
1 " "	'13	546,231	*273,458	272,773	161,730	111,043
12 " "	'14	6,751,158	*3,335,666	3,415,492	2,082,284	1,333,208
12 " "	'13	6,691,264	*3,291,334	3,399,930	1,815,505	1,584,425

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*Includes taxes.

Traffic and Transportation

New Brooklyn Transfer System

In announcing to the public the new transfer system, of which brief mention was made in the ELECTRIC RAILWAY JOURNAL of May 30, page 1233, the Brooklyn (N. Y.) Rapid Transit Company carried a large display of advertisement in all the principal newspapers of Brooklyn in part as follows:

"In proceeding, through the various operating companies, to carry out the enlarged transfer plan, we wish to call attention to several facts which may pertinently be considered in connection with it.

"The new plan increases the total number of transfer points in the territory in which the surface railroad companies of the Brooklyn Rapid Transit System operate, from 721 to 1008.

"The Public Service Commission worked out this increase on the general theory of enabling a person to ride from any given locality on the surface lines of the system to any other locality on those lines for 5 cents (excluding the established 10-cent routes to Flushing, North Beach and Coney Island).

"This theory involved not only the establishment of one transfer on a cash fare at every point where two surface car lines intersect, but, in the opinion of the commission, the establishment of many so-called additional 'feeder privileges,' whereby in some instances four transfers are given for a cash fare, permitting five different rides.

"Unless the companies wished to institute litigation which would be long and tedious, they were forced to accept this more than liberal multiplication of rides for one fare, although they feel that it should not have been insisted upon as an additional exaction under a plan which granted initial transfers at practically every point of intersection.

"In spite of the sweeping character of its order, the commission has, however, done the companies the justice of recognizing frankly the vitality of the eighth commandment—'Thou Shalt Not Steal.' It has in certain instances restricted the transfer privilege to a single direction at certain streets, instead of compelling transfers in both directions, because the latter method would open the door to extensive 'loop the loop' riding.

"'Loop the loop' riding means the pleasant process of riding to a given destination, getting a transfer, doing your business, and riding back home on some other line, using your transfer to avoid paying another fare. Of course, the railroad companies cannot afford to submit to that sort of cheating, and no honest persons, including the Public Service Commission, defend the practice or justify the opportunity.

"These requirements and a few others make the new system a complicated one at best—and quite as difficult for the companies to enforce as for the public to understand.

"To be sure, it is not as complicated as the present system, and a public which has become accustomed to the present system should not have great difficulty in mastering the new system.

"But for a time much good-natured asking and giving of explanations will be needed. We are instructing our conductors to help as much as they can in this matter, and we ask our patrons to do their share.

"One thing it is very important to remember:

"Cash transfers—the yellow and the green ones—will be the ones you use in the great majority of cases. Every cash transfer is good for a single additional ride in either direction on any intersecting street, except the streets named on the back of the ticket.

"As to these excepted streets named on the back of the ticket, some of them are streets where additional privileges are granted under the first exception to the general principle of a single transfer without retransfer, and some of them are streets where transfer privileges are restricted out of respect for the eighth commandment.

"It will take a little time to get accustomed to looking this up on the back of your ticket, but if you will do so, the transfer system will be fairly simple for yourself and everyone else, for the other kinds of ticket are mostly for special uses and not likely to be misunderstood.

"We have made the details of the transfer plan as simple as we could, but we need your help in making it work smoothly.

"We don't know just what the effect is going to be on our revenues.

"To-day we receive 3.74 cents on the average for every passenger we carry on the entire system, and about 3.20 cents on the surface lines. The difference between that return and a full 5 cents per passenger is largely accounted for by the transfer system.

"If this average return per passenger be reduced much further it will seriously threaten our ability to render our present service, to say nothing of our ability to improve it.

"This was why we reserved our legal rights in consenting to try the new transfer order, so that we might contest it if we found our revenues were dangerously affected. We hope such will not be the case, but if it should come, we feel that you will hold good service superior to cheap service, and will support us on the facts as disclosed.

"You will discover many more transfer combinations than those which we have mentioned as you become familiar with the system. We want you to do so, because in so doing you will be co-operating to equalize traffic and thereby to relieve the overcrowding on many of the routes now badly congested.

"This means money, time and comfort for you—and at least some comfort for us. Equalization of and stimulus to car-riding will be our only offsets to the tremendous extension of transfer riding which is sure to follow the creation of 287 new transfer points.

"We have sometimes remarked on the community of our interests with those of the people we serve. The transfer proposition is no exception to this principle."

Los Angeles Transfer Problem.—President Wright of the Board of Public Utilities of Los Angeles has sent to the officials of the Pacific Electric Railway and the Los Angeles Railway letters asking for suggestions from the companies in regard to proposed modifications of the present transfer systems.

Civic Line and Bus Extensions in Toronto.—According to Comptroller McCarthy of Toronto, Ont., the citizens will be asked before the summer is over to vote on a by-law to authorize the city to raise $1,000,000 to be expended on motor buses and extensions of the civic railway now operated by the city.

Fine for Abusing Police Privilege.—A fine is provided for policemen and firemen of Kansas City, Mo., who loan their badges, by an ordinance recently passed by the City Council. It was explained that many policemen and firemen turned their badges over to friends, who rode free of charge by displaying them. A maximum fine of $100 is provided by the ordinance, which was passed at the instance of receivers for the Metropolitan Street Railway.

New Freight Terminals at East St. Louis.—The new freight terminal of the Illinois Traction System at East St. Louis, Ill., is now nearly completed and will soon be prepared to care for the handling of fresh meat shipments from St. Louis to northern points on the Illinois Traction System and connecting lines. The new service will give Springfield a ten-hour meat supply from St. Louis so that dealers will be able to handle meats more satisfactorily in the summer.

New York Subway Advertising Privilege Contract.—The contract which the Interborough Rapid Transit Company, New York, wishes to award to Artemus Ward, as the successor of Ward & Gow, for advertising and news-stand privileges on both the old and new subways and elevated lines has been put over by the Public Service Commission for final consideration on June 12. The contract will run for fifteen years from Jan. 1 last, and calls in that period for a payment to the company of $11,000,000.

Pittsburgh Accident Fakir Pleads Guilty.—James Warner, whose apprehension by the Pittsburgh (Pa.) Railway was noted in the ELECTRIC RAILWAY JOURNAL of May 16, pleaded guilty to perjury in the criminal court in Pittsburgh on May 21 and was paroled for one year. Warner was arrested after he had failed to convince a jury in common pleas court that he was entitled to $5,000 damages from the Pittsburgh Railways for alleged injuries. He confessed to the court that he had sought to deceive the jury and had sworn falsely concerning his supposed injuries. The company's lawyers were willing that Warner be paroled after his exposure and confession.

Larger Vestibules on Detroit Interurban Cars.—The matter of standardizing motormen's vestibules on interurban cars of the Detroit (Mich.) United Railway was one of the principal questions for consideration at the May meeting of the general safety board. It was shown that representatives of every line except the Rapid Railway preferred the larger vestibule, and it was decided that all future changes would be toward the construction of the larger vestibule, except as applied to the Rapid Railway, where the smaller vestibule is generally favored by the men operating the cars. Among other suggestions offered were that new men in substations be put through occasional examinations in the handling of high-tension switches; that superintendents and roadmasters be made permanent members of district safety boards, and that spare headlights be maintained at substations.

Safety First Emblems for Interurban Employees.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has issued to the forty members of its committee handsome gold buttons to be worn in lapels as an emblem of the movement. On the edge of the buttons are the words, "safety first," in gold on a blue background. The center is white, carrying in blue, gold and red, a block signal and a diagram showing the route of the two divisions of the company. Less expensive buttons will be distributed among the other employees of the company. The company holds meetings of its safety first committee about every two months. The most recent was at Dearborn on June 3. The buttons distributed recently by the Metropolitan Street Railway, Kansas City, and the Kansas City, Clay County & St. Joseph Railway, were furnished by the Whitehead & Hoag Company, Newark, N. J.

Rate Hearing Before Missouri Commission.—John M. Olin, Madison, Wis., has been retained by the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., as its attorney in future commutation hearings. The electric railway has completed its physical valuation at a cost of about $5,000. Mr. Olin will devote his energies to the intangible valuation. His first appearance for the company was at Kansas City on June 3, when the Missouri Public Utilities Commission heard evidence in requests for the establishment of commutation rates by the company. The physical valuation was made by Sloane, Huddle, Fustel & Freeman. The Kansas City, Clay County & St. Joseph Railway will shortly issue a joint tariff with the Chicago & Great Western Railway regarding grain rates from Kansas City to St. Joseph, Mo. Both companies have hitherto published separate tariffs.

Photographic Contest by Twin City Lines.—The Twin City Lines at Minneapolis and St. Paul have announced the photographic contest for $100 in cash prizes. The contest is being held under the guidance of A. W. Warnock, general passenger agent. A newspaper announcement of it occupies a space 6½ in. wide x 12 in. high. A list of twenty-six scenic features located on the various routes of the railroad system is displayed. The individual prizes range from a first prize of $25 down to nine minimum prizes of $1 each. Some of the conditions necessary for fulfilment are that all pictures must be new and must be taken between May 28 and July 5. The pictures may be of any size, and any number may be submitted. The announcement is concluded as follows: "This is simply a contest to encourage the taking of pictures during the month of June, when the Twin Cities are at their best for picture making, and to bring forth new material with which to advertise the Twin Cities."

Librarian on the Interurban as an Educator.—In her recent annual report to the city Rosa Leeper, librarian at Dallas, Tex., comments as follows on the influence of the interurban railway as an educator: "The influence of the interurban railroads on the life of the city is shown at the library, both in the circulation and the reference work. When the rules for the government of the library were made in 1901, the distance limit set for borrowers was 3½ miles from the post-office. Later this was changed to a radius of 10 miles from the post-office, thus extending library privileges to more than a third of the county. During the past year we have had several persons ask for further extension, giving as a reason that they had moved out on the interurban beyond the 10-mile limit, though still doing business in Dallas. In the reference department Saturday morning during the school term seldom fails to bring students from the surrounding towns, anywhere within a 70-mile radius, for debate and other reference work."

New Seattle-Tacoma Fare Schedule Filed.—The Puget Sound Electric Railway filed recently with the Public Service Commission, experimental passenger tariff No. 6, naming passenger rates, which were to be placed in force on June 1. In general the rates will be 2 cents per mile. For the benefit of regular riders commutation tickets will be sold at a reduction of 30 per cent from regular rates, in books containing twenty round-trip tickets—good for either husband or wife or both at one time, limited to sixty days. Ticket books will also be placed on sale good for children attending free public schools, at one-half the regular tariff rates, good between th hours of 6 a. m. and 6 p. m. on school days during the school year. The rate between Tacoma and Seattle will remain at $1.25. The striking changes are on the north end of the line near Seattle. The decision of the State Public Service Commission of Washington permitting the company to file a new schedule of passenger rates was referred to in the ELECTRIC RAILWAY JOURNAL of May 23, page 1174.

Securing Stations in Novel Way.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has put into effect an unusual plan for securing stations along the route, which has had good results and served to stimulate traffic. No less than five men have been accorded the privilege of erecting depots and storerooms on the company's right-of-way, at points where no agent has been maintained in the past. In consideration for the expenditure by each man the company has appointed him an agent, allowing each a percentage of outgoing business, with a guarantee of $10 monthly. The average size of the depots is 62 ft. by 22 ft., with a platform 70 ft. in length. The average cost of the buildings is $1,600. The definite income for the builder on the investment of $1,600 is $10 monthly or $120 annually, about 8 per cent on his investment. His chief income, despite the fact that he usually runs well above the $10 mark on tickets and freight, is derived from the sale of fruit, newspapers, periodicals and similar lines to passengers or near-by residents. The stations are built on the right-of-way of the company and eventually may be removed to make room for double-tracking or additional switches. The builders, however, have five-year leases, with an option of five more, if mutually agreeable.

Northampton Wage Award.—The arbitration board on wages of the employees of the Northampton Street Railway, which comprised Thomas A. McDonnell, chairman; T. G. Spalding, representing the company, and Martin J. Hennessey, representing the men, has made its award, which covers a period of from June 1, 1913, to June 1, 1914. The arbitration was asked for nearly a year ago, and it was then agreed that the finding would cover a period beginning June 1 of last year, and that the men should be entitled to back pay beginning at that time, should the finding of the board show increases of wages. The board does award small increases of wages to conductors and motormen, but, on other points, finds for the company. It makes no change in the arrangement which compels the men to wait until their sixth year of service before becoming entitled to the maximum wages. It establishes no daily rate of pay, but places the wage scale strictly on an hourly rate for actual platform service. It finds that no tangible evidence was given concerning the wages of employees other than motormen and conductors, and makes no changes in the wages of other employees. It finds that cost of living increased up to June 1, 1913, but has decreased since that time. The hourly wages of motormen and conductors are increased in the finding as follows: First year, from 21 cents to 23 cents; second year, 22½ cents to 24 cents; third year, 23 cents to 25 cents; fourth year, 24 cents to 26 cents; fifth year, 24½ cents to 27 cents; sixth year, 26 cents to 28 cents. The carmen asked for $2.50 a day for the first six months, $2.75 for the second six months and $3 thereafter.

Personal Mention

Mr. A. L. Valentine, superintendent of public utilities of Seattle, Wash., is in charge of the operation of the municipal electric railway which was placed in operation in Seattle recently.

Mr. E. H. Odell has resigned as secretary-treasurer of the Pacific Claim Agents' Association, Seattle, Wash., on account of ill health. He has been succeeded by Mr. T. N. Henry, as noted elsewhere in this column.

Mr. E. E. Lillie, superintendent of the Spokane & Inland Empire Railroad, Portland, Ore., has had his jurisdiction extended to cover the traction division, vice Mr. F. C. Farr, who has resigned to engage in other business.

Mr. B. C. Edgar, assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, has resigned to accept the position of general superintendent of the Nashville Railway & Light Company, Nashville, Tenn.

Mr. W. C. Campbell has been appointed assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed Mr. B. C. Edgar, who has become connected with the Nashville Railway & Light Company, Nashville, Tenn.

Mr. P. L. Saltonstall, president of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has been elected a member of the executive board of the company to succeed Mr. Chauncey Eldridge, who has resigned from Tucker, Anthony & Company, as noted elsewhere in this column.

Mr. Charles Craigmile has been appointed assistant superintendent of the Lake Shore & Northern Division of the Empire United Railways, Syracuse, N. Y., and will report to Mr. W. F. Sheehan, superintendent. Mr. Craigmile was formerly dispatcher of the Sheboygan Railway & Electric Company, Sheboygan, Wis.

Mr. J. P. H. de Windt, who has been assistant to the president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be elected vice-president and general manager of the company, or resident operating head, Mr. J. S. Pevear, the new president, continuing his headquarters at New Orleans.

Mr. J. S. Pevear, vice-president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and president of the New Orleans Railway & Light Company, New Orleans, La., will be the new president of the Birmingham Railway, Light & Power Company, succeeding Mr. A. H. Ford, whose appointment to the Cumberland County Power & Light Company, Portland, Me., is noted elsewhere in this column.

Mr. Theodore P. Shonts, president of the Interborough-Metropolitan Company, president of the Interborough Rapid Transit Company and president of the New York (N. Y.) Railways, had the honorary degree of Doctor of Laws conferred upon him by the Ohio Northern University at Ada, Ohio, on May 28. Mr. Shonts was graduated from Monmouth College, Monmouth, Ill. He studied law and practised for a time before he entered railroad work.

Mr. John G. Tobin has been appointed superintendent of the Gary & Southern Traction Company, Gary, Ind., to succeed Mr. T. P. Clay, resigned. Mr. Tobin began his railway career with the Cleveland (Ohio) Railway, which he served in the mechanical department for six years. In January, 1912, he accepted a position with the Gary & Southern Traction Company in charge of substations and rolling stock, which position he held until his recent appointment as superintendent of the property.

Mr. W. K. Loos, who has been appointed superintendent of the Reading Division of the Reading Transit & Light Company, Reading, Pa., entered electric railway work with the Philadelphia (Pa.) Rapid Transit Company as a motorman, in which capacity he served for five years. He was next connected with the Philadelphia & Reading Railway as storekeeper for five years. He then entered the service of the Oley Valley division of the Reading Transit & Light Company as a conductor and four years later was appointed a street inspector. On May 1 he was advanced to the position of superintendent of the Reading Division of the company.

Mr. William B. Poland, vice-president and chief engineer of the Philippine Railway, who has been in charge of the construction and operation of the company's lines for a number of years, has left the Philippines to return to the United States probably by way of Australia, Valparaiso, and the Trans-Andean line to Buenos Aires. His address is care of J. G. White & Company, Inc., New York. Construction has been finished, the operation systematized and industrial and agricultural development work along the company's lines in Cebu and Panay organized. It is not expected that Mr. Poland will return to the islands, in which case the property will be left under the management in the Philippines of Mr. R. R. Hancock, at present general superintendent at Iloilo, P. I. This line is a steam railroad.

Mr. Joseph Johnson, formerly fire commissioner of New York, has been appointed chief of the transportation bureau of the Public Service Commission for the First District of New York. Mr. Johnson was born at Griffin, Ga. He was educated at St. Mary's College, Belmont, N. C., and received the degree of A.M. from the University of Alabama. He was city editor of the Atlanta *Journal* in 1896 and served on the staff of the New York *American* from 1897 to 1901. He was also war correspondent of the New York *American* during the Spanish-American War. He was with the New York *World* from 1901 to 1903. From 1906 to 1910 he served under Comptroller Hermann A. Metz of New York. He was deputy fire commissioner of New York from 1910 to 1912 and fire commissioner under Mayor Gaynor from 1912 to 1914.

Mr. Chauncey Eldridge, one of the advisory committee of three under whose supervision the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., was built by the Wyandotte Construction Company, has resigned from Tucker, Anthony & Company to become connected with a wireless telegraph company at San Francisco, Cal. Mr. Eldridge has been with Tucker, Anthony & Company about thirteen years and assisted in the construction of the Canton-Akron lines, the Columbus, Buckeye Lake & Newark Railway, the Columbus, Newark & Zanesville Railway, the Mesaba Railway, the Hartford & Springfield Street Railway, the Hartford, Rockville & Manchester Tramway and numerous water works. He was a member of the executive board of the Kansas City, Clay County & St. Joseph Railway, but has now been succeeded on the board by Mr. P. L. Saltonstall, the president of the company.

Mr. Joseph O'Hara, who has been superintendent of transportation of the Springfield (Ill.) Consolidated Railway since Dec. 1, 1911, has been appointed general manager of the company. Mr. O'Hara was formerly general manager of the Chicago, Aurora & De Kalb Railway, Aurora, Ill. Before becoming connected with that company he was superintendent of the Illinois Valley Railroad, La Salle, Ill. He served in various capacities with the Grand Rapids (Mich.) Railroad for five years and was previously connected with the Père Marquette Railroad for two years, and as superintendent of the Eastern Ohio Traction Company, Cleveland, Ohio, for four years. Mr. O'Hara also was superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Chicago, Ill., from August, 1903, to October, 1907, when he resigned to become superintendent of transportation of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C. He resigned from the Washington, Baltimore & Annapolis Electric Railway on June 1, 1908, to become connected with the Illinois Valley Railroad.

Mr. T. N. Henry, who has recently been appointed secretary-treasurer of the Pacific Claim Agents' Association, Seattle, Wash., to succeed Mr. E. H. Odell, was born in Missouri. He was graduated from a normal school in 1887 at the age of nineteen, and engaged in school work in his native State for a year. In 1888 he located at Olympia, Wash. He taught in the public schools of Olympia and the county schools of Thurston County, in which Olympia is situated, until 1894. He was then elected county superintendent of common schools, in which capacity he served until 1897. During 1897 and 1898 he was principal of the

Ward school at Olympia. In 1898 he was re-elected county superintendent of the common schools and was again reelected to that position in 1900. From 1902 to 1904 he served as chairman and campaign manager of the Republican County Committee of Thurston County. From 1901 to 1903 he was editor and publisher of a school journal. In 1904 he became city editor of the *Morning Olympian*, Olympia, Wash. From 1905 to 1906 Mr. Henry represented the textbook publishers before the city and county text-book commissions of Washington. From 1907 to 1913 he was postmaster at Prosser, Wash. During his incumbency at the office of postmaster he was in 1910-11 president of the Prosser Commercial Club, secretary of the Washington State Horticultural Association and compiler and editor of that association's year book for that year. From 1910 to 1913 he also served as a member of the Washington State Fair Commission under appointment by the Governor of the State. In January, 1914, Mr. Henry was appointed acting secretary-treasurer of the Pacific Claim Agent's Association and acting secretary of the Pacific Claim Agents' Index Bureau. Mr. Henry was the author of the State compulsory education law enacted by the Legislature of 1903, of the Washington State law providing for union high schools and of the State law providing for a system of State examinations and certification of students completing the grammar school course in Washington.

A. H. Ford

Mr. A. H. Ford, who, as previously announced in the ELECTRIC RAILWAY JOURNAL, has been appointed vice-president and general manager of the Cumberland County Power & Light Company, Portland, Maine, was connected with steam railroads in Louisville, Ky., prior to 1893, in the accounting and treasury departments. In 1893 he entered street railway work in New Orleans as assistant secretary and treasurer of the New Orleans Traction Company, Ltd., shortly afterward becoming secretary and treasurer of that company. He served in that capacity until April 1, 1900, when he accepted the position of manager of the railway department of the New Orleans & Carrollton Railway & Light Company. When the properties in New Orleans were merged in 1902 Mr. Ford entered the private banking house of Isidore Newman & Sons, New Orleans, where he remained until July, 1904, when he was transferred to New York as manager of the operating department of Ford, Bacon & Davis, engineers. He continued with Ford, Bacon & Davis in this connection until 1906, when he became president of the American Cities Railway & Light Company, the holding company controlling electric railway and light properties in Birmingham, Ala.; Knoxville and Memphis, Tenn.; Little Rock, Ark., and Houston, Tex. On Sept. 1, 1907, Mr. Ford was transferred to Birmingham as president and general manager of the Birmingham Railway, Light & Power Company, which position he has occupied up to the present time. The Cumberland County Power & Light Company, with which Mr. Ford now becomes connected, operates the local railway system in Portland, several interurban lines and a number of electric light properties.

OBITUARY

Harris Charles Fahnestock, banker and a director of many corporations, died on June 4 at his home in New York. Mr. Fahnestock was born on Feb. 27, 1835, in Harrisburg, Pa. He was treasurer of the Washington & Georgetown Railroad, the first horse railroad in Washington.

Alexander E. Orr, ex-president of the old Rapid Transit Commission of New York City and one of the most distinguished merchants in the city, died on June 3 in Brooklyn. He was eighty-four years old. Mr. Orr was born in Ireland in 1831, came to this country on a visit in 1850 and in the following year took up his permanent residence in New York.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Washington & Lincolnton Railroad, Lincolnton, Ga.**—Chartered in Georgia to build a 25-mile interurban railway from Washington to Lincolnton. Capital stock, $100,000. Incorporators: W. B. Crawford, J. B. Cullars, W. T. Florence, C. H. Ward, C. J. Perryman and W. C. Powell, all of Lincoln County, and J. R. Dyson, W. T. Johnson, K. A. Wilheit, William Wynne, Jr., and Garnett Greene, all of Wilkes County.

***Georgetown (Ill.) Railroad.**—Incorporated in Illinois to build a 3-mile electric railway between Georgetown and the new coal mines which are located 3 miles west of Georgetown. Capital stock, $50,000. Incorporators: James H. Hewitt, R. Sandusky, George Buchanan, J. R. Dillon, C. E. Pritchard, Samuel Bennett, C. E. Lindley, C. B. Spang, O. P. Clark, W. P. Holaday, H. W. Morris and C. S. Paxton.

***Springfield (Mass.) Transit Company.**—Chartered in Massachusetts to build an electric railway in Springfield. Capital stock, $250,000. Incorporators: Clinton N. Field, Jenness K. Dexter, Henry J. Perkins and Robert A. Knight.

***East Linden Electric Railway, Linden, Ohio.**—Application for a charter has been made by this company in Ohio to build an electric railway between Columbus, Linden and East Linden, a distance of 4 miles. Capital stock, $10,000. Officers: Philip B. Gaynor, New York, and Paul H. Kohr, secretary. Robert W. Manley, David S. Gray and Edgar L. Weinland.

Cushing (Okla.) Traction Company.—Application for a charter has been made by this company in Oklahoma to build a 10-mile electric railway from Cushing in an easterly direction to the oil fields. Capital stock, $50,000. Incorporators: Frank Brown, Independence, Kan.; Roy B. Jones and H. Askins, Cushing. [E. R. J., May 16, '14.]

***Virginia Blue Ridge Railway, Lynchburg, Va.**—Chartered in Virginia to build a 25-mile steam or electric railway in Nelson and Albemarle counties. Capital stock, $150,000 to $300,000. Officers: John W. Dwight, Ithaca, president, and J. W. Powell, Canisteo, secretary.

FRANCHISES

Globe, Ariz.—The Globe & Miami Traction Company has received a franchise from the Council in Globe. Richard West, Miami, president. [E. R. J., May 9, '14.]

***Sausalito, Cal.**—The Board of Trustees of Sausalito has granted a franchise to T. A. Vance, representing a company, to build a funicular railway to rise to a height of 1000 ft. from the bay front in Sausalito to the summit of the heights.

Fresno, Cal.—The Fresno Interurban Railway has received a franchise from the Board of Supervisors over certain sections of Fresno Avenue in Fresno.

Santa Clara, Cal.—The Peninsula Railway has received a thirty-day extension of time on its franchise in which to complete its line from the corner of Franklin Street and Jefferson Street to the town limits on the Saratoga Road in Santa Clara.

Covington, Ky.—The Union Light, Heat & Power Company has received a franchise from the Council to build an electric line in West Covington.

Holbrook, Mass.—The Bay State Street Railway has received a franchise from the Council in Holbrook for an extension from the Post-office Square into the land east of the Square, where an express office is to be located.

Clarksdale, Miss.—The City Council has refused to grant a twenty-five-year franchise to build an electric railway in Clarksdale. The petition was presented by a number of citizens, but it was thought that the franchise called for too much privilege. This is part of a plan to build an electric railway to connect Lyon, Clarksdale and Friars Point. [E. R. J., May 23, '14.]

Orange, N. J.—The Public Service Railway has received a franchise from the Council for the extension of its Central Avenue line through Orange.

Buffalo, N. Y.—The International Traction Company has asked the Council for a franchise to build a new line from Military Road through Skillen Street to the city line at O'Neil Street in Buffalo, a distance of about 1 mile.

Elizabeth City, N. C.—Thomas J. Markham, Elizabeth City, and associates have received a franchise from the Council in Elizabeth City. This is part of a plan to build an electric line to connect Weeksville, Nixontown, Elizabeth City, South Mills, Deep Creek and Norfolk. [E. R. J., May 30, '14.]

Wilmington, N. C.—The Tidewater Power Company has asked the Council for a franchise to extend its lines in Wilmington.

***Columbus, Ohio.**—The East Linden Electric Railway has asked the Council for a franchise to build an electric line from Leonard Avenue and Taylor Avenue in Columbus north to the village of Linden. Paul H. Kohr, secretary.

Warren, Ohio.—The Mahoning & Shenango Railway & Light Company has received a twenty-five-year extension of time on its franchise from the Council in Warren, on condition that the company extend its line to Packard Park, double track a section of Market Street and double track Main Street from Market Street to the Erie station at Warren.

Thorold, Ont.—The St. Catharines, Merritton & Thorold Electric Railway has received a franchise from the Council to extend its lines in Thorold to the factory district.

Scranton, Pa.—The Scranton Railway has received a fifty-year franchise from the Council for an extension of its Luzerne Street line in Scranton.

Blaine, Wash.—The Blaine-Lynden Electric Railway has received a franchise from the Council in Blaine. This company plans to build an electric line between Blaine, Lynden and Bellingham. John J. Pinckney, Blaine, president. [E. R. J., May 9, '14.]

***Moundsville, W. Va.**—J. F. Burley, Moundsville, and associates have asked the Council for a franchise to build a belt line electric railway in Moundsville.

TRACK AND ROADWAY

Huntsville Railway, Light & Power Company, Huntsville, Ala.—An extension from the present southwestern terminus of this railway in Huntsville into the town of Merrimack is being built by this company.

Edmonton (Alta.) Interurban Railway.—A by-law has been passed authorizing the expenditure of $168,000 by the City Council on street railway extensions in Edmonton. It is stated that this company is considering plans to build a branch line to Fort Saskatchewan, Alta.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded a contract to the Westminster Iron Works for the erection of an ornamental arched entrance to Central Park. The cost is estimated to be about $4,000.

Northern Electric Railway, Chico, Cal.—Work will be begun at once by this company on its extension, which will provide North Sacramento with an electric line. This first unit will provide 1½ miles of railway through the tract of land of the North Sacramento Land Company from the lines of the Northern Electric Railway to the lines of the Southern Pacific Railway.

San Francisco, Cal.—The Board of Public Works has awarded the contract to Eaton & Smith for the construction of the Potrero Avenue municipal railway line on a bid of $143,767. The construction of the track and conduits is to be completed in 120 days from the date of the signing of the contract. It is expected that the line will be ready for operation early in September when the running of cars on the Van Ness Avenue line, with which it will connect, is to begin.

Big Four Electric Railway, Tulare, Cal.—The Railroad Commission has granted authority to this company to issue and sell its capital stock to the amount of $392,000, on certain conditions. This 45-mile electric railway will connect Tulare, Visalia, Lindsay and Porterville. [E. R. J., Nov. 22, '13.]

Washington Railway & Electric Company, Washington, D. C.—Plans are being considered by this company for an extension on Nichols Avenue, Congress Heights.

Jacksonville (Fla.) Traction Company.—Plans are being made by this company to double-track its Main Street line from a point between Twelfth Street and the city limits of Jacksonville.

***New Smyrna, Fla.**—Plans are being considered to build an electric line between the St. Johns River, either at Enterprise or at Blue Spring Landing, and New Smyrna by way of Lake Helen. There is a good prospect that a sufficient amount of money will be raised to carry the project through.

Chicago, Peoria & Quincy Traction Company, Quincy, Ill.—It is planned that work will be begun upon the first section of the new interurban line between Hollis, Ill., and Lewistown, Ill., within the next month. Right-of-way is now being secured and stock sales will be begun soon. The new line, as projected, will pass through six county seats and connect Chicago, Peoria and Quincy. [E. R. J., May 9, '14.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—During the next few weeks this company plans to award contracts to build about 2250 ft. of new track to the city park in Pittsburg.

Shreveport (La.) Traction Company.—An extension of the Fairfield line in Shreveport to South Highlands is being contemplated by this company.

Hagerstown & Frederick Railway, Frederick, Md.—This company, which was recently financed, is considering the construction of lines to Brunswick and Emmitsburg. Toward Brunswick, the line now goes as far as Jefferson, about 6 miles away. In the northern end of the county a spur of the railway reaches to Thurmont, about 7 miles from Emmitsburg.

Winnipeg (Man.) Electric Railway.—Plans have been approved for the extension of this company's line from lot 83, St. Norbert, past St. Norbert Station. John H. Kern, Moose Jaw, has been awarded the contract by the Council to build the extension from Winnipeg to Transcona.

Bay State Street Railway, Boston, Mass.—This company will extend its tracks on Lynnfield Street about ½ mile, to include the present residential section in Lynn.

Springfield (Mass.) Street Railway.—This company is asked to build an extension in Springfield from Maple Street, through Ross Avenue, Elm Street, South Street and Washington Avenue to Charles Street.

Electric Short Line Railroad, Minneapolis, Minn.—Officers of this company, which plan to build an electric line southward through eastern South Dakota, as a continuation of a line from Minneapolis to the western section of Minnesota, will visit Flandreau and other cities and towns in South Dakota to make arrangements to have the line extended through this section. The company expects to build to Brookings, and from that city southward to Sioux Falls, and ultimately to Sioux City. The new line south of Brookings will be constructed on what is known as the Stewart grade, which extends into Moody county. From there a new grade will be made to Flandreau and to Sioux Falls. It is believed that as the result of the visit to be made by the officers soon arrangements can be made for the construction of the proposed line to this part of the northwest.

Kansas City, Ozark & Southern Railway, Ava, Mo.—Plans are being prepared by this company for an extension south from Ava, through Ozark County.

City Light & Traction Company, Sedalia, Mo.—During the next few weeks this company expects to rebuild some of its tracks in Sedalia.

Meridian Light & Railway Company, Meridian, Miss.—This company has awarded a contract to Griffin & Company, Meridian, to grade its Twenty-fourth Avenue line in Meridian.

Public Service Railway, Newark, N. J.—This company has placed in operation its new crosstown line in Camden.

Jamestown, Westfield & Northwestern Traction Company, Jamestown, N. Y.—This company has placed in operation its electric line between Jamestown and Bemus Point.

New York & Long Island Traction Company, Hempstead, N. Y.—Work on a new line in Queens will soon be under construction by this company, which will connect its present lines in the Jamaica section with the elevated extension on Liberty Avenue, Jamaica. A certificate of extension was filed recently with the Queens County Clerk. The company will extend a line from the Rockaway Plank Road to Liberty Avenue at Ozone Park, where connection will be made with the new elevated line, and will add a loop on Ocean Avenue.

New Bern-Ghent Street Railway, New Bern, N. C.—Plans are being considered by this company for an extension from New Bern into Jones County.

***Williston & Northern Electric Railroad, Williston, N. D.**—This company has been organized to build a 60-mile electric railway from Williston north along the west side of the Little Muddy Valley. The following officers were elected: A. H. Brown, president; F. R. Zahl, vice-president; H. W. Braatlien, secretary, and N. N. Landrol, treasurer.

Ohio Electric Railway, Cincinnati, Ohio.—Plans are being prepared by this company for the continued use of the present piling bridge for car traffic during the construction of the new bridge in Hamilton.

Cleveland (Ohio) Electric Railway.—This company plans to lay, in both renewals and extensions, approximately 29 miles of single track. This construction will include 95-lb., 7-in. T-rail on wood and steel ties with the standard Clark joint.

Columbus, Marion & Bucyrus Railway, Marion, Ohio.—During the next few weeks this company will award contracts to build a new entrance into Marion.

Toronto Suburban Street Railway, Toronto Junction, Ont.—Plans are being made by this company to extend its Weston-Woodbridge line to Brampton, Ont., to connect with its Lambton to Guelph line just west of Brampton. The Lampton to Guelph line is rapidly approaching completion.

Dunville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—The Clinton Township Council has passed a resolution asking the Hydro-Electric Power Commission of Ontario to take over the incomplete Dunville, Wellandport & Beamsville Electric Railway.

Hershey (Pa.) Transit Company.—During the next few weeks this company will award contracts to build 10 miles of new track from Hershey to Elizabethtown.

South Fork-Portage Railway, Johnstown, Pa.—This company is completing its roadbed between South Fork and Portage, a distance of 7½ miles.

Reading (Pa.) Transit Company.—Plans are being considered by this company to build a line along Twelfth Street in Reading.

Rhode Island Company, Providence, R. I.—Work has been resumed by this company on the new electric line to Chepachet, above Greenville.

Moose Jaw (Sask.) Electric Railway.—A. H. Dion, general superintendent of this company has notified the City Council that he had been authorized by the directors to proceed with the extension on Hall Street, for ½ mile from Main Street in Moose Jaw. The Council passed a resolution calling upon the company to extend the line on Hall Street to Eighteenth Avenue, and along that avenue so as to connect with the line now in operation on Athabasca Street East.

Carolina Traction Company, Rock Hill, S. C.—During the next six weeks this company will award contracts to build 2 miles of new track in Rock Hill.

Sioux Falls (S. D.) Traction System.—This company is now paving about 2 miles of track in Sioux Falls. In the business district a granite block paving is being laid and granite cement concrete is being laid in the residence section. Special work is being done in the way of crossings, turnouts and side tracks, in preparation for paving.

Bristol (Tenn.) Traction Company.—This company is broadening the gage of the Holston Valley Railway and electrifying it. This line extends for a distance of 10 miles east from Bristol and terminates at Big Creek Park on the Holston River.

Chattanooga (Tenn.) Railways Company.—Surveys have been completed, but it has not yet been decided when construction will be begun by this company on its 4-mile electric line between Rossville and Port Oglethorpe. Headquarters: 710 Market Street, Chattanooga, Tenn. E. Reed, general superintendent. [E. R. J., March 22, '13.]

Texas Traction Company, Dallas, Tex.—An extension of the Gray's Hill line to the street north of the Sherman Hospital in Sherman is being contemplated by this company.

***Mineral Wells Interurban Railway, Fort Worth, Tex.**—Plans are being considered to organize this company to build an electric railway to extend from Fort Worth northwest through Parker County, via Springtown and through the northern section of Palo Pinto County, to Mineral Wells, a distance of 50 miles. Those who are likely to organize this company are: E. E. Baldridge, W. E. Connell, S. Davidson, B. J. Tillar, G. T. Reynolds, J. R. Christal, M. Sansom, John P. King, B. H. Davenport and E. D. Farmer. These men were the directors of the Fort Worth-Denton Interurban Railway.

Northern Texas Traction Company, Fort Worth, Tex.—Plans are being considered by this company to build an electric line in Handley.

Marshall (Tex.) Traction Company.—During the next six weeks this company plans to rebuild 2400 ft. of track on Washington Avenue in Marshall. An 18-in. concrete roadbed will be laid with 72-in. rails.

McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.—Surveys are being made by this company on its 77-mile line between McKinney, Bonham and Paris. L. A. Scott, McKinney, chief engineer. [E. R. J., May 23, '14.]

San Antonio, San José & Medina Interurban Railway, San Antonio, Tex.—This company will begin construction at once on its line to connect San Antonio, San José and Kirk. There will be one steel bridge 100 ft. long on the line, and towers for conveying current from the Medina dam to supply San Antonio and other cities will be erected along the right-of-way. [E. R. J., May 23, '14.]

Ogden (Utah) Rapid Transit Company.—Plans are being made by this company to begin work at once on its extension from the Hermitage, in Ogden Canyon, to Huntsville. Plans are also contemplated for a line to Logan, Lewistown and Preston, Utah. Several short extensions are being built in Ogden.

Barre & Montpelier Traction & Power Company, Montpelier, Vt.—During the next few weeks this company expects to pave a portion of State Street in Montpelier.

South Richmond & Chesterfield Railway, Richmond, Va.—Plans are being made to begin the construction of this line from Broad Rock Road and Hull Street, Richmond, to Falling Creek. J. C. Robertson, Richmond, is interested. [E. R. J., April 11, '14.]

Seattle (Wash.) Municipal Railway.—The City Council has voted $500,000 of utility bonds to complete the municipal line in Rainier Valley. Plans for the line have been approved by the Mayor.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—Plans are being made by this company to extend its Balland Beach line sixteen blocks in Seattle.

Charleston (W. Va.) Traction Company.—It is reported that this company has awarded a contract to the American Bridge Company for a 1500-ton steel bridge to be erected over the Kanawha River in Charleston.

West Virginia Traction & Electric Company, Wheeling, W. Va.—The double-tracking of this company's line along the National Road and through Fulton to Glenwood station is contemplated.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company is making all the necessary preliminary arrangements preparatory to beginning construction work on its line between Milwaukee and Fox Lake.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company has asked the Railroad Commission of Wisconsin for certificates of convenience and necessity to build an interurban electric railway between Janesville and Madison.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—Work has been begun by this company laying new ties and ballasting its line between Sheboygan, Plymouth and Sheboygan Falls.

SHOPS AND BUILDINGS

Bristol & Plainville Tramway Company, Bristol, Conn.—During the next few weeks this company plans to build an addition to its carhouse in Bristol.

Southern Iowa Traction Company, Centerville, Ill.—This company's depot at the corner of Washington Street has been completed and is now ready for occupancy. The building has been remodeled.

Illinois Traction System, Peoria, Ill.—J. J. Jobst has begun the work of excavating for the foundation for the new $400,000 interurban station to be erected by this company on Hamilton Boulevard and Jefferson Street in Peoria. Bidders on the construction for the buildings and train shed have been asked to resubmit their bids. The first bids were not uniform. It is expected that the bids will be resubmitted within a few days and that the contract for the structure will be let in a short time.

Centerville Light & Traction Company, Centerville, Ia.—Another improvement found necessary by this company will be an addition, 90 ft. x 60 ft., built on the rear of its carhouse, and a 50 ft. x 60 ft. addition on the front of the present carhouses. A new repair shop will also be added, 90 ft. x 25 ft. The work will be done by B. S. Staley and will be begun at once.

Metropolitan Street Railway, Kansas City, Mo.—Plans are being considered to build a new depot in Kansas City.

Ohio Electric Railway, Cincinnati, Ohio.—This company is asked to consider plans to build a new passenger station at Fort McKinley.

POWER HOUSES AND SUBSTATIONS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has awarded a contract to the Alabama Power Company to furnish power for its lines in Birmingham.

Tampa (Fla.) Electric Company.—To increase the efficiency of this company's power house, six new boilers will be installed in the West Jackson Street power plant during the summer. A new smokestack will be built, made of radial brick and 200 ft. in height. The improvement will cost approximately $20,000.

Centerville Light & Traction Company, Centerville, Ia.—This company has made arrangements with the Southern Railway & Light Company to furnish the power for its lines in Albia.

Somerset Traction Company, Skowhegan, Maine.—This company's new substation in Skowhegan is nearing completion. The structure is of brick and concrete construction and is equipped by the Westinghouse Electric & Manufacturing Company. A 300-kw rotary converter has been installed. All apparatus and supplies have been purchased.

Bay State Street Railway, Boston, Mass.—This company will double the capacity of its power plant when the additions and improvements now in process at the Mason Street power house are completed.

City Light & Traction Company, Sedalia, Mo.—This company is installing a Le Blanc condenser, cooling tower and Tirrill regulator at its power house in Sedalia.

Interborough Rapid Transit Company, New York, N. Y.—Two 4000-kw rotary converters and transformers have been installed in this company's substation at 110th Street and Eighth Avenue, New York, N. Y. The apparatus was ordered from the General Electric Company.

New York Municipal Railway, Brooklyn, N. Y.—This company is asking for bids on three 4000-kw, one 3000-kw and three 2000-kw rotary converters, all to include transformers and switchboard apparatus. This new equipment is for its new subway system.

Columbus, Marion & Bucyrus Railway, Marion, Ohio.—During the next few weeks this company expects to build a new power house in Marion.

Manufactures and Supplies

ROLLING STOCK

Warren-Bisbee Railway, Warren, Ariz., expects to purchase two double-truck cars.

Arkansas Northwestern Railroad, Bentonville, Ark., has ordered one 70-ft. car from the McKeen Motor Car Company.

Bristol & Plainville Tramway Company, Bristol, Conn., expects to purchase two double-truck closed cars within the next few months.

Minneapolis & Northern Railroad, Minneapolis, Minn., has received one 55-ft. gasoline-motor freight-and-express car from the McKeen Motor Car Company.

Minneapolis, St. Paul & Sault Ste. Marie Railway, Minneapolis, Minn., has received one 75-ft., 200-hp gasoline-motor car from the McKeen Motor Car Company.

Detroit, Toledo & Ironton Railroad, Detroit, Mich., is equipping two 50-ft. cars with storage battery equipment ordered from the Railway Storage Battery Car Company. The storage batteries, with an amp. output of 450 amp., will constitute the heaviest storage battery equipment that has yet been installed in storage battery propelled cars in the United States. The cars will be operated at a train speed of 50 m.p.h. Westinghouse motors, air-brakes and control are provided.

Cambria & Indiana Railroad, Philadelphia, Pa., has ordered one 50-ft. storage-battery car from the Railway Storage Battery Car Company. The car-body, which consists of separate passenger, smoking, baggage and mail compartments, will be built by The J. G. Brill Company. The car will be equipped for both storage-battery and trolley operation; on a certain 5 per cent grade section of the line trolley operation alone will be used. The passenger compartment will provide a seating capacity of fifty persons, the smoking compartment ten persons. The interior finish will be mahogany. Westinghouse 25-hp motors, control and air brakes will be provided.

New Orleans Railway & Light Company, New Orleans, La., has issued through its controlling company, the United Gas & Electric Corporation, New York, N. Y., specifications for fifty 47 ft. 8 in. all-steel maximum-traction truck, pay-as-you-enter, arched-roof cars. The specifications provide for a seating capacity of fifty-five persons; length of car body, 34 ft. 8 in.; wheelbase, 4 ft. 10 in.; distance between truck centers, 22 ft.; height from rail to sills, 29 in.; headlining, Agasote; curtains, Pantasote. There will be eighteen transverse wooden slat seats, two longitudinal seats at each end and one removable platform seat. Double doors will be provided at the rear and single doors at the front of the car. Folding steps will be furnished for both doors; the double door, however, will be operated only at the end of the run. There will be no grab handle, but instead an inside vertical grab stanchion. Cables will be inclosed in channel-shaped ducts running along the center of the roof. Horizontal tubes and stanchions will be installed instead of straps. These cars, it is expected, will be ordered within about a week.

TRADE NOTES

Titan Storage Battery Company, Newark, N. J., has appointed W. Crighton Harris as chief enginer. Mr. Harris recently resigned from the engineering firm of Crighton, Harris & Company.

Acme Supply Company, Chicago, Ill., has appointed R. C. Munro to a position with its railroad sales department. Mr. Munro recently resigned as western representative of the Wendell & Macduffie Company.

Rooke Automatic Register Company, Providence, R. I., has received an order to place its system of fare collection on all of the cars of the Elmira Water, Light & Railroad Company, Elmira, New York. More than fifty roads are now using in daily service this system of fare collection.

Electric Storage Battery Company, Philadelphia, Pa., has appointed Nelson B. Hazeltine, formerly Philadelphia district sales manager for the Adams-Bagnall Electric Company, Cleveland, Ohio, to a position in its sales organization, with headquarters at the New York office, 100 Broadway.

Trussed Concrete Steel Company, Detroit, Mich., has removed its general sales offices to its plant at Youngstown, Ohio. The publicity department of the company will remain in Detroit. In addition an eastern engineering and selling organization will be established in New York to handle Michigan business.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has widely extended the territory of the E. R. Mason Company, its Eastern representative. Heretofore, the E. R. Mason Company has handled the line in New York only, but beginning with the first of June it will cover in addition the entire New England States, New York, New Jersey, Delaware and eastern Pennsylvania.

Allgemeine Elektricitäts Gesellschaft, Berlin, Germany, has received from the American Museum of Safety the gold medal of the Travellers' Insurance Company, Hartford, Conn., which hitherto has been awarded only to the Pennsylvania Railroad Company and the New York Edison Company. The medal is given in recognition of the Allgemeine Company's achievements in conserving life and limb in its German workshops.

H. M. Byllesby & Company, Chicago, Ill., announce the resignation of R. E. Wilsey, vice-president and manager of the bond department, and F. W. Stearns, vice-president and legal representative of the company. It is reported that Mr. Wilsey will enter the bond business on his return to this country after a trip abroad. W. H. Clarke, formerly assistant manager of the bond department, has been appointed manager of that department.

Prince-Groff Company, New York, N. Y., manufacturing "Pressurlokd" water gage systems, the "Wedglok" track drilling system and "Kwikgrip" pipe wrenches, has recently elected a new staff of officers and also moved its general offices to 50 Church street, New York. The new officers are Sherman W. Prince, president; Clarence B. Groff, vice-president, and George W. Steinmetz, treasurer. Charles H. Spotts has been appointed sales manager.

Edward T. Stotesbury has retired from the board of directors of the Cambria Steel Company, the vacancy caused by his resignation having been filled by the election of E. Silck, vice-president and general manager. Mr. Stotesbury has also resigned from the board of the Cambria Iron Company, which is controlled by the Cambria Steel Company, and has withdrawn from the executive committee of the board of the Pennsylvania Steel Company.

Nachod Signal Company, Inc., Philadelphia, Pa., has recently fitted up a demonstration room at its offices, 50 Church street, New York, where automatic signals controlled by trolley contactors are shown in operation on miniature track plans, and with moving cars. Electric railway managers may thus get information on signaling most conveniently and in a short time by inspecting this demonstration. The company is showing single-track signals, double-track signals and highway-crossing bells.

H. W. Johns-Manville Company, New York, N. Y., has appointed Allan Wallace as traffic manager with office at the company's headquarters in New York City. Mr. Wallace was formerly connected with the traffic department of the Grand Trunk Railway. He was afterward made assistant to the manager of the Lehigh Valley-Grand Trunk Fast Freight Line, with headquarters at Buffalo, N. Y., and subsequently became general agent of the Grand Trunk Railway, leaving the service of the latter company to enter commercial life in the capacity of traffic manager, later handling railway sales. This company has moved its Duluth office to larger quarters at 327 West First Street.

ADVERTISING LITERATURE

Goldschmidt Thermit Company, New York, N. Y., has issued a catalog describing its system of thermit welding for locomotives and railroad shops.

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued catalog P describing and illustrating various installations of its overhead hand traveling cranes.

P. Wall Manufacturing & Supply Company, Pittsburgh, Pa., has issued a catalog describing its steel specialties, among which are steel gongs for locomotives, foot, roof and hood gongs for street railways and galvanized steel oil tanks and waste cans.

Kindling Machinery Company, Milwaukee, Wis., has issued a catalog describing and illustrating its "Squeegee" street washing machine and its sand spreader. The catalog contains reports of successful tests of the street washing machines which were conducted in New York and Washington, D. C.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 153 listing its special offerings and other used materials, among which are boilers, cranes, crushers, engines, flat and gondola cars, concrete mixers, pipe switches, tracks and trucks, and including an illustrated page on new goods and specialties.

Esterline Company, Indianapolis, Ind., has issued a complete catalog on "Golden Glow" railway headlights. This publication is printed in colors showing the lighting effects obtained with the headlights. The questions of parabolic reflectors, glass parabolas and incandescent bulbs are fully discussed, and headlights adapted for recessed or extended dash, hood-mounting and high power headlights for interurban and electric locomotive service are illustrated and described.

Babcock & Wilcox, New York, N. Y., have issued a bound catalog on the subject of chain grate stokers, which in attractive appearance and general method of compilation constitutes a companion book to the catalog on superheated steam recently issued by them and described in the ELECTRIC RAILWAY JOURNAL of May 23, 1914. The stoker catalog includes, among a number of interesting illustrations, views of actual installations of the Commonwealth Edison Company, Public Service Company of Northern Illinois, Pennsylvania Tunnel & Terminal Railroad, Twin City Rapid Transit Company, Chicago Elevated Railway and Louisville Railway.

Lumber, Tie & Timber Vulcanizing Company, New York, N. Y., has issued a catalog describing its method of quickly curing lumber green from the saw. Railroad ties, it is claimed, may be cured by this treatment in six to twelve hours. The treatment consists in loading the lumber direct from the sorting chains on to cars and running the cars into a steel cylinder covered with a magnesia or asbestos covering in order to minimize loss of heat due to radiation, and provided with rapidly closing vacuum-type dors. Owing to the constant pull of the vacuum all cells of the wood are kept normal, thus tending to reduce shrinkage. Further shrinkage is practically eliminated due to the distribution of the chemicals and the elimination of moisture.

Electric Service Supplies Company, Philadelphia, Pa., has issued a folder descriptive of Keystone trolley catchers. The folder, to be distributed in Great Britain, has on its front cover an effective illustration showing a Keystone catcher installed on a single-truck, double-deck car of the type used almost exclusively in London. These folders are being distributed in Great Britain at this time to take advantage of the discussion there regarding the demand made by the car men for either vestibules or wind screens. With either of these placed on the cars now in operation the personal attention which has been given the trolley rope by the conductor or trolley boy would be very much hindered and would necessitate installing trolley catchers to "watch the poles."

Automatic Coin Wrapping Machine Company, New York, N. Y., has issued a catalog describing the Batdorf motor-driven automatic machines for separating, computing, wrapping and packing coin. In the coin wrapping machine the coins are fed into a hopper. The machine then automatically counts the predetermined number of coins for the package; tears off the wrapper from the roll of paper and securely wraps it around the coins; crimps in the ends of the wrapper and while wrapping this package the machine is counting the required number of coins for the next package. This machine counts various denominations of coins at the rate of 350 coins a minute. The coin handling machine automatically counts coins at the rate of 750 per 1000 coins a minute. Among the electric railways which are mentioned in the catalog as using this coin handling system are the Pittsburgh Railways, United Railways, St. Louis, Mo., and Denver City Tramway Company.

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THE M. C. B. CONVENTION

No casual visitor at the forty-eighth annual convention of the Master Car Builders' Association, which was held at Atlantic City during the past week, could fail to be impressed with the vast amount of technical work accomplished during the three sessions. In addition to the routine business of the organization the reports of eighteen committees were considered and subjected to discussion, including matters of such extended scope and vital importance as a revision of the rules of car interchange and the standardization of coupler design. Obviously the activities of so representative a body must continue regardless of any temporary stagnation in business such as that from which the railroads are suffering. This fact is borne out by the size of the registration lists at the convention as well as by the number and extent of the exhibits. Indeed, the 250 exhibitors with their 82,000 sq. ft. of floor space offer an impressive display of confidence in the early banishment of hard times. The exhibits themselves, of which a brief account is given on another page, are characterized by the importance that has been accorded to locomotive superheaters and stokers, pieces of apparatus which appeal, of course, more especially to the delegates of the Master Mechanics convention which will be held next week, although, in addition to this, the solid cast-steel truck side appears in many different forms. The display of machine tools is unusually elaborate and is notable throughout for refinement of finish, a feature that has been generally lacking in American-built machinery in the past. Nevertheless, the gross weight of machines shown actually exceeds by 10 per cent the exhibition at last year's convention. This fact alone serves as an indication of confidence in the importance of the convention as a whole.

INTERSTATE SYSTEM OF ACCOUNTS

The new system of accounts for electric railways, issued by the Interstate Commerce Commission for electric carriers subject to its jurisdiction, was prepared in conference between representatives of the commission and the committee on a standard classification of the American Electric Railway Accountants' Association. The titles of the accounts are published in this issue. The classification will probably become the standard of the Accountants' Association. This should influence its adoption in the country at large. The number of roads that will adopt the system because they are required so to do by the interstate character of their operations is very small. The great majority of the roads are now using either the earlier standard classification of the association or a modification thereof, or they are using a system prescribed by the State commission to which they report. The States have not acted uniformly in their preparation of accounts for electric railways. They have, of course, generally adopted the Interstate Commerce Commission classification of accounts for steam railroad companies; in fact, this classification is mentioned specifically in some of the State laws creating commissions. If the Interstate Commerce Commission had developed its system for electric railways several years ago, probably the State commissions would have held the same attitude toward it that they held toward the interstate system for steam railroads. However, it is desirable now that all interests work together so as to effect a gradual introduction of a uniform system. The interstate classification contains the provision for recognition of the principle of depreciation upon which some of the State commissions have insisted. There is, therefore, no reason from this standpoint why it should not be adopted generally by the States. Certainly uniformity is greatly needed. The result of its introduction will be comparisons where comparisons cannot be made fairly now because of differences in accounting methods.

PUBLIC POLICY OF TWO INDUSTRIES

While the problems of electric utilities are different from those of electric railways, the two classes of properties have much in common. For this reason the report of the public policy committee of the National Electric Light Association, an abstract of which was published in our issue of last week, is of much more than passing interest. Many of our readers are connected with companies that furnish both classes of service and are therefore equally interested in the problems of each. Some fundamental differences mark the work of the two classes. For instance, the urban railway industry is older than the electric lighting system, and a volume could be written on the differences that arise from this fact. The electric railway has a flat rate of fare; the lighting industry has variable rates. The electric railway suffers unmeasured harm because it is necessarily in constant contact with the public; the electric industry is not hampered by comparison of rush-hour service with normal service. Yet these points of difference, sharp as they are, become as nothing when the larger issues of the two industries are under consideration. Both are affected in the same way by anything that disturbs or changes relations with the public. Both are affected equally by regulation. Movements toward municipal ownership are of the same concern to the one as to the other. The issues are, in fact, so close that each industry should study the other. There should be the closest co-operation between the two classes. It is much to be desired that the co-operation which has been developed between the public policy committee of the Light Association and the public relations committee of the American Electric Railway Association shall be continued and strengthened. Any means toward this end which can be taken by the railway officials should be adopted without delay.

TIME TO BOOST THE CONVENTION It takes extra energy to get a car up to speed, owing to the fact that a great deal of energy must be stored in momentum. After the car is up to speed, a comparatively small amount of power will keep it going. This homely but accurate analogy is intended to introduce the statement that now is the time to show an active interest in the Atlantic City convention, in spite of the fact that that important meeting is still four months off. Quite a little of that four months is the vacation season when acceleration is not the order of the day, coasting being rather more popular. The next few weeks are the best for planning. The many committees of the association are now holding their summing-up meetings, at which the work of the winter is being brought to a head and put into the form of concrete resolutions and recommendations. The manufacturers are engaging space for their exhibits and are making plans as to the details thereof. A number of important and interesting recommendations are to be made to the convention, and the prospects are bright for the best exhibition yet. The ELECTRIC RAILWAY JOURNAL will do everything in its power during the summer months to keep the industry informed as to the development of convention plans. In the meantime we will continue to remain cheerful by remembering that bumper wheat crops are reported and therefore that the return of general prosperity ought not long to be delayed. A first-class convention will help to bring it back.

PHILADELPHIA RAPID TRANSIT AGREEMENT

The agreement reached by A. Merritt Taylor, Director of City Transit, Philadelphia, and the Philadelphia Rapid Transit Company, abstracted elsewhere in this issue, is of vital importance to the city of Philadelphia, and if ratified by Councils and approved by the Public Service Commission it will mean a realization of the city's long-felt desire for a more extensive transportation system. The supreme importance of the plan lies in the fact that the present and proposed transit facilities will be operated as a unit in such a manner as to give the public the greatest service at the least cost. It does not require much more than a superficial examination to disclose terms in the contract that are clearly of advantage to the city, and it should be realized by the public that the broad-minded citizenship of the company's officials has been no less instrumental in bringing the agreement to its present stage of development than the assiduous efforts of the city's representatives.

The proposed plan provides for a total investment of approximately $63,000,000, of which $45,500,000 will be invested by the city in building the subway and elevated lines, about $12,000,000 by the Philadelphia Rapid Transit Company for the equipment of these municipally owned lines, and about $6,000,000 by outside interests in constructing the Camden tube. Under this plan Philadelphia takes a place in rapid transit development more in keeping with its area and population as judged by the extensive systems already existing or under construction in New York, Chicago and Boston.

The salient features of the program from the city's standpoint are these: The city is to own all the new facilities. It may compel the company to extend existing lines in accordance with traffic conditions as determined upon hearing before the Public Service Commission, and the Transit Department and the City Comptroller are to have access to the company's books and accounts for auditing purposes. In consideration of the elimination of the present annual charge of $800,000 for exchange tickets and the establishment of practically universal free transfers, the city is to postpone sinking fund payments for seven years and to release the company for six years from the payment of taxes now levied upon subsidiary dividends of about $116,000 per year, or a total of $696,000. Moreover, the city has secured a waiver of all dividends accrued on the Philadelphia Rapid Transit Company's stock up to Dec. 31, 1914, thereby cancelling a $12,000,000 obligation which would otherwise have to be liquidated before the city could share in the profits above 6 per cent on the company's capital stock under the 1907 contract.

On the other hand, the transit company has also received certain valuable considerations for its participation in the program. From the earnings of the new high-speed lines certain preferential payments will be deducted—namely, 6 per cent on the company's investment for equipment, and after ten years a further 1 per cent to be set up in a sinking fund to extinguish the cost of this equipment. There is also a carefully worded provision to reimburse the company for any falling off in the net income of the existing system on account of the diversion of traffic to the new city-owned lines. The preferential payments are based upon the average net income from the present system for the two fiscal years prior to the operation of the first city-owned line. After such deductions as the above and a further subtraction of interest and sinking fund accruals the surplus is to be divided between the city and the company in proportion to their relative investments.

It is difficult to see how a much more positive guarantee could be given to the city for that increased growth and prosperity that inevitably follows the development of rapid-transit lines. The cost is substantially offset by the one mill tax on personal property that has been turned over by the State to the city, by the increase in property taxes that will be caused by enhanced values, and by the cancellation of the annual $800,000 exchange ticket charge. The area suitable for new buildings will be so enlarged as to make it possible for Philadelphia to continue on a wider scale than ever its development of small homes, and the efficiency of the population will be increased by the time saving to a capitalized money value of about $38,780,000. It may be remembered that Philadelphia is the first American city that has ever had a scientific analysis made of the business possibilities of a proposed rapid-transit system. The celerity with which the city and the company have reached the present program is a fitting sequel to the thoroughness of the preceding engineers' report, and it is to be hoped that Councils will not attempt to play politics or interpose delays for the sake of diverting contract opportunities to party favorites. The program has developed too far for the city to brook any factitious obstruction.

ALL-STEEL CARS FOR CITY SERVICE

Elsewhere in this issue is a communication from an engineer of equipment who has devoted an exceptional amount of attention to the subject of car design for city service, and his discussion of the use of all-steel construction for city cars is a very thorough exposition of the subject and certainly well worth perusal. In one case, however, we feel inclined to take issue with the writer. This is in regard to the use of commercial rolled shapes in place of pressed-steel members. Our correspondent's implication is that the former are generally very desirable. As a matter of fact, the average rolled shape, or at least the channel and the I-beam, is designed primarily for use in permanent structures in which weight is a secondary consideration, although as pointed out by our correspondent himself weight is a very serious matter in steel car design. The use of angles and tees is, of course, a necessity in all-steel construction, and to this extent the commercial shape is desirable. In the end, however, so much weight is saved by the use of members with wide flanges pressed from steel plate, and so many advantages in flexibility of design over the commercial shapes can be utilized that the expense of making dies is certainly not of very great importance. When a certain amount of standardization has been developed it will become negligible.

The wonderful possibilities of a pressed-steel design with regard to economies in weight is illustrated by the case of the new 67-ft. car of the New York Municipal Railway Corporation, the framing of which is described elsewhere in this issue. It is true, of course, that this particular car is intended for subway and elevated high-speed service and not for surface operation, but it bears a significant message of economy for the user of city cars. When rolling stock 10 ft. wide can be built to a weight of 1268 lb. per running foot of car fully equipped, the merits of the pressed steel construction cannot be overlooked.

We are, however, in exact accord with our correspondent's statement regarding the ease of forming pressed-steel work. The difficulties of this process have been very greatly exaggerated in the past, possibly because the operation has not been understood. It is true that the use of steel pressings is growing in electric railway repair shops, and in connection with steel car repairs the introduction of the operation need cause no apprehension. Even this work, however, is seldom needed for steel-car maintenance except in case of severe collisions.

The possibility of making complete repairs in a railway company's shop is used by our correspondent as an argument against the tubular post, and undoubtedly the argument is sound. As a matter of fact, even within the last year the tubular steel post has decreased in popularity, at least so far as number used is concerned. Of course, the inherent complication of repairs involved by the tubular steel post design has been accepted largely because of the desire for an all-steel interior finish, but since we consider that steel paneling even for interurban equipment is unnecessary and, on account of its great cost, undesirable, we feel that a pressed or even rolled piece with a finish of wood serves the purposes of a post far better than a tube of thin steel, which has been formed in a complicated outline.

Of course, the matter of collisions in city service is one which affects repairs only. The physical danger to passengers is so slight as to be utterly negligible, and, as pointed out in the communication under discussion, this has had and will continue to have but little influence in deciding whether steel or wood shall be used for the construction of city cars. The question of preference is going to be decided along the lines of maintenance, weight and cost. However, the fact that collisions exert an influence on maintenance costs will be accepted readily by anyone who has witnessed a collision of even moderate severity and seen the roof of a wooden car move forward and spring every post in the sides. Here is a feature inherent in the steel car which is doubly important. Obviously, such a form of damage could not occur to a car designed so that its sides acted as a pair of trusses between the letter-boards and the sills. This conception of the duties of car-side construction, however, appears to take hold but slowly, although it has been universally adopted by the most successful designers of rapid-transit cars. There is no reason whatsoever that prevents its use in city service.

Summed up, our correspondent's communication amounts to a strong argument for the use of the all-steel car in all classes of service. If steel construction was generally accepted as best for city cars, its even greater advantages for high-speed service should logically displace the wooden car completely, because, as pointed out, the strains and vibration of elevated, subway and interurban service demand even now a greater strength and rigidity than can be supplied by wood.

Detroit United Railway's New Machine Shop

This Fireproof Structure, Unique in Many Particulars, Is the Second of the Group of Four Buildings Which Will Form This Company's General Repair Shops

The machine shop building of the Detroit United Railway's new repair shop group has just been completed. This structure, like the paint shop built by this company in the spring of 1913 and described in the ELECTRIC RAILWAY JOURNAL of April 12, 1913, on page 668, is fireproofed throughout and contains many unique features. The grouping of the various machine shop departments, the arrangement of the overhead crane system, as well as the construction details, are original in many particulars.

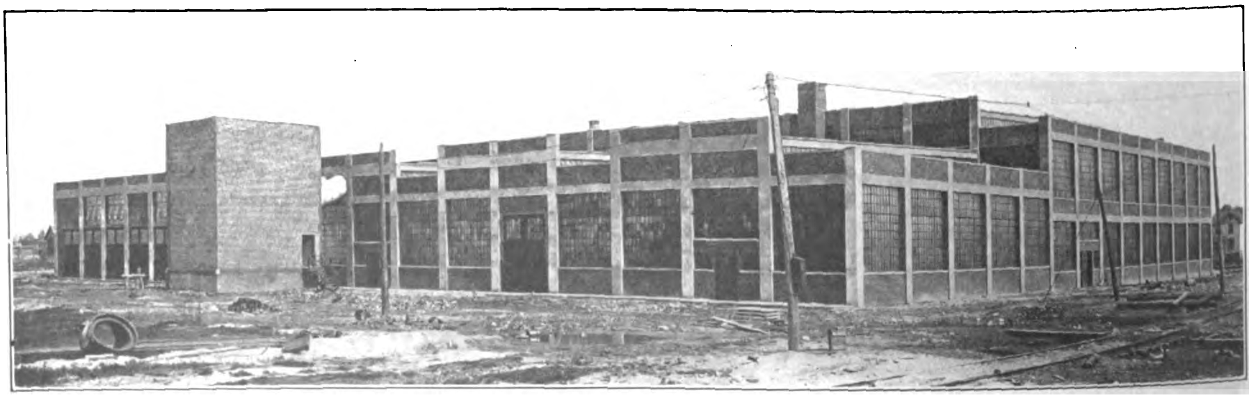
As mentioned in the article describing the new paint shop, the four buildings which will form the complete repair shop group are arranged in the form of a square with a building in each corner. A public street divides the group through the center and serves as a means of entrance for teams as well as for two of the double-track leads to the transfer table pit entrances to the buildings. The site is in Highland Park, a suburban district just outside the corporate limits of Detroit, approximately 6 miles north of the business center of the city.

The repair shop property fronts 800 ft. on Woodward Avenue, a principal thoroughfare leading into the city from the north, and it extends west for a depth of 2616 ft. Occupying the east half are the Woodward Avenue carhouse and storage yards, one of the most important stations on this company's system. The shops occupy the west half of the property and are reached by a double-track entrance from the double-track line in Woodward Avenue which, in addition to being the most important city railway line, serves as an entrance for interurban cars. Existing crosstown lines, as well as several new ones recently completed or under construction, intersect the Woodward Avenue line, so that the new repair shops are accessible from all parts of the city as well as from the six interurban lines radiating in three directions from Detroit. A steam-road connection with the Detroit Terminal Railroad provides access to practically all of the steam railroads entering Detroit. This location is also desirable because it is close to a residential district where shop employees can afford to live. At the same time the 48 acres in the tract afford ample space for expansion.

GENERAL ARRANGEMENT

In plan the new machine shop building is 235 ft. 7 in. x 306 ft. It is divided into three departments, namely, the truck shop, 151 ft. 4 in. x 235 ft. 7 in. in size; the machine shop, 152 ft. x 153 ft., and the blacksmith shop, 83 ft. 6 in. x 153 ft. The electrical repair shop is situated on the second floor over the machine shop and has the same area. This building occupies the corner diagonally opposite from the new paint shop and is served by two transfer tables. These in turn are reached by four track leads, two on each side of the building, which connect into the main tracks extending along the north side of the repair shop property. Since a transfer table was not needed for entrance to the blacksmith shop, except for the delivery of materials, that portion of the transfer pit beside it was available for the heating plant.

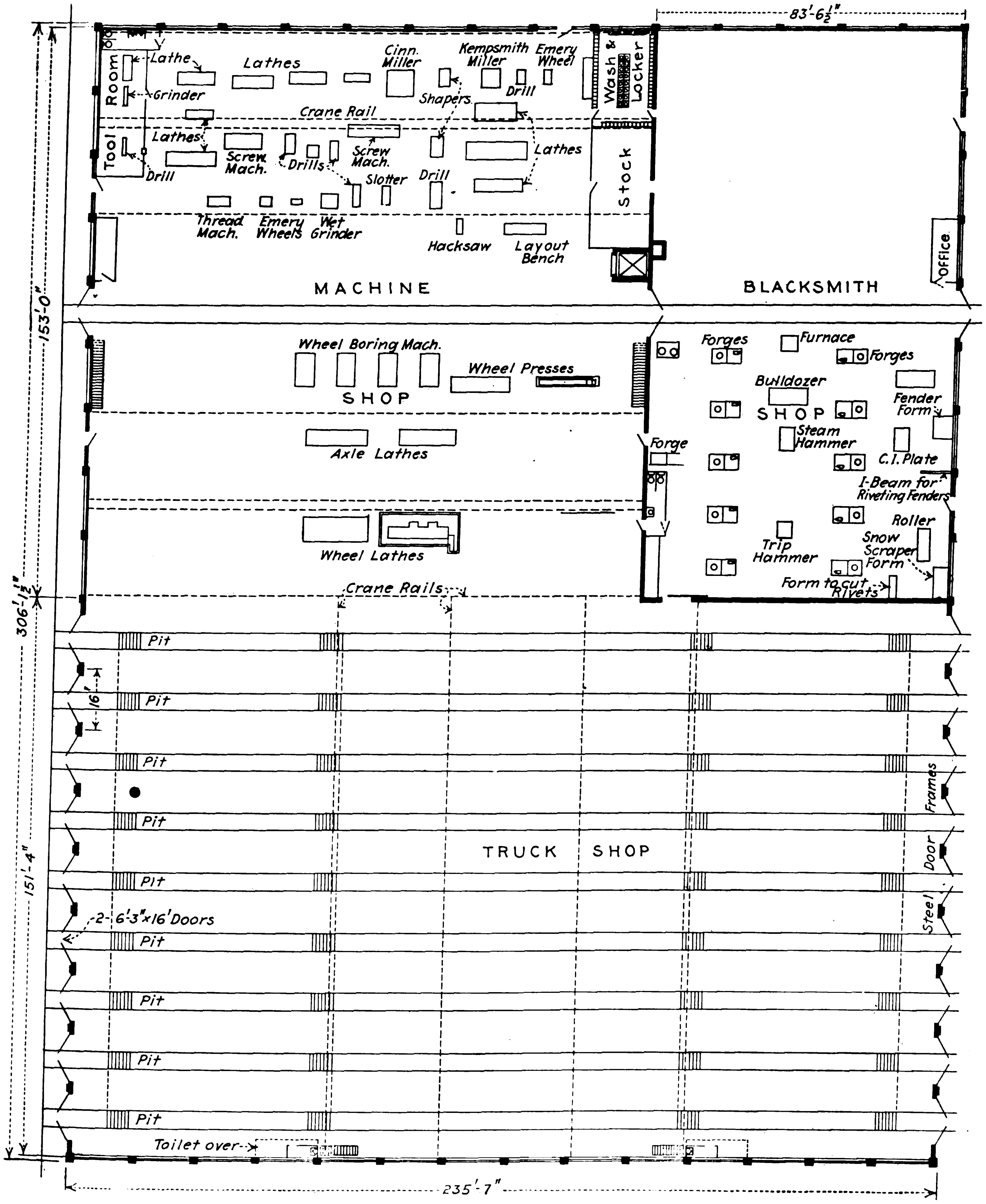
Nine tracks pass through the truck shop, which is designed to be worked from both ends at the same time. One track enters the machine shop at about its center and extends into the blacksmith shop. This will serve for the delivery and receipt of supplies. A wye, leading off of one of the tracks beside the building, permits cars to be turned readily in case it is required that they enter the truck shop in a definite position. Each of these nine tracks contains two 60-ft. pits, one row just inside the entrances at each side of the building. Each pit is equipped with four air jacks of sufficient capacity to lift the maximum car-body weight and so connected to the shop compressed-air system with hose that they may be shifted to meet the various car widths. At each end of each set of nine pits is an aisle in which car bodies can have parts replaced, the bodies being run forward into the aisles after having been raised sufficiently to remove them from the trucks. In each aisle there are two 3-ton bridge cranes for handling heavy repair parts, each equipped with two trolleys and operated by pendant switches. In the aisle between the two equipped with the 3-ton cranes is a 5-ton crane, set on a runway which traverses the full width of the shop. The latter bridge crane serves the entire shop crane system, the runway being high enough to permit defective parts to be carried to the electrical department, the wheel-repair department or the machine shop. Crane runways, at right angles to this large crane runway, permit the handling of heavy repair parts to any part of any of the shop departments, except the blacksmith shop. The small bridge cranes in the electrical machine and wheel-shop departments are each of 1-ton capacity and arranged for control through pendant switches.



Detroit United Machine Shop—General View of Shop Building, Showing Fanhouse in Foreground

It is planned that the pits will serve only for car inspection and adjusting of brakes, all truck and electrical equipment renewals being handled in the truck repair bay at the ends of the pits. In order to replace defective equipment as promptly as possible, however, it is planned to carry quite a stock of duplicate repair parts. Duplicate sets of motors and trucks will be included among these, although more or less difficulty is experienced in replacing trucks owing to variation in side bearings. In the old repair shops armature and fields were replaced on the trucks, now this work will be handled in the electrical department, truck repairs being made by men who devote all of their time to that class of work.

In line with the plan of procedure in the new paint shop, machine operations were carefully studied with a view of grouping machines and departments to reduce waste motion to a minimum. As a result of this study the location of the truck shop aisles were so planned that they would adjoin the blacksmith shop, the wheel-


83'-6½"
Tool Room
Lathe
Lathes
Cinn. Miller
Kempsmith Miller
Emery Wheel
Wash & Locker
Grinder
Shapers
Drill
Crane Rail
Lathes
Screw Mach.
Drills
Screw Mach.
Lathes
Drill
Slotter
Drill
Stock
Thread Mach.
Emery Wheels
Wet Grinder
Hacksaw
Layout Bench
Office
MACHINE
BLACKSMITH
153'-0"
Wheel Boring Mach.
Wheel Presses
SHOP
Forges
Furnace
Forges
Bulldozer
Fender Form
SHOP
Steam Hammer
Forge
Axle Lathes
C.I. Plate
I-Beam for Riveting Fenders
Roller
Wheel Lathes
Trip Hammer
Snow Scraper Form
Form to cut Rivets
Crane Rails
306'-1½"
Pit
16'
Pit
Pit
Frames
Pit
TRUCK SHOP
Door
Pit
Steel
2-6'3"x16' Doors
Pit
151'-4"
Pit
Pit
Pit
Toilet over
235'-7"

Detroit United Machine Shop—Main Floor

repair department and the electrical department. General machine work incident to each of the foregoing departments is handled both in the electrical department on the second floor and in the machine shop which adjoins the wheel-repair space on the first floor. All these departments are grouped as compactly as possible. A 5-ton electric freight elevator serves them all in addition to the overhead bridge crane systems.

BUILDING CONSTRUCTION DETAILS

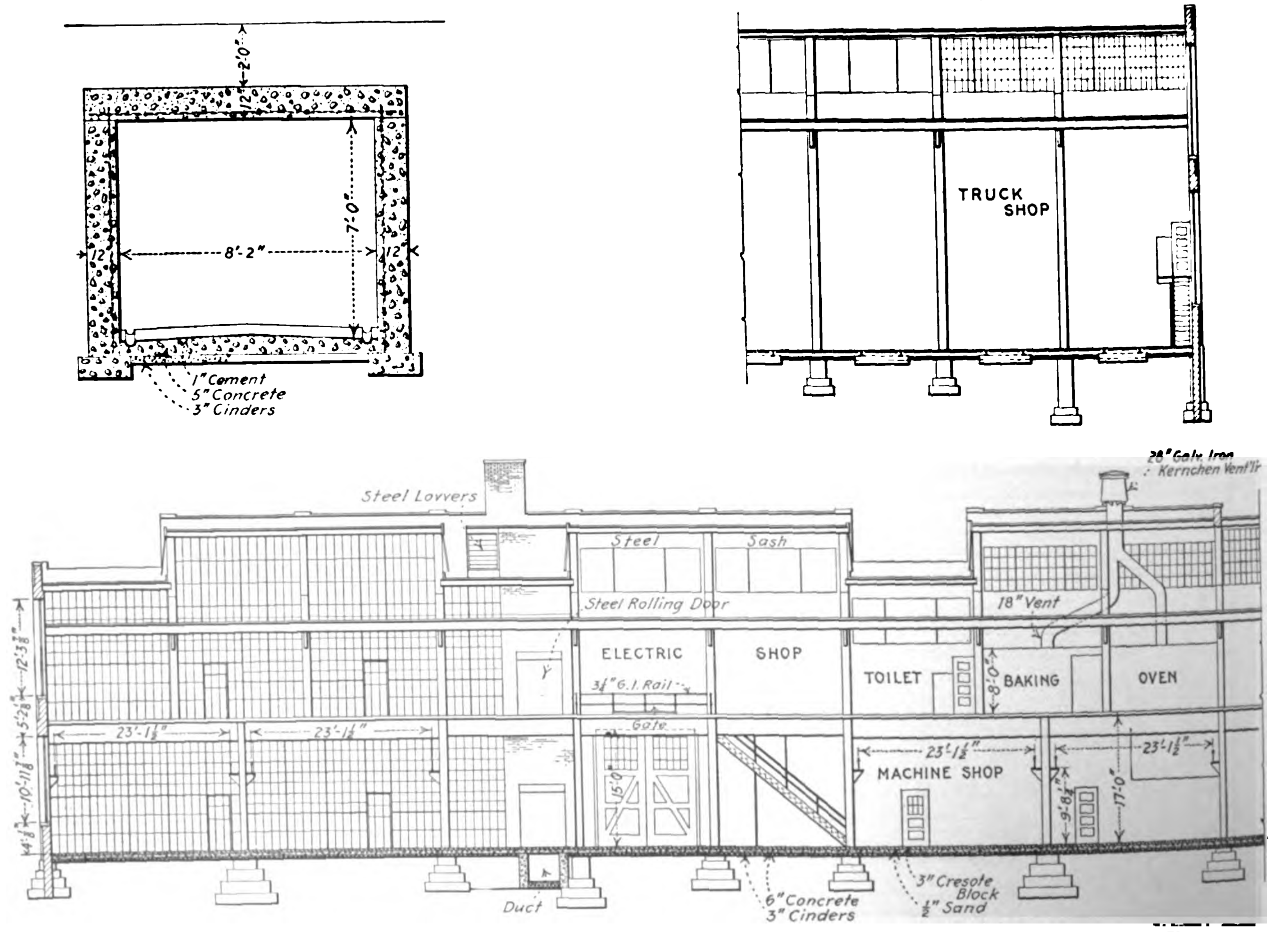
Unlike the paint shop which was largely of reinforced concrete, the new machine shop is constructed with a structural-steel frame on concrete pedestals, with a reinforced concrete second floor and roof, and brick curtain walls. In the interior of the building the frame was left exposed, and that in the exterior walls was encased in concrete. This encasement was utilized to advantage in the exterior walls for decorative effect, with the result that there is a pleasing contrast between the red brick walls and the gray concrete pilasters, belt courses and coping. This is quite clearly shown in the general view of the new building in one of the illustrations.

In the selection of building columns advantage was taken of reduced cost as well as minimum over-all dimensions incident to the use of Bethlehem girder beams. The truck shop roof was so supported on steel trusses that the pit areas were left clear of columns, four rows being all that were necessary to carry the three crane runways in the three aisles between the ends of the pits. The roof itself is made up of three sets of parallel monitor decks over the electrical shop, a transverse monitor deck over the middle aisle of the truck shop and a series of shallow monitor decks over the tracks in the truck shop and over the blacksmith shop. All of these features provide liberal natural illumination and ventilation throughout the shop. Each of the monitors is fitted with pivoted metal sashes and frames with continuous operating mechanisms. The exterior walls are also liberally fitted with large metal sash areas, with frequent pivoted sash sections for ventilation.

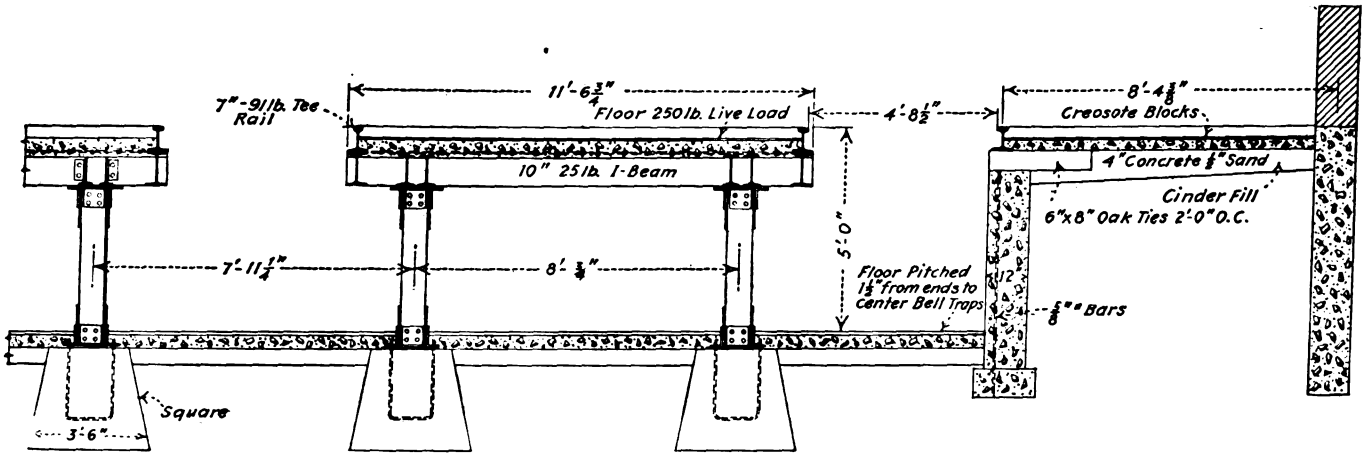
Walls and partitions are of three kinds, namely, 15-in. brick curtain walls in the exterior, 12-in. brick partition walls around the blacksmith shop, the only enclosed room, Fenestra steel and glass partitions around the offices, locker and lunch rooms, and 2-in. concrete slabs on expanded metal supported on structural-steel frames around the toilets. The steel and glass partitions extend from floor to ceiling, thus completely enclosing the spaces where they are employed. The reinforced concrete partitions around the toilets are in all cases 5 ft. high. As shown in the accompanying illustrations, the toilet facilities are arranged both on balconies and on the shop floor level. The numerous toilets and the sanitary drinking fountains are conveniently located throughout the shop.

FLOOR AND ROOF CONSTRUCTION

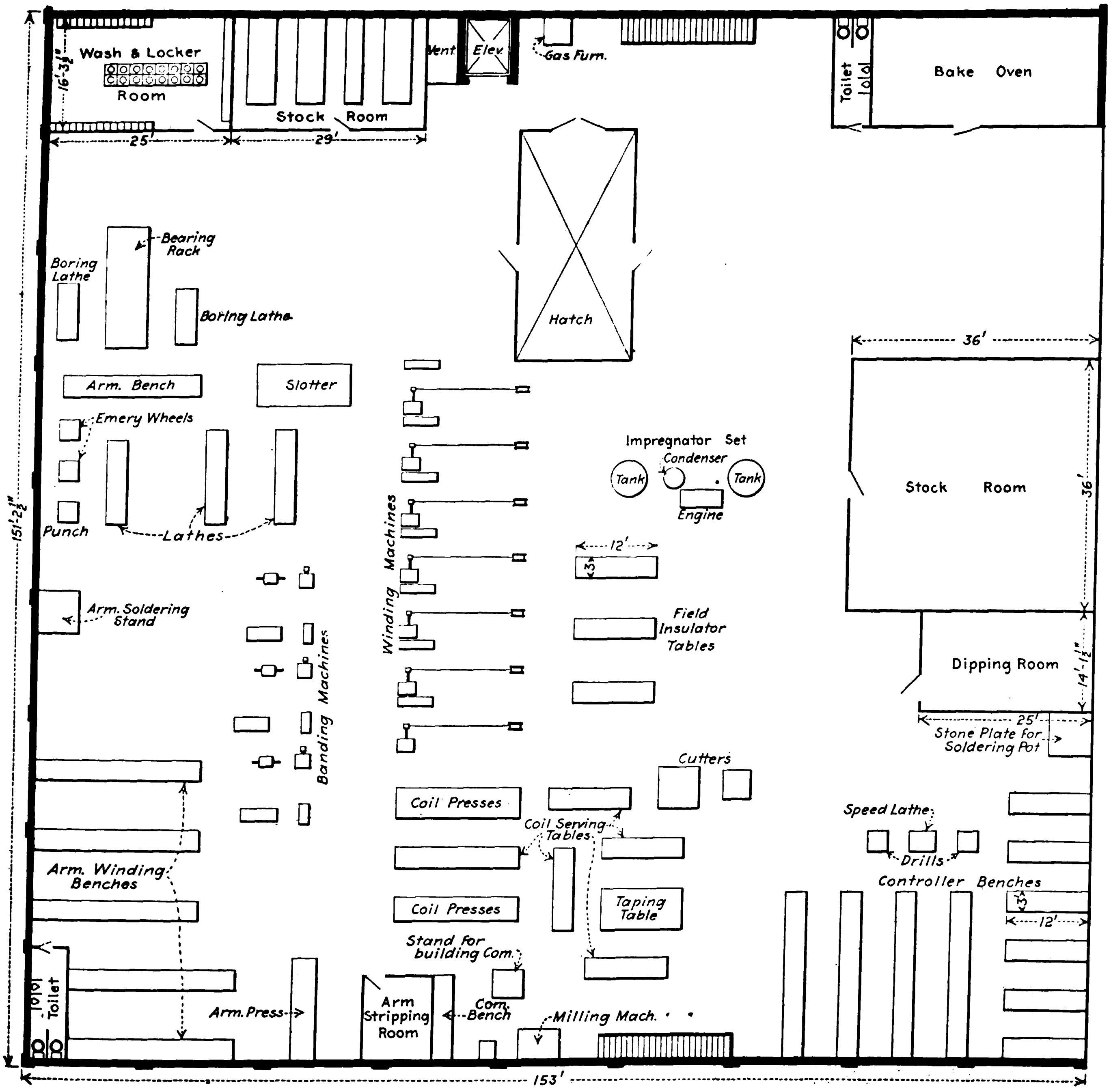
Creosoted wood-block floors, 5 in. in thickness, were laid over the entire ground-floor area except in the blacksmith shop, where a cinder floor was laid. The blocks are laid on a 1-in. sand cushion and a 6-in. concrete foundation. As shown in the general views this finished wood-block floor was covered with about 1/4 in. of fine sand which will be left until the joints are completely filled. In the selection of this type of floor, Sylvester Potter, master mechanic, believed that it is nearly ideal, because it eliminates the chipping incident to concrete floors and is much more comfortable for workmen. Its resilience and toughness prevent breakage of castings accidentally dropped. A wood-block floor was slightly more expensive than concrete would have been, but undoubtedly it will be more durable.



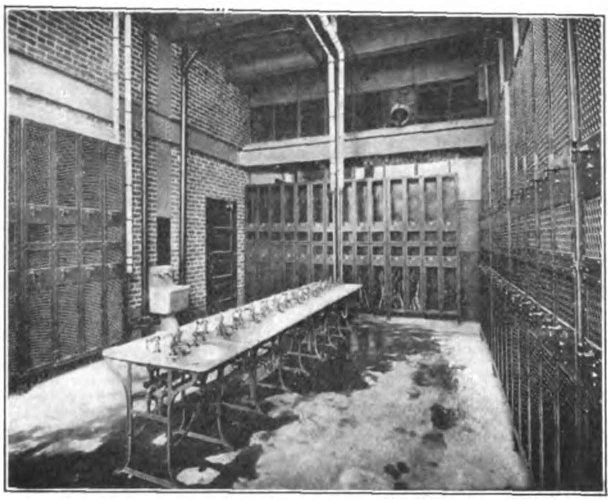
Detroit United Machine Shop—Sectional Elevation, Sections Through Tunnel and Portion of Truck Shop


7"-91lb. Tee Rail
11'-6¾"
Floor 250 lb. Live Load
4'-8½"
8'-4⅜"
Creosote Blocks
10" 25 lb. I-Beam
4" Concrete ½" Sand
Cinder Fill
6"x8" Oak Ties 2'-0" O.C.
5'-0"
7'-11¼"
8'-¾"
Floor Pitched 1½" from ends to Center Bell Traps
12
⅝" Bars
Square
3'-6"

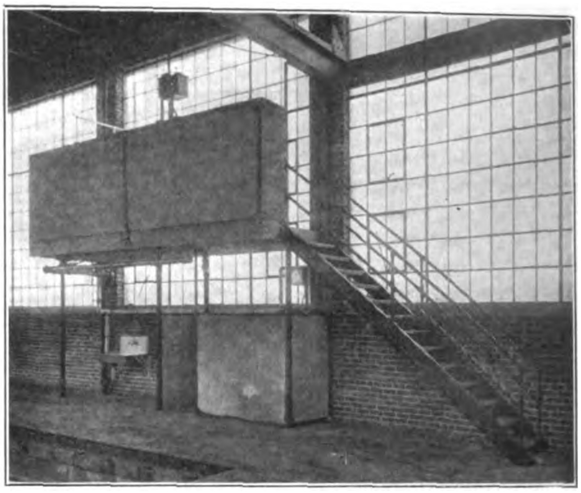
Detroit United Machine Shop—Details of Truck Pit


Wash & Locker Room
16'-3½"
25'
29'
Stock Room
Vent
Elev.
Gas Furn.
Toilet
Bake Oven
Hatch
Bearing Rack
Boring Lathe
Boring Lathe
Arm. Bench
Slotter
Emery Wheels
Punch
Lathes
Winding Machines
Banding Machines
Impregnator Set
Condenser
Tank
Tank
Engine
12'
3'
Field Insulator Tables
36'
36'
Stock Room
Dipping Room
14'-1½"
25'
Stone Plate For Soldering Pot
Arm. Soldering Stand
151'-2½"
Cutters
Coil Presses
Coil Serving Tables
Coil Presses
Taping Table
Speed Lathe
Drills
Controller Benches
3'
12'
Arm. Winding Benches
Toilet
Arm. Press
Stand for building Com.
Arm Stripping Room
Com. Bench
Milling Mach.
153'

Detroit United Machine Shop—Electrical Shop



Detroit United Machine Shop—View Showing Arrangement of Locker and Washroom



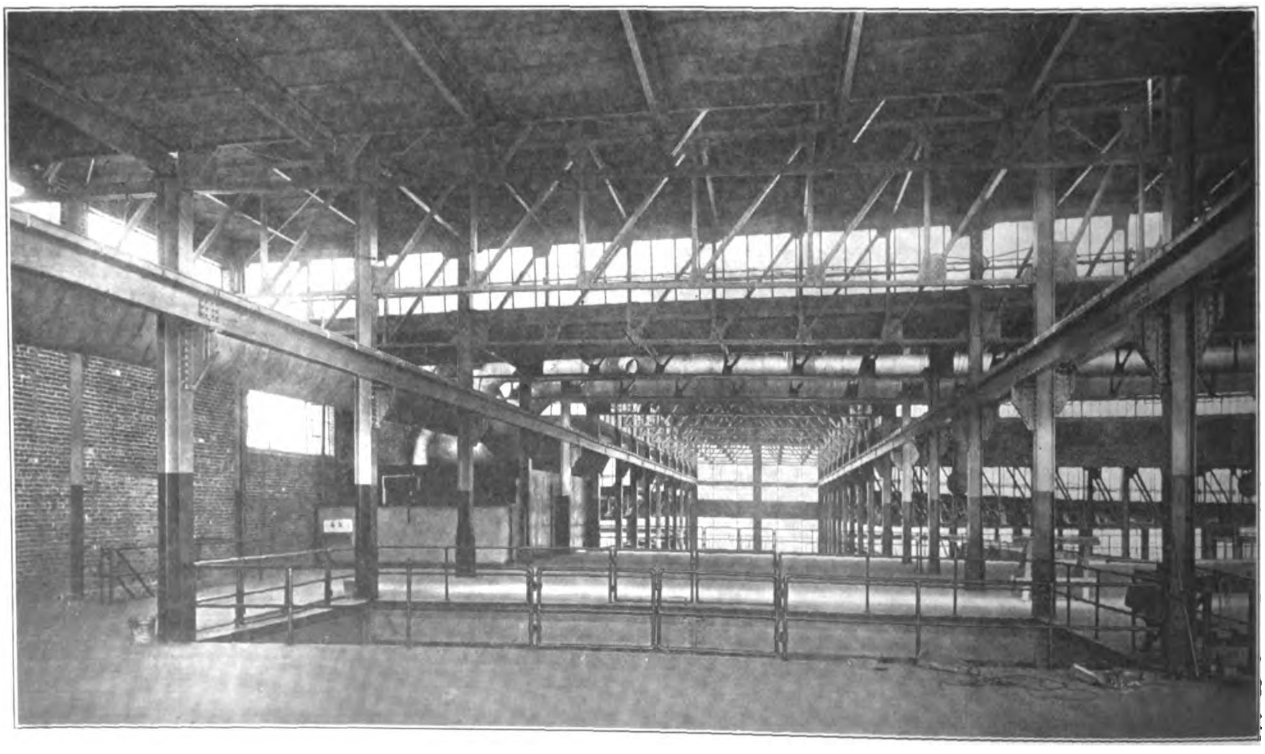
Detroit United Machine Shop—View Showing Typical Toilet Balcony

The wood blocks and 6-in. concrete slabs beneath were considered sufficient foundation for most of the heavy machine tools. Some machines, however, will be anchored to the floor by bolts grouted into pockets made by removing the wood block.

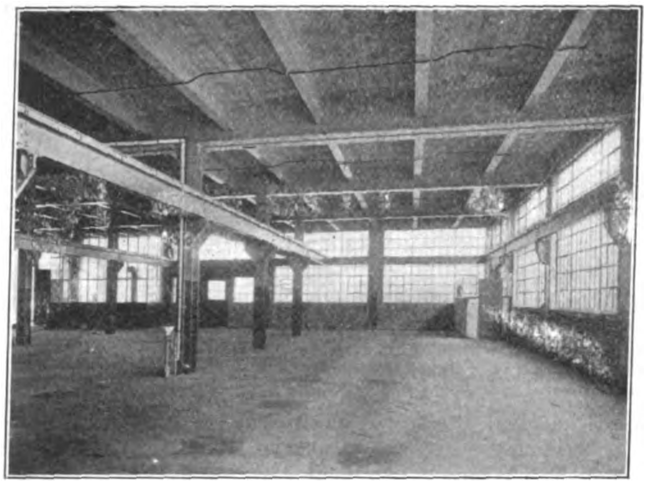
Concrete slabs, 5 in. thick and reinforced with 3/8-in. steel bars, 4½ in. center to center, were used in the second floor. These are supported on I-beams partially embedded in the slabs, but not completely encased in the concrete. The stairways leading to this floor as well as the toilet balconies are of cast iron with pipe rails. The roof construction is somewhat unique in that reinforced concrete slabs built on the ground and set in place on the I-beam rafters after thorough seasoning were used. The roof was made sufficiently flat to permit the use of a tar and gravel roof covering, hips and valleys along the fire walls being provided by depositing cinder concrete saddles on top of the concrete roof slabs.

As mentioned at another place in this article there are eighteen 60-ft. inspection pits under the nine tracks which pass through the truck shop. Cars enter the truck shop from both ends under their own power, trolley wire brackets and entrances being provided at the large swinging doors and wooden trolley troughs and trolley to the inside ends of the pits. These pits are rather unique in that the track rails are supported on cantilever beams, thus providing a wider pit floor area than is possible with ordinary design. As shown in one of the accompanying engravings, a standard 91-lb. 7-in. T-rail was used in the shop tracks. This is carried on 6-in. x 8-in. oak ties spaced at 2-ft. centers where the rail is carried over the outside pit walls. The rail is fastened to these ties by clips which are spiked only on the outside of the rail base.

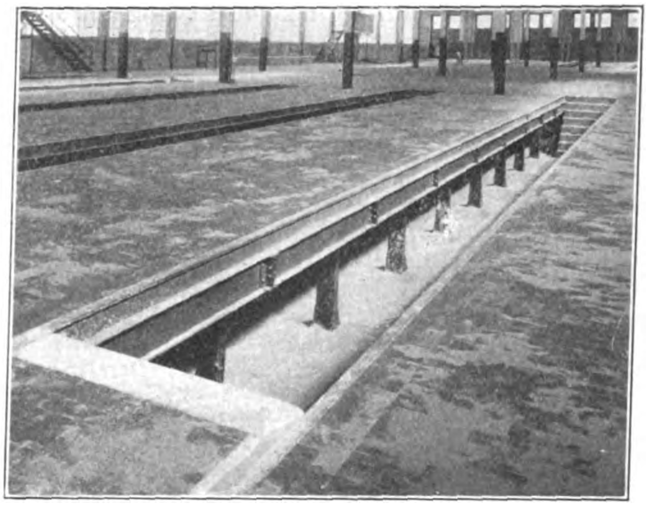
Over the pits the track rail is supported on 10-in., 25-lb. I-beam stringers, which in turn are riveted to transverse floor beams spaced at 6-ft. 8-in. intervals.



Detroit United Machine Shop—View of 5-Ton Crane Aisle from Electrical Shop Floor Level



Detroit United Machine Shop—View of a Corner of Machine Shop Proper Before Placing Machine Tools

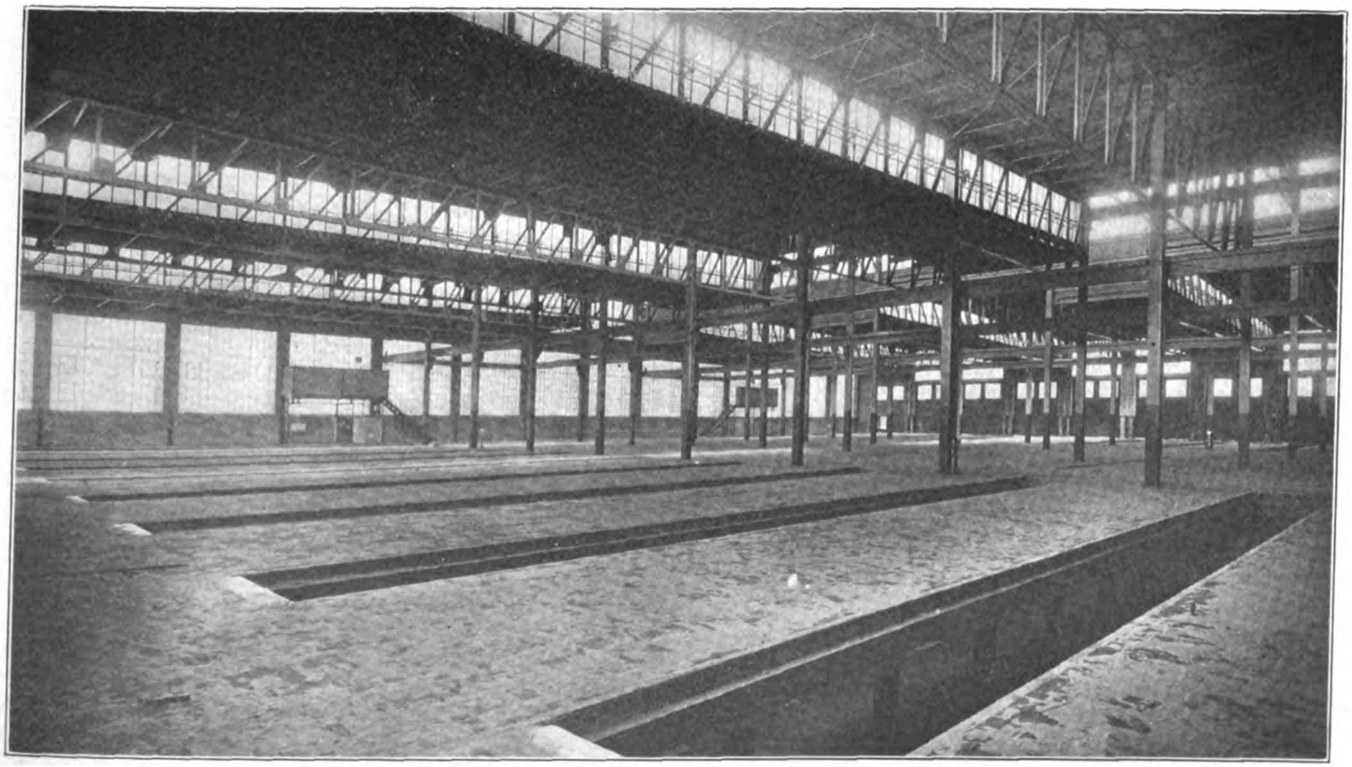


Detroit United Machine Shop—View of Repair Pit in Truck Shop

These floor beams are also formed of 10-in. 25-lb. I-beams and project into the pit 1 ft. 9 in. beyond the center line of the supporting columns, providing a 4-ft. 5½-in. clear pit width at the shop-floor level and 7 ft. 3¼ in. clear width at the pit-floor level. All pits are 5 ft. deep and each set of nine is made in one large pit area. The aisles between tracks at the shop floor level are 11 ft. wide and are formed of reinforced concrete slabs which in turn carry the creosoted block floor. These slabs are supported on structural steel beams and columns, and steps at both ends of all pits, built of reinforced concrete, lead from the shop floor level into the pits.

Probably one of the most novel features in the entire machine shop layout is the coil baking oven. This is located in one corner of the electrical repair department beside the blacksmith shop partition. The oven is 16 ft. 8½ in. x 32 ft. in plan with an over-all height of 8 ft. The walls and roof are 3¼ in. thick and are formed of a 3-in. I-beam and channel frame to the outside of which No. 20 steel plate is riveted, with No. 10 steel plate on the inside. The space between the steel plates is packed solid with 85 per cent carbonate of magnesia for insulation. A door, built up like the steel partition walls, and 4 ft. x 7 ft. in size, affords the only entrance for handling coils to and from the oven.

A temperature of 210 deg. is maintained by means of three Peter Smith Heater Company's forced hot-air electric heaters. These were installed outside the insulated walls and the hot air is forced into the oven through 8-in. x 18-in. openings at the floor line along the 32-ft. side of the oven. Three ft. 6 in. above the floor level and extending completely around the inside walls of this oven is a sheet steel deflector, set at 45 deg. to the walls and projecting 14 in. into the oven. It is designed to deflect the rising hot-air currents down and toward the center of the oven. Two 18-in. ventilators carried from the oven roof through the building roof form the hot-air outlets. Each electric



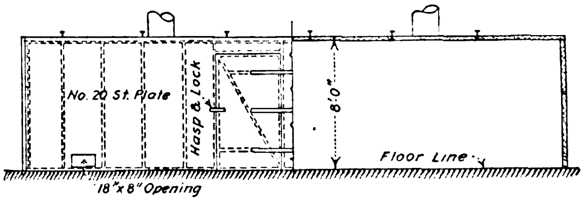
Detroit United Machine Shop—General View of Truck Shop

heater is equipped with an individual switchboard and thermostatic control, so that a uniform temperature can be maintained.

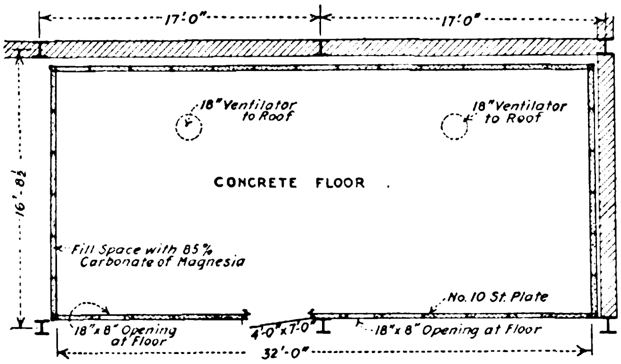
A complete compressed-air piping system was installed in the concrete floors to supply air for the air jacks used in raising car bodies over the pits, and for general use throughout the shops. A reservoir, 3 ft. x 15 ft. in size, placed under the concrete floor forming the pit aisle beside the blacksmith shop, serves the air jacks. Compressed air for this entire system is furnished by an Ingersoll-Rand 125-ft. compressor, electrically driven and automatically controlled. This is installed at one end of the wheel-repair department beside the partition between it and the blacksmith shop.

LIGHTING, POWER AND HEATING SYSTEMS

All lighting and power circuits are in pipe conduit, that for the machine tools being imbedded in the concrete floor foundation with conduit outlets for all machines where individual motor drive is to be used. The machine and electrical departments are lighted with 250-watt tungsten lamps placed at sufficiently frequent intervals to make night work possible. The truck and blacksmith shops are illuminated by 2000-cp d.c. arc lamps. Both the lighting and power circuits supply power at 550 volts d.c.



ELEVATION AND SECTION



PLAN OF BAKING OVEN

Detroit United Machine Shop—Details of Baking Oven

The heating system is by indirect radiation of the forced hot-air type. That in the truck shop is supplied from underground ducts with outlets under the floors between the inspection pits. These ducts and those which supply hot air to other portions of the shop from duct openings overhead radiate from a fanhouse. This is a separate brick building at the end of the transfer table pit beside the blacksmith shop. Cold air for the heating system is taken from the shop floor by large motor-driven fans, which blow it over banks of steam coils. It returns to the shop building through underground ducts on the ground floor and overhead insulated pipe ducts on the second floor.

The fanhouse contains two 12-ft. motor-driven fans and a small fan which serves the truck shop heating system exclusively. The steam coils in the fanhouse are supplied from a temporary heating plant erected on the proposed storehouse site. An underground reinforced concrete tunnel system has been constructed under the transfer table pits between the buildings for the steam heat feed and return mains. When the new carpenter shop, the next shop building to be constructed, is finished, a permanent heating and power plant building will be erected in the aisle between the carpenter and machine shops. The tunnel for the steam-heat piping system has been so designed that the change in location of the heating plant will make changes in the tunnel system unnecessary.

LOCKER ROOMS AND STOREROOMS

Two locker and washrooms are provided in the machine shop building, one beside the machine shop entrance from the street, that is in the aisle between the two groups of buildings, and the second on the electrical repair floor. Each is fitted with double-deck metal lockers, the upper sections of which are equipped with portable hooks or rods arranged for hanging hats and coats. There are 112 lockers on the first floor and eighty-eight on the second. Each locker room also is equipped with sixteen wash basins arranged in two rows back to back along the center line of the room.

For the present, or at least until the storehouse has been built, the two lunchrooms on the first and second floors will be used as stockrooms. These have been fitted with metal shelving and sets of drawers for storage of miscellaneous small supplies. These storerooms, as well as the truck shop office, will be connected with the paint shop by a local telephone system containing eight telephones. Two trunk lines now connect the new shops with the rest of the railway system. Telephone communication between the various shop departments, as well as between the old and new shops was important because the entire office force has been moved from the old repair shops into a room in the new paint shop building.

As shown on the building plan, the locations of the various machine tools, work benches, etc., have been planned for the future. The wheel and axle machine tools have been grouped at a point where the movement of these parts to and from the truck shop has been reduced to a minimum. Two transverse sections of track leading to the wheel presses from the truck shop have been provided for wheel storage. These presses also are situated beside the hatchway in the electrical shop floor so that the large bridge crane serving the entire shop may deliver wheels to them. This also is true of the location of the material receiving and delivery track which passes through the machine and blacksmith departments. Incidentally this track passes under the hatchway in the electrical shop floor, thus making it possible for the large bridge crane to serve the supply cars.

Eight downdraft Buffalo Forge Company's forges make up the principal part of the blacksmith shop equipment. Seven of these are connected to one large blower, and the eighth forge is provided with an individual blower so that it may be used at odd times. At the present time only one-half of the blacksmith shop floor space is occupied, the remaining portion serving as storage space for various kinds of rough material. Other blacksmith shop equipment includes a bulldozer, a steam hammer, a trip hammer, cast-iron plate tables and forms for fenders, snow scrapers, etc.

The Anglo-Argentine Tramways Company, Buenos Aires, Argentina, has completed excavating work on the tunnel to the terminus at Plaza Primera Junta, in Caballito, of the first section of its subway system, which is open between Plaza de Mayo and Calle Rio de Janeiro. Since the opening of the extension from Once to Rio de Janeiro on April 1 a notable increase in passenger traffic has been recorded.

Interstate Commerce Commission Classification of Accounts

Titles of the Accounts in the New System Which is to Become Effective on July 1, 1914—Depreciation and Valuation Expenses Included—Condensed Classification of Operating Expenses for Small Carriers

The Interstate Commerce Commission has approved the uniform system of accounts for electric railways. Owing, however, to the press of work at the government printing office the printing of the pamphlets containing the new system has been unavoidably delayed. It was expected this week, however, that the final issue would be in the hands of carriers within a few days.

The system of accounts is to become effective for interstate electric carriers on July 1, 1914. It contains classifications of operating expenses, operating revenues, form of income statement, profit and loss accounts, form of general balance sheet statement, and road and equipment accounts. The numbers and titles of the accounts as they are to appear in the final authoritative issue are published herewith.

It will be noted that three classes of carriers are created in the application of the classification of operating expenses. These classes are as follows:

Class A. Companies having annual operating revenues of more than $1,000,000.

Class B. Companies having average annual operating revenues of more than $250,000 but not in excess of $1,000,000.

Class C. Companies having average annual operating revenues not in excess of $250,000.

The companies of Class A are required to keep all the primary accounts provided in the text of the classification of operating expenses. Companies of Class B have the option of using the classifications for Class A or the classification provided for Class B carriers. Companies of Class C have the option of using any one of the classifications provided for Classes A, B and C. Carriers using the classification for Class A are to apply the account numbers prescribed. Carriers using the condensed classifications shall adopt the numbers used in the schedules, including those hyphenated to show the merging of accounts.

It will be noted that the classifications provide accounts for depreciation of way and structures, depreciation of equipment, depreciation of power plant buildings and equipment, valuation expenses and amortization of franchises.

OPERATING EXPENSE ACCOUNTS

GENERAL ACCOUNTS

I. Way and Structures
II. Equipment
III. Power
IV. Conducting Transportation
V. Traffic
VI. General and Miscellaneous

PRIMARY ACCOUNTS

[To be kept by electric railways of class A.]

I. Way and Structures—
 1. Superintendence of way and structures
 2. Ballast
 3. Ties
 4. Rails
 5. Rail fastenings and joints
 6. Special work
 7. Underground construction
 8. Track and roadway labor
 9. Miscellaneous track and roadway expenses
 10. Paving
 11. Cleaning and sanding track
 12. Removal of snow and ice
 13. Tunnels and subways
 14. Elevated structures and foundations
 15. Bridges, trestles, and culverts
 16. Crossings, fences, and signs
 17. Signal and interlocking apparatus
 18. Telephone and telegraph lines
 19. Miscellaneous way expenses
 20. Poles and fixtures
 21. Underground conduits
 22. Distribution system
 23. Miscellaneous electric line expenses
 24. Buildings, fixtures, and grounds
 25. Depreciation of way and structures
 26. Other operations—dr.
 27. Other operations—cr.
 28. Equalization—way and structures

II. Equipment—
 29. Superintendence of equipment
 30. Passenger and combination cars
 31. Freight, express, and mail cars
 32. Service equipment
 33. Electric equipment of cars
 34. Locomotives
 35. Floating equipment
 36. Shop equipment
 37. Shop expenses
 38. Vehicles and horses
 39. Miscellaneous equipment expenses
 40. Depreciation of equipment
 41. Equipment retired
 42. Other operations—dr.
 43. Other operations—cr.
 44. Equalization—equipment

III. Power—
 45. Superintendence of power
 46. Power plant buildings, fixtures, and grounds
 47. Power plant equipment

III. Power—Continued
 48. Substation equipment
 49. Transmission system
 50. Depreciation of power plant buildings and equipment
 51. Equalization—power
 52. Power plant employees
 53. Fuel for power
 54. Water for power
 55. Lubricants for power
 56. Miscellaneous power plant supplies and expenses
 57. Substation employees
 58. Substation supplies and expenses
 59. Power purchased
 60. Power exchanged—balance
 61. Power transferred—credit
 62. Other operations—cr.

IV. Conducting Transportation—
 63. Superintendence of transportation
 64. Passenger conductors, motormen, and trainmen
 65. Freight and express conductors, motormen and trainmen
 66. Miscellaneous car-service employees
 67. Miscellaneous car-service expenses
 68. Station employees
 69. Station expenses
 70. Carhouse employees
 71. Carhouse expenses
 72. Operation of signal and interlocking apparatus
 73. Operation of telephone and telegraph lines
 74. Operation of floating equipment
 75. Operation of steam locomotives
 76. Freight and express collection and delivery
 77. Loss and damage
 78. Other transportation expenses

V. Traffic—
 79. Superintendence and solicitation.
 80. Advertising.
 81. Parks, resorts, and attractions
 82. Miscellaneous traffic expenses

VI. General and Miscellaneous—
 83. Salaries and expenses of general officers
 84. Salaries and expenses of general office clerks
 85. General office supplies and expenses
 86. Law expenses
 87. Relief department expenses
 88. Pensions and gratuities
 89. Miscellaneous general expenses
 90. Valuation expenses
 91. Amortization of franchises
 92. Injuries and damages
 93. Insurance
 94. Stationery and printing
 95. Store expenses
 96. Garage and stable expenses
 97. Rent of tracks and facilities
 98. Rent of equipment
 99. Other operations—dr.
 100. Other operations—cr.

VII. Transportation for Investment—Cr.

CONDENSED SCHEDULES OF ACCOUNTS

Accounts for Class B Carriers.—For Class B carriers—those having annual revenues of more than $250,000, but not in excess of $1,000,000—the complete schedule of accounts by titles follows, the preceding numerals showing in each instance the primary account or accounts the contents of which are included under the title named in connection therewith.

I. Way and Structures:
 1. Superintendence of way and structures
 2-12. Maintenance of track and roadway
 13-19. Other maintenance of way
 20. Poles and fixtures
 21. Underground conduits
 22. Distribution system
 23. Miscellaneous electric line expenses
 24. Buildings, fixtures, and grounds
 25. Depreciation of way and structures
 26. Other operations—dr.
 27. Other operations—cr.
 28. Equalization—way and structures

II. Equipment:
 29. Superintendence of equipment
 30-32. Maintenance of cars
 33. Electric equipment of cars
 34. Maintenance of locomotives
 35-39. Miscellaneous equipment expenses
 40. Depreciation of equipment
 41. Equipment retired
 42. Other operations—dr.
 43. Other operations—cr.
 44. Equalization—equipment

III. Power:
 45. Superintendence of power
 46. Power plant buildings, fixtures, and grounds
 47. Power plant equipment
 48. Substation equipment
 49. Transmission system
 50. Depreciation of power plant buildings and equipment
 51. Equalization—power
 52. Power plant employees
 53. Fuel for power
 54. Water for power
 55. Lubricants for power
 56. Miscellaneous power plant supplies and expenses
 57. Substation employees
 58. Substation supplies and expenses
 59. Power purchased
 60. Power exchanged—balance
 61. Power transferred—credit
 62. Other operations—cr.

IV. Conducting Transportation:
 63. Superintendence of transportation
 64. Passenger conductors, motormen, and trainmen
 65. Freight and express conductors, motormen, and trainmen.
 66-67. Miscellaneous car-service employees and expenses

IV. Connecting Transportation — Continued.
  68-69. Station employees and expenses
  70-71. Carhouse employees and expenses
  72-73. Signal, interlocking, telephone, and telegraph systems.
  74. Operation of floating equipment
  75. Operation of steam locomotives
  76. Freight and express collection and delivery
  77. Loss and damage
  78. Other transportation expenses
V. Traffic:
  79-82. Traffic expense
VI. General and Miscellaneous:
  83-84. Salaries and expenses of general officers and general office clerks
  85. General office supplies and expenses
  86. Law expenses
  87. Relief department expenses
  88. Pensions and gratuities
  89. Miscellaneous general expenses
  90. Valuation expenses
  91. Amortization of franchises
  92. Injuries and damages
  93. Insurance
  94. Stationery and printing
  95. Store expenses
  96. Garage and stable expenses
  97. Rent of tracks and facilities
  98. Rent of equipment
  99. Other operations—dr.
  100. Other operations—cr.
VII. Transportation for Investment—Cr.

Accounts for Class C Carriers.—For Class C carriers—those having annual revenues not in excess of $250,000—the complete schedule of accounts by titles is as follows, the preceding numerals, as in the foregoing schedule, showing in each case the primary account or accounts, the contents of which are included under the accompanying title:

I. Way and Structures:
  1. Superintendence of way and structures
  2-19. Maintenance of way
  20-23. Maintenance of electric lines
  24. Buildings, fixtures, and grounds
  25. Depreciation of way and structures
  26. Other operations—dr.
  27. Other operations—cr.
  28. Equalization—way and structures

II. Equipment:
  29. Superintendence of equipment
  30-32. Maintenance of cars
  33. Maintenance of electric equipment of cars
  34. Maintenance of locomotives
  35-39. Miscellaneous equipment expenses
  40. Depreciation of equipment
  41. Equipment retired
  42. Other operations—dr.
  43. Other operations—cr.
  44. Equalization—equipment

111. Power:
  45. Superintendence of power
  46. Power plant buildings, fixtures, and grounds
  47-49. Maintenance of power equipment
  50. Depreciation of power plant buildings and equipment
  51. Equalization—power
  52. Power plant employees
  53. Fuel for power
  54-56. Other power supplies and expenses
  57-58. Substation employees, supplies, and expenses
  59. Power purchased
  60. Power exchanged—balance
  61. Power transferred—credit
  62. Other operations—cr.

IV. Conducting Transportation
  63. Superintendence of transportation
  64-65. Conductors, motormen, and trainmen
  66-78. Miscellaneous transportation expenses

V. Traffic:
  79-82. Traffic expenses

VI. General and Miscellaneous:
  83-89. General expenses
  90. Valuation expenses
  91. Amortization of franchises
  92. Injuries and damages
  93. Insurance
  94. Stationery and printing
  95-96. Store, garage, and stable expenses
  97. Rent of tracks and facilities
  98. Rent of equipment
  99. Other operations—dr.
  100. Other operations—cr.
VII. Transportation for Investment—Cr.

OPERATING REVENUE ACCOUNTS

General Accounts

I. Revenue from Transportation
II. Revenue from Other Railway Operations

Primary Accounts

I. Revenue from Transportation—
  101. Passenger revenue
  102. Baggage revenue
  103. Parlor, sleeping, dining, and special car revenue
  104. Mail revenue
  105. Express revenue
  106. Milk revenue
  107. Freight revenue
  108. Switching revenue
  109. Miscellaneous transportation revenue
II. Revenue from Other Railway Operations—
  110. Station and car privileges
  111. Parcel room receipts
  112. Storage
  113. Demurrage
  114. Telephone and telegraph service
  115. Rent of tracks and facilities
  116. Rent of equipment
  117. Rent of buildings and other property
  118. Power
  119. Miscellaneous

FORM OF INCOME STATEMENT.

Explanatory Note.—The income statement is designed to show the results from transportation operations and other business of the accounting company during any specified period.

I. Operating Income:
  201. Railway operating revenues
  213. Railway operating expenses
    Net revenue (or deficit)—railway operations
  202. Auxiliary operations—revenues
  214. Auxiliary operations—expenses
    Net revenue (or deficit)—auxiliary operations
    Net operating revenue (or deficit)
  215. Taxes assignable to railway operations
    Operating income (or loss)

II. Nonoperating Income:
  203. Income from lease of road
  204. Miscellaneous rent income
  205. Net income from miscellaneous physical property
  206. Dividend income
  207. Income from funded securities
  208. Income from unfunded securities and accounts
  209. Income from sinking fund and other reserves
  210. Release of premiums on funded debt
  211. Contributions from others
  212. Miscellaneous income
    Total nonoperating income
    Gross income (or loss)

III. Deductions from Gross Income:
  216. Rent for leased roads
  217. Miscellaneous rents
  218. Miscellaneous taxes
  219. Net loss on miscellaneous physical property
  220. Interest on funded debt
  221. Interest on unfunded debt
  222. Amortization of discount on funded debt.
  223. Income transferred to other companies
  224. Maintenance of organization—lessor companies
  225. Miscellaneous debits
    Total deductions from gross income
    Net income (or loss) transferred to credit (or debit) of profit and loss

PROFIT AND LOSS ACCOUNTS

Primary Accounts

Credits:
  301. Credit balance at beginning of fiscal period
  302. Credit balance transferred from income account
  303. Profit on road and equipment sold
  304. Delayed income credits
  305. Donations
  306. Miscellaneous credits

Debits:
  307. Debit balance at beginning of fiscal period
  308. Debit balance transferred from income account
  309. Appropriations of surplus to sinking fund and other reserves
  310. Dividend appropriations of surplus
  311. Appropriations of surplus for investment in physical property
  312. Stock discount extinguished through surplus
  313. Debt discount extinguished through surplus
  314. Miscellaneous appropriations of surplus
  315. Loss on road and equipment retired
  316. Delayed income debits
  317. Miscellaneous debits

FORM OF GENERAL BALANCE SHEET STATEMENT

Asset Side.

Investments:
  401. Road and equipment
  402. Sinking funds—
    Total book assets at date
    Carrier's own issues at date
    Other assets at date
  403. Deposits in lieu of mortgaged property sold—
    Total book assets at date
    Carrier's own issues at date
    Other assets at date
  404. Miscellaneous physical property
  405. Investments in affiliated companies—
    (*a*) Stocks
    (*b*) Bonds
    (*c*) Notes
    (*d*) Advances
  406. Other investments—
    (*a*) Stocks
    (*b*) Bonds
    (*c*) Notes
    (*d*) Advances
    (*e*) Miscellaneous
      Total

Current Assets:
  407. Cash
  408. Special deposits—
    Total book assets at date
    Carrier's own issues at date
    Other assets at date
  409. Loans and notes receivable
  410. Miscellaneous accounts receivable
  411. Material and supplies
  412. Interest, dividends, and rents receivable
  413. Other current assets
      Total

Deferred Assets:
  414. Insurance and other funds—
    Total book assets at date
    Carrier's own issues at date
    Other assets at date
  415. Other deferred assets
      Total

Unadjusted Debits:
  416. Rents and insurance premiums paid in advance
  417. Discount on capital stock
  418. Discount on funded debt
  419. Property abandoned chargeable to operating expenses
  420. Other unadjusted debits
  421. Securities issued or assumed—unpledged
  422. Securities issued or assumed—pledged
      Total

Liability Side

Stock:
  423. Capital stock—
    Book liability at date
    Held by or for carrier at date
    Actually outstanding at date
  424. Stock liability for conversion
  425. Premium on capital stock
      Total

Governmental grants:
  426. Grants in aid of construction
Long-term debt:
  427. Funded debt unmatured—
    Book liability at date.
    Held by or for carrier at date
    Actually outstanding at date
  428. Receiver's certificates
  429. Nonnegotiable debt to affiliated companies
    (*a*) Notes
    (*b*) Open accounts
      Total

Current Liabilities:
  430. Loans and notes payable
  431. Audited accounts and wages payable
  432. Miscellaneous accounts payable
  433. Matured interest, dividends, and rents unpaid
  434. Matured funded debt unpaid
  435. Accrued interest, dividends, and rents payable
  436. Other current liabilities
      Total
Deferred liabilities:
  437. Liability for provident funds
  438. Other deferred liabilities
      Total
Unadjusted credits:
  439. Tax liability
  440. Premium on funded debt
  441. Insurance and casualty reserves
  442. Operating reserves
  443. Accrued depreciation—road and equipment
  444. Reserve for amortization of franchises
  445. Accrued depreciation—miscellaneous physical property
  446. Other unadjusted credits
      Total

Corporate surplus:
- 447. Additions to property through surplus
- 448. Funded debt retired through surplus
- 449. Sinking fund reserves
- 450. Miscellaneous fund reserve
- 451. Profit and loss—balance
- Total

ROAD AND EQUIPMENT ACCOUNTS

GENERAL ACCOUNTS

- I. Way and structures
- II. Equipment
- III. Power
- IV. General and miscellaneous

PRIMARY ACCOUNTS

I. Way and structures—
- 501. Engineering and superintendence
- 502. Right of way
- 503. Other land used in electric railway operation
- 504. Grading
- 505. Ballast
- 506. Ties
- 507. Rails, rail fastenings, and joints

I. Way and structures—Continued
- 508. Special work
- 509. Underground construction
- 510. Track and roadway labor
- 511. Paving
- 512. Roadway machinery and tools
- 513. Tunnels and subways
- 514. Elevated structures and foundations
- 515. Bridges, trestles, and culverts
- 516. Crossings, fences, and signs
- 517. Signals and interlocking apparatus
- 518. Telephone and telegraph lines
- 519. Poles and fixtures
- 520. Underground conduits
- 521. Distribution system
- 522. General office buildings
- 523. Shops and carhouses
- 524. Stations, miscellaneous buildings, and structures
- 525. Wharves and docks
- 526. Park and resort property
- 527. Cost of road purchased
- 528. Reconstruction of road purchased
- 529. Other expenditures — ways and structures

II. Equipment—
- 530. Passenger and combination cars
- 531. Freight, express, and mail cars
- 532. Service equipment
- 533. Electric equipment of cars
- 534. Locomotives
- 535. Floating equipment
- 536. Shop equipment
- 537. Furniture
- 538. Miscellaneous equipment

III. Power—
- 539. Power plant buildings
- 540. Substation buildings
- 541. Dams, canals, and pipe lines
- 542. Power plant equipment
- 543. Substation equipment
- 544. Transmission system

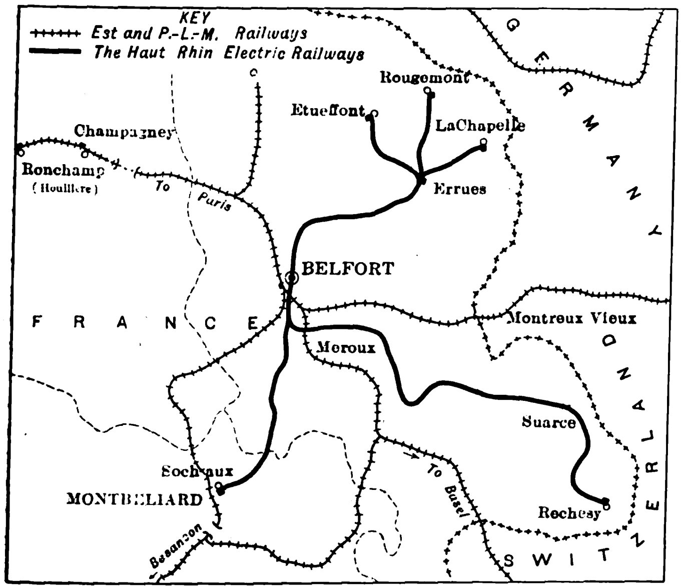
IV. General and miscellaneous—
- 545. Franchises
- 546. Law expenditures
- 547. Interest during construction
- 548. Injuries and damages
- 549. Taxes
- 550. Miscellaneous

BELFORT METER-GAGE SINGLE-PHASE RAILWAY

According to *The Engineer*, London, there was put into operation last autumn in the Upper Rhine section of France a narrow-gage (39.37-in.) railway extending from Belfort to Réchésy. As shown in the accompanying map, the system comprises the following mileage in single track: Belfort to Sochaux, 10.12 miles; Belfort to Réchésy, 17.91 miles; and Belfort to Rougemont, 9.42 miles. Connected with the last line are branch lines from Errues to Etueffont (3.6 miles), and from Errues to La Chapelle (3.2 miles). The grades are slight. Owing to the length of the railway the ordinary low-voltage d.c. system could not be used, nor did a 1200-volt d.c. scheme seem the most advantageous. The engineers, therefore, decided upon the 6600-volt, twenty-five cycle single-phase system. By careful design of the overhead equipment permission was obtained to use this high voltage within Belfort.

Energy is purchased from the Société Des Houillières de Ronchamp, whose steam station at Ronchamp, 12.4 miles from Belfort, contains one 5000-hp and three 2500-hp turbines. Three-phase current is generated at 5000 volts and transmitted, via 30,000-volt lines, to Belfort for transformation to 3000 volts. Converters then change the three-phase current into single-phase current. Each converter consists of a three-phase asynchronous motor and a synchronous single-phase generator coupled together.

Each double-truck motor car has two 35-hp motors per truck, a main transformer, multiple-unit control, an air compressor and electric lighting and heating. The motors are compensated repulsion machines. Therefore they have two stator windings, a main exciting winding and a compensating winding. The builders of the electrical equipment appear to favor this type of motor, because a fairly high voltage can be applied to the stator so that the working current is small in comparison with that of a series motor. Speed variation is effected by varying the voltage at the terminals of the motor. The following voltages are applied: 310, 415, 500 and 550. The motors are designed to develop from 35 hp to 40 hp for one hour with a temperature rise not exceeding 75 deg. Cent. above the surrounding air. The gear ratio is 1:4.93, and when the armature is running at a speed of 750 r.p.m. the speed of the cars is 15.2 m.p.h. The diameter of the driving wheels is 34 in. It is possible to run the motors at 1400 r.p.m., and the speed of the cars is then 28.2 m.p.h. Some of the motor cars are making more than 136 miles a day without undue heating of the motors.



Electric Ry Journal

Map of Lines in Belfort District

The oil-insulated car transformer is suspended between the two trucks. It has two secondary windings: one is wound to give 120 volts for lighting and heating, for working the compressor motor and for operating the contactors; the other winding supplies the traction motors.

All high-tension apparatus is placed in a chamber at the center of the car. Arrangements are made for grounding the high-tension parts automatically when the door of the chamber is opened. The low-voltage equipment, such as contactors, motor switches, and the switches which de-energize the contactors in the event of an overload, are mounted on marble panels and inclosed in a cabinet. One terminal of all the circuits is grounded; the roofs of the car are likewise grounded. Bows operated by compressed air collect the current from the high-tension wire; one bow is used for each direction of running. By turning a two-way cock compressed air is admitted to one cylinder and released from the other cylinder; the bow connected to the first cylinder is thus raised, while the bow connected to the other cylinder is lowered. By means of another lever it is possible to let the air out of both cylinders at once, and then both bows are lowered. A 3.5 hp 110-volt single-phase repulsion motor drives the compressor which supplies compressed air to the bows and brakes.

The single catenary overhead line has a copper conductor of 50 sq. mm (No. 0 B & S) sectional area, and a catenary cable is of stranded steel. Chain hangers spaced about 10 ft. apart serve to suspend the copper wire. Clips at the ends of the hangers join the latter to the catenary cable and contact wire. Oil switches are provided for dividing the line into sections in the ordinary way. In Belfort steel poles have been erected, but those on the remainder of the railway are of reinforced concrete and tapered.

N. E. L. A. Convention at Philadelphia

Abstracts of Papers and Reports of Electric Railway Interest, in Addition to Those Published in Last Week's Issue, Are Given Below

In last week's issue of the ELECTRIC RAILWAY JOURNAL a partial report of the convention held from June 1 to June 4 was printed, but on account of lack of space the full report could not be given. The following paragraphs contain additional information of reference value.

The convention was notable in the large attendance, 4000, for the value of the papers and reports presented which covered all phases of central station, lighting and industrial power work, and for the exercises which marked the thirtieth anniversary of the first international conference and the first international electrical exhibition, which were held in Philadelphia in 1884. Two books, issued by the association, were brought out at the convention, namely, "The Electrical Salesmen's Handbook" and the "Handbook on Overhead Line Construction." The association rescinded its action on the 1911 report of the committee on overhead line construction by eliminating from it any recommendation of voltage limitation. A resolution was passed to the effect that the National Electric Light Association, as an association, believes that no specifications for the joint occupancy of pole lines having a voltage limitation feature, by inference or otherwise, should be approved or adopted as standard. It was decided also to discontinue the hydroelectric section and to place the work heretofore done by that section in the hands of some other committee. The next convention of the association will be held in San Francisco.

EXHIBITION ANNIVERSARY EXERCISES

The anniversary exercises were attended by a number of pioneers in the electric lighting and railway business, including Thomas A. Edison, Charles F. Brush, Frank J. Sprague, E. W. Rice, Jr., Samuel Insull, Arthur Williams and others. Walton Clark, president of the Franklin Institute of Philadelphia, under the auspices of which the International Electrical Exposition of 1884 was held, cited the influence wrought by the spirit of Franklin and by the Franklin Institute on the electrical industry to-day and its scientific and industrial development.

E. W. Rice, Jr., president of the General Electric Company, compared electrical conditions existing in the year of the Philadelphia exhibition with the development achieved to-day. In 1884, he said, not a single trolley car was in existence. The highest potential employed was 2000 volts and the largest current in use did not exceed, say, 5000 amp. The largest electrical generator was the Edison "Jumbo," with a rating of 1200 16-cp lamps, and the largest engine on exhibition was of less than 150 hp.

Frank J. Sprague referred to the pioneer work in electrical traction, with which he was so intimately connected. He declared that in trunk-line electrification the electric locomotive still has in its steam competitor a worthy rival, particularly when electrification involves the scrapping of expensive equipment and the purchasing of other expensive apparatus. He predicted the coming of centralized energy generation with interconnecting transmission lines following railroad rights-of-way, perhaps in underground conduit for greater safety and reliability. Before the electrification of the roads, he said that there will come some means of positively connecting the signals along the right-of-way with the control levers in the locomotive cab, so that in the event of failure of the driver to observe signals the train will be automatically braked and collisions avoided.

POWER PLANTS AND EQUIPMENT

PURCHASING COAL

The methods employed by one of the New York electric-service companies in the purchase and delivery of its coal were described in the paper on "Purchasing Storing and Accounting of Coal for the New York Edison Company," by Charles L. Lehmann. The company purchases its coal by yearly contract and follows the railroad shipments to tidewater ports. Coal which is not required for immediate use is stored in a yard capable of holding 150,000 tons. At present about 900 tons of coal can be received and stored per day of nine hours, and about 3000 tons can be reloaded in the same time. Extensions are now being made to accommodate 300,000 tons, and facilities are being provided for increasing the daily unloading and reloading rate to 1800 tons and 5000 tons respectively. Nitrogen-filled and magnetite search-lamps are employed to facilitate carrying on coal-yard operations at night.

HYDROELECTRIC PROGRESS

T. C. Martin presented a sixty-two-page report setting forth the present status of electric transmission from hydraulic development, discussing in a broad way various aspects of water-power and conservation problems in national and state legislation. The last section of the report was devoted to the description in outline of the most recently completed hydroelectric installations and transmissions in this country and abroad, and many points bearing upon transmission-line practice, station design, substation construction and other practical matters were included.

TEMPERATURE IN ELECTRICAL APPARATUS

A brief method of calculating heat flow in electrical apparatus was outlined in F. D. Newbury's paper on "Temperature and Its Effect on the Power Capacity of Electrical Apparatus." While low temperature has become a criterion of excellence in electrical apparatus, the operating surface temperature is of importance only in its relation to the maximum temperature to which the insulating material can be subjected safely and continuously. Designing engineers are looking forward to the time when surface temperatures can be entirely neglected and sole dependence placed on internal temperature measurements made at the hottest parts.

In most generators very little heat flows through the insulation between coils as they are usually at about the same temperature. A somewhat larger flow occurs between the lower coil and the core, and a still larger flow takes place from the top coil to the slot wedge. Curves were shown indicating the temperature gradient transverse to conductors and along them. The highest temperature may be expected between separate coils or between the bottom coil and the core, as is borne out by actual tests. Actual measurements in generators showed that temperatures ranging from 100 deg. to 130 deg. C. are not uncommon at the hottest parts.

A safe temperature limit of 105 deg. C. was given for treated cotton, paper, silk and similar fibrous materials. A temperature limit of 105 deg. to 125 deg. C. was suggested for combinations of the above materials with mica or similar heat-resisting materials when both classes of materials are depended upon for insulation strength. With combinations of the same materials, but in which mica and similar heat-resisting materials furnish the entire insulation strength a limit of 150 deg. C. was suggested.

ELECTRICAL TRANSMISSION OF POWER

HIGH-TENSION TRANSMISSION SYSTEMS

Selby Haar, New York, presented a paper in which were outlined the features of existing transmission plants designed for operation at 70,000 volts or over. A number of interesting deductions were set forth. For example, the average voltage per mile of these systems is slightly over 1200, the limits being 4590 and 440. It appears probable that the transmission voltage will continue to increase as fast as suitable apparatus can be built. A generator of highest rating in these plants is 18,000 kva, and the smallest is 750 kw. Specified power factors range generally from 0.80 to 0.90.

From the data on transformers it appears that very large single-phase units are still being installed, apparently owing to the difficulty of transporting large three-phase units. In most cases delta connection is used for at least one of the windings. The longest transmission is about 240 miles, the normal span ranges from 450 ft. to 850 ft., and most lines are strung on double-circuit towers. The hemp center seems to have been supplanted in conductor design. The average spacing of conductor and the number of insulating units depends almost entirely upon atmospheric conditions and the topography of the region traversed. Under lightning protection the overhead ground wire is firmly established and electrolytic arresters are widely popular. The arc suppressor is also gaining adherence, and something is being done under the heading of excess voltage protection to prevent the formation of surges by the proper proportioning of switching devices, ground wires and line constants. The use of outdoor switching apparatus is steadily increasing.

UNDERGROUND CONSTRUCTION

The report of the committee on underground construction, of which Philip Torchio is chairman, consisted of six separate contributions on the subjects of alternating-current underground distribution systems, underground transformers, high-tension cable joints, protection of cables in manholes, low-cost underground distributing systems and operating data on high-tension cables.

The reports showed that, although considerable improvements have been made in the manufacture of high-voltage cable, the original method of making cable joints, despite its imperfections, is still employed. Results of tests by a large company on a number of 15,000-volt cable joints showed that out of nine splices examined six had failed between 50,000 volts and 63,000 volts, one withstood 65,800 volts for four minutes, and two withstood 70,000 volts for twelve minutes. The vacuum process of making joints was recommended. Tests made recently to determine the relative value of two types of protective cable covering show cement mortar to be superior to asbestos or steel-tape covering. An objectionable feature connected with the asbestos covering is the presence of the iron banding tape, which may become grounded and thus actually become involved in an arc circuit, a condition which cannot exist when cement covering is used.

Attention was called to the fruitless efforts which have been made to develop an inexpensive underground distributing system. Among methods of underground construction which are fairly comparable in cost with those on overhead systems are the use of armored cable and split-fiber conduit laid in the bare earth. An installation of 55 miles of lead-covered, steel-armored cable laid bare in earth was described briefly. Eighty per cent of the cable has been in service about four years, and only one fault has developed in that time.

COST OF UNDERGROUND EQUIPMENT

Conductors		Approximate Price per 1000 Feet		
Number	Size, B. & S. Gage	Additional Cost of Steel Tape Armor	Iron Pipe	Fiber Pipe
Two	No. 8	$42.00	$71.00	$31.00
Two.	No. 6	45.00	71.00	31.00
Two	No. 4	56.00	112.00	34.00
Three	No. 6	47.00	112.00	34.00
Three	No. 4	59.00	112.00	34.00
Three	No. 1	69.00	146.00	37.00
Three	No. 2-0	80.00	146.00	37.00

A similar relatively inexpensive installation was referred to consisting of ordinary line wire laid in individual fiber ducts filled with insulating compound and buried in the earth. Eight years' service seems to indicate that this construction is satisfactory. The cost of installing was about 75 cents per foot.

The report also contained operating data on high-tension cables collected from seventeen companies. A marked difference is shown in the thickness of insulation used by them for cables of relatively low voltages, but greater uniformity for high-voltage cables. The maximum allowable loading employed by different companies gives temperatures varying from 90 deg. to 150 deg. Fahr. in the lead sheath, and tests made to supplement this information show that the temperature of the conductor would be as much as 75 deg. Fahr. higher than that of the sheath. Attention was called to the possibility of varying the maximum loading with the seasons of the year. The cable burn-outs for 2300 miles of cable were 14.2 per 100 miles, of which 78 per cent were in cable sections and 22 per cent in joints. The burn-outs were attributed to electrolysis, extraneous injury, sharp bends in manholes, defective cable, badly made joints and surges due to lightning or trouble on overhead lines joined to the underground cables. A majority of the companies apply a break-down test of 150 to 200 per cent of the working voltage to the new lines for an average of five minutes. Only six companies make any break-down tests on old cables, the voltages used ranging from 125 to 200 per cent, applied for five minutes.

ACCIDENT PREVENTION

A helpful résumé of accident prevention from the central-station standpoint was presented by the committee in charge of this subject, of which Martin J. Insull, Chicago, is chairman. The report outlined the organization of a "safety first" campaign, with practical suggestions as to method of procedure, formation of committees, education of employees, first aid and its limitations. The committee favored uniform reports of accidents, submitting a standard blank for this purpose. An interesting feature was a number of diagrams showing the causes, anatomical distribution and occupations involved in 2670 accidents reported by member companies in the past sixteen months. The more frequent causes were striking or being struck by material, handling tools, wire, glass, sharp edges, lifting or moving material, falling bodies, electric current and falls.

The latter part of the list included a list of standard danger and safety signs, printed in colors, a scenario of the motion-picture film "The Lineman," which is the property of the association and which shows careful and careless ways of working on the distribution system. It may be rented at small cost.

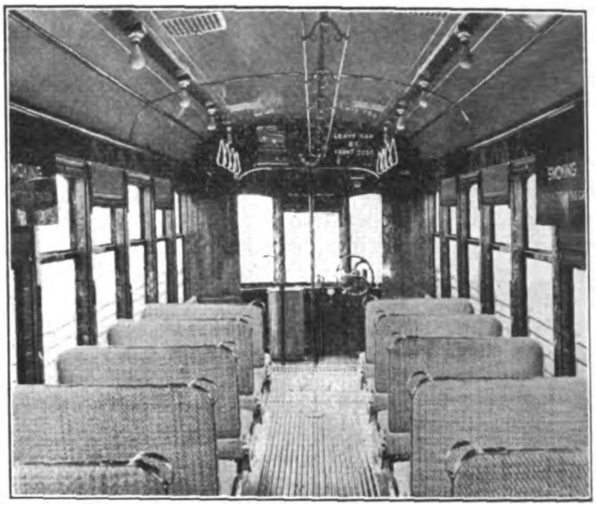
APPRAISALS

D. C. Jackson, professor of electrical engineering, Massachusetts Institute of Technology, presented a paper entitled "Appraisals of Electric Light and Power Properties." He called attention to the important differences between operation of public service companies and the ordinary businesses with which the general public has become familiar through experience. The interest on investment in a public utility property is a much larger part of the total revenue than in a mercantile business. Instead of earning a gross annual revenue equal to or exceeding the capital investment, a public service corporation ordinarily expends a sum of money in establishing its plant and business which is not less than four or five times, and in some cases as much as twelve times, the gross annual revenue that it may expect to receive. This at once multiplies the proportion of the revenue which must go to the investors in case a reasonable return is made on the investment.

Competition does not introduce any inconveniences in relations between customer and purveyor in ordinary business, nor is expensive duplication of capital caused by competition where the fixed capital is small. Inconvenience to the customer is often caused, however, by general competition of like public service companies, and duplication of capital is likely to be large and economically defensible in the case of competing public service companies which give like service. Electric utilities might gain greater strength with the public, thereby improving their facilities, by making annual investment and earnings statements of studied definiteness and completeness whether required to do so by public service commissions or not, and the publication of these statements in the daily newspapers, after the manner of the publication of bank statements, would bring matters before the public mind in a way that no other process can rival. To bring about the needed confidence between the public and the companies without friction and shock it is of importance that engineering statistics be made more a part of the permanent record of the companies and that the record keeping of the companies become a joint structure of accountants' financial statistics and of engineers' physical and production statistics.

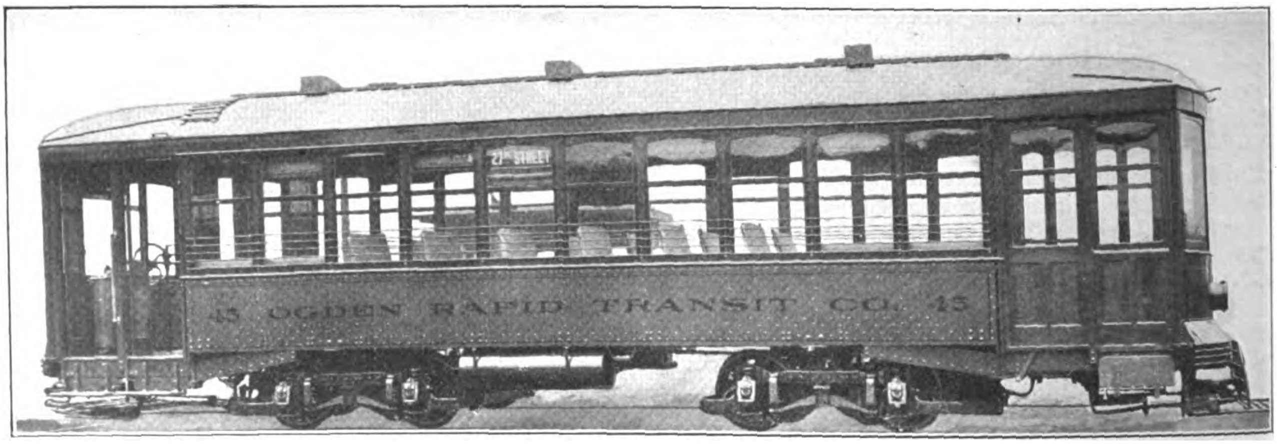
COMPOSITE CONSTRUCTION CARS FOR OGDEN, UTAH

The Ogden (Utah) Rapid Transit Company has lately received from the American Car Company works of The J. G. Brill Company, six closed motor cars of the single-arch type shown in the accompanying illustrations. The new cars are 39 ft. 6 in. over the vestibules, 26 ft. 6 in. over the body, 8 ft. 4 in. over the sills and 8 ft. 7 in. over all. The height from the rail to the sills is 2 ft. 8½ in. and from the sills to the trolley base 8 ft. 10½ in. The underframe and posts of the car are composed of commercial sections and in addition a side sheathing of 3/16 in. x 28¼ in. x 26 ft. 2 in. The roof headlining is of Galco. The vestibules are 6 ft. 6 in. over all.


Interior View of Ogden Car, Showing Short Bulkheads

The view of the interior shows that no end-body doors are used, the car being operated according to the pay-within system.

A number of interesting specialties have been incorporated in these cars, such as the "Rico" sanitary strap, Ohmer fare register, Railway Utility Company's ventilators, Tomlinson radial couplers, Hedley anti-climbers, Esterline headlights, Ohio Brass sanders, Berg fenders and Hunter illuminated destination signs. The trucks are of the car builders' 27 G-1 type with the short wheelbase of 4 ft. 6 in. and are equipped with Griffin wheels. The electric and braking equipment comprises two GE-80 outside hung motors, Consolidated heaters, General Electric air brakes with CP-27 A compressor and car builder type hand brakes with Peacock drums.



Car of Composite Construction for Ogden (Utah) Rapid Transit Company

The New York Municipal Car—Body

The Present Article Is a Detailed Description of the Construction of the Body—Among Noteworthy Features Are the Substantial End Stiffening for a Full Side-Girder Design, the Compromise Roof Design to Provide for Tunnel Clearances While Retaining Ventilation Advantages of the Monitor Deck and Absence of Floors Under Seats to Save Weight

On Feb. 26, 1914, the New York Municipal Railway Corporation placed with the American Car & Foundry Company an order for the bodies of 100 cars to be used in subway and elevated service. The contract with the car builder calls for the delivery of the complete order by Dec. 1, 1914. In addition, the railway reserves the right to order 500 more cars for delivery within three years from the date of the present agreement. The cars which are now under order are of the 67-ft. x 10-ft. side-door design described in the June 6 issue. The present article will describe such features of the framing and general body construction as correspond fairly closely to the specifications which were accepted by the car builder.

DIVISION OF DUTIES BETWEEN RAILWAY AND CAR BUILDER

In accordance with the practice of the allied Brooklyn Rapid Transit System, all electrical, mechanical and pneumatic apparatus, etc., will be installed by the New York Municipal Railway Corporation. This equipment comprises the following: Motors, control, air brakes, door-operating mechanism, heaters, signals, lighting fixtures, fire extinguishers and practically all of the wiring. The company has also furnished but left to the car builder for installation f.o.b. Berwick, Pa., the following items: Trucks: draft gears, drawbars and coupler heads with radial bar and gear attachments and car-body center plates.

The car builder will furnish and install the following accessories for the apparatus supplied by the railway: Conduit pipe, fittings, hangers, brackets, etc., for the control, lighting, heating, signaling and auxiliary circuits; hangers, brackets, etc., for the air brakes; foundation brake rigging and hand brakes complete; brackets and attachments for the door-operating devices; draft sills and reinforcements for couplers and draft gears.

In general, the foregoing paragraphs delineate the division of duties between the railway and the car builder. The intent of the railway in having the car builder do so much miscellaneous work is to enjoy the advantage of laying out beforehand all jobs that would, if done subsequently, injure the finish of the car. As matters are now being handled, the cars will reach Brooklyn with the conduit and piping in place; and if the cars are built rapidly enough they will be delivered with the terminals of the different wires hanging out of the conduit for attachment to the lighting fixtures.

MATERIALS

A careful study was made to determine the most desirable material for the different parts of the car body, with the result that an unusual variety of metals was specified. The uses and characteristics of each class of material are summarized in the following paragraphs:

Structural steel shapes: A.S.T.M. specification for "Steel Shapes, Universal Mill Plates and Bars," dated June 1, 1912.

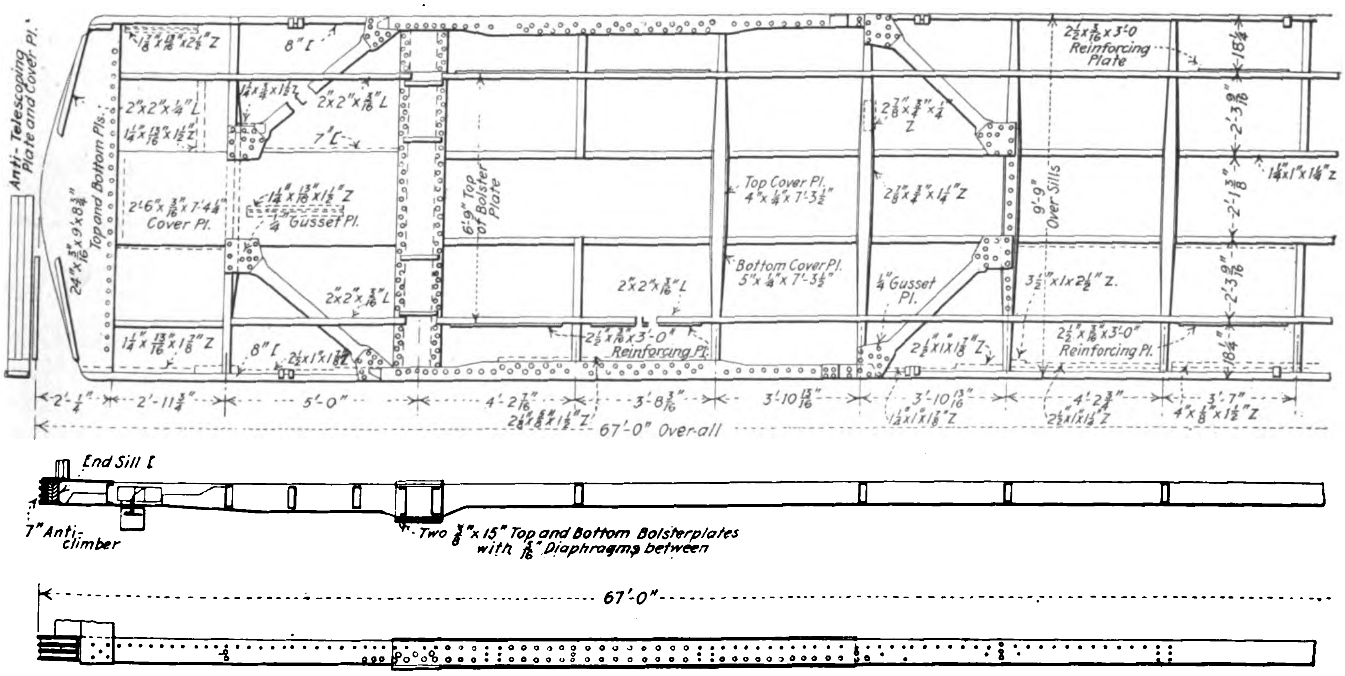
Rivets more than ¼-in. diameter: A.S.T.M. specification for "Rivet Steel," dated June 1, 1912; rivets of ¼-in. and less diameter, Norway iron.

Steel castings: Open hearth or crucible steel—phosphorus not to exceed 0.05 per cent; sulphur not to exceed 0.05 per cent; tensile stress per square inch not less than 60,000 lb.; elastic limit per square inch not less than 27,000 lb.; elongation in 2 in. not less than 30 per cent.

Malleable iron castings: A.S.T.M. specification for "Malleable Iron Castings," dated Nov. 15, 1904.

Gray iron castings: A.S.T.M. specification for "Gray Iron Castings," dated Sept. 1, 1905.

Wrought iron: A.S.T.M. specification for "Refined Wrought Iron Bars," dated June 1, 1912.


Anti-Telescoping Plate and Cover Pl.
1 7/8"x13/16"x2 1/2" Z
8" [
2"x2"x1/4" L
1 1/4"x13/16"x1 1/2" Z
1 1/4x3/4x1 1/2 Z
2"x2"x3/16" L
7" [
Top and Bottom Pls.
24"x5/16"x9'x8 3/4"
2'-6"x3/16"x7'-4 1/4" Cover Pl.
1 1/4"x13/16"x1 1/2" Z
1/4" Gusset Pl.
2"x2"x3/16" L
1 1/4"x13/16"x1 7/8" Z
8" [
2 1/2x1"x1 7/8 Z
6'-9" Top of Bolster Plate
2"x2"x3/16" L
2 1/2"x3/16"x3'-0" Reinforcing Pl.
Top Cover Pl. 4"x1/4"x7'-3 1/2"
Bottom Cover Pl. 5"x1/4"x7'-3 1/2"
2 7/8"x3/4"x1/4" Z
2 7/8"x3/4"x1 1/4" Z
1/4" Gusset Pl.
2 1/2"x1x1 7/8" Z
9'-9" Over Sills
3 1/2"x1x2 1/2" Z.
2 1/2x3/16x3'-0 Reinforcing Plate
2 1/2"x3/16"x3'-0" Reinforcing Pl.
18 1/4
2'-3 9/16"
2'-1 3/8"
2'-3 9/16"
18 1/4"
1 1/4x1"x1 1/4" Z
2'-1/4"
2'-11 3/4"
5'-0"
4'-2 7/16"
3'-8 3/16"
3'-10 13/16"
3'-10 13/16"
4'-2 3/4"
3'-7"
2 1/8"x5/8"x1 1/2" Z
1 1/2x1"x1 7/8" Z
2 1/2"x1"x1 1/2" Z
4"x1/8"x1 1/2" Z
67'-0" Over-all
End Sill [
7" Anti-climber
Two 3/8"x15" Top and Bottom Bolsterplates with 5/16" Diaphragms between
67'-0"

N. Y. M. Car—One-Half of the Underframe, Including Reinforcing Plates for Standing Loads

Bronze hardware composition: Copper, 88.4 per cent; tin, 5.5 per cent; lead, 2.8 per cent; zinc, 3.3 per cent. Impurities exceeding 1.5 per cent are not allowed, but a variation of 10 per cent in the specified amounts of tin, lead and zinc will be permitted.

Perhaps the most interesting feature of the various uses of metal is the adoption of "ingot iron" for floor sheets, doors and roof on account of its rust-resisting qualities. Floor sheets are exposed to the atmosphere, and even galvanized iron will rust at the connections with the rivets. In the case of doors, moisture will penetrate to places which cannot be repainted, which fact is one of the objections to steel doors. Roofs are subject to much moisture, and here the selection of "ingot iron" makes it possible to use thinner sheets than would be practicable with steel.

For rolled steel and ingot iron sheets and plates, the company specified three grades of steel and one grade of "ingot iron" according to the use to which they were to be applied, as follows: Grade A—thin steel for moldings, interior trim, etc.; Grade B—flattened steel used for outside and inside finishing, posts, etc.; Grade C—all other rolled steel sheets and shapes; Grade D—ingot iron sheets for roofs, floor sheets, ventilators, doors, etc.

The specifications for Grades A, B, C steel, which are based on those of the Pennsylvania Railroad and the American Society for Testing Materials, call for the open hearth process with both phosphorus and sulphur content less than 0.05 per cent. The individual qualifications of each grade follow:

Grade A—Furnished in strips or level sheets. Must be successfully drawn or pressed cold into moldings, etc., without rupture. Must have bright finished surfaces, free from mill scale and rust. No tests other than successful working.

Grade B—Medium blue, annealed, roller-leveled, soft steel capable of being formed either hot or cold by pressing. No physical tests required for sheets less than 0.1 in. thick. For sheets of 0.1 in. or more, tensile strength must be 55,000 lb. to 65,000 lb. per sq. in., and the elongation in 8 in. not less than 20 per cent.

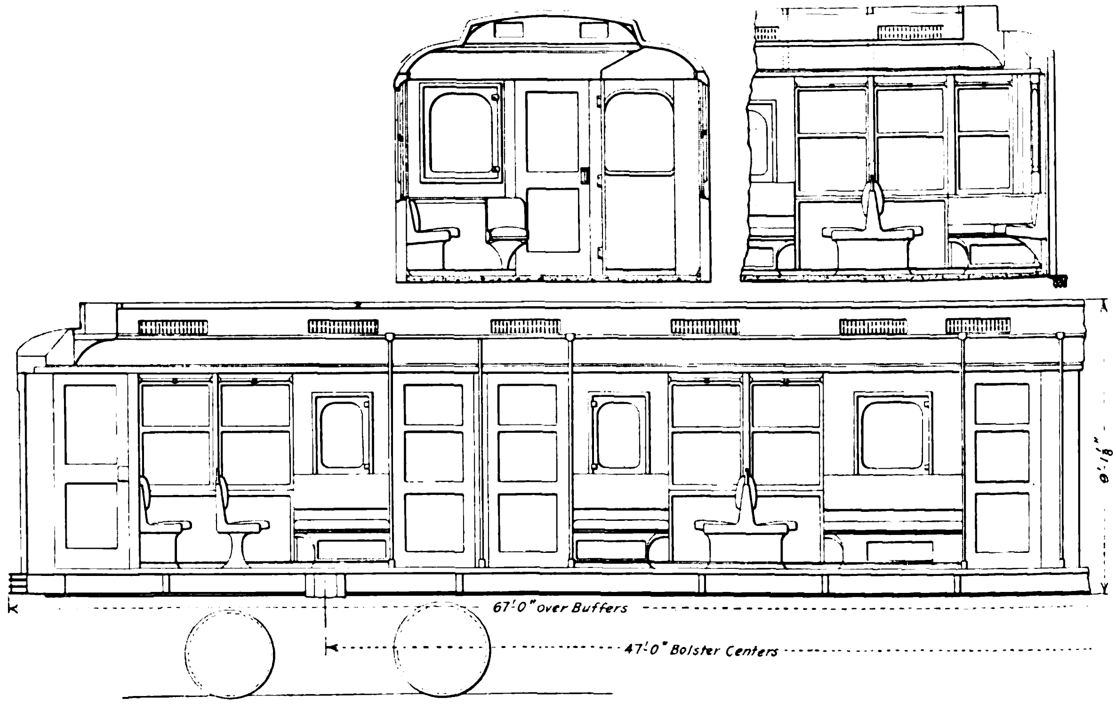
Grade C—Medium soft steel, capable of being formed either hot or cold by pressing. The tensile strength is specified from 55,000 lb. to 65,000 lb. per sq. in., and the elongation in 8 in. is to be not less than 25 per cent.

Grade D or ingot iron—The specification especially devised for this rust-resistor is as follows: Physical—elastic limit not less than 25,000 lb. per sq. in.; tensile strength, not less than 42,000 lb. per sq. in.; elongation in 8 in. not less than 25 per cent.; reduction in area not less than 50 per cent; Chemical—not more than 0.16 per cent total impurities, including the elements of sulphur, carbon, copper, phosphorus, silicon, nitrogen, manganese, oxygen and hydrogen.

ADMISSIBLE STRESSES

The maximum unit stresses to which any member of the car framing will be subjected do not exceed the following amounts:

STRESSES	
Bolsters	12,500 lb. per sq. in.
Sills and framing	16,000 lb. per sq. in.
Shear	
In framing other than buffing	10,000 lb. per sq. in.
Buffing	12,000 lb. per sq. in.
Bearing	
In framing other than buffing	20,000 lb. per sq. in.
Buffing	24,000 lb. per sq. in.



N. Y. M. Car—Side and End Elevations, Showing Seat Arrangements, Doors, Ventilators, Etc.

In the design of the roof carlins, use was made of the United States government's regulations for postal cars in connection with which the following formula is used:

$$\frac{\text{Roof area per carlin}}{\text{Section Modulus}} = \text{not to exceed } 100.$$

For the N. Y. M. car, the corresponding figures were as follows:

$$\frac{10 \times 3}{0.415} = 72.3$$

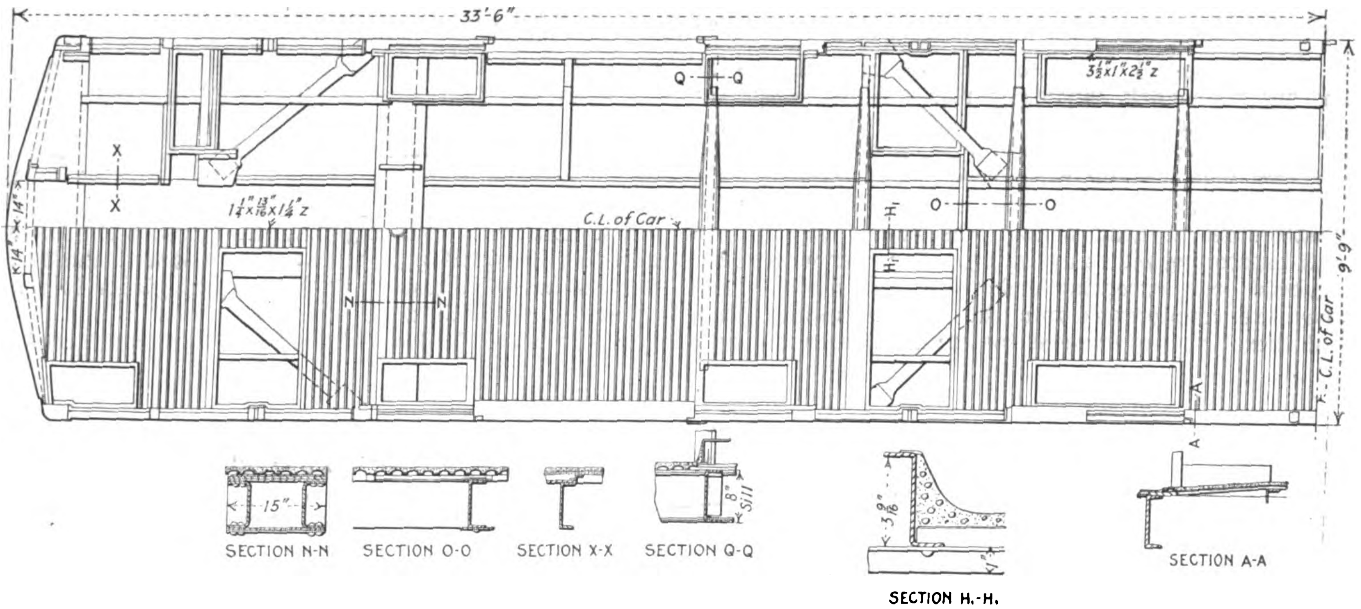
It will be seen from the foregoing that the strength of the roof members of this car is 38 per cent greater than required by the government specifications.

The stress in the brake rods is 12,000 lb. at emergency applications. This stress is 80 per cent greater than for service applications. Pins are figured not to exceed 15,000 lb. single shear with emergency application. Although theoretically the shear of the pin on the brake rod would be divided, it was assumed that it might come entirely at one point. The bending moment on brake levers was figured not to exceed 23,000 lb. in emergency. In the endeavor to get greatest strength for least weight in every detail, a study was made of brake lever shapes. To secure a practically uniform stress throughout the theoretically perfect lever would have been tapered in the form of a parabola from the point of maximum stress. For practical reasons, however, this form could only be approximated.

SAMPLE CAR—GENERAL DESIGN

An important feature of the work at the car builder's shop is the construction and equipment of a sample car. As each step in the assembly of this car is completed, adjustments for unforeseen conditions are made and then the car builder is authorized to duplicate the approved stage on the remaining cars.

This car is designed as a side-girder structure in which the full height and length of the sides are available for resisting bending stresses, the door piers being used to transmit the stresses from the lower to the upper members. The underframe as a whole is designed merely to transmit the floor loads to the side sills, but the sections between the ends and bolsters, as hereinafter described, are especially stiffened and tied in with the side frame to take care of buffing shocks. The roof is practically free of all strains except that due to its own weight, and the carlins are little more than ties between the side girders.



N. Y. M. Car—Underframe, Corrugated Metal Base for Floor and Typical Sections—Note the Absence of Flooring Under the Seats and Sanitary Coves as at Section H_1-H_1

SIDE FRAME

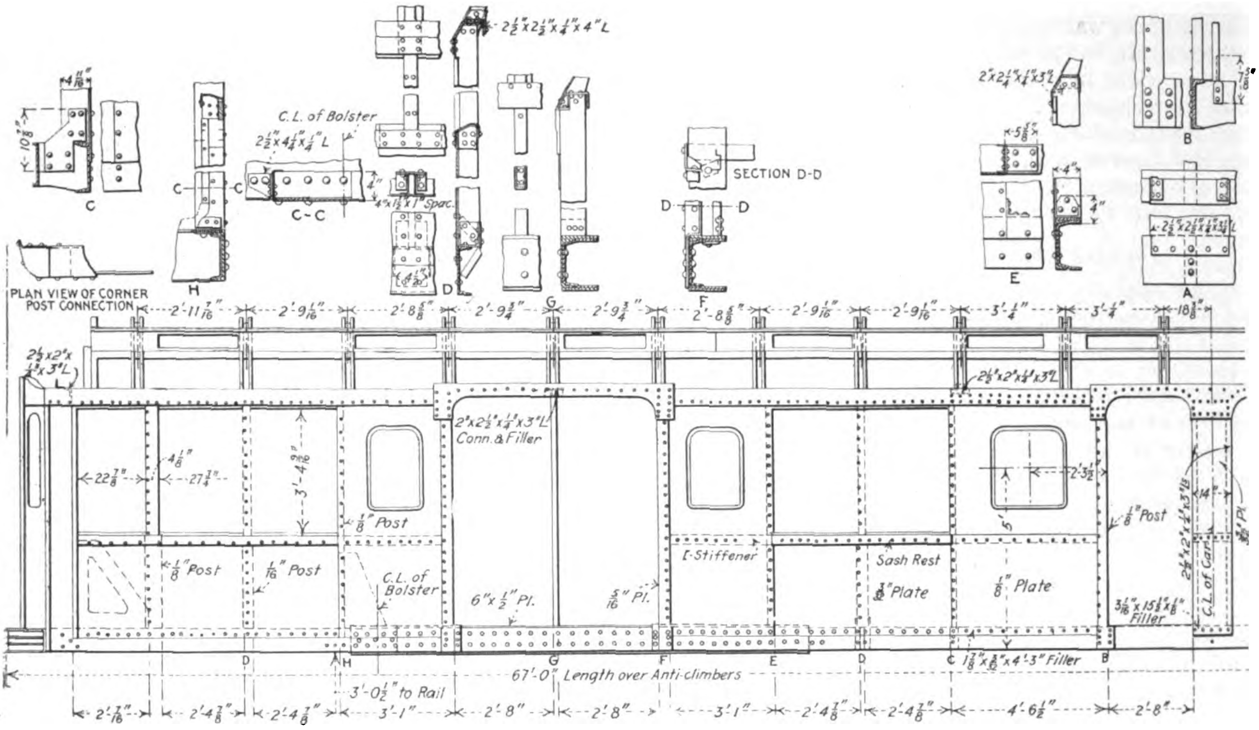
The side frame is constructed of pressed steel panels, posts, pillars, etc. all of Grade B steel. The pressed steel panels provided at each side of each pair of side doors have openings with flanges to take the sash pressed into the same. The door side of these panels is reinforced with pressed steel posts to provide necessary stiffness, and the side adjacent to the windows has flanges pressed to form the sash stop, and at this side is riveted a pressed section of ⅛-in. Grade C steel to form the post. Horizontal stiffeners of 3/16-in. Grade C steel are provided on the inside of these panels in the door pockets, and a gusset plate is attached to the post at rear of the door pockets and to the adjoining cross-bearers. Pressed sections are provided on the post adjacent to the bolster; also at the corner post under the first window; the latter to provide stiffness for the end of car and to serve as a protection against telescoping. Pressed reinforcing plates of 5/16-in. Grade C steel are used at the intersection of the door pocket panels at the end side doors and the side sills. Door headers of ⅛-in. Grade B steel pressings are employed over each door opening, riveted to the adjoining panels and body plate. These headers serve to give the proper finish and to provide the reinforcement necessary to compensate for that part of the top plate which has to be cut away to make headroom.

The body plate is of pressed section, of 3-16/in. Grade C steel. At the door opening the body plate is cut and properly formed and reinforced. The sash rests, which are installed in short sections between the window posts, are of ⅛-in. Grade B steel, reinforced on the inside with ⅛-in. Grade C steel pressings fitted at the posts and connected thereto with connection pressings and splice bars. The outside sheets excepting the door pocket panels are of 3/32-in. Grade B steel. Wherever possible the joints are welded to insure maximum strength, homogeneity and watertightness. It will be noted from the foregoing description that there is practically no belt rail as the inside stiffeners serve the same purpose. This construction gives a smooth outer side with no ledges or other water-catching fixtures.

Of the accompanying sections taken through the side, the one marked "vertical section through main windows" is of additional interest as showing the window construction adopted to avoid ledges for dust. By rounding off the edge, the conspicuous white line usually formed by frequent wiping will be avoided.

UNDERFRAME

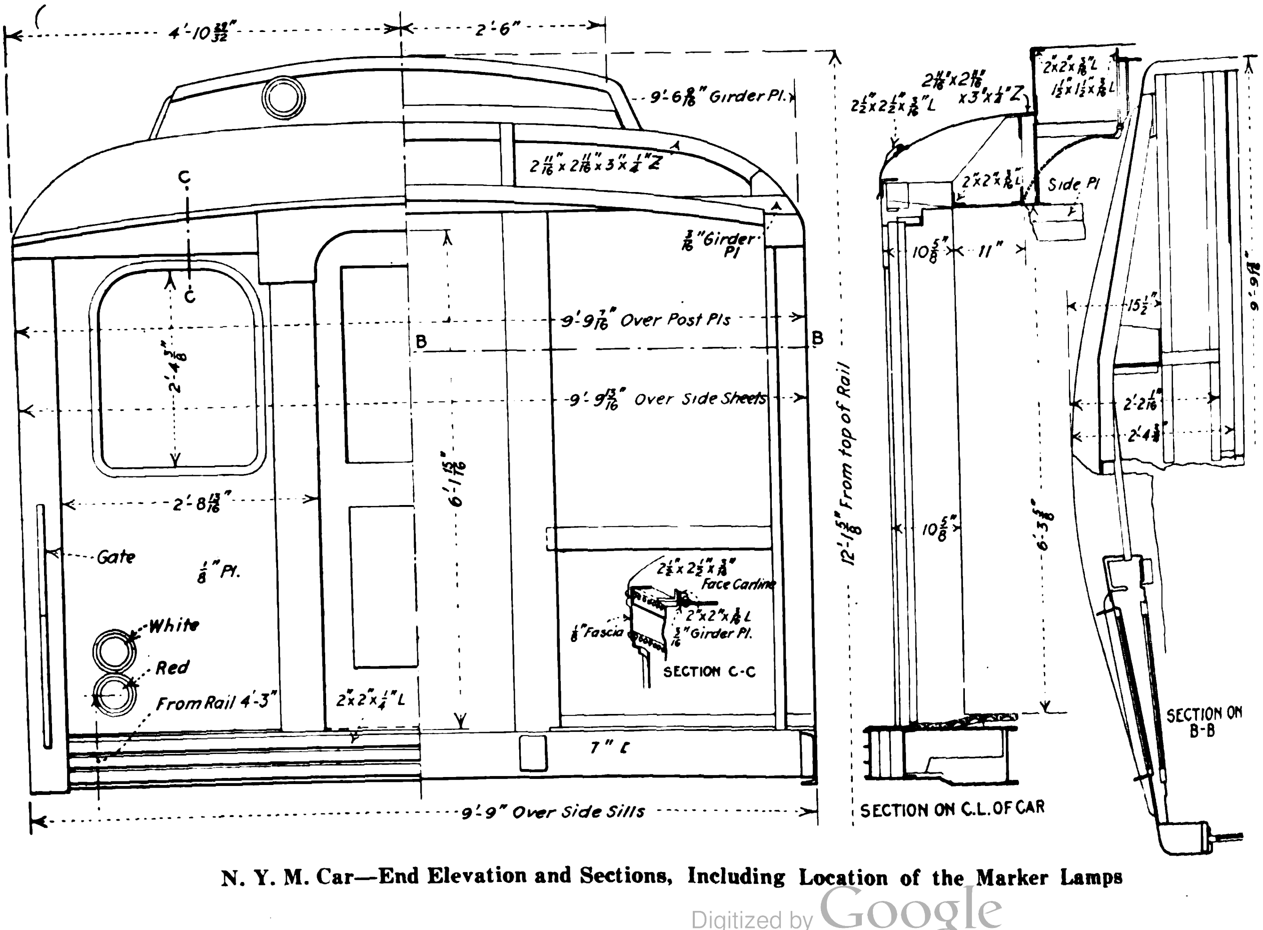
The underframe includes two side sills and two center sills, each running practically the full length of the car in one piece. The side sills are 8-in., 11.25-lb. and the center sills 7-in., 14.75-lb. medium steel channels. The side sill channels are attached to the buffer channels and anti-telescoping plates with steel pressings as indicated on the plans. The center sill channels are secured to the buffer channel by connection angles and riveted to the top and bottom buffer or anti-telescoping plates. A cover plate 3/16 in. thick x 30 in. wide is provided on top of the center sill channels, extending from the anti-telescoping plate to the bolster, riveted to the center sill channels; also secured to the anti-telescoping plates and to the bolster by riveting to the extension of the top flange of the pressed diaphragms. Two 3/16-in. x 24-in. anti-telescoping plates are provided at each end


PLAN VIEW OF CORNER POST CONNECTION
C.L. of Bolster
C-C
SECTION D-D
4"x1½"x1"Spac.
Conn.&Filler
⅛" Post
1/16" Post
C.L. of Bolster
6"x½" Pl.
5/16" Pl.
I-Stiffener
Sash Rest
⅛" Plate
⅛" Plate
⅛" Post
Filler
C.L. of Car
67'-0" Length over Anti-climbers
3'-0½" to Rail
1⅛"x⅛"x4'-3" Filler

N. Y. M. Car—Side Framing, Including Details of Connections at Various Parts

of the car, located on the top and bottom of the center and buffer channels, riveted thereto and to the side sill channels. These plates extend over the buffer channel to provide for the installation of Hedley 7-in. anti-climbers and the buffer timbers. These anti-climbers are bolted through the buffer timber and channel with countersunk keyhead bolts. The buffer timbers and anti-telescoping plates are clamped together with round keyhead bolts, excepting under threshold plates, where they are countersunk into the anti-telescoping plate, but there is no permanent fastening between the anti-climbers and anti-telescoping plates. The foregoing anti-telescoping construction between end and bolster is designed to take care of extraordinary buffing shocks without excessive weight of material, and in combination with the diagonals noted in the following paragraph the entire framing strength is made available to resist collisions. Pressings have also been designed for carrying the draft gear attachments and with the 3/16-in x 30-in. cover plate they form a box girder to reinforce the center sills.

At the end side doors the side sills are reinforced to


4'-10 11/32"
2'-6"
9'-6⅞" Girder Pl.
2 11/16"x2 11/16"x3"x¼"Z
3/16" Girder Pl
9'-9 7/16" Over Post Pls
9'-9 13/16" Over Side Sheets
2'-4⅝"
6'-1 15/16"
12'-1⅝" From top of Rail
2'-8 13/16"
Gate
⅛" Pl.
White
Red
From Rail 4'-3"
2"x2"x¼"L
7" ⊏
9'-9" Over Side Sills
Face Carline
⅛" Fascia
3/16" Girder Pl.
SECTION C-C
Side Pl
10⅝"
11"
6'-3⅝"
SECTION ON C.L. OF CAR
15½"
2'-2 1/16"
2'-4⅜"
9'-9⅞"
SECTION ON B-B

N. Y. M. Car—End Elevation and Sections, Including Location of the Marker Lamps take care of the break in the side girders required for the doors. This reinforcement comprises a 5/16-in. pressed steel shape and ½-in. x 6-in. cover plates, top and bottom, extending from the bolster itself to the second main cross-bearer from the bolster and riveted to the side sill. To stiffen the underframe laterally, diagonal braces are provided from the intersection of the center sill channels and cross-bearer, between the bolster and the end of the car, extending to the intersection of the bolster and side sill; also from the side sill at the intersection of the next adjoining cross-bearer and center sill toward the middle of the car. These braces are of 3/16-in. plate with ends flared to provide for proper fastening. Provision against the torsion of side sills by reason of eccentric loading is embodied in the reinforcements already described.

The main cross-bearers are built up of 3/16-in. steel diaphragm pressings, with top and bottom cover plates of the sizes shown. The intermediate cross-bearers are of 3/16-in. pressed steel diaphragms without cover plates. The plan of the underframe shows a number of minor features, such as stringers and cross-bearers for carrying the floor; also the 2½-in. x 3/16-in. x 3-ft. reinforcing plates, which will take care of excessive standing loads in the seatless area opposite the side doors.

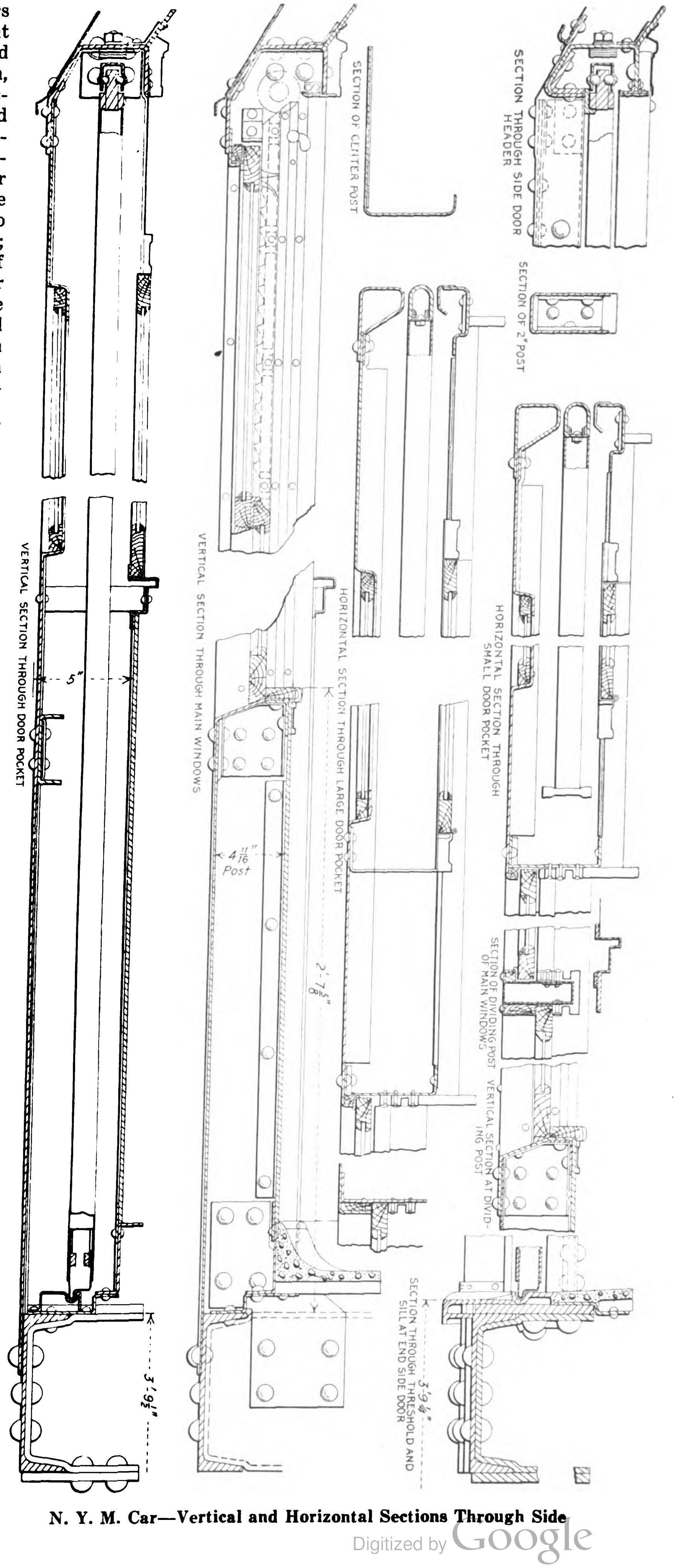
BOLSTERS AND BEARINGS

The bolster is of the built-up type, consisting of two ⅜-in. x 15-in. steel plates on top and bottom with 5/16-in. pressed steel diaphragms between the plates. This double-plate section extends from the center outward for about two-thirds of the bolster length. The bolster is riveted to the side and center sills, and a vertical reinforcing flange is provided at the ends of the bolster and riveted to the adjacent post of the side frame.

The car-body center plates are made with two bronze friction disks, and the bearing surfaces of the steel center plate castings are burnished to avoid cutting. For reasons of truck design, the Stucki roller side bearings are of inverted form, the rack being installed on the truck and the plate on the car body. These bearings are of self-centering type, namely, as one side of the roller is heavier than the other the force of gravity rights the bearing as the car departs from curves.

END FRAMING

The end sheets are of ⅛-in. Grade B steel specially formed with openings for windows with flanges to take sash pressed into same and riveted to pressed posts at end doors and corners. The corner posts are built up of pressings; the outside post of ⅛-in. Grade B steel and the inside of ⅛-in. Grade C steel. The door posts are Grade C steel 3/16 in. thickness, and the inside door post on door pocket side are of pressed section ⅛-in. Grade B steel. Cast-steel connection castings are employed between the end door posts and buffer sills to resist telescoping, and reinforcements are

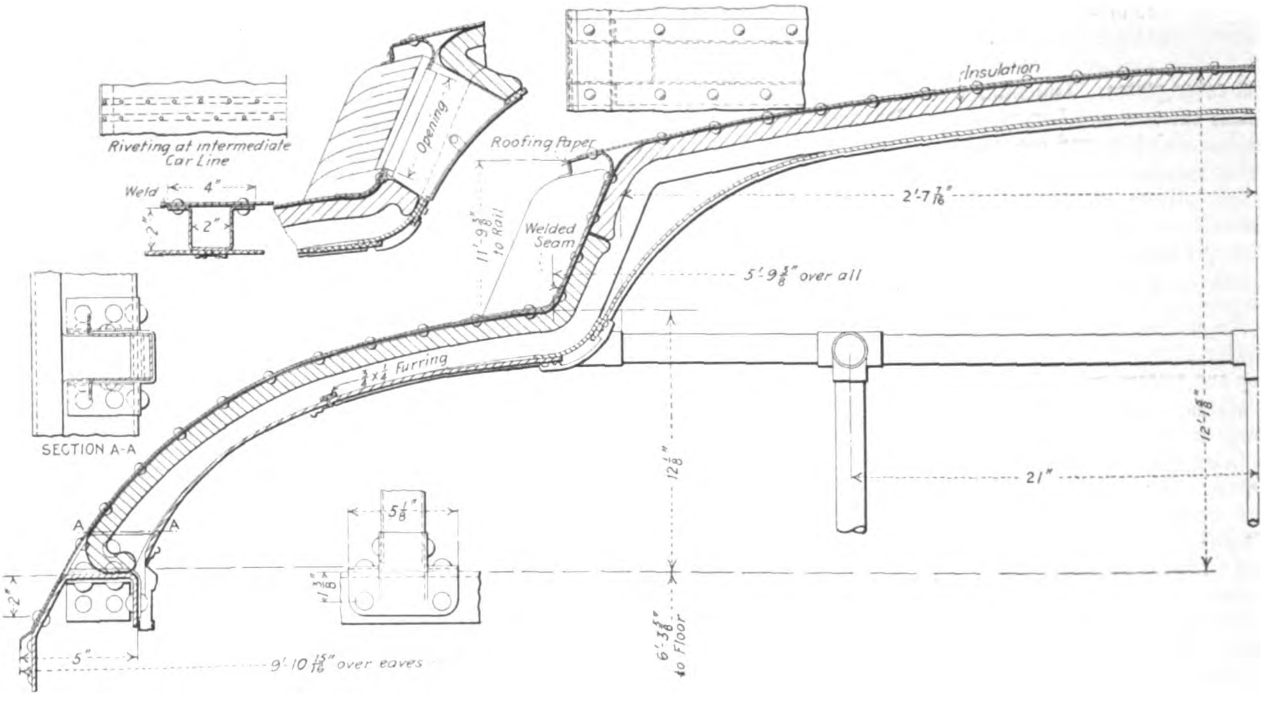

VERTICAL SECTION THROUGH DOOR POCKET
5"
3'-9½"
SECTION OF CENTER POST
VERTICAL SECTION THROUGH MAIN WINDOWS
4 11/16" Post
2'-7 5/8"
HORIZONTAL SECTION THROUGH LARGE DOOR POCKET
SECTION THROUGH SIDE DOOR HEADER
SECTION OF 2" POST
HORIZONTAL SECTION THROUGH SMALL DOOR POCKET
SECTION OF DIVIDING POST OF MAIN WINDOWS
VERTICAL SECTION AT DIVIDING POST
SECTION THROUGH THRESHOLD AND SILL AT END SIDE DOOR
3'-9¼"

N. Y. M. Car—Vertical and Horizontal Sections Through Side

also provided on the end sheets. The hood framing is built up of standerd structural steel shapes and plates.

ROOF

The form of the roof is a compromise between the single arch and the monitor type, owing to the type of Perry "ingot-iron" ventilators used in the deck and to the need for maximum clearance in the tunnels. Inside the car, the effect is that of an Empire ceiling. The deck plate is of 1/16-in. ingot iron. The carlins are 3/32-in. Grade B steel pressed in one piece, flanged and attached to the body plate with pressed steel brackets. The upper deck roof sheets are of 1/16-in. "ingot iron" and extend in one piece across the entire width of the upper deck. Splices are made at carlins by lapping sheets, riveting to carlins and welding joints. These sheets are riveted longitudinally to the deck plate. The lower deck roof sheets are of 1/16-in. "ingot iron" fastened to the carlins and spliced in the same manner as the upper deck sheets. They are riveted longitudinally to the body plate, cutting out over the door openings. They are also riveted longitudinally to the deck plate. One-ply "Rubberoid" roofing is furnished between each member of the structure and the roof sheets, and the roof sheets are riveted to and spliced at all carlins, whether at splices or not. The hoods and the drip rails are of 1/16-in. "ingot iron." The gutters are of the same material and are soldered to the roof sheets.



N. Y. M. Car—Section of Compromise Roof Adopted Because of Tunnel Clearances and Form of Ventilator; Other Details

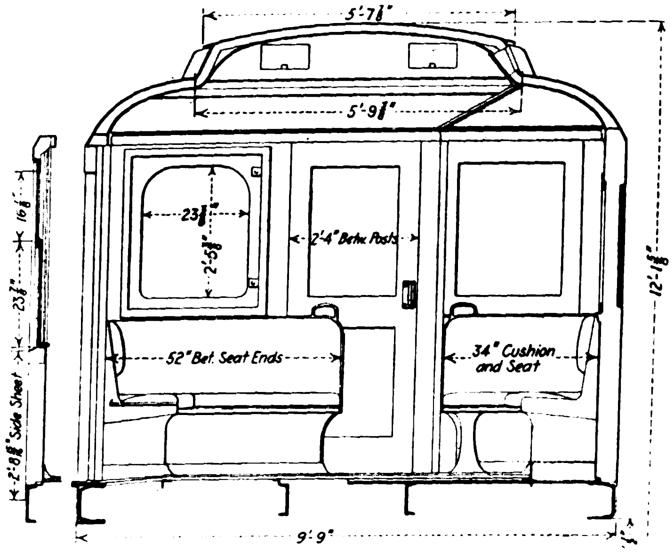
FLOOR

The floor construction presents a most interesting novelty in that no floor is used under most of the seats. This plan saves appreciable weight and floor material; furthermore, it permits apparatus to be located to better advantage. Thus valves, governor, air-compressor intakes and other fittings can be placed in nooks protected from dust, water, etc., while still accessible for inspection. The seat supports form a box with pressed steel sides open at the bottom but with a 3/16-in. waterproof Agasote shield below the cushion to secure heat insulation. The floor sheets are of "Chanarch" ⅝-in. section No. 22 gage, galvanized sheet "ingot iron," laid on top of the floor stringers, riveted thereto and at all joints. A ⅞-in. ramp is provided at each side door. The floor covering is of "Flexolith," laid to a thickness of ⅜ in. above the top of the floor. After the flooring is thoroughly hardened, it receives two coats of a mixture containing one part linseed oil and three parts turpentine. At all sides and at seat risers, etc., a sanitary cove, 2½ in. high, neatly rounded at corners, is provided, and all open spaces at the posts and sides of car are thoroughly sealed.

DOORS AND SASH

All doors are constructed of "ingot-iron" sheets. The door joints are welded and thoroughly sealed against moisture. The side and end doors slide into pockets and are hung on "Diamond" ball-bearing door hangers. A novelty in connection with the threshold plates is that the abrasive metal, which is of "Feralun" type, has been combined with the threshold plate and door guide, the abrasive metal being used also for the door guides which are usually of cast iron. The portion of treads used as door guides has no abrasive surface. Door guides of pressed steel extend from the threshold plates into the door pockets. All side and end doors have an adjustable guide shoe to suit the threshold plates. Felt weather stripping is provided on the rear edge of each side and end door and reinforced sheet rubber at the top of all sliding doors and at the door jamb of the end doors. The end doors are equipped with Howard end door locks. The center door pockets are arranged for destination signs.

All sashes are of mahogany. Fixed sashes set in steel panels are ⅝-in. thick, but the stationary end sashes in steel panels, which have wired-glass are ¾ in. thick; all other sash are 13/16 in. finished thickness. As in the present subway, the upper side sash is arranged to drop. The sashes on the inside of the door pockets are arranged to swing. Each upper side sash is provided with "Forsyth" metal weather strip and is equipped with O. M. Edwards' two sash catches and Edwards' compression spring rollers. Weather strips of velvet carpet are supplied at the top and bottom of



N. Y. M. Car—Transverse Section and Interior End Elevation

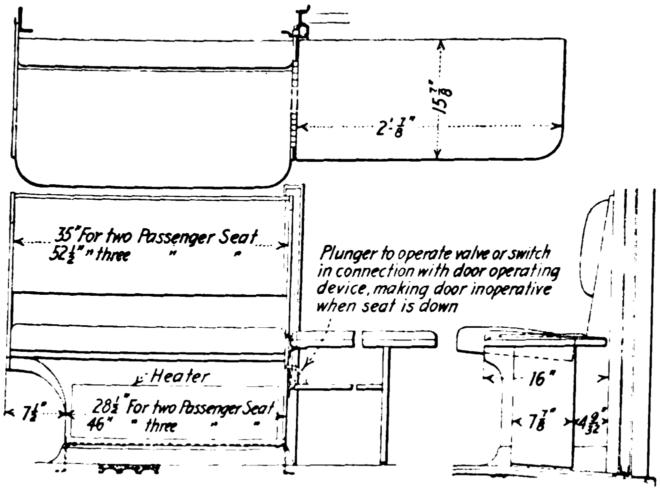
the upper side sashes. All of the sash hardware is of bronze.

The curtain material is of double Pantasote with the Curtain Supply Company's friction type fixtures and Rex all-metal friction rollers at all windows except the side windows in the door panels.

SEATS AND CABS

All the rattan seat cushions and backs are of Hale & Kilburn manufacture. The seat frames are constructed of light Grade A steel sheets. A support of shallow pan shape is built for each seat frame, flanged to support the "Chanarch" flooring at edges and to have a 2½-in. sanitary cove around the entire seat base. The seat frames can be readily installed and removed from the car without in any way disturbing the flooring material or the interior finish. It is interesting to note that the seats, including height, shape and angles have the approval of the American Posture League. Cast-iron porcelain enameled grab handles of "Ellcon" make are provided on the seat framing. Porcelain enamel instead of bronze was selected for sanitary reasons as the metal is not kept clean so readily.

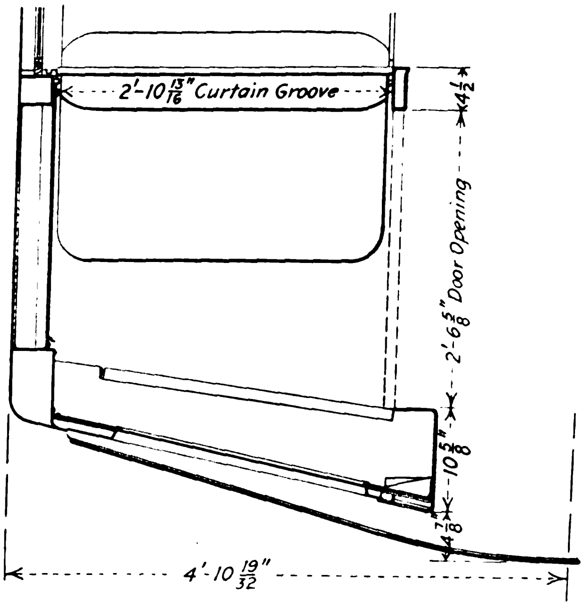
A cab is provided at two diagonally opposite corners of each car, arranged with a door hinged from the end door post and with a curtain in the rear partition, to form an inclosure for the motorman. When open for passengers the door swings to cover the control and air-brake operating valves at the end of the car, and the curtain in the rear partition is raised. The door is equipped with a double-acting latch with a lock to hold same in position both as made up for cab and as arranged for use of passengers. The motorman's seat is of pressed steel covered with hair felt and rattan. When not in use it is folded to make room for a regular passenger seat. When the latter is folded, the seat cushion is behind the back of the adjoining seat on the other side of the partition while the seat back is hinged to drop.


15 7/8"
2'-7/8"
35" For two Passenger Seat
52½" " three " "
Plunger to operate valve or switch in connection with door operating device, making door inoperative when seat is down
Heater
7½"
28½" For two Passenger Seat
46" " three " "
16"
7 7/8"
4 9/32"

N. Y. M. Car—Longitudinal and Side-Door Folding Seat

HEADLINING AND INTERIOR SIDE SHEATHING

All side end and roof sheets, posts and pillars, as well as all other parts of car body, are provided with heat insulation of Johns-Manville "Salamander." This material is applied on a coat of wet freight car paint with crout nails spot-welded to the sheets. The headlining is of 3/16-in. "Agasote," the upper deck extending in one piece transversely and in seven sections longitudinally. The lower deck headlining is made in eight sections longitudinally with joints lining up with the joints in the upper deck ceiling. A transom conforming to the lower deck ceiling is provided transversely at each end of car. All joints of headlining are covered with drawn steel moldings, and held in place with oval head machine screws. A 3/16-in. wainscoting of "Agasote" is provided at the sides of the car between the posts. All sheets for interior finish, other than the headlining and wainscoting of "Agasote," are of Grade A steel. All drawn steel moldings are of Grade A material.



N. Y. M. Car—Passenger Seat in Empty Cab

MISCELLANY

Grab handles of cold rolled steel with forged ends are used at the ends of the cars. Each end also has two safety gates which are arranged to hang between two adjoining cars. These gates have spring hinges to hold them in the outward position to insure self-coupling, thus avoiding the need for relying upon the guards to close the danger gaps between cars.

Spaces for advertising racks 11 in. wide over side doors and windows, and of special sizes at the ends, are formed of drawn steel moldings. The standing areas inside the car are supplied with vertical stanchions and elevated horizontal railings of 1⅝ in. and 1 5/16 in. outside diameter steel tubing enameled with porcelain.

Report of Edmonton Municipal Railway

Official Reports Show the Reasons for the Deficits in Operation by the City and the Increase in Fares Which Was Made Necessary by Continued Losses

The Edmonton *Official Gazette*, published by authority of the Municipal Council of the city of Edmonton, Alberta, gives detailed information in regard to the financial difficulties which have been met in the operation of the municipal electric railway and the increase in fares which has resulted.

DEPRECIATION AND OBSOLESCENCE

The *Official Gazette* of April 2, 1914, made the following statement in regard to depreciation and obsolescence: "With respect to depreciation and obsolescence which has been charged to all departments covering 1913, it was determined during 1912 that the departments were not on a sound financial basis in that no provision had been made to provide for the difference between the life of the article and the period covered by the debentures to purchase that article. During 1913 certain amounts had been set aside to meet this condition and will be added to from year to year so that it is hoped that each department will be kept on a strong financial basis in all respects."

In the *Official Gazette* of April 9 there is a further reference to depreciation. The provision for depreciation of the capital assets of the utilities was the sinking fund only. A different method had been followed in earlier years but adjustments had been made so as to coincide with the sinking fund. Exceptions to this were the power plant, to which $100,000 had been granted out of general taxation, and the electric light and power department, whose surplus had been set aside for special purposes. The report of MacIntosh & Hyde, chartered accountants of Montreal, who audited the finances of the city of Edmonton, expressed their opinion that "with the setting aside of the reserves now made, the respective plant values are as correct as they can be made short of an actual physical valuation, to make which would be impracticable in almost every case."

Concerning the street railway department the accountants report that as in other departments, the depreciation in excess of the sinking fund has been brought into the accounts, after which the deficit at Dec. 31, 1913, was $405,394. The accountants add: "It is maintained that were the street railway to receive all its current without charge it would still not make a profit on its present showing. This is doubtless true, but it is a simple proposition to state that any reduction will operate toward minimizing the annual loss. If, therefore, it can be shown that the charge for current is unduly high every energy should be given toward securing that the basis of charge be equitable. The street railway is helping to cover within a short period a very large amount of obsolescence in the power plant. If the present policy is carried out the street railway can look for no relief under this head for nearly two years, after which there should be a substantial reduction in the cost of power.

COST OF ENERGY

"In comparing the charge for street railway current in Edmonton with other cities, care should be taken to ascertain the method of measurement. Up to November last the Edmonton Street Railway had to pay 2.4 cents per kw-hr., but of the total current approximately 80 per cent was a.c. and only 20 per cent d.c. The loss in conversion of the former is fully 20 per cent, raising the real price of the current to almost 2.8 cents. About the same time that the rate was reduced to 2 cents the introduction of new machinery made the proportion of a.c. and d.c. about 50 per cent each, or equal to 2.2 cents all around on the d.c. basis.

"The benefit of the reduction only affects the last two months and the rate is still high. If the power plant problem were solved by the transference of its obsolescence to general taxation the street railway would stand to receive its substantial credit as its share of the power plant's revenue surplus and would be relieved at once from any further contribution to power plant obsolescence.

"In our view probably the two most important factors which contribute to the lack of success which has hitherto marked the history of the street railway are the geography of the city itself and the fact that the development of the street railway is substantially ahead of that of the city.

"Notwithstanding statistics to the contrary, it would appear that the street railway has been extended into districts where there is not yet a sufficient population to justify the construction of the lines, if viewed from a purely commercial standpoint. For the present the railway has to maintain these services, and it is to be hoped that the facilities of transit afforded thereby will so develop the districts in question that the services will, in the course of time, be remunerative. Meanwhile the street railway is burdened with the heavy deficit of $405,395, to carry which it has no funds of its own and must therefore suffer heavy interest on this sum in addition to its ordinary charges.

GIVE A FRESH START

"Seeing there is little prospect of material improvement in the near future and as the street railway has suffered considerably by being required to furnish citizens with transit facilities which cannot as yet be other than unprofitable, there seems good ground for the Council to consider means whereby this deficit may be cleared off and the street railway be given a fresh start. We see two practical ways. One is to wipe out the power plant obsolescence, refund the street railway its share of the overcharges already made, reduce the price of current to cost and raise additional revenue by increasing fares to a straight 5-cent basis, with reduced fares only to workmen and children. The other way is to raise sufficient money from general taxation to clear off the deficit in either one or two years and to raise fares until it can be demonstrated that the street railway can afford to reduce same and still pay its way."

MacIntosh & Hyde also take up the position of the power plant. They say that the reason why the power plant quotes rates which result in a huge surplus at the expense of its sister utilities is that it has a large quantity of obsolete plant which stands in need of replacement. While the power charge is not the only factor in the unfortunate showing of the street railway, it is, in their opinion, a distinct present hardship on the railway to be called upon to bear within about three years its full share of the obsolescence of the power plant. The accountants also criticise the financing of the new carhouse. They find that after making adjustments for overcharges and allowing a fair value for material, machinery, tools, etc., returned, the actual cost of the building was $167,735. The cost of the original plans was $2,300, making a total of $170,035. The total appropriations were $100,000, indicating an overexpenditure of $70,035.

LOSS OF $129,636 IN FOURTEEN MONTHS

The annual report of the City Commissioners for 1913 gives the following information in regard to the street railway:

"There has been a heavy loss in the operation of this department for the fourteen months, amounting to $129,636, and after paying the newly established reserve on depreciation, the loss has been considerably increased, and the total deficiency to date is over $405,394. We are of opinion that this utility has been extended considerably beyond the ordinary requirements of the city, the consequence being that insufficient revenue has been obtained. With the extended service that is given to each individual passenger, the tariff of fares is not high enough. It has been put forward that companies charging a 5-cent fare have, in addition to expenses, to provide profit for shareholders. It should, however, be borne in mind that the city pays approximately 5 per cent interest, and about 3 per cent for sinking fund, in addition to a heavy charge for depreciation. It might reasonably be held that 8 per cent for interest and sinking fund is equivalent to the dividend that would be paid by privately-owned undertakings. Your Commissioners have under consideration proposals for an increase in fares, approximating to an all-round 5-cent charge.

"The entire system was carefully gone over at the end of the year, and it was determined to make provision for certain depreciation charges not previously taken care of. This has added quite a burden to the system, but we realize that this must necessarily be considered in order to keep our system up to its proper value."

RAILWAY FINANCES SHOULD BE TREATED SEPARATELY

The report of the City Commissioners also takes up the subject of depreciation. While provision for depreciation and obsolescence should have the effect of increasing the deficiency in some of the departments, the Commissioners feel that it was necessary to put the matter on a sound basis, as otherwise the true losses of several departments would not be ascertainable from their accounts. The Commissioners say that while the creation of the reserve fund in the power plant has been at the expense of the departments which are the only customers of the plant, "it has been coincident with a reduction in rates to these departments and we feel that the problem of placing the water works and street railway department on a paying basis is one that should be treated separately and not at a sacrifice of a sound policy in regard to treatment of defective assets of the power plant."

The question of raising fares was brought before the City Council on April 28. As reported in the *Official Gazette* of April 30, the operation committee reported substantially as follows:

That in view of the fact that during the early years of street railway construction the railway bore the expense of certain paving charges under a policy which was changed in 1912, and as the committee believes that it would be to the general advantage of the city that a uniform policy similar to the present be made applicable to street railway construction since its inception, the committee recommends that the cost of paving wrongfully charged against the street railway prior to 1912 should now be borne by the city at large.

That subject to the City Solicitor's opinion a straight 5-cent fare be put in operation as speedily as possible with the exception that tickets be sold for use between 5:30 a. m. and 8 a. m. at a rate of 9 for 25 cents, except on Sundays, and that no alteration be made in children's fares.

That the committee asks for a report showing approximately the effect on land values that the laying of street railway lines has had on property directly benefited.

Definite action was not taken at this time. The *Official Gazette* of April 30 also contained a letter from John Chalmers, Commissioner of Operation, regarding the street railway deficit and suggested future policy. For paving up to 1912 the railway was paying an annual charge of $11,000. Since 1912 the railway has paid only the extra cost incident to the presence of the tracks on streets. Mr. Chalmers adds that at the inception of the system, the lowest basis of fares in existence in any of the old cities in eastern Canada was adopted, in spite of the fact that construction and operating expenses are from 30 to 50 per cent higher than in those cities. He adds:

HIGHER FARE SHOULD HAVE BEEN MADE

"What we say should have been adopted at the inception of this system was to charge, not the lowest but the highest permissible fare, sufficiently high to have insured a balance on the right side of the ledger. Then as the system grew stronger and after a proper reserve fund had been established, reductions could quite properly have been made. There was no rational excuse for adopting such a low tariff at that time. There are to-day but some fifteen systems in America operating under less than a 5-cent fare, and in some cases these are applying for permission to raise to the 5-cent tariff. New York, Buffalo, Chicago, etc., cities where both labor and material are cheap, charge 5 cents per ride and in some cases no transfers are given. It might be argued that all these systems alluded to, being private companies, pay large dividends. Such is not the case. In the last issue of the *Railway Journal*, quarterly dividends of over 40 lines were shown and these run from 1½ to 2 per cent.

"As the city grows maintenance charges increase, better type of construction is required, traffic requires that new and improved cars be put in service, besides many other expenses that a small system has not to meet. Since 1909 the system has also been carrying certain capital expenditures that only recently have become earnings. All capital raised is at present in an earning capacity, but it must be remembered that with any public utility it is scarcely possible at all times to place capital immediately where it can earn returns. Part may have to be carried over for one or two years. This is incident to all large undertakings, and provision must be made to carry this."

Mr. Chalmers also gives costs. To construct 1 mile of ballasted track with overhead work cost in Edmonton $15,911; cars cost $8,000; rails $60 per ton; poles $12 each; copper $20.50 per 100 lb.; track fastening $5 per 100 lb.; cement $3 per bbl.; stone $2.50 per yd.; labor, common, 30 cents per hour. For motormen and conductors the average wage in Edmonton is 35 cents per hour; carhouse men are paid 37 cents per hour. It costs the city over $40 a day to operate a car, while the returns for the first week in April of this year showed only two routes that are paying.

Mr. Chalmers adds: "Prior to 1913 no provision had been made for depreciation or replacements, and as much of the plant and apparatus will not be useful for the period covered by the lifetime of the bonds, particularly as some of the early bond issues were for forty years, and also that equipment must be superseded by more improved types, it was decided to create a fund to take care of this proper obligation. In 1913, $63,289 was charged to this account and a continuous charge is now made of about 3 per cent of the capital invested."

OTHER CANADIAN ROADS IN SIMILAR TROUBLE

In another part of his report, Mr. Chalmers says: "Our present financial condition is not exceptional to all other street railways west of Winnipeg. Systems in Saskatoon, Brandon, Regina, Lethbridge and Calgary, all equipped with modern apparatus, operating under the same rates of fare as we are and with the same rates of power charges, are showing deficits. Lethbridge is reported to have lost $30,000 last year and Brandon is losing at the rate of $100 per day.

GIVING CITY VERY BAD ADVERTISING

"The present financial condition of our non-paying utilities is giving us, in common with our sister cities that have utilities that are not paying, very bad advertising in the financial world, also presenting a strong argument for public utility corporations against public ownership, and it is but a matter of time before our credit will be seriously crippled. These interests do not ask at what rates we are selling our service. They merely take our financial statements and point out that the deficit is so much for last year and more for this year; even if we gave service free it is of no interest to them.

"It is an unsound premise that the public should expect, especially in the developmental stage, and all our utilities are in the development stage and will continue to be for a few more years, service at less than could be produced by a private company operating on a sound financial basis."

Mr. Chalmers therefore recommended that the street railway tariff be raised. Under the schedule of 5 cents with ticket rate of fares of 4 1/6 cents in certain hours and children's fares at 2½ cents, after allowing the full amount for depreciation, this would still leave a deficit of $54,947. If depreciation should not be considered in the operating expenses, this should give a surplus of $47,052, which would give roughly 47 per cent of what should be credited to the depreciation account. Mr. Chalmers said he did not feel that the city would be justified in attempting any higher raise in tariff, but that it must endeavor by the closest economy and a constant endeavor to lower the cost of operation and meet the charges. The increase he suggested would mean a 20 per cent increase for cash fares and a 10 per cent increase for ticket fares.

ARGUES AGAINST EXTENSIONS

In closing Mr. Chalmers emphasized the necessity of putting the system on a sound basis financially, and advised strongly against the construction and operation of further extensions unless it could be shown conclusively that they would produce sufficient revenue to cover all charges or until the present system is in a financial condition to carry such extensions without having them be a burden and financial loss.

J. H. Larmouth, superintendent of the street railway, in his report to the Commissioner of Operation, suggested that one way in which the account could be made to balance would be to increase the fares until the undertaking earned sufficient money to wipe out the deficit and to show a surplus, when rates could be reduced to whatever level the earnings warranted.

REDUCTION IN COSTS NOT IN SIGHT

At a meeting of the City Council on May 5, reported in the *Official Gazette* of May 7, a report on the subject of street railway fares from Mr. Chalmers was read. Mr. Chalmers quoted from his report of May 12, 1913, calling attention to the unsatisfactory financial condition of the street railway. He said that for some years, at least, material reduction in the cost of operation could be expected. The tendency is always to extend the system further into new territory. The tendency at present is to build up the outlying sections rather than to fill up the central portion of the city. He declared that further extensions should be considered very carefully before being authorized, and in each case, before the extensions were built, there should be assurance of a reasonable revenue. He emphasized again the necessity of prompt action toward a sound financial policy.

At the same meeting the operation committee reported that the proposed increase in fare had been put to vote before the committee and defeated.

The annual report of the street railway department, covering the fourteen months ended Dec. 31, 1913, was published in the *Official Gazette* for May 7. It strongly recommended that definite action be taken to increase the revenue, showing that the department had shown a deficit ever since it started and that the deficit was getting larger each year.

AID AND HIGHER FARES FOR THE RAILWAY

At the meeting of the City Council on May 12, reported in the *Official Gazette* for May 14, the Council voted to have the city at large assume the amount of $131,933 as a general debt. That represents the expenditure borne by the street railway for paving between the tracks. It was also decided that the sum of $39,192, being the total annual charges paid by the street railway on the paving mentioned to Dec. 31, 1913, be repaid to the street railway by a tax levy in the current year, and that the interest and sinking fund for 1914 also be raised by taxes for the current year. The Commissioner of Operation was directed to make the following schedule of fares operative as speedily as possible: A straight 5-cent fare, with the exception of tickets to be sold at 8 for 25 cents for use between 5:30 and 8 a. m., while the rate for children's tickets remained without change.

INTRAMURAL RAILWAY FOR THE PANAMA-PACIFIC EXPOSITION

The intramural railway at the Panama-Pacific International Exposition is to have part of its line completed and equipped in time to handle traffic during the festivities to be held at the grounds on July 4. At least one of the locomotives, a number of cars and that part of the trackage necessary to carry passengers from the Palace of Machinery to the Palace of Agriculture are planned as a demonstration of the service to be rendered during 1915.

The intramural railway will be a replica of a modern railroad system and will be built to one-third standard size in all features where this is possible. The gage will be 19½ in. and complete Pacific-type steam locomotives, which weigh only 13 tons, will be operated by engineers and firemen, members of the national organization, who are not over 5 ft. in height. The line will be double tracked, about 2½ miles between terminals and will be protected by a block signal system. There are to be about 100 cars of 20-ft. and 24-ft. lengths, eight locomotives and one switch engine. These engines will burn either oil or hard coal, the concessionaire guaranteeing that there will be no smoke.

A regular train schedule will be maintained between the eastern terminus at the southeast corner of Machinery Palace and the western end of the line near the Stadium. The line for most of its length runs along the Marina close to the water, and there will be five intermediate stations.

The Master Car Builders' Convention

Abstracts Are Published of the Papers Presented at Atlantic City, Together with a Description of the Novelties Among the Exhibits Which Were of Special Interest to Electric Railways

The annual convention of the Master Car Builders' Association was held in Atlantic City June 10 to 13, 1914. During the course of the proceedings a number of papers were presented of which many were of special interest to the electric railway industry, and these are published in abstract in the following paragraphs.

NEW STANDARD COUPLER

The standing committee on coupler and draft equipment, which presented at the 1913 convention a series of results of tests upon couplers in present general use and upon several new types of couplers of increased weight and strength, reported before the convention that it had conducted jointly with the various manufacturers of couplers exhaustive tests and investigations to the end of developing a single standard design. Specifications on a coupler design together with working models built by the various manufacturers in accordance with these specifications were presented at the 1913 convention, and these new types were submitted to exhaustive static and road service tests.

The report of the 1914 committee presented the results of these tests in detail, showing that the couplers designed according to the new specification possessed an ultimate strength 70 per cent greater than the average of the present types of couplers. In addition, the permanent set of the knuckle in the pulling tests was shown to have been reduced to a practically negligible amount, the average figures for a permanent set under a load of 150,000 lb. being 0.21 in. for the present types of coupler and 0.0024 in. for the new specification type. The results of road tests on the present type and on the specification type were also included in detail in the report.

From the data thus obtained the committee made a selection among the various designs of specification couplers submitted, and two which appeared to be superior in strength and rigidity were chosen for a final test. Of these one had a straight lock and the other a wedge lock. The committee then held a joint meeting with the representatives of the various coupler manufacturers at which the tests were generally discussed, the committee stating that it felt that all of the coupler manufacturers should make the trial couplers so that the problem of interchangeability could be worked out and so that all manufacturers would be prepared to make the standard coupler when it was finally adopted.

All of the manufacturers discussed the matter freely, stating generally that they were prepared to manufacture the two types of trial couplers during the experimental stage and expressing a desire to abide by the decision of the coupler committee. With regard to patent features, the manufacturers whose couplers were selected for trial stated that they would live up to their agreement to allow other manufacturers to make the coupler that was finally chosen. It was decided eventually that 5000 couplers of each of the two types were to be tried out in service and that the railroads of the country should be requested to purchase the trial couplers freely until that number had been placed in service. In case the number of 5000 was exceeded the manufacturers other than those two whose couplers had been selected were to begin manufacturing the trial couplers. The two couplers selected for trial weighed respectively 480 lb. and 467 lb. and had ultimate strengths of 545,000 lb. and 495,200 lb.

TRAIN BRAKE AND SIGNAL EQUIPMENT

The report of the standing committee on train brake and signal equipment presented a report which recommended that all passenger cars should be equipped with brake and signal-pipe end-clamp hangers of a swinging or sliding design to provide lateral motion. The committee also recommended the use for a conductor's valve of a rubber-seated check valve which was not self-closing, and that the conductor's valve should be corded for the entire length of the car except in the case of dining and other cars where this was impossible. In this case a conductor's valve cord should be made of metallic material and of red color and the signal valve and cord to be of gray, so that these cords could be easily distinguished. The committee also stated its desire to keep before the association the clasp type of truck-brake rigging for passenger cars. The number of cars in service at the present time and equipped with clasp brakes was sufficient to make possible a satisfactory investigation of performance, and the committee advocated the appointment of a special committee to investigate the subject of clasp-brake rigging in general and to make schedules of the weights of cars which should be so equipped. On account of the limited range of action of the present train air signal the committee also pointed out the desirability of developing a satisfactory signal device. In addition the committee advocated consideration of galvanized pipe and fittings for refrigerator and coal cars. A revision of the present general instructions for air-brake and air-signal systems was included in the report.

BRAKESHOE TESTS

The committee on brakeshoe and brake-beam equipment reported in detail the results of a series of laboratory tests on different kinds of brakeshoes, the tests being made at different speeds and pressures. In these tests it was found that the coefficient of friction decreased steadily as the brakeshoe pressure increased, ranging between 13 per cent and 10 per cent with brakeshoe pressures between 12,000 and 18,000 lb. per shoe. In one case, namely, that of a shoe made up of a pressed-steel back 1/8-in. thick and completely filled with a composition, the coefficient of friction ranged between 20 per cent and 15 per cent with brakeshoe pressures as before. The loss in weight due to wear was found to be very irregular, in general increasing with the pressure. The approximate distance required by each shoe to produce a theoretical stop was found to be inversely proportional to the coefficient of friction in each case. All of the tests were carried out at a peripheral speed equivalent to that of 65 m.p.h.

The same committee included in this report a revision of the specification for tests on No. 2 brake-beams, and stated that in answer to a circular letter regarding the desirability of adopting a standard No. 2 brake-beam as recommended practice of the association the majority of replies were in favor of this action.

STEEL CAR CONSTRUCTION

The committee on car construction included in its report a recommendation to the effect that existing steel or steel-underframe cars which had less strength than the following standard should be classified with wooden cars and subject to the same rules for combination defects. This would apply when the area of the center sills was less than 16 sq. in., the ratio of stress to end load was more than 0.09 and the length of center or draft sill members between braces more than twenty times the depth of the member measured in the direction in which buckling might take place. In determining the ratio of stress to end strain the distance between the neutral axis of any member of the car and the center line of strain should be taken as a lever arm through which bending effect is added to direct tension or compression. A formula for the ratio of stress to end strain was given as one divided by area in square inches, plus the quotient obtained by dividing the lever arm in inches by the section modulus. In connection with new cars it was stated that minimum center sill areas between points of impact on existing cars might vary up to 55 sq. in., and, as service experience had demonstrated that cars having minimum center sill strength were crippled in acting as cushions for the strong cars, this made it desirable to aim at uniformity of center sill strength for all cars in the train. Designs of cars which did not go into general service in interchange might be considered only from their own load carrying standpoint without regard to impact strains in the train, but those used in interchange had to be considered from both standpoints. For interchange cars the committee recommended a minimum area of center sills of 24 sq. in., a maximum ratio of end strain to net load of 0.06 and a length of center- or draft-sill member between braces equal to twenty times the maximum depth of the member.

With regard to boxcar end design, the committee recommended that new cars should have ends of steel plate ¼ in. thick reinforced between corner posts with the equivalent of either two vertical steel braces with a total section modulus of not less than nine, or else one vertical and two diagonal steel braces with a total section modulus of not less than ten, or else three horizontal steel braces with the same modulus. Special ends of the corrugated type might be substituted for the ones described.

OTHER REPORTS

The committee on the retirement of small capacity cars recommended that the following rule should be submitted to letter ballot: "After Oct. 1, 1916, all cars of less than 60,000 lb. capacity having wooden or metal draft arms which do not extend beyond the body bolster will not be accepted in interchange." The committee reported a considerable majority of replies in answer to a circular letter from roads which considered it practicable to prohibit the use of 40,000-lb. cars in interchange, and that a small majority of the roads replying even considered it practicable to prohibit the use of 50,000-lb. cars. Few roads had restrictions in force regarding the use of 40,000-lb. and 50,000-lb. cars. The committee reported about 50,000 cars of the smaller capacity in service and about 75,000 cars with a capacity of more than 40,000 lb. and less than 60,000 lb.

The committee on specifications and tests for materials presented revised specifications for air-brake and signal hose, for welded pipe, for heat-treated knuckle pivot pins, for steel axles, for refined wrought-iron bars, for helical springs, for chain for passenger and freight cars and for material for journal-box brasses.

The committee on car trucks submitted limiting dimensions and specifications as well as tests for cast-steel truck sides, including a recommendation to establish a spread of 50 in. center to center for side bars of 140,000 lb. capacity truck bolsters and one providing for clearances of side bearings for new cars amounting to ¼ in. minimum and ⅝ in. maximum, this being the total for the truck.

THE EXHIBITS

The exhibits of the manufacturers were easily up to the standard set at previous conventions. The floor space occupied by the various booths totalled 82,000 sq. ft., and a number of exhibitors were in evidence with new apparatus which had been developed only during the past year and which was, in consequence, displayed for the first time. Much of this appeared in the machinery exhibit which was unusual on account of the bulk of the machine tools displayed, the estimates giving the whole installation a tonnage that ranged from 10 per cent to 15 per cent in excess of that of last year, but the rapid development of automatic stokers and superheaters for locomotives brought out a number of new devices along these lines as well.

One of the new tools in the machinery exhibit was one called a 10-in. vertical shaper, which had a revolving and traveling table like a slotter, as well as a sliding head that moved in a vertical plane. The ram carrying the cutting tool, however, moved in guides like those of a shaper but these were pivoted at the top so that they could be swung out of the vertical and locked in that position, thus permitting bevel cuts on work of irregular shape. The tool is intended especially for die work.

Another exhibitor in the machinery annex had installed an electric furnace and quenching vats, and with the aid of an impact machine and scleroscope gave actual demonstrations of proper and improper methods for heat-treating gears and pinions. Sample pinion teeth of various qualities of metal both in tool-steel and case-hardened material were heat-treated and then broken to show, by the appearance of the fracture, the results of heating to different temperatures. With case-hardened material the metal was first heated to the critical temperature of the core, or the temperature between 700 deg. Cent. and 800 deg. Cent., depending on the composition, from which the low-carbon steel of the interior of the tooth would cool with a fine-grained structure to give greatest strength and toughness. The metal was then heated to the lower critical temperature of the case, or the skin of high-carbon steel on the outside of the tooth, and quenched a second time. The fracture showed that the refinement of the core had not been injured by the heat-treatment of the case because of the lower temperature at which the second heat was made.

Other notable exhibits among the machinery included a universal punch and shear and cutter for heavy commercial shapes that was built up of steel plate throughout. No casting of any kind was employed in its construction so that, notwithstanding its height of about 10 ft., including the motor which drove it, and its length of 15 ft., the machine was only about 18 in. thick except at the floor line, where the base knees extended outward. An interesting radius grinder was exhibited also. This was of the planer type and it had horizontal rolling curtains that extended over the ways to protect them from dust when they were exposed by movement of the table. The spindle carrying the small emery wheel had a vertical oscillating motion of about 1 in. to keep the wear of the wheel even and the cut true.

The exhibit of the committee on couplers was impressive. Samples of the two experimental standard types of coupler were displayed in both of the forms of contour that are to be tried out in actual service. In addition two experimental standard couplers with the No. 5 contour that had been subjected to a coupling test by the committee were shown in exactly the condition which they were in after coupling and uncoupling 30,000 times. This was estimated to be the equivalent of eighty-two years of service. Notwithstanding this neither of the couplers showed appreciable wear and both operated with extraordinary ease and positiveness. To show the relative advantages of the No. 5 and the No. 10 contour a set of flat wooden models were mounted on guides and operated, the angle at which the couplings were made being adjustable so that the action when coupling on curves could be investigated. Both of the experimental standard couplers, which will be submitted to the railroads for purchase in small lots to try out in actual service, have straight locks, the advantage of limited knuckle play afforded by the wedge lock being considered to be offset by the possibility of creeping by the latter form under certain conditions. However, tests of the wedge lock are to be continued by the committee on couplers with a view to eliminating creepage if possible without the use of anti-creepers.

That the super-car is imminent was indicated by the large display of 70-ton trucks and other equipment for the extra-heavy coal cars now coming into use, although even this extraordinary lading is somewhat overshadowed by the recent trial of 90-ton cars on the Norfolk & Western Railroad. However, only one complete 70-ton car was shown at the convention, this being on the exhibit track on Mississippi Avenue. The car was unique in having side bearing trucks and a truck bolster that carried no load whatsoever and served only to pivot the truck on curves. Each of the side bearings was a unit composed of two plates with rollers in a guide between them, a ratchet making the motion positive. Side play was provided by a Barber roller-bearing with the rollers set in sloping ways between the bolster and the cap on top of the springs, the latter being coils carried on the cast-steel drop truck side.

All of the cars exhibited were of all-steel construction with the exception of one 40-ton boxcar, which had a steel underframe, steel-truss side and end frames, and a steel roof. The only wood used in it was the planking for the side inside of the steel framing. The trucks of this car were of the built-up type and thus opposed the impression of the popularity of the cast-steel truck side given by the numerous exhibits of various other manufacturers. Among the latter, which included designs of the flexible, boltless and single-casting types displayed at last year's convention, was one in which a side-play feature was introduced through the use of swing links extending between lugs on the journal box to the lower member of the truss-side below, thus affording no direct contact between box and truck, the springs being of the leaf type and set under the bolster ends in the usual manner. Ball and roller side and center bearings of various types were generally prominent numerically.

Most of the cast-steel truck sides gave an impression of heavy, massive construction that was emphasized in the 70-ton trucks. Even the pressed-steel journal boxes which were exhibited were made of steel plate nearly ¼ in. thick, with ⅛-in. lids. In the 6-in. x 11-in. size this type of box weighed 100 lb., and in the 4¼-in. x 8-in. size 63 lb. The pinless journal-box lid was exhibited again this year, together with a dust-proof lid that was set into the journal-box opening to make a bevel joint along all four edges.

In addition to the welding exhibits, which included one showing a complete plant for the commercial production of oxygen and hydrogen by electrolytic breaking down of water, many displays of hand tools were made. One of these was a quick-adjustable pipe wrench which had a rack and thumb-latch in place of the usual nut, and which was in consequence but half as thick as the standard Stillson wrench and was capable of use on inaccessible pipes. Another type of pipe wrench had the distinction of having no teeth in the jaws, compression being effected by a toggle action. This produced really remarkable results in exerting pulls on smooth pipe without marking the surface in the slightest degree. A lathe dog that operated on the same principle was a novelty. Both of these tools, however, have different jaws for each change of radius of pipe or bar. Among the hand tools, it may be said, was a 40-ton chain block, and a horse of comparatively light weight used for supporting car bodies in the shop and composed of a truncated cone of sheet steel with cast top and bottom.

Among the miscellaneous features of interest was a spiral pipe clamp which, when in line with the pipe, held it firmly, but which, when turned at an angle, permitted the pipe to be lifted out, no bolts being used and but one piece forming the complete clamp. There was also a coupler that uncoupled when desired under the heaviest pulls, thus eliminating the necessity for taking slack before cutting off a car. This coupler was of the present M. C. B. type but was not one of the two designs selected as experimental standards by the association. Car replacers for city street cars, consisting of low beveled castings, were also shown together with heat-insulating brick of very low conductivity and extraordinarily low weight. Several of the exhibitors displayed samples of steel moldings and pressed panels for the interior finish of passenger cars, indicating a belief in the future demand for this material, and a flange lubricator was shown in which a rolling ball opened a valve that lubricated the flange on one side of the car or engine whenever that wheel moved against the rail. Another scheme for lubricating was a graphite filler in which the graphite in small prongs was attached to a piece of wire netting and the whole set in a journal brass before the babbitt was poured into it. After babbitting the ends of the prongs of graphite were exposed at the bearing surface of the babbitt. A novelty in car steps was also shown. This consisted of a disappearing lower step that was thrust out by air pressure but returned to the concealed position whenever the air was off. The valve that supplied the air had an extended spindle that struck one of the axles and that had a pendulum-like end. When the axle revolved this pendulum was forced to one side by the motion and the consequent full travel of the valve opened a port and released the air. The motion of the step in moving either out or in is so gentle that a passenger's weight upon it prevents it from closing.

It is reported that Belgians will form a company which will undertake the exploitation in Constantinople of the tramways, electricity, gas, and, later on, of an underground railway. At first the company will have a stock capital of $3,600,000 and a debenture capital of the same amount, as the first object is to exploit the tramways; but it is already foreseen that the execution of the whole programme will involve more than $20,000,000. The existing 25 km of tramway lines have already been electrified. In 1916 the Belgian company will absorb the light and power undertaking, which is actually worked by a Hungarian company, controlled by the Budapest Aktien Gesellschaft für Elektrische und Verkehrs-Unternehmungen. The Hungarian company already sells over 2000 kw and anticipates greatly increased production. The Belgian group has obtained the concession of an underground railway between Stambul, Galata and Pera. The new company will probably bear the name of Union Ottomane, Société d'Entreprises Electriques à Constantinople.

American Association News

Notes on Work of Committees on Power Distribution and Education and of the Exhibit Committee of the A. E. R. M. A.—Engineering Manual Distributed this Week

COMMITTEE ON POWER DISTRIBUTION

Following the session of the committee on power distribution reported in last week's issue of the ELECTRIC RAILWAY JOURNAL, another was held on June 5 at association headquarters. This was attended by G. W. Palmer, Jr., Bay State Street Railway Company, Boston, Mass.; Gaylord Thompson, New Jersey & Pennsylvania Traction Company, Trenton, N. J.; Charles R. Harte, Connecticut Company, New Haven, Conn.; Ralph H. Rice, Board of Supervising Engineers, Chicago, Ill., and C. L. Cadle, New York State Railways, Rochester, N. Y.

The sub-committee on concrete poles presented a report in which the application of the deflection formulas given in last year's report covering square poles were extended to include octagonal poles, to meet situations that might call for more artistic appearance. The sub-committee had endeavored to secure criticisms of the formulas offered last year, and such comments as had been received were on the whole commendatory. Mr. Cadle volunteered to construct and test poles as suggested by the committee and arrangements for this work will be made at once.

The sub-committee on specifications for rubber insulated wires and cables, of which R. H. Rice is chairman, presented revised specifications which had been prepared after correspondence with members of the committee. These specifications after consideration by the committee were referred to the sub-committee for further revision and report to the chairman. Since the last convention specifications have been prepared for rubber insulated wire and cables by the joint rubber insulation committee, which is made up of representatives from scientific bodies and users and manufacturers of wires and cables. The recommendations of this committee have been carefully considered in the preparation of the Engineering Association specifications.

EXHIBIT COMMITTEE OF THE A. E. R. M. A.

H. G. McConnaughy, director of exhibits, announces the following as the exhibit committee for the coming convention at Atlantic City: E. H. Baker, vice-president in charge of exhibits, Galena Signal Oil Company; George Arnold, Cleveland Frog & Crossing Company; S. A. Bullock, Baldwin Locomotive Works; S. J. Cotsworth, Lorain Steel Company; N. M. Hench, Carnegie Steel Company; Wm. M. Henderson, Pennsylvania Steel Company; T. W. Illingsworth, Midvale Steel Company; F. D. Killion, Western Electric Company; J. A. Kucera, ELECTRIC RAILWAY JOURNAL; R. C. McCloy, Wm. Wharton, Jr., & Company, Inc.; J. R. McFarlin, Electric Service Supplies Company; J. C. McQuiston, Westinghouse Companies; E. B. Meissner, St. Louis Car Company; J. W. Perry, H. W. Johns-Manville Company; A. L. Price, Ohio Brass Company; F. W. Sargent, American Brake Shoe & Foundry Company; L. W. Shugg, General Electric Company; P. C. Snow, Globe Ticket Company; L. H. Snyder, Jos. Dixon Crucible Company; Charles H. Thomas, Galena Signal Oil Compan,y and S. M. Wilson, J. G. Brill Company.

The circular sent out by the Manufacturers' Association, which was described in last week's issue of the ELECTRIC RAILWAY JOURNAL, has brought excellent results. Applications are coming in rapidly for space and the prospects are bright for the best and largest convention yet held. But one week now remains in which to make applications for space without prejudice as to chronological order. It will be remembered all applications received prior to June 20 will have equal consideration. After that date space will be assigned in order of receipt.

COMMITTEE ON EDUCATION

The committee on education of the American Association is corresponding with the member companies for the purpose of securing data on apprentice training and general education work which has been undertaken by the companies. The inquiries relate to work other than that covered by the Accountants' and the Transportation and Traffic Associations. The educational committee has secured permission of the executive committee to make preliminary arrangements with a reputable correspondence school for the preparation of a special course for electric railway employees.

A conference will be held in a few days between the committee and representatives of one of the leading correspondence schools. The questions which the committee is asking of the members are as follows: Have you in operation in your shops a regular apprentice system for the training of mechanics, etc.? If so, please give some detail of the shop training furnished. Do you, as a company, give the apprentice boys any instruction of a school nature; drawing, arithmetic, etc.? Is this work done during shop hours? Do you co-operate officially with any trade, vocational, night or other school for the purpose of encouraging your apprentices to study? If so, is attendance voluntary or required? If the American Electric Railway Association should be able to make an arrangement with a reputable correspondence school for a course to be administered under the general direction of the Committee on Education, would you favor it providing that it is understood that the expense will be less than the usual fees and that the students be expected to pay all or a large part of the expense? Can you estimate the number of enrollments which might be expected in such case? Have you any record of the number of your employees enrolled in night or other courses? Do you have any systematic way of following up such work and encouraging it? Would it be practicable for you to appoint an official of your company to act as supervisor of apprentice training, to keep track of all such matters as are referred to above, provided that you were convinced of the advisability of such an appointment? Do you have a systematic plan for training power plant and substation operators? If so, can you give some details of your plan? Have you any training plan for line workers?

OTHER COMMITTEES

The Committee on Education of the Accountants' Association has received more than a fourth of the number of enrollments required for the course described in a recent issue of the ELECTRIC RAILWAY JOURNAL. Applications and requests for information are still coming in. The committee hopes to have the full number soon so that definite arrangements for the course can be made.

The meeting of the committee on equipment, which was to have been held last week, has been postponed until June 19 and will be held at the Fort Pitt Hotel, Pittsburgh.

The rules committee of the Transportation & Traffic Association held a meeting in New York on June 12. This meeting was held at the association headquarters.

A meeting of the joint committee on block signals of the Engineering and the Transportation & Traffic Associations will be held at Hotel Secor, Toledo, June 23.

THE ENGINEERING MANUAL

In the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 15, 1913, page 769, a preliminary description of the volume of standards and recommendations of the American Electric Railway Engineering Association was given. During the past week the complete manual has been distributed to the members of the association. This manual puts in very concrete and tangible form the results of the work of the engineering association, and renders it accessible. Its loose-leaf character makes it very elastic.

The preface which forms the first leaflet in the manual explains first that the material in the volume is comprised under three divisions: (a) standards, which have had the formal approval of the association; (b) recommendations, also approved as such; (c) miscellaneous methods and practices including all other definitely approved recommendations. This material is arranged systematically under seven headings as follows: buildings and structures, power distribution, equipment, power generation, miscellaneous methods and practices, signals and way. These are subdivided as necessary. For example, the section on buildings and structures contains these sections: office buildings, etc., power houses and storage yards, contents, foundations, miscellaneous, power and substations, materials, terminals, shelters, etc. Each section and subsection are appropriately lettered for convenience in arranging the pamphlets. The preface also contains an explanation of the rules for the adoption of standards and recommendations.

Two colors of paper are used in the manual, blue for all standards and recommendations and white for all other material. At the top of the first page of each reprint is a condensed statement of the recommendation or practice, how it was initiated and carried through and references to the records in the proceedings of the action taken. The manual is elaborately indexed.

INSPECTION REPORT OF THE MISSOURI PUBLIC SERVICE COMMISSION

The Missouri Public Service Commission has recently issued its first report concerning the annual inspection of the steam and electric railroads of the State. Owing to the fact that the commission was created in April and the work of organizing the nucleus of the engineering department was not completed until September, only 3594 miles out of a total of 11,279 were inspected during the year. Included in this amount were the 81 miles for the Kansas City, Clay County & St. Joseph Railway. The commission states that in its opinion the construction and equipment of this road is first class, that the present condition of the track and roadbed is such that the speed of 50 m.p.h. maintained is safe, and that the service and convenience for the public are in every way satisfactory. In connection with the inspection the commission called upon all the carriers to furnish a concise statement of the physical condition of their tracks, bridges and other facilities. This first inspection report also contains a report on accidents during the year and the protection methods ordered.

COMMUNICATIONS

ALL-STEEL CARS FOR CITY SERVICE

June 15, 1914.

To the Editors:

For ten years I have had an excellent opportunity for watching and studying the development of electric railway rolling stock. Although I am neither a car builder nor an operating man my position is such that I must study the trend of the industry and be prepared to decide on the value of various types of rolling stock, and I have been interested in your recent articles and in the communications on the weight of large steel cars such as are used in subway, elevated and high-speed work. Perhaps some of my observations and ideas about the all-steel car for city street railway service may be of interest.

The question as to whether wood or steel cars should be adopted by any road depends very largely on the service to be given, as well as on the comparative first cost, life and maintenance cost. Not so many reasons exist for the adoption of all-steel cars for street railway service as for the service on high-speed lines where danger of collisions and fire hazards are much greater. In metropolitan cities where subways have been built or are contemplated the use of a steel surface car is always justified from the fire-hazard standpoint, providing there is ever a possibility of street cars being run for any distance through subways. In elevated, subway and interurban service the higher speeds demand a car structure designed to withstand the severe strains and shocks due to impact, vibration, swaying, buffing and pulling. It is necessary also to have greater strength in the structure as a protection against possible collision, because the train weights are greater and the speeds higher. Street railway maximum speeds are comparatively low, cars are operated nearly always as single units and they are not run on high structures or in tunnels where the consequences of collision or fire might be serious.

The foregoing reasons account for the present greater use of steel cars on high speed lines than on street railways. There are, however, strong reasons for the adoption of all-steel cars for street railway service, and the tendency right now is toward their quite general adoption.

An inspection of the car articles published in the JOURNAL during the last few years shows a notable increase in the extent to which steel is used in street car construction. I believe that this tendency will grow until practically all the street railway cars, except perhaps in small towns, will be built of steel. I have been told by car builders that even now good ash timber for posts and rails is very scarce. It is difficult to obtain good live wood. Unless the best grade of wood can be used there is little argument to be raised against steel posts.

Some of the first all-steel street cars were very special in design. Few standard rolled shapes were employed. Practically all of the parts were specially formed, and as a great many dies had to be made the first cost of these cars was comparatively high. Now as orders for steel cars increase in number and as the designs tend to become more simple and more uniform, the cost per car for dies will be greatly reduced. It is also possible by care in design to utilize a great many commercial rolled shapes and thereby reduce the number of special die sections to a minimum. Also, as more steel cars are built and as the railway managements become more familiar with them, the designs will become simplified so that the car builders will be more willing to undertake their construction.

For some years the difference between the first cost of wood and steel cars has been sufficient to prevent the great number of roads considering the use of steel cars. This situation will not last. The design of steel cars will improve, the car builders will grow more familiar with steel construction and the cost of first-class lumber for wooden cars will continue to rise. Thus the difference in price will become less and less, and the steel street car will be more popular.

I have often heard mechanical men discussing the maintenance features of steel cars. There need be little apprehension on that score. First, because a steel street car will withstand much more exterior abuse and require far less shop attention than a wooden car. Also, in repairing steel street cars it has not been found necessary to use expensive steel-working tools, or high-priced special labor, and the repairs have not consumed any more time than would have been necessary to make the same repairs on ordinary wooden equipment. Knowledge of the ease with which pressed-steel work can be formed is spreading, so that quite a number of electric railways are now equipped with home-made presses and dies for making small parts which formerly had to be forged. It is only a short step from such work to the use of larger dies in the shop bulldozers with which can be made practically any section needed for ordinary repairs.

A feature which is being given more and more attention in car design is the choice of parts so that replacements may be made at home without having to rely on manufacturers for duplication, and it is possible to design a steel car post so that duplicates can be made in the railway company's shops. There is also a possibility that the electric spot welding machine will be developed into a portable tool so that it can be taken to the work which it is to perform. Then all of the minor parts of the steel car can be fastened with spot welds rather than with rivets. This not only will simplify and lessen the cost of the construction, but will improve the exterior and interior appearance of the car, because the spot welding will do away with the riveting as well as the fastening of finish with machine screws which have been found very difficult to maintain tight.

An obvious advantage which follows from the stiffer, stronger construction of steel cars is that of increased safety to the passenger. For example, the ability of a steel car to withstand collision with vehicles and to protect the passengers against injury is much greater than with cars having wooden superstructures, although, of course, the composite car with steel up to the belt rail possesses the same advantage: that is, the side structure of the car is strong enough to prevent the pole of a wagon piercing the car and injuring passengers.

An enormous resistance to shearing blows is possessed by the light pressed sections of which the frames of steel cars are usually built. The great advantage of this feature for heavy city service has been exemplified on one large metropolitan system which operates a fairly large number of large steel cars. Here the customary collisions have taken place between cars, heavy trucks and fire engines, but the strength of the steel cars is such that, although the impact from such collisions may bend the front posts far enough inwardly to tip over the controller, the vestibule holds together, nevertheless, and protects the motorman and passengers. In all instances, the bumper and the roof have remained intact even though the posts have been bent inwardly so far as to crack them at the belt. The fact that the top and bottom connections of the posts hold under these severe stresses shows the great value of the steel construction as compared with wooden construction, which, under similar circumstances, would break and crush inward at least to the bulkhead.

The comparative behavior in collisions of steel and composite cars of about the same general dimensions shows greatly to the advantage of the steel car. In one such collision a composite car with a steel underframe and wood superstructure struck a steel car at right angles midway between bolsters. The damage to the wooden car was considerable. The entire vestibule above the platform floor was sheared off and crushed to a point back of the body bulkhead, the platform of the composite car going under the frame of the all-steel car. But the steel car suffered comparatively little. The side plates were dented and two window posts were bent, one of them being cracked, and some of the equipment underneath the steel car was, of course, sheared off by the platform of the wooden car. Other than this slight damage the steel car was uninjured. The underframe remained in perfect alignment after the collision. A careful inspection showed that, had there been passengers in the seats closest to the point of impact, they would not have been injured except perhaps by falling glass. Had a wooden car received a similar collision blow it is very probable that the side would have been crushed in, the underframe thrown out of alignment and the seats adjacent to the blow badly damaged. In consequence, it is safe to say that steel cars enjoy a greater freedom from time out of service due to external injury than wooden ones, and when repairs are necessary they cost no more with steel construction cars than similar repairs with wood.

On the score of comparative weights of steel and wooden cars, it is possible to design a steel car having the same strength as the composite car but with considerably less weight, and the steel car will offer greater resistance to blows and collisions. This weight economy is accomplished by utilizing the complete side of the car from the top of the letterboard to the bottom sill and all the metal contained therein as a single truss, which, from its depth, has comparatively excessive strength for its weight.

A few years ago it was said that steel cars were very difficult to heat, but progress in the design of heating equipment and in learning the exact requirements for heat installations have practically caused this criticism to disappear. Steel cars can now be built and equipped without any question as to sufficient heating.

With regard to the comparative life of wooden and steel cars, it has been stated that if a steel car of equivalent size compares favorably in weight with the wooden car, then the steel parts are so light that the life may be unduly shortened from rusting. This criticism has not been substantiated in service. I have studied many steel cars which had various parts made of the light pressed sections. These cars have been in service under severe operating conditions for five years, and the probability of rust unduly shortening their life is very remote. When properly designed the steel car will have a much longer life than a wooden car, and in view of this fact it may not always be possible to realize the full life of the car due to rapid changes in the art. On this score, the advisability of building cars which will outlive the natural period of obsolescence might be questioned. However, the greatly reduced maintenance will offset this possibility, and as the first cost of the steel car gets nearer the first cost of wooden cars this criticism disappears.

Looking into the future, we see an increasing demand for seats, for speed and for safety. The all-steel street car has the greatest possibilities for meeting these demands. With regard to seats a larger interior is possible for the same weight and for the same width. Regarding speed and safety, the greater strength of the all-steel car as compared to a wood or composite car is not even debatable.

In conclusion, considering the total annual charges for operation which involves the questions of weight and maintenance, and assuming the first costs of all-steel and composite cars to be not far apart, the all-steel car is the more economical investment, and, therefore, must come into general use. With the all-steel car showing the economy just pointed out, the electric railway has, by its use, an opportunity for making a saving which will offset to a certain degree the increased cost of general operation due to the rising tide of the labor market and the standing still or recession of the rate of fare.

EQUIPMENT ENGINEER.

A "SAFETY FIRST" DOUBLE ACROSTIC

TORONTO & YORK RADIAL RAILWAY
TORONTO, ONT., June 6, 1914.

To the Editors:

In view of the wide interest shown in the "safety first" movement, the writer has composed the following double acrostic on this now-famous phrase.

SAFETY FIRST
Safety first, last and alwayS
Am I my brother's keeper? Yes, and it is A
First duty to protect him, my employer and myselF
Ever being on the alert, watching for troublE
To eliminate carelessness in any capacity and assisT
Young and old to reach their goal in safetY

First stop, look and listen, be sure yourselF
Illuminate and guard dark spots and places,
show and be shown, be from MissourI
Remember, accidents are sometimes the result
of carelessness, so considerR
Study the relations of rules and regulationS
To the ever present and worthy subjecT
SAFETY FIRST

A composition like the foregoing may be found to make a serviceable as well as an entertaining poster or dodger.

R. W. ENNIS, Assistant Master Mechanic.

SOLID AND INSERT MANGANESE STEEL SPECIAL TRACK WORK EXPERIENCE

CHICAGO, ILL., June 10, 1914.

To the Editors:

In a paper on track construction and maintenance presented before the New England Street Railway Club and published in the ELECTRIC RAILWAY JOURNAL for June 6, page 1257, the author says that from experience he sees no grounds for the contention that solid manganese special work is not superior to manganese inserts, if it is properly applied. Later, in referring to the experience in Chicago he speaks of the special work there which did not come up to expectations as being "the crop of first experiments," and adds that the pieces are now made up in sections instead of in unit castings. Nevertheless, I would be interested to see a collection of data, as comprehensive as that published about Chicago, gleaned from Eastern properties. It may be that some of these roads are obtaining a better grade of manganese steel than we are able to purchase here. On the other hand, Chicago, too, has many isolated cases where manganese steel special work has given excellent service and was superior to manganese insert work. But it also had equally as many cases where solid manganese steel failed to give as good service.

Generally speaking, and after an inspection covering not a few pieces but more than 1200 layouts containing more than 1200 pieces, it was concluded that the insert work used in Chicago was giving service at least equal to solid manganese steel. On the other hand, the fact that about 50 per cent of the solid manganese steel castings showed superior wearing qualities under the severest service conditions indicated that there was a lack of uniformity in the product.

Chicago's experience with solid manganese steel special work was among the first where results could be had, and the dense traffic over such a wide area caused the special work to reach its wear life limit before other exhaustive tests could be made elsewhere. At the time that the data in your issue of May 2 were published it was believed that the manufacturers had improved the physical properties of manganese steel. Few, if any, other railway companies, however, have had this newer or better manganese steel in service sufficiently long to draw accurate conclusions; at least not conclusions from practically exhaustive experience. Finally, as to the point that the change from unit castings to four pieces in a crossing, there was about an equal number of both kinds used in Chicago, and little or no difference in the physical properties could be observed. The four-piece casting, however, undoubtedly has the advantage over the unit casting in that partial renewals may be made.

G. W. WESTON,
Board of Supervising Engineers, Chicago Traction.

STATUS OF ENGINEERING ORGANIZATION IN THE UNITED STATES

President Hunter McDonald, of the American Society of Civil Engineers, in his address before the Baltimore convention on June 2 discussed several phases of the standing of the civil engineers in this country and abroad. He deplored the fact that the term "civil engineer" has been allowed to change until civil engineering is now looked upon as a branch of engineering. He attributed this condition to inactivity on the part of civil engineers themselves.

Mr. McDonald gave a synopsis of the work and organization of German, French and English engineering societies and showed that foreign societies are doing more for their members than is our own society of civil engineers. However, the profession has cause for pride in the achievement of the completion of the Panama Canal and in other great undertakings in which civil engineers play prominent parts. The American Society of Civil Engineers, while large and prosperous, has a great field in which to work without in any way lowering the standard of requirement for membership. Local societies can be established and assisted so as to raise and elevate the profession. The engineer should also take more active part in public affairs if the public is now awake to the advantages of sound engineering advice. Through the secular press the importance of the engineer in civil life can be brought to the attention of the public. Whenever the people are shown that engineers are organized not only for their own improvement and protection, but also for the public good there will be no lack of proper consideration.

Mr. McDonald advocated the erection of a new building for the society, one which would bring in some income. He estimated that the present accommodations cost the society the equivalent of a rental of $30,000 per annum. This money could be saved and utilized in extending financial assistance to needy society sections.

The provincial government of Buenos Aires, Argentina, has authorized Juan F. Tetamanti to transfer the concession for an electric tramway service at La Plata to the newly constituted La Nacional Company.

Equipment and Its Maintenance

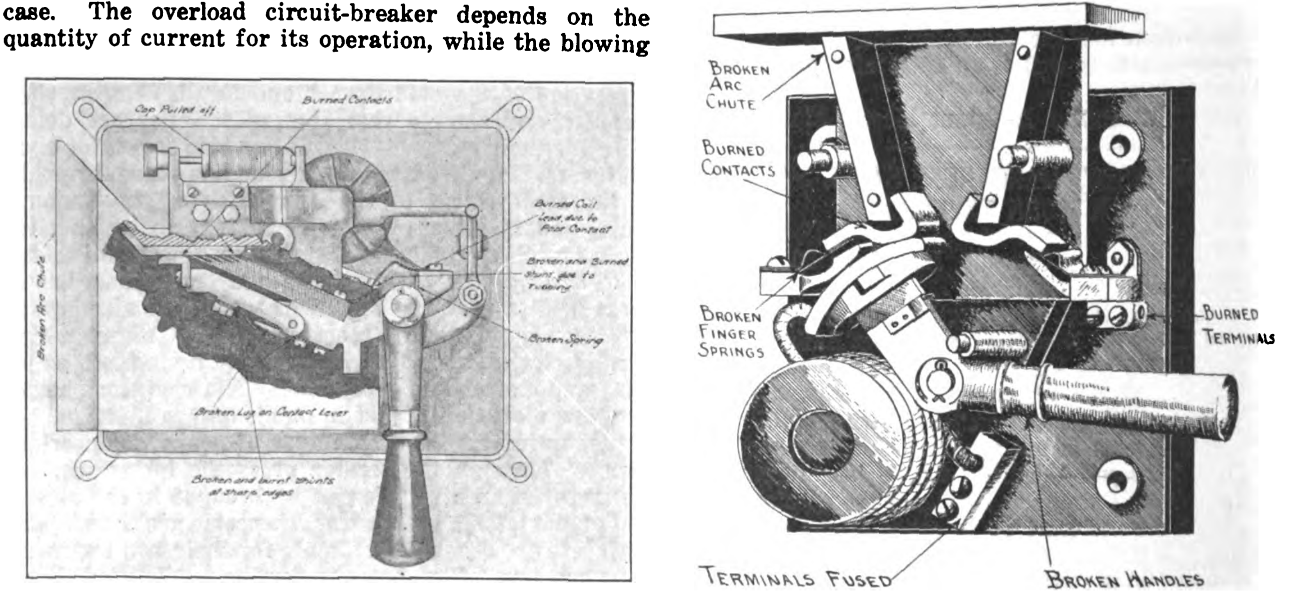
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

EQUIPMENT DEFECTS—CIRCUIT-BREAKERS AND HOOD SWITCHES—I.

BY C. W. SQUIER, E.E.

On electrically-operated cars it is necessary to have some type of switch to open the main circuit in cases of emergency. This switch should be located within easy access of the motorman, for controller fingers sometimes become fused or bent so that they prevent throwing the power off from the controller. The hood switch or circuit-breaker then affords a means for opening the circuit. It is also desirable to have some form of automatic protection for the equipment to provide against excessive currents due to overload and short-circuits. Circuit-breakers can be set to open the circuit immediately at any overload in excess of their setting. Hood switches do not have the overload attachment for tripping them and are opened only by hand. When hood switches are used the equipment is protected against overload by the fuses which are also employed in most cases with circuit-breakers. Fuses give a time element not afforded in circuit-breakers, as they do not blow instantaneously on overload, and the time taken to blow depends on the magnitude of the overload. There is a common impression that overload circuit-breakers and fuses have the same characteristics, but such is not the case. The overload circuit-breaker depends on the quantity of current for its operation, while the blowing of a fuse depends both upon the quantity of current and upon the time that it is flowing.



Westinghouse and General Electric Circuit-Breakers Showing Where Troubles Are Possible

Every piece of apparatus regardless of its character or the purpose for which it is designed has certain parts which are essential to its proper operation. In circuit-breakers these parts are as follows: the current-carrying parts by means of which the circuit is made and broken; the operating mechanism necessary to close and open the contacts, and the insulation necessary to separate parts of different potential and to prevent grounds which might result from the floating of the arc to some grounded part. The current-carrying parts consist of the terminals, shunts, contacts, blow-out coil and overload coil. The last two are usually combined so that one coil serves both purposes.

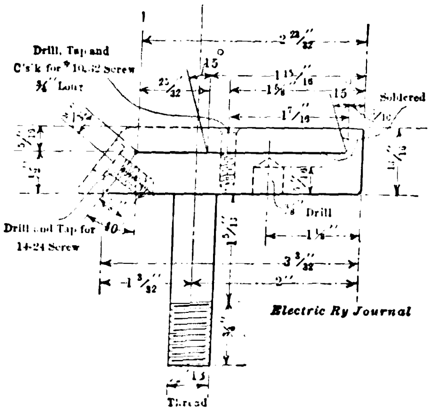
TERMINALS

Terminals are of several different types. Some consist of brass or copper lugs with holes to receive the wires which are clamped in place by means of set screws; others consist of a finished plate or lug to which a cast terminal is bolted either by means of a through bolt or a cap screw, the connecting wire being soldered into the cast terminal. Of these classes the latter gives the least trouble. Troubles at terminals generally arise from the working loose of connections. If the connections become very loose, the consequent arcing will burn the terminal away completely and often damage adjacent parts. Since all parts of a car equipment are subjected to continued vibration terminals with screws are more liable to have loose connections than those fastened by bolts which can be locked in a positive manner.

Great care should be exercised in making connections whenever circuit-breakers are installed after being overhauled or adjusted. These connections come very close to the main contacts and as the studs of brass or copper are such excellent conductors of heat, a poor connection is often the cause of excessive heating of the contacts and springs, even if arcing does not actually occur.

SHUNTS

The principal cause of trouble with shunts is due to the breaking of strands where a braided shunt is used. This rupture reduces the section available for carrying current, and overheating and burning take place. Vibration sometimes causes the shunts to rub on adjacent parts and so become worn. In one of the circuit-breakers illustrated it will be noted that trouble has been experienced by the rubbing of the shunts against the arc chutes and contact arms. Shunts also break at the point of support, usually due to the presence of a sharp edge or corner over which they are required to bend. After the shunts have been installed their position should be noted in both the open and closed position of the breaker, and any sharp edges which would be likely to cut the shunt during operation should be slightly rounded.



Circuit-Breaker Contact Base for New Style Contact

CONTACTS

In addition to carrying the current for the car the contacts must open the circuit when separated by the action of the operating mechanism. They must be of ample cross-section to carry without undue heating the current for which the circuit-breaker is designed. It is possible to increase the capacity of these contact surfaces by increasing the pressure with which they are held in contact. The curve shown in connection with this fact illustrates the increased carrying capacity which can be obtained by greater pressure between the contacts.

The design of the contacts must also be such that destructive arcing will not take place and that their carrying capacity will not be impaired by burning or pitting of the contacts themselves. Of the two types of contacts illustrated, one uses auxiliary contacts which remain closed until the main current-carrying brush contacts have separated so that these auxiliary contacts take the arc due to the final opening of the circuit; the other form is similar to that of controller fingers, the final break occurring on the ball of the finger.

Another essential of good contacts is that they must stand careless handling and excessive operating conditions without being thrown out of adjustment, or if the proper alignment of the contact surfaces is disturbed they should be self-adjusting to a certain extent in order to give proper contact to the surfaces disturbed and also to compensate for the wear caused by severe arcing or continued operation. Nearly all contacts which are in successful operation are more or less self-adjusting. The brush contact shown is made up of laminations of spring copper, and when properly shaped it allows a large amount of self-adjustment. The finger contact is self-adjusting in that the springs allow a variation in either direction from the normal position of the finger. There are several other types that give excellent results, but a discussion of those referred to will bring out the principal troubles.

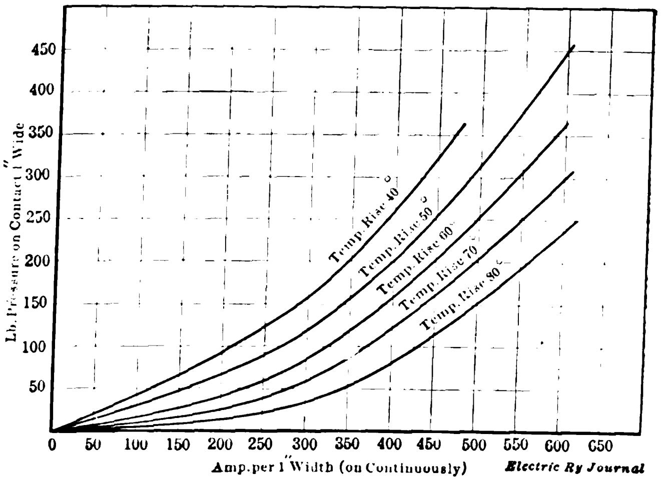
While inspecting a large number of different style circuit-breakers which were forwarded to the general repair shop for overhauling, I found that fully 75 per cent of them were sent in for the excessive burning of contacts at points where no arcing was supposed to occur. The laminated copper brush is a fruitful source of trouble and care should be taken to make certain that the auxiliary contacts are in firm contact until after the main brush has opened. By failing to make replacements of the auxiliary contacts frequently enough, these become burned away so that the laminated brushes take the arcing of the final opening of the circuit. This action soon results in the destruction of the contact surfaces or in the complete burning away of the contacts.

The laminated brush is not easy to adjust in as much as the repairman can see but one edge of its contact surface. While this edge may appear to have proper contact, still the remaining portion may not be making contact at all. The brush should bear evenly throughout its surface with considerable pressure. A brush print that will show poor contact, if it exists, may be made by inserting a piece of white paper together with a piece of carbon paper between the contact block and the brush and then closing the circuit-breaker.

Both main and auxiliary contacts are usually arranged so as to make a face-to-face wiping contact while being closed. This prevents dirt from gathering on the contact surfaces, and the frequent operation to which a car circuit-breaker is subjected will keep these contact surfaces free from dust or grit so that it is not necessary to brush or clean them. To remove carbonization and prevent short-circuits to adjacent parts, however, the circuit-breakers should be blown out with compressed air and all parts wiped clean with cheesecloth. Where the currents handled are excessive, the oxidizing of the contact surfaces will produce local heating.

Another important point to be considered in connection with the contacts is that they must be so designed that the burning and pitting caused by opening the circuit on overload will not cause sticking or jamming and so prevent the opening or closing of the breaker. The contacts of some types of hood switches consist of a jaw and knife blade. These are not satisfactory, as slight burning causes the contacts to jam.

In connection with the replacement of auxiliary contacts, it is desirable that these be designed so that it will not be necessary to replace any but the parts that take the arcing. The Westinghouse Electric & Manufacturing Company has shortened the renewable part of its stationary contacts in late designs in order to reduce the amount of scrap when renewals are made. Originally these contacts were long enough to take both the auxiliary and the brush contact. An accompanying illustration shows a method of using this short contact on told bases originally designed for a longer contact.



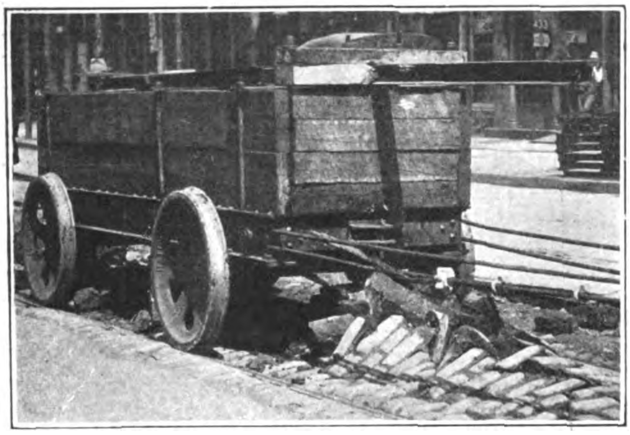
Relation of Current-Carrying Capacity of Contacts to Pressure at Point of Contact

In the various types of contacts, the springs which furnish the contact pressure must be placed in a way that will remove all possibility of their having to carry currents excessive enough to cause overheating and loss of temper.

BREAKING UP PAVEMENT WITH A PLOW AT CLEVELAND

BY CHARLES H. CLARK, ENGINEER OF MAINTENANCE OF WAY CLEVELAND RAILWAY

The accompanying half-tones show a novel pavement plow which the writer recently designed for the quick and economical break-up of paving antecedent to track work. The plow consists of a heavy steel casting of suitable shape for lifting the paving blocks and for cutting the tie rods at the same time. It is pulled by a service motor car which is equipped with four Westinghouse 305 motors and HL control. The weight of the motor car with load is about 50 tons. The weight of the plow car together with its counterweight is about 11 tons.



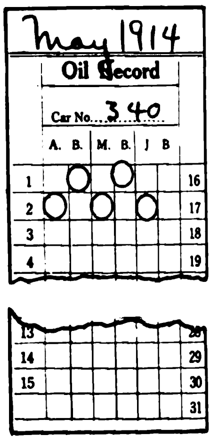
Pavement Plow in Action

Three men and the crew of the motor car are all the personnel needed to operate the machine. We have found that with this unique plow we can remove 1300 sq. ft. of pavement in one minute. On another occasion the pavement in a stretch of track 2600 ft. long was removed in thirty-five minutes. We have experienced only such slight difficulties as the breaking of the cable which pulls the plow. The plow is used but once or twice a week, for an hour's work with it will give us enough track to work on for eight or twelve days. The plow has been in use for about two months.

MICHIGAN UNITED TRACTION OIL RECORD SYSTEM

Anything done to simplify the clerical work of the master mechanic of a small property, as well as a large one, is well worthy of mention. This applies especially to the new method of keeping lubrication records at the outlying shops and carhouses of the Michigan United Traction, Jackson, Mich. This system includes a single form of oil-record card, a case to contain the classified record, punches and a scratch pad. Each day or night the foreman in charge of any carhouse lists the car numbers and parts he wants oiled on a sheet of scratch paper, which he also dates, signs and hands to the oiler.

Motors, journals and air compressors are lubricated every fifteen days, and gears and center bearings every thirty days. The record of the last lubrication is indicated on the oil-record card, a reproduction of which is shown in the illustration. A punch mark beside the date and in the proper column forms the record. Two columns are provided under each form of bearing, one for the first and the other for the last fifteen days of the month. One form of punch mark indicates that the oiling was done by the day man and the other by the night man. After each oiler has completed his program of lubrication as furnished by the foreman he signs the slip of paper, dates it and returns it to the foreman's office. From these the oil record is punched on the cards.

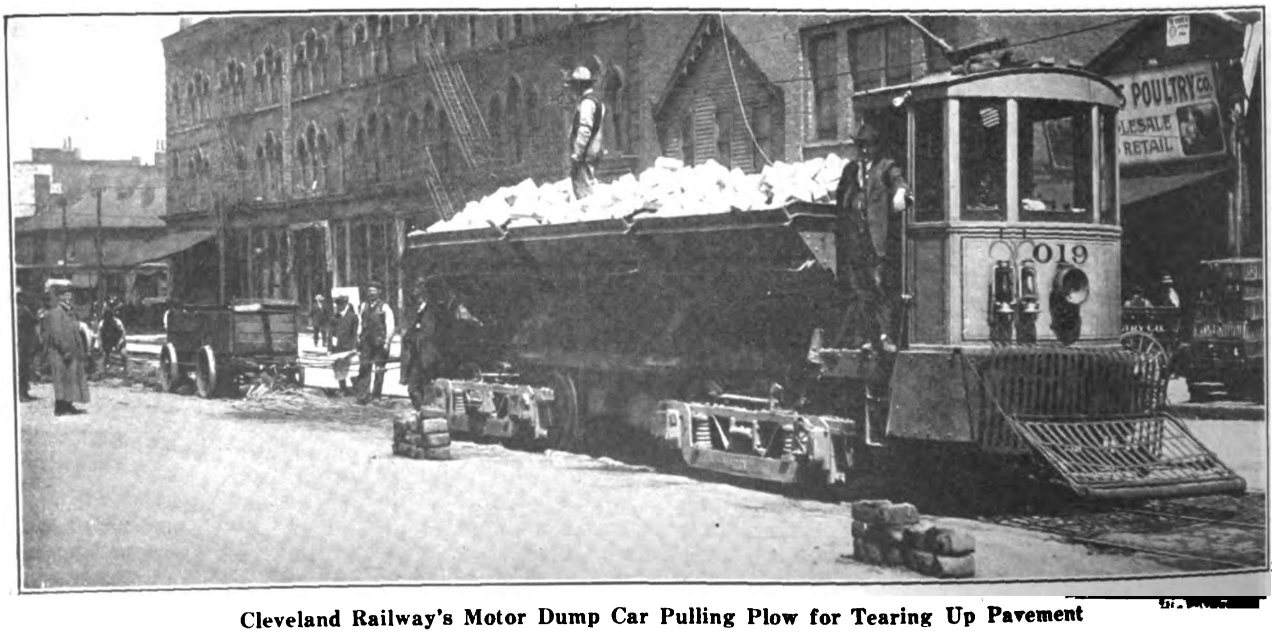


May 1914
Oil Record
Car No. 340

A. B.
M. B.
J B
1
2
3
4
16
17
18
19
13
14
15
28
29
30
31

Oil Record

A card is assigned to each car each month and all are hung on hooks in a cabinet provided for the purpose. In it the cards are arranged in groups or classified as to runs for city cars, divisions, and whether local or limited for interurban cars and miscellaneous equipment. This arrangement is merely for the convenience of the foreman and at the same time some indication of the class of service in which the equipment operates. At the close of each month new cards for each car are made out and the old ones are collected and mailed to the office of the superintendent of motive power. The simplicity of this record has made it popular and effective.

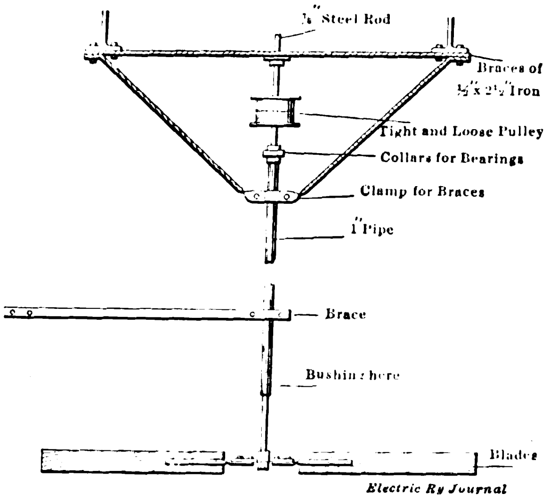


Cleveland Railway's Motor Dump Car Pulling Plow for Tearing Up Pavement

A FAN FOR OPERATION WITH SHAFTING

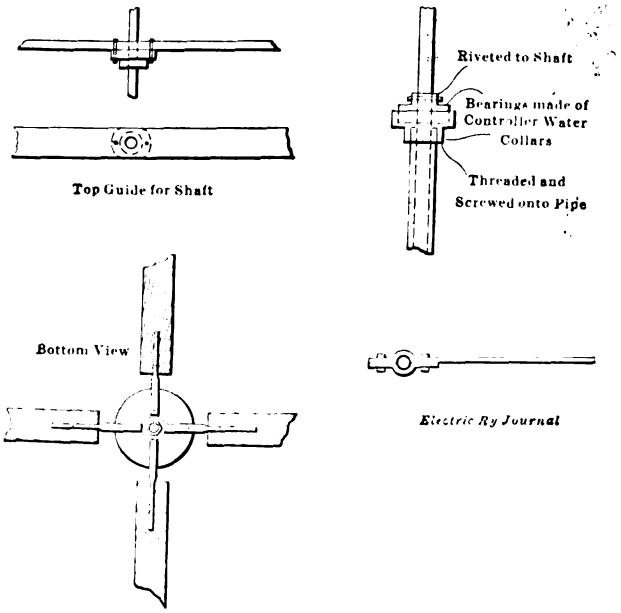
BY R. H. PARSONS

A subject very interesting at this period of the year is that of the fan. It means more than comfort to the men working in warm places. It means more work, by reason of feeling more in a mood to work while the body is cool, and more interest in the work because the company has shown a desire to help the men keep comfortable. The simple fan illustrated herewith can be made of material always on hand in a railway shop, does not cost much, can be run from the shafting or pullies of machines already in use and is, to say the least, very efficient.



Assembly of Fan Used in Connection with Shafting

A piece of 1-in. pipe is taken and cut to any length desired, depending on where it is to be used, height of ceiling, etc. A piece of ⅞-in. rod or steel shafting is then also cut to the proper length and placed through the pipe. The pipe is held in place by a brace from the ceiling or from two I-beams above. This brace is forged around the pipe, and an additional piece is bolted thereto to form a clamp. Across the top of this brace should be placed a piece of flat iron ⅝-in. x 2½ in., or nearly that size, through which a hole is made, fitted with a brass bushing to make a guide bearing for the top of the shaft.


Top Guide for Shaft
Riveted to Shaft
Bearings made of Controller Water Collars
Threaded and Screwed onto Pipe
Bottom View
Electric Ry Journal

Detail of Fan Used in Connection with Shafting

At the top of the pipe is placed the bearing which takes the weight of the shaft and fan, and which is the main bearing of the fan. In the one illustrated a K-11 controller main cylinder water collar was fitted to the pipe with the large or cup side up. A water collar for the reverse cylinder of the same controller was used for the top part of the bearing, which is riveted to the shaft, installed in the cup of the part fastened to the pipe. At this point also a brass bushing is fitted to the inside of the pipe in which the shaft turns, the whole making an ideal bearing easy to lubricate. Between this bearing and the top guide are fitted a tight and loose pulley with a flange at the top and bottom to keep the belt in place, as the belt runs over these pulleys in a vertical position. The pipe is also bushed at the bottom and held by another brace to some convenient part of the building or machine. The fan proper is made of four flat pieces of wood, fastened to a flange, which in turn is held to the shaft by a set screw. The fans are held to the flange by 3/16-in. x 1-in. strips of iron, given a little twist to give a proper pitch to the blades.

BEACH GAS-ELECTRIC CAR WITH BATTERY AUXILIARY

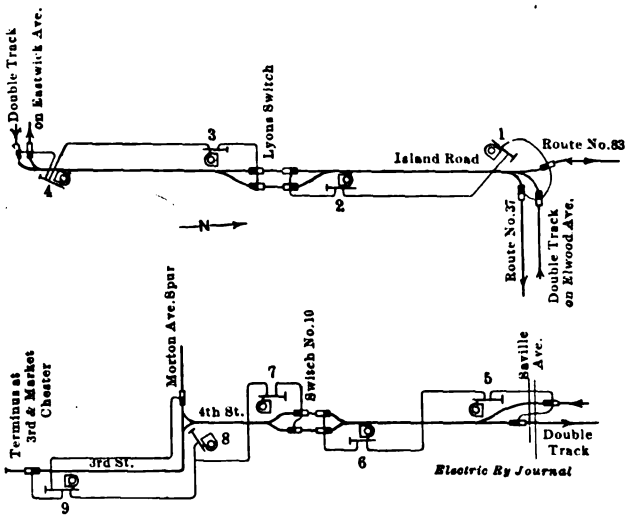
Ralph H. Beach, New York, well known in the field of self-propelled cars, has recently brought out a new type of gas-electric self-propelled car in which the engine requirements are kept to a minimum by the use of a storage battery auxiliary. In the event of failure of the engine from any cause the battery is always available and dependable for at least 50 miles. Mr. Beach believes that the principal defect of other types of self-propelled cars is that they must keep in continuous use an engine capacity which in reality is required only during the acceleration and grade-climbing periods. It is asserted that the use of the battery will therefore make it possible to cut down the engine equipment to one-half of what would ordinarily be installed. It is calculated that on level running with the car stopping each 5 miles 4.9 per cent of the total energy required to drive the car will be derived from the battery and consequently 95.1 per cent of the energy will be furnished by the engine direct, whereas the battery would do 30.1 per cent of the work on a 5 per cent grade.

LONDON ACCIDENTS DUE TO CARS AND OTHER VEHICLES

According to the *Tramway & Railway World*, the highways committee of the London County Council has furnished to the council a statement showing that the accidents on streets with railway service are not greater than in other thoroughfares. In 117 miles of streets with both tramway and motor bus routes the fatalities caused by power-driven vehicles were, in 1910, 67; in 1911, 107, and in 1912, 126; while of these the cars were responsible for 19, 18 and 21; and motor omnibuses for 26, 46 and 67. In 119 miles of omnibus routes without cars the fatalities from power-driven vehicles were in the same three years 53, 71 and 109; and of these there were attributed to motor omnibuses 23, 39, 70. The two divisions of the Metropolitan Police district which had the largest average number of fatalities per square mile for 1910-11 are St. James', with 11.40, and Marylebone, with 8.98. Neither of these had car lines. The area which has the largest number of fatalities recorded in 1912 was Bow, where there were 28, of which four were put down to trams and 24 to other power vehicles. The select committee did not think that anything had been shown to connect with tramways, even indirectly, the alarming rise of fatalities of recent years.

AUTOMATIC SIGNALS ON THE CHESTER SHORT LINE

The Chester Short Line, which is operated by the Philadelphia Rapid Transit Company, extends from City Hall subway in Philadelphia to Third and Market Streets, Chester, a distance of 14½ miles. The route is largely on private right-of-way and is double tracked except for two single track stretches, totaling about 2¼ miles. Cars on this route, No. 37, have a headway of fifteen minutes in each direction. A second route, No. 83, operates every ten minutes on one of these pieces of single track, between Elmwood Avenue and Island Road.



Philadelphia Signals—Diagram Showing Signal Location and Control

At Eddystone, near Chester, the Baldwin Locomotive Works is located, and to serve this plant trippers are run in the morning and at night to City Hall subway. Some of these are stored on Morton Avenue spur, shown on the attached diagrams, and enter the last single track block in the middle, as many as four sometimes following in succession. Other trippers are turned at Saville Avenue and also at No. 10 Switch.

Elmwood Avenue and Island Road is a loop terminus for several lines, and the single track begins at this point on Island Road. At Lyons—½ mile south—there is a through turnout, and at Eastwick Avenue—½ mile further—the double track is resumed, which continues for about 6½ miles. On Saturday and Sunday afternoons the headway over this portion as far as Darby Creek is reduced to seven and a half minutes. From Saville Avenue, Eddystone, the single track continues to the end of the line. It passes over two bridges with private right-of-way, and descends a grade and curve to Switch No. 10, which is a through type turnout ½ mile south. Three squares beyond this is Morton Avenue with the spur for trippers, while the single track continues to Third and Market Streets, Chester, the south end of the line, ¾ mile from Switch No. 10. At this point the car is reversed, there being no loop or crossover.

In order to safeguard traffic under these conditions the railway company has installed on the single track sections automatic signals furnished by the Nachod Signal Company, Inc. The accompanying line cut shows the signalling layout on the single track sections, the track being represented by the trolley wire over it. The actual location of the signal on the plan is at the base of the pole, and the actual location of the trolley contactors on the wire is at the middle of the symbol. As these are directional contactors, divided into halves electrically, in the representation the white end signifies that the trolley wheel touching that end first causes the adjacent signal to give the permissive indication, as when a car enters. The wiring shown connecting the signals and contactors of a single block is diagrammatic, and represents one or more wires.

While there is no car in the block between Saville Avenue and Switch No. 10, for instance, signals No. 5 and No. 6 are both "neutral," showing neither lights nor disks. Then a car moving south from Saville Avenue toward Switch No. 10, passing the contactor on the right-hand track at Saville Avenue sets signal No. 6 at stop at Switch No. 10, and after this has assumed the stop position—a red light and a red disk—signal No. 5 at Saville Avenue responds by changing to the permissive position—a white light and a white disk. The signals remain in this condition, preventing an opposing move from Switch No. 10, until the car passes under the contactor on the right-hand track at Switch No. 10, when both signals are cleared. However, should another car have followed the first at Saville Avenue before it had left the block, the second car would find signal No. 5 showing permissive, meaning "block occupied—follow under control." When the first car had left the block at Switch No. 10, the signals would not change, but only after the block had been entirely vacated would they be restored to the normal neutral. This is accomplished by a counter in the signal relay, whereby as many cars must leave the block as have entered it, before the signals will indicate a clear block. The arrangement for counting is perfectly general, and cars might make any shifting moves, whatever the indication of the signals at the time may be, and all counts would be properly registered, either positively into the block or negatively out of it.

Philadelphia Signals—Signal at Lyons and Contactors at Eastcreek Avenue

The block from Switch No. 10 to the terminus at Third and Market Streets embraces three signals, Nos. 7, 8 and 9, of which 7 and 9 operate as the signals No. 5 and No. 6 previously described. No. 8 is, however, a repeater of signal No. 9, and will always assume the position of that signal. This repeater signal faces the Morton Avenue spur, and a contactor there is wired to signal No. 9, so that a car proceeding south from

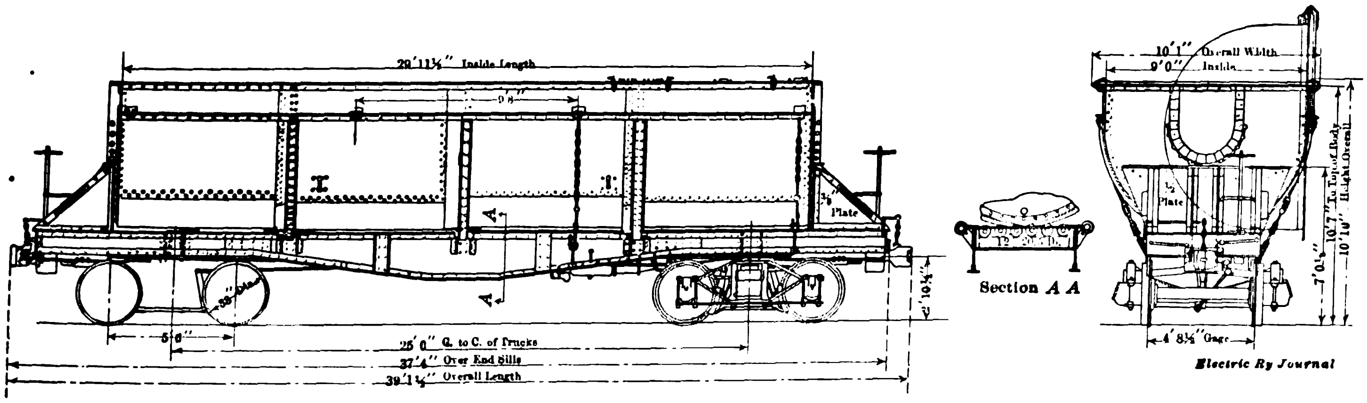
Switch No. 10 to Chester sets Nos. 9 and 8 red, and No. 7 white, and clears all signals at the terminus.

On the return trip it sets signal No. 7 red, and Nos. 8 and 9 white, but at Switch No. 10 will clear all signals. If signal No. 8 shows neutral, a Baldwin tripper, stored on Morton Avenue, as previously mentioned, may enter the block and will count in on signal No. 9, setting Nos. 9 and 8 white, and No. 7 red. The tripper may then safely proceed north toward Switch No. 10. Other trippers may, of course, follow on this signal. From the above it will be seen that a tripper may make this move either when signal No. 8 is neutral or when it is showing white due to a regular car moving north in the block. The use of a repeater signal at No. 8 shows the condition of the block at the intermediate point, and the contactor there provides a means of recording an entrance or exit at that point.

MODERN GARBAGE CARS

An important advance in the design of garbage cars has been brought out by the Orenstein-Arthur Koppel Company, Koppel, Pa. The principal features of this car will be readily seen from the accompanying side and end elevation. This car is designed particularly for inland cities where garbage is transferred from wagons to the cars which run to the destruction plants. The bodies of these cars are, in reality, large tanks with semicircular bottom and are usually built with a capacity of 1450 cu. ft. to 1800 cu. ft., which gives a tonnage of forty to fifty. The 1450-cu. ft. car has a length of 39 ft. 1½ in. over couplers, a width of 10 ft. 1 in. and height 10 ft. 10 in. The underframes are made according to the usual fishbelly sill construction for large cars. The bodies are supported on the underframe by heavy cast-steel rockers at each end, and at three intermediate points by rollers. The end supports are heavily braced to strengthen the car against end shocks and movement of the load.

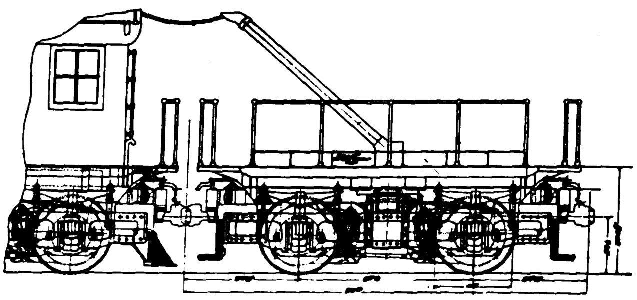
The bodies are kept from movement during transit by two heavy side chains on each side. These chains are fastened with a shackle so that they can be quickly released. In dumping the car a crane engages a loop on the side and rolls the body over so that it rests on its side. When the body is in the dumping position, most of the material dumps automatically and the rest is flushed out. On account of the roller supports in the center and the shape of the cast-steel cradles at the ends only a small air hoist is needed to right or dump the bodies. The bodies, of course, are made watertight. The cars are constructed in accordance with M.C.B. standards and the requirements of the Interstate Commerce Commission so that they can run on their own wheels and axles in connection with standard railroad equipment. The cars are made in two sizes as follows: 80,000 lb. capacity and 1450 cu. ft. content, weight 44,600 lb.; 100,000 lb. capacity and 1800 cu. ft. content, weight 51,600 lb. These weights refer to trailers only.



Construction of Steel Garbage Disposal Car

TRACTOR TRUCKS AND ADDITIONAL LOCOMOTIVES FOR BUTTE 2400-VOLT RAILWAY

The Butte, Anaconda & Pacific Railway has recently ordered from the General Electric Company four additional freight locomotives which will be duplicates of the seventeen 80-ton units put in service about a year ago. In order to make these locomotives suitable for very slow speed spotting service, there have also been ordered three additional tractor trucks which can be used in combination with the standard locomotive units. These trucks are an ingenious adaptation of standard parts of the freight locomotives, increasing the tractive effort of the standard unit to the equivalent of a 120-ton locomotive. These units will be used especially for spotting cars at the smelter and also for low-speed switching in the Butte yards. While the new locomotives are adapted especially to switching service, they are also capable of operation in combination with any of the freight locomotives now in service and have the same electrical and mechanical equipment.



Tractor Trucks for 2400-Volt D. C. Butte, Anaconda & Pacific Railway

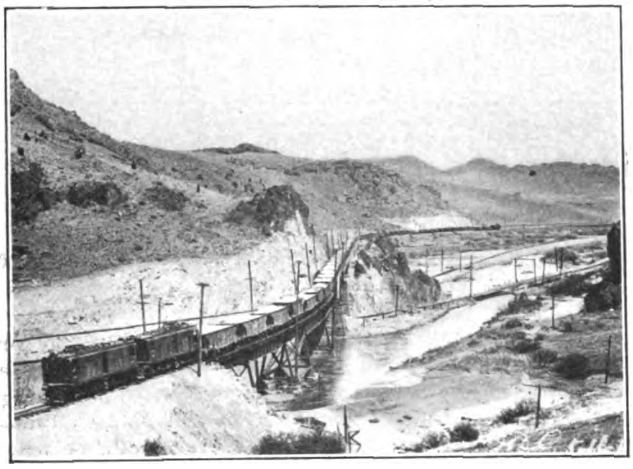
During the present year it is expected that approximately 25 per cent more ore will be transported from Butte to Anaconda than was hauled last year. This increase arises from the transfer of ore which was previously hauled to smelters at Great Falls. The additional haulage will bring the total annual traffic on the road up to about 6,250,000 tons.

The three two-axle tractor trucks will each be equipped with two GE-229 motors insulated for 2400 volts similar to those on the locomotive. Cable and connecting plugs will also be provided for operation with the locomotives, so that the truck motors will be operated with the other motors from the same controller without change in the main control. The number of steps will therefore be the same as on the locomotive; ten points with six motors in series and seven with two sets in multiple, each set consisting of three motors arranged in series. In operation, each of the tractor truck motors is connected in series with one pair of motors on the locomotive, making a six-axle, six-motor unit which will furnish 50 per cent more tractive effort than the 80-ton locomotive alone at about two-thirds speed without increase in current input.

The characteristics of the 120-ton unit are as follows:

Total weight on drivers	240,000 lb.
Starting tractive effort at 30 per cent coefficient	72,000 lb.
Tractive effort at one hour rating of motors	43,200 lb.
Speed at one hour rating, motors in series	4.8 m.p.h.
Speed at one hour rating, motors in series parallel	10.3 m.p.h.

Mechanically these trucks are similar in construction to the trucks on the 80-ton locomotives. Instead of a locomotive body, however, a platform is supplied, built up of channels, angles and plates which are supported on the truck transom. Struts are provided at the corners to secure the platform to the side frame. Ballast, consisting of cement and iron punchings of sufficient quantity to bring up the weight of the truck to 40 tons, is placed between the center channels of the platform in a boxlike structure built for this purpose. A passageway protected by a hand rail extends along each side of the platform.


Butte 2400-Volt D. C. Locomotives Hauling Sixty-five Cars with 4450 Tons of Ore

In the center of the platform a crane extends at an angle from the platform floor, suitable for supporting the eight cables necessary for connecting the motors of the tractor to those on the locomotive. This crane can be revolved 180 deg. so as to permit the coupling of the locomotive to either end of the truck. When in operation, this crane is rigidly locked in position. Air-brake equipment with the necessary triple valve, auxiliary reservoir, etc., is also installed on the truck.

Each of the four locomotives now under construction is provided with a junction box placed near the roof above the front window. This is designed so as to permit the removal of couplers with a small amount of labor and time, so that the tractor may be connected to any one of the freight locomotives which is provided with this junction box.

Members of the Kentucky Association of Stationary Engineers, who held their annual convention in Louisville recently, were taken through the High Street power plant of the Louisville Railway by F. L. Ray, chief engineer of the company and a vice-president of the National Association. A special car was used to convey the delegates to points of interest about the city.

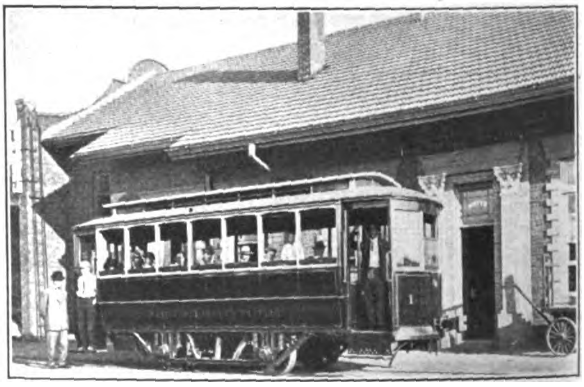
BRASS "SAFETY FIRST" PLATES FOR CARS

Brass "Safety First" Plate

An interesting and useful development of the "safety first" movement is indicated by the accompanying illustration which shows a specimen of the types of etched brass caution notice plates designed for posting on panels between windows and in other prominent positions on electric railway cars. These plates are manufactured by L. F. Grammes & Sons, Allentown, Pa., and any wording desired by the purchaser is put on them. Pains have been taken to make these plates attractive in order to draw the attention of the passengers and thus secure their co-operation in the present country-wide "safety first" movement. The plates add a pleasing fixture to the car. They are made of brass, with durably lacquered letters on a red background, or of red letters showing through a black lacquer, in either of which styles the lettering stands out prominently and makes these plates easily readable. The size of the plates is 2 in. wide x 7 in. deep. Since the plates were first placed on the market they have won such popularity that more than 20,000 are said to have been purchased by different electric and steam railways in less than a month.

STORAGE BATTERY CARS AT MILLEDGEVILLE, GA.

In November, 1913, the Milledgeville (Ga.) Railway placed in operation a storage battery car for use over the track of the Central Railroad of Georgia between Milledgeville and a State sanatorium 3½ miles distant. The car is of the Brill single-truck type with longitudinal seats for twenty-six passengers, and its weight including the electrical equipment and storage battery is 16,000 lb. The battery as furnished by the Electric Storage Battery Company, Philadelphia, Pa., consists of fifty-eight type MV-29 "Hycap-Exide" cells and is mounted under the car seats. This battery has a five-hour rated capacity of 385 amp-hr. The car is geared for a maximum speed of 15 m.p.h. In regular service it makes six round trips a day, the running time for each trip being twenty-five minutes. The grades on the line form an interesting feature of the service. One grade 350 ft. long averages 6 per cent and has a maximum of 7.9 per cent. On this grade a stop is made in both directions. Another grade of 4 per cent is about 6000 ft. long. Both grades are combined with curves,


Storage Battery Car for Milledgeville, Ga.

but the latter, fortunately, are wide. George H. Tunnell, general manager of the railway, in a letter sent under date of April 23 to the manufacturer states that the car is using less energy than was guaranteed, also that it has been operating satisfactorily in every other respect.

EMERGENCY JACK FOR PHILADELPHIA CARS

The Philadelphia Rapid Transit Company, after several months of tests and investigations, has decided to equip all of its cars with a Barrett emergency jack as especially designed for it by the Duff Manufacturing Company, Pittsburgh, Pa. The Philadelphia company for some time past has been using the Barrett emergency jack No. 22 on some of its cars. While this jack is suitable for the smaller single truck cars heretofore used by the company, the purchase of near-side cars with Brill No. 39-E double trucks made a new jack necessary.

The placing of a jack under these cars is somewhat difficult, due to their peculiar construction. A steel skirting or plow is riveted to the truck close to the street level, extending over the front and two sides of each truck. This leaves only the rear journal box and bolster of each truck available for the application of the jack. At the front and back overhang, due to the folded steps below the doors, the most available point to apply the jack is under the end sills. All these points are at different elevations above the ground.

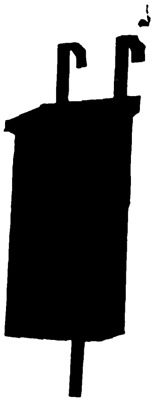
In addition, the height under the overhang as well as under the journal boxes and bolsters varies somewhat, depending on where the car is standing, say over a switch, on the track or off the track. However, the most convenient height of the jack when closed was finally determined to be 18 in., with a maximum height of 28 in. when ratcheted up. This makes it possible to apply the head of the jack under the end sills to raise the body of the car 10 in. above the trucks under the most favorable conditions.

For application under the journal boxes and bolsters a bracket or toe is provided which can be adjusted to any height beween 5½ and 13½ in. above the ground by sliding it up or down on the outside rack, without ratcheting. The jack is thus made ready for obtaining a "bite" instantly, and the entire raise of 10 in. is made available for actual lifting of the trucks above the ground wherever the car may be standing. This is a new feature in an emergency car jack, but one which should come into frequent use on account of the two important advantages of quick application and the reservation of the entire "raise" of the jack for the lifting of the car above anything pinned beneath it. The outside rack on which the toe or bracket slides is suspended from the top of the inside rack or lifting bar on a swivel joint, permitting the toe to be swung around the jack, with the vertical lifting bar as its axis, over an angle of 90 deg. Therefore, the operation of the lever is not confined to the usual position at right angles to the side of the car, but at the most convenient angle within the above limit which the surrounding obstructions may dictate.

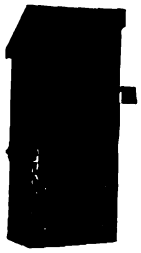
Easy operation was deemed a particularly desirable condition in the present case. As the jack has a capacity of 20 tons on the head and 8 tons on the toe, the leverage has been facilitated by machine-cut reducing gears which, while not preventing a quick lift, greatly reduce the power required for operation. The jack will be known as No. 439.

HANGERS FOR EASY INSTALLATION OF ARRESTERS

The Electric Service Supplies Company has placed on the market special types of lightning arrester hangers which are designed for the substantial and easy installation of the company's Garton-Daniels lightning arresters. Heretofore operating men made use of small cleats to fasten these arresters to the cross-arms or have devised other means to meet unusual conditions. The Style C hanger, shown, is for installations between two cross-arms, the upper part of the supports being bent to fit over the upper arm. It is a comparatively easy task to install the arrester when it can thus be secured to the cross-arms without having to be held. This is also true of Style B hanger, shown, but as this style is for single arm installation it does not require a lower support.

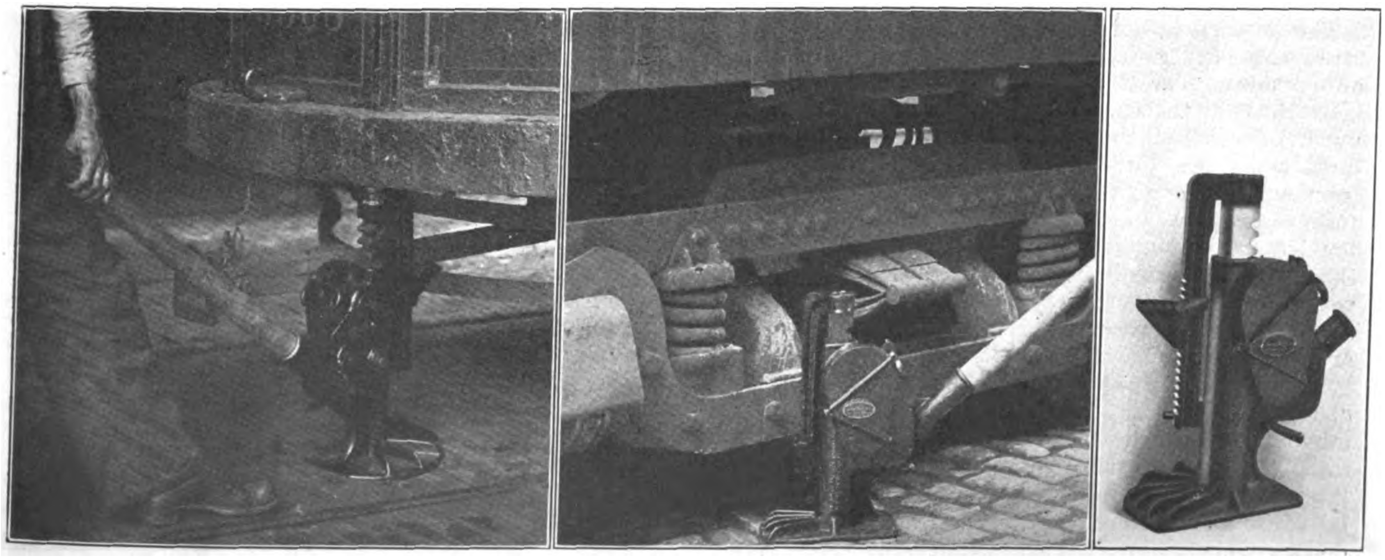


Style C



Style B

The Council of Ministers in Russia has recently approved the raising of a loan of about $2,000,000 by the town of Vilna for the installation of an electric tramway. The loan has not yet received imperial sanction.

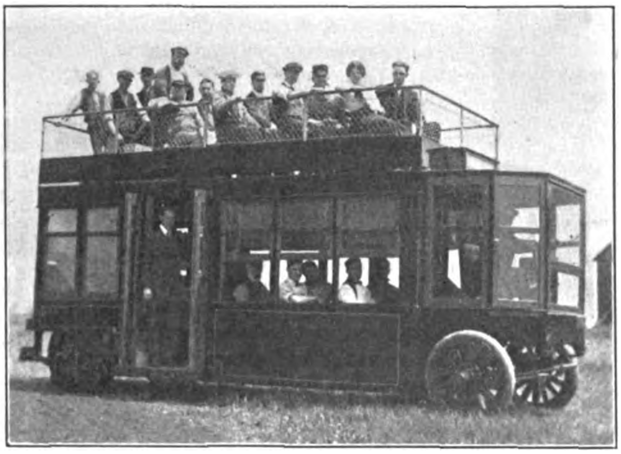


Application of Jack Under End Sill at Truck of Philadelphia Rapid Transit Company's Cars; View of Jack

A STEPLESS ELECTRIC BUS

The Field Omnibus Company, New York, in co-operation with the engineers of the New York Motor Bus Company with whom it has a contract, has developed the first stepless type of omnibus for public service transportation. This omnibus is of the double-deck type which, it is believed, will be more popular with the public than the single-deck bus except in extreme weather conditions. It is of such a low height than it can operate with safety under trolley wires and viaducts or other elevated structures.

The bus illustrated seats thirty-eight passengers, eighteen on the lower deck and twenty on the upper deck. It is 20 ft. 10 in. high over all; the distance from the ground into the car is 12½ in., and the height of the car roof from the ground is 7 ft. 8 in. The last dimension is 2 ft. 3 in. lower than the London, Paris and New York double-deck buses. This bus is practically 5 ft. shorter than the present type of double-deck bus in use. It is of all-steel construction. It has practically no regular chassis frame, but the body is framed to fill this requirement. The rear wheels are mounted on an auxiliary truck which carries the driving machinery and which can be detached as a whole for examination and repair. Two 10-hp motors are supplied by a motor drive plant which consists of an Edison storage battery equipment of 100 cells. The motor drive is by universal shaft-internal gear and spur pinion with a seven to one reduction. This gives a simple, flexible and independent drive with solid axle construction and no differential.



Storage Battery for Auto Bus

The motors, gearing, etc., as well as brakes and strut rods, are readily accessible for examination or adjustment. The front wheels are hung from the body through the springs. The batteries are located under the seats on the first deck and in a rear compartment under the stairway at the back of the door. The interior arrangement is a development of the stepless feature and low hung body. The stairway is located at the left of the entrance. The operator's cab is over the front axle and is completely equipped with a railway type controller with cut-outs for both motors, safety switch, charging plug, circuit breaker, ammeter and voltmeter and two sets of brakes.

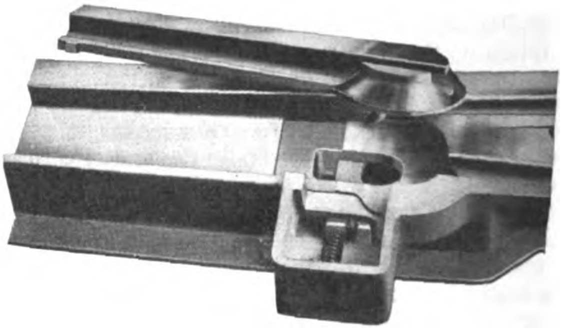
The lighting of the bus operates from a separate set of storage batteries. The interior and stairway is illuminated with enclosed cut-glass fixtures. Headlights, tail lights and portable lights are also provided. The interior finish is equal to that of a Pullman coach. It is of solid quartered mahogany wood, well rubbed down. The spring cushion, leather seats are on mahogany boxes with an iron frame.

The bus is designed to give a daily average of 125 miles or more. It has shown a speed on the level of 10 to 20 m.p.h., and on a 6 per cent grade made a speed of 10 m.p.h.

The builder has also developed a modified bus in which the stepless feature is retained. The body is designed after the old English coach style, having the entrance on the side at the front end instead of at the rear.

A TADPOLE SWITCH WITH REPLACEMENT FEATURES

A tadpole switch which is designed to meet the most severe operating conditions without becoming loose at the heel, with the resultant tendency to form a lip on the runway rail as well as to overturn under wheel pressure, has recently been developed by the St. Louis Steel Foundry Company. This switch is made of solid manganese steel. One of the difficulties hitherto pertaining to the tadpole design of switch has been in the loose heel and bearing. It is this defect, rather than the wear in the throatways on the running rails, that has fixed the life of the piece. In the case of the present tadpole switch, the maker has made it unnecessary to remove the entire switch piece should some part of it become defective. To this end, also, the heel of the tongue was so designed that a new tongue would always fit into the old socket. As is shown in the accompanying illustration, the principal features in this new switch were embodied in setting and fastening the heel of the tongue. By providing an undercut socket bearing this switch conforms to the maker's original design, but the bearing area has been materially increased. The tongue proper also has been reinforced by a web which forms the throatway floor the full length of the tongue. The wide bearing area of the undercut heel reduces the effect of impact at this point to a minimum. It is believed that the maximum wear of the heel has been attained by distributing equally over its 60 sq. in. of bearing surface, the impact at the heel as well as the shifting of the trailing closed point under load. The wide undercut bearing area is equally effective against grinding down and against receiving and distributing impact blows.



Tadpole Switch.

The pivot bearing is alongside the gage line and furnishes side restraint at the point best adapted to resist shifting or overturning sideways. This heel is kept tight by pressure on a lug depending from the heel of the tongue. A combination key and wedge bearing on this lug forces the tongue back between the side bearings as well as down on the bottom bearing, and also acts as a lever to hold the point down. The curved part of the heel is not subject to side thrust back of the pivoted center, nor will the heel adjustment permit the shifting of the tongue back of any point of contact along its side and the consequent tendency to throw the point. Wear in the tongue lug and the key which bears against it is readily taken up by driving the wedge tight in the socket.

News of Electric Railways

Action on Municipal Ownership Bill in Washington

The District of Columbia committee of the House of Representatives has ordered a favorable report on the Crosser bill providing for the government ownership and operation of the street railways in the District of Columbia. The hearings on this bill have been reported in recent issues of the ELECTRIC RAILWAY JOURNAL. The vote in the committee was nine to eight in favor of the measure, and a vigorous minority report is promised when the matter is laid before the House of Representatives. Both the majority and the minority reports are to be ready in about two weeks, and the proponents of the measure declare that they will force action at the summer session of Congress. In view of the crowded calendar and the efforts of the Congressmen to get away for the fall campaign the possibility of a vote in the House is slight. There is no prospect of action by the Senate before winter.

President Wilson has taken no stand on the question, although it is believed that he would sign the bill if it were sent to him by Congress. The fact that all the district commissioners appointed by the President favored the bill makes this the more likely.

If the Crosser bill becomes a law the commissioners of the District of Columbia would be directed to begin condemnation proceedings within ninety days for the acquirement of all the street railways in the District. These proceedings would be held before the Public Utilities Commission of the District, which is made up of the district commissioners, and that commission would fix the price to be paid for the properties. An appeal of its decision would lie to the Court of Appeals of the District of Columbia. To pay for the railroads the bill provides for the issue of thirty-year bonds paying 3.65 per cent. This interest is to be paid out of the revenue derived from the operation of the railways. The commissioners also are to have the authority to purchase such portions of the Washington systems as extend beyond the boundaries of the District of Columbia by the same method of condemnation proceedings and to pay for them with similar bond issues. The following specific provision in the bill, however, prevents the government from guaranteeing these bonds:

"The United States shall not be liable for the payment of the whole or any part of the principal or interest of said bonds, nor shall any money contributed by the United States for or on account of the District of Columbia be used for such purpose, nor shall any payment made or liability incurred by the District of Columbia on account of the condemnation of such street railroad or railroads be a basis of contribution by the United States for the maintenance of the government of the District of Columbia."

The commissioners are given plenary powers of control, management and operation of the systems thus to be acquired. A special sinking fund is also to be established to wipe out the bonds.

The committee vote came at the end of a series of hearings which began last January but were desultory in character until representatives of the American Electric Railway Association took part about four weeks ago. This raised the general question of governmental ownership. The advocates of the measure are already proclaiming the committee action a national victory for their principles. Every effort will be made to induce Congress to adopt the measure as part of the national campaign for the municipalization of public utilities. In that case Washington will be pointed out as a national example for all municipal ownership propagandists.

The vote in the committee stood as follows:

For the Crosser bill—Representatives Wyatt Aiken, of South Carolina; William L. Igoe, of Missouri; George E. Gorman, of Illinois; Joseph B. Thompson, of Oklahoma; Robert Crosser, of Ohio; Archibald C. Hart, of New Jersey; William J. Cary, of Wisconsin; Carl E. Mapes, of Michigan; Anderson H. Walters, of Pennsylvania.—9.

Against the bill—Thaddeus H. Caraway, of Arkansas; Eugene E. Reed, of New Hampshire; Charles P. Coady, of Maryland; Solomon F. Prouty, of Iowa; Samuel Wallin, of New York; Samuel E. Winslow, of Massachusetts; Abraham L. Keister, of Pennsylvania; Ben Johnson, of Kentucky.—8.

Representative Henry George, Jr., of New York, had left word before sailing for Europe that he wished to be recorded for the bill, but under the rules this could not be done. Representatives Denis O'Leary of New York and Claude l'Engle of Florida, also out of the city, sent letters asserting that they favored the bill. The only other member of the committee, Representative Horatio C. Claypool of Ohio, left no word as to his attitude. Representative Walters, who voted for the bill, said he did not feel bound by his vote to favor the measure on the floor of the House, but thought the bill was so important that it should be reported by the committee.

The committee report favoring the measure will be drawn up by Representative Crosser. The minority report is being prepared by Representative Winslow.

The action of the committee came somewhat as a surprise because the hearings had been attended by an average of only about four members. As a result it was expected that there would not be a quorum for the committee session when the bill came up for action. As a matter of fact, the attendance of seventeen is about the largest the committee has had during the present session of Congress.

Chairman Johnson of the committee, who voted against the report, declared that he considered the bill "very bad," particularly because it created a lien only on the receipts of the proposed government railways, and he thought in order to make the bonds worth anything they ought to be based on something more tangible. He declared that eventually the United States government would have to lend its endorsement to the bonds. These, he said, would probably total $50,000,000 and would be a tax upon the people of the District of Columbia, although the latter would have nothing to say about them. "There are so many defects in the bill," concluded Chairman Johnson, "that I cannot conscientiously vote to advance it one step."

Representative Winslow, who is to write the minority report, was even more vigorous in his opposition to the bill. "All the arguments in favor of the progress and the needs of the people," declared Mr. Winslow, "are on the side of the private corporations. It is in private corporations that you find the greatest efficiency, and at no greater cost than in municipal ownership." Mr. Winslow presented a report showing that only three cities and twenty-nine towns in Massachusetts have municipal lighting plants, and of these thirteen are only distributing plants. Municipal ownership, he said, had been rejected by four cities and fifteen towns and four other cities and twenty-five towns dropped such a proposal after preliminary investigation.

Representative Prouty declared that the question was one the people of the District of Columbia ought to settle for themselves. He expressed grave doubt as to whether the 375,000 people of the District would be willing to support the burden of possibly $50,000,000 worth of bonds imposed upon them by Congress.

Representative Caraway declared he would not be a party "to load this burden on the people here." He said that the only persons who had appeared in favor of the measure were "professional agitators who appear here to pass on every measure that comes before this committee." He declared that they usually misrepresent those whom they claim to represent.

Representative Crosser, the father of the measure, told the committee that he had worked for six months upon the bill and that he was convinced of the soundness of the public policy outlined in it. He cited the Democratic platform in defence of the measure and pleaded that the committee should at least send the measure to the House for a vote there.

Representative Gorman, who made the motion to report the bill, told the committee that he cast his vote in favor of the measure because the people in his district of Chicago had voted in favor of the general proposition of municipal ownership.

The most interesting testimony during the last days of the committee hearings was contributed by Judson C. Welliver, an editorial writer on the Washington *Times*, who told the committee that the people of the District of Columbia were "overwhelmingly" in favor of government ownership of the Washington street railways. Mr. Welliver referred to the failure of the people to secure universal transfers from the two systems as a reason for his support of government ownership. But when Chairman Johnson cross-examined Mr. Welliver for the basis of his assertion that the people of the District favored government ownership there was trouble.

"You have stated that the District of Columbia is overwhelmingly in favor of municipal ownership," said Chairman Johnson. "Will you mind stating what authority you have for that remark?"

"Oh, I have talked with many people here," replied the witness.

"And they say they are overwhelmingly in favor of municipal ownership?"

"Yes."

Then Chairman Johnson insisted upon securing the names of the people with whom Mr. Welliver had talked. In a four-hour session with the aid of a city directory Mr. Welliver named sixteen residents of the District as persons with whom he had discussed the issue and who had favored government ownership. The first three of these were the District Commissioners who had testified at the hearings and the fourth was Corporation Counsel Syme, who also had testified. Another was Gifford Pinchot, but Mr. Welliver withdrew his name because Mr. Pinchot is running for United States Senator in Pennsylvania and he felt Mr. Pinchot might be embarrassed if he were listed as a resident of the District of Columbia.

The public policy committee of the National Electric Light Association in its report presented at the Philadelphia convention last week referred to the Washington situation as follows:

"One of the most serious of recent developments toward government ownership and operation is the proposal pending before Congress that the United States government shall purchase and operate the street railway system of the city of Washington, D. C. It is understood that this is but the first step toward the acquirement of all the public utilities of the city of Washington and the District of Columbia and their future operation as well as ownership by the national government. The movement is one of most serious political and economic import. Obviously, it would be no more possible for private capital and employment to compete with the unlimited resources of the national government in transportation or the manufacture and sale of gas or electricity than it would be for private effort to compete with the resources of the government in the manufacture and sale of clothing or of food or any of life's necessities, the availability of which is a matter of far greater human importance. The principle underlying the one underlies all, and it is to be hoped that upon proper consideration of the matter Congress will defeat this movement. It is urged that our members get in touch with their representatives in Congress and present to them the serious political and economic consequences that are bound to follow an undertaking of this nature so essentially private in its character."

Kansas Tax Assessments

The State Tax Commission of Kansas has made public the following valuations placed by it on the principal electric railways in the State:

	1913	1914
Atchison Railway, Light & Power Company	$96,694	$102,986
Arkansas Valley Interurban Railway, Wichita	674,899	674,907
Emporia Railway & Light Company	56,712	56,147
Fort Scott Gas & Electric Company	61,053	79,800
Hutchinson Interurban Railway	181,265	186,541
Iola Electric Railroad	70,791	47,687
Joplin & Pittsburg Railway	1,390,816	1,510,805
Kansas City, Lawrence & Topeka Electric	127,642	125,104
Kansas City-Western Railway	1,220,629	1,132,827
Kansas City Elevated Railway	1,064,992	1,065,948
Manhattan City & Interurban Railway	91,762	113,072
Lawrence Railway & Light Company	114,765	116,452
Metropolitan Street Railway, Kansas City	2,645,626	2,942,397
Missouri & Kansas Interurban Railway	454,887	449,061
Parsons Railway & Light Company	56,053	52,516
Salina Street & Interurban Railway	60,568	77,392
Southwestern Interurban Railway	150,746	159,747
Southwest Missouri Railroad	61,274	61,275
Topeka Railway	1,277,158	1,549,428
Union Light & Power Company, Junction City	140,064	120,791
Union Traction Company, Coffeyville	753,329	754,188
Wichita Railroad, Light & Power Company	1,350,669	1,500,619

Toledo Committee Withholds Report

A committee of the Toledo Citizens' Franchise Association is preparing a draft of a street railway franchise which will be presented to the City Council at its regular meeting on June 22, if it can be completed in time. Because of the widespread interest in the drafts that have already been discussed before that body or the franchise committee, the association will endeavor to present an instrument that will contain the features upon which the city and company have agreed and suggestions covering subjects upon which they have failed to unite.

The franchise committee of the Citizens' Franchise Association consists of Judge John H. Doyle, Gustavus Ohlinger, Frank L. Mulholland and George Greenhalgh. This committee and the Council franchise committee met in joint session on June 9. It is the purpose of the association's committee to ascertain as far as possible the ideas of the administration on all phases of the situation.

Many data have been secured by the association upon which to base its proposition, but the committee will consult with representatives of all classes interested in the settlement of the franchise question. Inquiry will also be made of the company as to the possibility of incorporating certain requirements in the franchise under consideration.

At the regular meeting of the City Council on June 8, the Council committee of the whole made no report of its rejection of the Doherty franchise and the acceptance of the report of the franchise committee. These matters were held in abeyance pending the proposition from the Citizens' Franchise Association. It may never be necessary for the committee to make a report of its meeting, unless the efforts of the business men are rejected by the Council.

At the meeting of the Council franchise committee on the evening of June 4 Mayor Keller announced that no proposition not based on a 3-cent fare will be entertained.

Henry L. Doherty, representing the Toledo Railways & Light Company, stated that he had no new proposition to make. He did, however, say that he would endeavor to operate the road on a sliding scale of the same general character as that used in Cleveland. This statement was made in reply to a question after the Cleveland plan had been discussed. Seemingly there is a tendency now toward the adoption of this plan so modified as to give the company an additional return on its investment for each reduction made in the fare. It is believed this will furnish an incentive for economic management and operation.

President James Thompson said he was impressed by past investigations that there should be no fixed fare for a period of twenty-five years. He said further that the organization feels certain there should be a sliding scale. This comes as near to a declaration as has yet been made by the association. Mr. Thompson said no attempt had been made by the Council franchise committee to ascertain the cost of street railway service.

Attorney Frank Mulholland, in charge of the association's work, announced its opposition to municipal ownership under present conditions. He said that the time was not ripe for placing the business under political control and that conditions with the railway itself were chaotic.

F. M. Dotson and others, speaking for the city, said they were certain a 3-cent fare would pay, if properly tried out, and that any proposition to gain consideration must have that rate as a basis.

Mr. Doherty maintained that a change in the plan at this time would only mean delay. His plan of an adjustable scale of fare is the most available, and 3-cent fare was possible under it, whereas such fare was impossible under the city's plan. While willing to consider any suggestion, Mr. Doherty told the committee that the company had no new plan to present.

Little has been done yet by the Central Labor Union in circulating petitions for initiating a municipal ownership ordinance.

The Non-Partisan League sends representatives to all Council and committee meetings, but is not actively urging its ideas at these meetings.

Engineers McAdoo and Corbett are in Toledo to report on a plan of an ideal system of lines for the city. Their work will, no doubt, have a favorable bearing upon the negotiations when they are again taken up.

Tax Injunction in Cleveland

The Cleveland (Ohio) Railway was granted a temporary restraining order by Judge Thomas M. Kennedy, of the Cuyahoga County Common Pleas Court, on May 5, to prevent the county treasurer from proceeding to collect taxes for 1913 upon the valuation fixed by the State tax commission. The petition states that its report for the year was filed with the commission and that the valuation given was correct. Later the commission announced a tentative valuation of $21,837,330, which was $7,750,000 in excess of the value returned by the company. At a hearing requested by the company the commission refused to reduce the valuation, and also failed to set forth the rules under which it had been ascertained.

The petition states that the commission violated both the general code and the State constitution in arbitrarily fixing the valuation at the figure named, and that the provision of the general code that "reasonable and proper rules must be used to govern and regulate the mode and manner of all valuations and assessments" has been violated. It is claimed that the valuation is higher than that of any other similar company in the State. The belief is expressed that the valuation was ascertained by taking the receipts of the company for the last three years and calculating the net earnings at 33 1/3 per cent of the gross and capitalizing this at 10 per cent. The net earnings of the company for the last three years were only 19 per cent of the gross instead of 33 1/3 per cent.

This suit followed a tender to the county treasurer of certified checks for $242,883, the taxes at the regular rate on $16,078,765, the valuation of the property claimed by the company. J. J. Stanley, president; H. J. Davies, secretary, and H. J. Crawford, of Squire, Sanders & Dempsey, legal representatives of the company, together tendered the checks to Treasurer O'Brien, who refused them. This was done to secure a basis upon which to ask for an injunction. If the company should be successful in its endeavor to overthrow the valuation fixed by the commission, a new system of valuing street railway properties will have to be fixed.

Business Conditions in Portland, Ore.

C. M. Clark, chairman of the executive committee of the Portland Railway, Light & Power Company, Portland, Ore., has included in the annual pamphlet report of the company for the year ended Dec. 31, 1913, a statement in regard to business conditions in that city which he has concluded in part as follows:

"The capital expenditures required during this year will be small. The development of Alaska and the opening of the Panama Canal should prove helpful in restoring to Portland the prosperity which characterized its growth in the decade preceding 1912. In addition, there are a number of local reasons for increased earnings, such as the development of the light and power business in the Willamette Valley, including the sale of power to the Willamette Valley Southern Railway and the Southern Pacific Company. The overdevelopment of the territory and of your company is temporary only and may soon be changed into a condition where the capacity of the company will be fully required to meet the demands of a new period of growth and development. Even during the last two years there has been a steady growth and improvement in Oregon and in Portland, and the agricultural, financial and industrial conditions are sound and stable."

New Kansas City Successor Company Incorporated

Articles of incorporation of the Kansas City Railways, which will take over the lines of the Metropolitan Street Railway, Kansas City, Mo., if the proposed franchise extension is granted, were filed on June 4 by Clyde Taylor, attorney for the receivers. The capitalization of the new company is fixed at $100,000. Eleven nominal directors were named, as follows: Frank Hagerman, Chester H. Smith, Clyde Taylor, Kenneth W. Tapp, R. B. Sayre, J. W. Murray, R. J. Clark, James B. Welch, E. E. Ball, S. R. Freet and J. A. Harder. These directors will resign as soon as the franchise has been approved by the people, and will be succeeded by the five city directors named in the ordinance and the six company directors.

The Kansas City Terminal Railway, on June 5, indicated it would oppose the granting of an extension of a franchise to the Metropolitan Street Railway. Through Samuel W. Sawyer, the company notified the Missouri Public Utilities Commission that it desired to be heard in case the franchise discussion reached that body. The Terminal Railway charged the Metropolitan Street Railway and the city with bad faith in rejecting an old agreement whereby the Metropolitan Street Railway was to share the cost of several viaducts and subways.

The revised franchise went to one house of the Kansas City Council on June 15. The other board will receive it on June 22. The measure will be voted on by the people on July 7.

The franchise committee of the Council signed its report on June 1. The report reviewed the street railway situation in part as follows:

"1. On June 3, 1911, the United States Court appointed receivers of the Metropolitan Street Railway, who have been since operating the property. On Sept. 25, 1911, in the administration of Mayor Brown, the city filed in the receivership case a petition setting forth all its claims for relief against the system, whether arising out of their contractual relations or the needs of a growing community. It took the position that it wanted not any forfeiture of any franchise, but some arrangement made under which the property could be refinanced and improvements in the service made. There was a reference to and hearing before Judge Brumback as special master. He reported the amount necessary to be raised for improvements.

"After considering this report, Judge Hook, on Jan. 2, 1912, directed the receivers to inquire whether the municipal authorities were willing to entertain negotiations for a new franchise, and, if they were, to engage in them. Mayor Brown and his associates deemed a new contract necessary. They expressed a willingness to enter into such negotiations, which were then opened and in good faith continued until the approach of the city election. Both sides, to avoid having politics enter into what should be strictly a business proposition, then agreed to postpone further negotiations until after the April, 1912, city election. The newspapers of Kansas City, as shown by practically every issue of each paper, were unanimous upon the question of the absolute necessity of a new contract.

"2. After the election of Mayor Jost, the receivers asked to reopen negotiations with his administration. This he declined to do until he and his advisers first obtained a knowledge of the value of the property, the earnings therefrom, the expenses of operation and the financial condition of the company.

"To obtain and give this information as to the value the receivers expended more than $100,000. The city appropriated and spent $25,000 to obtain its information as to all of said matters. Judge Hook appointed Bion J. Arnold to ascertain the value. This he did, reporting the entire value of the system to be $36,800,000 and its actual cost, exclusive of the Kansas City & Westport Belt Line, to be $35,074,000. L. R. Ash and the engineering force of the city made the valuation for the city. He found the entire value to be $32,000,000. E. P. Moxey examined into the financial condition of the company and the actual cost of the property. He reported that $38,084,000 had been invested in the street railway property. The earnings and expenses were fully shown, the city having obtained everything necessary to form an accurate judgment. Finally, a tentative form of contract which had been agreed to by the Mayor and the company was introduced in the Council on Oct. 30, 1913. While it was being considered by a joint committee of the Council, the receivers, withdrew from the conference on Jan. 6, 1914, upon the alleged ground that the proposition was not by some being considered as a business matter, for the unbiased judgment of the people, but was being used to make political capital for the spring election.

"3. On April 27, 1914, the bondholders applied to Judge Hook to speed their proceedings to foreclose mortgages securing payment of street railway bonds aggregating $23,463,043, now due. The receivers asked and the judge granted permission to pay them an additional 1 per cent interest pending one more effort to negotiate a new contract. The additional 1 per cent now authorized under court orders alone aggregates $230,644 per year.

"Thereupon the receivers asked and the Mayor consented to a reopening of negotiations. Council committees were appointed to act with the Mayor. They were assisted by Judge A. F. Evans, city counselor; O. V. Wilson, Franklin D. Crabbs and John C. Lester, constituting a committee of the Commercial Club; L. R. Ash, formerly city engineer, and Robert P. Woods, an engineer chosen by the Mayor for the board of control.

"Suggestions have been asked and hundreds of citizens have appeared before the committee. The stenographic report of the proceedings before the former committee, covering months, has been consulted. The report of Bion J. Arnold and P. J. Kealy, engineers for the receivers, and L. R. Ash, engineer, and E. P. Moxey, accountant for the city, have also been carefully considered throughout the negotiations.

"As a result of more than two years' consideration of this subject by the city a form of substituted ordinance has been drawn, printed, and, with a copy of this report, will be mailed to all the voters of the city. This report will be handed to the clerk to hold for one week, subject to the further considerations of the committee, before filing, so that every person may see what, if any, changes have been made by this committee, and within that time call to its attention any possible error, mistake or oversight. Any such suggestion, for convenience, should be put in writing, addressed to the franchise committee and delivered to the clerk."

F. E. Gloyd, who was appointed on Oct. 28, 1913, to the board of directors of the Metropolitan Street Railway as a representative of the city, resigned on June 15. Mayor Jost appointed Frank C. Niles, wholesale cigar man, as his successor. Mr. Niles will serve two years, that being the length of Mr. Gloyd's term.

The Metropolitan Street Railway franchise ordinance, with slight changes, passed the upper house of the Kansas City Council unanimously on June 15. The physical value of the company's property in Missouri has been reduced from $25,800,000 to $25,648,806. A provision was adopted whereby the company which builds the central interurban station will receive 20 per cent of the fares of passengers. The power of determining extensions in addition to those provided for the first three years was taken from the board of control and placed with the City Council.

Shreveport Rate Cases Decided

On June 8 Justice Hughes of the United States Supreme Court handed down a decision in the long-pending Shreveport rate cases. The decision presents another phase of the problem dealt with in the Minnesota rate cases. Then the court held that rates fixed by the States for the regulation of intrastate traffic could be enforced provided that they were not confiscatory and the government or its agencies had not made specific rules for interstate traffic with which the State rules conflicted.

The present decision dealt with a case in which the rates fixed by a State did conflict with the federal regulation of interstate traffic. The charge was made that the Houston East & West Texas Railway and the Texas & Pacific Railway, pursuant to the order of the Texas Railroad Commission, charged lower rates on shipments from Dallas, Tex., than they charged for shipments for the same distances from Shreveport, La., thus involving a discrimination against interstate commerce as against intrastate commerce. The Supreme Court upheld the right of the railroads to disregard the rates of the Texas commission and to maintain the rates fixed by the Interstate Commerce Commission.

The court first decided that Congress had power to control intrastate charges over an interstate carrier to the extent necessary to prevent injurious discriminations against interstate traffic, and then held that Congress had conferred this power upon the Interstate Commerce Commission. "The fact that carriers are instruments of intrastate commerce as well as of interstate commerce," said Justice Hughes, "does not derogate from the authority of Congress over the latter or preclude the federal power from being exerted to prevent the intrastate operations of such carriers from being made a means of injury to that which has been confided to federal care. Wherever the interstate and intrastate transactions are so related that the government of the one involves the control of the other, it is Congress and not the State that is entitled to prescribe the final and dominant rule."

Seattle Suburban Line Sale Negotiations

A conference between William R. Crawford, former president of the Seattle, Renton & Southern Railway; Scott Calhoun, receiver, and city officials, lasting more than two hours, was held on May 23. Councilmen Dale and Fitzgerald and Assistant Corporation Counsel Howard A. Hanson appeared for the city. The two main issues discussed were the matter of the city paying a stipulated sum for the road and the question of what percentage of the receipts from extensions the city would turn over to the receivers. Mr. Crawford adhered to the original proposition. He asked that the city pay for the line by giving stockholders 25 per cent of the gross receipts for twenty-five years. He would consent to no proposition in which the city would pay a stipulated sum at the end of a term of years, or by the sale of bonds. He argued that 25 per cent of the gross receipts on extensions made to the Renton line should be given, the same as under the terms of the sale of the main line. Mr. Crawford's demand that 25 per cent of the receipts of extensions be turned over to the stockholders during that period brought the reply from the city representatives that they could not comply with such a request.

On May 26 city officials of Seattle asked Mr. Calhoun to fix a flat price on the Fourth Avenue extension, from Stewart to King Streets, reserving payment for the rest of the system under a future payment, or percentage plan, to be arranged later.

New Mail Pay Bill Introduced in Congress

Representative Tuttle of New Jersey on June 4 introduced in the House of Representatives the bill of the joint committee on postage and second-class mail matter and compensation for transportation of mails to provide a scientific system of paying railroads for carrying mails. The committee is unanimous in its approval of the measure and declares that the leading governmental authorities, including the Postmaster General, also favor it. The bill was referred to the House committee on post-offices and post-roads, and on June 5 was reported with amendments, committed to the committee of the whole House and ordered to be printed. It is now on the calendar and may be called up at any time.

The main provisions that are of interest to electric railways are Sections 1 and 15. Section 1 provides for the readjustment of weights and compensation to railroad companies for carrying mail when the weighing in any particular section is interfered with on account of floods or other causes where weights are decreased below the normal. Such unusual conditions make it necessary that an average of weights in accordance with the section be taken to determine the compensation on roads affected by floods in the Ohio Valley and territories tributary.

The main purpose of Section 15 is to readjust compensation to the railroads for the carrying of mails. The existing laws provide for readjustment of such pay upon two general bases: First, railroad companies are paid for the weight of material carried, and, second, where railway post-office cars 40 ft. or more are required for the distribution of mails en route an additional rate of pay may be allowed therefor. There is no provision in the existing law for additional pay for apartment car service performed in baggage cars furnished by the company. The proposed bill provides for one basis of pay for all service performed in full cars, in apartment cars and in storage cars, that basis being the space authorized as necessary for the distribution and transportation of the mails. Closed pouch service on trains where no car space is furnished may still be paid for on the basis of weight of mail carried. The rates of pay for the several classes of service provided are based upon a consideration of the fair value of the services rendered and are somewhat less than the revenue received by railroad companies for passenger car service.

It is represented by the Post Office Department that the application of these rates for 1915, with allowance for the usual growth in service, will result in a cost to the post office department of approximately $58,278,000. The appropriation for the transportation of mails on railroad routes for that year is $61,600,000, which means an approximate saving of $3,000,000 under the proposed system. A provision is included in the bill making it unlawful for any railway to refuse to perform mail service at the rates of compensation provided by law.

Pittsburgh Arbitrators Selected.—Judge S. L. Mastrezat, of the State Supreme Court, has been selected as the third arbitrator in the dispute between the Pittsburgh Railways and its employees. The employees recently selected Representative Stephen G. Porter and the company its attorney, James C. Gray, with the understanding that if these two failed to reach an agreement on the points in dispute they would select a third.

Wage Adjustment in Connecticut.—An adjustment of wages and working conditions covering the period from June 1, 1914, to June 1, 1916, has been reached by the management with a committee representing the motormen and conductors on the lines of the Connecticut Company and the New York & Stamford Railway. The same conditions have been made effective on the lines of the Westchester Street Railroad, the men of which were not represented at the conference.

Strike at Westinghouse Works.—A number of the employees of the Westinghouse Electric & Manufacturing Company and the Westinghouse Machine Company went on a strike recently because the management refused to recognize the demands of the newly-formed labor union, the Allegheny Congenial Industrial Union, and as a result the works of these companies at East Pittsburgh are partly shut down. The management of the company does not believe that the trouble will be of long duration.

House Passes Trust Bills.—Three of the Administration's anti-trust bills were passed by the House of Representatives on June 5. They are the railroad capitalization bill, providing for the close regulation and control by the Interstate Commerce Commission of issues of railroad stocks and bonds; the Covington bill, creating an interstate trade commission, with broad inquisitorial powers over corporations engaged in interstate commerce, and the Clayton bill, the provisions of which are designed to strengthen and support the Sherman law and other acts against monopolies and restraints of trade.

Elevated Third-Tracking Contract Awarded.—The Public Service Commission for the First District of New York has approved the award of the contract for the third-tracking of the Fulton Street elevated railroad in Brooklyn by the New York Municipal Railway Corporation to Terry & Tench, the lowest bidders, for $462,871. This contract covers that portion of the road between Nostrand Avenue and Sackman Street. The steel for this work has already been ordered from Milliken Brothers, Inc. Actual work must begin within ten days after the delivery of the contract, and the entire work must be completed within twelve months from that time.

Indiana Liability Act Interpreted.—The Appellate Court of Indiana on June 3 affirmed the Tipton Circuit Court in holding that interurban motormen do not come within the provisions protecting railroad employees under the Employer's Liability Act of 1893. The decision was made in holding that Earl Hughes cannot recover damages from the Union Traction Company of Indiana for injuries suffered in 1908. The forward end of a telephone pole fell from a work train that was traveling at 50 m.p.h. An end of the pole caught in the ground while the middle of it caught on a car of the train, throwing the other end forward on the cab, injuring Mr. Hughes, who was motorman of the work train. The opinion of the court tells of the history of railroad and interurban legislation, and shows that the Legislature has always treated railroads and interurbans as public utilities requiring different rules governing their activity. The Appellate Court held that the rules of law on which Mr. Hughes sought to recover were made to apply to steam railroads, and that he, as a motorman on an interurban work train, cannot recover under those statutes.

Newark Terminal Contract Awarded.—The contract for the construction of the foundation of an eight-story terminal building and subway connections have been let by the Public Service Corporation of Newark, N. J., to the Holbrook, Cabot & Rollins Corporation, New York. This work, which will cost between $600,000 and $700,000, is part of a plan which will involve an outlay of several millions to relieve transportation congestion in Newark. An eight-story office structure will top the terminal, which will occupy an 180-foot frontage on Park Place, with wings on Canal, East Park Street and Pine Street, devoted exclusively to the uses of the Public Service Corporation and allied companies. The grade floor will be used as a concourse and showrooms for commercial departments of gas and electric companies. The first floor will be used for surface car loops, and the basement will be for subway tracks. To these there will be approaches underground, starting from private property on Washington, near Warren Street, the subway to extend under Halsey, Cedar and Broad Streets at Military Park to the company's terminal site between the American Insurance Company and Proctor Theater buildings. The plans of the terminal and subway are by George B. Post & Sons. The plans for the building were described and illustrated in the ELECTRIC RAILWAY JOURNAL of Feb. 8, 1913, page 246.

United States Chamber of Commerce on Class Legislation.—The Chamber of Commerce of the United States of America has issued a circular letter to its organization members regarding proposed unjust discrimination against business and in favor of labor and agriculture in various bills awaiting passage in Congress. The letter calls attention to the clause included in the sundry civil appropriation bill providing that no part of the money can be used for prosecuting violations of the anti-trust laws by organizations or individuals seeking increased wages, shorter hours of labor, better conditions of labor, or "fair and reasonable" prices for farm products. There is also mentioned the two clauses of the Clayton bill relating to the exemption from prosecution under the anti-trust law of labor and agriculture organizations and to restrictions placed upon the courts in using the ordinary processes of injunction against certain specified methods employed by labor unions in conducting strikes. In referendum No. 3, which was closed on June 14, 1913, and adopted unanimously at the last annual convention, the members of the Chamber of Commerce placed themselves on record against class legislation and the exemption of labor organizations from the Sherman act. The above circular letter is a call for prompt and determined action on the part of business organizations and business men in the country regarding such legislation.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

A bill providing for the unification of electric railways centering in Boston has been presented by the Bay State Street Railway. The proposed act incorporates the Commonwealth Electric Railway, with authority to acquire or operate the whole or any part of the street railway properties located within the Boston Metropolitan District. The principal systems included in the proposed merger are the Boston Elevated Railway, the Bay State Street Railway, and the Boston, Revere Beach & Lynn Railroad. The proposition includes the standardization of the gage of the latter, with its electrification and connection with the East Boston tunnel. In acquiring the Boston Elevated Railway, the Commonwealth company would not become its successor in respect to fare limitations and privileges, but the fares proposed would be submitted to the Public Service Commission for approval. An interesting feature of the bill provides that the company and any steam or electric railroad owning or operating lines within the metropolitan district may enter into contract for a connecting suburban service. The district includes territory within 10 miles of the capitol building at Boston.

The bill to allow street railways to refund the cost of replacement of reconstruction work up to 120 per cent of their capital stock has been ordered to be engrossed by the House of Representative.

PROGRAMS OF ASSOCIATION MEETINGS

Society for the Promotion of Engineering Education

The twenty-second annual meeting of the Society for the Promotion of Engineering Education will be held at Princeton, N. J., June 23 to 26. All the meetings of the society and the council for the discussion of papers and business matters will be held in the Palmer Physical Laboratory at Princeton University. The registration headquarters will be in Nassau Hall. Practically all the papers which are to be read at the convention were published in the April, May and June bulletins of the association.

National Association of Corporation Schools

The second annual convention of the National Association of Corporation Schools was held at the new auditorium of the Curtis Publishing Company in Philadelphia on June 9, 10, 11 and 12. The annual banquet was held at 7:30 p. m. on June 12 at the Hotel Bellevue-Stratford. The papers presented at the convention dealt with salesmanship, advertising and distribution; accounting, financing and purchasing; apprenticeship and engineering schools; general office work schools; vocational guidance and welfare work, including physical efficiency, hygiene and sanitation.

New York Electric Railway Association

As previously announced in the ELECTRIC RAILWAY JOURNAL, the thirty-second annual meeting of the New York Electric Railway Association will be held at Hotel Champlain, Bluff Point, N. Y., Tuesday and Wednesday, June 30 and July 1. At the business sessions on Tuesday and Wednesday the principal addresses and discussion will be on the subjects of accident insurance, accident prevention and efficiency; the questions in the question box will also be presented for discussion. The annual banquet will be held at Hotel Champlain on the evening of Tuesday, June 30. There will be a morning session only on Wednesday. The complete program will be published in next week's issue of the ELECTRIC RAILWAY JOURNAL.

Central Electric Railway Association

The program has been announced for the summer meeting of the Central Electric Railway Association to be held at Assembly Hall of the Hotel Secor at Toledo, Ohio, on June 25 and 26. On the evening of June 25 Thomas N. McCarter, president of the Public Service Corporation of New Jersey and past president of the American Electric Railway Association, will address the members of the association and the public in Zenobia Theater at 8 p. m. This meeting will also be addressed by Peter Witt, Street Railway Commissioner of Cleveland, and others. The address of welcome to the members will be delivered by Carl Kellar, Mayor of Toledo, and the response will be made by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway, who is president of the Central Electric Railway Association. The program for the business session on June 25 provides for the following addresses:

Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company.

A. W. Brady, past president of the American Electric Railway Association and past president of the Central Electric Railway Association, and president of the Union Traction Company of Indiana.

"The Credit of Public Utility Companies," by C. Edgar Elliott of Breed, Elliott & Harrison, Chicago, Ill.

C. L. Henry, second vice-president of the American Electric Railway Association, first vice-president of the Central Electric Railway Association and president of the Indianapolis & Cincinnati Traction Company.

"Our Traffic Association," by A. L. Neereamer, secretary of the Central Electric Railway Association and chairman of the Central Electric Traffic Association.

"Economies in Operation of Field Control Equipments on the Toledo Railways & Light Company's Line," by F. E. Wynne, general engineer of the railway department of the Westinghouse Electric & Manufacturing Company.

At 10.30 a. m. on June 25 there will be an automobile ride for ladies with luncheon at the Inverness Club. At 8 p. m. there will be a theater party for the ladies.

The entire day of June 26 will be spent at Toledo Beach. At 2 p. m. there will be a ball game between the railway and the supply men. A special feature of the entertainment program at Toledo Beach on June 26 will be demonstrations by Harry N. Atwood with his aeroplane. Arrangements have been made for free rides with Mr. Atwood for members.

Financial and Corporate

Stock and Money Markets

June 10, 1914.

The session on the New York Stock Exchange closed dull to-day. The trading totaled only a little more than 100,000 shares. The bond market was broader to-day but the sales were at about the same volume as yesterday. Interborough-Metropolitan shares were active in the morning on rumors of prospects of a dividend out of the extra disbursement of the Interborough Rapid Transit Company. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2 @ 2¼ per cent; four months, 2¾ @ 3 per cent; six months, 3 @ 3¼ per cent.

The transit issues were inactive in Philadelphia to-day. Otherwise the market was strong.

The Chicago market was narrow and dull to-day. The bulk of the bond transactions was in Chicago City Railway 5's.

The Boston market was dull and more or less irregular. The tone was easier at the close.

The stock transactions in Baltimore to-day totaled only 814 shares. The bond transactions totaled $32,800, par value.

Quotations of traction and manufacturing securities as compared with last week follows:

	June 3	June 11
American Brake Shoe & Foundry (com.)....	87½	89
American Brake Shoe & Foundry (pref.)....	136	137
American Cities Company (com.)..........	*29	29
American Cities Company (pref.)..........	65⅛	67
American Light & Traction Company (com.).	337	336
American Light & Traction Company (pref.).	108	108
American Railways Company................	37	37
Aurora, Elgin & Chicago Railroad (com.)....	32½	34
Aurora, Elgin & Chicago Railroad (pref.)....	77	77
Boston Elevated Railway	81½	87½
Boston Suburban Electric Companies (com.).	7	7
Boston Suburban Electric Companies (pref.).	a65	*65
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company...........	92¾	92
Capital Traction Company, Washington......	100⅛	99
Chicago City Railway	135	135
Chicago Elevated Railways (com.).........	20	20
Chicago Elevated Railways (pref.).........	62	65
Chicago Railways, ptcptg., ctf. 1............	95	95
Chicago Railways, ptcptg., ctf. 2............	34½	34½
Chicago Railways, ptcptg., ctf. 3............	5	5
Chicago Railways, ptcptg., ctf. 4............	2	2
Cincinnati Street Railway	102¾	103¼
Cleveland Railway	104⅞	105
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company........	13	13
Columbus Railway (com.)...................	53	*53
Columbus Railway (pref.)..................	79½	79½
Denver & Northwestern Railway............	*63	63
Detroit United Railway	a80	a80
General Electric Company	147½	148¼
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	86½	83¾
Interborough-Metropolitan Company (com.)..	14¼	15
Interborough-Metropolitan Company (pref.)..	62	64½
International Traction Company (com.)......	*40	30
International Traction Company (pref.)......	*85	85
Kansas City Railway & Light Company (com.)	*18	22
Kansas City Railway & Light Company (pref.)	*37	39
Lake Shore Electric Railway (com.)........	*6	6
Lake Shore Electric Railway (1st pref.)......	*92	90
Lake Shore Electric Railway (2d pref.).....	*22	*22
Manhattan Railway	131	131½
Massachusetts Electric Companies (com.)....	12	12½
Massachusetts Electric Companies (pref.)....	60¼	62
Milwaukee Electric Ry. & Light Co. (pref.)..	95	95
Norfolk Railway & Light Company..........	*25½	26
North American Company	76	76½
Northern Ohio Traction & Light Co. (com.)..	70	a70
Northern Ohio Traction & Light Co. (pref.)	101	97¼
Philadelphia Company, Pittsburgh (com.)....	39	38¾
Philadelphia Company, Pittsburgh (pref.)....	38½	37
Philadelphia Rapid Transit Company........	15¾	15¾
Portland Railway, Light & Power Company...	*50	47
Public Service Corporation	112	112
Third Avenue Railway, New York...........	41	42¾
Toledo Traction, Light & Power Co. (com.).	a20	20
Toledo Traction, Light & Power Co. (pref.).	a70	70
Twin City Rapid Transit Co., Minn. (com.)..	105	105¼
Union Traction Company of Indiana (com.).	*11½	11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	14
United Rys. & Electric Company (Baltimore)	28	28
United Rys. Inv. Company (com.)...........	14	13
United Rys. Inv. Company (pref.)...........	38	37½
Virginia Railway & Power Company, (com.).	49	48¾
Virginia Railway & Power Company (pref.)..	99	99¾
Washington Ry. & Electric Company (com.)	87¼	87½
Washington Ry. & Electric Company (pref.).	83½	83
West End Street Railway, Boston (com.)...	66	67½
West End Street Railway, Boston (pref.)....	85	a92
Westinghouse Elec. & Mfg. Company.........	76¼	76¾
Westinghouse Elec. & Mfg. Co. (1st pref.)..	124	124

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* Last sale. a Asked.

Washington Railway & Electric Company

The statement of income, profit and loss of the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries for the year ended Dec. 31, 1913, is as follows:

Gross earnings from operation	$4,943,315
Miscellaneous income	10,221
Gross income	$4,953,536
Operating expenses, including taxes	2,669,971
Gross income, less operating expenses and taxes	$2,283,565
Fixed charges	1,126,915
Surplus income	$1,156,650
Disposition of surplus:	
Payment of 5 per cent dividend on preferred stock	$425,000
Payment of 6½ per cent dividend on common stock	422,500
Total	$847,500
Distribution to conductors and motormen under profit-sharing plan	$30,082
Depreciation on equipment—railways	81,174
Removal of abandoned tracks	1,047
Charged off, account Glen Echo Park	2,000
Charged off, account adjustment of taxes prior to Jan. 1, 1913	4,543
Sinking fund requirements—(Potomac Electric Power Company	92,320
Uncollectible accounts—(Potomac Electric Power Company)	2,706
Loss due to abandonment of street lighting equipment—(Potomac Electric Power Company)	14,429
Total	$228,301
Credited to profit and loss	$80,849

The gross earnings from operation as shown by the above statement were an increase of $294,987 over those of 1912, while miscellaneous income decreased $3,012. The gross income increased $291,975; the operating expenses, including taxes, $141,748; the gross income, less operating expenses and taxes, $150,228; the fixed charges, $19,308, and the surplus, $130,919. The net expenditures of the railway companies for additions, extensions and new equipment chargeable to construction accounts amounted to $249,820. Similar net expenditures by the Potomac Electric Power Company amounted to $235,952. The requirement for the year for the sinking fund of the Potomac Electric Power Company amounted to $93,320. The amount set aside for maintenance and depreciation of the railway and lighting departments amounted to $804,570 in 1913, as compared to $740,502 in 1912.

The record of passengers carried during the year showed 85,982,161. Of these 20,003,412 were free transfers. The average fare per pay passenger was 4.301 cents, with an average fare of all passengers carried of 3.269 cents, including transfers. The total car mileage for the system for the year was 10,771,952. Greater efficiency was shown during the year by a reduction in car hours of detention, the record for the year showing an improvement of 23 per cent.

The report gives a detailed description of the various improvements in the track and roadway department and the mechanical department during the year. Those in the track and roadway department consisted of the installation of new rails, special work, trolley poles, railroad ties, automatic electric track switches and trolley wire. The entire system was prepared for car wheels with 3-in. threads, instead of the previous 2½-in. standard. The report of the master mechanic for the year showed in the main that thirty new city and ten suburban cars were assembled and put into service, forty-seven cars equipped with air brakes, sixty-three cars repaired, seventy-one cars painted and ninety-seven varnished.

During the year 538 claims were settled by the claims department at a total expense of $118,749. Under the profit-sharing system of the company, whereby 26 per cent of the gross passenger receipts less the District of Columbia tax of 4 per cent is appropriated for trainmen's wages and accidents, $30,081 was set up for the profit-sharing fund, giving each man in service for one year $42.53. In regard to the activities of the medical department, the report states that the number of office calls made during the year was 3466, and treatment was rendered to 951 at their homes. There were 1297 surgical dressing cases, 87 operations and 281 vaccinations. The report discussed at length the numerous other welfare activities that have been inaugurated by the company for the benefit of the men, such as recreation rooms, Christmas entertainment, savings and loan department, relief association, public library, and the like. Tables are also presented showing the total outstanding capital stock and funded debt of the subsidiary companies and the amount thereof owned by the Washington Railway & Electric Company.

New Orleans Railway & Light Company

The comparative and consolidated income statement of the New Orleans Railway & Light Company, New Orleans, La., for the years ended Dec. 31, 1913 and 1912, follows:

	1913	1912
Operating revenue:		
Railway department	$4,401,152	$4,295,027
Electric department	1,335,186	1,244,042
Gas department	1,158,094	1,089,078
Total	$6,894,432	$6,628,147
Operating expenses:		
Railway department	$2,542,886	$2,450,917
Electric department	608,046	551,915
Gas department	449,449	417,524
Total	$3,600,381	$3,420,356
Net operating revenue	$3,294,051	$3,207,791
Revenue deductions:		
Taxes	$724,535	$560,980
Uncollectible consumers' accounts	6,661	5,010
Total	$731,196	$565,991
Net operating income	$2,562,855	$2,641,800
Income from outside operations	11,791	10,464
Total operating income	$2,574,646	$2,652,264
Miscellaneous income	34,762	31,110
Gross income	$2,609,408	$2,683,374
Income deductions:		
Interest on funded debt	$1,630,731	$1,569,973
Other interest charges	52,181	44,049
Dividends on stocks of minority stockholders of leased company	4,107	4,130
Amortization of funded debt, discount and expense	23,375	39,971
Taxes on non-operating land and improvements	16,559	16,785
Miscellaneous deductions	4,926	9,473
Total	$1,731,879	$1,684,381
Net income before deducting dividends	$877,529	$998,993
Dividend deductions on stocks of other affiliated companies in system owned by others	4,770	3,960
Net income after deducting dividends on stock of affiliated companies owned by others	$872,759	$995,033

The surplus on Dec. 31, 1912, of $2,739,519, credits of $885,606, debits of $1,338,939, and dividends of $799,690 give a surplus as of Dec. 31, 1913, of $1,486,496. As compared with the results of the previous year the gross operating revenue increased $266,285, or 4.02 per cent, and operating revenue $86,260, or 2.69 per cent. The net income decreased $122,273, or 12.28 per cent. The decrease in the net income was due entirely to the increase in taxes, the board of taxation having increased the assessment approximately $3,500,000, or 20 per cent. On the same basis of taxation as in 1912, the net income would have shown an increase of approximately $40,000, in spite of the increased cost of operation due to higher cost of materials and wages and the increased amount set aside to cover renewals and replacements, amounting to $180,025.

Charges for maintenance during the year amounted to $814,401, an increase of $32,639, or 4.1 per cent. In addition to this amount there was expended $225,231 for renewals and replacements, of which $180,813 was charged to operating expenses, maintenance accounts, and $44,418 against the depreciation reserve. During the year there was expended for construction, improvements and betterments the sum of $685,658.

The total miles of single track in operation in 1913 were 205.56 as compared to 190.92 in 1905, and cars 641 as compared to 552 for the same years. The comparative railway traffic statistics for these two years were as follows:

	1913	1912
Revenue passengers carried	87,038,951	65,021,214
Transfer passengers carried	22,373,512	6,641,193
Percentage of passengers using transfers	25.7	16.2
Average fare per passenger—cents	3.99	4.57
Car mileage	19,815,363	16,753,874
Number of 18-hour cars	122,839	102,156

Unification of Chicago Surface and Elevated Lines Being Considered

A plan is now being considered by the local transportation committee of the Chicago City Council for the unified operation of the surface and elevated roads. L. A. Busby, president of the Chicago Surface Lines, has attended these conferences and expressed willingness to enter into such an operating arrangement. The aldermen are inclined to oppose his request that the 45 per cent and 55 per cent division of the net receipts be applied to the merged properties, because they believe such an arrangement will reduce the city's income to the traction fund.

Belt Line Railway Corporation, New York, N. Y.—A decision has been handed down by the United States Circuit Court of Appeals which modifies the decree of the Federal District Court by holding the Metropolitan Street Railway for the payment of an issue of bonds and by freeing the bondholders of the Central Park, North & East River Railroad, now the Belt Line Railway Corporation, of the expense of the electrification of the line which was turned over by the receivers to the company on Aug. 6, 1908. In the matter of the claim of the Metropolitan Express Company for damages for breach of the lease for the operation of freight cars over the surface line the United States Circuit Court of Appeals has reversed the decree of the lower court. The lower court is directed to dismiss the claim as to the New York City Railway and to enter a decree in favor of the Metropolitan Express Company for the sum of $129,704.32 against the Metropolitan Street Railway.

Brooklyn (N. Y.) Rapid Transit Company.—The Brooklyn *Daily Eagle* says: "The stockholders' list of the Brooklyn Rapid Transit Company has steadily lengthened since the payment of the initial dividend in 1911. The records of the company show that at the time of the first dividend the payment went to 1200 stockholders and the last quarterly dividend, which has just been declared, will go to approximately 5000 stockholders. The feature of the list is the number of small holdings of stock ranging from one share upward, and the large number of women stockholders. The growth in the list of stockholders represents gradual distribution, as practically none of the convertible bonds was presented for conversion up to a year and a half ago."

Calgary Municipal Railway, Alberta, Can.—The Calgary Municipal Railway produced a total revenue of $767,726 for the year ended Dec. 31, 1913. Of this amount $741,948 came from car operations. The operating expenses amounted to $575,691, divided as follows: Maintenance of way and structures, $23,408; maintenance of equipment, $73,258; transportation expenses, $427,900, and general expenses, $51,124. After the payment of debenture interest amounting to $71,672, debenture sinking fund payment, $34,008, taxes, $2,452, and rental charges, $982, there was left a surplus of $83,160. Of this surplus $70,267 was carried to the depreciation and replacement account and the balance of $12,893 to the net revenue account. Miscellaneous statistics of the railway for the year included the following: Car miles run, 3,040,214; revenue passengers, 18,355,274; transfer passengers, 6,478,332; average fare per revenue passenger, 3.994 cents; average fare all passengers, 2.952 cents; car earnings per car mile, 24.404 cents; gross earnings per car mile, 24.758 cents, and operating expenses per car mile, 18.918 cents.

Chardon, Jefferson & Meadville Interurban Railway, Cleveland, Ohio.—Permission has been granted by the Public Utilities Commission of Ohio to the Chardon, Jefferson & Meadville Interurban Railway to issue $400,000 of its 5 per cent bonds and $300,000 of common stock. The proceeds secured from the sale of the securities will be used to construct the proposed line between Chardon and Jefferson, a distance of about 10 miles.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio.—The Dayton, Springfield & Xenia Southern Railway has been authorized by the Public Utilities Commission of Ohio to issue its first mortgage 5 per cent bonds, maturing on Oct. 1, 1923, of the total principal sum of $3,500 and its equipment trust certificates, bearing interest at the rate of 6 per cent a year, maturing at the rate of one-tenth each year, of the total principal sum of $12,000, the bonds to be sold for not less than 75.

Empire United Railways, Inc., Syracuse, N. Y.—The Empire United Railways has applied to the Public Service Commission of the Second District of New York for permission to issue $295,000 of 5 per cent first and refunding bonds.

Federal Light & Traction Company, New York, N. Y.—The directors of the Federal Light & Traction Company have authorized, since Jan. 1, expenditures amounting to approximately $583,000, covering additions and improvements that will be completed before the end of the current year. It is stated that a further appropriation of $160,000 will be made to serve new business and to place in effect economies in operation. The company has procured street lighting contracts at remunerative rates, and the Santa Fé shops are being enlarged and will be electrically equipped. A contract for 2000-hp for mining purposes at Trinidad has been closed, which will result in an estimated gross business of $70,000 a year.

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia.—The Fort Dodge, Des Moines & Southern Railroad and its subsidiaries recently filed open end mortgages to the Old Colony Trust Company, Boston, Mass., as trustee to secure first mortgage twenty-five-year gold bonds dated Dec. 1, 1913, as follows: Fort Dodge, Des Moines & Southern Railroad, first mortgage 5 per cent bonds, $4,500,000 authorized; Fort Dodge Street Railway, first mortgage 6 per cent bonds, $100,000 authorized; Central Iowa Light & Power Company, first mortgage 6 per cent bonds, $500,000 authorized. The principal is due on Dec. 1, 1938, but the bonds are redeemable on any interest date at par and interest. Of the bonds of the Central Iowa Light & Power Company, $100,000 are reserved to retire $100,000 of income demand notes which remain out.

Hanover & McSherrystown Street Railway, Hanover, Pa.—The controlling interest in the Hanover & McSherrystown Street Railway is reported to have been purchased by B. W. Frazer & Company, Philadelphia.

Interborough Rapid Transit Company, New York, N. Y.—The directors of the Interborough Rapid Transit Company have declared an extra dividend of 5 per cent on the $35,000,000 of stock, which will make this year's distribution 15 per cent. As all but $1,000,000 of the stock is held by the Interborough-Metropolitan Company, the extra dividend means an addition of $1,700,000 to that company's income, which has hitherto, except when extra dividends were declared, been only sufficient to pay bond interest. In 1912 the operating company declared an extra dividend of 5 per cent and in 1913 one of 2 per cent.

Lincoln Railway & Light Company, Lincoln, Ill.—Frederick Hudson, Charleston, Ill., executor of the Traner estate, and W. H. Mowry, Philadelphia, both bondholders of the Lincoln Railway & Light Company, have filed notice through their attorney that they intend to start foreclosure proceedings, the company having defaulted in the payment of interest due on its bonds. Under the terms of the original trust deed to the American Trust & Savings Bank, Chicago, the holders of 20 per cent of the bonds can at any time take action for foreclosure, by giving the other bondholders thirty days' notice. P. E. Kuhl, Lincoln, has been named as trustee of the company to succeed the American Trust & Savings Bank. Under the terms of the original trust deed it was provided that the holders of 50 per cent of the bonds could at any time name a different trustee. Mr. Kuhl was appointed because he is a local man, familiar with the details of the company.

Madison Light & Railway Company, Madison, Ind.—James R. Magoffin, New York, is offering at a price to yield more than 6 per cent first mortgage 6 per cent gold bonds of the Madison Light & Railway Company due in 1942. The authorized issue is $150,000, of which $90,000 is outstanding. The bonds are in the denomination of $1,000. The Pittsburgh Trust Company, Pittsburgh, Pa., is trustee of the issue.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The directors of the Mahoning & Shenango Railway & Light Company are considering plans to consolidate the half dozen or more subsidiary companies into one corporation to be called the Mahoning & Shenango Valley Electric & Railway Company.

Marion, Bluffton & Eastern Traction Company, Bluffton, Ind.—The Marion, Bluffton & Eastern Traction Company has applied to the Public Utilities Commission of Indiana for permission to issue $504,000 of bonds and $206,000 of common stock.

New Orleans Railway & Light Company, New Orleans, La.—E. H. Rollins & Sons, Boston, Mass., are offering at par and interest to yield 6 per cent $750,000 of New Orleans Railway & Light Company's 6 per cent debentures, dated June 1, 1913, and due June 1, 1916, with optional retirement at 101 and accrued interest on any interest payment date. The debentures are of $500 and $1,000 par value, coupon, with privilege of registration as to principal. They are guaranteed as to principal and interest by endorsement by the American Cities Company, which owns 96 per cent of the common and 87 per cent of the preferred stock of the New Orleans Railway & Light Company. These debentures are authorized to an amount of $4,000,000, of which $3,250,000 have been issued to pay existing construction indebtedness and to provide for new construction during 1914. The remaining $750,000 are reserved to meet the anticipated construction requirements of 1915.

New York (N. Y.) Railways.—On June 15 the Public Service Commission for the First District of New York will hold a hearing, before Commissioner Milo R. Maltbie, on the application of the New York Railways for permission to purchase 4204 shares of the stock of the Twenty-third Street Railway. The company proposed to purchase this stock at $350 a share, or a total of $1,472,000, and to pay for it by the issuance of its 4 per cent first mortgage gold bonds. The Twenty-third Street Railway was operated by the old Metropolitan Street Railway under lease, and this lease was taken over by the New York Railways. Under this lease rental was a sum equivalent to 18 per cent on the par value of the stock of the Twenty-third Street Railway. This stock aggregates 6000 shares of the par value of $100 each, and the annual rental, therefore, amounted to $108,000.

New York, Westchester & Connecticut Traction Company, New York, N. Y.—The New York, Westchester & Connecticut Traction Company, which is controlled by the Third Avenue Railway, New York, has applied to the Public Service Commission of the Second District of New York for permission to reduce its capital stock from $600,000 to $200,000.

Northern Electric Railway, Chico, Cal.—The trustees of the Sloss securities have notified the creditors of the Northern Electric Railway, the Northern California Securities Company, the Vallejo & Northern Railroad and the Valley Syndicate that it will not be possible to pay the interest on the first and consolidated 5 per cent forty-year bonds of the Northern Electric Railway or on any notes secured by the bonds. Coupons on all the underlying bonds are being paid as they mature.

Nova Scotia Tramways & Power Company, Halifax, N. S.—The bill incorporating the Nova Scotia Tramways & Power Company has been passed by the Nova Scotia Legislature with a number of amendments. As the bill stands the capital of the company is $6,000,000, and in addition to absorbing the Halifax Tramways the new company is also authorized to acquire the power sites and rights on the Gaspereaux River owned by the Nova Scotia Light & Power Company. It is agreed that the yearly payment to the city of Halifax shall never be less than that paid in 1913 by the Halifax Tramways and that the rates for light and power shall never be increased above those paid at the present time. The fares now charged on the local railway are not to be increased and in addition workmen's tickets at a price of eight for 25 cents are to be sold in the future. All points at issue are to be referred to the Public Utilities Commission for settlement.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The following notice has been sent to the stockholders of the Oakland, Antioch & Eastern Railway: "The directors of the Oakland, Antioch & Eastern Railway have levied an assessment of $2 a share on the capital stock of the corporation, payable on July 3, and a further assessment of $1.50, payable about Oct. 1, 1914, and $1.50 payable on Jan. 1, 1915. After careful consideration, the opinion of the directors is that this will finance the needs of the railroad. For the first quarter gross earnings, despite general unfavorable conditions, were: March, $47,000; April, $48,900; May (estimated), $52,000. There are $1,350,000 bonds in the treasury of the corporation authorized by the Railroad Commission. The largest stockholders have decided that they would prefer to pay an assessment on their stock rather than endeavor to put these bonds out under the present unfavorable conditions and burden the company with high interest charges. Heretofore assessments to furnish capital have been considered unnecessarily conservative; but the directors of the Oakland, Antioch & Eastern Railway believe that assessments levied for capital improvements and additions and not for deficits or loss, will be, before long, considered the soundest foundation for any corporation to build on. In order that the stockholders may share this understanding, a physical valuation is being made by Bion J. Arnold, as well as a consolidated audit of the companies by Price, Waterhouse & Company which, when completed in the near future, will be distributed to stockholders."

Ottawa (Ont.) Electric Railway.—The Ottawa Electric Railway has called for payment $15,000 of 4 per cent debenture bonds issued under the mortgage dated June 29, 1897. The bonds will be paid at par and interest on July 5, 1914, at the office of the company in Ottawa.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has issued a circular to stockholders outlining a plan of financing and requesting the approval of a charter amendment for the re-classification of the capital stock into $100,000,000 of common, $50,000,000 of first preferred 6 per cent cumulative and $10,000,000 of present preferred. The stockholders will have the right to subscribe to an immediate issue of $12,500,000 of new preferred at $82.50 a share. The right is extended to holders of the old issue of $10,000,000 of preferred stock to receive after July 1, 1916, 10¼ shares of new preferred for ten shares of old preferred. The proceeds from the sale of new preferred stock will be applied toward the payment of one-year notes amounting to $7,000,000 and other indebtedness, leaving approximately $2,500,000 in the company's treasury. The company controls the Sacramento Electric, Gas & Railway Company.

Sioux City (Ia.) Service Company.—The First National Bank, Milwaukee, Wis., is offering at 97 and interest first and refunding mortgage sinking fund 5 per cent gold bonds of the Sioux City Service Company, dated 1910, and due June 1, 1928. The amount of the bonds outstanding under this issue is $1,378,000. The company was formerly known as the Sioux City Traction Company. It operates 45 miles of line and supplies power for industrial and lighting purposes.

United Railways & Electric Company, Baltimore, Md.—The stockholders of the United Railways & Electric Company have authorized the issue of $1,000,000 of 5 per cent convertible notes which were recently offered and oversubscribed. The stockholders also authorized the sale of $489,000 of 5 per cent bonds of the Maryland Electric Railways now in the treasury of the company. It is stated that the stockholders of the United Railways & Electric Company took all of the notes to which they were entitled, leaving only about $100,000 to be divided among non-stockholding subscribers. The subscriptions from non-stockholding subscribers totaled several million dollars and the bankers, Alexander Brown & Sons, threw out all bids for lots of more than $10,000, while those who asked for less than $10,000 and more than $1,000 were awarded from one-tenth to one-twentieth of the amount requested. The Public Service Commission on June 5 heard the application of the United Railways & Electric Company for permission to issue the $1,000,000 of two-year notes, which have already been sold subject to the approval of the commission. The commission reserved its decision.

Warren, Brookfield & Spencer Street Railway, Brookfield, Mass.—The property of the Warren, Brookfield & Spencer Street Railway was offered for sale at Brookfield on June 4, under foreclosure of the mortgage, for which the International Trust Company, Boston, Mass., is trustee. The upset price of the property was fixed at $150,000, but no bids were made. The property will be offered again on July 16. H. N. Lathrop, president and general manager of the Plymouth & Sandwich Street Railway, Plymouth, Mass., stated before the adjournment of the sale that parties he represented would bid for the property provided the minimum price to be received for it by the receiver was reduced by the court. Thomas T. Robinson, Boston, the receiver, is reported to have stated that he does not favor a modification of the court's decree with respect to the selling price.

Dividends Declared

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, preferred.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Continental Passenger Railway, Philadelphia, Pa., $3.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Indianapolis (Ind.) Street Railway, 3 per cent.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¾ per cent.

New Orleans Railway & Light Company, New Orleans, La., 1¼ per cent, preferred; 50 cents, common.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1¾ per cent, common, 2½ per cent, 5 per cent non-cumulative preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Union Traction Company, Philadelphia, Pa., $1.50.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD COMPANY, WHEATON, ILL.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$149,756	*$104,010	$45,746	$33,345	$12,400
1 " " '13	146,266	*95,923	50,344	32,735	17,609
10 " " '14	1,669,962	*1,071,008	598,954	343,043	255,911
10 " " '13	1,602,216	*956,167	646,049	322,062	323,987

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$31,896	*$17,317	$14,579	$11,005	$3,574
1 " " '13	29,683	*16,501	13,182	10,607	2,575
4 " " '14	115,833	*66,498	49,336	43,789	5,547
4 " " '13	110,307	*64,306	46,000	41,727	4,273

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$99,627	$60,562	$39,065	$32,190	$6,875
1 " " '13	94,941	57,567	37,374	31,238	6,136
4 " " '14	373,925	239,493	134,433	128,143	6,290
4 " " '13	354,933	231,044	123,889	124,213	†324

DETROIT (MICH.) UNITED RAILWAY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$1,009,588	$682,897	$346,502	$179,533	$166,969
1 " " '13	1,063,666	687,012	376,653	179,882	196,771
4 " " '14	3,864,029	2,660,615	1,203,414	721,055	402,359
4 " " '13	4,035,876	2,671,773	1,364,103	717,294	646,808

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$109,199	*$75,175	$34,025	$35,287	†$1,262
1 " " '13	102,229	*71,694	30,535	35,063	†4,528
4 " " '14	410,161	*878,244	131,816	140,906	†9,090
4 " " '13	386,166	*260,263	135,903	139,891	†13,988

NEW YORK (N. Y.) RAILWAYS

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$1,180,514	$733,840	$446,674	$371,949	$74,725
1 " " '13	1,202,761	743,173	482,170	375,770	106,400
10 " " '14	11,806,187	7,287,075	4,519,112	3,708.666	810.446
10 " " '13	12,025,770	7,270,817	4,754,953	3,765,138	989,716

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$287,719	*$173,322	$114,397	$50,331	$64,066
1 " " '13	238,546	*154,621	83,926	45,214	38,712
4 " " '11	1,080,884	*668,302	412,582	200,155	212,427
4 " " '13	925,727	*582,406	343,321	180,296	163,025

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Apr., '14	$743,578	$386,032	$357,546	$225,063	$132,483
1 " " '13	697,429	350,659	346,770	231,458	115,312
4 " " '14	2,920,604	1,603,032	1,317,572	900,448	417,124
4 " " '13	2,733,883	1,446,037	1,287,846	929,595	357,951

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*Includes taxes.
†Deficit.

Traffic and Transportation

"Safety First" Banquet in Indiana

The fourth semi-annual "safety first" banquet of the Union Traction Company of Indiana, held at the Hotel Doxey, Anderson, Ind., on the evening of May 22, was attended by nearly 100 trainmen and officials. H. A. Nicholl, general manager of the company, was toastmaster, and in the absence of A. W. Brady, president of the company, J. A. Van Osdel was first to respond. Others who spoke were R. N. Hemming, superintendent of motive power; G. H. Kelsay, superintendent of power; W. H. Forse, Jr., secretary-treasurer, J. E. Hester, Anderson; C. O. Balfour, Indianapolis; Joseph Overman, Marion; Frank Smith, Muncie, and W. W. Fadely, Tipton. All the men took as their subject some phases of "safety first." During the evening several selections were sung by a quartet of employees of the company.

E. E. Slick, the claim adjuster, was chairman of the board of judges in the essay contest in which essays from employees were submitted on the subject of "Prevention of Accidents to Passengers," but the selection of the papers was made by the other members of the contest board, which consisted of J. E. Hester, general shop foreman; M. E. Graston, division passenger and freight agent; G. Graham, division shop foreman; A. Newhouse, division shop foreman, and A. A. Dunlap, division engineer.

The safety organization of the company consists of a general safety board made up of the operating officials of the company and five local safety committees, located at the different division points. These committees are made up of the division superintendents of the transportation, roadway, power and motive power departments, whose tenure of office is permanent, and of employees from the above departments and the general offices of the company to make the number of fourteen or fifteen for each committee. These members are changed every six months. The chairman of the local safety committees are appointed by the general manager, but a secretary is elected by each committee. The semi-annual banquets, in which the members of the general safety board and all members of the local safety committees participate, have proved very effective in promoting good fellowship and co-operation among all departments. In July or August, two separate days will be set aside for the third annual picnic, at which all employees are expected to be present.

To stimulate interest by its trainmen the company determined to offer for the best three papers written on the subject of "Prevention of Accidents to Passengers" a first price of $15, a second of $10 and a third of $5. The contest was open to all motormen, conductors and brakemen in good standing and the essays were to consist of not less than 150 and not more than 300 words. Each local safety committee selected one of its number as a judge of the contest, and the committeemen thus selected, in conjunction with Mr. Slick, as chairman, constituted the contest board to pass on all articles presented, and on all subjects of dispute.

The essay of Harley G. Hook, a conductor on the interurban division of the company who was awarded the first prize, was as follows:

"For the prevention of avoidable accidents to passengers, as far as the passenger-carrying company is concerned, efficient and responsible men imbued with the safety-first idea are an absolute necessity.

"Men must be selected for training in the passenger service, in whom efficiency and responsibility can be developed in a high degree, hence their selection is a matter of careful discrimination.

"The strict and careful adherence to duty that can result only in the formation of habits that prepare the trainman to carry out his work with machine-like precision, is his first care.

"This line of action brings about the complete co-operation of hand, brain and eye that makes the efficient man. This state of development, however, presupposes temperate living.

"Under any other condition the highest degree of efficiency is impossible, and lack of efficiency is lack of responsibility, and irresponsibility means loss of life, limbs and material valuation. Trainmen of conscience and Christian character, never take a chance with the lives of others. A man of this degree of development in his business will know the condition of the mechanism he has to operate, will know how to act in an emergency and will work in accord with those with whom he is associated."

The essay by John E. Hancock, a motorman on the interurban division, who was awarded the second prize, was as follows:

"The prevention of accidents lies in the mental power and action of man; concentration of power and ability to succeed are equal to the foundation for stability of character. Worry, excitement, or anything else which tends to disturb the mind, would be detrimental to successful concentration. With effort of will, we can shut out annoying impressions. This may seem hard to do, yet it is an accomplishment worth cultivating. The impression may be so strong as to hold attention against the resisting efforts of the will. However concentration necessarily limits the range of thought and action within the scope of mental vision, and confines one's acquirements closely to a specialized field.

"Difficulties are only stimulants to intelligence. The word impossible is often a mere call to sacrifice strength and endurance; in other words, our greatest accomplishments were considered to be impossible of achievement at one time.

"The experiences or acts of to-day furnish food for thought for to-morrow, and we should profit thereby; whether it is the acts of others or our own deeds. If they are bad, improve them; if they are good make them better. We should not allow ourselves to think what is, will be, and so cannot be improved.

"We should never allow our minds, or range of vision, to wander beyond the territory of the position which we are filling. We should look after the interest and welfare of the passengers the same as we would the members of our family. We are responsible for their safety so long as they are in our care. Remember, we can bring cheer and happiness to many homes instead of sorrow, if we only do our duty. We must strictly adhere to all rules and regulations, be loyal to our passengers, our company and ourselves. Accidents will then vanish and safety reign supreme."

The essay by Joseph R. Finn, a motorman on the city lines of the company who was awarded the third prize was as follows:

"To determine the best means of preventing accidents, we must first learn the cause of all accidents. Strictly speaking, there is no such thing as an accident, for there cannot be an effect without a cause. All causation is mental first, last and all the time. Thought must precede all cause and action. A motorman can best help to prevent so-called accidents first by getting on good terms with himself, by leading an honest, straightforward, sober, clean life.

"No one can be an efficient workman if he is at war in his thought with anyone. Second, a workman must look on the officials of the road as co-workers in bringing out the service for the public and all other employees in the same sensible way. No man can do first-class work if he looks at his job from a personal or selfish standpoint. Having got our basis right, we must necessarily be in a harmonious state of thought. Being in a harmonious state of thought, we are in a mental condition to detect anything wrong and know how to prevent bad results. If a man is in a resentful, angry, hating state of thought, he cannot see bad conditions, but, on the contrary, is actually helping to make the conditions that cause accidents. Whatever a man does, he must give his undivided attention to it if he wishes to succeed. If a man cannot succeed in the small thing pertaining to his duty, he surely can never advance to larger things."

The names of the general safety board of the company follow: William H. Forse, Jr., secretary and treasurer; H. A. Nicholl, general manager; Walter Shroyer, auditor; S. R. Dunbar, purchasing agent; E. E. Slick, claim adjuster; C. A. Baldwin, superintendent of transportation; F. D. Norviel, general passenger and freight agent; C. H. Allen, real estate and tax agent; G. H. Kelsay, superintendent of power; R. N. Hemming, superintendent of motive power, and L. A. Mitchell, superintendent of track and roadway. The chairman of the board is H. A. Nicholl. S. R. Dunbar is secretary.

Increase in Fare on Kentucky Line

At least one electric railway in Kentucky will gain an advantage from the new State law designed to reduce the cost of travel, when that law goes into effect on June 20. Heretofore the average rate on the 70 miles of interurban lines of the Kentucky Traction & Terminal Company, Lexington, Ky., has been 2 cents a mile. After June 20, according to an announcement just made by the company, the rate will be increased to 2½ cents. The lines of the company connect Lexington, Paris, Georgetown, Nicholasville, Versailles and Frankfort.

The law will have the effect of reducing the cost of travel on the steam roads, but on the lines of the Kentucky Traction & Terminal Company it will mean, for instance, additions of 5 cents to the fares from Lexington to Georgetown, Versailles, Nicholasville and Paris. The rate to Frankfort has always been on the basis of 2½ cents a mile. Short rides, which have heretofore been charged for as a 5-cent fare, will, under the new law, yield the company 10 cents, the minimum fare which may be paid. Fares have been more or less arbitrary between certain points heretofore, but are to be made to conform exactly to the distances the passengers are carried.

The company heretofore has made an extra charge for carrying baggage other than hand baggage, but under the new law will have to carry up to 150 lb. for each passenger so desiring, free of charge. This phase is not expected to make much difference, for the lines have done very little baggage carrying under the former provisions when the total cost of travel, including the extra charge for baggage, was less than that on the steam lines.

The law applies to railroads which exceed fifty miles in length and earn $4,000 gross or more a mile.

Economy Prize Contest Awards

Edwin C. Faber, vice-president and general manager of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has announced the prize winners in the contest for suggestions for the elimination of waste and the adoption of practices which would tend to greater economy in operation. The contest was first announced in a personal communication from Mr. Faber to each of the employees of the company. An abstrict of this communication setting forth the objects of the contest appeared in the ELECTRIC RAILWAY JOURNAL for March 7, page 561. The competition closed on April 1. Sixty-two employees contributed papers and suggestions. These were judged by a committee consisting of three employees, one department head and one senior officer. A total of 175 separate suggestions was received. These were so keyed before delivery to the committee that the identity of the writers was unknown to the committee. In a number of cases investigations were necessary and data were compiled to obtain more exact knowledge of the true value of the suggestions. On account of the difficulty in deciding between some of the suggestions, the committee requested and was granted permission to award four additional prizes of $5 each. In all, $170 was divided into fifteen prizes. The first prize was $50, the second prize $25, and so on down in steps of $5, with ten prizes of $5 each.

In announcing the winners Mr. Faber wrote:

"You will readily appreciate that all of the suggestions cannot be carried out because some would involve an expenditure wholly out of keeping with the saving to be effected, but the spirit of loyalty and helpfulness displayed in this contest is very gratifying to the company and we believe it will lead to further campaigns along similar lines."

The prize winning suggestions were as follows:

Suggests shop experience and instruction for motormen while breaking in.

Suggests method of fare collection to prevent over-riding between Fifty-second Avenue and Fifth Avenue Terminal in Chicago.

A new collection system for Elgin Light & Power department.

A checking system for shop tools.

System for stopping illegitimate use of O.K'd cash fare receipts.

Suggests a system of inspection and marking for ties which should be removed from service.

Suggests replacement of certain obsolete electric meters.

Improved method of handling wire and cable in storeroom.

Oil lanterns and markers to be burned only while needed.

City cars not to delay at end of lines.

Extra brasses for Chicago cars to be kept at Aurora and Elgin terminals.

Air hose on cars to be hung up properly.

Use of hedge fence for snow fences.

Pit lights in shops to be turned out when not needed.

Saving twine and using old reports for scratch pads.

The winner of the first prize made the suggestion that "when a new motorman has finished going over all the lines and is ready to accept the responsibility of the position for which he has applied, he should be placed under the instruction of the shop foreman. The shop foreman would explain to him during a short course of study the mechanism of the different types of cars in service, what the different parts are called, what and what not to do in case of car becoming disabled, what might happen in case of the abuse of different parts, what it costs this company annually for flat wheels and how to avoid them, how to start a car without causing a destructive rush of current to the motors, how to operate cars in snow, sleet and flooded streets without damage, how to save current on curves, etc., and what it costs annually for sand, its purchase, shipment, and the drying of same, and how and when to use it without waste."

New Kansas Road Ready for Operation.—The first car run over the Kansas City, Kaw Valley & Western Railway left Kansas City on the morning of June 6, carrying officers of the company. Regular service will begin on June 15. Power will be secured from the municipal plant in Kansas City, Kan.

Record Traffic in Kansas City.—More than 400,000 passengers were carried by the Metropolitan Street Railway, Kansas City, Mo., on Decoration Day, May 30, setting a new record for the day. This number was handled with only one accident. This occurred to a newsboy who attempted to board a moving car.

Liquor Advertisements Barred From Cars.—Orders have been issued canceling all liquor advirtisements in cars of the West Penn Traction Company, Pittsburgh, Pa., which operates throughout the coke region. The company is strictly enforcing the rule against drinking by employees, and the officials decided that in view of their attitude in this matter it was not consistent to accept liquor advertising.

Accidents in New York in April.—Reports of accidents on railroads and street railroads in New York City during April, made to the Public Service Commission for the First District, show that the total number was 5352, which is a decrease of nearly 400 from the same month last year. The total number of injuries decreased from 3827 to 3310, and the number killed increased from four to nine, although the total of serious injury cases, 200, was sixteen less than in the same month last year.

Railway and Real Estate Companies Co-operate.—The Topeka (Kan.) Railway is co-operating with real estate concerns of the Kansas capital by utilizing its advertising space to urge residents to locate as far out as possible. The company's advertising explains that a number of advantages are available in the suburbs, such as low taxes, better air and more room. It concludes by asserting that the suburbs are as convenient as homes in the central part of the city because of the rapid and reliable street railway service.

Safety Campaign in Ottawa.—The Ottawa (Ont.) Electric Railway has started a "safety first" campaign in Ottawa. Permission has already been obtained from the school boards to hang "safety first" calendars, such as are used in Brooklyn, N. Y., in each classroom, and arrangements have been made with moving picture houses to run "safety first" films. The Montreal Tramway's campaign will be followed in a modified form by educating and instructing the company's employees, obtaining the assistance of the newspapers and attempting to educate the public generally along "safety first" lines.

Canadian Fare Reduction Petition Dismissed.—The application of Mayor Baillie, of Aylmer, Ont., made to the Railway Commission of Canada, on behalf of the town of Aylmer for a reduction of the fare between Hull and Aylmer on the Hull (Que.) Electric Railway, has been dismissed by the board. Mayor Baillie told the board that there were 400 people in Aylmer who work in Ottawa all the year round and that the number would be increased if the fares were reduced. E. W. Beatty, representing the company, contended that the fares per mile on the Hull Electric Railway are lower than on many other similar roads in Canada and the United States. He also explained that the company pays a dividend of only 3.7 per cent. Gordon Gale, general manager for the company, took exception to the statement of Mayor Baillie that 400 people travel daily into Hull from Aylmer.

"Safety First" League in Louisville.—At the last meeting of the directors of the Louisville (Ky.) Railway a fund of $35,000 was set aside to be expended in "safety first" work under an original method. Every one of the 1050 motormen and conductors in the company's employ who joins the "safety first" league which the company intends to organize will share in this fund at the rate of 1 cent an hour for the time he is actually at work. All the company's lines are affected, namely the city lines, the Louisville & Interurban lines and the Louisville & Eastern Electric Railway. The distribution of the fund became effective on June 1, and the fund will be sufficient to keep the plan in operation for the remainder of the fiscal year. It was not so stated but it is understood that the arrangement, provided it proves reasonably successful this year, will be continued in succeeding years. Actual organization of the men will follow at once, according to Samuel Riddle, superintendent of the company. It is intended that much of the work shall be done through committees.

The Louisville Disbarment Case.—The members of the firm of Louisville, Ky., attorneys recently accused by Judge Field of the local Circuit Court at Louisville of practices which if proved, meant disbarment, have thrown themselves on the mercy of the court. Responses filed when the case was originally called denied that the attorneys were guilty of acts charged. This meant a trial by jury. The formal responses were withdrawn recently and the attorneys, who have been prominent in suits for damages against the Louisville Railway, each filed his statement with the court. The members of the firm are all young men and the firm has been remarkably successful in getting judgments from juries. The following extract from the statement of one of the accused attorneys is characteristic of the statements filed by the other members of the firm. "If it be unprofessional to solicit business or to lend money to an injured person having a family and unable to work, then my firm and a large portion of the lawyers at this bar are guilty of such conduct. . . . Lawyers much older than I have for many years set the example of soliciting business and rendering financial aid to their clients."

Hearing in Cincinnati Suburban Fare Case.—The hearing on the injunction case of the Ohio Traction Company and the Cincinnati & Hamilton Traction Company against the city of Cincinnati, to prevent the latter from putting into force a 5-cent fare ordinance on the Millcreek Valley line between Cincinnati and Hartwell, was begun before Federal Judge John E. Sater on June 8. In closing the arguments Attorney Lawrence Maxwell, for the companies, stated that the enactment of the ordinance fixing a fare of 5 cents is an unlawful attempt to force the companies to make a reduction. He said that fraud is shown upon the face of the instrument. Mr. Maxwell contends that the county commissioners have a right to grant perpetual franchises on all roads lying within a municipality when they have control of them, as they did in this case. According to him the franchises held by the company were, with one or two exceptions, all granted by the County Commissioners. City Solicitor Schoenle contended that the franchises granted by the County Commissioners are not valid. He declared further that the commissioners had no right to grant perpetual franchises and no right to grant franchises on portions of road lying within the corporate limits of a municipality. According to him the companies have no franchises on the Springfield pike to Wyoming through Hartwell. Walter A. Draper, vice-president of the Ohio Traction Company, stated that a total of more than $450,000 has been spent on the road between the Cincinnati Zoo and Carthage.

Personal Mention

Mr. C. O. Mailloux has had the degree of Doctor of Science conferred on him by Lehigh University.

Mr. Louis B. Stillwell has had the degree of Doctor of Science conferred on him by Lehigh University.

Mr. R. M. Hannaford, assistant chief engineer of the Montreal (Que.) Tramways, has been elected second vice-president of the Canadian Railway Club.

Mr. C. N. Wilcoxon, who for the last four years has been general manager of the Chicago, Lake Shore & South Bend Railway, was elected president of the company at the annual meeting, held at Michigan City, Ind., on June 8.

Mr. Howard Griswold, formerly assistant engineer for the San Francisco-Oakland Terminal Railways, Oakland, Cal., has been made mechanical and electrical engineer for the Central California Traction Company, with headquarters at Stockton.

Mr. J. V. Sullivan, formerly general supervisor of the Chicago (Ill.) Railways, has resigned that position to become assistant to Mr. John E. Wilkie, vice-president of the Chicago Railways and assistant to L. A. Busby, president of the Chicago Surface Lines.

Dr. Harold Pender, at present professor of electrical engineering at the Massachusetts Institute of Technology and director of the research division of the department of electrical engineering, has accepted an invitation to become professor in charge of the department of electrical engineering at the University of Pennsylvania and will take up his new duties next fall.

Mr. Alva C. Dole has been appointed superintendent of the Elmwood division of the Rhode Island Company, Providence, R. I., to succeed the late A. Frank Searle. Mr. Dole became connected with the Rhode Island Company last Noember and was assigned to the Clyde carhouse, which embraces all of the car lines in the Pawtuxet Valley, including the Providence-Washington, Phenix-Rocky Point, and the Crompton-Hope lines. Prior to last November he was superintendent of the Providence & Fall River Street Railway for five years, with headquarters at Swansea.

Mr. James Walter Gillette, formerly general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark., has accepted the position of sales engineer for the Electrical Engineers' Equipment Company, Chicago, Ill. Mr. Gillette was born on June 28, 1871, and was educated in the Middle West. He has had extensive engineering experience with electrical manufacturing companies and central station companies both in the United States and in South America. At the sixth annual convention of the Arkansas Association of Utility Operators in May, 1913, he was elected president of that body.

Mr. Paul Breese has been appointed superintendent of the Clyde division of the Rhode Island Company, Providence, R. I., to succeed Mr. Alva C. Dole. Mr. Breese has been with the Rhode Island Company since 1900, excepting for an interval of one year. He was first employed as a motorman in 1900, and in 1902 he went with the Berkshire Street Railway. In 1901 he was inspector for about a year. Mr. Breese returned to Rhode Island in 1903 and worked as conductor. For about five years he was engaged in special work and was in charge of the construction car. He has been a conductor on the East Greenwich line for the last two years.

Mr. A. D. Schindler has resigned as vice-president and general manager of the Northern Electric Railway, Chico, Cal., to devote himself to his private interests in southern California. Mr. Schindler has been connected with the Northern Electric Railway since July, 1906. Prior to that time he was with the Pacific Electric Railway. He was previously connected with the Spreckles interests in San Diego. He also served for three years with the engineering forces of the steam railroads in Washington, which are now part of the Great Northern System. Before that he was connected with the Southern Pacific Company in Arizona for twelve years as a civil engineer.

Mr. B. J. Jones, who has been manager of the Steubenville & East Liverpool Railway & Light Company, the East Liverpool Traction & Light Company and the Ohio River Passenger Railway, East Liverpool, Ohio, will continue to manage the Steubenville & East Liverpool Railway & Light Company and the Ohio River Railway. Mr. Jones became connected with the properties at East Liverpool on Nov. 1, 1913, to remain only during the receivership, which was terminated on April 1. The owners of the properties at East Liverpool have decided to separate them, and have appointed Mr. F. A. Nichols, Buffalo, as manager of the East Liverpool Traction & Light Company.

Mr. C. B. King, who has been elected president of the Canadian Electric Railway Association, was born in Galena, Ind., on Sept. 12, 1871. He attended the public schools at New Albany, Ind., and was graduated from the high school there in May, 1891. Mr. King began work in the shops of the Louisville (Ky.) Railway in June, 1891, and shortly afterwards was appointed storekeeper, which position he held till April, 1895, when he accepted the office of chief clerk to the general manager of the Detroit Citizens' Street Railway. This company was reorganized in 1900 as the Detroit United Railway with practically the same officers as the Detroit Citizens' Street Railway, and Mr. King continued with the new company as assistant division superintendent and assistant to the president until November, 1905, when he was appointed manager of the London (Ont.) Street Railway, which position he still holds.

Mr. Robert Patterson Woods, who recently was appointed to the board of control of the Metropolitan Street Railway, Kansas City, Mo., representing the city to succeed Mr. L. R. Ash, subject to ratification, was born at Buffalo, N. Y., on March 4, 1870. From 1891 to 1901 Mr. Woods was connected with a number of bridge, waterworks and sewer projects for various corporations. In 1900 he was chief engineer in charge of construction of the Wabash River traction line. In 1901 he held the same position in connection with the building of the Indianapolis-Shelbyville line. From 1902 to 1904 he was with the Indianapolis & Northwestern Traction Company as chief engineer. In 1904 he became consulting and construction engineer in charge of the design and construction of the Lebanon-Thorntown Electric Railway, Lebanon, Ind. He is at present vice-president and general manager of that company. A 10,000-acre electric pumping project at Portales, N. M., engaged Mr. Woods' attention after he had completed the Indianapolis & Western lines in 1908. From May, 1911, to June, 1913, he was chief engineer for the Kansas City, Clay County & Excelsior Spring Railway. Mr. Woods is the author of a number of technical papers on engineering. He served two terms as president of the Indiana Engineering Society. His home is in Kansas City and he maintains offices in that city and in the Traction Terminal Building, Indianapolis.

Mr. A. L. Valentine, superintendent of the department of public utilities of the city of Seattle, Wash., which includes the municipal street railway and the division of weights and measures, was born in Fontanelle, Adair County, Ia., on June 18, 1868. He went to California with his parents in 1875, and soon thereafter settled in Seattle with his uncle. Mr. Valentine's education was obtained in the Seattle public schools. In 1886 he was employed by the Puget Sound & Grays Harbor Railroad as a member of the surveying party. From 1887 to 1890 he was employed in the office of the city engineer of Seattle. Later he was associated with the Port Townsend Southern Railroad as engineer in charge of terminals, and subsequently was associated with the Northern Pacific Railway in connection with the Seattle terminals. From 1892 to 1897 he was assistant engineer of the Oregon Improvement Company and chief clerk to the superintendent of the Columbia & Puget Sound Railroad, a subsidiary of the Oregon Improvement Company. In 1897 he was employed by the Northern Pacific Coal Company, but re-entered the employ of the Oregon Improvement Company in the fall as manager of its store at Franklin, Wash., where he remained until 1899. During the summer of 1899 he was employed on engineering work by the Great Northern Railway. In the following year he went to Nome, Alaska, where he resided three years. In 1904 Mr. Valentine was elected to the office of county engineer of King County, Wash. In 1906 he was re-elected to the position of county engineer. He was appointed to the position of superintendent of public utilities on Sept. 29, 1909, by Mayor John F. Miller to fill an unexpired term, and on Jan. 1, 1910, he was appointed for a full term of three years. He was reappointed for a term of three years on Jan. 1, 1913, by Mayor George F. Cotterill. During 1912 Mr. Valentine was chairman of the Board of Public Works of Seattle.

OBITUARY

Spencer Swain, vice-president of the Heywood Brothers & Wakefield Company, died on June 7 at his home in Harrison, N. Y.

Edward Brill, vice-president and treasurer of The J. G. Brill Company, died of pneumonia at his home in Atlantic City, on June 7, after a short illness. Mr. Brill was born in Philadelphia and was the third and, at the time of his death, the only remaining son of John George Brill who, with his eldest son, George Martin Brill, founded the business in 1868. He was educated in the public schools of Philadelphia and started with the company in 1880 as timekeeper at the old plant at Thirty-first and Chestnut Streets. He rose through several departments to become head of the lumber department in 1888. This office he retained until 1906, when he was elected treasurer and remained in charge of the financial affairs of the company until his death. In 1912 he was in addition elected vice-president. Mr. Brill always took a great interest in financial affairs. He was possessed of a remarkable memory for details and a keen faculty for exactness. In addition to being vice-president and treasurer of The Brill Company he was a director and treasurer of the John Stephenson Company, Elizabeth, and the American Car Company, St. Louis; assistant treasurer and director of the Wason Manufacturing Company, Springfield, and he was also a director of the G. C. Kuhlman Car Company, Cleveland.

Jacob Furth, president of the Puget Sound Traction, Light & Power Company, and the Puget Sound Electric Railway, Seattle, Wash., and one of the foremost financiers on the Pacific Northwest, died at his home in Seattle on June 2. Mr. Furth was born in Schwihau, Bohemia, on Nov. 13, 1840. He was one of ten sons and attended the schools of his native country until he reached the age of fourteen. In 1858 Mr. Furth settled in Nevada City, Cal., where he obtained employment as salesman in a mercantile establishment. Shortly thereafter he opened a small store at North San Juan, Cal. In 1870 he removed to Colusa, Cal., where he conducted a general store for twelve years. In 1882 he removed to Seattle. In the fall of 1883 Mr. Furth and others organized the Puget Sound National Bank. Later he was elected president of the institution, which soon grew to be the largest and strongest bank in the city. In 1899 Stone & Webster, Boston, began negotiations toward consolidating the light and railway properties in Seattle and enlisted Mr. Furth's assistance. He was financially interested in the Madison Street cable line and also the First Avenue cable system. As a result of negotiations covering several months, a merger was consummated which included all the street railways. Mr. Furth was elected president of the system, first known as the Seattle Electric Company, and now incorporated as the Puget Sound Traction, Light & Power Company. Mr. Furth's benefactions to Seattle were many and far reaching.

In his annual report as president of the Public Service Company of Northern Illinois Samuel Insull refers to the new Public Utilities Commission of Illinois. He also describes at length welfare work for employees in which the company has engaged. Mr. Insull says that the new Illinois commission law "will doubtless cause some operating inconvenience for a time, but no serious difficulties are anticipated, and the ultimate result should be beneficial both to the public and to the company. The company's service is rendered in fourteen counties and in 144 municipalities, with varying ordinance requirements, and eventually regulation by one body must naturally tend toward a larger degree of uniformity. A service annuity system to make provision for faithful employees was put into effect on Dec. 1, 1913. It is administered by a committee of five composed of the president of the company as chairman, the secretary of the company as secretary, ex officio, and three other members to be appointed annually by the board of directors.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Wilmington & West Chester Railway, Wilmington, Del.—Application for a charter has been made by this company in Delaware to build an electric railway from the present end of the Washington Street line of the Wilmington & Philadelphia Traction Company on the Boulevard to Concord Avenue. It is expected to eventually extend this line to Lombardy cemetery on the Concord turnpike in Wilmington. Capital stock, $6,000. Incorporators: William A. Heindle, Alfred W. Burke, Joseph A. Berndt, Julius Theobold and David L. Ott. [E. R. J., May 30, '14.]

***Kansas City (Mo.) Railways.**—Incorporated in Missouri to succeed the Metropolitan Street Railway, Kansas City, if the proposed franchise extension is granted. Capital stock, $100,000. Directors: Frank Hegeman, Chester H. Smith, Clyde Taylor, Kenneth W. Tapp, A. B. Sayre, J. W. Murray, R. J. Clark, James B. Welsh, E. E. Ball, S. R. Freet and J. A. Harden.

***Grand Falls (N. B.) Electric Railway.**—Incorporated by the New Brunswick Legislature to build an electric railway in Grand Falls, N. B.

***Nova Scotia Tramways & Power Company, Halifax, N. S.**—Incorporated in Nova Scotia by the Nova Scotia Legislature to take over the Pictou County Electric Company with its electric railway, and the Halifax Electric Tramway Company, Halifax.

FRANCHISES

Fresno, Cal.—John B. Rogers, promoter of the Fresno Interurban Railway, has bought a franchise from the Council to build a short line within the city limits of Fresno from the city corporate line to Belmont Avenue, Fresno.

New Haven, Conn.—The Connecticut Company has received three of the five petitions for permission to relocate its tracks in different towns in Connecticut. The petitions granted were for relocations in East Hartford, Bridgeport and Hartford.

Wilmington, Del.—The Wilmington & West Chester Railway, the incorporation of which is noted above, will ask the Council for a franchise to build an electric railway from the present end of the Washington Street line of the Wilmington & Philadelphia Traction Company on the Boulevard to Concord Avenue in Wilmington.

Miami, Fla.—B. B. Tatum, representing the Miami Traction Company, has asked the Council for a franchise to build a 2½-mile trackless trolley line in Miami.

Freeport, Ill.—The Freeport Railway & Light Company has asked the Council for a franchise to extend several of its lines in Freeport.

Greenville, Ky.—The Central City, Greenville & Drakesboro Railway has received a franchise from the Council in Greenville. This is part of a plan to build an electric railway to connect Central City, Drakesboro, Greenville, Hillside, Brownsville, Mercer, Powderly, Bevier and Graham. W. H. Netherlands, Central City, is interested. [E. R. J., May 9, '14.]

Louisville, Ky.—Action on the measure to create a franchise for the extension of the Chestnut Street line of the Louisville Railway has been deferred by the Board of Aldermen of Louisville, to which body the measure was sent after its passage by the Councilmen. The Aldermen's Committee asked for further time on the measure.

Brockton, Mass.—The Bay State Street Railway has received a franchise from the Council to extend its tracks in Brockton.

Tonawanda, N. Y.—The Frontier Electric Railway has received from the Board of Aldermen a six months' extension of time on its franchise in which to begin the construction of its line in Tonawanda. James S. Simmons, Niagara Falls, vice-president. [E. R. J., March 21, '14.]

Wilmington, N. C.—The Tidewater Power Company has received a franchise from the Council to extend its line out on Red Cross Street to Oakdale cemetery and also to make certain changes on Princess Street in Wilmington.

Cape Breton, N. S.—The Cape Breton Electric Company has received a franchise from the Cape Breton County Council for an extension to New Waterford.

Sharon, Ohio.—The Mahoning Valley Street Railway has received a franchise from the Council to extend some of its lines in Sharon.

Dunnville, Ont.—The Dunnville, Wellandport & Beamsville Electric Railway has received an extension of six months on its franchise for the completion of the line under construction in Dunnville.

Pittsburgh, Pa.—The Wilkes-Barre Railroad has asked the Council for a franchise to extend its West Pittston Street line in Pittsburgh from the present terminus, at Wyoming Avenue, up Exeter Street to the tracks of the Delaware, Lackawanna & Western Railroad.

Forney, Tex.—Application has been made by the Stone & Webster interests to the Council in Forney and in Mesquite asking for franchises for the Dallas & Terrell Interurban Railway in Forney and in Mesquite. [E. R. J., May 2, '14.]

Temple, Tex.—The Southwestern Traction Company has asked the Council for a franchise to extend its lines in Temple.

***Raymond, Wash.**—Frank McMean has asked the County Commissioner for a franchise to build a system of electric railways on all the public highways in Pacific County.

TRACK AND ROADWAY

***Mobile, Ala.**—H. L. Misamore, Fairhope, and associates are considering plans to build an electric railway to connect Mobile and Pensacola. The line would extend from a point on the Mobile River opposite the foot of Dauphin Street across Mobile Bay, thence south on the eastern shore to Zundels, then east to Magnolia Springs, Foley, Elberta, Lillian and Pensacola.

Alabama Traction Company, Montgomery, Ala.—Having lost its legal fight to force the Montgomery Light & Traction Company to allow it to use tracks through the business streets, the Alabama Traction Company plans to build its electric railway through other streets and touch the business and residential sections in Montgomery.

Edmonton (Alta.) Interurban Railway.—Plans are being considered by this company as to the most economical form of motive power for its line to St. Albert; also as to the advisability of building a line to Fort Saskatchewan, 18 miles east of Edmonton.

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.—This company has placed an order with the United States Steel Products Company for rails. Good progress is being made with the grading for its line between Lacombe and Edmonton. Gasoline-electric cars will be operated. J. B. McBride, Lacombe, secretary. [E. R. J., March 14, '14.]

Warren-Bisbee Railway, Warren, Ariz.—This company plans to buy four special track layouts from the Buda Company, Chicago.

British Columbia Electric Railway, Vancouver, B. C.—In connection with the operation of its Saanich interurban line, opened for service last year, this company is making plans for the development of a pleasure resort on Vancouver Island to meet the demands of residents and visitors to Victoria, B. C.

Northern Electric Railway, Chico, Cal.—This company plans to double-track its line from Factoryville Junction to the Scranton City line.

Pacific Electric Railway, Los Angeles, Cal.—The first official run has been made over the newly completed Los Angeles-San Bernardino electric line, which will probably be placed in service in July with due ceremony at Urbita Springs, a point central to all towns which will benefit by the new electric line.

Marin County Electric Railway, Mill Valley, Cal.—Work has been begun by this company on Cascade drive in Mill Valley on the branch of this railway which will connect Mill Valley and Sausalito. W. Wesley Hicks, 320 Market Street, San Francisco, chief engineer. [E. R. J., May 30, '14.]

San Francisco (Cal.) Municipal Railway.—The contract for the construction of about 2 miles of new track for this company was awarded on June 4 by the Board of Public Works of San Francisco to F. Rolandi. This new line is to lead from Market Street and Stockton Street through the Stockton Street tunnel to Columbus Avenue and thence to and across the Fort Mason military reservation to a terminus near one of the exposition entrances in San Francisco.

Okeechobee Interurban Railway, Arcadia, Fla.—About 15 miles have been graded by this company on its line from Arcadia to the eastern coast of Florida. This line will connect two canals and a steam railway. E. Prouty, Arcadia, president.

Idaho-Pacific Railway, Twin Falls, Idaho.—Work will be begun by this company within the next few weeks on its line between Twin Falls, Hagerman, Tuttle, and Castleford. Headquarters: First National Bank Building, Twin Falls. M. J. Sweeley, Twin Falls, president. [E. R. J., April 11, '14.]

Freeport Railway & Light Company, Freeport, Ill.—Extensions of this railway to the southerly and westerly portions of Freeport are being contemplated by this company. One line will be extended to within a block of St. Francis Hospital and another line to within the same distance of the city cemetery.

Marion, Bluffton & Eastern Traction Company, Indianapolis, Ind.—This company has effected a reorganization under the name of the Marion & Bluffton Traction Company. Articles of incorporation for the new company were filed recently with the Secretary of State. The directors, who include Hugh Dougherty, Indianapolis, remain the same. The capital stock of the company as now incorporated is $216,000, divided into 2160 shares of common stock.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—Work will soon be begun by this company on extensions to Morton Park and to Beallview Park in Richmond.

Union Electric Company, Dubuque, Ia.—This company is asked to consider plans for an extension along Dodge Street and Fremont Avenue to the Wartburg seminary in Dubuque.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Work has been begun by this company on the extension from Broadway on Ninth Street to Lincoln Park in Joplin.

Shreveport (La.) Traction Company.—Preparations have been begun by this company for double-tracking its Fair Grounds-Highland Park line on Texas Avenue between Jordan Street and the Kansas City Southern Railway crossing in Shreveport.

***Fort Fairfield, Maine.**—Louis A. Cyr, John M. Wood and Alfred L. Noyes are considering plans to build an electric line from Fort Fairfield to Limestone, Caswell, Cyr, Connor and other points.

Portland, Gray & Lewiston Railroad, Portland, Maine.—The 10-mile line between Lewiston and Portland has been completed and will soon be placed in operation.

Bay State Street Railway, Boston, Mass.—Plans are being contemplated by this company for a double-track line over Main Street in Randolph from the Avon line to West Corners, where the state highway begins.

Grand Rapids (Mich.) Railway.—Work on the extension in Grand Rapids on Franklin Street from Lafayette Avenue to Division Avenue S. E., is under way.

***Muskegon-Saginaw Electric Company, Muskegon, Mich.**—This company has been organized with a capitalization of $1,000,000, and 90 miles of right-of-way for an electric line between Muskegon and Stanton have been obtained. The organization of this company was made by the stockholders of the Muskegon-Casnovia Land & Development Company.

Duluth (Minn.) Street Railway.—This company is asked to consider plans for an extension between New Duluth and Gary.

Cortland County Traction Company, Cortland, N. Y.—During the summer this company plans to build about 1 mile of new track in Cortland. All orders have been placed.

***Fredonia, N. Y.**—Surveys are being made to build an electric railway between Fredonia and Van Buren Point, 4 miles. No names are yet given of those interested in the project.

Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y.—A 3-mile extension of this line in Geneva through Hamilton Street and Reed Street to Lyceum Street to form a loop connection with the present line at Milton Street is being considered by this company.

Carolina & Yadkin River Railway, High Point, N. C.—This company has placed in operation its line between High Point and Thomasville.

Cleveland, Youngstown & Eastern Traction Company, Cleveland, Ohio.—The Public Utilities Commission of Ohio has ordered the Cleveland, Youngstown & Eastern Traction Company to make repairs to its tracks and bridges that will require rebuilding to a large extent.

Dayton, Middletown & Cincinnati Railway, Middletown, Ohio.—This company is asked to consider plans to build its proposed line between Dayton, Middletown and Cincinnati, so that it will extend to Germantown. James G. Miller, West Chester, president. [E. R. J., May 30, '14.]

Oil Belt Traction Company, Oklahoma City, Okla.—Plans are being formulated by this company to build an electric railway which will have Oklahoma City for its Western terminus and Fort Smith, Ark., for the Eastern terminus. The railway has been financed and construction will soon be begun. The company will ask a bonus from each city. Concessions in the way of bridge rights may be accepted in lieu of a cash bonus. Oklahoma City is to be the headquarters. The main line will run east to Shawnee, thence to Henryetta and Okemah, to Checotah, pass through Warner, cross the Arkansas River near Tamaha, and, passing through Mackey, Sallisaw, Muldrow and Rowland, cross the Arkansas River again and enter Fort Smith. From Henryetta the first of the subsidiary lines of the company will branch off, running through Okmulgee, Kiefer, Sapulpa, Tulsa, Talala to Centralia, which is to be the junction point of a number of branches. From Centralia one line will run west to Nowata and Bartlesville. Another branch will be built northwest to Coffeyville. Another is to run east with Miami as its destination, and a fourth is to be built southeast through Vinita to Grove, and almost to the Arkansas line. It is planned to build a branch west from Sapulpa to Dumwright and Cushing, and a branch from Collinsville to Claremore also is projected. [E. R. J., May 16, '14.]

Altoona & Logan Valley Electric Railway, Altoona, Pa.—Work has been begun by this company double-tracking the Tyrone division. An additional track is being laid from East Altoona to the top of Hutchinson's Hill and also in the vicinity of Tipton.

***Elizabethtown & Hershey Railway, Elizabethtown, Pa.**—Plans are being made by this company to apply soon for a charter to build an electric railway from Elizabethtown to Hershey via Conewago and Deodate.

Montreal & Southern Counties Railway, Montreal, Que.—The extension from Marieville to St. Cesaire, 9 miles, has been placed in operation. Work on the 15 mile extension from St. Cesaire to Granby is expected to be begun at once, and the contract calls for completion in October.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Some 20 miles of extensions are being planned by this company. A branch will be built to connect with the existing line at Edgefield Junction and to extend in a northwardly direction from Nashville to Goodlettsville, Ridge Top, Green Briar and Springfield. Arrangements have been made to finance this project.

Dallas (Tex.) Consolidated Electric Railway.—Satisfactory arrangements are being completed between the Southern Methodist University and this company, which will insure the construction of a new line to be built on Abbott Avenue to Hillcrest and to the campus of the University.

McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.—This company has awarded a contract to Frederick A. Jones, Dallas, to make surveys for this 74-mile line to connect McKinney, Bonham and Paris. L. A. Scott, president. [E. R. J., June 6, '14.]

South Morgantown Traction Company, Morgantown, W. Va.—During the next few weeks this company will award contracts to build about 2 miles of new track from its present terminus to Tin Mill at Sabraton, W. Va.

Seattle (Wash.) Municipal Railway.—The second division of this railway which extends from Youngstown, in the southern part of Seattle, 9 miles in a southerly direction to Lake Burien, has been placed in operation.

Beloit, Delavan & Clinton Railway, Beloit, Wis.—Grading has been begun by this company on its 22-mile line between Beloit and Delavan. Charles F. Lathers, Beloit, is interested. [E. R. J., Dec. 20, '14.]

Janesville & Madison Traction Company, Madison, Wis.—This company has asked the Railway Commission of Wisconsin for certificates of convenience and necessity to build an electric railway between Janesville and Madison. G. Pickardt, 409 Washington Building, Madison, president. [E. R. J., May 23, '14.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—It is stated that excavation has been begun by this company at the site for the new carhouse at Vancouver, but plans for the structure have not been completed.

Muncie & Portland Traction Company, Portland, Ind.—This company has purchased the property in Portland opposite the present headquarters of the company and will remodel and rebuild the structure now on the ground for new headquarters. Terminal for freight and switching purposes will be established on the new property.

Tri-City Railway, Davenport, Ia.—This company is adding to its carhouse as described in the ELECTRIC RAILWAY JOURNAL for May 30. In the addition will be recreation rooms for the employees.

St. John (N. B.) Railway.—The carhouse addition to be built on Wentworth Street, St. John, will be begun at once. The structure will be of steel and brick construction, 58 ft. x 115 ft. The contract for the carhouse is reported to have been awarded to A. R. C. Clarke & Son, St. John, N. B.

Atlantic City & Shore Railroad, Atlantic City, N. J.—This company expects to occupy its new carhouse and office building in Atlantic City, about June 15.

Sioux Falls (S. D.) Traction Company.—This company has completed its new carhouse, office, shop and waiting room building in Sioux Falls. The structure is 88 ft. x 150 ft., with a capacity for 24 cars, and is of brick and granite construction. The office section of the building is two stories high, 22 ft. x 150 ft.

POWER HOUSES AND SUBSTATIONS

Halifax (N. S.) Electric Tramways.—This company is considering plans for the installation of another 2000-kw, high-pressure turbo-generator set.

Guelph (Ont.) Radial Railway.—Alterations are being made at this company's power house in Guelph. The improvements consist of dispensing with engine and boilers, and putting in car pits and stock rooms at a total cost of $3,500.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are being made by this company to build a shipping station at Georgetown.

Dallas Electric Light & Power Company, Dallas, Tex.—This company will add to its substation equipment a 1000-kw, two-unit, three-bearing motor-generator set. The apparatus has been purchased from the General Electric Company.

Monongahela Valley Traction Company, Fairmont, W. Va.—It is reported that this company will soon add a 1000-kw generator, gas-engine driven, at its power plant in Clarksburg.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company will install additional substation equipment consisting of a 3000-kw rotary converter with starting panel and a 3150-kva water-cooled transformer. The contract for the apparatus has been placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., is reported to be in the market for ten gondola cars.

Albany Southern Railroad, Albany, N. Y., has ordered two double-truck cars from The J. G. Brill Company.

South Morgantown Traction Company, Morgantown, W. Va., expects to purchase two Brill semi-convertible cars.

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta., expects soon to purchase a gasoline-electric motor car for its new line between Lacombe and Edmonton.

Ephrata & Lebanon Street Railway, Ephrata, Pa., has ordered three steel passenger cars, three combination passenger and baggage cars and one 40-ft. baggage and express car from the Cincinnati Car Company.

Marine Railway, Brooklyn, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of May 30 as having ordered two closed storage-battery cars from the Railway Storage Battery Car Company, has placed the order for the car body with The J. G. Brill Company.

Wellington (New Zealand) Tramways are in the market for one motor car, according to foreign trade notice No. 13,181 of the Bureau of Foreign & Domestic Commerce, Washington, D. C. Copies of the specifications may be obtained from the office of the Tramways and Electrical Engineer, Harris Street, Wellington, on payment for the contract of $5.11, which will be refunded upon receipt of a bona fide tender. Bids must be submitted by July 9, and local representation is necessary.

Scranton (Pa.) Railway has specified the following details for the ten closed prepayment cars which were recently ordered from the J. G. Brill Company:

Seating capacity	48
Bolster centers, length,	18 ft.
Length of body	30 ft. 6 in.
Length over vestibule,	42 ft. 6 in.
Width over sills	8 ft.
Width over all	8 ft. 2 in.
Height, rail over trolley board	11 ft. 6 in.
Body,	steel frame, wood finish
Interior frame	mahogany
Headlining	agasote
Roof	plain arch
Underframe	steel
Air-brakes	West.
Bumpers	Hedley
Car trimmings	bronze
Control	GE-K-35
Couplers	Brill
Curtain fixtures,	Cur. Sup. Co.
Curtain material,	Pantasote
Destination signs	Keystone
Door signals	Consol.
Fenders	H. B.
Gongs	12 in. Dedenda
Hand brakes	Peacock
Heaters	Consol.
Headlights	Crouse-Hinds
Motors,	4 GE-203, inside hung
Sanders	Brill
Sash fixtures	Brill
Seats	Brill
Seating material,	mahogany slats
Trolley catches	Keystone
Trucks	Taylor
Ventilators	Peerless

Houston (Tex.) Electric Company has specified the following details for the ten closed prepayment cars which were recently ordered from the American Car Company:

Seating capacity	43
Bolster centers, length,	19 ft. 2 in.
Length of body	26 ft. 6 in.
Length over vestibule	39 ft.
Width over sills	8 ft. 4 in.
Width over all	8 ft. 7 in.
Height, rail to sills	32⅜ in.
Height, sill to trolley base,	8 ft. 9½ in.
Body	composite
Interior trim,	statuary bronze
Roof	plain arch
Underframe	metal
Air brakes	West.
Axles	Brill
Bumpers	Am. Car Co.
Cables	West.
Car trimmings	Dayton
Control	H.L. single-end
Couplers	Ohio Brass
Curtain fixtures,	Cur. Sup. Co.
Curtain material,	Pantasote
Destination signs	Hunter
Fare boxes	Johnson
Wheelguards,	H.B. life guards
Gears and pinions,	tool steel
Gongs	Wall Mfg. Co.
Hand brakes	Am. Car Co., with Peacock brakes
Headlights	Crouse-Hinds
Journal boxes	Brill
Motors,	2 West. 307, outside hung
Paint	Am. Car Co.
Registers	International
Sash fixtures	O. M. Edwards
Seats,	Heywood Bros. & Wake
Seating material	cherry cushions, back stained mahogany
Springs	Brill
Step threads	Feralun
Trolley catchers,	Elec. Serv. Sup. Co.
Trolley base	Holland
Trucks	Brill 39-E
Varnish	Chicago
Ventilators,	Am. Car Co. (Stone & Webster hood type)
Wheels	Brill

TRADE NOTES

Fred A. Poor, Chicago representative of the Rail Joint Company, resigned on June 1, 1914, to become president of the P. & M. Company, with general offices in the Railway Exchange Building, Chicago, Ill.

Joseph Dixon Crucible Company, Jersey City, N. J., has received an order to apply a double coating of silica-graphite paint on the 900 tons of structural steel which are being supplied by the Lackawanna Bridge Company for the construction of the superstructure of the Rochester Railway & Light Company's new power plant.

Hatfield Rail Joint Manufacturing Company, Macon, Ga., has made arrangements with T. B. Bowman, formerly assistant to the president of the Q. & C. Company, and now with the Efficiency Company, New York, N. Y., to assume charge of sales with offices at 2 Rector Street, New York, and 700 Railway Exchange, Chicago, Ill.

J. A. Bodkin has resigned from his position as engineer for the Q. & C. Company, New York, N. Y., effective June 15, 1914, after which time he will be associated with his brother in the Track Specialties Company, 29 Broadway, New York, N. Y., manufacturer of rail, step and insulated joints, rail anchors, braces and benders, brace and tie plates, guard rail clamps and braces.

Milwaukee Concrete Mixer & Machinery Company, Milwaukee, Wis., has appointed George C. Marsh as general manager, succeeding W. J. Roseberry, Jr. Mr. Roseberry has been appointed sales manager of the newly organized concrete mixer department of the Power & Mining Machinery Company, Cudahy, Wis., which manufactures the International concrete mixer.

Electric Service Supplies Company, Philadelphia, Pa., has added the services of W. J. Bryan to its sales force. Mr. Bryan was graduated in engineering at the University of Michigan in 1906, and was for five years connected with William B. Scaife & Sons Company, Pittsburgh, Pa., in various capacities. He will represent the Electric Service Supplies Company in the New England States, with office in Boston.

Ohio Brass Company, Mansfield, Ohio, has received a large order for overhead construction, rail bonds and a considerable amount of car equipment to be used in connection with forty to sixty-mile track extensions which the Ogden (Utah) Rapid Transit Company is constructing. This company has also received a large order from the Pennsylvania Railroad for rail bonds to be installed in the new Philadelphia-Paoli electrification.

General Electric Company, Schenectady, N. Y., has received orders for the following car equipments: Southern Traction Company, two G.E.-203, 50-hp, two-motor and four G.E.-201, 60-hp, 600-1200-volt, two-motor car equipments; Dayton, Springfield & Xenia Southern Railway, four G.E.-201, 60-hp motors; Trenton & Mercer County Traction Corporation, ten G.E.-210, 70-hp, two-motor equipments; Dallas Consolidated Electric Street Railway, 35 G.E.-201, 60-hp, two-motor car equipments with Type MK multiple-unit control; Union Street Railway, six G.E.-200, 40-hp, four-motor equipments; Central New York Southern Railroad, five G.E.-201, 60-hp, two-motor equipments; Memphis (Tenn.) Street Railway, twenty-five G.E.-201, 60-hp, two-motor equipments.

Harold Almert, Chicago, Ill., consulting engineer, has been retained as technical counsel by the Washington Railway & Electric Company and the Potomac Electric Power Company, of Washington, D. C. The appraisal division of Mr. Almert's staff will make a detailed inventory and valuation of the property of these companies, not only in Washington, but throughout the District of Columbia. This is in preparation for a hearing before the Federal Utility

Commission, which appeared before the local committee of Congress, through the corporation counsel, on June 2, and declared itself in favor of immediate municipal ownership of the utilities in the District of Columbia.

W. A. Thomas, who for several years past has been commercial engineer in charge of all sales of mining apparatus for the Westinghouse Electric & Manufacturing Company, with headquarters at East Pittsburgh, Pa., has resigned his position with that company, and has taken up the practice of consulting engineering in Pittsburgh, with offices in the Second National Bank Building. He will specialize in mining. Mr. Thomas was graduated from Penn State College in 1898 and was thereafter connected with the testing department and the power and mining engineering department of the General Electric Company for several years. For two years he was in charge of the power equipment of the Pennsylvania Coal & Coke Company, Cresson, Pa., later resigning this position to take charge of the mining work of the Westinghouse Electric & Manufacturing Company. Mr. Thomas is also president of the Rocky Ridge Coal Company, Robertsdale, Pa.

U. S. Light & Heating Company, Niagara Falls, N. Y., has appointed L. R. Pomeroy as manager of its New York sales office, with office at 24 West 61st Street. Mr. Pomeroy has been in the railroad and railroad supply business for more than thirty-five years. He was educated at Irving Institute, Tarrytown, N. Y. From 1880 to 1886 he was secretary and treasurer of the Suburban Rapid Transit Company of New York and then for nine years he was with the Carnegie Steel Company, introducing basic boiler steel for locomotives and special forgings. Subsequently he engaged in the same kind of work with the Cambria Steel Company and the Latrobe Steel Company jointly. For three years to 1902 he was assistant general manager of the Schenectady Locomotive Works and then for six years represented in the railway field the General Electric Company. Then he went to the Safety Car Heating & Lighting Company and afterwards to J. G. White & Company as chief engineer of the railway and industrial divisions. For some time he has had an office as consulting engineer at 50 Church Street, New York.

ADVERTISING LITERATURE

Power Specialty Company, New York, N. Y., has issued a catalog describing its Foster locomotive superheaters.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued sheets describing its tool steel gears and pinions for railway use.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder on the subject of its merit system of fare protection.

Standard Underground Cable Company, Pittsburgh, Pa., has issued Bulletin No. 680-1 describing its steel tape armored cables.

MacGovern & Company, New York, N. Y., have issued a catalog describing their electrical and steam machinery, including cars and car equipments.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a sheet describing its ball-bearing mountings for jib crane columns. Another catalog has also been issued by this company describing its ball bearings and their application to axle generators.

Zarro Amusement Device Company, Ltd., Beaver Falls, Pa., has issued a catalog describing its complete line of amusement features for electric railway parks. These features are fully illustrated in the catalog and include riding devices of all kinds, coasters, scenic railways, chutes, old mills, carousels, interior or exterior mechanical amusement devices, fun houses, playground apparatus, scenic studios, theater equipment and electric working signs.

Redmond & Company, New York, N. Y., have issued a circular showing the charted fluctuations of twenty-five standard railroad bonds based on average quotations from 1904 to 1914. This circular is an amplification of a statement in the previous circular of the company to the effect that many listed bonds were selling close to the low prices of 1907. Among the securities recommended by Redmond & Company for investment are the 5 per cent bonds due 1934 of the Southern Pacific Company, San Francisco, Cal., the first mortgage 5 per cent sinking fund gold bonds due 1952 of the Columbia Railway, Gas & Electric Company, Columbia, S. C., and the first mortgage 5 per cent bonds due 1937 of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Macbeth-Evans Glass Company, Pittsburgh, Pa., has issued a catalog on the subject of Alba lighting shades for electric railway cars. The catalog describes with the aid of comparative illustrations an interesting test made by the Cleveland (Ohio) Railway in one of its cars. In this case nineteen bare 23-watt tungsten lamps gave almost the same amount of illumination on the useful plane as the same number of bare 64-watt carbon lamps. These lamps were then equipped with Alba shades, and the resulting illumination on the useful plane was increased 62 per cent simply by properly directing the light. Twenty-four 23-watt tungsten lamps were required to furnish the same amount of illumination on the useful plane as nineteen 64-watt carbon lamps, while only fifteen 23-watt tungsten lamps equipped with Alba shades were required. The circular also contains illustrations of illuminated car interiors of the Fort Wayne & Northern Indiana Traction Company, the Union Traction Company of Indiana, the Third Avenue Railway, Mahoning & Shenango Railway & Light Company, Northwestern Pennsylvania Railway, and Columbus, Delaware & Marion Railway, in which these shades are used.

Railway Improvement Company, New York, N. Y., has issued a publication in de luxe binding entitled "A Practical Bonus System for Motormen." Starting from the premises that a successful bonus system presupposes increased earnings by the railway company and increased pay for the employees, the book proceeds to discuss the use of the coasting time recorder as a practical instrument for the fulfillment of the above requirements. It is shown that the recorder, by measuring the number of minutes their car is coasting without power, enables the railway to pay more money in wages out of the saving effected thereby. By this system the motorman who can coast the greatest number of minutes is entitled to a bonus, while the man who coasts the least number of minutes is instructed in the proper operation of his car so that in future he can coast better and make a better record. The manufacturers offer a unique plan of guarantee of the ultimate self-paying features of the recorder by the issuance of "clock trust certificates" to cover their purchase. The end of the publication contains tabulated records from recorders in actual service on the Third Avenue Railway, San Francisco-Oakland Terminal Railways, Virginia Railway & Power Company, Manhattan Elevated Railway, British Columbia Electric Railway, Washington Railway & Electric Company, Denver City Tramway, Los Angeles Railway, London (Eng.) Electric Railway, Interborough Rapid Transit Company and Hudson & Manhattan Railway.

NEW PUBLICATION

List of Publications Pertaining to Government Ownership of Railways.—Bulletin No. 62.—Published by Bureau of Railway Economics, Washington, D. C. 74 pages, paperbound.

This pamphlet gives a list of articles that have been written in all parts of the world on the subject of government ownership of railroads, the names of the authors, the special subjects covered and the sources in which the articles may be found. The general articles are classified under one head, and those dealing with foreign countries and with the United States are grouped by countries for ready reference. In the introduction it is stated that every effort has been made to include references to all available literature on the subject—good, bad and indifferent—for and against government ownership. No attempt has been made, however, to include reference to the larger subject of the relations of railroads to the State, or to books and articles that are merely descriptive of State railroads. In introducing the bibliography for the United States the pamphlet gives the following railroads in this country as being now or formerly under national, State or city ownership: Western Atlantic, Georgia; Columbia, Pennsylvania; North Carolina, Western North Carolina; Texas State, Texas; Troy & Greenfield Railroad and Hoosac Tunnel, Massachusetts; Richmond, Fredericksburg & Potomac, Virginia; United Railways of New Jersey, New Jersey; Cincinnati Southern, city of Cincinnati; Panama Railroad.

Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLIII NEW YORK, SATURDAY, JUNE 20, 1914 No. 25

THE MASTER MECHANICS AND ELECTRIFICATION No one has ever yet been able to accuse the American Railway Master Mechanics Association of lack of enterprise, and the action taken at last week's convention by this body, one of the oldest and most influential in the technical world, is an illuminating example of the reason. The association has decided that permanent consideration shall be given by a standing committee to the subject of maintaining electric equipment, because in the words of its committee on subjects it "believes that the Master Mechanics Association should keep closely in touch with the question of electric operation, with the idea that it is impossible to predict where or when electrification of steam roads may be introduced." The action is undoubtedly a far-sighted one. Of the present steam railroad mileage of approximately 240,000, only 1800 miles are electrified—about three-fourths of 1 per cent. Of course, this does not include the lines that were built for electric operation nor the branches of steam roads leased by rival electric roads. The fact, however, that even this actual electrified mileage has been built up in the face of the dull business period dating almost exactly from the time when the first large electrification took place is good evidence that the master mechanics are right in taking up the subject.

ACCOUNTANTS' EDUCATIONAL COURSE After years of consistent effort the committee on education of the American Electric Railway Accountants' Association has completed a working plan for a correspondence course of instruction, and will put it into operation in the fall if the requisite number of enrollments is obtained. The work which this association has accomplished in connection with the standard classification of accounts indicates the comprehensive character of its methods. The assumption that the educational work will be equally thorough is a fair one. Accounting is a subject which lends itself particularly well to correspondence instruction. Its theory and practice are definite, tangible and well developed. It is of broad interest because its underlying principles apply in fields outside of the professional accountant's activities. Hence the new course should be followed, not only by young men and women in the comptroller's department, but by those in all divisions of electric railway work in which accurate records can be utilized. The new course is like a ship ready to launch. This is the critical period. There will be comparatively plain sailing after the launching.

ANTICIPATING THE FIRST STITCH The old saw reads "A stitch in time saves nine"; and this is the first principle on which the inspection work of every good maintenance shop is based. It is clear, however, from Mr. Ransom's article in our June 6 issue on "Use of Inspection Tests to Locate Incipient Defects" that the prevention of trouble can be carried to a still greater and more profitable degree of exactness than is offered by visual examinations alone. It is the peculiar characteristic of apparatus in an electric circuit that it may be bad electrically while seemingly good mechanically. A broken strand in an insulated covering, for example, can cause all kinds of trouble with no possibility that the cause will be discovered except by a happy guess. An invisible film of insulating material may gather on some contact surface and lead to excessive heating, or current may be wastefully used in heaters and motors because of crossed or open connections. Therefore, a test set made in accordance with the principles described by Mr. Ransom gives three distinct benefits: It catches defects before they make themselves expensively felt in service, it prevents the possibility of car fires due to broken or abraded connections, and it detects the excessive or wrongful use of energy by the various pieces of current-consuming equipment in the circuit. Preliminary tests of this kind are analogous to the laudable Chinese custom of paying the physician to keep the patient well instead of to cure him.

PROTECTING WOOD POSTS IN STEEL CARS Comment has recently been made regarding the tendency of steel to rust when it is in contact with wood, the point being raised in connection with composite cars such as those that are constructed with steel side girders and wooden posts. The reason for this tendency is obvious enough when one considers that all wood, even though it may be kiln-dried, contains a certain amount of moisture that varies in accordance with conditions. In addition to this, practically all wood fiber is capable of absorbing and holding mechanically, like a sponge, some portion of any water with which it comes in contact, so that after once becoming wet a piece of wood will remain sensibly moist for a considerable period of time if it is deprived of the opportunity for eliminating the moisture by rapid evaporation. Such conditions are quite comparable to those existing in the case of side-posts which are housed in the stagnant air between the side sheathing of the car and the inner lining and at the same time are subject to the effect of moisture that may seep in from washing or during wet weather, and it is not surprising that the metal which touches the wood displays a distinct tendency toward rusting. When composite cars are built it is a most obvious necessity to see that an ample and absolutely continuous coating of paint is interposed between the two materials because the deterioration of one invariably sets up a corresponding action in the other, the rusting of steel being inevitably accompanied by a rotting of wood which may be in contact with it.

THE NEW M. C. B. STANDARD COUPLER

The work of the Master Car Builders' Association committee on couplers, whose report was presented at the recently-concluded Atlantic City Convention, constitutes a remarkable example of accomplishment in harmonizing conflicting interests. The committee has succeeded during the past three years in developing specifications for a universal standard coupler, testing samples built by the many different makers under these specifications, and, after obtaining practical agreements from the various manufacturers in support of a one-design standard, selecting two of the samples for a service trial through extended purchase and installation by the various railroads in the country. The work has thus progressed to the point where the final adoption of the standard design depends simply upon which of the two types selected stands up the better, and the final decision, which may of course involve slight changes, will therefore be largely in the hands of the railroads themselves.

To the average interurban railway, which seldom handles cars for interchange, the direct effect of this standardization may not seem to be of vast importance at the present time. On electric roads where the present M.C.B. coupler is used, its single universal feature, that of mutual operation of all of the widely different designs, has been sufficient, and the difficulties involved by keeping in stock the vast aggregation of parts required for maintaining the types found on interchange cars have been minimized.

However, the interurban lines can no more escape the ultimate consideration of interchange equipment than can any electric railway escape the conclusion that must be drawn from the accomplishment of the committee in bringing the various coupler manufacturers together. This has been done notwithstanding the many patents and special designs upon which great volumes of business have been built up in the past, and it is undoubtedly true that the manufacturers have displayed a most commendable spirit in co-operating with the committee. But the fact that they have done so at all shows the possibilities that lie in the consistent and persistent efforts of an organized body of purchasers. The economies inherent in standardization are of enormous value, and, although the establishment of a one-design standard may eliminate much of the benefit to an industry that comes from the competition of inventive minds, no industry can fail to benefit by it when its scope, as in the case of the universal standard coupler, extends only to apparatus that has passed through the refining process of many years of service.

WHAT IS TREASURY STOCK?

In spite of all the efforts to standardize electric railway accounting, there are still some subjects upon which opinions as well as practices differ, such as that of treasury stock. The term "treasury stock," as defined in some sources, means the stock retained by a corporation and not issued to the subscribers and capable of being disposed of only at par. The reports used by most commissions supervising electric railways consider treasury stock as having once been issued and as being a division of one branch of the outstanding stock —namely, that held by the respondent corporation. A current balance sheet that has come to our hands, however, treats treasury stock as issued but as distinct from outstanding stock.

Here, we believe, is a conflict of terms that is worth clearing up by analysis and definition. In the first place, treasury stock is not capital stock unissued, for the latter is nothing but a figure of possibilities, a measure of a privilege to issue more stock in the future. Treasury stock is rather capital stock that has been issued as full-paid and non-assessable and thereafter reacquired by the corporation by purchase or through donation. It differs from the remainder of the issued stock in that it has no vote and draws no dividends while in the treasury, and it differs from the unissued stock in that it may be sold below par without involving the purchaser in liability for the difference between the cost to him and the par value.

If treasury stock, then, is distinct from unissued stock, should it be included in the total of stock outstanding? It seems as if the subject would be made clearer if the term "outstanding" were used to refer simply to the stock held by individuals, firms or corporations other than the respondent corporation or else by the trustees of sinking or other funds. Perhaps the inter-relation of these terms may best be shown by stating how the subject is generally regarded in financial circles. A corporation with an authorized capital stock of $1,000,000 issues all but $100,000. Its stock list would now include: authorized, $1,000,000; issued, $900,000; unissued, $100,000. A donation of $100,000 is made to the corporation by the incorporators from the amounts issued to them, thereby reducing the outstanding total. The list would now be: authorized, $1,000,000; issued, $900,000; outstanding, $800,000; treasury, $100,000; unissued, $100,000.

In the light of this discussion, it is interesting to note that the recent tentative Interstate Commerce Commission system of accounts provides for carrying at par under "securities owned-unpledged," securities actually issued for value by the accounting company but now held in its treasury under circumstances requiring that they shall not be treated as paid or retired. In speaking of this class of securities the commission uses the term "reacquired securities," and refers to them as "nominally outstanding." The subject is complicated, however, by the fact that provision is made for carrying on the liability side of the balance sheet the amount of securities "actually outstanding," which by definition represents the securities issued but not reacquired. Nevertheless, the accounting directions state that this balance sheet item is to be divided to show the par value of the certificates "actually outstanding" and the par value of certificates reacquired or nominally issued. Under the circumstances it would seem that the heading "securities actually outstanding at date," under which the determinative amount as regards the balance sheet liability total is carried in the long column, belies its meaning as defined. If treasury or reacquired securities of a railway are carried as an asset, they must also be carried on the liability side, and a grand total caption that specifically excludes them should not be chosen. The subject is a puzzling one, especially to the investor who does not always understand just what the classification desires to show, and for this reason, if for no other, greater attention should be paid to this point.

ACCIDENT PREVENTION IN SMALL CITIES

Mr. Boyce's unusual article on "'Safety First' Work in a Small City," as published elsewhere in this issue, indicates forcibly that the smaller railway properties are capable of developing effective safety campaigns even if they cannot afford to adopt the more costly methods of their big brothers. Talks by specialists and moving pictures are splendid things in their way, but until accident lecture and film bureaus are formed to give this service at a low cost, the small railway must make the best of its more limited opportunities. Car, newspaper and highway publicity suggest themselves as natural channels, but the publicity material itself must be written "at" the patrons in a way that will appeal to their experience. Thus, the announcements of Mr. Boyce's company do not repeat the well-worn "Don't get off backward" *ad infinitum* but treat this fault in the light of its varied consequences from the onlookers' mockery at an awkward fall to the possibility of mortal injury. When such cards are written in homely yet correct language with a sympathetic eye to human failings they will make a much deeper impression than a few cut-and-dried shibboleths which public and employees soon come to read with lack-luster eyes.

Two accident-prevention methods followed by Mr. Boyce's company deserve special notice. One is the practice of having the men report bad lighting in the vicinity of bad roadway, and the other is the analysis of accidents on the basis of territorial divisions. As to the first, almost every railway which operates over unpaved or badly paved highways has had to foot more than one accident claim that should have been paid by the municipality. If the danger spots are reported by the trainmen, steps can be taken to illuminate or repair them to a degree which will insure safety. Again, the plan of analyzing accidents on the basis of territorial division offers the advantage of concentration in reducing some one form of accident. Thus, on Mr. Boyce's line, derailments were distinctive of one section, accidents from badly lighted highways of another and accidents from disorderly conduct of a third. By applying a territorial analysis, each characteristic trouble was minimized without spending money where is was not required.

CO-OPERATION WITH THE MOTIVE-POWER DEPARTMENT

We have taken the position that the generation of power is not necessarily a part of the transportation business, essential as energy is for the movement of cars, and that power plants will be operated to a decreasing extent as parts of an electric railway system. Nevertheless, this paper expects to continue to devote a considerable amount of its space to the discussion of power plant problems and to descriptions of exceptionally interesting plants. This will be done for several reasons. In the first place, the power plant will continue to be a part of the organization of a great many electric railway systems. Second, purely as a matter of engineering progress, it is safe to say that every engineer, no matter what his specialty, and all operating electric railway men are interested in following the marvelous changes which have marked the history of power engineering during the past decade. The substitution of the steam turbine for reciprocating engines, the recent radical changes in steam boiler construction and the perfection of steam measuring instruments are typical illustrations of what is going on in this field.

While hydraulic plants are less conspicuous than those operated by steam and less spectacular developments are to be expected from them, great progress also is being made in that field of electrical generation. This fact is shown by the description of the new station of the Salmon River Power Company, printed in this issue. This plant is at the eastern end of the transmission lines of the Niagara, Lockport & Ontario Power Company which has heretofore drawn most of its power from Niagara Falls, and most of the power supplied along its transmission line is used for electric railway purposes. The new plant has unusually interesting design and operating features, owing to its location and its relation to the Niagara Falls plant. The two principal water powers in New York are now yoked into a team, the yoke being the transmission system. The electric railways in the central and western part of the State are the gainers by the union.

In the Salmon River plant provision has been made for the possible operation of the electric generators as synchronous motors, the water wheels to be run idle if necessary. The flywheels and turbine runners give such added mass to the rotating system that the plant should constitute an excellent synchronous condenser. The control of power factor thus made possible would greatly reduce the line voltage drop.

Seattle Municipal Street Railway System

A Discussion of the Construction Progress on the North Division and the Negotiations on the South Division of the Municipal Electric Railway—Tables Showing Cost of Construction and Estimated Operating Expenses of Northern Line

As noted in the May 30 issue of the ELECTRIC RAILWAY JOURNAL, the municipal electric railway system of Seattle, Wash., began operations on May 23, 1914. The history of the events leading up to the vote on the municipal line and of the early negotiations, construction and proposed equipment was published in the ELECTRIC RAILWAY JOURNAL of April 26, 1913.

CONSTRUCTION

It will be recalled that on the second attempt the voters of Seattle by a large majority, on March 7, 1911, authorized the flotation of $800,000 of bonds for the immediate construction of a complete railway system, municipally owned, extending from Third Avenue West and Nickerson Street to Fourth Avenue and Pine Street, thence over Fourth Avenue South to Rainier Boulevard and Ryan Street, the north line to be built immediately and the southern extension to be either constructed or acquired by condemnation. The construction on the north line, Division "A," extending from Third Avenue West and Nickerson Street to Fourth Avenue and Pine Street, was begun by the Jahn Construction Company, Seattle, during September, 1912, and thirteen months later, Oct. 8, 1913, the last spike was driven.

SOUTHERN EXTENSION PENDING

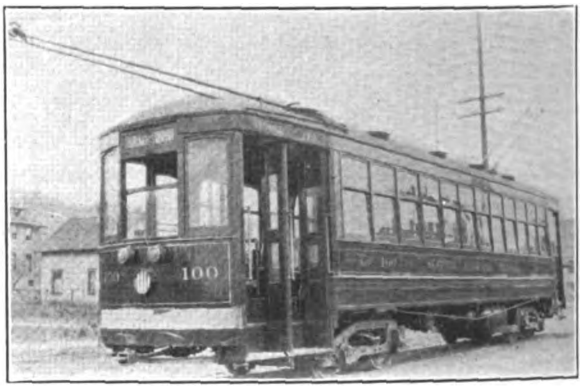
The southern extension, Division "B," extending from Pine Street over Fourth Avenue South to Rainier Boulevard and Ryan Street, is now occupied by the Seattle, Renton & Southern Railway, and up to the present time the city of Seattle has made no settlement with this company. To complete the municipal line as defined in the statute the line of the Seattle, Renton & Southern Railway must be purchased outright, condemned and purchased or paralleled. The City Council and Scott Calhoun, receiver for the Seattle, Renton & Southern Railway, have not reached a basis for the purchase of the line which is mutually satisfactory, the city asserting that the price demanded by the receiver is exorbitant. Condemnation proceedings have been instituted, but these are still pending. However, at a meeting of the Council on April 6 the following resolution was passed:

"*Be it Resolved* by the city of Seattle as follows: that the Board of Public Works be and it hereby is authorized and directed immediately to prepare plans and estimates of the cost, and plans and specifications for the construction, of all necessary roadway, overhead construction, rolling stock, equipment and apparatus for the full and complete construction of a system of street railway along and over and upon to the following streets, to wit: First, on Rainier Avenue, from Dearborn Street to Hudson Street; second, on Rainier Avenue from Hudson Street to the south city limits; third, on Dearborn Street, Seattle Boulevard and Fourth Avenue South, from Rainier Avenue to Jackson Street; fourth, on Fourth Avenue South and Jackson Street, and fifth, on Fourth Avenue South and Spokane Street from Seattle Boulevard to a connection with the Highland Park & Lake Burien Line."

The above route parallels that of the Seattle, Renton & Southern Railway. The latest development is that the City Council has authorized an issue of utility bonds in the sum of $500,000 to be used to construct this new line. Councilmen urge the immediate use of the general bond issue for the first part of the work, but in case the negotiations for the purchase of the existing line are concluded soon the proposed line will not be built.

DETAILS OF NORTHERN DEVELOPMENT

At the present writing there have been constructed on the north line 4 miles of double track and 0.7 miles of single track of modern type. The rails are girder rails, being the only ones of this section in the city. Power will be obtained from the city light department, and a concrete substation has been erected at about the middle of the line at Dexter and Aloha Streets. The city light department will also have charge of the operation and maintenance of the substation and the overhead work. The complete metallic transmission system is used, two trolley wires being carried over each track.



Seattle Municipal Railway—Type of "Pay-as-you-enter" Car Used on Line

The carhouse is located near the terminus of the line and herein are housed the twelve cars owned by the city. These are of the pay-as-you-enter type purchased from the Cincinnati Car Company. Each car has seats for forty-eight passengers and standing room for twenty-seven more.

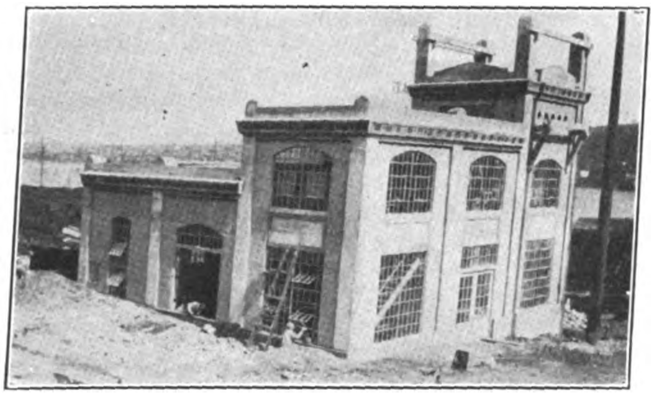
COST OF CONSTRUCTION

The cost of construction of the Seattle line, as officially reported, is as follows:

Track:	
Main line	$169,658
Carhouse tracks	7,798
Northern Pacific connection	319
	$177,775
Overhead:	
Pole line	$9,522
Trolley and feeder system	51,022
Substation (including ground, building and apparatus)	43,942
Carhouse (including ground, building and grinder)	22,092
Cars	76,138
Line car (estimated cost)	4,000
Division "B"	1,942
Estimated additional engineering expense	2,500
	$379,414

OPERATION, FARES AND TRANSFERS

The operation of the municipal line is under the supervision of the public utilities department and directly in charge of A. L. Valentine, superintendent of public utilities. A round trip on the line is made in forty-eight minutes. With eight of the new cars in use during the rush hours of the evening, this will give



Seattle Municipal Railway—Substation for Delivery of Power to City Railway

a six-minute schedule. There is no provision for transfer privileges with the lines of the Seattle Electric Company. This question has been brought to the attention of the State Public Service Commission, which is expected to make a decision in the matter some time during the year.

The following ordinance regarding fares and transfers has been considered and approved by the public utilities committee:

"Sec. 1. The rate of fare on the municipal street railway lines within the city of Seattle shall be as set forth in this ordinance.

"Sec. 2. The rate of fare when paid in cash shall be 5 cents.

"Sec. 3. Commutation tickets, not entitling holder to a transfer, shall be sold by the conductors on the cars at the rate of six for 25 cents, twelve for 50 cents, or twenty-five for $1. They shall also be kept on sale at the office of the superintendent of public utilities.

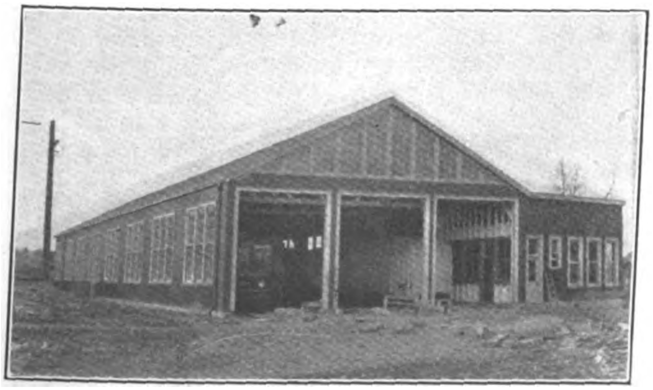
"Sec. 4. School children going to and returning from public schools, on school days, upon presenting a certificate of attendance on forms supplied by the superintendent of public utilities and signed by the principal of their school, shall be entitled to ride for 2½ cents. Three cents shall be accepted from school children in payment of a single fare, two school children may ride for 5 cents, or school children's tickets may be purchased from the conductors at the rate of forty for $1, twenty for 50 cents or ten for 25 cents.

"Sec. 5. Children under six years of age shall, when accompanied by parents or guardian, be entitled to ride free.

"Sec. 6. Employees of the municipal street railway shall ride free upon displaying their badge or pass supplied by the superintendent of public utilities.

"Sec. 7. Any passenger who has paid cash fare or school children's ticket shall, upon request, be furnished with a transfer to any intersecting line of any street railway company now operating in the city limits, or that may hereafter operate therein, which shall give and receive transfers to and from all lines owned, controlled or operated by the city of Seattle, on a basis of settlement that the transfers are to be redeemed at the rate of 2½ cents for a full cash fare, or 1¼ cents for school children's tickets. Such transfer shall be good only upon the first connecting car at the point of transfer and upon cars going in the same general direction.

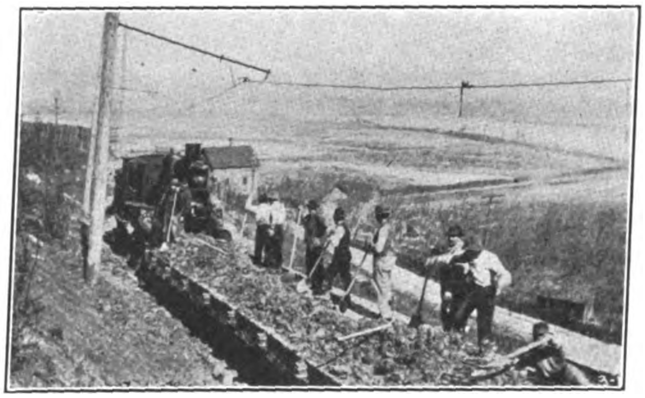
"Sec. 8. The rate of fare charged on any lines operated outside of the city limits shall be the same as that charged on the municipal street railway lines operated in the city limits, and shall be in addition thereto."



Seattle Municipal Railway—Carhouse for Storing of City-Owned Cars

ESTIMATED EARNINGS AND EXPENSES OF OPERATION

According to an estimate made by the public utilities department there are 7825 people in the district directly tributary to the line. If the expectations of the department are realized these will use the municipal railway almost exclusively. Taking two-thirds of the rate used by the Seattle Electric Company to calculate possible earnings, Superintendent Valentine, in a statement submitted to the Board of Public Works and the City Council, estimates that the gross earnings of the line per annum will be $75,000, with expenses of operation and maintenance amounting to $68,000.



Seattle Municipal Railway—Work of Rehabilitation of Highland Park & Lake Burien Railway

The estimate of the cost of operating and maintaining the municipal system compiled by Superintendent Valentine follows:

SALARIES		
Transportation		
1 inspector at $100 per month	$1,200	
24 trainmen—365 days at $3 per day	26,280	
	$27,480	$27,480
Roadway		
Roadmaster, at $100 a month, three months	$300	
Trackman—400 days at $3 per day	1,200	
Line repair work	150	
	$1,650	$1,650
Shops		
Carhouse foreman	$1,500	
2 carhouse men—365 days at $3 per day	2,190	
	$3,690	$3,690
SUPPLIES AND EXPENSES		
Forms, stationery, etc.	$480	
Power (from city light plant)	9,000	
Furniture and telephone service	200	
Shop supplies and fixtures	2,000	
Accident and legal expense	1,500	
State insurance tax (3 per cent. of payroll)	985	
Interest on bonds ($375,000 at 4½ per cent)	18,875	
	$31,040	$31,040
Common user, Fourth Avenue		4,000
Total		$67,860

It will be noticed from the above statement that there seem to be some omissions of charges which usually appear in expense accounts of electric railways, such as salary of superintendent, salaries of clerks, fire insurance, taxes, etc. It is stated that the salary of the superintendent, clerks, etc., will be apportioned partly from the earnings of the line and partly from the city's funds for compensation to its employees. Property owned by the city is not taxed. As yet no proposition has been taken up for the insurance of the buildings and equipment against fire.

EXTENSIONS

It is the intention of the public utilities department to extend the municipal railway as soon as possible in two directions, but this will not be done until the northern division has been proved a success. As soon as the Seattle, Renton & Southern Railway difficulty can be cleared up, cars can be run over Fourth Avenue to Ryan Avenue and Rainier Boulevard, and eventually connect with the Highland Park & Lake Burien Railroad. It is also planned to construct a branch line out Virginia and Fairview Streets and thence to the University district, but these plans are only tentative.

The Lake Burien line was built by a group of capitalists some years ago from West Seattle to Lake Burien, a distance of 9 miles. The road was promoted by persons who owned property near Lake Burien, and the first car was operated on July 1, 1912. For four months an intermittent service was maintained, and then a slide covered the track for a mile and operation was abandoned. The line has lain idle until recently when it was turned over to the city free of all incumbrances by the owners, on condition that the city maintain a service so that the property owners along the road who subscribed to the funds for the road's construction might have access to Seattle. The council immediately appropriated $25,000 to be used in rehabilitating the right-of-way, half of which is in the city limits, and at this time the line is practically ready for use. Of the $25,000 appropriated by the Council to be used in preparing for operations, $7,500 will be utilized in the construction of a substation at Ninth Avenue Southwest and West Trenton Street. The Board of Public Works was recently authorized to purchase the site and receive bids for construction and for furnishing equipment.

Seattle Municipal Railway—Example of Rehabilitation Work on Highland Park & Lake Burien Railway

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In a recent issue of the Jacksonville (Fla.) *Times-Union* is an account of a banquet tendered by Hardy Croom, manager Jacksonville Traction Company, to the motormen and conductors of his line for the splendid manner in which they handled the crowds in Jacksonville during Reunion Week. The men attended the banquet in relays, which enabled every man to partake of Manager Croom's hospitality without interfering with the service of the line. Mr. Croom received a letter from the Jacksonville Board of Trade highly commending the men for their splendid service.

MASTER MECHANICS' CONVENTION

The forty-seventh annual convention of the American Railway Master Mechanics' Association was held in Atlantic City June 15-17, following the convention of the Master Car Builders' Association, which was held during the latter part of the previous week. At the convention a considerable amount of attention was devoted to questions of fuel economy, which included consideration of such matters as smoke prevention, and the development of mechanical stokers, superheaters and other means for reducing fuel consumption. The committee on fuel economy presented a report in which it was stated that tests of superheater locomotives had shown savings in fuel amounting to as much as 25 per cent, though somewhat less than this was to be expected in regular service. The brick arch was stated to affect about 10 per cent economy in fuel in addition to its ability to maintain a constant temperature in the firebox. No novel methods of effecting fuel economy were brought out in the report, the committee's conclusions being in the form of recommendations for the exercise of care in the selection of fuel and use of specifications in its purchase as well as in keeping accurate coal records. The importance of good boiler feed water was mentioned, treating plants being desirable in many cases as the savings due to the reduction of scale and decreased boiler maintenance would pay for the cost of treatment. Emphasis was laid upon the necessity for close co-operation between engineers and firemen and between these men and their supervising officers with regard to the economical use of fuel.

LOCOMOTIVE STOKERS

The report of the committee on automatic stokers for locomotives was largely a summary of present installations. It appeared from data furnished in the report that a mileage of 40,000 per stoker failure had become easily possible. Some fourteen roads were operating stokers on more than one locomotive each, the Pennsylvania lines west of Pittsburgh having 301 and the Baltimore & Ohio 193. All told there appeared to be 726 automatic stokers now in service. These were of six different types, of which two held the field to the practical exclusion of the remainder. Five other types of stokers were reported to be under development, but none of these had yet been built.

The report stated that when the demands upon the boiler were fairly uniform, permitting a regular feed of coal, the operation of the stoker practically took care of itself, but in the absence of automatic manipulation manual control did not always result in efficient regulation of the fire. The boiler was allowed to blow off more than necessary and there was some tendency, through neglect, to allow the fire to get low while the engine was standing on the road. It was still a question as to whether run-of-mine or screened coals were economical. There were few data to show the relative fuel consumption between hand firing and stoker firing, but the experience gained during the year seemed to give color to the belief that the stoker was not necessarily a coal-saving device. It appeared that, though the coal consumption increased as the coal became finer in character, the stoker was better than hand firing to maintain steam with fine coal. The committee expressed doubt as to whether less smoke was produced with stoker firing than with hand firing.

HEAT-TREATED STEEL

The committee on the use of special alloys and heat-treated steel in locomotive construction reported that the term "heat treatment" generally covered two principal classes, one being forgings which were annealed, or heated slightly above the critical temperature and then allowed to cool slowly, and the second being forgings which were quenched or cooled rapidly after heating to a temperature slightly above the critical point. Replies to a circular of inquiry were received from a number of railroads, and in these there seemed to be some doubt as to the meaning of the term "heat treated." Where the replies referred to frames and steel castings it was probable that they meant annealing only, while in case of other parts, with the possible exception of springs, it might be assumed that the heat treatment covered quenching and tempering. Briefly, the replies indicated that, among thirty-seven railroads, four were using heat-treated steel castings and carbon-steel frames. Two roads were using heat treatment for main and parallel rods, nine for piston rods and twelve for axles and crank pins. Only two roads were using it for tires and wheels, as compared with five one year ago. One road had discontinued its use altogether on account of unsatisfactory service. The use of heat-treated carbon steel appeared to be still experimental and did not appear to have been appreciably extended, according to the committee's report.

Seventeen roads were using vanadium-steel frames, nine more than last year, and ten roads were using chrome-vanadium steel for main and parallel rods, nine for piston rods, four for valve-motion parts, twelve for axles and crank pins, and thirteen for tires and wheels. Many of these roads considered the use experimental only. The reports indicated that chrome-vanadium steel provided a considerable increase in wear over plain carbon steel. Tests showed that parts of case-hardened carbon steel wore much better than corresponding parts of quenched and tempered steel. However, vanadium-steel axles and driving tires appeared to be capable of considerably more wear than the same parts made of carbon steel.

The replies to the circular indicated that the method of heat treatment was an active cause of failures in both heat-treated carbon steel and alloy steel. That is, unless the quenching and tempering were properly done there was danger of checking and the production of cracks and unequal stresses. In designing locomotive parts the general practice was to use the same working stresses for heat-treated carbon and alloy steels as for plain carbon steel on account of lack of experience with the former materials.

Thirteen railroads reported the use of vanadium springs principally for test purposes, and one of these roads stated that vanadium springs did not reduce the number of spring failures in spite of the stronger physical properties. The remaining twenty-six roads that replied were using springs of 0.90 to 1.10 carbon steel. Vanadium springs were reported as designed with a fiber stress of 100,000 lb. per sq. in. which is indicated by experience to be a safe value, whereas carbon-steel springs were usually designed with a fiber stress of 80,000 lb. per sq. in.

But little quenching or tempering of carbon or alloy steel was reported by the railroads in their own shops, it being the general policy to leave this operation to the steel manufacturer, and the result was that no generally accepted practice had been developed. Due to the lack of a generally accepted method for proof-testing axles that had been quenched and tempered certain railroads had modified the usual drop test to suit the conditions. Impact tests of axles were made for the purpose of detecting flaws which might have developed in the course of quenching and tempering. Test pieces for the tension test were also used in some cases, but such tests did not determine the soundness of the axle as a whole and served only to determine physical properties of the material from which it was made. The report included a curve which showed that on the Pennsylvania Railroad, tests for heat-treated axles were made on an M.C.B. drop with a spring anvil, the tup weighing 1640 lb., and the axle being on supports 3 ft. apart. A 9-in. axle called for a drop of 7 ft., or nearly 12,000 ft. lb., as a proof test, and a 5-in. axle called for a drop of 1 ft. 4 in., giving a 2000-ft. lb. blow. On the New York Central lines the tests were made on solid anvil supports about 57 in. apart, and a 9-in. axle was required to stand, for a proof test, a blow of 9000 ft. lb., the drop being 5 ft. 6 in. A 5-in. axle called for a 6-in. drop and a blow of approximately 1000 ft. lb.

The committee reported a strong tendency among users of quenched and tempered steel to require a drilling of parts over 7 in. diameter, and this practice was advocated by steel makers. In the case of axles and crank pins particularly, drilling took away practically nothing from the strength of the part, and it removed material from the center where defective metal was most likely to exist and where it was least subject to the beneficial effects of heat treatment. In addition drilling allowed the forging to adapt itself to expansion and contraction while being heated or cooled. The toughness of properly quenched and tempered carbon steel was demonstrated by an illustration of a hollow-bored crank pin that accompanied the report. In this the hole was badly distorted and partly closed without any evidence of cracking in the material. Properly manufactured and treated alloy steel of different kinds had shown that it was capable of a remarkable amount of bending and distortion without fracture, and it was the belief of the committee that the manufacture of plain carbon and alloy steel, intended for quenching and tempering, would eventually be developed to the point where such material could be used in designs involving much higher unit working stresses than were possible with untreated or annealed plain carbon steel.

LOCOMOTIVE HEADLIGHTS

The report of the committee on locomotive headlights outlined the results of a series of tests made during 1913. The recommendations of the committee were that, in order for a headlight to be of such intensity as would avoid misreading of signals, obscuring of hand signals, fuses, red lanterns and classification lamps by opposing headlights, and to avoid the temporary blinding of the enginemen looking into it, the headlight should have an apparent beam not greater than 3000 cp, referred to the center of a horizontal reference plane 3 ft. above the rail at a distance between 500 and 1000 ft. ahead of the locomotive.

On the other hand, to provide sufficient illumination ahead of the engine to allow ready performance of the engineer's duties while operating in and out of passenger terminals and industrial sidings and while switching, and to permit ready location of whistle posts, yard limit and crossing signs, a headlight should not, at any time, have an apparent beam less than 450 cp at a distance of 500 ft. ahead of the focal center of the light and not less than 500 cp at a distance 1000 ft. ahead of the focal center. The reading at a point 20 ft. each side of the center line of the beam should be not less than 30 cp at a distance of 50 ft. ahead of the focal center, and not less than 300 cp at a distance of 400 ft. ahead of the focal center. As these readings were expressed in apparent beam candle power they would be considered independent of the source and intensity of the light, the design of the reflector and other features of the headlight design.

In general it was found that the headlights of very high intensity, such as called for by some States whose laws require headlights of 1500 unreflected candle power, were actually dangerous.

New Hydroelectric Plant of the Salmon River Power Company

A Hydroelectric Plant Recently Put Into Commission in Central New York to Supplement the Output of the Niagara Falls Plant of the Ontario Power Company—The New Plant Has Been Leased in Perpetuity to the Niagara, Lockport & Ontario Power Company

The Salmon River Power Company was organized to develop the power of the Salmon River, a stream which flows from the foothills of the Adirondacks in a westerly direction through the northern central part of New York State into the eastern end of Lake Ontario. While the length of the stream is only 44 miles, it drains a watershed remarkable from the hydraulic standpoint in that over a tributary area of 190 square miles there is an average annual rainfall of about 60 in. In addition, the river falls 650 ft. in the 17 miles between Stillwater and the lake and more than 400 ft. in a distance of less than 8 miles. At Salmon Falls the drop is 110 ft. While the flow of the stream is somewhat irregular, the valley above the Salmon Falls is of a form suitable for storage purposes. Moreover, the location of the site is such as to enable the power company to dispose of the entire output of the plant to the Niagara, Lockport & Ontario Power Company, which has leased the property in perpetuity and acquired all its capital stock. The latter company draws its supply at present from the plant of the Ontario Power Company at Niagara Falls and from its own steam plants at Lyons and Auburn. It can utilize the full output of the new plant to advantage in combination with the other three.

THE HYDRAULIC WORKS

From the hydraulic standpoint the features of interest are the concrete dam and spillway situated near Stillwater, the artificial lake about 8 miles in length and 5½ square miles in area, impounded by it, the 2-mile conduit of wood-stave and steel pipe, the distributer in which the conduit terminates, the enormous and novel surge tank, the Johnson valves in the penstocks, the penstocks themselves, the turbines and their governors, and finally the tailrace.

The Salmon River is of the kind found all through the lake district of central New York. The riverbed is at the bottom of a narrow valley with rather steep hills rising on both sides. At places the valley widens considerably, as, for example, just above Salmon Falls; at others it narrows into a gorge with steep banks, as at Stillwater. By the location of a dam at the latter point with a crest at an elevation of 935 a large area was submerged with little loss of property, as the valley is sparsely settled. The height of the dam crest is limited to about 935 ft. unless more extensive dikes are built to prevent diversion of the water into the watershed of the streams draining into Oneida Lake, several of which take their rise on the south side of a narrow ridge which parallels the Salmon River closely on the south. The artificial lake impounded by the dam has a capacity of 2,600,000,000 cu. ft. with a dam crest at 935 ft. and, at the average rate of flow of the stream, about twenty days are required to fill it. With the crest at this height the average net head produced at the power house less than 2 miles away is 245 ft.

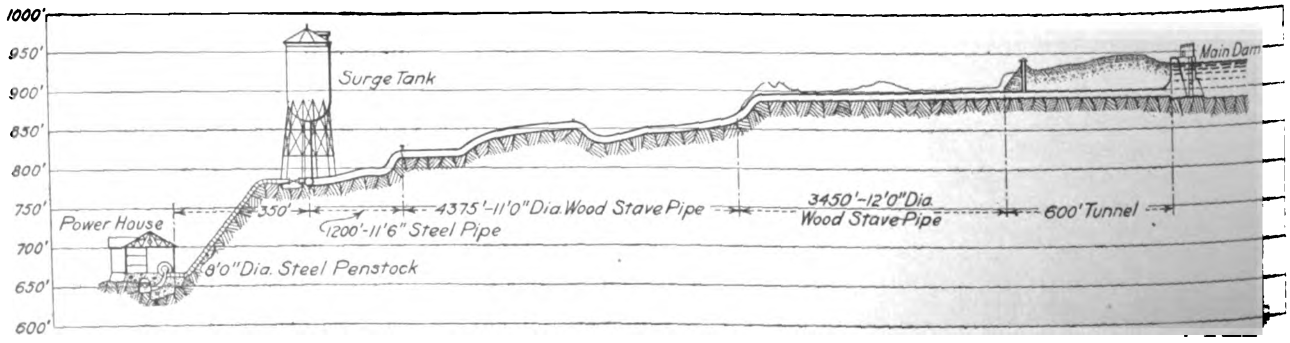
On the down-stream face of the dam is a 25-hp Pelton wheel for the gate drive, connected by long shafting and bevel gearing to a longitudinal shaft in the gatehouse. By means of clutches the gate-raising mechanism is connected to this shaft.

The conduit connecting the dam and the power house consists of five sections, a 600-ft. reinforced concrete-lined tunnel drilled through rock, a 7825-ft. length of wood-stave pipe, a 1200-ft. length of steel pipe, a steel distributer and four short penstocks.

The more novel features of this plant are found in and near the power house. On the crest of the ridge just behind are not only the most conspicuous but also the most original elements of the hydraulic equipment. First there is the distributer, a 12-ft. steel pipe made of ⅝-in. plate 210 ft. in length and joined at one end to the pipe line in a huge concrete anchor block. The other end is closed by a bulkhead. The distributer is inclosed in concrete. The elevation of the bottom of the distributer is 775 ft., or 160 ft. below the crest of the dam.

From the center of the distributer a 12-ft. riser branches off to a surge tank. The surge-tank riser joins the distributer with easy curves, but a novel and cheaper connection is made to the penstock intakes, 8 ft. in diameter. This is a simple flanged and riveted joint, which would, without some modification, produce eddies and loss of head. To prevent such, wooden fillers suitably rounded off are secured around the mouths of the intakes inside the distributer.

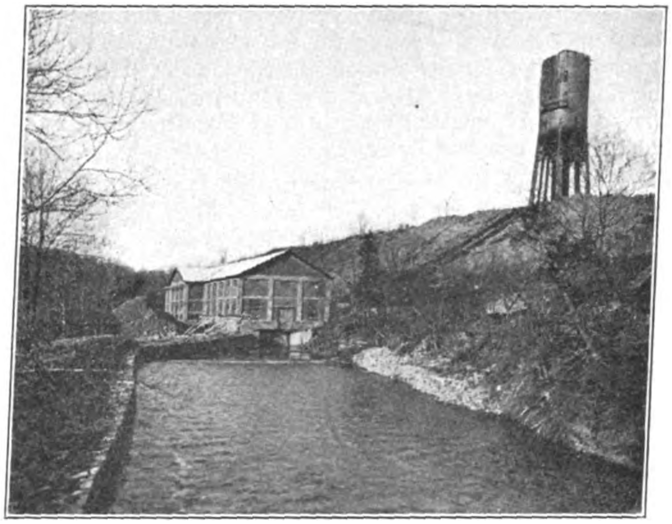
The surge tank consists of a cylindrical shell, 50 ft. in diameter and 80 ft. high, surmounting a hemispherical bottom which adds 25 ft. to the height. Its capacity is, therefore, 1,400,000 gal. The tank is supported on ten columns with heavy concrete footings. It and the riser are housed in with a framed wooden structure providing a surrounding air space which can



Salmon River Power Development—Diagrammatic Section of Hydraulic Works be heated when necessary from a small house below. The top of the roof of this structure is 205 ft. above the ground, and the top of the tank is high enough above the crest of the dam so that if the flow of the water in the pipe line were suddenly interrupted its energy would be absorbed by the rise in level in the tank without overflow.

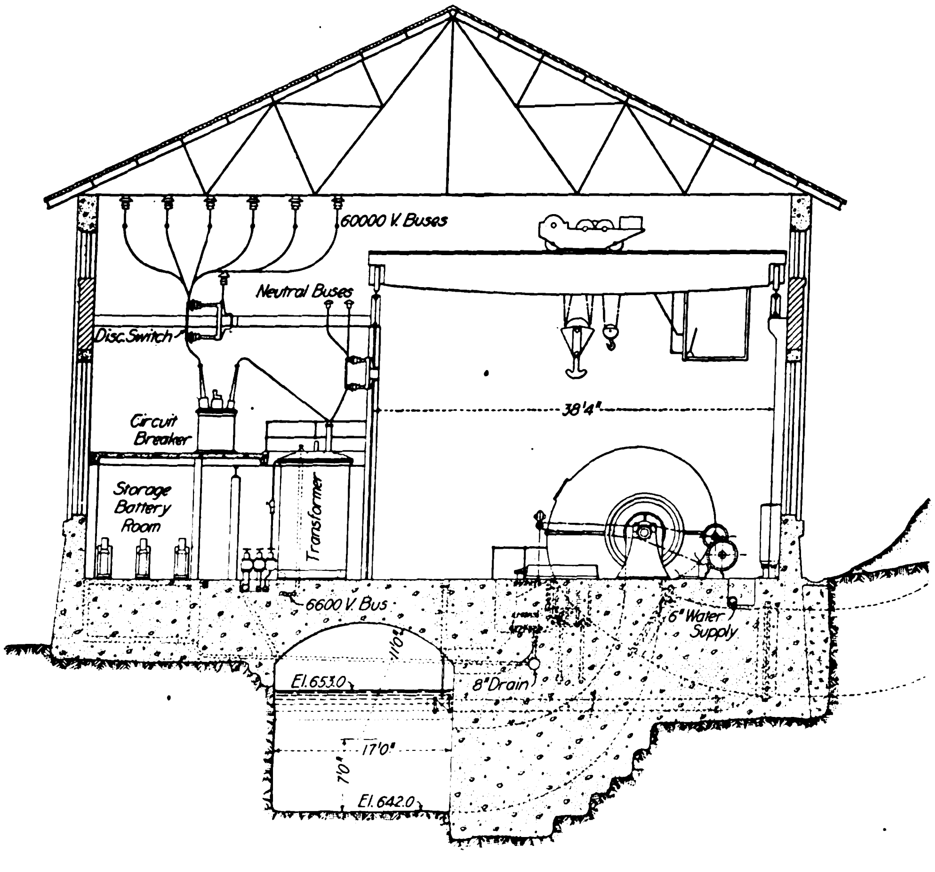
The four 8-ft. penstocks are connected to the intakes through valves of a type which represent a comparatively new development in hydraulic practice. They operate under a head of nearly 154 ft. The valve used is the invention of R. D. Johnson. It was built by the Wellman-Seaver Morgan Company. The valve is shown herewith in diagrammatic section. The principle of operation is that a plunger, *C*, slides in a cylinder, *B*, enclosed in the shell, *A*, being closed through a two-way valve by penstock pressure through the left-hand horizontal pipe and vertical pipe 2. The valve seat is furnished by the bronze rings *E*, *E*. The valve opens when pipe 2 is connected to the drain.

Below the valve houses are the four 8-ft. penstocks, anchored above and below in heavy concrete blocks, and laid in trenches and entirely back-filled. The steel plates vary in thickness from ½ in. on the upper horizontal portion of the penstocks to ⅞ in. at the lower end where they enter the power house.



Salmon River Power Development—Power House, Surge Tank and Tailrace

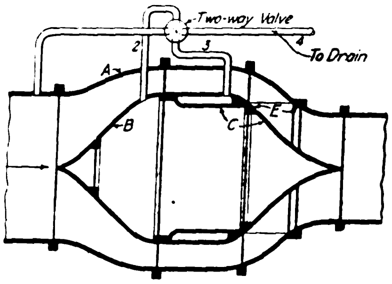
The four turbines are of the Francis horizontal, single-spiral, double-discharge type of 10,000-hp rating each. They are provided with outside, balanced wicket gates operated by Lombard governors. These machines have guaranteed efficiencies of 82 per cent at full load, 85 at three-quarters load, 80 at half load and 70 at quarter load. The specifications on governing permit not more than 15 per cent increase in speed above the normal value of 375 r.p.m. on the sudden removal of full load, 6 per cent for half load, 3 per cent for quarter load, and 1.5 per cent for tenth load. The turbines are provided with heavy flywheels to assist in governing and to facilitate the operation of the electrical equipment of the plant in parallel with the Niagara, Lockport & Ontario Power Company's system. The turbines are provided with relief valves operated by the governors, so that the sudden checking of overspeed cannot result in an excessive rise of pressure.



Salmon River Power Development—Section of Power House

THE POWER HOUSE

The building is rectangular with a projecting feeder bay.



Salmon River Power Development — Diagrammatic Section of Johnson Hydraulic Valve

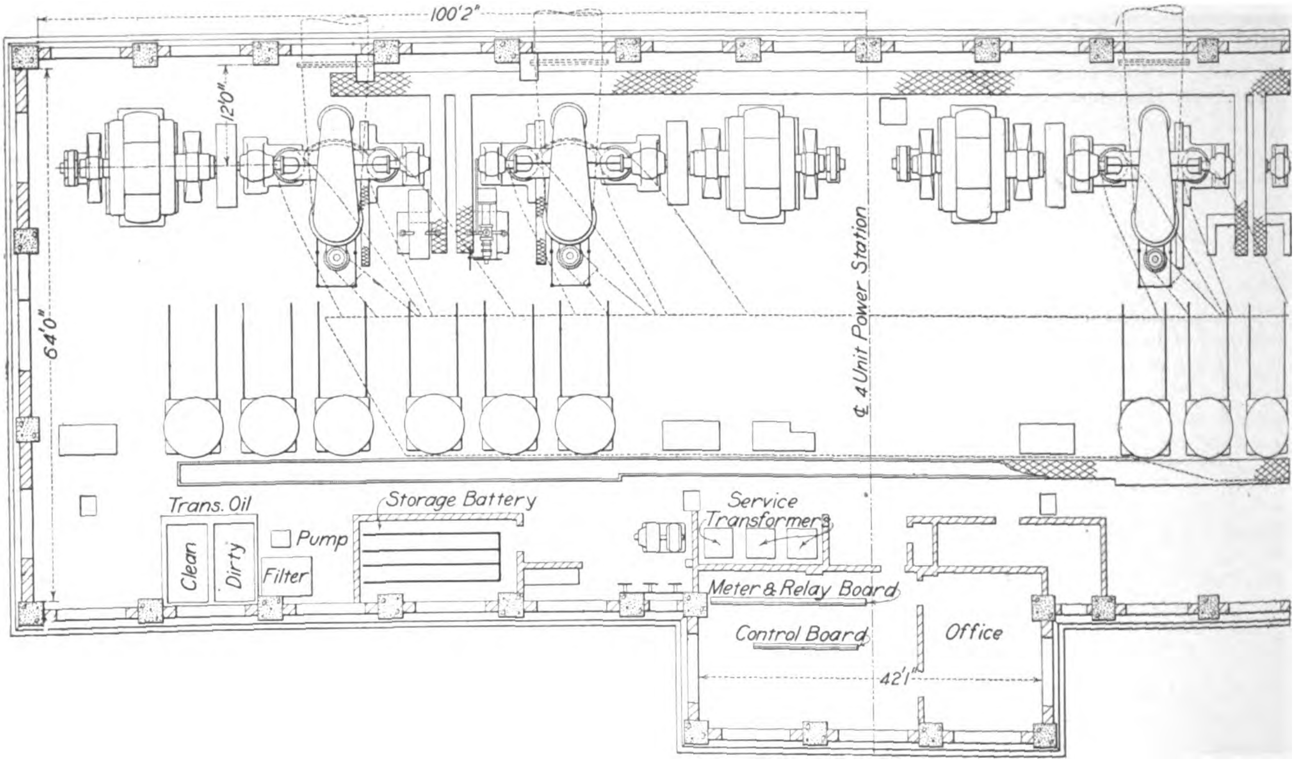
The interior is open to the roof and, with the exception of a gallery about 12 ft. above the main floor on the feeder-bay side, forms one great room. It is served by a 40-ton Shaw electric crane with main and auxiliary hoist all driven by 250-volt d.c. motors. The crane has a 38-ft. span and the runway covers the entire length of the building.

Each of the four electrical generating units consists of a 375-r.p.m., 6600-volt, twenty-five-cycle, 5600-kva, three-phase generator with exciter mounted on an extension of the shaft; three 2200-kva, single-phase, twenty-five-cycle transformers with a normal ratio of 6600 volts to 34,650 volts, with high tension in star, giving 60,000 volts line voltage; a 6600-volt, 1200-amp, triple-pole, single-throw, type "C" oil circuit-breaker, automatic for reverse power, and the necessary connecting cables and auxiliaries. Each unit is thus as nearly self-contained as possible.

The generator is of standard form except that the pole faces are furnished with damping grids and the shaft is made exceptionally rugged on account of the use of the heavy flywheel. It is of the semi-inclosed type, and the method of ventilation is interesting in that all the cooling air may be discharged through a single large opening in the top of the frame. It is designed to operate either as a generator or as a synchronous condenser, the plant being meant to be used both for energy generation and for voltage and power-factor regulation. The generator has rated capacity at 85 per cent power factor, and it is designed to carry 20 per cent overload. It is capable also of operating at full current output up to 7500 volts.

On account of the special nature of this plant, the specifications call for high efficiency at half and quarter loads. The accompanying table shows the required values.

		Per Cent Efficiency at Indicated Percentages of Full-Load Current				
Volts	Power Factor	25	50	75	100	120
6600	100	89.6	93.8	95.1	96.1	96.4
6600	85	87.3	92.2	94.0	95.0	95.5
7500	85	86.1	90.8	93.2	94.5	...



Salmon River Power Development—Plan of Power House

Excitation for each generator is furnished by a separate directly connected shunt-wound exciter, each generator requiring from 125 amp and 125 volts at no load, normal voltage, to 235 amp and 245 volts at 7500 kva and 7500 volts. The exciter is adapted to voltage and power-factor control by the Tirrill regulator.

The main transformers are water-cooled, and each set of three is star-connected on the high-tension and delta-connected on the low-tension side. Like the generators, the transformers are designed for high efficiency at light load, the full-load copper loss being 30.8 kw and the core loss 16.7 kw. The specified regulation is 1.55 per cent at full load and 100 per cent power factor, and 4.15 per cent at 85 per cent power factor.

The transformer cases are mounted on flanged wheels rolling on tracks, this mounting permitting the bringing of the transformers into the field of the crane. The usual provisions are made to drain the cases of oil and to clean and dry the oil. Three 100-kw self-cooled transformers are used for general service about the plant, stepping the voltage down from 6600 to 220. These are delta-connected on both sides.

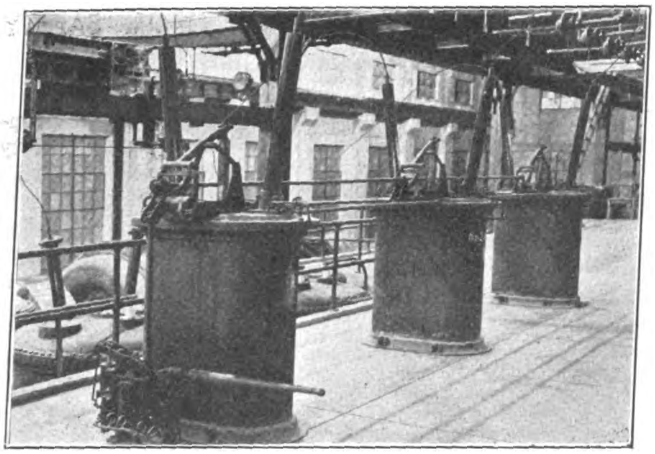
The busbars, circuit-breakers, control switchboard, etc., are placed in galleries at one side of the turbine room and in the small bay already referred to. The high-tension busbars, which are in duplicate, are hung directly from the roof, and a row of disconnecting switches is mounted just below them, a switch as well as a circuit-breaker being in each line on the line side and on the transformer side. The line and transformer circuit-breakers are on the upper gallery, and all connecting wires are No. 0000 hard-drawn trolley wire, which is of sufficient stiffness to avoid the necessity of many supports. On the lower or main floor under the gallery are the generator circuit-breakers, the main and service transformers, the service circuit-breaker structure, the storage battery for switch operation, the oil storage, cleaning and drying equipment and auxiliaries.

The feeder bay, referred to before, has two floors, the lower of which contains the superintendent's office and the control switchboard. The switchboard is of the vertical panel type. It is, of course, quite remote from the turbine room. Above the switchboard room is the line entrance chamber with choke coils and the line "disconnects."

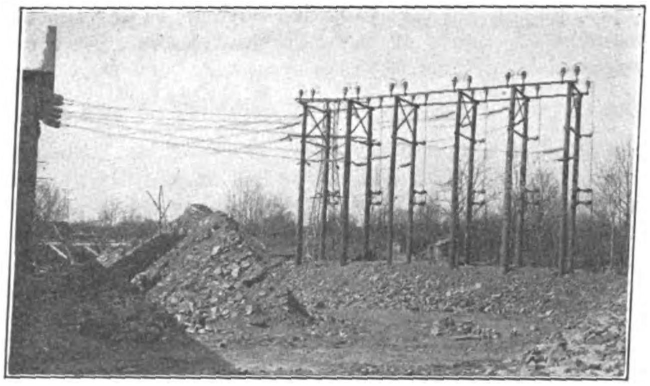
THE TRANSMISSION LINE

The line which connects the generating plant at Bennett Bridge with the substation of the Niagara, Lockport & Ontario Power Company at Solvay, near Syracuse, is approximately 42 miles long and comprises two circuits.

The line conductors are of No. 0000, seven-strand cable, hard-drawn copper. The elastic limit of this is not less than 35,000 lb. per square inch and the ultimate strength 50,000 lb. Permissible elongation in 10 in. is not less than 1.5 per cent and as nearly 2 per cent as possible. Conductivity is at least 98 per cent of Matthiessen's standard. The lines are protected for a distance of a few miles at each end by three ground wires,



Salmon River Power Development—Circuit-Breakers in Power House



Salmon River Power Development—Terminal and Lightning Arrester Structure

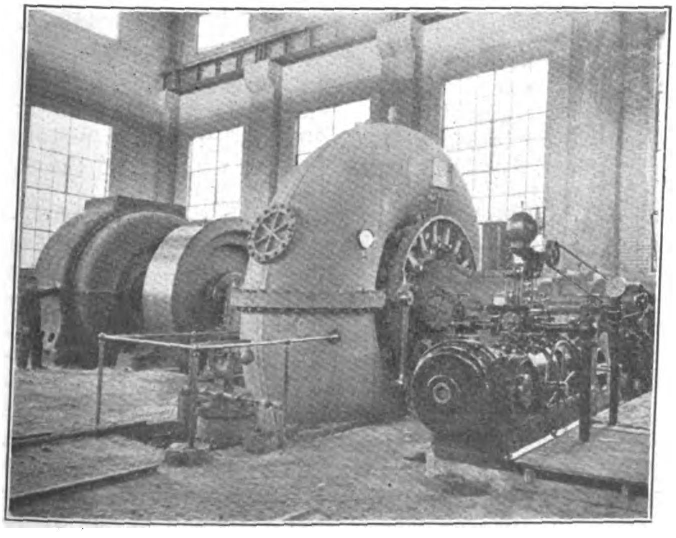
and for the rest of the way by two ground wires. These ground wires are of galvanized Siemens-Martin steel strand. A telephone line of ¼-in. copper-clad steel is carried directly on the transmission towers.

Starting at the line circuit-breaker each line wire first includes an oil-immersed choke coil, passing thence to a disconnecting switch mounted high in the terminal chamber. The wall entrance is through a 36-in. tile set in the wall at an angle and containing a concrete diaphragm supporting a multi-sleeve porcelain bushing.

Outside the power plant is a structure built up of 50-ft. wooden poles and cross-arms and serving several purposes. It acts as an angle and strain tower, taking up all line tension and starting the line off in the proper direction. The topography of the station site is such as to make this necessary. It carries the horn-gap arresters and fuses which furnish the lightning protection for the station, keeping this apparatus at a suitable distance from the latter. Each line wire is attached to the station wall by two strings of insulators set at an angle thereto, to prevent swinging of the entrance wire, and to the angle tower by a single string at each of two points.

Each lightning arrester consists simply of two electrically parallel, grounded horn-gaps, one longer than the other. The shorter gap is grounded through a fuse.

The Salmon River line is to be tied in with the Niagara Falls plant of the Ontario Power Company, acting in general as a source of energy but occasionally as a synchronous condenser plant. Towers of unusual strength for such lines were therefore installed. The specifications called for the following test load strength: For the standard towers, a load of 4000 lb. applied in a horizontal direction at any one of the conductor or ground-wire supports, or a horizontal load of 12,000 lb. applied at the center of the tower at the middle cross-arm, or a vertical load of 2000 lb. applied at any insulator or ground-wire support, should not produce failure or permanent distortion of any member. For the strain towers of standard type the corresponding figures are 4000 lb., 30,000 lb. and 2000 lb. The towers are heavy, not only on account of the great strength called for, but also because a very liberal allowance was provided for clearance to prevent the line wires from swinging together. The standard towers are designed for spacing ten to the mile.

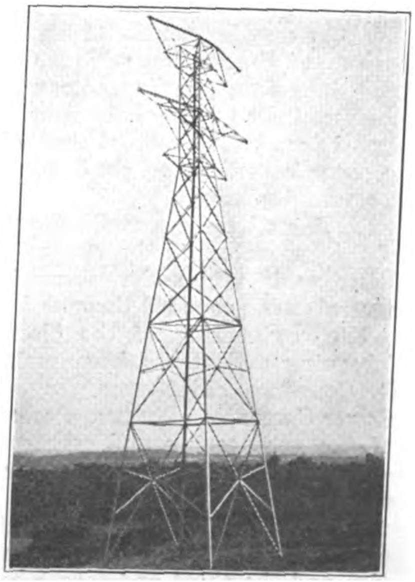


Salmon River Power Development—Illustration Showing Generating Unit

The towers are of the square, rigid type, the arrangement being as shown in the accompanying illustration. The height of the standard tower is 44 ft. to the point of support of the lowest insulator, and provision was made for extensions to be applied to the bases to raise some towers from 10 ft. to 20 ft. higher. While the insulators are placed in general one above the other, the middle one is offset. The vertical distance between cables is 8 ft., and the middle one on each side projects beyond the uppermost and lowest a distance of 6 ft.

The towers carry four cross-arms. The top one is for the ground wires and below it are two short arms and one long one, all carrying strings of insulators at both ends. About one-fourth of the towers are strain towers, and there are several special towers constructed to comply with the regulations of the steam railroads which have to be crossed. The parts of the tower are galvanized after manufacture, and all bolts, nuts, washers, clamps and other small parts are sherardized.

All of the footings for the standard towers are of structural steel



Salmon River Power Development—Transmission Line Tower shapes, galvanized and provided with holes for the attachment of timber or other structures for adaptation to special conditions.

SPECIAL DESIGN AND OPERATING FEATURES OF THE PLANT

From the above description it is evident that the plant of the Salmon River Power Company is unusual in a number of particulars. It is designed to operate in parallel with a plant six times as large as itself, situated 200 miles away by transmission line. Its characteristics must be such that it will carry a proper proportion of the load. The smaller plant must be protected from the effects of excessive loads on the line and of short-circuits within itself. For this reason, as will have been noted, the design of the generators is such that they will not be injured by any attempted draft of excessive current, a large inductance being allowed for this purpose.

From the operating standpoint the design of the plant involved studies of the following features: (1) The kilowatt rating of the plant in relation to the stream flow and the load characteristics, to the end that its output might be utilized to the best advantage. (2) The speed regulation of the plant, to the end that it should take its share of both slow and rapid load variations. (3) The regulation of the voltage of the plant, to the end that it should give a uniform voltage at any desired point on the transmission system. (4) Provision for utilizing the plant for power-factor regulation in the line and, when it is not carrying active load for one reason or another, for using it as a great synchronous condenser to draw leading current and thus improve the power factor of the load on the Niagara Falls plant. Some of the interesting engineering features adopted as a result of these studies are as follows:

The heavy flywheels were installed on the generating units for the purpose of increasing the flywheel effect of the rotating parts to a value equal to that of the units at Niagara Falls. The energy storage thus provided, by improving the speed regulation, will enable the plant to take its share of momentary overloads. For the present the load will be regulated by hand on telephone orders from a central point such as Syracuse. It is possible that automatic control of load will be provided later. For the purpose of improving the operation of the generators as synchronous condensers, amortizing windings were provided in the pole faces.

Among other provisions for insuring satisfactory operation may be mentioned the extra insulation of that portion of the station wiring directly exposed to line conditions from the line entrance to and including the line terminals of the choke coils. The insulation is designed for 110,000 volts so that failure is no more likely to occur here than on the line. The high-tension busbars are duplicate.

Provision has been made for grounding the neutrals of the generators in the station, but the desirability of doing so is still under discussion. The transformer neutrals are grounded through high resistance.

The engineering of the plant as described in the foregoing article has been under the direction of V. G. Converse, chief engineer of the Salmon River Power Company. Barclay, Parsons & Klapp had charge of the engineering and construction of the dam and acted as consulting engineers for the entire work. The plant was put into operation on April 10, 1914, and is now operating with entire satisfaction, carrying daily a maximum of 15,000 kw. Two units are now in operation and the third and fourth are in process of installation.

EMPLOYEES OF INSULL PROPERTIES FORM "SAFETY FIRST" ASSOCIATIONS

The employees of the southern Indiana Insull properties have been organized on an independent "safety first" basis, the shop men, the train men, the construction men and the water and lighting and gas operations men each being organized in separate groups, involving altogether some 400 men. On June 11 the shop men of the Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company were organized into the "Safety First" Association, shop men's division, while the next day the trainmen of the two roads and the employees of the gas, water and electric companies of Jeffersonville and New Albany, Ind., were organized. Monday saw the track construction men of the two companies and the electrical construction men organize their division. Each of the four divisions will work through committees which will report in turn to a general committee formed of the heads of the four divisions. Recommendations and suggestions as to policy will reach the officials of the several companies through the members of this general committee. Sufficient inducements will be offered for good suggestions to keep the interest of the men at a high pitch. Heretofore the "safety first" work with the men has been directed by the officers of the company. The men have held quarterly meetings, which have been presided over by representatives of the company. Hereafter the men will direct their own work. As a result of "safety first" work, not a single accident was reported on the Insull lines for the first twelve days of June.

SOCIETY FOR ELECTRICAL DEVELOPMENT

The Society for Electrical Development held its second annual meeting on June 1 at the Bellevue-Stratford Hotel in Philadelphia. J. M. Wakeman, general manager of the society, reported that the funds necessary to begin active work had been pledged. The work has been divided into the following sections: fields of co-operation, new development, commercial exchange bureau, and editorial and advertising. The society staff is made up as follows: G. B. Muldaur is in charge of the first section work and he is assisted by R. N. Lee. This work will consist of the formation of co-operative leagues to aid architects and builders in arranging for complete electric service. Mr. Muldaur will also bring the text-books and lecture courses up to date. J. P. Mallett will investigate present uses of electricity in the various industries and study the extension of these applications. Theodore Dwight will secure and index information regarding the uses of electricity. Other departments with the men in charge are as follows: news and advertising, H. C. Spaulding; motion picture department, L. G. Harkness-Smith; window trimming, A. J. Edgell.

The society membership now includes 298 central stations, 186 manufacturers, 272 jobbers and dealers, 588 contractors and 23 others. The following officers were elected to serve for the ensuing year: President, Henry L. Doherty; vice-presidents, W. H. Johnson, A. W. Burchard, W. E. Robertson, J. R. Crouse, Ernest Freeman; general manager, J. M. Wakeman; acting secretary and treasurer, James Smieton, Jr. The executive committee will be H. L. Doherty, Ernest Freeman, A. W. Burchard, J. R. Strong, Gerard Swope, L. A. Osborne, W. E. Robertson, J. R. Crouse and W. H. Johnson. Mr. Johnson was elected chairman of the executive committee.

Report of Committee on Cost of Passenger Transportation Service

Abstract of a Review, Prepared for the Committee of the American Electric Railway Association, of Studies of the Fare Situation and Cost of Urban Service

A report has been prepared for the committee on the cost of passenger transportation service of the American Electric Railway Association to review the work done in recent years in the study of the fare situation and the cost of urban service. This report has been made public by the committee in connection with the inauguration of the work of the Bureau of Fare Research of the Association. An abstract of the report follows.

Your committee has considered it important at the outset of its investigations through the Bureau of Fare Research to present in review what has been accomplished by previous studies of the cost of urban passenger transportation service.

PURPOSE OF THE REPORT

The main purpose of such a presentation is to point out differences in the method of determining such costs, differences in the pertinent facts as found by various investigators, and conflicts of opinion as to the most practicable solution to the problem of unremunerative fares where they exist, in order that the scope of the future work of the Bureau of Fare Research may be defined. Another purpose for the present report has been to emphasize the seriousness of the urban fare problem and the urgent necessity which now prevails in many cases of obtaining some form of relief if the transportation service upon which the municipalities are dependent is to continue to contribute to their development. The bureau has not as yet considered the questions of interurban service, nor has it extended this review to cover the traffic characteristics of subway or elevated urban traffic.

The widespread dissatisfaction with present fares arises from the belief that the present rates are generally inadequate to furnish city traction companies a reasonable return upon the investment necessary to provide the service demanded, that present rates are not suited to best development of the community served, and that unless radical changes are made in the rates or in the application of the rate of charge to the kind of service and the area served, the development of the business, already retarded, will be brought to a standstill with consequent injury to the community as well as to present investors.

REASONS URGED FOR INCREASE

The reasons which have been urged for an increase in the rate of fare relate principally to changes in operating conditions which have occurred since the present cash fares were made effective. These reasons and some of the facts which have been cited to support them are as follows:

a. The area within which the flat rate applied has been continually expanding, carrying with it a greater demand for service facilities at the same price. According to statistics gathered by Mr. Davis, of Ford, Bacon & Davis, covering sixteen typical American cities, this increase in area has ranged as high as 70 per cent for the ten-year period from 1900 to 1910 and the increase in area of all cities examined since 1870 has been substantial. [These statistics were presented by Mr. Davis at the 1911 midyear conference of the American Electric Railway Association and were published in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911.—EDS.] The growth of the area served unless it is accompanied by a corresponding increase in the number of fares per mile of track, or per car mile operated is one of the controlling factors of the increase in the cost of service.

b. Similarly the length of the longest haul possible for one fare has steadily increased with the expansion in area served. The increase in longest haul has carried with it an increase in the actual average haul per passenger, and a consequent increase in the amount and cost of service for the same fare. According to the figures cited by Mr. Davis, the longest possible haul in sixteen representative cities in 1910 ranged from 7.76 miles to 20 miles, and has in instances doubled within the period from 1890 to 1910.

TRANSFER TRAFFIC INCREASING

c. The proportion of transfers to revenue passengers is constantly increasing and at a rate far greater than the increase in earnings. According to the figures cited by Dr. Conway, in the "Annals of the American Academy of Political and Social Science," while this proportion on Chicago street railways was 4.6 per cent in 1884, it had increased to 58.6 per cent in 1909. Upon the New York City Railway, according to the data cited, the proportion of transfers to revenue passengers has increased from 1.10 per cent in 1888 to 55.13 per cent in 1907. This tendency has been so general that similar changes may be noted from the operating report of almost any American street railway. As a result of the growth in passenger traffic riding on transfers, the average fare per passenger carried has steadily decreased, until in some instances the average fare per passenger carried is below 3 cents. The cost of service per passenger is dependent partly upon the distance hauled. In a large measure, however, it is dependent upon the number of passengers carried, since the cost of stops, the liability of accident, the expense of supervision and many other expense items are not controlled by the number of revenue passengers but by the total number of passengers carried.

d. The demands for service during peak hours are continually growing. To provide for such service the utility must, in addition to its regular cars, provide extra or tripper service. Such service requires additional cars, additional car storage capacity, additional power plant capacity, etc., all of which are only in use a small portion of the day. The cost of injuries and damages, and the supervision of transportation, are greater during rush hours, and it is often impossible to procure services of conductors and motormen during such rush hours at rates per hour which would obtain were the employment extended throughout the day. While these facts are generally known to the industry, aside from isolated instances, no comparative data have evidently been published as to the extent and increase of the amount of peak-hour service.

INCREASES IN COSTS OF MATERIALS AND LABOR

e. Large increases have been sustained in both the cost of material and labor, and this factor alone, independent of the traffic conditions enumerated, has served to make present rates of fare unremunerative. Dr. Conway, in his analysis of the reasons for decreased returns of urban street railways, cites United States Bureau of Labor reports as disclosing "that average wholesale prices of street railway materials and supplies, as evidenced by operating expenses, less wages and salaries, increased from approximately 4.7 cents per car mile in 1902 to 6.2 cents per car mile in 1907, or from approximately 21.9 per cent to 24 per cent of the gross earnings," and points out that the census enumeration reveals an increase of 8 per cent in wages per street railway employee during the same period. According to the experience of the Philadelphia Rapid Transit Company, also referred to, girder rail has increased in cost 139 per cent, switches 23 per cent, frogs 17 per cent, ties 30 per cent, cars 100 per cent, coal 33 per cent, during the fifteen-year period 1896 to 1910. According to the data referred to by Mr. Burleigh, wages of track and line laborers have increased 16 2/3 per cent, and materials going into maintenance of track from 15 to 25 per cent during ten years. [The paper of Mr. Burleigh on "The Present Tendency of Street Railway Operating Expenses" was presented before the 1913 midyear conference of the American Electric Railway Association. An abstract was published in the ELECTRIC RAILWAY JOURNAL of Feb. 1, 1913.—EDS.] Similarly street paving requirements have increased from 0.172 cent per car mile in 1904 to 0.309 cent in 1912, and platform labor has increased nearly 25 per cent during the same period. Taxes, which in 1904 amounted to 5.12 per cent of total operating revenue, have grown in volume each year until they amounted to 7.12 per cent of the total operating revenues in 1912. Among other items of increase which have assumed importance at the present time are the costs of employees' liability and benefit plans, items which were not anticipated when present fares went into effect. These increases do not contain any reference to the growth of the cost of injuries and damages which in itself, has, in many instances, assumed alarming proportions.

f. Standards of service now demanded by the public are far more costly than standards which prevailed when present fares became effective. Heavier cars, a higher grade of maintenance, safety devices, etc., have all involved items of expense which relate to betterment of service rather than betterment of income. Expenditures of this class have a definite effect upon the cost of operation, although it is not always possible to measure the amount statistically.

g. The cost of obtaining money for betterments and extensions has, within the past few years, increased at a rapid rate. This money stringency has probably been due in part to general market conditions. It is certain, however, that it has in large part been due to an increased appreciation by investors of the risks inherent in the business. Among such risks, aside from the factors influencing the cost of service already enumerated, are the uncertainty created by expiring franchises and the hostile attitude of municipalities.

LITTLE PUBLICITY OF THE FACTS

The reasons for increase in the cost of service enumerated, while including the principal elements, do not by any means exhaust the list. The question of their relative importance and the facts underlying them still require substantial verification, and this is one of the matters upon which the bureau will gather data. Aside from the few instances noted, there has been little or no publicity of the facts supporting a case for increased rates.

There appears to be little dispute as to the items which will comprise the total cost of service, although there are differences of opinion as to their amount and application to the problem as to how far it is possible to haul passengers for a given fare. Total cost of service includes the ordinary expenses or cash cost of operation, including taxes, reasonable reserves for postponed costs for depreciation, injuries and damages, legal expenses, insurance, contingencies and pensions, and a fair return upon the investment or value of the property necessary to perform the service. These items will probably differ in each case, and the work of the bureau consists in determining the application of such total costs to existing and proposed systems of rates.

After the total cost of service has been determined, consisting of the ordinary operating expenses, included in maintenance of way and structures, maintenance of equipment, traffic, transportation, general and undistributed expenses and fixed charges, the latter consisting of taxes, insurance against contingencies, depreciation and return upon the investment, the application of these costs to the ascertainment of what is the paying haul per passenger or per car, is a problem of which various solutions have been proposed. Some of the differences underlying the various methods are fundamental, and it may be well to describe the various bases suggested with examples of their application in practice, and some of the objections which have been urged against each.

METHOD SUGGESTED BY MR. FORD

In his memorandum attached to the 1911 report of the committee on determining the proper basis of rates and fares, Frank R. Ford has suggested a method of calculation, based upon the passenger mile, and points out its application to a zone system of fares. [The memorandum by Mr. Ford was published in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1911.—EDS.]

As applied to assumed quantities the process outlined by Mr. Ford would be as shown in Table I.

TABLE I—APPLICATION OF PROCESS SUGGESTED BY MR. FORD

a. Cost of service per annum (including fixed charges and return upon the investment)	$100,000
b. Revenue passengers carried per annum	2,000,000
c. Average haul per revenue passenger	3.5 miles
d. Revenue passenger miles per annum ($b \times c$)	7,000,000
e. Cost of service per revenue passenger per mile	1.43 cents
f. Average fare per revenue passenger (assumed)	4.90 cents
g. Length of paying haul per revenue passenger ($f \div e$)	3.43 miles

Under the conditions assumed in Table I an existing line upon which a revenue passenger is hauled an average of 3.5 miles would be justified in drawing in the single fare point, or center zone, so as to reduce the average haul to 3.43 miles, or a proposed extension of an existing line would have its fare points determined after merging added costs and added passenger miles to the total costs and passenger miles, for the entire line.

Two important objections have been raised against the application of such a plan.

1. The basis of measurement is not definite. To provide for an average haul of 3.5 miles per passenger may take 5 miles of route. An inspection of typical car loading curves indicates that the average haul in any direction does not originate at the center of the zone, but from a discharged area of varying width upon different lines. Even where extensive passenger traffic data are available, therefore, the geographical placing of fare points becomes a matter of judgment from the facts in hand. This will, of course, be true of any determination of the zone in which the single fare is properly applied, since a strict application of cost of service to each line would result in an impracticable, irregular area, in which paying lines would be extended, and losing lines contracted until there would result abnormal distortions in traffic density.

2. Operating expenses do not depend entirely upon passenger miles, and in determining the profitableness of new extensions, where traffic is small and fixed charges heavy, the application of the passenger mile treatment would result in an understatement of the cost involved in making the extension. This is recognized in the joint report of conferees upon rapid transit development in New York, in which it is suggested that the passenger mile basis of apportioning expenses be applied to only such expenses as cannot be definitely localized.

PLAN OF MR. BRADLEE

Unlike the passenger mile or Ford formula, as it has been referred to, the basis suggested by Mr. Bradlee computes the paying haul upon the car rather than passenger basis. [The memorandum of Mr. Bradlee was part of the report of the 1911 committee on determining the proper basis of rates and fares of the American Electric Railway Association. The memorandum was published in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1911.—EDS.]

As applied to assumed quantities the process outlined by Mr. Bradlee may be illustrated as shown in Table II.

TABLE II—APPLICATION OF PROCESS SUGGESTED BY MR. BRADLEE

a. Cost of service per annum (including fixed charges and return upon the investment)		$100,000
(1) Operating expenses (exclusive of taxes, depreciation and obsolescence)	$48,000	
(2) Fixed charges (taxes, depreciation and obsolescence and return on investment)	52,000	
b. Car miles per annum		320,000
c. Operating expenses per car mile ($a1 \div b$)		$0.15
d. Length of one-half trips		4.7 miles
e. Revenue passengers per one-half trip		24
f. Passenger revenue per one-half trip ($e \times 4.9$ cents per passenger)		$1.18
g. Investment per $1 operating revenue		$4.00
h. Fixed charges (taxes, depreciation and obsolescence and return on investment) per $1 operating revenue (13 per cent of $g = a2$)		$0.52
i. Amount of passenger revenue per one-half trip available for operating expenses (48 per cent of *f*)		$0.57
j. Paying haul per one-half trip per car ($i \div c$)		3.7 miles

In brief the process consists of assessing each dollar of revenue with the same proportion of fixed charges, and providing that ordinary operating expenses be prorated on a car mile basis. Under the conditions assumed, the reasonable haul which it is possible to run a car is 3.7 miles, whereas the present trip distance from the center of the line is 4.7 miles. Mr. Bradlee, in the supplementary memorandum contained in the 1912 committee reports [published in the ELECTRIC RAILWAY JOURNAL of Nov. 30, 1912.—EDS.] has applied his suggested process to twenty selected electric railways. The results disclose maximum half trip lengths in miles, ranging from 1.71 miles to 4.54 miles, as applied to nine companies with annual gross receipts of over $1,000,000—2.24 miles for one company in the revenue groupings of from $750,000 to $1,000,000; 2.02 miles and 3.22 miles for two companies within the revenue grouping, $500,000 to $750,000; 1.21 miles to 2.51 miles for four companies with revenues from $250,000 to $500,000, and 1.23 miles to 2.88 miles for four companies with gross receipts less than $250,000 per annum.

The objections which have been urged to the method suggested are:

(1) The distribution of fixed charges upon the basis of revenue obviously does not place upon new extensions the full cost applicable thereto. Many extensions exist which involve heavy investments for the revenue obtained, being as high as $10 for each $1 of operating revenue instead of the average of $4 assumed in the illustration.

(2) Many ordinary operating expenses are more properly distributed upon some other than the car mile unit.

SUGGESTION OF NEW JERSEY COMMISSION

Under this heading may be included various suggestions which have been made from time to time with regard to separating the cost of service into two classes: *a*, expenditures, fixed in their nature which may be expected to continue irrespective of the amount of traffic involved, or the length of haul, and, *b*, expenditures dependent upon traffic, and the application of such separated costs to a system of rates. Such a process has been employed in the determination of rates for electric, gas, telephone, water and railroad service, where such rates are based on cost. Rates consisting of a fixed charge per passenger plus a charge per passenger mile, are suggested by the Board of Public Utility Commissioners of the State of New Jersey.

MILWAUKEE CASE

A more extended basis of analysis is that outlined by the Railroad Commission of Wisconsin in the Milwaukee fare case, in which the Ford and Bradlee formulas are also applied, and the results so obtained compared and discussed. [An abstract of the decision of the commission was published in the ELECTRIC RAILWAY JOURNAL of Aug. 31, 1912, and Sept. 7, 1912.—EDS.]

The Wisconsin commission finds in its analysis of the Milwaukee situation, that the fixed or terminal expenses amounted to 58 per cent of the total cost of service in that case, and the variable or movement expenses 42 per cent of the total cost.

C. N. Duffy, in his contribution to the work of the committee for determining the proper basis of rates and fares, has pointed out that the proportion of costs attributable to terminal and movement expenses, according to the scheme of analysis as developed by the Wisconsin Railroad Commission, is dependent upon the load factor, that is, the ratio of the number of passengers to the maximum seating capacity of the cars. [An abstract of Mr. Duffy's paper, which was presented at the 1913 midyear conference of the American Electric Railway Association, was published in the ELECTRIC RAILWAY JOURNAL of Feb. 1, 1913.—EDS.]

Like the method suggested by Mr. Ford, the Wisconsin method relates to a paying haul per passenger rather than to a paying haul per car. With the same assumed quantities used in illustrating the "passenger mile basis" and the "car haul" basis, the process of calculation may be illustrated as shown in Table III.

TABLE III—ILLUSTRATION OF WISCONSIN METHOD

a. Cost of service per annum (including fixed charges and return upon the investment)		$100,000
(*A*) Costs independent of traffic	$10,000	
(*B*) Costs proportional to car movement	82,000	
(*C*) Costs proportional to passengers carried	8,000	
b. Revenue passengers carried per annum		2,000,000
c. Average haul per revenue passenger		3.5 miles
d. Revenue passenger miles per annum ($b \times c$)		7,000,000
e. Car miles per annum		320,000
f. Seats per car (including standing by preference)		48
g. Seat miles per annum ($e \times f$)		15,360,000
h. Load factor ($g \div d$), per cent		46
i. "Terminal" cost (aA) + 54 per cent (aB)		$52,280
j. "Movement" cost (46 per cent (aB) + (aC)		$47,720
k. "Terminal" cost per revenue passenger ($i \div b$)		2.61 cents
l. "Movement" cost per revenue passenger mile ($j \div d$)		0.67 cent
m. Average fare per revenue passenger (assumed)		4.90 cents
n. Length of paying haul per revenue passenger ($m - k) \div l$		3.12 miles

PLAN OF PROFESSOR RICHEY

The influence of the element of idle capacity required in furnishing service, expressed as "load factor" by Mr. Duffy, is also pointed out in an analysis of the cost of rush hour service by Prof. Albert S. Richey. Total cost of service is divided into a fixed cost independent of car hours and running cost dependent upon car hours, 50 per cent being found assignable to each.

Professor Richey finds in the illustration assumed that the total cost of operation of an "18-hour car," operated 350 days per year, is $1.624 per car hour, whereas a "rush-hour" car, operated 300 days for three hours with eight hours of service on Sunday, is $3.659. Reduced to units of passengers carried, the costs range from 3.2 cents where the car is in service eighteen hours a day, to 15.7 cents where the car is in service only one hour a day, the cost curve being similar in form to the readiness to serve cost curve for electric service.

The criticisms which have been made of the method suggested by the Railroad Commission of Wisconsin may be summarized as follows:

a. Similar to the objection referred to, with regard to the passenger mile basis of Mr. Ford, the application of passenger mile basis to the length of car haul is not always definite.

b. The scheme of analysis is complex and involves many separations of items which form a small portion of the total cost and which therefore do not materially affect the conclusions.

c. The grouping of expenses employed in many instances proceeds on debatable ground. Whether separate items of expenses vary with the car mile, car hour or passengers carried, and are properly apportioned in accordance with these units, is a question concerning which differences of opinion exist which cannot in all instances be settled by statistical comparisons. The grouping of return upon the investment as an item of cost proportional to traffic has been particularly questioned.

SIMILARITY IN METHODS

The review and comparison of these methods show some points of similarity. The principal differences have arisen in the basis of pro-rating the total cost of service over the outer edges of the service area, which in any practical adjustment of single fare points, or establishment of zones will prove debatable ground. It seems certain that in any analysis of costs as complex as those involved in the traction business, no single unit of comparison such as the car hour or the car mile will be applicable to all separate items of cost. Platform labor is bought by the hour, much of the work of maintenance is done by the mile or by the car rather than because of traffic conditions. It is possible, however, that when all these more accurate separations are assembled, the resulting division will conform closely with that obtained by applying some single unit. In the detailed analysis made by the Railroad Commission of Wisconsin, for example, it is noted that a similar division would have been obtained had the basis of apportionment been entirely the car mile, rather than the mile, the car hour, the car mile, and the number of passengers. Considerable work has already been done by the association in examining into the practical nature of many units of operation, and methods of separations of cost between freight and passenger business have been recommended. [Reference is made to the report of the joint committee on a statistical unit for car operation of the American Electric Railway Accountants' and Transportation & Traffic Associations and the report of the joint committee on express and freight accounting of the Accountants' and the Transportation & Traffic Associations, presented at the 1912 convention. Abstracts of these reports were published in the ELECTRIC RAILWAY JOURNAL of Oct. 10, 1912.—EDS.] Similarly the question of weight in car operation, of weather and wear in track maintenance, of demand factor in station operation, are typical problems of economy of operation which have claimed the attention of operating departments of our companies, the conclusions of which are particularly important in determining upon the proper units of comparison.

It is obvious, therefore, that before definite recommendations can be made as to the methods of computing the paying haul by the bureau, considerable additional investigation is necessary in order that many of the factors of cost proposed may be disposed of as either unimportant or their application clearly defined.

It is very apparent from the results of such investigations as have already been made that whatever the statistical method of determining the area within which a given fare can apply and yield the company a fair return upon its investment, there can be no doubt that present fares for urban transportation service in many cases are not highly remunerative, and that in many other cases present tendencies if left unchecked will undoubtedly reach the point where the service demanded will be unprofitable. These conclusions are not in any sense premature, but must follow from any scrutiny of the elements entering into the cost of service.

In addition to the ordinary operating expenses or cash cost of operation, including taxes which are readily obtainable from the income account of any traction company, the total cost also includes reserves for postponed costs of operation, such as injuries and damages, insurance, legal expenses, pensions, etc., provision for depreciation and a return upon the investment. Both the allowances for depreciation and the rate of return are a function of the investment or value, and their importance as a portion of the total cost will depend upon the amount of such investment, or value in tangible and intangible property. Mr. Bradlee has pointed out that such investment in twenty selected traction properties ranges from $3 to $5.55 per dollar of operating revenue, and the conservative character of these figures is corroborated by valuations of traction properties which have been made by and for municipalities and commissions. [The memorandum, presented by Mr. Bradlee in connection with the 1912 report of the committee for determining the proper basis for rates and fares, before the American Electric Railway Association, was published in the ELECTRIC RAILWAY JOURNAL of Nov. 30, 1912.—EDS.]

DEPRECIATION AND RETURN ON THE INVESTMENT

The allowance for depreciation and return upon the investment in percentage of the investment are likewise subject to variation in each case. In several cases the amount deemed as reasonable for depreciation by commissions and city authorities has exceeded 4 per cent of the total value of property assumed as reasonable. Placing the rate of return at 8 per cent the total amount for depreciation and return will amount to at least 12 per cent of the investment or value. If the investment or value in turn amounts to $4 for each dollar of revenue, 48 per cent of operating revenue is claimed by the two items, depreciation and rate of return, leaving only 52 per cent available for current, ordinary operating expenses, reserves for postponed costs and taxes. It is obvious that many urban transportation companies cannot approach this operating ratio under present rates of fare.

Both increases in operating costs and the large investment necessary for the service demanded are serving to make the present dollar of earnings inadequate. These conclusions conform with those reached from other hypothetical figures, based upon the actual investment and returns in traction properties. [Reference is made here to the memoranda of Mr. Bradlee and Mr. Duffy, presented with the 1912 report of the committee for determining the proper basis for rates and fares. These were published in the ELECTRIC RAILWAY JOURNAL of Nov. 30, 1912.—EDS.]

Predictions as to the traffic and revenue possibilities of extended fare limits and reduced rates of fare sometimes form an important part of investigations by public officials and experts into the question of what is remunerative service. Frequently these predictions have but slight foundation in fact or proceed from an attempt to apply results in one locality to another in which the factors underlying the estimate are essentially different. The location of residence districts, business centers, factory sites, etc., are determined largely by the geographical layout of the town, the right of way of railroads, shipping facilities and other factors, and may be expected to differ in each case. The industrial factors affecting growth, even were the layout similar, are also essentially different for each city, so that any predictions of value must be based upon other than generalized data.

FUTURE GROWTH OF TRAFFIC

The existence of so-called laws of growth based upon statistical studies covering a large number of instances are, however, repeatedly referred to, and it is important that the facts upon which they are based be examined into, not only for the purpose of defining their limitations but also with the end in view of reaching conclusions as to the limits under which no service is remunerative. Among such studies are those of Mattersdorf, a German engineer, who has made extended statistical analyses of traffic, growth in population and revenues based upon the returns of German street railways, contained in the 1905 supplement of the "Zeitschrift für Kleinbahnen." [An abstract of the conclusions of Mr. Mattersdorf was published in the STREET RAILWAY JOURNAL of June 2, 1906.—EDS.]

A similar study based upon returns of street railways in the United States—contained in the census reports for 1902 and 1907—is that made by Watkins for the Public Service Commission, First District, New York. A study of the relation of growth of earnings to population is contained in the Arnold report on the Pittsburgh transportation problem. [An abstract of Mr. Arnold's report was published in the ELECTRIC RAILWAY JOURNAL of Aug. 13, 1910.—EDS.]

It is Mattersdorf's conclusion that the amount of traffic measured in the number of passengers carried may be expected to increase in cities up to 500,000 population as the square of the population, but in the cities above this population, only in direct proportion. In other words, in the smaller cities where population doubles, traffic may be expected to increase fourfold.

Attention is properly called to the fact that Mattersdorf does not claim for his conclusions a universal application as immutable as a law of physics such as has been attributed to him. "How the foregoing fundamental rules may be applied," he states, "in practical financing and operating questions need not be especially considered in this article. It may be enough to state that the establishment of such rules does not reduce the necessity of properly combining the various factors in the study of a particular case. It may, however, be of some assistance in such an examination." It should be noted also that the rides per capita per annum, and the various factors of traffic density disclosed in Mattersdorf's diagrams indicate conditions dissimilar from typical American cities where data are available so that the question as to whether these conclusions would be substantially confirmed by similar studies in this country is open to conjecture.

In making prediction as to future traffic requirements in New York City, Watkins, in the Public Service Commission, First District, 1910 report, points out that the quadratic formula of Mattersdorf is similar to the rule sometimes applied in estimating prospective traffic on steam roads, but does not hold in all cases, and when carried beyond a point of saturation reduces itself to a manifest absurdity.

"If rides increase in the proportion of the square of population," he says, "the number of rides per capita must increase in the same proportion as the population. A city of 30,000 may have traffic amounting to 100 rides per capita per year. Taking this as a somewhat arbitrary starting point for our mathematical assumption, we may compute hypothetical traffic figures for any size of urban center. A city of 100,000 should, on this basis, have 333 rides per capita, and one of a million 3333. On the other hand, if a city of 500,000 has 200 rides per capita, one of 50,000 should have but 20 and one of 5,000,000 should have 2000 rides per capita. Six rides a day for every man, woman and child in the community is a very high average. According to this, a person in the prime of life would be taking about twelve rides a day. It would seem that he could scarcely have time to do much else. The fact is, there must be a saturation point for traffic, in the neighborhood of which the number of rides per capita will increase very slowly."

The mathematical rule proposed by Watkins is that traffic will increase at a rate per cent twice that of the increase of population rather than at the same ratio as population, or as the square of the population, and supports this by an analysis of statistics of 31 American cities. He is careful to state also that "No one claims that any of these formulas are more than rough working approximations."

A recent criticism of Watkins' rule is made by an Italian engineer, Renzo Norsa, who has made a personal inspection and report of traffic conditions in the United States. Norsa points out that the quadratic rule as he interprets it from Watkins' diagram is identical with the percentage rule proposed. He says:

"Watkins proposes to substitute for the quadratic rule the following: The per cent increase of traffic is double the per cent increase of the population. This rule should have the advantage of giving a slower variation of traffic than that which corresponds to the quadratic rule, and based on it Watkins would obtain the curve indicated in diagram *C*. (Public Service Commission Report, 1910, p. 40, Diagram IV.) However, not agreeing for the most part with the other conclusions from Watkins' diligent study, this proposition does not seem acceptable to us.

"The reason why Watkins finds a curve which is removed from the quadratic is that he applies his rule to determined values of the population and they are 100,000, 200,000, etc., while the quadratic rule is a continuous rule, that is, it serves for any value of the population. Finally it must be observed that there are also cities in which traffic has been developed much more rapidly than would correspond to the quadratic rule." Renzo Norsa—*Problems di Traffico Urbano e Ferrovie Metroppolitane Agli Stati Uniti*, Milan, 1913 (Problems of Urban and Metropolitan Railway Traffic in the United States), p. 23.

The same general rule which has been developed by Dr. Mattersdorf, with respect to population and traffic, is reached by Mr. Arnold, with regard to probable increases in earnings, "A study," he states, "of the relative growth of population and of transit earnings of the large American cities, during the past ten years, shows some surprising results, and points to the conclusion that as a rule, the earnings from local transportation increase as the square of the population. Upon this assumption, it is estimated that when the population of the Pittsburgh district reaches 2,000,000, annual passenger income will aggregate $40,000,000 or $20 per capita."

A popular impression which has become current from this and similar conclusions, is that because of such assured increases in gross earnings anticipated increases in net earnings will likewise prove substantial and this reason has in some instances been urged as a justification for reduced rates.

It is to be regretted that the conclusion of Mattersdorf, as to the relation of population and earnings, which supplement his investigations of the quadratic rule has not been given the same publicity in this country as his conclusions as to traffic. Reducing passenger earnings for various German surface traction lines to the same comparative basis, and plotting the results, Mattersdorf shows that revenue per car kilometer increases as the number of passengers per capita per annum, up to from 80 to 100 passengers per capita, and is then a decreasing quantity for greater densities of traffic. When it is considered that these conclusions are summarized in most cases from zone systems of fare which yield a greater relative compensation for longer hauls than is possible under the systems of flat rates for any distance in vogue in this country, that rides per capita upon American surface lines generally exceed the transition point of about 100 rides, and that operating expenses may be expected to keep pace with the car miles run, it is probable that careful investigation will disclose that optimistic expectations of increased net returns with growth of population are not borne out by experience.

With the greater increase in population in the outskirts of the city, it is apparent that there must follow an increase in long haul traffic, which, under a flat rate system of charges, is the least remunerative traffic. R. B. Stearns has pointed out the results of a study of the amount of such increases made in Milwaukee. [The paper by Mr. Stearns was presented before the American Electric Railway Association midyear conference in 1913. An abstract was published in the ELECTRIC RAILWAY JOURNAL of Feb. 1, 1913.—EDS.] When the past records of population are separated into zones and the usual forecasts of future growth are made, it is found that the relatively greater increase in population will occur where, under present flat rates, it is a source of the greatest additional expense to the company. Such prognostications of Mr. Stearns indicate that while 93.3 per cent of the total revenue passengers in Milwaukee in 1912 were contained in the 3½-mile zone, this may be expected to decrease to 76.5 per cent of the total in 1930. Outlying zones on the other hand show corresponding increases. It is apparent from this summary that much additional investigation is necessary of such factors as riding habit and earning capacity with reference to population served, etc., before conclusions may be reached, as to the value of these generalized theories.

CONCLUSIONS FROM THE STUDIES

The following appear to be reasonable conclusions derived from such quantitative studies as have so far been made with respect to the cost of urban transportation service.

1. Due to the varying conditions obtaining as between various American electric railways, in matters of investment costs, revenues, operating expenses, taxes and general condition of maintenance of property, no general figure measuring the length of remunerative haul for a given urban fare can be stated, and it seems probable that considerable variation of this figure will be evident when more complete data are available.

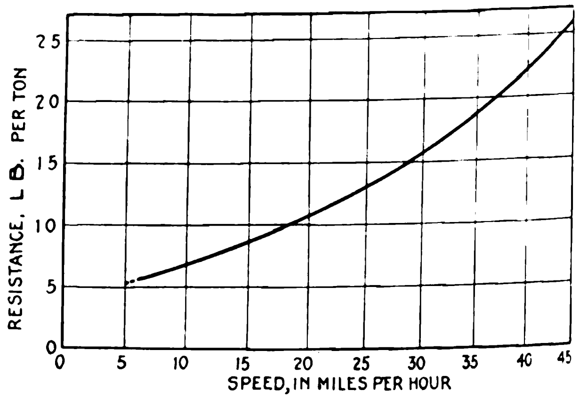
2. Each railway system presents problems peculiar to itself, and the profitableness of a given rate of fare must be determined for the particular locality in the light of the facts individual to the railway system rendering service therein.

3. The factors which are increasing the cost of service, consisting in part of increased areas served, increased length of haul, increasing proportion of transfers to revenue passengers, development of peak hour traffic, increases in operating costs, higher standards of service demanded, and increase in the cost of obtaining capital are properly subjects of further investigation by the bureau. While much has been accomplished in developing methods for estimating the distance which a passenger or car may be hauled with profit, the bases proposed are suggestive but conflicting, and deserve more critical study.

CAR RESISTANCE TESTS AT THE UNIVERSITY OF ILLINOIS

The electric test car of the University of Illinois has recently been utilized in making an elaborate series of tests on car resistance. This car was described in the issue of the STREET RAILWAY JOURNAL for June 9, 1906, volume 27, page 907. The car is a 45-ft. interurban car, weighing approximately 28 tons and having a cross-sectional area of car body and trucks of 90 sq. ft. It is equipped with four 50-hp motors. The car contains elaborate recording apparatus by means of which continuous graphical records of current, voltage, speed, time, distance, brake-cylinder pressure and location on the road may be kept. These records are drawn upon a chart 40 in. wide. The continuous electrical records can be checked by means of recording watt-hour meters.

The tests were made on several selected sections of track of the Illinois Traction System in the vicinity of the university. This track was in good condition. The weather during the tests was generally fair and the average temperature was moderate. The wind velocity did not exceed 26 m.p.h. The general plan of the tests was to run the car backward and forward over the chosen track section at various speeds, maintaining the same constant speed during each pair of opposing runs. A total of 269 resistance determinations were made, about one-half of the runs being with the wind and the other half against it. The resistance in each case was calculated from the electrical input to the car, from which all of the motor and other losses were deducted. Several groups of tests were made on different sections of track and with slightly different details of operation.



Illinois Resistance Tests—Final Curve, All Tests

The results of the test have been expressed in the form of equations as follows

$$R = 4 + 0.222\,S + 0.00582\,S^2 \qquad (1)$$

R is the resistance in pounds per ton, and S is the speed in miles per hour.

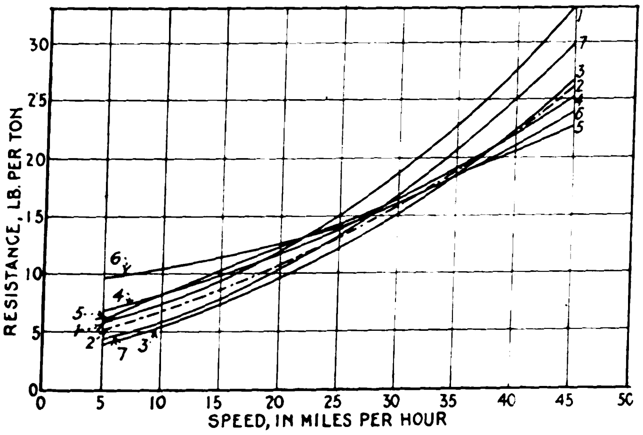
This equation has been modified as shown in formula 2 to take more definite account of air resistance. In formula 2, A is the cross-sectional area of the car expressed in square feet and W is the car weight in tons.

$$R = 4 + 0.222\,S + 0.00181\,\frac{A}{W}S^2 \qquad (2)$$

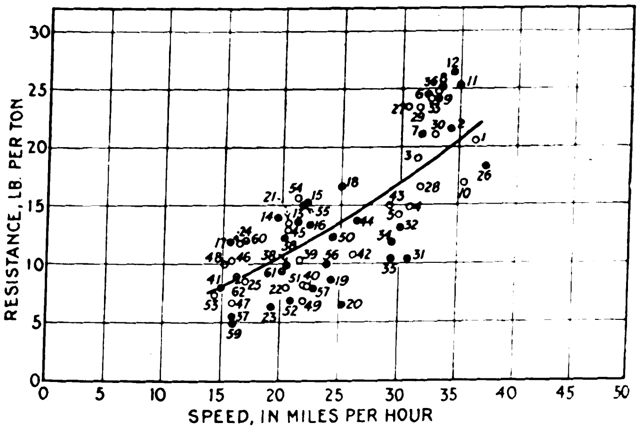
These formulas are the equations of a parabola which corresponds closely to the curve shown in the first accompanying figure.

A second illustration shows curves for the University of Illinois car plotted from a number of well-known formulas.

The third illustration, of an individual test, is given to indicate the variations from the curve made by individual observations. The black dots indicate the measurements made with the car going against the wind, the open circles those with the car going with the wind, and those half shaded with the car moving in still air.



Illinois Resistance Tests—Curves Plotted from Various Formulas



Illinois Resistance Tests—Typical Individual Test

In drawing the curve for individual tests a method was devised which would give more accurate results than an arithmetical average of resistances with and against the wind. The method is based on the assumption that the air resistance varies with the square of the speed.

Let R_s = the resistance at speed s excluding air resistance

R = the total resistance at speed s.

$$R = R_s + cs^2 \qquad (1)$$

in which c = some constant quantity.

R_a = the resistance for a run against the wind at speed s

$$R_a = R_s + c\,(s + v)^2. \qquad (2)$$

in which v = the component of the wind velocity parallel to the track.

R_w = the resistance for a run at speed s with the wind

$$R_w = R_s + c\,(s - v)^2. \qquad (3)$$

Subtracting equation (3) from (2) and solving for c gives

$$c = \frac{R_a - R_w}{4\,sv}. \qquad (4)$$

Substituting equation (4) in equation (2) and solving for R_a, we have

$$R_s = R_a - \frac{R_a - R_w}{4\,sv}(s + v)^2. \qquad (5)$$

Substituting equation (5) in equation (1)

$$R = R_a - \frac{R_a - R_w}{4\,s}(2\,s + v).$$

The tests described above were planned by E. C. Schmidt, professor in charge of the department of railway engineering, University of Illinois, and were carried out under his general direction and supervision. The work was under the direct charge of H. H. Dunn, assistant in railway engineering, University of Illinois, engineering experiment station. Mr. Dunn was assisted by E. I. Wanger and D. C. Faber, who were formerly connected with the department of railway engineering and the engineering experiment station respectively.

ELECTRICAL RESEARCH AT BOSTON "TECH"

In a statement issued last week, the Research Division of the Massachusetts Institute of Technology's electrical engineering department announced that by July 1 nine research associates and assistants will be devoting their entire time to scientific investigation. Close relations with the instructing staff are insured by the organization of the division, and the advice and co-operation of the electrical engineering teaching force of both the Institute and Harvard University are assured by the recent co-operative agreement between the two institutions. Among the subjects of interest to the electric railway industry which are being investigated are a study of the effect of the passenger ride upon the net return on the investment in street railway properties, a research expected to require about five years, during which time the revenues, expenses and traffic data of a number of large cities will be analyzed; a study of core losses in electrical machinery; a study of skin effect in solid and standard conductors when carrying high-frequency currents; the measurement of the alternating current resistance of rails of various compositions at frequencies up to sixty cycles, and a study of transient electric phenomena in a 750-mile artificial transmission line.

The proceedings of the tenth annual meeting of the American Wood Preservers' Association, which was held in New Orleans, La., in January, have recently been published. The book contains the usual account of the convention activities with the complete series of the papers presented, as well as a reprint of the constitution and by-laws of the society and a list of the names and addresses of the members. The last part of the book, pages 430 to 482, is devoted to the compilation of statistical data, showing the quantity of preservatives consumed in 1913, the number and geographical location of plants and the amount of wood treated, and to a short discussion on what forestry is doing in the United States.

"Safety First" Work in a Small City

One of the Novel Methods Used to Reduce Accidents Was to Analyze them According to Territorial Divisions—All Correspondence on Accidents Is Written on "Safety First" Letterheads and Envelopes

In a "Safety First" campaign which has been conducted by the Beaver Valley Traction Company, New Brighton, Pa., during the past four years, the prevention of accidents has been approached from a number of angles as follows:

First—By lectures and bulletins to trainmen and shopmen.

Second—By acting on suggestions from trainmen, such as information in regard to badly lighted places along the highways; school children who, when leaving school, endanger themselves by jumping on or off cars, etc., and reckless drivers.

Third—By dividing the territory into sections about 1 mile long and classifying the accidents which happened in each section. It has been found that in certain sections particular classes of accidents were constantly recurring. In some sections the fault was found to be with bad track or special work, as shown by the number of derailments in those sections; in others, poorly lighted highways were responsible for certain classes of accidents. There are now forty-five clusters of 23-watt lamps illuminating these dark spots. In still other cases, most of the accidents were caused by disorderly conduct on the cars, and the remedy applied was to have a special officer ride on the cars in the territory more frequently.

Fourth—An advertising campaign was carried on by the use of newspaper space, blotters and paper drinking cups in the schools, one-half sheet posters on the car dashes, warning cards on the interior of the cars and warnings printed on the back of transfers.

The newspaper, poster and car card advertising copy has been varied to catch the attention of the widely different classes from whom this company derives its patronage. To a certain class some of the copy may seem harrowing or morbid, but it is believed that to reach a number of the patrons a variety of copy of the nature of that reproduced here must be used. It should be understood, of course, that the original copy was set in display type and signed by the Beaver Valley Traction Company.

1. "WOULD YOU want to fall in the street while the passengers of a crowded car gazed upon you during the dreadful moment of your mishap? Some may laugh, even though you should be seriously injured. A person falling inspires merriment among certain people. If you would prevent falling, and rebuke those who laugh and provide against injury, never get off a street car except while facing the front of the car, and be sure that the car has stopped. DO NOT GET OFF BACKWARDS."

2. "DON'T PLACE ALL CONFIDENCE in the performance of your automobile. You may dash across the street in front of a moving car a hundred times safely and fail once. You may spin around a car that is not moving fast enough for you many times without an accident, but a tire may burst once and involve you in a disastrous collision. Always be careful when you are approaching a street car track. The path of the motorman is defined. He cannot turn out to avoid an accident with you. He does not know where you are when you come driving furiously down a side street, but you always know where he is. So for your own sake and for the sake of those who use the cars be careful in driving your automobile."

3. "DEATH OR INJURY awaits the person who wanders aimlessly about the streets. Keep the children away from the street-car tracks during their play. Teachers and parents can help this work of preventing accidents by warning the children. You do your part and few accidents will occur on our lines."

4. "ARE YOU AWARE OF THE FACT that on account of the thoughtlessness of some people we are compelled to provide against more than one hundred ways in which accidents could occur on a line less well governed than the BEAVER VALLEY TRACTION COMPANY?"

5. "WE ADVISE that you punish your boy every time that you learn he has been stealing a ride on the street cars. It may save his life or limb."

6. "THE EYE WITNESS—Did you ever see an accident? If you did and talked to those about you that also witnessed it, you will know that no two persons exactly agree on how it happened. That is why, when an accident occurs on our lines, the conductor requests you to sign a card giving your name and address. It aids us in an effort to place the blame correctly."

7. "DON'T FAIL TO IMPRESS YOUR CHILDREN with the necessity to be always careful when boarding and alighting from cars. Tell them to wait until the car comes to a full stop."

8. "DON'T pass behind a car without first making certain another car or vehicle is not approaching. Many accidents are caused by people running excitedly around the rear of a car, from which they have alighted, directly into a car or vehicle coming from the opposite direction."

9. "DON'T allow children to put their heads or arms through the open window of a car. A passing wagon may be too close and cause injury or possibly death."

10. "DON'T allow children to steal rides on rear of a wagon or carriage. Their discovery by the driver often startles them into running in front of a moving car. The motorman may not see them in time to prevent an accident. Tell them it is extremely dangerous."

11. "YOUNG MAN, you may be able to get on or off a car while it is in motion a thousand times without injury, but one failure may cost you your life or limb."

12. "A PATRON RECENTLY SAID: 'If I had a child that would steal rides on street cars or wagons I would turn the lad across my knee and argue the question with him in a manner that he would remember.'"

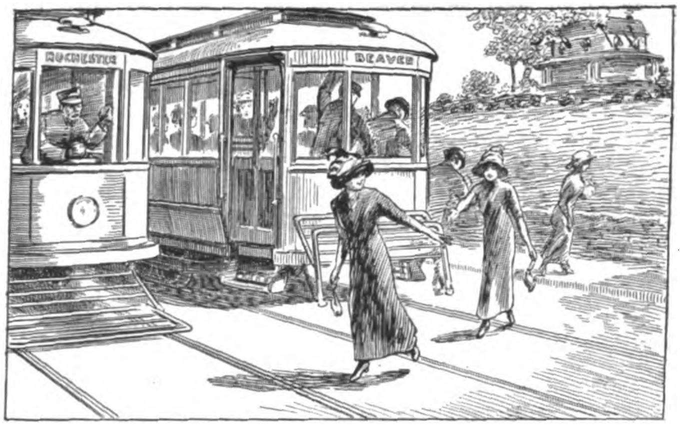
13. "THIS company does not permit passengers to ride on the front platform or engage the motorman in conversation."

14. "STOP! LOOK! LISTEN! Before you start across a street car or railway track."

15. "DON'T be negligent or careless. We are operating our cars as safely as we can without your assistance. We desire you to co-operate and make travel on our lines absolutely safe."

16. "IF YOU ARE A TEAMSTER don't drive your team in the car tracks. If you must do so see that they are out of the way of any approaching car. There is nothing to prevent a car from striking your wagon when you drive directly in front of a car. Be reasonable. The horses would prefer the right side of the street. Be as reasonable as the horses."

17. "IT MAY BE SAFE for your wife to go to the country but it is not safe for her to get off a car backwards. To save her, kindly ask her how she gets off



"Safety First" in a Small City—Fig. 1—Poster Illustrating a Frequent Accident

a street car. Explain the proper way, and then enforce it."

18. "WE DO NOT CARE if you are a suffragette. You have no business trying to get on or off a street car while it is in motion."

19. "CARELESSNESS is correctly defined as that which all public service companies must guard against; that which large factories must guard against. Carelessness: the act of the pedestrian whose mind wanders; the act of the man, woman or child who wanders about heedless of the dangers that exist on all sides. Are you careless?"

20. "IT WON'T HURT to wait until the car stops perfectly still. Then, to alight, place your bundles under your right arm, grasp the left hand rail with your left hand and step down on to the street and away from the tracks."

21. "WE WANT to hammer it in so that young men will realize that it is not smart to get on or off a street car while it is in motion."

22. "THERE IS an excuse for everything—except a person alighting from a street car in the wrong way. Please, madam, in alighting face the front of the car, grasp the hand rail with your left hand, stepping down to the street with your face to the front of the car. If you grasp the hand rail with your right hand you are bound to get off backwards. That may mean a fractured skull or just a spill in the street that is not at all dignified."

CAR CARDS

The following copy is part of what was used on car cards which are of various colors and are lettered with card writer's brush and contrasting ink:

1. "We are guarding against 125 different kinds of accidents. How many can you name?"

MAKE YOURSELF A COMMITTEE OF ONE TO PREVENT SOME ACCIDENT
QUIT TAKING CHANCES
THE ODDS ARE AGAINST YOU

"Safety First" in a Small City—Fig. 2—Signs at Carhouses and Shops

2. "The B. V. T. Co. is doing its best to absolutely prevent accidents on its lines. Will you help us in the name of public safety?"

3. "Don't get off until the car stops perfectly still."

4. "Don't get off facing the rear of car."

5. "Don't put your head or arms out of the window."

6. "Don't pull the bell rope."

7. "Don't allow your children to run or play on the streets. It's dangerous."

8. "Don't allow your boys to steal rides on the cars."

9. (Fig. 1.) "Death is about to claim this woman. It will be her fault. She crossed behind a car and did not look."

10. "Young lady, why won't you learn how to get off a street car? Always face the front of the car."

11. "Please get off the car facing the front. Wait until the car stops. Take hold of hand rail with left hand."

12. "It's easy to get off the car in the right way. It's mighty hard to patch a fractured skull."

SAFETY FIRST
BOOST
FOR
SAFETY

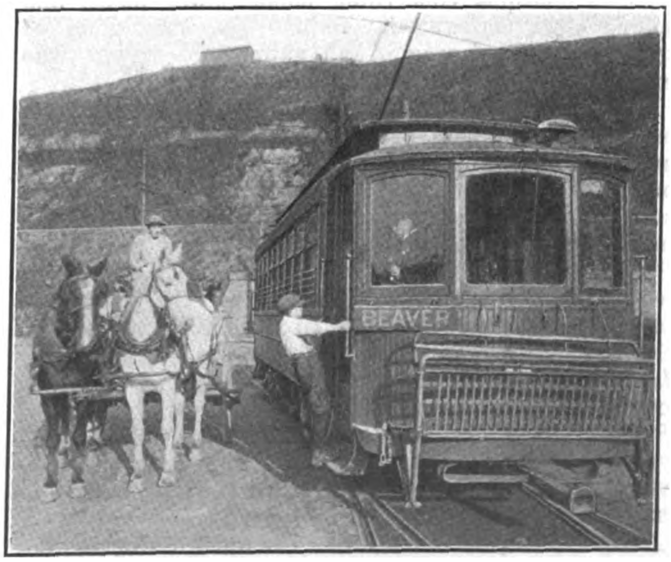
"Safety First" in a Small City—Fig. 3—Signs in Offices and Crew Rooms

POSTERS

The following copy was used on posters, size 18x25 in. Some of them were blue letters on white background and some of them blue on pink background. Poster No. 1 reads—"Death or injury awaits the person who does not heed warning of approaching danger. Stop! Look! Listen! Before crossing the tracks!" Poster No. 2 reads—"It's easy to wait until the car stops. It's so hard to patch a broken skull or mend a broken arm. Wait until the car stops." Poster No. 3 says—"Death or injury may result from crossing tracks without looking both ways." Poster No. 4 is—"Death or injury await your children if permitted to play on street car tracks or 'hook' rides on cars, wagons or automobiles. Warn them now before it is too late."

TRAINING OF EMPLOYEES

Warning signs are placed in conspicuous places in the trainmen's rooms, cars, shops and power house, to keep the subject constantly before all employees. These signs are of two kinds, enameled and printed. The



"Safety First" in a Small City—Fig. 4—Boy Ready to Jump in Front of Truck

printed signs are placed in a black frame with a glass front 11½ in. x 27 in. like Fig. 2. Some of these signs have red letters on a white ground, black letters on pink background, black letters on white, or red letters on yellow background.

The following copy is used in 3½-in. letters:

1. "Safety first means a lot to you."
2. "Quit taking chances. The odds are against you."
3. "Give the side of safety the benefit of doubt."
4. "If you are injured, no matter how little, tell your foreman about it right away and go to the doctor."
5. "You have no right to take chances. The other fellow may get hurt."
6. "Make yourself a committee of one to prevent some accident."
7. "Regardless of schedule, motormen must run slowly during fog."
8. "Suggestions from employees for the prevention of accidents are always welcome."
9. "It is far easier to do a thing right than to explain why you did it wrong."
10. "Small neglects are apt to cause serious accidents."
11. "You are responsible for the safety of others, as well as yourself."

The small enameled sign, Fig. 3, is distributed freely through office and crews' rooms. Enameled warning signs are also placed on the building which contains our electric welding equipment. This sign is printed in several Slavic languages as well as in English.

In the crews' rooms is an enlarged copy of the foggy weather rule. This copy is 18 in. x 44 in. in size and reads as follows:

"FOGGY WEATHER—During foggy weather, or at any time that smoke, steam or anything obscures the view, motormen must run their cars carefully and regardless of schedule time, at a rate of speed not faster than will admit of them stopping their car in the distance they can see ahead, gong being rung freely."

In addition to this, a sign 10 in. x 24 in. in red letters on white background, reads: "Regardless of schedule, motormen must run slowly during fog."

CO-OPERATION OF SAFETY COMMITTEE

We also have a safety committee, composed of the following men: two early and two late run trainmen, master mechanic, chief engineer, two dispatchers, track foreman, line foreman and the company attorney, all working under the direction of the superintendent.

This committee, in addition to making the usual recommendations concerning shop, power house and rolling stock safeguards, receive the complaints of trainmen against wagon and automobile drivers who are inclined to be reckless or incautious.

This information is transmitted to the superintendent, with an account of the occurrence, the date, time and location. The facts are then sent to the vehicle owner in a courteous letter dictated and signed by the superintendent and written on the special letterhead of our safety committee, which has been named the Beaver County Safety League. The mission of this league, as given on the letterhead, is "the prevention of street car, auto, fire, live wire and other accidents." Such letters are inclosed, further, in a special Safety League envelope, the upper left-hand corner of which bears the inscription "Beaver County Safety League, Beaver Valley Traction Company, New Brighton, Pa," while "First aid to the uninjured" appears on the center of the face on the lower margin." The reverse side has the following in the four sections:

"Do not alight from a street car until it stops—stops still. Do this and prevent accident."

"Keep the children away from the car tracks."

"It is so easy to prevent accidents and so hard to patch a fractured skull or broken limb."

"Madam, face the front of the car when alighting."

The replies to such letters are generally to the effect that the addressee has taken the steps necessary to prevent a repetition of the complaint.

The Beaver Valley Traction Company will be glad to furnish to any company the results obtained from this accident-prevention campaign.

CONVENTION OF NATIONAL ASSOCIATION OF CORPORATION SCHOOLS

The second convention of the National Association of Corporation Schools was held in the Curtis Auditorium in Philadelphia on June 9 to 12. The Curtis Publishing Company issued a daily paper with a title "Ourselves" during the convention. Representatives were present from a large number of the eighty or more manufacturing and operating companies attended. Dr. C. P. Steinmetz, of the General Electric Company, was elected president for the coming year.

The Association of Corporation Schools is an organization which, as the name implies, is intended to promote continuation training while students are earning their living at various occupations. A very large number of corporations have educational plans of different kinds in operation, and the association is intended merely to act as a clearing house for information regarding these schools. In an editorial published in the June 12 issue of "Ourselves" Dr. Steinmetz outlined the purposes of the association. He pointed out that 96 per cent of the graduates of the public schools are forced to go into the industries without any industrial training. This situation is due to the complete breakdown of former systems of industrial training which has in the past few years proved a national danger. The general education of the masses has become an industrial necessity since modern industries began. With the rising education and increasing intelligence of the masses came the demand for a share in the government of society and the share of the good things of the world. Education consists of two parts: general education as given by our public school system and special training for the trade or profession. This was formerly afforded by the apprentice course, but when the economic laws forced the organizations of the industries into big corporations, the necessity of subdivision of labor left no place where the young man or woman could in a few years pass through all the different operations of a trade. This left no place in which to learn a trade. Thus while the public school system has developed and become very efficient, its function is and always has been the general education required by any person before he can specialize in learning a trade, but there is no place left in modern industry to learn a trade. This is the great problem which confronts our civilization and endangers our prosperity, and this has led to the establishment of apprentice courses and corporation schools and thereby the association. The work of solving the problem has hardly begun.

During the meeting, at which a very large number of papers were read, addresses were delivered by such men as L. L. Parks, superintendent of apprentices, American Locomotive Company; Paul Kreuzpointner, Pennsylvania Railroad Company; N. S. Dougherty, Pennsylvania Railroad Company; S. W. Thomas, Santa Fé Railroad System; M. W. Alexander, General Electric Company; R. J. Watson, Westinghouse Electric & Manufacturing Company; Charles R. Beeman, Carnegie Steel Company; C. R. Dooley, Westinghouse Electric & Manufacturing Company, and many others.

Electrification of the Usui-Toge Railway, Japan

The Line Was Electrified at 650-Volts Direct-Current with Under-Contact Third-Rail Owing to Tunnel Clearances—Electricity Has Eliminated the Use of Separate Locomotives for the Adhesion and Rack Sections

The Usui-Toge electrified division of the Japanese State Railway crosses a mountain chain some 75 miles to the northwest of Tokio. The original line was constructed in 1893, and to overcome a difference in level of 1837 ft. in a length of 6.8 miles the line was constructed with the Abt rack system on grades between 2.5 to 6.7 per cent. The length of trains is limited by the length of the single turnout at Kumanotaira at the center of the line, which is only 410 ft. between two rocky ridges. With steam operation ordinary locomotives were used for the sections without racks, while rack locomotives were employed on the steeper grades of the line.

The gage of the line is the Japanese standard of 3 ft. 6 in. Originally the trains consisted of one locomotive with five to six passenger and freight cars. Later, double trains consisting of two locomotives and ten to twelve coaches were used. The steam locomotives were designed for a speed of only 5.6 to 6.2 m.p.h.

Electrification offered the only way to secure longer and faster trains. Smoke elimination was also a consideration, as the town of Karuizawa, situated at a height of 2752 ft. above sea level, is a popular health resort. The line passes through twenty-six tunnels, which comprise in aggregate length about 2.2 miles of the 5-mile rack section.

Bids for electrification were invited in 1909 in accordance with specifications drawn up by the Imperial Japanese Railway authorities. At the end of the same year the order for the delivery of the electric rolling stock was placed with the Allgemeine Electricitäts Gesellschaft. It included twelve d.c. rack locomotives, which have been in service since May, 1912. As was to be anticipated, the traffic has increased considerably, and the time taken in traveling from Yokogawa to Karuizawa has been reduced from one and one-half hours to forty minutes.

POWER AND DISTRIBUTION

Electric energy is obtained from a power station erected near Yokogawa specially for the railway. It contains three 1000-kw General Electric Curtis vertical turbines which supply three-phase current at 6600 volts, fifty cycles. The excitation current is provided by two 125-volt exciters with outputs of 75 kw each, direct-coupled to vertical steam engines. The steam for the turbines is generated in eight water-tube boilers with superheaters and automatic stokers. The boiler plant was constructed entirely in Japan, and Japanese coal is used as fuel.

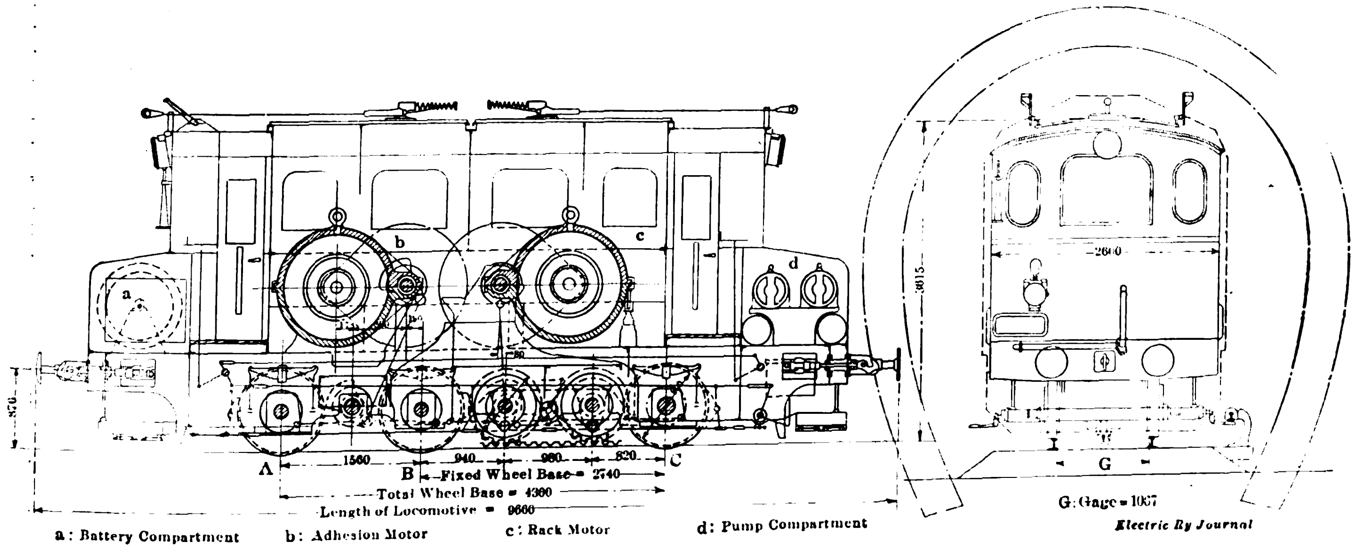
The high-tension three-phase current is led to the two substations through underground iron-armored cables, where it is transformed to 240 volts and then converted to 650 volts d.c. by means of four 450-kw rotary converters. The four converters constitute a sufficient reserve in themselves, but each substation also has a further reserve consisting of a 312-cell storage battery with a capacity of 1322 amp-hr. in connection with a 100-kw Pirani booster.

One of the chief reasons for the selection of the low pressure of 650 volts was found in the difficulty of securing satisfactory insulation in the narrow tunnels, which made overhead high-tension impossible from the outset. On the other hand, with the outputs and currents in question, only the third-rail system could be considered for the rack section of the line, and this system just came within the limits of practicability for a pressure of 650 volts when allowance was made for the somewhat moist atmospheric conditions of the tunnels. At the Yokogawa and Karuizawa yards, the current is collected with a trolley wheel from a catenary line.

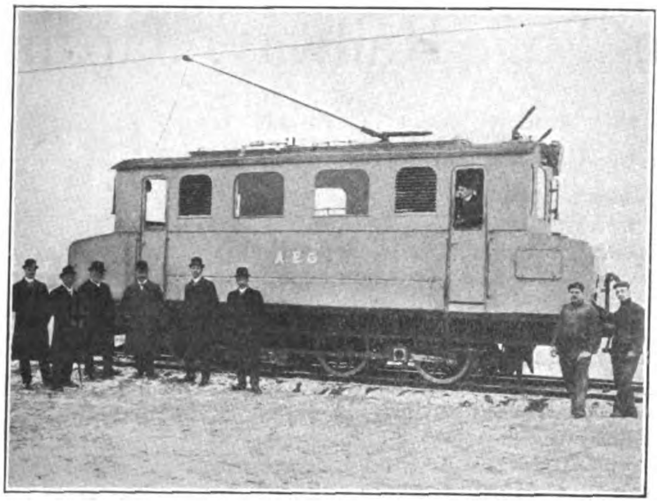
For feeding the overhead line four insulated feeder cables pass from each substation to the line, where they are fixed to wooden poles on the open track and insulators in the tunnels. The current is returned through the rails and special cables, laid beside the track.

LOCOMOTIVES

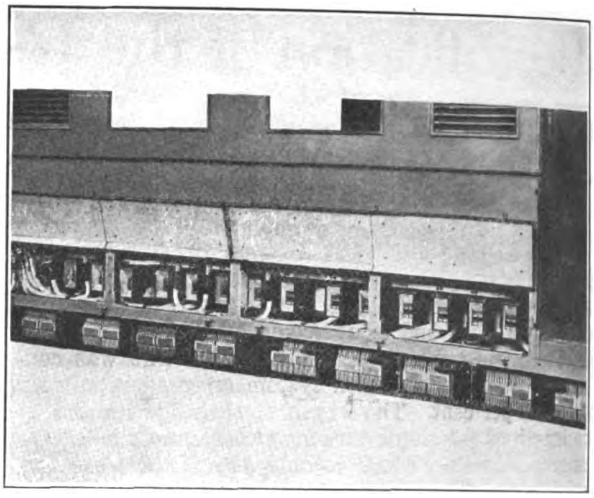
The rack locomotives are designed with separate drives for the adhesion and rack sections of the line. They are capable of drawing a train 90 metric tons in weight, or, when two locomotives are used, a double train weighing 180 tons on a grade of 6.7 per cent at a speed of approximately 10 m.p.h. per hour. They are



Usui-Toge Railway—Elevation and Clearances of Locomotive



Usui-Toge Railway—Rock and Adhesion Locomotive with Under-Running Shoes and Trolley Wheel



Usui-Toge Railway—View Showing Contactors and Resistances on Locomotive

by far the largest rack locomotives of their kind yet constructed.

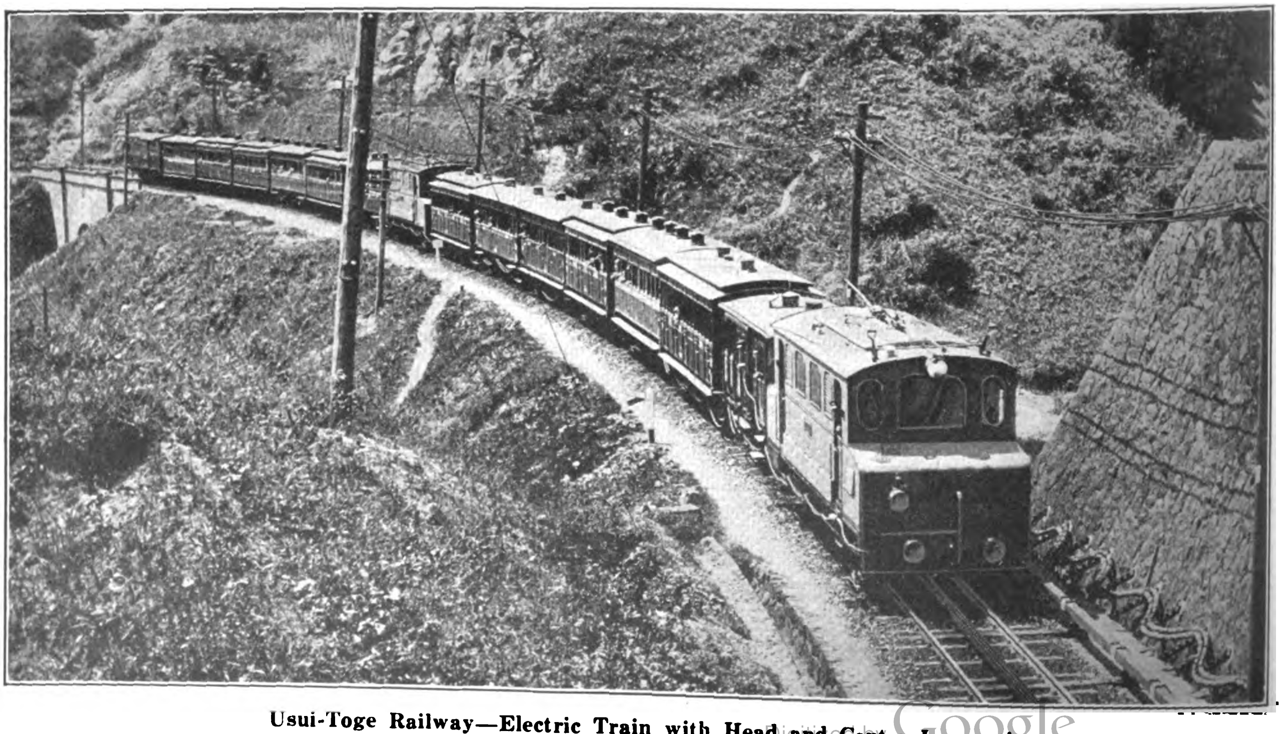
The system of drive by means of raised motors and parallel cranks was necessitated by the large output required from the motors and also by the special nature of the rack machinery, which makes it somewhat difficult to mount the motors low. The locomotive weight of 42 tons is distributed practically uniformly over the three adhesion driving axles. The hourly rating is 350-hp per motor at a speed of 650 r.p.m.

The motor for the adhesion drive is rigidly mounted in the spring-supported main frame of the locomotive. It works with a gear ratio of 1:6.4 on to the gearing shaft and from that on to the jack shaft, from which the driving wheels are driven by coupling rods. The two pinions are mounted on two axles in the fixed inner frame; the pressure of the gearing teeth is here taken up by the movement of the locomotive springs. The inner frame also carries the driving motor for the rack machine. This motor is mounted in the inner frame on a cast-steel bracket which can turn. It is geared 1:5.9.

The drive is carried out directly by a driving rod working on to a pinion shaft. As in the adhesion drive the cranks are set at an angle of 90 deg.

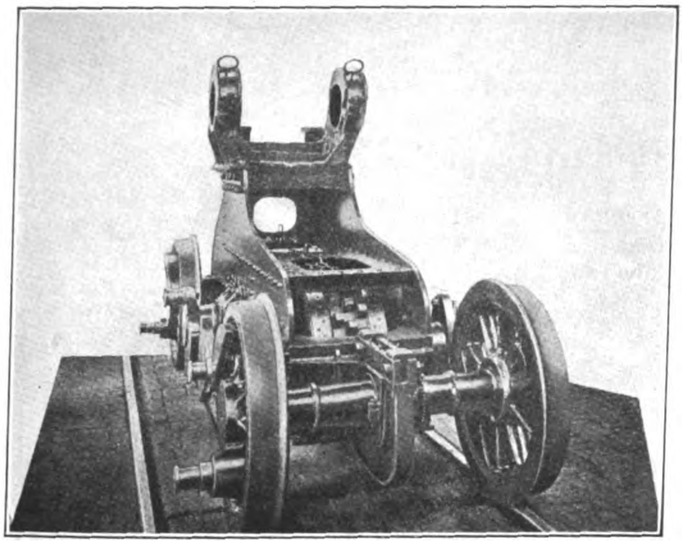
The motors are alike electrically but differ mechanically. Both motors are divided in the center, and the upper half and the rotor can be raised or lowered by means of a crane. The motors are controlled by means of thirty-two contactors. These contactors are in asbestos-lined compartments along the sides of the locomotive, so that contactor inspection and maintenance offer no difficulties. The contactors and the controller, which is placed on one side of the locomotive near the contactors, are operated by 80-volt battery current. The advantage of taking the control current from a battery is that the short-circuit brake can be used even when no line current is available. The controller contains three drums. The main drum and reversing drum correspond to the drums of an ordinary controller for contactor control, but the third has two auxiliary contactors which, corresponding to the three positions "adhesion," "rack" and "brake," group the main contacts in the manner required for the different forms of service.

On the adhesion section the locomotive is driven solely



Usui-Toge Railway—Electric Train with Head and Center Locomotives by the adhesion motor. The rack motor runs on no-load and maintains a constant speed, which is approximately the same as that of the adhesion motor. By this means the locomotive can run on to the rack even at high speeds without any injurious vibration. The synchronism between the loaded motor and the rack motor running on no-load is obtained by connecting the field of the rack motor in series with the field and armature of the adhesion motor, the armatures of the two motors being connected in parallel. The factors which determine the speed are therefore the same for both motors if the pressure drop and armature reaction are left out of consideration. On the rack section the motors work with the usual series-parallel connections, the motors being in series on the first nine steps and in parallel on the remaining six steps. On the ninth and fifteenth steps the motors are shunted. By altering the shunt resistances the distribution of the load, which changes with the wear of the running wheel diameter, can be adjusted between the rack and adhesion motors.

The first six positions of the controller are used for operating the electric brake. For the short-circuit brake, which is always used on down grades, the armature of one motor is connected in series with the field of the other motor and with a set of resistances. This crossed-brake connection makes the brake act with absolute certainty whether the position of the reversing controller corresponds to the direction of rotation of the motors or not. If the current fails in the third-rail while the train is traveling upward, the motorman only has to remember that the grouping drum must be placed on the position "brake" before the braking can be carried out at the main drum. The current then generated in the motors is converted into heat in the resistances which are also used for starting up. For this purpose the resistances are suspended along the sides of the locomotive in such a manner that they can be adequately cooled. On down grades the short-circuit brake is supplemented by a vacuum brake. In addition, a hand brake combined with the vacuum brake rigging is provided for contingencies.



Usui-Toge Railway—Rigid Inner Frame of Locomotive for Rack and Adhesion Service

The locomotives have now been in service for nearly two years. After a few preliminary difficulties in connection with the parallel crank drive, which were overcome by strengthening the cranks, the traffic is now handled smoothly and satisfactorily. The electrification of the line cost $1,750,000.

INSULATED RETURN FEEDER TESTS IN ST. LOUIS

During the months of February and May a number of tests of the return feeder system in St. Louis, described in the article in the ELECTRIC RAILWAY JOURNAL for Jan. 17, were made by A. F. Ganz, F. N. Waterman, S. S. Wyer, H. S. Warren and Elam Miller. Two principal kinds of tests were made: (1) Measurements of over-all voltages, and (2), measurements of potential gradients. The over-all voltage measurements were made on the tracks between the point of lowest potential and various points on the boundary of the Ann Avenue substation district. The measurements of potential gradients were made in various sections of the district to determine the voltage drop per 1000 ft. of track. So far as possible the potential gradient tests were made with one-hour recording volt meters. The gradient measurements were made during the hour of evening peak. Simultaneously with the taking of the records of voltages and gradients, observations of current output from the Ann Avenue substation were made.

Of the nine sets of over-all voltages measured, the averages for the highest ten consecutive minutes during the hour of peak loads are less than 7 volts in seven cases, exactly 7 volts in one case and 9 volts in the remaining case, the average for the nine measure ments being 4.67 volts. The averages of the over-all voltages vary from 2.5 to 8.4, an average of 4.13 for the nine over-all voltage measurements made. Of twenty-seven gradients measured, eleven are 1 volt or less for the highest ten minutes. Of those exceeding 1 volt eight were accounted for by finding high resistance or open bonds or special work in the section of track included in the measurements. Potential gradient measurements were made in all cases in tracks immediately adjoining return feeder connections.

In comparing the conditions found in the Ann Avenue substation district with the ordinances recently enacted in several American cities it was concluded by the engineers that the requirements of these ordinances can be readily complied with even in a large city electric railway system, as they considered the Ann Avenue substation district typical of the general conditions met in electric railways in large cities. They also concluded that the results have been obtained at an initial cost which cannot be considered large and at an annual cost small in comparison with the benefits derived. They point out that it is vital to the successful operation of the insulated return feeder system, as well as of any other system of electrolysis mitigation, that the rail bonding be kept in good repair. Special work should be independently shunted by jumpers of ample size. Return pilot wires are of great value in furnishing a ready means of supervising and checking the conditions of the return system. Such wires were not used in St. Louis.

JOVIAN LEAGUE ORGANIZED IN LOUISVILLE

Jovians of Louisville have effected an organization of a Jovian League, of which R. E. Brian, manager of the Louisville branch of the Federal Sign System, is president. Robert Montgomery, manager of the Commercial department of the Louisville Gas & Electric Company, is vice-president, and Carl A. Klemm, manager of the Louisville office of the Westinghouse Electric & Manufacturing Company, is secretary. The board of directors of the league includes in its membership Walter O. Smith, superintendent of construction of the Louisville Gas & Electric Company, and James Clark, Jr., head of the electric company which bears his name, and statesman of the order.

ILLINOIS TRACTION BILLBOARD ADVERTISING

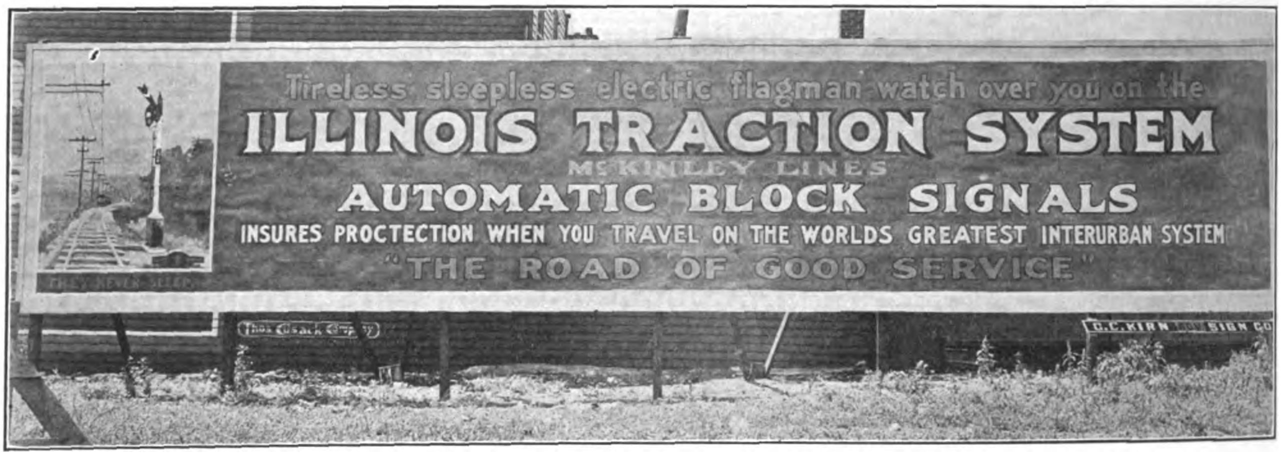
At its largest terminals the Illinois Traction System makes generous use of large painted signboards setting forth the merits of its several services. The three boards shown herewith are located in St. Louis. These illustrate and advertise the sleeping-car service, freight service, general train service and the protection afforded by automatic block signals. These boards are 10 ft. high and 50 ft. long and are painted in four or five colors. The wording and pictures on the boards are changed often enough to make them attractive.

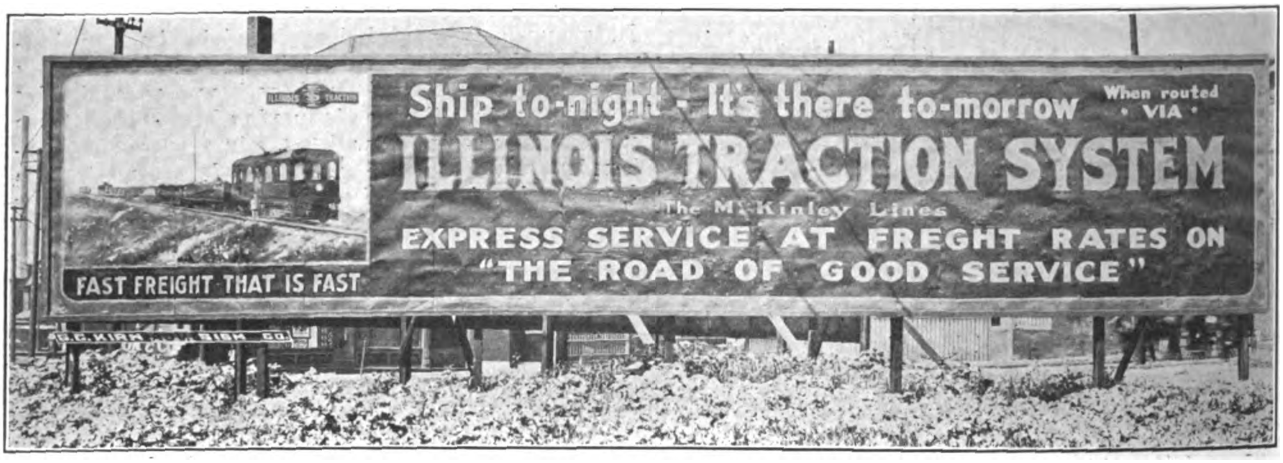
In designing these boards, striking photographic views used in the regular printed advertising were reproduced in natural colors. For example, the board shown in the upper engraving displays a photograph of a piece of track and a block signal, the middle board shows one of the twelve 800-hp electric locomotives built in the company shops. This "engine" is hauling a long train of coal cars and a standard caboose.

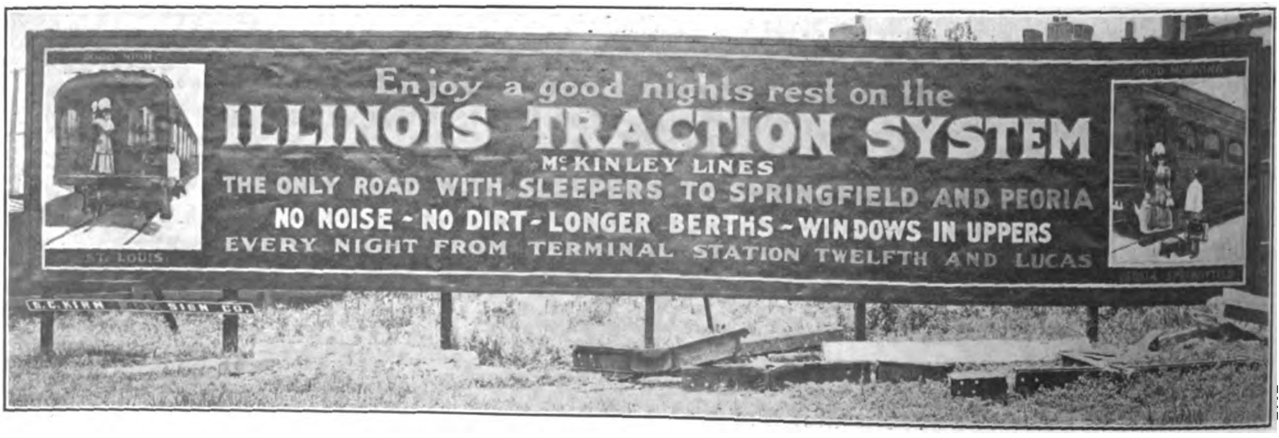
The lower board shows pictures of two much-used sleeping car photographs entitled "Good Night, St. Louis," and "Good Morning, Peoria."

These signboards are located at street intersections where extra land was purchased so that curves could be enlarged. They are placed so that they may be read by the passengers on the cars and from two intersecting streets.

The preparation of material for display on these boards and the carrying out of the work is part of the publicity campaign of the Illinois Traction System, of which E. E. Soules, Peoria, is publicity manager.


Tireless sleepless electric flagman watch over you on the
ILLINOIS TRACTION SYSTEM
McKINLEY LINES
AUTOMATIC BLOCK SIGNALS
INSURES PROCTECTION WHEN YOU TRAVEL ON THE WORLDS GREATEST INTERURBAN SYSTEM
"THE ROAD OF GOOD SERVICE"
THEY NEVER SLEEP
Thos Cusack Co
G.C. KIRN SIGN CO


Ship to-night - It's there to-morrow
When routed VIA
ILLINOIS TRACTION SYSTEM
The McKinley Lines
EXPRESS SERVICE AT FREGHT RATES ON
"THE ROAD OF GOOD SERVICE"
FAST FREIGHT THAT IS FAST
G.C. KIRN SIGN CO.


Enjoy a good nights rest on the
ILLINOIS TRACTION SYSTEM
McKINLEY LINES
THE ONLY ROAD WITH SLEEPERS TO SPRINGFIELD AND PEORIA
NO NOISE - NO DIRT - LONGER BERTHS - WINDOWS IN UPPERS
EVERY NIGHT FROM TERMINAL STATION TWELFTH AND LUCAS
GOOD NIGHT
ST. LOUIS
GOOD MORNING
G.C. KIRN SIGN CO.

Illinois Traction System—Large Signboards at St. Louis

IMPROVEMENTS IN CAR DESIGN

An extended paper on this subject was read by C. H. Cross, mechanical engineer of The Milwaukee Electric Railway & Light Company, at a meeting of that company's company section on June 11.

Mr. Cross said that ten years ago the standard cars for city service were the convertible and semi-convertible types of cars with drop platforms. Both types arranged for single and double-end operation were to be found. Such local types as the California, with open and closed compartment, and the Denver side-center entrance cars were at a standstill. The imported double-deck car had ceased to be the center of attraction, and the discussion of car design was confined almost wholly to the long versus the short car. This discussion was conducted not from the engineer's standpoint but was rather limited to the subject of the amount of walking the conductor would have to do and the possibility of missed fares during the rush hours and on crowded cars. Such economic questions as the minimum weight per seat or per square foot of car floor area or per foot of car length, also the relation of the weight of the car to the coal pile, had not been duly considered and, if clear to some of the fraternity, had not been brought out for general consideration. The speaker said that within the last few years the relation between the weight of the cars and the coal pile had become clear to some, but a further real saving is sure to follow if the operating department of a company takes care not unnecessarily to destroy the light-weight equipment while it is in service.

STANDARDIZATION

The speaker said that standardization, whether in size of car, body or power equipment, had not yet been obtained. Even to-day standardization in the city cars may appear ridiculous to some, yet careful consideration of the subject will show that there are many details connected with the city cars of which no plausible objection can be afforded to standardization. Examples will be found in height of steps, size of glass for windows, length of cross-seats, width of aisles, distribution of car area to seats and standing space, etc.

Of the different types of car bodies now in use, investigation shows that bodies with the same relative dimensions vary in weight as much as 80 per cent, although designed for similar service. Whether a car is built of all-steel, semi-steel or all wooden construction is immaterial from the standpoint of weight, provided it is used under similar traffic conditions and the loading is calculated on a definite standard, as, for example, number of pounds per square foot of floor area or per foot of car length. The fact that moving useless dead weight costs money should be an incentive to the car designer to keep the weight of the car down to a minimum. As a collision is an extraordinary occurrence and as experience with the modern lightweight cars shows that a certain damage results to the structure, regardless of whether impact has been taken into consideration in the design or not, it certainly is not economical to add weight to the car when such a plan does not enhance the total factor of safety in operation.

PAY-AS-YOU-ENTER CARS

Mr. Cross said that in the STREET RAILWAY JOURNAL of August, 1890, page 377, is found a description of some cars built in 1871, proposing a system of pay-as-you-enter car operation. He added that no doubt these cars were suggested by Ridgeway's patent, granted in 1870. He added that the article comments as follows: "If everybody always had the exact fare ready, this plan would have worked, but the individuals with bundles and packages were as numerous then as now, and the scheme had to be abandoned."

The speaker then said that within comparatively few years there has been in service a type of single truck, one-man operated, city car equipped with a stationary fare box, into which passengers as they entered were expected to drop their nickels. When the passenger did not have the proper coin, change was made by the car conductor who also issued transfers. That time brings changes, he added, there can be no doubt, as it has been deemed advisable to modify within the last few years even this early type of the prepayment car to a more modern, up-to-date type of prepayment city car. In this connection the speaker said that cars without bulkheads were described in the STREET RAILWAY JOURNAL for August, 1890, page 378. These cars were used in the District of Columbia near Washington.

In his discussion, the speaker said, he did not propose to enumerate the various new or novel designs, but he thought it might be of interest to set forth the results as determined in connection with one design and the success of the inventor in the litigation had with its defence. The design, he said, is known as the "Milwaukee type" and a description and floor plan are given in the ELECTRIC RAILWAY JOURNAL for Aug. 3, 1912, page 167. Additional details, he continued, are given as follows from the brief and argument, together with the memorandum of the decision, reached in the case of the Prepayment Car Sales Company, plaintiff, vs. Orange County Traction Company, defendant, a case tried both in the United States District Court for the Southern Division of New York and in the United States Circuit Court of Appeals for the Second Circuit.

According to Mr. Cross, the Orange County Traction Company purchased ten cars equipped with the type of mechanism developed in Milwaukee and, as a result, were made defendants in a suit by the Prepayment Car Sales Company. The cars were alleged to infringe the plaintiff's patent No. 935,929, as defined in claims Nos. 3 to 16. According to the speaker, the plaintiff's attorney stated "the central invention and the center thing in issue is the invention covered by this patent, No. 935,929." In the plaintiff's patent, according to Mr. Cross, the twenty original claims mentioned means for forming a restricted passageway arranged in the barrier or extending longitudinally into the car, while only five of the claims mentioned means for moving the doors.

In continuation, Mr. Cross said that in the construction of the commonly called pay-as-you-enter cars a railing is placed on the platform at the end of the car so as to provide separate entrance and exit passage, while the fare is collected as the passenger enters the car by a conductor stationed on the platform in a convenient position with reference to the entrance passage to the body of the car. According to Mr. Cross there are really five elements to the combination claimed by the complainant; namely, (1) a car having a car body and platform or vestibule space merging unobstructedly; (2) a movable side entrance door of some type; (3) means for controlling the door; (4) means for separating the entrance and exit passageways; (5) the location of both these means of various parts in the car with reference to the position of the side entrance door.

In continuation Mr. Cross said that the defendant's structure shows a car having a car body space and end platform or vestibule and unobstructed mergence of the two parts, but that both these elements are disclosed in a passenger car embodying the construction of the claim under consideration in the Ridgeway patent No. 102,435, issued as early as 1870 and already mentioned. Mr. Cross also said that doors operated by means of a distant control on the platform were well known to the art prior to the date of the patent in suit and cited as perhaps the best known instances, the Boston Elevated, Chicago West Side Elevated, Northwestern Elevated of Chicago, Minneapolis, Minn., Rochester and Eastern surface cars.

He also said that the defendant traction company is also licensed under application for patent serial No. 398,517 which application was filed Oct. 21, 1907, seven months prior to the date of plaintiff's application for patent serial No. 935,929. He added that in the spring of 1907, a car was built in Chicago under the application for patent serial No. 398,517, and that this car, he said, was completely successful, performing its functions for over a year until it was removed due to a change in the management of the road.

Mr. Cross then continued: " 'If, therefore, there be a patentable invention in placing the door of a car in the side of the car body and operating it from a distant control upon the platform, that invention was not made by the plaintiff's patentee.'

" 'The opinion is therefore rendered that there is no patentable invention in the location of the door controlling means upon the platform in accordance with the convenience of the person who is to operate it. Wherever located, its function is the same and change in its location involves ordinary mechanical skill, not invention.'

" 'The issue is decided in favor of the defendant. U. S. Circuit Court of Appeals, Second Circuit, Judges Lacombe, Coxe and Rodgers affirmed the judgment of the District Court, Eastern District of New York, which decision was rendered by Judge Veeder in favor of the defendant, the Orange County Traction Company, Newburgh, N. Y.' "

Mr. Cross then said:

"The object of giving the detail in this case is that of showing the true status of the prepayment type of car equipped with doors on the platform. Various companies broadcast over this country are unwilling to engage in litigation, yet if the facts be known, this type of car can be made use of without question should they so desire, and no royalities need be paid."

SEATING AND ROOF CHANGES

Another requirement, according to Mr. Cross, connected with the prepayment system was proper seating to avoid congestion. The most common method is to use longitudinal side seats near the end of the car body to provide additional stream flow space and a limited number of cross seats near the center where the flow of traffic was less. In center-entrance cars, various types of folding seats are in use both at the ends and in every idle space near the center well and doors, this being done to get the most seats possible.

One of the more marked changes in car design is the adoption of the single arch roof with the use of pressed light-sheet steel carlins. The change from the monitor to the arch type, while seemingly new, is in reality nothing more than a reversion to the original type of steam car roofs and to those used on foreign electric railway cars. As early as twenty years ago the suggestion was made that a simple natural arch was more pleasing than the monitor, but the change was not made at the time because of the lack of something better for ventilation. Although many mechanical and natural ventilators have been developed within the past few years some doubt still exists as to whether the stronger roof and lighter arch is not secured at the expense of ventilation during the season that the cars must be heated. In Milwaukee the monitor roof of type 500 cars weighs 600 lb. more than the arch roof cars of type 600 cars. The change in roof shapes had also been accompanied by the introduction of composition and metal headlining as the veneers were becoming too high in price and were expensive to maintain. The United Railroads of St. Louis also uses composition material for outside panels, and in the South it is used for roof sheathing without any roofing canvas.

The quality of cane for seat upholstery, Mr. Cross said, has deteriorated very much, notwithstanding the fact that the price has increased. Substitutions of pressed steel shapes for malleable castings for seat frame parts has been made chiefly because of the demand for lighter weight seats.

The speaker then reviewed the adoption of steel for electric cars from the composite underframe of 1903 to the pressed steel designs of to-day. For city cars built with drop platforms the combination of wood with steel underframe was still the most popular.

SPECIAL CARS

Although the Ohio and California type of cars was in use previous to 1903, Mr. Cross said that no improvements of any consequence were made in them until the prepayment system encouraged the adoption of folding steps, special doors, railings, etc. A much more important development, however, has been the rejuvenation of the side-entrance car. Among the prominent types are the motor and trailer cars of the Denver Tramways, the low-floor cars of the Pittsburgh Railways, the motor and trailer cars of the United Railways of St. Louis and the center entrance cars of the Washington Railways & Electric Company and Brooklyn Rapid Transit System. All of these cars have been described at length in the ELECTRIC RAILWAY JOURNAL. It may be noted that in the St. Louis trail car the center line of the car body does not coincide with the king pin of the truck. The body was set 2 in. off center, owing to the extreme width of these straight side cars, to provide suitable devil strip clearance. An interesting fact in connection with the St. Louis motor cars is that a saving of 600 lb. or more per car is obtained by the use of the storage air brake instead of the individual compressor system. The speaker felt that the most striking features of the Brooklyn center entrance design were the light, all-steel framing, the large seating capacity and the wide doors. By using pressed steel shapes this structure had been fabricated to weigh, when fully equipped, only 639 lb. per seat.

CONCLUSIONS

In closing Mr. Cross presented the following conclusions:

"First, pay-as-you-enter cars equipped with movable doors or gates controlled by distant handles, operated either by the conductor or the motorman can be used in this country without paying royalties.

"Second, the better type of recently designed cars, whether for surface or subway use, are either of the 'all steel' or 'semi-steel' type into which as much other non-combustible construction material have been incorporated as is possible consistent with minimum weight.

"Third, the stepless arranged center-entrance type of car has proven its worth from many points of view in actual service for handling both the rush hour and normal traffic."

In a recent issue of *The Tramway and Railway World* is announced the withdrawal of first-class cars on the Hagley Road route in Birmingham, England, because of insufficient patronage. First-class cars, however, are still being used in Liverpool, among other cities.

American Association News

Delegation from the Association Appeared Before the Senate Interstate Commerce Committee to Protest Against the Inclusion of Electric Railways in the Provisions of the Rayburn Bill—Committee Activities Continue

HEARING ON THE RAYBURN BILL

Five representatives of the American Electric Railway Association appeared before the Interstate Commerce Committee of the United States Senate on Tuesday (June 16) to make a vigorous protest against the inclusion of electric railway lines in the provisions of the Rayburn bill for government control of stock and bond issues.

The witnesses were: Horace F. Clark, Washington, D. C., attorney, representing the American Electric Railway Association; Arthur W. Brady, Anderson, Ind., president Union Traction Company; Bernard F. Weadock, Detroit, Mich., attorney Detroit United Lines; James M. Barrett, Fort Wayne, Ind., president and general counsel Fort Wayne & Northern Indiana Traction Company; and Charles L. Henry, Indianapolis, Ind., president Indianapolis & Cincinnati Traction Company.

Attorney Clark made a brief statement of introduction for the other witnesses who, he said, appeared as representatives of the American Electric Railway Association. He told the committee that when the House considers a long series of safety appliance bills, this association had been able to secure the inclusion of a provision to except electric railways from the operation of the Stephens "safety appliance" bill. He felt that a similar exception should be written into the Rayburn bill. Mr. Clark said that less than 1 per cent of the business of the electric lines was interstate and that because of this fact congress should not hesitate to make the exception asked.

Mr. Brady told the committee that the association represented about 45,000 miles of traction lines. He said that only about 335 out of 1200 or 1300 lines in the country could be listed as interstate carriers. These, he said, had about 17,000 miles of track, but three-fourths of them were less than 50 miles in length. He said that in his own state of Indiana, the interurban business had been developed about as much as in any other state, but even in Indiana 99 per cent of the total business done by the electric lines was intrastate traffic. In answer to a question, Mr. Brady said that the laws of Indiana regulate the terms and conditions of securities issued by companies. He said that this was one reason why the exclusion asked by his association should be granted by congress.

Chairman Newlands asked the witness if national regulation would not be just as acceptable as state regulation, provided a comprehensive measure were passed putting the entire work in the hands of the Interstate Commerce Commission and excluding the local security commissions. To this Mr. Brady replied that he thought there were serious objections to such a plan. "It would be unwise, unfair and unnecessary," said Mr. Brady, "to vest this jurisdiction in the Interstate Commerce Commission, and we would not be here if we did not think that we had good reason for that position."

Mr. Brady pointed out that at present his lines are subject in many ways to the Interstate Commerce Commission. They are forbidden to grant rebates or to make discriminations. They must make reports regularly to the Interstate Commerce Commission. Their accounting systems are subject to its jurisdiction, and they are even subject to the provisions of a valuation act. Mr. Brady insisted that it would be unfair to lines having such a small percentage of interstate business to treat them as though they were interstate carriers of the same character as the New York Central Railway or the great transcontinental lines of the country.

Mr. Brady emphasized his belief that it would be unwise and unnecessary for the federal government to take over the control of the security issues of the electric lines because these concerns were essentially local and already subject to full state regulation. "We object to it strenuously," he said, "for the reason that we believe that it would add greatly to the difficulties that we have to meet."

Most of the lines of this character, Mr. Brady told the committee, were short systems not strong financially and represented a development of the last fifteen years. They have been built wholly in advance of the need for them. Many of them are struggling under adverse conditions and some of them are barely able to make both ends meet. One vital objection to the proposed regulation was the fact that it would compel these small companies to send representatives to Washington—from all over the United States—every time they found it necessary to issue securities or notes. This, he said, would involve a considerable expense, particularly because the individual issues would be small. An output of $25,000 in securities, he said, was often a big item for one of these lines. In an issue of that size the expense of several hundred dollars entailed by sending a representative to Washington might amount to more than the usual commission for handling such a transaction.

The witness also explained to the committee that such a proposal would add greatly to the burdens of the Interstate Commerce Commission which now has its hands full with the regulation of some 250,000 miles of steam railroad. This commission, he feared, would make its rules to cover the operation of the large railroads with hundreds of millions of dollars of financing, and this would not fit the case of the smaller lines. He suggested that congress wait until similar legislation had been worked out practically by the Interstate Commerce Commission for the big roads before applying it to the electric railways.

"You have made what seems to me," said Senator Robinson of Arkansas when Mr. Brady concluded, "a very clear and rather forcible statement of your position."

Mr. Weadock told the committee that the 800 miles of the Detroit lines were subject to the regulations of 166 municipalities in Michigan—under rigid home rule—as well as the Michigan Railroad Commission, the Public Utilities Commission of Ohio, a city commission in Detroit and the Interstate Commerce Commission. He said that there was also a state securities commission in Michigan which passed upon the issue of utility bonds and that its approval also had to be obtained for security issues. Mr. Weadock said that in his state the interstate business of the electric lines was less than 1 per cent.

If there were federal control of securities, Mr. Weadock explained to the committee, it would take the larger part of a week for a representative to come to Washington to lay his case before the committee and return to Detroit. A decision could be asked and obtained from the Michigan commission within twenty-four hours. With the enormous work already imposed upon the Interstate Commerce Commission, he said, the small electric railways could not secure the same attention given to steam railroads, and he did not believe they would be entitled to it. In answer to a question, he said that he would welcome complete regulations by the Interstate Commerce Commission provided it could come to Michigan and oust the state commission and the 166 municipalities as well as the city commission of Detroit and common council of that city.

Mr. Barrett told the committee that the Fort Wayne & Northern Indiana Traction was the third largest electric railway in Indiana. He said that it had about 130 miles of interurban lines and 68 miles of city lines. However, none of these lines reaches to within 20 miles of the state lines. From a connecting line, however, which crosses the state line, he said that his company obtained a very small amount of interstate traffic. This, he said, was a very minute fraction of the company's business. Under the proposed law, he would have to come to Washington to secure the right to issue securities for his city lines, although they were purely of local concern. He said that the state commission could handle such a matter far more expeditiously than the Interstate Commerce Commission and that it could also personally inspect the property. This, the Interstate Commerce Commission could not do. He felt that if such a law were passed his company would find it cheaper to refuse absolutely to carry any interstate commerce business.

Mr. Henry told the committee that the Indianapolis & Cincinnati Traction Company was now trying to extend its lines into Cincinnati. If the proposed law were passed without the exemption, he said it would be necessary, before this extension could be built to get the approval of the Indiana and Ohio commissions as well as that of the Interstate Commerce Commission. He said that the average fare on his line was 24 cents and that the interurban companies could not make from 70 to 90 per cent of their moneys out of freight as the steam roads did. He believed congress should give the company ten years more of development and that then, if they had grown enough, it would be time enough to put them under federal control.

COMMITTEE ON EDUCATION

A meeting of the committee on education was held in New York on June 16. After a discussion of the fundamental principles which must underlie a successful correspondence course of instruction, the following tentative plan was outlined: The course will be subdivided into three general divisions corresponding to the natural divisions of the mechanical, civil and electrical engineering departments of an electric railway. One course will, therefore, be for young men in the shops, another for those in the track and structural departments and the third for those employed in power houses and substations and in line work.

The course to be outlined can be completed by an average student in about two years on the assumption that he spends a reasonable proportion of his evenings on the work and during the day observes closely what he sees about him. It is proposed that regular reports of the work of students be furnished to foremen or superintendents and to the committee on education of the association.

Leading instructors of a correspondence school will at once undertake a study of conditions existing on electric railway systems so that they may be able to outline courses of study, utilizing existing texts with a view to meeting the needs of young men in the electric railway industry. They will, as soon as possible, outline three grades of courses in each of the three divisions mentioned. One course will be very complete, the second somewhat condensed, while the third will contain only the bare essentials. The courses will be very practical in their nature, and problems, drawings and other student work will be closely related to the every-day duties of electric railway employees.

As soon as the sample curriculums have been prepared a meeting of the committee on education will be held to consider them. The sample curriculums will also be submitted to the chairman of the committees of the American Electric Railway Engineering Association, which are active in the three respective fields. The correspondence school officials will then calculate carefully the cost of the proposed instruction and will make a special rate which will be as low as is consistent with a reasonable profit.

While no date has been set for the meeting of the committee on education, it is expected that one can be held in the course of a few weeks and that the complete plans of the committee can be put into shape in ample time to have them brought to the attention of the members of the association before the coming convention.

MEMBER OF THE CLASSIFICATION COMMITTEE

M. W. Glover, president of the American Electric Railway Accountants' Association, Mobile, Ala., announcees the appointment of P. S. Young, treasurer Public Service Railway, Newark, N. J., as a member of the committee on a standard classification of accounts, in place of F. E. Smith, resigned.

WATER-POWER LEGISLATION

For the committee on public lands, Representative James M. Graham, of Illinois, has filed a favorable repor ton the federal administration's water-power leasing bill. The bill authorizes the Secretary of the Interior to lease to citizens of the United States or properly qualified associations or corporations for a term of not more than fifty years, water-power sites in the public lands of the United States, exclusive of the national parks. The Secretary is to have the power to prescribe the regulations for these leases, which are to be irrevocable except for a breach of their terms. The Secretary is to have the power of giving preference to political subdivisions, such as states, counties or municipalties. He is also authorized to grant temporary permits for one year, with extensions in certain contingencies, to enable intending applicants to investigate the possibilities of power development.

Whenever the power developed is sold outside the state of its development the regulation and control of the service, charges for service and the issuance of stocks and bonds are conferred upon the Secretary of the Interior or upon such body "as may be provided by federal statute." Similar control is given over intrastate business where there is no state public utilities commission. Combinations and agreements in restraint of trade or increase of prices are forbidden. Sale or delivery of power to distributing companies except for thirty-day periods in cases of necessity are also prohibited. Provision is made for keeping the property intact as a "going concern" at and after the time when the lease terminates. This is to be done by giving the United States the right to take over the property, upon not less than three years' notice prior to the expiration of the lease, upon payment of the actual costs of right-of-way, water rights, lands and interest, as well as of all structures and fixtures.

COMMUNICATIONS

EDUCATIONAL COURSE OF ACCOUNTANTS' ASSOCIATION

THE AMERICAN RAILWAYS COMPANY,
PHILADELPHIA, PA., June 17, 1914.

To the Editors:

Referring to the announcement in your issue of May 30 of the educational course of the Accountants' Association, I wish to trespass upon your space to urge upon the various member companies the importance of this work.

One of the most serious problems facing our industry to-day is our relations with the public and the regulating bodies of the national government and the various States. Those of us who are called upon to represent our companies before these bodies and boards of trade and the like realize the vital importance of having at our command well authenticated facts and figures to bear out our contentions, and the only way that we can receive this information is through a thoroughly well-trained organization along accounting lines.

It seems to me that this course should not be confined entirely to men in the accounting department but that the younger men in the various operating departments, and more particularly in the engineering department, could profit very largely by following this course. They would then be in a much better position to respond intelligently to the requests of the accounting department for figures and statistics bearing upon the construction and operating costs.

And to the younger men in the accounting department I would urge the importance of being well grounded in the theory of accounting, thus fitting themselves for promotion to fields of larger responsibility and greater remuneration. There should be one or more students in this course in every company connected with the Association.

C. L. S. TINGLEY, Second Vice-President.

SAN FRANCISCO MUNICIPAL RAILWAY REPORT

WILLIAM DOLGE, CERTIFIED PUBLIC ACCOUNTANT
SAN FRANCISCO, CAL., May 29, 1914.

To the Editors:

Gentlemen: I have read with much interest your editorial in the issue of May 23 on the San Francisco Municipal Railway report.

The preparation of the report brought out many novel points, among them the propriety of capitalizing the expense of the elections held Dec. 30, 1909, and April 22, 1913, and not capitalizing the elections held Dec. 2, 1902, Oct. 8, 1903, and June 24, 1909. Expense of a municipal election on account of a municipal public service enterprise may be likened to the promotion expense incurred by a private corporation. For that reason, it seemed proper to capitalize the cost of the election at which the bonds were authorized (Dec. 30, 1909) and also to capitalize the cost of the referendum election April 22, 1913. The three prior elections may be compared to three separate attempts to promote the undertaking, and I am quite sure that if in a private corporation the three earlier promotions (elections) were unsuccessful that the Railroad Commission of the State of California would not permit the railroad corporation to capitalize the cost of the three unsuccessful attempts.

Apparently the writer of the editorial overlooked the chronology appearing on the inside cover of the report, for it is there stated that the budget appropriation of $325,000 made in June, 1906, for the Geary Street Railway was used for the reconstruction and rehabilitation of streets and buildings destroyed in the disaster of April 18-22, 1906. In so far as there were any expenses for legal services, engineering, etc., prior to 1909, I question whether the Railroad Commission would permit their inclusion as capital expenditures. In any event, the amount was a negligible one, for all or nearly all of the $325,000 appropriated for the railroad was spent for the reconstruction and rehabilitation of streets and public buildings.

It was feared that to set up a separate reserve for injuries and accidents (in the first report that was bound to have a wide circulation) would prove a temptation to accident fakirs and ambulance chasers. At this time the important thing is that the reserves set up shall be deemed adequate by competent authority. So long as there is no deliberate misstatement, I am frank to say that I do not believe that "the effect" (of combining the reserves for depreciation and for injuries and accidents) "to others than the close analyst is bound to be misleading."

WILLIAM DOLGE.

NEW ELECTRIC RAILWAY POWER CONTRACT IN ALABAMA

Recently a contract has been signed between the Alabama Power Company and the Birmingham Railway, Light & Power Company, of Birmingham, Ala., which company is part of the American Cities Company, for the furnishing of energy to the Birmingham district from the hydroelectric plant of the Alabama Power Company, situated on Coosa River, some 60 miles from Birmingham.

The Alabama Power Company at its plant on Coosa River has installed four units of 17,500 hp, which will generate sixty-cycle, three-phase power at 6600 volts. This will be transformed and transmitted to Birmingham at 110,000 volts. over a steel-tower transmission line of the latest design, equipped with suspension type insulators and No. 00 stranded-copper cables. This voltage will be reduced at the Magella substation of the Alabama Power Company, which is situated on the outskirts of Birmingham, to 22,000 volts and will be delivered to the several substations of the Birmingham Railway, Light & Power Company at that voltage.

The capacity of the present steam plant of the Birmingham Railway, Light & Power Company is 17,400 kw. From this station current is furnished to approximately 140 miles of street railway, for the lighting of Birmingham and suburban towns, and to numerous power consumers in the district. This plant will be retained as a reserve station and to insure continuity of service. In addition to this, the Alabama Power Company has a 12,500-kw steam turbine station at Gadsden, Ala., which is also connected to its system.

Approximately 60,000,000 kw-hr. of electrical energy is being consumed each year in the Birmingham district. A considerable portion of this is furnished to mining and manufacturing plants, which are taking advantage of the extremely low power rates offered.

In a recent order issued by the Pennsylvania Railroad, passenger trainmen are instructed that whenever passenger coaches are crowded, a member of the train crew must announce the number of seats available in other coaches, and must also tell the number of seats available in each coach. Special attention is directed to this practice at the larger terminals, where passengers are liable to be inconvenienced by the congestion of travel.

Equipment and Its Maintenance

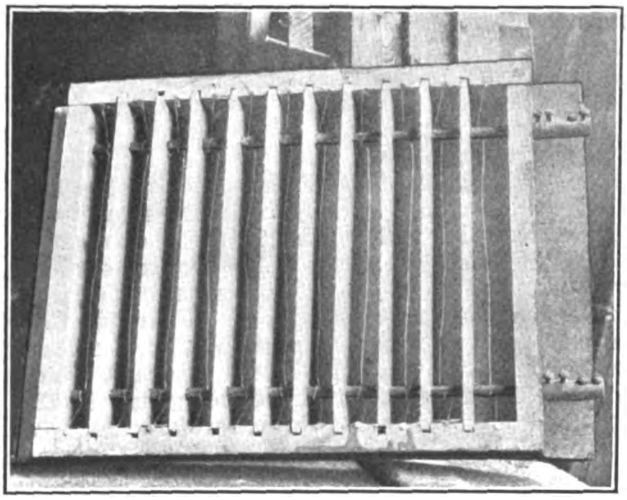
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

HOME-MADE CAR LIGHTNING ARRESTER

BY C. B. GAW, MASTER MECHANIC, KALAMAZOO, MICH.

A home-made car lightning arrester which has been in service for more than two years without a failure has been developed by the mechanical department of the Michigan United Traction Company at Kalamazoo, Mich. Essentially, this device consists of a frame 12½ in. wide x 16 in. long x 2½ in. deep and divided into eleven cells. At one side of this frame is a section of No. 00 trolley, which is connected into the power circuit, and on the other side of the frame also a section of No. 00 trolley which is connected to ground. These two copper bars are connected in each of the eleven cells with short pieces of No. 29 double cotton-covered magnet wire with an insulated Western Union splice in each. The connection of this magnet wire to the No. 00 copper bus in the power circuit is bare, and that to the ground is insulated by the cotton insulation on the No. 29 wire. After a thorough test it has been found that this insulation is just sufficient within reasonable working limits to prevent its breaking down in the Western Union joint when the 600-volt trolley current is on the line. In case of lightning discharge, however, this insulation is broken down and an instantaneous connection to ground is made.



Michigan United Home-Made Car Lightning Arrester

The lightning arrester cabinet is made of ⅞-in. pine strips with a ½-in. sheet asbestos back and 3/16-in. transite board partitions between the eleven cells. The two sections of bare No. 00 copper trolley are passed transversely through the transite board partition walls at each side of the cabinet. Both of these copper buses fit into sockets at one side of the cabinet and pass through the opposite side of the cabinet, terminating in two-way sleeve connectors. Each of the No. 29 magnet wires in the cells contains, as mentioned before, a Western Union splice at its center, which, after it is made, is dipped in a thin solution of shellac to prevent chafing. The No. 00 copper bus is connected into the power circuit between the trolley base and the choke coil. The grounded bus is connected by a ground wire securely fastened to one of the motor cases.

For more than two years 100 arresters of this type have been in service, and there has not been a single instance where lightning has reached the electrical equipment. In cases where lightning did strike a car protected with this arrester, one or more of the No. 29 wire connections were burnt in two, thus requiring renewals from time to time. Variation in the quality of the insulation at the Western Union splice, as well as at the insulated connection to the grounded No. 00 copper bus causes the weakest wire to fail with each lightning discharge. As will be seen from the description of the cabinet and the material used, this arrester is comparatively inexpensive, and its successful protection of car electrical equipment after two years of service indicates its practicability.

GAGE AT SPECIAL WORK

BY "CONTRIBUTOR"

The March 28 issue of the Electric Railway Journal contained an article on derailment at facing point switches by H. H. George which was inspired by some comments by the writer on the same subject. The writer has read Mr. George's conclusions with great interest and feels called upon to explain a little more fully his own position in the premises. It is his humble opinion that the subject cannot be disposed of theoretically. A great many distinctly practical elements enter into it. First, it must be acknowledged that there are in operation over special work practically no perfect wheels set to exact gage, or at best only a very small percentage are in this ideal condition. Then again, the writer has found that trucks are sometimes out of square, and that wheels vary in diameter, develop double treads and all kinds of odd-shaped flanges which do not conform at all to the standard wheels for which the special work is designed. With these points, briefly stated, in mind, the writer decided that the street was the place to determine causes. Some of our derailments at facing point switches were very puzzling, but after several years we proved that on the Connecticut Company's system at least nine out of ten such derailments occurred when the wheels were riding on the tongue; in other words, derailments when the wheels were guarding against the side of the switch tongue were so rare that we eliminated them from consideration.

For example, let us take a diamond switch tongue in a Y-layout or turnout: ¼-in. wide gage would be very satisfactory (although we think unnecessary) for one-way operation but fatal for the other because we would have guard action in only one direction. Hence, cars operated in the opposite direction would be in trouble due to the back of the wheel flange striking the mate point with a possible chance for derailment.

Another case in point: It has become standard with the Connecticut Company to use the open point switch and the tongue mate in all emergency crossovers to avoid the pounding of the heel of the switch tongue. The use of ¼-in. wide gage on the curved side of these crossovers would give us very unsatisfactory results. The reason is that wheels more or less worn in their gage line when operating over these switches and without guard action (the mate being on the inside of the curve) would either mount the point of the mate or, if the wheel did keep the groove of the mate, both wheels would be pulled sidewise as soon as guard action began, thus giving the tongue a twist at the heel and moving it to a neutral position. The same thing applies to any layout where it is necessary to place the switch piece on the outside of the curve.

On our lines we have a large number of switch pieces placed on the outside of the curve, not only in large layouts but in some of the smaller ones as well. While Mr. George's article was both interesting and instructive for the track conditions which he describes, we have not experienced a sufficient number of derailments to warrant any extensive investigation. For example, let us assume the case of a car passing over a right-hand branch-off, such as Mr. George describes, with the switch piece set on the inside of the curve. An average pair of wheels in operation will measure ⅛ in. to ¼ in. less than 4 ft. 8¼ in. in their gage. In taking the curve this wear would allow the wheels to pass safely the point of the mate, but the more worn they are the less liable they are to pass safely the point of the mate when the car takes the straight line. The reasons for this are the loss of guard action and the fact that the wheel very often leans hard against the tongue, thereby allowing the back of the wheel opposite to it on the same axle to strike the mate point a sharp blow.

A trip through any large carhouse by trackmen with a wheel gage will tend to show that the writer has not exaggerated the general condition of wheels in operation on the average electric railway. Particular attention is called to the odd-shaped flanges which develop in steel wheels after they have been in service a comparatively short time. In conclusion, the writer believes that in order to solve so difficult a question as derailments at facing point switches, the actual physical condition of all the elements which enter into the problem must be taken into consideration.

EQUIPMENT DEFECTS — CIRCUIT BREAKERS AND HOOD SWITCHES—II

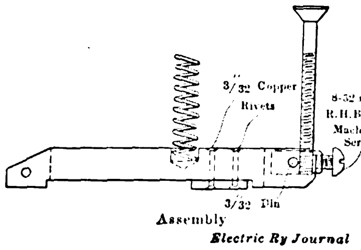
BY C. W. SQUIER, E.E.

Where coils are located near the contacts or the arc chute, the arc sometimes floats back and short-circuits to the coil. Another source of trouble is at the terminals of the coil. Where a series coil is used, the turns of the coil are heavy and not easily sprung into place, and if bolted to a terminal arcing sometimes takes place due to improper contact.

OPERATING MECHANISM AND HANDLES

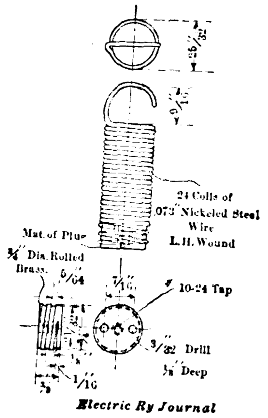
A common form of circuit-breaker mechanism consists of an insulated handle pivoted at an intermediate point so that the opposite end operates the contact parts. After the contacts are closed a further movement of the handle may act through levers forming a toggle-joint to produce a great pressure between the contacts, or the spring itself may act to produce heavy pressure at the contact surfaces through contact levers. The toggle is most valuable in the design of circuit-breakers, as almost unlimited pressure can be obtained by its use. I have already referred to the value of great pressure between the contact surfaces, and the toggle can be used not only to produce this pressure but also to keep the contacts in the closed position if the knee of the toggle is passed slightly beyond the dead center before its movement is limited by a stop. When the handle has reached the end of its movement a spring latch holds the contacts closed.

Handles are insulated as the breakers must be built for safe operation in the dark—in fact, for protecting the motorman at all times from coming in contact with a live part. They should also be of strong construction as breakage is the principal troubles experienced, chiefly from careless handling and rough usage. Coil springs which act on the handles and levers at their fulcrum are very hard to maintain and their breakage is often excessive. The accompanying illustrations show two springs which have been changed from the original design to overcome breaking. The number of turns has been increased by one, and the radius of the various bends has been lengthened as much as possible. This reduces the tension on the bend and the total strain is divided between three coils instead of two.



Electric Ry Journal

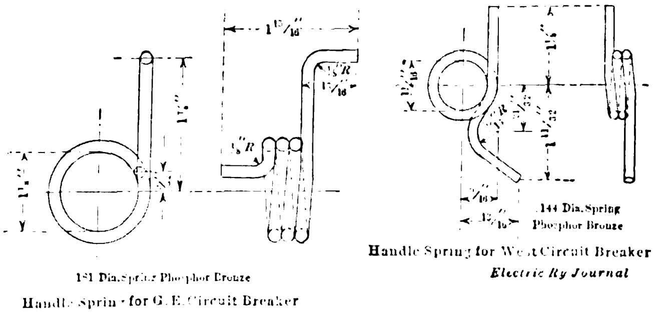
Release Latch for GE-14390 Breaker


25/32
9/16
24 Coils of .073" Nickeled Steel Wire L.H. Wound
Mat. of Plug ¾" Dia. Rolled Brass.
5/64
7/16"
10-24 Tap
3/32" Drill ⅛" Deep
1/16"
Electric Ry Journal

Calibrating Spring with Cap, GE Type M Q

TRIPPING MECHANISM AND CALIBRATING SPRINGS

The tripping mechanism consists of a hinged armature which is operated by the magnetic circuit of the overload coil. The movement of this armature releases the catch holding the contacts closed or breaks the toggle and they fly apart as the holding pressure is released. Adjustment for the current necessary to operate the armature is obtained by varying the pull which a coil spring makes on the armature by means of a thumb screw. A brass plate is usually provided close to the adjusting screw and spring, and corresponding current values are stamped on it. This calibrating plate is worthless because the tension of different calibrating springs vary for the same amount of extension and because springs gradually lose their tension the longer they remain in service. Hence the current values stamped on the plate cannot be depended upon as the correct current setting for the breaker.


1 15/16"
⅛"R
15/16"
⅛"R
.144 Dia. Spring Phosphor Bronze
181 Dia. Spring Phosphor Bronze
Handle Spring for West Circuit Breaker

Electric Ry Journal

Handle Spring for G. E. Circuit Breaker

Details of Circuit-Breaker Springs Changed to Overcome Breaking

A common form of calibrating spring is one spirally wound with nickeled steel wire. A loop is provided at one end for hooking to the armature while a nickel-plated brass cap is soldered to the other end, this cap being tapped out to receive the adjusting screw. This method of fastening the cap to the spring is not satisfactory as the cap becomes unsoldered and the end of the spring pulls out. A form of cap which will not pull out and does not depend on solder for its fastening is shown in an accompanying illustration. This cap is ⅜ in. long and has a spiral groove on the outside into which the spring screws tightly. With this cap the active length of the spring is reduced by one turn, but with carefully made springs this reduction does not affect the tension of the spring appreciably. Another trouble sometimes found with new calibrating springs is that they are wound with too much initial tension, so that the circuit-breaker will not open on overload even with no tension on the spring when the armature is in the raised position.

HAND TRIP

An easy means must always be provided for opening circuit-breakers by hand. This usually takes the form of an insulated knob on the armature or latch. Generally provision is also made that the movement of the operating handle in a direction opposite to that for closing will trip the latch and cause the contacts to open. A severe blow results from the sudden opening of the breaker and some means must be provided to absorb this and to prevent the rebound of the contacts. Soft rubber bumpers were used on older types but these proved unsatisfactory due to the short life of the rubber.

The various levers and arms comprising the operating and trip mechanism should be designed for strength, and all fulcrum points made as large as possible. An accompanying illustration shows a release latch for a GE circuit-breaker which has been redesigned by the operating company to prevent excessive breakage of this part and the spring which operates it. The original design had a flat spring riveted to the latch. This spring was continually breaking. The accompanying design shows the replacing spring of coil type which has overcome the trouble due to breakage. At the same time the lever has been strengthened and more metal has been added around the fulcrum points, as these wore through quickly in the original design.

One of the greatest defects in the design of old types of circuit-breakers was the great number of small parts. Manufacturers have recognized this disadvantage and in the late type of breakers an effort has been made to keep the parts few in number, rugged in construction and all mechanism as simple and reliable as possible.

INSULATION AND ARC CHUTES

Another important part of the construction of a circuit-breaker is the insulating material which separates the contacts and current-carrying parts from each other and from ground. Some of the essential qualities of a good insulating material are the following: It must withstand a considerable degree of heat, and where used as arc chutes it must withstand the arc without melting; it must be permanent and of sufficient mechanical strength to withstand rough usage; it must also resist carbonization, since excessive carbonization forms a path for the current to leak to ground and it must not absorb moisture from the air.

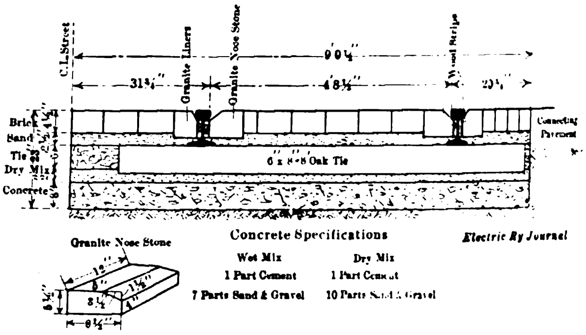
The arc chute serves to confine and direct the arc caused by opening the circuit until the magnetic blowout extinguishes it. It is therefore subjected to more carbonization and burning than other insulating parts. On inspection the arc chute should be carefully wiped out with cheesecloth and shellacked, making certain that the shellac is completely dry before the car is allowed to return to service.

LOCATION

Circuit-breakers may be subjected to excessive short-circuits and overloads which represent a tremendous amount of energy. Their function is to open the circuit under these conditions without injury to themselves or any adjacent parts. They should therefore be located so that the arc and hot vapor can be readily dissipated without the danger of floating to some grounded part or setting fire to any inflammable material. In standard railway practice the circuit-breaker is usually mounted under the canopy, where it is readily accessible to the motorman and where it can be quickly closed so as to avoid delays.

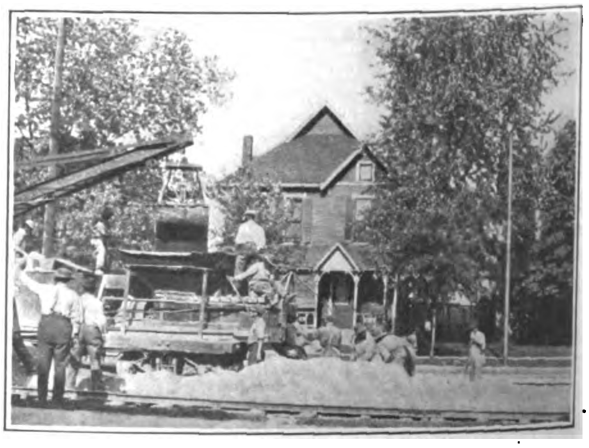
CONCRETE MIXING AND PLACING AT INDIANAPOLIS

The track and roadway department of the Indianapolis Traction & Terminal Company has gone a step further than many other railways in reducing the force necessary to mix and place large quantities of concrete in track rehabilitation and extensions. Its outfit complete is made up of four cars, namely, a general utility motor car, a 3800-gal. tank car, a derrick car and a mixer car. With this equipment working up to capacity this company has never had sufficient work open to keep the plant in operation during an entire day. It has, however, demonstrated that it can average approximately 270 lin. ft. an hour of 8-in. concrete slab 9 ft. wide. This totals approximately 70 cu. yd. per hour of concrete in place when the plant is manned by fourteen men.



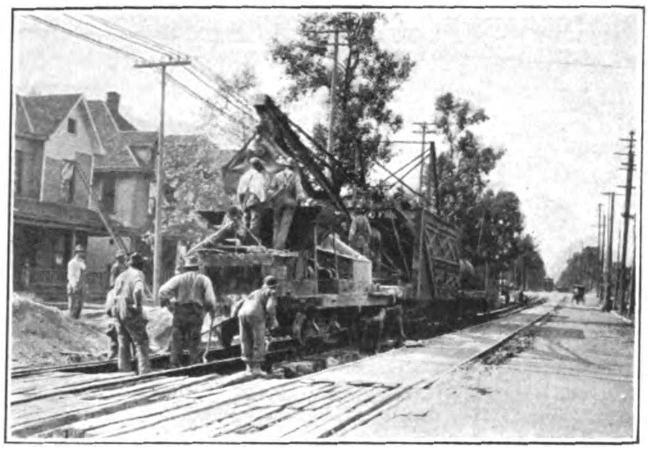
Indianapolis Concrete Mixing Plant—Cross-Section of Concrete Track Construction

The tank car is used to provide a constant water supply and also to avoid the extending of connections to fire hydrants at street intersections. This tank car is



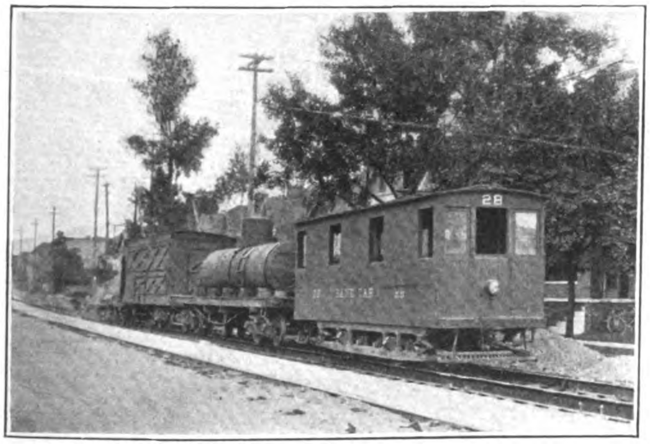
Indianapolis Concrete Mixing Plant—Side View of Mixer

connected to the mixer by way of a 2-in. rotary pump mounted on the mixer car. The derrick car is coupled to the mixer car, and the clamshell boom swings over a large metal hopper on the mixer. The derrick equipment is of the Byers double-drum hoist type with a swinging gear, and a ½-yd. Hayward clamshell bucket. The hoisting mechanism is operated electrically, consequently a single operator is all that is required. The concrete mixer car is equipped with a continuous mixer of the Drake duplex type, motor driven. Gravel is deposited on the street by dump cars, and the batches are virtually measured by the quantity of material picked up by the clamshell bucket. As the worm gear in the continuous mixer mechanism is arranged to feed two sacks of cement to each clamshell bucket-full, the derrick operator is required to pick up a full bucket with each operation.



Indianapolis Concrete Mixing Plant—View from Mixer End

A force of from twelve to fifteen men is required to man the plant completely. These men are engaged chiefly around the mixer and derrick car. After the material has been deposited on the street by the dump cars the track is raised clear of the finished slab and set on blocking, after which the concrete is deposited in place. When the slab has set from twenty-four to forty-eight hours the track is dropped to the slab and then tamped to its permanent surface with a mixture of dry gravel and cement. A sufficient quantity of cement is added to the gravel merely to make it possible to tamp it firmly in position under the ties. The slight amount of surface water which later percolates through the pavement causes the mixture to set and form a fairly good grade of concrete.

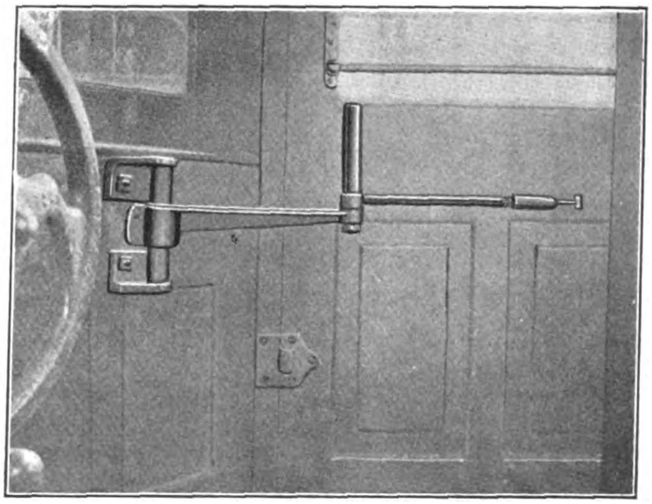


Indianapolis Concrete Mixing Plant—View of Train

In connection with the foregoing account, it is pertinent to present a cross-section of the standard wooden tie and T-rail concrete track construction for which the concrete mixing and placing outfit described is used. This engraving not only shows the track construction in detail but also presents the specifications for the concrete and the form of granite nose block.

SIMPLE DOOR-OPERATING MECHANISM

By the process of elimination the master mechanic of the Kalamazoo (Mich.) Street Railway has reduced his door-operating mechanism to a very simple form. At first this mechanism consisted of the usual crank and handle, with a combination of bell cranks under the vestibule floor and just under the bonnet. As shown in the illustration, the simplified mechanism consists of nothing more than a handle applied at the pin which connects the pivoted lever attached to the door and the one bolted to the front of the vestibule. By making these pivoted levers slightly tight in the straight-line position, the motorman is able to press the handle beyond center, which serves to lock the door in the closed position. To open and close the vestibule door the motorman must shift his position a little, which makes it practically impossible for him to close the door and start the car simultaneously.



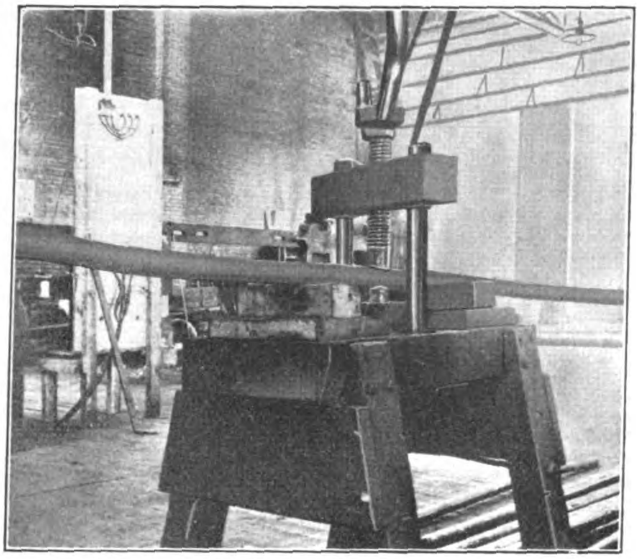
Simplified Door-Operating Lever, Kalamazoo

At the meeting of the Hastings & District Electric Tramways, Ltd., Hastings, England, G. Kitchin, who presided, said that last May he told the directors that the bill for the substitution of the overhead system of electric traction for the Dolter surface-contact system had been rejected by the House of Lords. The company had also been notified by the Board of Trade that in September it would call upon the company to cease using the stud system. After considering various alternatives the company decided to install the Tilling-Stevens petrol electric system on the Front line, and now has six cars in service and eleven more under order. The new cars are running satisfactorily.

In a recent consular report it is indicated that the proposed railway from Valparaiso to Santiago, via Casa Blanca, in Chile, is soon to be realized. It is suggested that $11,193,000, which had originally been intended for the electrification of the present steam railroad, be diverted for the building of the new line. The President and parliamentary representatives of Valparaiso are unanimous in support of the project, therefore it is only dependent on favorable action by the Senate to insure the success of the undertaking.

HOME-MADE TROLLEY POLE STRAIGHTENER

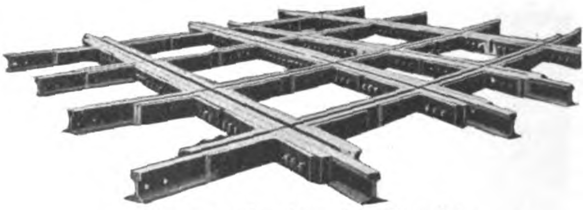
In order to facilitate the work of straightening trolley poles, a handy and inexpensive trolley pole straightener has been developed by the mechanical department of the Toledo Railways & Light Company, Toledo, Ohio. Essentially it consists of a substantially built wooden bench securely bolted to the shop floor, to the top of which a screw press has been attached. Blocking at each side of the bench permits the press to be used in straightening short kinks, and also to serve as a clamp for straightening long bends by springing the ends of the trolley pole. Clamping and pressure action is brought to bear on the trolley pole by a double-handle crank attached to the pressure nut.



Toledo Railways—Home-Made Trolley Pole Straightener

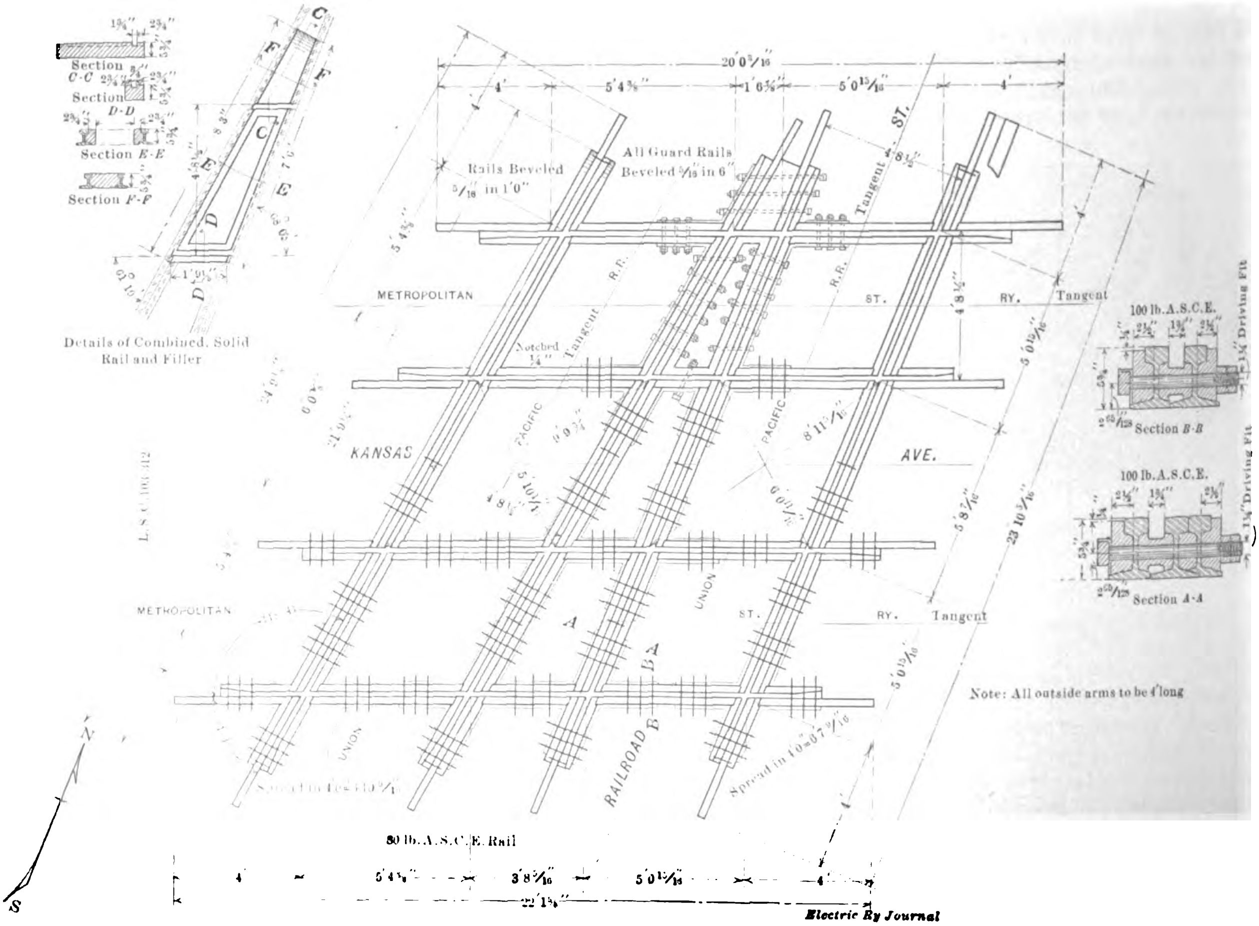
TRACK CROSSING MADE AT KANSAS CITY

The Metropolitan Street Railway, Kansas City, Mo., has recently completed at its shops under the direction of A. E. Harvey, chief engineer, and G. J. Smith, master mechanic, the T-rail crossing shown in the accompanying drawing and half-tone. This is a steam railway crossing for use at an intersection with the Union Pacific Railway at Kansas Avenue and Railroad Street, Kansas City, Kan. While the company has built a number of crossings at its shops, that just finished is by far the largest that it has ever made.



Kansas City Crossing, Complete

In general design the crossing does not differ from others used by this railway, but there is considerable difference in detail. Thus all knee braces were planed to fit the section of the rail, and they were also made unusually heavy in view of the company's experience that such braces prove often to be the weakest part of a crossing. All holes were reamed before the crossing was assembled, and the crossing was put together with bolts that had been turned and then installed with a driving fit.


Section C-C
Section D-D
Section E-E
Section F-F
Details of Combined, Solid Rail and Filler
Rails Beveled 5/16" in 1'0"
All Guard Rails Beveled 5/16" in 6"
20'0 3/16"
4'
5'4⅜"
1'6⅝"
5'0 15/16"
4'
4'8½"
METROPOLITAN
ST.
RY.
Tangent
R.R.
ST.
Notched ¼"
KANSAS
AVE.
PACIFIC
UNION
RAILROAD
100 lb. A.S.C.E.
Section B-B
Section A-A
1¼" Driving Fit
23'10 5/16"
Note: All outside arms to be 4' long
80 lb. A.S.C.E. Rail
5'4⅜"
3'8⅝"
5'0 15/16"
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S
Electric Ry Journal

General Layout and Construction Details of T-Rail Steam Railroad Crossing Built at the Shops of the Metropolitan Street Railway, Kansas City, Mo.

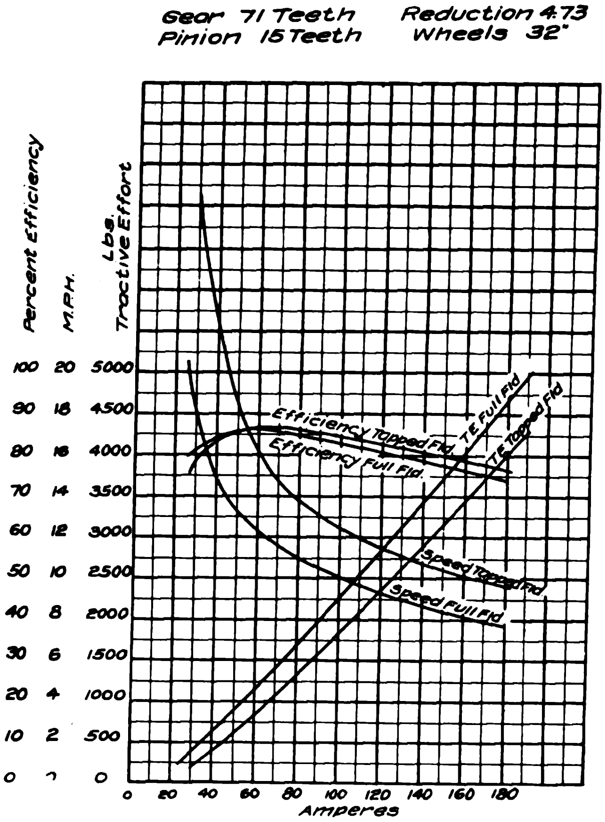
TAP FIELD MOTORS FOR CHICAGO CITY RAILWAY

The 200 new motors in two-motor equipments recently supplied by the General Electric Company to the Chicago City Railway for service on its new cars, while following generally the well-defined lines of modern railway motor practice, embody many improvements. These motors, known as GE-242-A, are of the ventilated, commutating pole type, designed for tapped field operation, and are fitted with induced ventilation.

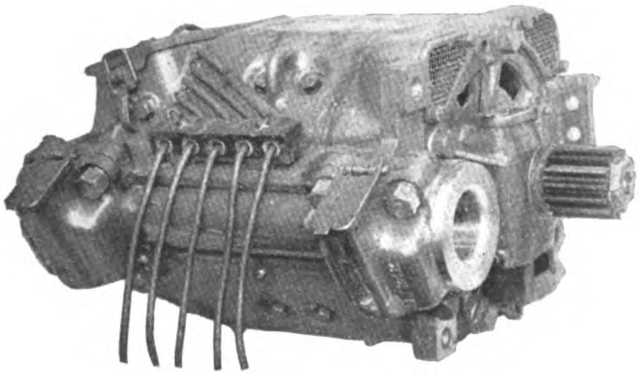
Under the A. I. E. E. standard, the GE-242-A motor has an hourly rating of 65 hp on 600 volts, and of 55 hp on 500 volts, but has a largely increased service capacity when compared with motors of the closed type having the same hourly rating, on account of the positive circulation of air which is maintained through the motor. The characteristic curves show the tractive effort, speed and efficiency at various inputs when operating with both full and tapped fields. The use of cast iron has been entirely eliminated from the design, steel or malleable iron being used for castings, and pressed steel or drop forgings wherever practicable.

The frame, which is of soft cast steel, approximately octagon in transverse section is of the box type. A bored opening, to take the frame head, is provided at each end, the one at the pinion end being sufficiently large to enable the armature, field coils and pole pieces to be easily exchanged. The solid malleable iron frame heads form the housings for the armature shaft bearings. They have boxes for oil and waste, and auxiliary oil wells for filling and gaging the supply of oil. They also have wells into which is drained any oil that may be thrown off by the deflectors on the armature shaft.

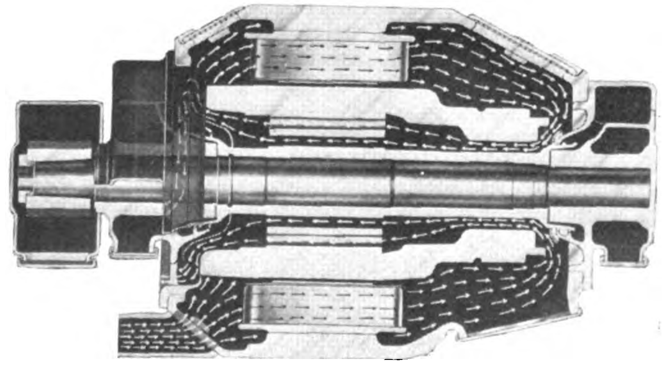
Provision is made for jack screws to facilitate the removal of the frame leads for inspection or repairs. The housings for the axle bearings are cut at an angle of 30 deg. to the vertical, the upper half being integral with the motor frame. This relieves the stress on the bolts and facilitates operations when mounting the motor on the truck. The bearing caps have large oil wells and are bolted to planed and tongued surfaces on the frames by four bolts securely locked. All covers for oil boxes have deep lips and are lined with thick felt spring-pressed against machined surfaces.



Characteristic Curve of GE-242 600-Volt Railway Motor on 550 Volts



View Showing Tap-Field Motor with Ventilator Openings at Right



Cross-Section of Tap-Field Motor, Showing Course of Ventilation

Ample facilities for internal inspection have been provided. The cover over the commutator has a spring locking device, which combines absolute security with instant removability. The armature shaft bearings are of bronze, lined with babbitt of such a thickness that should the babbitt be melted out by overheating, the bronze will still support the shaft without injuring the bearing surfaces and also prevent the armature from touching the pole pieces. The axle is completely inclosed between bearings by a sheet steel dust guard.

The four exciting pole pieces are built up of soft iron laminations. The commutating pole pieces are drop forgings. The field coils are wound of strip copper, insulated between turns with asbestos, the whole being mummified and insulated with varnished cambric and heavy tape to make them practically indestructible and moisture-proof. They are supported by improved spring metal seats and spring flanges to give an evenly distributed pressure and prevent movement and consequent abrasion.

The armature core is built up of soft steel laminations. The shaft may be removed without disturbing the windings or commutator connections. The vacuum-impregnated armature windings are made of rectangular wire. When all coils are assembled, the armature is heated and temporary binding bands are put on under great tension, which press down the coils well into place. When cold, these bands are removed and permanent bands of tinned steel wire are wound on in special recesses. These are secured by mechanical means in addition to their being soldered. This construction insures permanently tight armature coils.

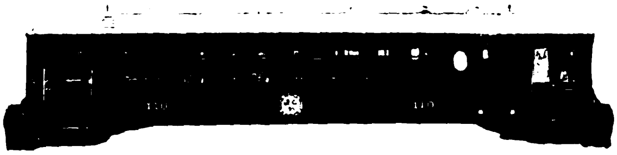
The commutator is built up of hard drawn copper bars, insulated from the steel shell by mica cones and from each other by a mica, grooved to a depth of 3/64 in. below the surface of the commutator. The brush-holder supports consist of a drop forging into which are pressed two mica insulated studs. These studs pass through porcelain insulators with very long creepage distances, and are held by drop forgings bolted to the frame by tap bolts inserted from the outside. The brush-holder body slides in finished ways on the support and maintains correct alignment throughout the range of adjustment. The bronze body affords thorough protection to the fingers and springs. The brushes slide in accurately machined ways, independent pressure fingers being provided for each brush. The fingers have drop-forged copper tips, which are pressed against the brushes by open-wound spiral springs. These springs are of oil-treated steel, and are of such a design that the tension remains practically constant throughout the limits of wear of the brushes. The tension can be adjusted by means of a ratchet wheel and pawl. A flat shunt of woven copper wire is provided. The brush-holder lead is attached to the support, which admits of removal of the holder without disturbing any electrical connection.

Circulation of air through the motor is maintained by means of a fan cast integral with the pinion end armature head. Air is drawn in through screened openings in the corners of the frame at the pinon end. It passes over and around the field coils and pole pieces to the commutator end; from thence it returns through the commutator shell, through longitudinal ducts in the armature core to the fan, and is exhausted through cored holes in the pinion end frame head to the exterior.

The gears and pinions are of armorized steel, known as "Grade K." These have a ratio of 4.73 to 1, a diametral pitch of three, and a working face of 5 in.

COMBINATION CAR FOR CENTRAL NEW YORK LINE

Two arch-roof combination cars with very neat outlines as illustrated were recently built by the Wason Manufacturing Company, Springfield, Mass., for the Geneva, Seneca Falls & Auburn Railroad, Seneca Falls, N. Y. These cars are of steel construction with mahogany trim in the passenger compartment, and with ash and stained mahogany in the baggage room located at one end. The weight of the car body alone is 23,000 lb., and its principal dimensions are as follows: Length over body, 32 ft. 6 in.; length over vestibules, 44 ft. 6 in.; width over sills and over posts at belt, 8 ft. 5 in.; bottom of sill to trolley base, 8 ft. 9⅝ in.; height from the top of the rails to the sills, 31 5/16 in., and distance between bolsters, 20 ft. The seating capacity per car is forty-four in winter and forty-five in summer. The bodies are mounted on Baldwin M.C.B. trucks of 6 ft. 4 in. wheelbase and equipped with 34-in. wheels. These trucks carry four Westinghouse No. 533-Y motors. The miscellaneous equipment of the cars includes Brill exhaust ventilators, Van Dorn radial couplers, Consolidated push-buttons, Peacock brakes and Providence fenders.



Combination Car for Seneca Falls, N. Y., Before Mounting on Trucks

A NEW SIGNAL FOR ELECTRIC RAILWAYS

The Street Railway Signal Company of Philadelphia has just placed upon the market a new type of contactor signal that can be arranged for either single or double track. A description of the general features of the single track form is given herewith. These signals, which are called "Model E," are of the trolley-contact operated, all-light type, having the three-position aspect for single-track opposing protection but permitting following movements as recommended by the block signal committee of the American Electric Railway Association in its 1913 report.

In the past trolley contact operated signals usually have been mounted on existing trolley poles, but the Model E signals may be mounted either on individual iron poles or else upon existing trolley poles. When the signal is mounted on an individual iron pole the aspect case is carried by an iron bracket which is fastened to the signal pole. This in turn is mounted on the relay case, and the relay case is fastened to a concrete foundation. This relay case contains the counting relays, the neutral relays, resistances and a terminal board which has the fuses and disconnecting switches mounted thereon. The relay case has doors in front and in back through which complete access to the apparatus is afforded.

Signal of Trolley Contactor System as Mounted on an Individual Pole

The aspects are as follows:

Red alone—Stop. Do not pass contactor.

Green—Proceed by contactor to operate signal.

Red and yellow—Proceed if green aspect changes to this on passing contactor.

Red and yellow—Block occupied by car running in same direction if car is approaching this aspect. Proceed under control if yellow light changes to opposite side of red on running under contactor.

When the block is unoccupied a green light shows in each of the signals, of which one is installed at each end of the block. A car entering the block at one end changes the signal at the other end from green to red, and also changes the first signal from green to red and yellow. A second car may enter the block at the first signal, extinguishing the yellow light that is burning and lighting the one on the opposite side of the red. This provides a positive and permanent indication that it has been registered. The car will register out regardless of whether it runs through the block and leaves at the opposite end or whether it backs out at the end where it entered.

Should two cars attempt to enter an unoccupied block from opposite ends at the same time and engage their respective contactors simultaneously both signals will change from green to red, and both will not change back to green again until both cars have backed past the contactors. It is not necessary to pull the trolley pole down where either car backs. Should a car overrun a red signal it will not change that signal, and in backing out it is not necessary to pull down the pole. The counting relays are so constructed that the change of the yellow lights for following cars will not take place unless the car has been properly registered.

One of the most important features of these signals is that if a car enters the block simultaneously with one leaving it, or if these entering and leaving operations overlap in any way, such as when a car enters the block at one end, runs through it and then stops under the contactor on either track of the turnout while another car enters at the opposite end all cars will register properly. This is of great importance where the headway is approximately equal to the running time through the block.

The signal mechanisms are of the dry type and have no inflammable parts. The insulation between contacts is of ebony, asbestos and bone. The contacts themselves are of a liberal size and have a heavy contacting pressure, a long rub, and the break is horizontal, permitting natural extinguishment of the arc. Three-quarter-inch air gaps are maintained between all bare, current-carrying parts. Immunity from lightning is assured by this extraordinarily high insulation. There are no delicate adjustments, and the individual parts are large and independently removable to the highest practical degree.

The lights are high-powered and are provided with efficient sun shades to give them arrestive effect even in bright sunlight. The green can readily be seen for 1200 ft. and the red for 1500 ft. No reflectors are used and hence there is no possibility of phantom indications. Two lamps are connected in multiple behind each lens to provide against burn-outs.

The trolley contactors are of the mechanical style, having the same high insulation and large individual parts as the signals. To install them does not necessitate cutting or bending the trolley wire. They operate independent contacts according to the direction in which the car moves under them. They are of decidedly high-speed design.

GASOLINE MOTOR CARS ON CENTRAL NEW YORK SOUTHERN RAILROAD

Two of the latest 1914, model C, engine-motor cars have been delivered by the McKeen Motor Car Company to the Central New York Southern Railroad, Ithaca, N. Y. This line, extending between Ithaca and Auburn, N. Y., a distance of 39 miles, was formerly the New York, Auburn & Lansing Railroad, the corporate name of which was changed upon the recent elimination of the receivership.

The steam equipment, which heretofore provided the passenger service, has been displaced by these 70-ft. motor cars to secure more attractive, economical and profitable passenger schedules.

The motive power machinery of the cars is similar to the 200-hp equipments of the Bessemer & Lake Erie, Soo Line and Sunset Central Lines, a description of which was published in the ELECTRIC RAILWAY JOURNAL, page 144, Jan. 17, 1914. The special features with which these cars are equipped are: The Warner railway meter which registers the mileage (ahead and backing up) per trip in addition to total mileage covered; pneumatic gong ringer; steam connection for heating cars in winter when not housed at terminal; rear door in passenger compartment for communication between the motor car and trailers; conductor's brake valve and pedal-operated whistle in rear for use of conductor when backing up, and an illuminated indicator on the rear similar to the observation platform indicators on first-class passenger trains.

SAND TRAP FOR USE WITH OFFSET AND SINGLE HOPPERS

The Nichols-Lintern Company, Cleveland, Ohio, specialist in track sanding equipment, has placed on the market a new sand trap, designated as No. 3. This trap was developed for conditions where the sand hopper cannot be located directly over the rail, in which event the adjustment of the sand conducting hose from the hopper to the rail may prove difficult. This device is so designed that solid piping from the trap can be carried over the rail. It is also designed to give clearance to the truck, dropping down (when the hopper is inside of the car) so that only a comparatively short piece of flexible conduit is required from the solid piping to within a few inches of the rail. This arrangement effects economy on conducting spouts, for usually when the lower part of the conduit is worn or disarranged, some 30 in. or more of this spout must be renewed. On the other hand, only a very short piece of hose is necessary for replacement when this trap and method of piping are used.

Sand Trap for Single-Hopper Equipment

This trap is also adaptable for the truck connection of sand pipes, where the pipes are carried on the trucks to follow the rail around the curve. In most cases, a one-hopper equipment is more desirable than two, for reasons of car construction, regular supply of sand and reduction of detail parts. In general, the No. 3 trap is especially adapted for sanding both rails from one hopper, whether for curve or tangent work.

The trials of multiple-unit trains on the Lauban-Königszelt mountain railways in Silesia, Germany, have proved very satisfactory, and the service is to be extended to Fellshammer, and shortly to the Austrian frontier, at Halbstadt, a total distance of 21.7 miles. The full electrical service will be put into operation before the end of the year, and the working of through trains by locomotives will commence during this summer. To the existing motor-generator station at Nieder-Salzbrunn will be added others at Ruhbank, Hirschberg and Lauban.

The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has applied to the State Public Utilities Commission of Illinois for permission to donate $400 for band concerts. It has been the custom of the company for years to donate a similar amount.

News of Electric Railways

Discussion on Municipal Purchase in San Francisco

With the approach of the opening of the Panama-Pacific Exposition, there has been a great deal of discussion in San Francisco in regard to the possibility of the purchase of the United Railroads of San Francisco by the municipality and the consolidation of the system with the present municipal line. It is generally agreed that the direct purchase by the city at the present time is impossible unless the plans for financing the Hetch Hetchy water supply plant are postponed, and all agree that the water situation must take precedence. While the limit of bonded indebtedness of the city, which is now 15 per cent, could be increased by an amendment of the charter, such a move would have to receive the sanction of the Legislature and would require a two-thirds vote. Attention has consequently been directed to plans which will allow the city to acquire the right at once under a scheme of financing which will not involve a large bond issue. One plan considered is that the bonds to be issued shall be a lien only on the earnings of the property.

A meeting to consider this subject was held recently at the Commercial Club, at which the speakers were J. W. Lilienthal, president of the United Railroads; M. W. O'Shaughnessy, city engineer; Percy V. Long, city attorney, and B. J. Arnold.

Mr. Lilienthal, the first speaker, said that he had been diffident about accepting the invitation. If he should advocate municipal ownership and the purchase of the United Railroads it would probably be insinuated that he was trying "to put something over," but if he declined the invitation he would be charged with a lack of sincerity in a statement which he was entrapped into making with reference to what should be done with the United Railroads. He classified public utilities as the absolutely indispensable, the partly indispensable and the non-indispensable. Water supply was the only utility which occurred to him as belonging to the first class. A municipal corporation should not be dependent upon a private corporation for its water supply. Transportation facilities came under the classification of the partly indispensable, and he believed the greatest good and greatest profit to the people themselves would be secured if street-car operation was carried on by private corporations under proper conditions and regulations. But the restrictions placed to-day upon the investment of capital, the demonstrated efficiency of public officials and the conceded need of greater facilities meant that the community had got to suffer or else handle the transportation problem as an entirety. This meant that the city should acquire the United Railroads if it could do so under the proper conditions and on the proper terms. This might be by outright purchase, by lease or in other ways. The speaker said that frankly he did not know which plan would be the best for the city, but he presented some statistics in regard to the capitalized earnings and expenses of the property. The franchises begin to expire in 1929, but some continue until 1952. If the city took over all lines without compensation at the termination of the several franchises the property would still show during its term of life estimated gross earnings of $306,000,000 and estimated net earnings of $107,100,000. This allowed nothing for the physical value of the property at the expiration of the respective franchises, and showed that if municipal ownership was ripe it would be worth while to make the effort to acquire the United Railroads with a view of what the system had to sell. No action had been taken by the directors of the company in regard to any proposed sale, but speaking as a citizen Mr. Lilienthal said that if a plan should be worked out by both parties favorable to both sides he would use such influence as he had with the company, or with the stockholders, to carry out such a plan.

Mr. O'Shaughnessy said that the operation of the present municipal line was now successful. It was taking in $1900 a day, and the Union Street Railway, acquired last November, was taking in about $900 a day. This made combined earnings of nearly $1,000,000 a year on an outlay of about $2,300,000. On a similar basis, with a combined property eight times as large, the earnings should be $8,000,000 on an investment of $19,000,000. However, it could not be expected that traffic on the other lines would be as good as on the Geary road. The speaker remarked that proportionally San Francisco was decreasing in population. It had an increase of only 7000 inhabitants a year for the last four years, whereas, according to statistics of the trans-bay traffic, the cities across the bay had increased about 15 per cent during the same period. The speaker felt that the cause of this was inadequate transportation and inadequate water supply in the city of San Francisco. He thought the limitation of the bonded indebtedness of the city ought to be removed. He said that the cost of the present municipal line per mile of track was much less than the sum at which the United Railroads was capitalized.

Percy V. Long, city attorney, referred to the expenditures to condemn the property of the local water company and said that this sum added to the bonds already issued almost exceeded the bonding capacity of the city. He thought that some agreement by lease or purchase by instalments could be carried on without a change in the present charter limitations on bonds. There would naturally be a radical difference of opinion as to what the city should pay for the properties.

Mr. Arnold said that he hoped that some of those who opposed the recommendations made in his report of two years ago thought more favorably of them now. He had drawn up an amendment to the city charter by which the company would continue in the operation of the line but under which the earnings of the property would gradually amortize the investment of the company and it would ultimately become the property of the city. This amendment, however, had been rejected at a city election. The question now was whether the city, if it took over the operation of the United Railroads, could be sure that there would be the same integrity of management as now exists with the municipal railway property. The speaker then described the franchise situations in Chicago and Cleveland, and the recommendations which he had made in Kansas City. In conclusion, he warned the citizens about extending the municipal line to sparsely settled districts. He had said two years ago that if municipal ownership could be made a success anywhere it could be made a success with the Geary Street line. The city should be careful also about reducing fares and increasing labor charges. The ideal plan was to have a combined system, with universal transfers, operated without parallel extensions.

Toledo Franchise Association Submits Ordinance

The franchise committee of the Toledo Citizens' Franchise Association submitted to the members of that organization on the evening of June 16 a draft of the proposed street railway franchise prepared for the purpose of effecting a compromise between the city of Toledo and the Toledo Railways & Light Company on the questions of the rate of fare and service on the city lines. This draft follows the Doherty proposal closely in most of its provisions, but certain changes have been made to comply with the demands of the administration. The new proposal has been approved by the executive committee of the Franchise Association, and on the evening of June 16 more than 400 members approved the proposal. The vote followed detailed explanations of the proposal by Attorney Frank L. Mulholland and Judge John H. Doyle, both members of the committee which prepared it.

The new proposal provides for a renewal of the Toledo Railway & Light Company's franchise for a period of twenty-five years. During the first four months from the date of the ordinance a rearrangement of the lines is to be prepared by an expert or experts with a view to giving the best service possible with the highest operating efficiency. This must provide for a cross-town line and such additions, extensions and eliminations as Council may direct. The compensation of the men employed to do this work must not exceed $25,000 and is to be paid by the company. The changes required by this rearrangement are to be completed within two years after Council adopts the plans of the experts, and that body is given four months after the report is received in which to adopt it in full or modified. Thus the company would be expected to complete the rearrangements within thirty-two months after the ordinance goes into effect. Franchise rights are to cease on all portions of track eliminated in the rearrangement and the company must restore the streets to good condition.

The ordinances proposed a trial period of operation of twelve months at a rate of fare of five tickets for 15 cents, immediately following the expiration of the thirty-two months or on the completion of the rearranged system. The cash fare is to be 5 cents. During the period of rearrangement and reconstruction, beginning with the date of the franchise, the rate is to be five tickets for 15 cents, good between 5.30 and 8.30 a. m. and 4.30 and 6.30 p. m., and six tickets for 25 cents, good at all times of the day. This is the same as in the past, except that the low-priced tickets are good one hour longer in the morning than under the old contracts, and it would probably mean quite a loss to the company for the thirty-two months.

At the expiration of the experimental period of twelve months, Council by resolution is to fix the rate of fare, for not less than five years, from data collected during the experimental period. This rate must be sufficient to cover all legitimate expenditures, including the interest and dividends on the investments. No franchise value is to be considered in fixing the rate, however. The rate of fare so fixed is to continue so long as neither party shall ask a revision, but in no event for less than five years. After the expiration of each five-year period, either party may ask for a revision made under the same conditions as the first. All actions relating to the establishment of a rate of fare are to be submitted to a vote of the electors. Babes in arms are to be carried free and a fare of 1 cent is to be charged for children under eight years of age. The fare on interurban cars within the city limits is to be 5 cents. The company is to give transfers without charge except to and from parallel lines.

The City Council is to name a commissioner or commissioners, not to exceed three, to secure facts and data during the "twelve months try-out period." The books, records, maps and receipts are all to be open to such commissioner or commissioners. They may also value the property and do such other work as may be required. The company is to furnish office room in its general offices for the commissioner or commissioners and such help as may be necessary. The commissioner is also to have the right to direct the operation of the company as to routing and rerouting cars and schedule of cars, with general supervision over the operation. This is in accord with the proposition originally made by Henry L. Doherty for the company. All facts and information obtained are to be reported to the Council so as to assist in arriving at an equitable rate for the first five-year period following the try-out period.

The company is to reimburse the city for the amount paid the commissioner or commissioners for compensation and expenses, but the sum is not to exceed $25,000. The city may appoint a commissioner or commissioners at any other time during the life of the franchise, and they are to have the same authority and powers as in the first instance, but all expenses thus incurred are to be paid by the city. The company is to furnish all its cars with pay-as-you-enter equipment within eight months after the ordinance goes into effect.

The right to purchase the property at any time within the period of the franchise is reserved by the city, but notice of twelve months must be given the company of intention so to do. The company is to agree to sell at the appraised value to be determined by arbitration. The decision to purchase the property may be reached by an initiative or referendum vote, but the right must be exercised within sixty days after the result of the vote is ascertained. A description of the method to be used in ascertaining the value of the property is included in the draft. It includes nothing for franchise rights.

In case the city should purchase only the tracks and track equipment the company agrees to furnish current at a fair price for the operation of cars for at least eighteen months after the property is acquired by the city. Condemnation proceedings are provided for, if necessary, to secure the property in whole or in part.

Provision is made for the operation of interurban cars over the city tracks, under the regulation of the city, the compensation to be not less than 60 per cent of the city fares collected. Transfers are to be exchanged between the city cars and those of the Toledo, Ottawa Beach & Northern and the Maumee Valley Railways & Light lines. Interurban companies operating over city tracks are each to furnish a bond of $50,000 to insure the company and city against damage.

The company is to pay the expenses of paving, repaving and improving streets between its tracks and 12 in. from the outer tracks. Freight cars may be operated between 12 o'clock midnight and 5 a. m. In addition, mail, funeral, express, observation and special cars may be operated over the tracks at any time. Tracks and a space 12 in. each side must be kept clear of snow in the winter and sprinkled in the summer.

The city reserves the right to nominate a purchaser for the company's property at the expiration of the franchise.

Should the city and the company fail to agree upon the valuation and terms, provision is made for arbitration and the method is fully set out in the ordinance. The city is to have the right at any time within two years before the expiration of the franchise to invite bids for a franchise and to offer the company's property to the successful bidder, at a price to be fixed by arbitration. The present company or its successor may submit a bid upon the same terms and conditions as any other company.

Statement by Majority of Northampton Arbitration Board

Owing to a dispute regarding the interpretation of the recent finding of the arbitration board in the wages case of the Northampton (Mass.) Street Railway, a majority of the board has issued a statement emphasizing the relation of the finding to the conditions of labor on the company's cars. The board points out that the arbitration agreement of Dec. 23, 1913, specified that the question to be determined by the board was the rate of wages for motormen and conductors, linemen, carhouse men, track walkers and track greasers for a period of one year from June 1, 1913. The agreement of June 1, 1912, which expired on June 1, 1913, and under which the employees were working up to the time when the findings of the arbitration board take effect, provided the following rates of pay: First year, 21 cents an hour; second year, 22.5 cents; third year, 23 cents; fourth year, 24 cents; fifth year, 24.5 cents; sixth year and thereafter, 25 cents. This agreement provided that nine and one-half hours' work inside of twelve consecutive hours should constitute a day's work, men whose runs were less than nine and one-half hours reporting to the superintendent's office subject to orders for the balance of their day's duties. On Sundays only a nine-hour day was required.

The employees, under the 1912 agreement, received ten hours' pay for this nine and one-half hours' work at the foregoing rates an hour, with the result that the following actual wages were paid: First year, 22.1 cents an hour; second year, 23.68 cents; third year, 24.2 cents; fourth year, 25.26 cents; fifth year, 25.79 cents; sixth year and after, 27.36 cents. These were the hourly rates which the men actually received up to June 1, 1913, and offered to continue. The men contended that they were insufficient. The award of the board in May, 1914, increased the hourly rates to 23 cents for first-year men; to 24 cents for the second year; to 25 cents for the third year; to 26 cents for the fourth year; to 27 cents for the fifth year, and to 28 cents for the sixth and succeeding years. The board points out that the desire of the employees to work only nine hours, since the passage of the so-called "nine hours in eleven" bill in the summer of 1913, does not affect the matter at issue. There is nothing in the law to prevent employees from working more than nine hours if they so desire, and there was no evidence before the board upon which it could be found that the company ever agreed to give any of its employees ten hours' pay for nine hours' work. The demand of $2.50 a day for the first six months, $2.75 for the second half-year and $3 per day thereafter was never presented to any official of the company until the first day of the hearing before the board. The report embodies only such fundamental matters of contention as were at issue in the hearings, and the board avers that the award of a wage scale based upon actual platform time is clearly expressed and in harmony with the requirements imposed upon it. The statement is signed by Thomas A. McDonnell and Timothy G. Spaulding.

Hearing on Boston Consolidation Bill

The joint legislative committee on street railways and metropolitan affairs gave a hearing at Boston, Mass., on June 11 upon the bill prepared by counsel for the Bay State Street Railway with the object of effecting a consolidation of all electric railways within the Boston metropolitan district. Frederic E. Snow, counsel for the Boston Elevated Railway, set forth the company's willingness to co-operate in the proposed merger, provided the necessary legislation was enacted. Mr. Snow said that the bill under consideration was in no sense a bill of the Boston Elevated Railway, and while a number of suggestions made to James F. Jackson, author of the drafted statute, have been adopted, the bill was in the main substantially in the form recommended by the Bay State company. Under its charter the Boston Elevated Railway was limited to a 5-cent fare and was obliged to give free transfers, although in many instances the ride was so long that passengers were carried at a loss. Persons living in those parts of the metropolitan district not served by the Boston Elevated Railway did not enjoy the same facilities as the patrons of that company for going to other parts of the district, nor could they in some instances ride to the center of Boston for a single 5-cent fare.

Mr. Snow said that it was the aim of the bill to equalize the transportation facilities and rates of fare within the district defined in the proposed act, through consolidation of companies and a general readjustment of the rates of fare. The bill was a permissive one, requiring the consent of the Public Service Commission as well as that of the companies.

P. F. Sullivan, president of the Bay State Street Railway, who has considered carefully the problem as a whole, believed that it would enable the companies to provide a consolidated transportation service which would benefit the entire community. The Boston Elevated Railway had neither directly nor indirectly committed itself to consolidation with the Bay State company upon any terms, but it was not opposed to the proposed legislation.

J. B. Eastman, of the Public Franchise League, recommended that the bill be referred to the Public Service Commission for study. James H. Vahey, counsel for the unions of street railway employees in the district involved, held that present agreements between the companies and their employees were not sufficiently protected by the bill. Mr. Jackson informed the last speaker that he was agreeable to any provision which would protect these agreements. The hearing was continued to June 15.

San Francisco Considers Purchase of United Railroads

Official steps toward the possible acquisition of the United Railroads by the city of San Francisco were taken at a meeting of the Board of Supervisors on June 8 when a resolution was unanimously adopted empowering the public utilities committee to confer with the officials of the company and take preliminary steps to determine the value of the property.

The resolution was introduced by the public utilities committee. It declared that the president of the United Railroads had announced his willingness to sell to the city, and in a lengthy preamble set forth the benefits which are expected to accrue to the city through municipal ownership of the existing railways. The public utilities committee was then empowered as follows:

To examine and investigate carefully all legal and financial questions involved in such acquisition.

To examine, investigate and value the physical properties and franchise of the United Railroads.

To confer with the president or other officers of the United Railroads, whenever the same may be expedient or necessary.

To request of the United Railroads the price and terms upon which it will sell and transfer its railway properties to the city and county of San Francisco.

To use and employ the services of the board of public works, the engineering department and the city attorney's office, as far as may be necessary and proper.

To report upon completion of such investigation, its findings and conclusions to the Board of Supervisors.

Before the adoption of this resolution the board was assured that the public utilities committee would spend no money in conducting its investigation without first securing the specific consent of the entire board.

Bion J. Arnold appeared before the meeting and made a brief talk to the Supervisors. He issued a warning against what he termed a natural propensity to extend the present municipal railway into non-paying territory.

The remarks in regard to municipal ownership in San Francisco made recently at the Commercial Club in that city by J. W. Lilienthal, president of the United Railroads; M. W. O'Shaughnessy, city engineer; Percy V. Long, city attorney, and B. J. Arnold are referred to on page 1410 of this issue.

Kansas City Ordinance Passed by Both Houses

The franchise ordinance extending the grant of the Metropolitan Street Railway, Kansas City, Mo., nineteen years is practically ready for the people's vote on July 7. The measure passed the upper house of the Council on June 15, and went to the lower branch on June 17. Mayor Jost, one of the framers of the measure, will probably sign it, and the next step will be to present it to the people for their ratification or rejection. Indications are that the franchise ordinance will be passed, though the Kansas City *Star* and *Times* are waging a bitter fight against the measure. On the other hand, the *Journal* and *Post* are in its favor.

The company is taking active steps to determine sentiment on the franchise question. All employees of the company have been asked to question their friends as to their attitude on the franchise and responses indicate that the ordinance has an excellent chance of passing.

Everything considered, sentiment is very favorable to the franchise, and unless some marked change of attitude develops it is very probable that the measure will be passed.

The interurban roads have come out in favor of the ordinance, and will co-operate as far as possible in securing a favorable vote. Some of those interested in the situation have sounded the Missouri Public Utilities Commission as to its attitude. The commission has maintained a policy of silence, however, and will probably not take action on the proposition unless it is asked to pass on some of the questions involved.

Boston Transit Commission Continued

Governor Walsh of Massachusetts has signed the bill to extend the term of the Boston Transit Commission three years. The Governor's statement follows:

"The bill to extend the term of office and to define the duties of the members of the Boston Transit Commission is similar in form to the acts which have been passed at intervals of three years on five different occasions, each extending the term of the commission.

"While I do not approve the extending of the term of service of the members of commissions by legislative action, yet the power to do so is inherent in the Legislature, and the Legislature, under our constitution, can not only extend the terms of office of public officials, but actually appoint the personnel of every commission in the State. The right given to the Governor to name members of commissions is entirely delegated by the Legislature, but it is the established policy of the State to have the personnel of commissions named by the Governor.

"To veto the present bill might lead to the failure of the present Legislature to make provision for the continuance of the work this commission is doing, all power of which is vested solely in the commission. I do not care to assume the responsibility for a situation which might arise of complete chaos—legal, structural and financial—in this work. The failure of the Legislature to provide for the continuation of the work of this commission would lead to great embarrassment to contractors, to the city, to prospective lessees and to the public. It does not seem to me that the principle involved is of such supreme importance in view of the Legislature's constitutional power and previous action in this matter to warrant a veto of the bill."

P. F. Sullivan on the Depreciating Fare Unit

Patrick F. Sullivan, president of the Bay State Street Railway, Boston, Mass., addressed the members of the United Improvement Association at the Boston City Club on June 3, 1914. Mr. Sullivan said in part:

"It is safe to say that transportation to-day is the lowest element in the so-called cost of living. Transportation, particularly in street railways, has decreased in cost. Since street railways are tied up with the public interest their capital has passed from the control of the investors. It is looked upon differently from capital invested in private enterprises. There is no reason why there should be a difference in attitude. Because of it street railways find it difficult to get money for essential improvements.

"Capital must have a sufficient return when invested, but its regulation by the State when invested in public service corporations is one of the most pressing subjects before the American people. To-day more service than ever is given for each unit of fare, and that unit has less purchasing power than it had ten years ago.

"I contend that a man who invests $100 in a public service corporation is entitled to reasonable protection and a reasonable return for his investment. But because of the control there is another attitude in the matter and it is difficult for a street railway to get money even for necessary improvements. The 5-cent fare unit is unscientific, unbusinesslike, uneconomic.

"Had it not been for some increase in business, more than 90 per cent of the capital invested in street railways to-day would be pretty near receivership.

"Street railways in this State have taken no account of depreciation. The Public Service Commission now insists that depreciation shall be recognized and charged into account. That is a most serious situation at the present time. Depreciation is an operating expense, part of the cost of doing business, and when that cost is added there will have to be an increase of rates or else there will be a serious state of things.

"There are twenty-six railway corporations in this State that did not pay or earn any dividend last year. Nearly every one of those companies operated in unprofitable territory, some of which would not pay even with a 10-cent fare. The unit of 5 cents was established when the routes were short, with no basis except the convenience of the nickel as a coin."

Illinois Utilities Board Rules of Procedure.—The State Board of Public Utilities of Illinois has issued a booklet, "Rules of Practice and Procedure and Forms Governing Matters Before the Commission," to guide the utilities and the municipalities in transacting their business with that body.

Steel Trolley Poles in Meriden.—J. K. Punderford, vice-president and general manager of the Connecticut Company, has sent to the Mayor of Meriden, Conn., a letter indicating the conditions under which the company would be willing to substitute tubular steel poles for wooden poles within territorial limitations which are specified by the company.

Municipal Operation in Nelson, B. C.—The Nelson (B. C.) Street Railway has been taken over by the city and the line is now being operated by the City Council. A. S. Horswell is chairman of the street railway committee and F. C. Ingram has been retained as superintendent. Nothing has been decided as to what alterations or extensions will be made this year.

Philadelphia Chamber of Commerce Favors Transit Plan.—The directors of the Chamber of Commerce of Philadelphia, Pa., have adopted a resolution urging Councils to take prompt action in regard to the plans of A. Merritt Taylor, city transit director, for financing the various projects for the establishment of rapid transit service throughout the city. The resolution has been referred by Councils to its special committee on transit.

Rapid Transit Construction Progress in Brooklyn.—The New York Municipal Railway Corporation (Brooklyn Rapid Transit System) has issued its report dealing with progress during May on the work which the company is doing under the dual subway contracts. The principal feature of the report, perhaps, is the summary of the progress with the improvements which are being made to increase the capacity of the present Brooklyn elevated railway structures.

Regina Railway Unprofitable.—The commissioners who are responsible for the operation of the Regina (Sask.) Municipal Railway are said to have concluded that the excess of operating expenses over revenue promises to be of such proportions that steps must be at once taken to reduce the probable loss. It has been suggested that the service be cut down on certain lines; that a straight 5-cent fare, with a 3-cent fare for school children, be established, and that the operation of cars on Sunday be stopped.

Vote on Radial System in Ontario.—On Sept. 21 the townships of Whitchurch, Uxbridge, Markham, Scarboro, Pickering, West Whitby and Reach and the various towns and villages that comprise what is known as the hydro-radial northeastern district, will vote on by-laws for entering into an agreement with the Hydro-Electric Power Commission of Ontario for the construction of a radial railway system that will serve the whole district. This was decided on at a meeting of the authorized representatives of the municipalities, held in Toronto on June 10, when the final routes were agreed upon.

Extension of Seattle Municipal Line.—The city of Seattle has begun the operation of the Lake Burien line, the second division of the municipal railway. Cars are run every hour after 9 o'clock. The property was accepted six months ago as an unincumbered gift to the city from the property owners along the line. Approximately $25,000 was spent by the city for improvements. It is expected that connections will be made with the ferry operating from Lake Burien to Vashon Island, and an extension of the line may be made from Lake Burien to Three Tree Point on Puget Sound, a distance of about 2 miles.

New York Workmen's Compensation Law.—The New York State Workmen's Compensation Commission has sent out a notice from its headquarters at 1 Madison Avenue, New York, calling attention to the fact that the provisions of the new law creating the State insurance fund take effect on July 1. Employers affected are required to insure payment of compensation either by insuring it in the State fund, or through insurance corporations or associations authorized under the law, or by convincing the Compensation Commission of financial ability to pay and depositing securities should the commission so require.

Conference Regarding Subway Plans in Detroit.—William Barclay Parsons and H. M. Brinckerhoff, New York, consulted the members of the Detroit Street Railway Commission and Mayor Marx on June 15 in regard to the proposed subway which the commission has outlined. They may be retained by the city to devise a comprehensive subway plan. According to the commission Messrs. Parsons and Brinckerhoff agreed that a subway would be feasible, but suggested that the city build for the future if it undertakes anything at all. Prof. E. W. Bemis, who is mentioned as the probable choice of the commission to appraise the properties of the Detroit United Railway within the city, is expected to confer with the commissioners at an early date.

Amalgamated Representatives to Study European Conditions.—W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, and E. L. Bland, another official of that association, have sailed from New York on the *Vaterland* to attend the British Trades Union Congress in Portsmouth, England, early in September. They propose to visit the principal Continental cities to study street railway management and operation. Mr. Mahon said: "We believe that municipal ownership is bound to come. We will do all we can to hasten its coming. We will get the views of the delegates at the congress from different parts of the world where there is municipal ownership, so that we will be able to conduct our agitation armed with a knowledge on the subject which we could not gain in any other way."

Washington Valuations.—In accordance with the law requiring that the State Tax Commission appraise the railroad property of the State of Washington for presentation to the various companies, that body has announced the total appraised valuation of both steam and electric lines for 1914 as $391,121,083, an increase of $1,580,651 over the equalized value of last year of $389,540,432. These appraisals will go before the State Board of Equalization next fall for consideration, at which time the railroads may protest against any features not deemed to be equitable. Features of the appraisals this year are the reduction of the valuation of the Puget Sound Electric Railway from $4,000,000 to $3,000,000, and the increase of the Puget Sound Traction, Light & Power Company from $16,898,596 to $17,212,500. The total tentative valuation of the electric railways for 1914 is $47,872,140 as compared with $47,009,329 for 1913.

Bad Faith Charged in Seattle Negotiations.—The receivers and the security holders of the Seattle, Renton & Southern Railway operating in the Rainier Valley out of Seattle, Wash., will oppose any attempt of the city of Seattle to invade the Rainier Valley with a rival municipal line or to injure the company's property in the improvement of Rainier Avenue, which it is proposed to grade and pave. Scott Calhoun, receiver of the company, charges the City Council with playing politics on the municipal ownership question and says that it is to the political advantage of certain members to keep agitation alive without reaching a settlement of any question. Bad faith is charged in the negotiations which the city has had with the company looking to the acquirement of the line as a municipal project. The city has ordered plans prepared by the city engineer for the construction of an electric railway to parallel the Seattle, Renton & Southern Railway.

Strike at Westinghouse Works.—On June 12 a number of employees of the Union Switch & Signal Company walked out at noon without presenting any reasons for so doing. The company promptly announced that the works would be shut down until June 15 at which time the employees would be expected to return. Practically the full quota of men has now returned. This, coupled with the unsuccessful attempt of the strikers to call out the men at the Westinghouse foundries at Trafford City, indicates a speedy return to normal conditions. The management has devoted its energies so far towards safeguarding the properties placed in its charge. Owing to the policy adopted several months ago of manufacturing goods for stock during the dull period, a large amount of goods, sufficient in many lines for several months, had been made and distributed to the company's warehouses in various parts of the country, from which orders have been filled daily without delay.

New York Subway Contract Awards.—The Public Service Commission for the First District of New York during the week ended June 13 awarded the contract for the construction of one section of subway in Manhattan and opened bids for another section. The contract awarded was that for the construction of Section No. 1-A of Routes Nos. 4 and 38, the Seventh Avenue subway. This section covers the connection between the new Seventh Avenue subway and the existing subway at the Battery. The contract was awarded to the Rapid Transit Subway Construction Company, which is controlled by the Interborough Rapid Transit Company for $474,244, which was the lowest of four bids received for the work. The contract on which bids were opened was for the construction of Section No. 7 of Route No. 5, the Lexington Avenue subway, extending from Forty-third to Fifty-third Streets. This subway is now under construction north of Fifty-third Street. Section No. 7 does not include the diagonal connection which is to be built across Forty-second Street, which will be made a separate section. According to unofficial reports of the totals of bids the Rapid Transit Subway Construction Company is the lowest bidder at $1,915,164.

Franchise Offer in Rockford.—The Rockford (Ill.) City Traction Company has submitted to the joint committee on railroads, streets and alleys of the City Council of Rockford conditions under which it would be willing to accept an extension of its franchise for twenty years. The present franchise of the company, under which no compensation is paid to the city, extends for nine years from October, 1914. The company is willing to pay to the city the following percentages of its gross passenger revenue during the life of the new grant: for each of the first five years one-half of 1 per cent; for each of the years in the second five-year period, 1 per cent; for each of the years in the third five-year period, 1¼ per cent, and for each of the years in the fourth or final five-year period, 1½ per cent. Regarding transfers the company says: "Although the Rockford & Interurban Railway is a separate organization, we will accept upon all city cars transfers from all incoming passengers from interurban cars, on the condition that no transfers shall be issued or good from city cars to interurban cars. City cars are now operated on all lines over which interurban cars pass out of the city. The granting of transfers from city cars to interurban cars is unwise for the reason that it results in crowding interurban cars with passengers who could just as well ride upon city cars. Interurban passengers are thereby seriously discommoded."

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railways Association

The summer meeting of the Illinois Electric Railways Association will be held at Keokuk, Ia., on June 24. The headquarters of the association will be at the Hotel Iowa. The program is as follows:

Address by Walter A. Shaw, member the Illinois State Public Utilities Commission.

Paper, "Low-Head and High-Head Hydroelectric Developments" (Illustrated), by E. M. Lake, of the Stone & Webster Engineering Corporation.

Paper, "Maintenance of Electrical Equipment," by Miles Lambert of the Westinghouse Electric & Manufacturing Company.

At the close of the program the regular association luncheon will be served at the Keokuk Elks' Club rooms. The afternoon will be devoted to a tour of inspection of the hydroelectric plant of the Mississippi River Power Company.

New York Electric Railway Association

The complete program has been announced for the thirty-second annual meeting of the New York Electric Railway Association to be held at the Hotel Champlain, Bluff Point, N. Y., on June 30 and July 1. At the regular business meeting of the association at 10 a. m. on June 30 the following addresses will be delivered:

"Employees' Accident Insurance," by Robert E. Dowling, chairman of the Workmen's Compensation Commission of the State of New York; James J. Hoey, Second Deputy Superintendent of Insurance of the State of New York; Cyrus W. Phillips, Deputy Commissioner, Workmen's Compensation Commission of the State of New York, Rochester, N. Y.; John T. Stone, president of the Maryland Casualty Company, Baltimore, Md.; Ernest Gonzenbach, general manager of the Empire United Railways, Inc., Syracuse, N. Y., and F. Spencer Baldwin, manager of the State Insurance Fund, Workmen's Compensation Commission of the State of New York.

"Accident Prevention," by James P. Barnes, general manager of the Syracuse & Suburban Railroad, Syracuse, N. Y.

On July 1 at 10 a. m. the following addresses will be delivered:

"Efficiency," by Charles J. Witherwax, general passenger agent of the Schenectady (N. Y.) Railway; F. A. Bagg, chief engineer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., and W. H. Sawyer of Ford, Bacon & Davis, New York, N. Y.

At this session the question box will also be discussed. The program will be concluded with the election of officers.

The banquet of the association will be held at the Hotel Champlain on June 30 at 8 p. m. The toastmaster will be Frank Hedley, president of the association. The speakers will be W. L. Conwell, vice-president and treasurer of the Transportation Utilities Company, New York, N. Y.; Edward A. Maher, Jr., assistant general manager of the Third Avenue Railroad, New York, N. Y., and Howard MacSherry, attorney of the Public Service Corporation of New Jersey, Newark, N. J.

Applications for hotel accommodations should be made to Albert Thieriot, Hotel Champlain, Bluff Point, N. Y.

Financial and Corporate

Stock and Money Markets

June 17, 1914.

The trading on the Stock Exchange to-day was on a moderate scale, with frequent intervals of pronounced dullness. In the last half of the day the market was influenced by the despatches reporting further Mexican complications. Interborough-Metropolitan declined slightly and heavy tone was shown in United Railways Investment issues. Rates in the money market were: Call, 2 per cent; sixty days, 2 @ 2½ per cent; four months, 2½ @ 2¾ per cent; six months, 3¼ @ 3½ per cent.

On the Philadelphia Exchange the tone was steady to-day in a broad market with small trading.

In Chicago all departments were steady to-day, but the trading was dull.

To-day was a holiday in Boston. Yesterday's market was dull and featureless. Price changes yesterday were not significant.

In Baltimore the sales of stock totaled 752 shares to-day. More than 200 shares of United Railways & Electric stock changed hands. The bond transactions totaled $41,900, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 11	June 18
American Brake Shoe & Foundry (com.)	89	90½
American Brake Shoe & Foundry (pref.)	137	138
American Cities Company (com.)	29	*29
American Cities Company (pref.)	67	65¼
American Light & Traction Company (com.)	336	340
American Light & Traction Company (pref.)	108	109
American Railways Company	37	37
Aurora, Elgin & Chicago Railroad (com.)	34	34¾
Aurora, Elgin & Chicago Railroad (pref.)	77	78
Boston Elevated Railway	87½	87½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	*65	65
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	92	90¾
Capital Traction Company, Washington	99	98½
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	95	96
Chicago Railways, ptcptg., ctf. 2	34½	33¼
Chicago Railways, ptcptg., ctf. 3	5	5
Chicago Railways, ptcptg., ctf. 4	2	2
Cincinnati Street Railway	103¼	102¾
Cleveland Railway	105	103½
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	*53	*53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	63	*63
Detroit United Railway	a80	a80
General Electric Company	148¼	147⅝
Georgia Railway & Electric Company (com.)	120	120½
Georgia Railway & Electric Company (pref.)	83¾	86½
Interborough-Metropolitan Company (com.)	15	14¼
Interborough-Metropolitan Company (pref.)	64½	62⅝
International Traction Company (com.)	30	*30
International Traction Company (pref.)	85	*85
Kansas City Railway & Light Company (com.)	22	22
Kansas City Railway & Light Company (pref.)	39	39
Lake Shore Electric Railway (com.)	6	*6
Lake Shore Electric Railway (1st pref.)	90	*90
Lake Shore Electric Railway (2d pref.)	*22	*22
Manhattan Railway	131½	129¼
Massachusetts Electric Companies (com.)	12½	11
Massachusetts Electric Companies (pref.)	62	61
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	26	26
North American Company	76½	68¾
Northern Ohio Traction & Light Co. (com.)	a70	60
Northern Ohio Traction & Light Co. (pref.)	97¼	a101
Philadelphia Company, Pittsburgh (com.)	38¾	38¾
Philadelphia Company, Pittsburgh (pref.)	37	37
Philadelphia Rapid Transit Company	15¾	15¾
Portland Railway, Light & Power Company	47	47
Public Service Corporation	112	112
Third Avenue Railway, New York	42¾	41½
Toledo Traction, Light & Power Co. (com.)	20	13
Toledo Traction, Light & Power Co. (pref.)	70	70
Twin City Rapid Transit Co., Minn. (com.)	105¼	103
Union Traction Company of Indiana (com.)	11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	14	14
United Rys. & Electric Company (Baltimore)	28	27⅝
United Rys. Inv. Company (com.)	13	11
United Rys. Inv. Company (pref.)	37½	32
Virginia Railway & Power Company (com.)	48¾	49
Virginia Railway & Power Company (pref.)	99⅝	97
Washington Ry. & Electric Company (com.)	87½	86
Washington Ry. & Electric Company (pref.)	83	82⅝
West End Street Railway, Boston (com.)	67½	67¾
West End Street Railway, Boston (pref.)	a92	88
Westinghouse Elec. & Mfg. Company	76¾	75⅝
Westinghouse Elec. & Mfg. Co. (1st pref.)	124	124

* Last sale. a Asked.

ANNUAL REPORTS

Standard Gas & Electric Company

The statement of income, profit and loss of the Standard Gas & Electric Company, Chicago, Ill., for the year ended Dec. 31, 1913, follows:

Earnings:	
Interest on bonds owned	$565,408
Dividends on preferred stock owned	245,698
Dividends on common stock owned	606,701
Special dividends on common stock owned	34,568
Interest on notes and accounts receivable	86,935
Total	$1,539,310
General expenses and taxes	36,506
Net earnings	$1,502,804
Deduct:	
Interest on bonds	$615,669
Interest on collateral trust notes	79,419
Interest on preferred stock scrip	5,893
Miscellaneous interest	50,043
Loss on sale of securities—net	273
Total	$751,297
Net income	$751,507
Profit and loss—surplus at beginning of period	1,008,659
Profit and loss—gross surplus	$1,760,166
Profit and loss charges:	
Dividends on preferred capital stock	$912,420
Premium on coupon notes redeemed	18,500
Premium on bonds redeemed	150,000
Total	$1,080,920
Profit and loss—surplus at end of period	$679,246

The combined income of all the subsidiary companies of the Standard Gas & Electric Company for the year ended Dec. 31, 1913, was $12.926,288; the operating expenses $7,109,628, and the net earnings, $5,816,660. Included in the above operating expenses were $801,446 for taxes and $735.794 for maintenance. The net earnings were disposed of as follows: Interest on bonded indebtedness, $3,190,631; interest on debentures, $25,387; interest on floating indebtedness, $194.325; dividends on preferred stock, $1,300,112, and dividends on common stock, $650,364, leaving a balance of $455,841.

Instead of declaring in dividends all the applicable earnings of the subsidiary companies, the directors of such companies, with the approval of the board of directors of the Standard Gas & Electric Company, allocated them on the books of the respective subsidiary companies as follows: Depreciation reserve, $285,442; undistributed surplus, $282.998, and then reinvested the entire amount of $578,440 in the property of the respective companies. The combined excess of current liabilities over current assets of all the controlled companies amounted on Dec. 31, 1913, to $435,241. By Jan. 31, 1914, this excess of current liabilities over current assets had decreased to $372,040. The combined depreciation reserve account of all subsidiary companies on Dec. 31, 1913, aggregated $2.249,856. This amount was exclusive of $735,794 included in the operating expenses for the year for maintenance. During the period replacements were made out of the previous depreciation reserves amounting to $31,487. The taxes of the various subsidiary companies increased $102.212 over 1912.

Of the sixteen subsidiary companies of the Standard Gas & Electric Company, the report states that ten are progressing so satisfactorily as to require no special mention. The six that are specifically discussed include the Fort Smith Light & Traction Company and the Arkansas Valley Railway & Light Company. It is stated that the former for the last fifteen months has suffered severe losses of both gross and net earnings on account of the period of depression in that part of the country, aggravated by increases in labor and fuel costs. The loss in net earnings for the latter company is directly attributed to the coal miners' strike leading to a greatly increased cost of fuel and to the large increase in taxes of $91,995 over 1912. The gross earnings of the company increased $38,000 during the year, however, and the earnings for 1914 conservatively estimated indicate a substantial increase in net.

The report of the Standard Gas & Electric Company is in many respects one of the most complete public utility reports that has been published. Aside from the above facts, it gives a résumé of the capitalization of the companies controlled and population served and a detailed description of the stock, bond and note issues of the subsidiaries. The report also discusses the question of franchises, competition, public service commissions and holding company management, and by means of an inserted map affords the investor an excellent illustration of what is meant by the diversity of location factor. Furthermore, at the end of the report there are placed a well-constructed balance sheet for the main company and tables showing the gross and net earnings of the subsidiaries, the amounts of stocks and bonds owned by the main company, the subsidiary bond issues, none of which are owned by the main company, and also general business statistics. Finally, a supplementary report is presented containing a consolidated statement of earnings for all the subsidiaries and individual balance sheets and detailed descriptions of the physical property of each subsidiary. The one striking point in which the two reports are deficient is that in neither one can there be found any statement showing the analysis of the operating revenues and the operating expenses of the subsidiary companies.

The J. G. White Companies

J. G. White, chairman of the boards of directors of the J. G. White Companies, New York, transmitted to the stockholders on May 27 the amalgamated balance sheet of the companies for the respective fiscal year ended Dec. 31, 1913, of the J. G. White Engineering Corporation and the J. G. White Management Corporation and for the year ended Feb. 28, 1914, of J. G. White & Company, Inc. It was considered advisable to amalgamate the balance sheets of the J. G. White Engineering Corporation and the J. G. White Management Corporation with the balance sheet of J. G. White & Company, Inc., which owns all of the common capital stock of the subsidiary companies, in order to present a more comprehensive view of the results of operation of the companies. The individual balance sheets of the three companies were also presented.

The amalgamated balance sheet shows that the cash in banks, branch offices and on hand was $553,941, and the bills and accounts receivable $596,574, making total current assets of $1,150,515. The total debts of the companies for the corresponding dates were $533,068, being less than the cash on hand and less than one-half of the current assets. The combined surplus account shows that the actual profits of the companies for the year were $349,070. After the payment of dividends at the rate of 7 per cent on the preferred stocks of the engineering and the management corporations and at the rate of 6 per cent on the preferred stock of J. G. White & Company, Inc., the sum of $179,937 was added to the surplus account, or about 12 per cent on the outstanding common stock of the incorporated company not in the hands of trustees. The committee of directors appointed to value the securities, co-operating with the officers, has charged to surplus account the sum of $159,260, leaving the balance carried forward at approximately the same figure as last year.

Mr. White expressed the opinion that the formation of the two companies to take over the engineering and the management business heretofore conducted as departments of the parent company had resulted in materially increasing the efficiency of the organization and strengthening the position of the companies.

American Railways, Philadelphia, Pa.—All of the outstanding 5 per cent collateral trust gold bonds of the Johnstown (Pa.) Traction Company, dated Jan. 1, 1910, have been called for payment at 102 and interest on July 1 at the office of the Real Estate Title Insurance & Trust Company, Philadelphia, Pa.

Aurora, Plainfield & Joliet Railroad, Joliet, Ill.—The Illinois Secretary of State has granted letters of incorporation to the Aurora, Plainfield & Joliet Railroad, with principal office in Joliet, Ill. The nominal capital is $25,000. The incorporators and the first board of directors are W. A. S. Mulligan, James E. Hauonic, Robert Oehmig, O. P. Stewart and Frank P. Page. The company will own and operate a road from Aurora, Kane County, through Plainfield to Joliet. The line originally constructed and operated by the Joliet, Plainfield & Aurora Railroad and sold to the Joliet & Southern Traction Company will be taken over by the new corporation, as well as the line formally owned and constructed by the Joliet & Southern Traction Company.

California Railway & Power Company, San Francisco, Cal.—An initial dividend of 2 per cent was paid on June 10 on the $6,874,400 of 7 per cent cumulative preferred stock of the California Railway & Power Company, all of which is owned by the United Railways Investment Company.

Charlottesville & Albemarle Railway, Charlottesville, Va.—The directors of the Charlottesville & Albemarle Railway have declared an initial dividend of 7 per cent on the preferred stock, 3½ per cent payable on July 1 and 3½ per cent on Jan. 1, 1915.

Chicago (Ill.) Elevated Railways.—The Chicago Elevated Railways has arranged to refinance the $30,000,000 of 5 per cent notes maturing on July 1. These notes were secured by $25,000,000 of first mortgage 5 per cent thirty-year bonds of Northwestern Elevated Railroad and practically all the stocks of the South Side Elevated, Northwestern Elevated, Metropolitan West Side Elevated and Chicago & Oak Park Elevated Railways. The $25,000,000 first mortgage of the Northwestern Elevated Railroad will be cancelled and a new mortgage for about $12,000,000 will be made and the bonds will be sold. There will also be issued $14,000,000 of two-year 5 per cent notes secured by the stock pledged as collateral for the notes maturing on July 1. The notes will be offered to the public at about 98. An issue of $7,000,000 debentures will also be authorized but will not be offered to the public.

Dedham & Franklin Street Railway, Westwood, Mass.—The Dedham & Medway Street Railway has been organized as a successor to the Dedham & Franklin Street Railway, sold under foreclosure as noted in the ELECTRIC RAILWAY JOURNAL of May 23, and has been leased to the Milford & Uxbridge Street Railway for five years, subject to renewal for five years, with an option of purchase at any time within the ten years. It is understood that the lease also applies to the old Medfield & Medway Street Railway, also sold under foreclosure recently.

Fort Worth (Tex.) Southern Traction Company.—The Fort Worth Southern Traction Company, recently acquired by Stone & Webster, Boston, Mass., has filed amended articles of incorporation, changing the name to the Tarrant County Traction Company and increasing the capitalization from $1,500,000 to $2,500,000.

New York (N. Y.) Railways.—On June 16 the Public Service Commission for the First District of New York held a hearing, before Commissioner Milo R. Malbie, on the application of the Broadway & Seventh Avenue Railroad for permission to issue bonds to the amount of $500,000, for the purpose of retiring bonds issued under its second mortgage and due July 1, 1914. The petition sets forth that in May, 1890, the company leased its roads and franchises to the Houston, West Street & Pavonia Ferry Railroad for the entire term of its charter, which company was subsequently merged with the Metropolitan Street Railway. Since Jan. 1, 1912, the New York Railways, as successor of the Metropolitan Company, has operated the property. In 1884 the company executed a second mortgage to cover an issue of $500,000 of 5 per cent bonds, payable on June 1, 1914, and in 1893 executed its first consolidated mortgage to cover an issue of $12,500,000 of 5 per cent bonds. The company has common stock outstanding in the amount of $2,100,000; $1,500,000 of first mortgage 5 per cent bonds; $500,000 of second mortgage 5 per cent bonds, and $7,650,000 of first consolidated mortgage 5 per cent bonds, out of a total authorized issue of $12,500,000. The petition stated that the application was "made without prejudice to the right of your petitioner to claim or assert that it has the legal right to issue said bonds without the approval of your honorable commission."

Ogden (Utah) Rapid Transit Company.—The stockholders of the Ogden Rapid Transit Company have approved the proposal of the board of directors of that company for the amalgamation of the company with the Logan Rapid Transit Company as the Ogden, Logan & Idaho Railroad. It is stated unofficially that M. S. Browning, president of the Ogden Rapid Transit Company, will be the president of the new company; L. R. Eccles and Joseph Scowcroft first and second vice-presidents respectively, and P. D. Kline, general manager, with headquarters at Ogden. The plan to amalgamate the companies has not yet been voted upon by the stockholders of the Logan Rapid Transit Company.

Philadelphia Company, Pittsburgh, Pa.—Patrick Calhoun, former president of the United Railroads, San Francisco, resigned as a director of the Philadelphia Company at the annual meeting of the stockholders, and George S. Davidson was elected to succeed him. The other directors whose terms had expired were re-elected.

Philadelphia (Pa.) Rapid Transit Company.—Stockholders of the Union Traction Company are being asked, in a letter sent to them over the signatures of James G. Balfour and John M. Fogelsanger, to signify their written protest against the company lending financial assistance or credit to the Philadelphia Rapid Transit Company in carrying on the proposed new transit plan.

Rochester (N. Y.) Railway.—A. H. Smith, president of the New York Central & Hudson River Railroad, has been elected a director of the Rochester Railway to succeed W. C. Brown, formerly president of the New York Central Railroad.

Syracuse & Suburban Railway, Syracuse, N. Y.—The Public Service Commission of the Second District of New York has authorized the Syracuse & Suburban Railway to issue $300,000 of five-year 6 per cent notes, the proceeds to be used to take up outstanding short-time notes aggregating $91,000 and to complete improvements, including the installation of signals.

United Railways & Electric Company, Baltimore, Md.—The Maryland Public Service Commission has withheld its approval of the issue of the $1,000,000 of two-year 5 per cent convertible notes of the United Railways & Electric Company. The notes are convertible into the common stock at 33 for the $50 shares, and it is this feature, it is understood, to which the commission took exception. The plan for issuing the notes was referred to in the ELECTRIC RAILWAY JOURNAL of June 13, 1914.

Washington Railway & Electric Company, Washington, D. C.—Hambleton & Company, Baltimore, Md., are placing at 83½ and interest $1,000,000 of consolidated mortgage 4 per cent gold bonds of the Washington Railway & Electric Company, dated 1902 and due Dec. 1, 1951, but redeemable as a whole or in part on thirty days' notice at 105 and interest on any interest date. The bonds are in the denomination of $1,000. The trustee under the mortgage securing the issue is the United States Mortgage & Trust Company. The proceeds of the $1,000,000 now being offered will be used to retire on Oct. 1, 1914, $500,000 of first mortgage 5 per cent bonds of the Columbia Railway, and $500,000 of extension mortgage 5 per cent bonds. Of the $17,500,000 of consolidated mortgage bonds authorized $11,642,350 has been issued, including the $1,000,000 now offered. The remaining $5,857,650 is reserved to retire a similar amount of underlying liens and bonds of subsidiary companies, none of which mature until Feb. 1, 1925. After the retirement of the Columbia Railway bonds on Oct. 1, 1914, the consolidated bonds will be a first mortgage on about 46 miles of single track and a general mortgage on the balance of the property subject to $4,829,000 of underlying liens of the Metropolitan Railroad and the Anacostia & Potomac River Railroad. The consolidated bonds are additionally secured by the pledge of $8,256,750 of stock and $465,000 of bonds of subsidiary companies. The subsidiary railways own more than 64 miles of single track, upon which the only underlying liens are $1,750,000 of bonds of the City & Suburban Railway.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—A protective committee composed of Wilson Woelpper, of Woelpper, Crawford & Company, Philadelphia, William S. J. Wetherill, Morris Ebert, M. H. Boehmer, Ellison Elmer and F. E. J. Hansom has been formed in the interest of the bondholders of the Wilkes-Barre & Hazleton Railroad, which defaulted on May 15 in the payment of the interest on the $1,900,000 of its 5 per cent bonds. The company asked the holders of the bonds to surrender their May 15 coupons and all others up to Nov. 15, 1916, and to accept non-interest bearing certificates for the coupons when they become due.

Dividends Declared

American Cities Company, New York, N. Y., 3 per cent, preferred.

Asheville Power & Light Company, Asheville, N. C., quarterly 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent, preferred.

Boston & Worcester Electric Company, Boston, Mass., $1, preferred.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred; quarterly, 2 per cent, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred.

Eastern Texas Electric Company, Dallas, Tex., 3 per cent, preferred.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred; one-half of 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Union Passenger Railway, Philadelphia, Pa., $4.75.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS COMPANY, PHILADELPHIA, PA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., May, '14	$475,534	......	......	......	......
1 " " '13	435,402	......	......	......	......
11 " " '14	5,068,314	......	......	......	......
11 " " '13	4,686,465	......	......	......	......

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Apr., '14	$90,429	*$57,600	$32,829	$27,597	$5,232
1 " " '13	92,389	*55,488	36,901	24,277	12,624
12 " " '14	1,200,748	*717,501	483,247	311,573	171,674
12 " " '13	1,114,529	*671,582	442,947	277,122	165,825

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Apr., '14	$243,426	*$66,782	$176,674	$80,000	$96,674
1 " " '13	106,730	*10,845	95,885	30,000	65,885
12 " " '14	2,916,800	*713,450	2,203,350	960,000	1,243,350
12 " " '13	1,399,395	*158,982	1,240,413	360,000	880,413

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Apr., '14	$186,634	*$115,608	$71,026	$63,745	$7,281
1 " " '13	167,748	*98,553	69,195	56,872	12,323
12 " " '14	2,407,857	*1,384,718	1,022,139	741,474	281,665
12 " " '13	2,189,830	*1,319,612	970,218	665,760	304,458

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Apr., '14	$213,998	*$143,327	$70,671	$55,708	$14,963
1 " " '13	205,464	*117,705	87,759	48,844	38,915
12 " " '14	2,745,570	*1,701,837	1,043,733	607,090	436,643
12 " " '13	2,528,522	*1,401,849	1,126,673	582,908	543,765

FORT WAYNE & NORTHERN INDIANA RAILWAY, FORT WAYNE, IND.

1m., Apr., '14	$145,232	$85,661	$59,571	$52,288	$7,283
1 " " '13	129,898	93,564	36,334	47,317	†10,983
4 " " '14	602,644	344,683	257,961	204,091	53,870
4 " " '13	558,440	325,798	232,642	190,034	42,608

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m., Apr., '14	$66,937	$34,872	$32,065	$20,719	$11,346
1 " " '13	60,663	30,148	30,520	19,177	11,343
10 " " '14	666,658	338,121	328,537	204,863	123,674
10 " " '13	635,085	335,910	299,175	186,915	112,260

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

1m., Apr., '14	$426,809	$201,331	$225,478	$134,969	$90,509
1 " " '13	406,086	198,207	207,879	126,758	81,121
10 " " '14	4,334,836	2,132,308	2,222,529	1,343,959	878,570
10 " " '13	4,099,447	2,012,128	2,087,619	1,243,990	843,629

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*Includes taxes.

†Deficit.

Traffic and Transportation

Final Arguments in Middlesex & Boston Arbitration

Final arguments were heard recently by the board of arbitrators sitting in the Middlesex & Boston Street Railway wage case. The board consists of George L. Mayberry, Waltham, Mass., chairman; James H. Vahey, Boston, representing the employees' union, and Arthur A. Ballantine, Boston, representing the company. An abstract of the company's argument as presented by G. M. G. Nichols, of Gaston, Snow & Saltonstall, Boston, follows:

The only points at issue before the board are wages of carhouse employees and their overtime work; and the wages of blue uniformed men and the graduated scale. The demands for blue uniformed men are 27 cents an hour the first year; 30 cents the second year, and 33 cents the third year and thereafter; and for carhouse men a 20 per cent increase and time and one-half for overtime. The company's answer is that it can get at its prevailing rates of pay all the men needed, that the present rates are fair and reasonable and that at this time the road cannot afford to pay more.

Carhouse employees, about forty in number, are as a rule taken by the company as green men at 17.5 cents per hour and raised to a maximum of 25 cents an hour. The company contends that little highly skilled labor is required at its carhouses, as the work consists largely of removing certain designated parts and substituting others. At the Waltham carhouse, the work is more difficult, but the wages are higher. Steady employment the year round is a feature.

The company acknowledges that its blue uniformed men perform well a serious and a substantial work, but that work requires little individual initiative or constructive ability, and offers continuous and permanent employment. Some things tend to increase the difficulty of platform work and others to decrease it. The increase in the number of passengers, transfers and stops, the collecting of 6-cent fares, the more complex equipment, larger cars and to some degree higher speed may have increased the work of the men, but the introduction of vestibules, of seats, air brakes, arc lights, electric switches, block signals and sand cars, the establishment of a free transfer point during rush seasons at Commonwealth Avenue, and the prepayment station and transfer point at the busy station of Norumbega Park and the sale of tickets by the company, all tend to make the work easier. In addition, wages have been increased, hours of work lessened and many other conditions changed to the advantage of the men.

The union evidence showed that a craftsman in the trades may work one, nine or ten months a year on the average.

At present the company is paying on a graduated scale 21 cents an hour to men in the first six months, 21.5 cents in the second six months, and then by graduations by years from 22.5 to 27 cents, the maximum being reached in the eighth year. In 1900 a flat rate of 20 cents was paid all over the system. Five increases have been granted since 1900. The company does not dispute that the cost of living has increased since 1900, but contends that the standard of living has also increased. Men earning the maximum pay have earned such amounts for four consecutive weeks as $20.18, $19.60, $19.50 and $20.80. A fair summary of the earnings of twenty-seven representative men would be from $16 to $18 a week. According to the twenty-sixth annual report on Statistics of Manufacturers, Massachusetts public document No. 36, of 389,485 male wage earners more than 18 years of age in manufacturing plants, two-thirds received less than $15 per week. In the boot and shoe trade, exclusive of findings, 50 per cent received less than $15, and 30 per cent of the males $12 a week or less. In the cotton goods trade, 89.4 per cent received less than $15; in the leather trade, 77.7 per cent; in the paper and wood pulp trade, 76.8 per cent; in the woolen, worsted, felt goods and felt hats trades, 82.3 per cent. No evidence has been submitted, which when analyzed, proves that the platform men of the road are, as a class, generally unable to live within their income.

Unable since its organization to earn upon the money actually invested in its properties, the fair rate of return to which its investors are entitled, hampered by many non-paying lines, and struggling with the problem of building up that paying volume of average business which it has always lacked, the road cannot stand a demand for increased wages at this time. All the various lines in the system were united in the attempt to build up a general system which would be able to continue public service with a fair return to stockholders and insure its permanency. The operating expenses per car mile compare favorably with other roads in the State, but the traffic density is too low to yield an adequate return. Many of the lines making up the system would have been unable to earn their operating expenses without help from the other branches. On June 30, 1913, the road had outstanding capital stock of $1,987,000; mortgage bonds to the amount of $1,983,000, and notes payable to the amount of $1,232,350. There were 92.5 miles of main track operated. The fixed charges for the year amounted to $198,452. The gross income, less operating expenses and fixed charges, left for the year a net divisible income of $79,926. The payment of a 4 per cent dividend left as a surplus for the year, $446. The total deficit, as of the above date, was $266,569. The company has never paid a dividend in excess of 6 per cent and only one at that rate. The aggregate dividends paid by the roads making up the system has been far short of a fair return on the capital invested.

Much of the equipment has reached the age where expensive additions and renewals are becoming imperative. The capitalization, issued under authority of the Massachusetts Railroad Commission, represents a bona-fide outlay. Any substantial additional burden laid upon the company at this time might cause it to seek relief by abandoning certain non-paying services.

Investigation of Service at Somerville, Mass.

Upon petition of citizens of Somerville the Massachusetts Public Service Commission held a hearing recently relative to service conditions on the local lines of the Boston Elevated Railway. Somerville is one of the principal suburbs of Boston and has a population of about 80,000. It is connected with the business center of Boston by several trunk lines of car and train service, the more prominent of which are the elevated lines from Sullivan Square to the Washington Street tunnel district, the surface lines leading into Boston via the East Cambridge Viaduct, and the Union Square-Central Square Cambridge line connecting with the Cambridge subway train service to and from Park Street.

The committee recommended that more cars be placed on each of the Somerville lines during the rush hours. On May 18 the company put into effect a new time-table providing four cars every fifteen minutes in the a.m. and p.m. rush hours between Sullivan Square terminal and Powder House Square, an increased service being provided over two combined routes of seven and eight minute headway each. On Somerville Avenue the company has instituted a twelve-minute service in place of the former fifteen-minute schedule obtaining in the middle of the day. On the Highland Avenue-Viaduct line from Scollay Square subway station nineteen outward trips have been established in the afternoon rush hours with a minimum headway of four minutes, between 4:48 and 6:18 p. m. The company showed that it is necessary, in order to meet requests for added service on Highland Avenue, Somerville, to turn back cars at Davis Square, and unless the city authorities grant a location which has been asked the company has no option but to utilize crossovers in the street.

At the hearings a request was made for additional service during the morning and afternoon rush hours between the top of Winter Hill and Sullivan Square terminal, upper level. The company is operating a ten-minute service from the top of Winter Hill through the lower level into Boston. The company does not feel it to be wise to attempt to provide a line of extra cars over this route to compete with a line not at present utilized to its proper capacity. Regarding the running of shuttle cars between Sullivan and Union Squares via Central Square, the company pointed out that no special work exists at Central Square which will permit this, and further contended that the route proposed would be roundabout in character. With the construction of the

East Cambridge Viaduct and the provision of direct service over it to and from Somerville via Somerville and Highland Avenues, the company does not see its way clear to install tracks through Beech Street to connect Elm Street with Massachusetts Avenue, Cambridge, and the Cambridge subway. The handling of traffic along radial lines is thus deemed essential to rapid transit and a properly economical service.

The petitioners requested the establishment of service from Spring Hill to Scollay Square over the Viaduct. The company points out that it is not feasible to add another through service to the two direct connections now afforded with the rapid transit system. It is impossible to operate large semi-convertible cars to the top of Spring Hill, and the company does not consider it good railroading to operate smaller cars on the Viaduct, which is exclusively utilized by large units.

The petitioners urged the adoption of the skip-stop system. The company believes that such an arrangement would not give the relief which it is the desire of the committee to secure. In order to facilitate the movement of the cars, the company's view is that the best results can be obtained by continuing the present policy of running non-stop cars from certain points inward in the morning and from the terminal to certain points outward in the evening.

A Seat per Passenger Ordinance During Non-Rush Hours Proposed for Chicago

With ever-increasing congestion the surface lines of Chicago are facing a serious problem. Steps for improving conditions are being discussed by the local transportation committee of the Chicago City Council, L. A. Busby, president of the Chicago Surface Lines, and George Weston, of the Board of Supervising Engineers. The local transportation committee after careful consideration has decided that it is impracticable to require the company to provide a seat per passenger during the entire day, and now proposes that an ordinance be passed requiring a seat per passenger to be provided during the non-rush-hour periods. Mr. Busby tentatively agreed to an ordinance containing such a provision. He also expressed the opinion that it was possible to limit the number of passengers per car to eighty during the rush-hour periods. Other suggestions for the relief of downtown surface-line congestion were that ordinances be passed requiring automobiles to be parked outside the loop district and requiring teams to be kept off the streets during the rush-hour periods. The latter is being seriously considered, but the question of authority has arisen. The legal department of the city has been requested to render an opinion on this subject before further steps are taken toward the preparation of an ordinance.

Toronto Traffic Report Presented

Charles R. Barnes, chief railway inspector of the Public Service Commission of the Second District of New York, who was retained by the Ontario Railway Board to report on the Toronto street railway system with a view to suggesting new routes and rerouting, has filed his report. Mr. Barnes suggests the fuller carrying out of what the Toronto Railway is doing now, particularly with regard to installing push-buttons, making passengers dismount by the front door, prohibiting passengers standing in the motorman's vestibule, etc. Mr. Barnes urges the installation of modern heating apparatus and recommends an increase in the seating capacity of Toronto cars. The present seating capacity of 29,069 during rush hours should be increased by 10,813, half of this number by Nov. 1 and the rest a year from that date. He recommends that thirty-seven single-truck cars and seventy-one closed trailers be replaced by new cars approved by the board by Nov. 1. An additional twenty-nine cars should be in service on new lines by the same date. In addition to this the platforms should be lengthened on 200 double-truck cars.

The extensions recommended are: Wilton, through to Pape and north to Danforth; Teraulay, from Agnes to College; Bloor, from Lansdowne to northwestern gate of High Park; tracks from Dundas and extension of Queens service to Quebec, pending construction of subways under railway tracks; Harbord to Ossington, Hallam, Lappin and Antler Streets to Dundas; new belt line along MacPherson Avenue from Avenue Road to Bathhurst, and operation of Dupont cars up Bathhurst to MacPherson and east to Avenue Road. The rerouting suggested is: Connect Parliament and Queen lines; Broadview and Dundas lines; Winchester and Harbord lines; eliminate stub on High Park end of College line; reroute College through to Teraulay via Queen, Bay and Wellington to Front.

The report will be taken up at a public meeting of the board, to which representatives of the company and city will be invited.

Arbitration in Springfield.—The officers of the Springfield (Mass.) Street Railway and the representatives of the employees have agreed to settle by arbitration the differences which have arisen regarding the discharge of five men.

Fare Increase Desired.—The Barre & Montpelier Traction & Power Company, Montpelier, Vt., has announced that it is confronted by conditions that render an increase in fares imperative if a receivership for the company is to be avoided.

Lower Steps in New Hampshire.—The Boston & Maine Railroad, Concord & Manchester Electric Branch, has placed in operation the first of its cars reconstructed to comply with the recent order of the Public Service Commission of New Hampshire prescribing the height of electric railway car steps.

Inquiry Into St. Louis Service.—The Public Service Commission of Missouri will inquire into the service furnished by the United Railways, St. Louis. The commission has designated J. L. Harrop, its chief engineer, to study traffic conditions in that city and to report his finding to the commission.

Service Questions in Pittsburgh.—At a meeting of the members of the Council of Pittsburgh, Pa., on June 11, it was decided to have the law department present to the Pittsburgh Railways suggestions looking toward the betterment of service in Pittsburgh with the idea of adjusting matters without carrying the case to the Public Service Commission.

Smoking on Brooklyn Cars.—The Public Service Commission of the First District of New York has authorized the Brooklyn Rapid Transit Company to permit smoking on the four rear seats of its semi-convertible surface cars. For some time past smoking has been permitted on the four rear seats of the open surface cars of the company fitted with running boards.

Group Insurance in Meridian.—The Meridian Light & Railway Company, Meridian, Miss., has arranged with the Equitable Life Assurance Society to insure under the group insurance plan all white employees who have been in the service of the company for six months or longer for an amount which approximates a year's salary of each employee. The insurance is being placed without cost to the men.

Increase in Fare on Seattle Suburban Line.—The receivers of the Seattle, Renton & Southern Railway, Seattle, Wash., are seeking to put into effect an increased schedule of rates on July 10. They propose to divide the road into four 5-cent zones. Under the new plan the cost of a ride to the city limits will be increased from 5 cents to 10 cents and it will cost 20 cents to ride to Renton unless commutation tickets are used.

Decision in Ferry Fare Case.—The United States Supreme Court has affirmed the decision of the New Jersey Court of Errors and Appeals holding that the Chosen Freeholders of Hudson County, N. J., had the right to order a reduction in fares to six cents per round trip on the Port Richmond & Bergen Point Ferry, operated between Bergen Point, N. J., and Port Richmond, Staten Island, N. Y., and owned by the Public Service Corporation.

East Liverpool Arbitrators Report.—The arbitrators who have been considering the wage question on the Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio, made their award on June 13 covering the linemen, substation operators, etc. They reported in favor of an increase for line foremen from $90 to $96 a month and linemen from $3 to $3.20 a day. They also recommended slight raises for other employees except the substation operators.

Seattle-Tacoma Fare Amendment.—An amendment has been filed with the Public Service Commission of Washington by the Puget Sound Electric Railway, Tacoma, Wash., to experimental tariff No. 6 covering passenger rates, which became effective on June 1, 1914, naming an experimental round-trip fare between Tacoma and Seattle of $1 instead of $1.25 as at present, effective on July 1, 1914. No change will be made in the single-trip fare.

Hearing on Commutation Fares in Missouri.—A hearing was held by the Missouri Public Utilities Commission at Jefferson City, Mo., on June 10 and 11 in regard to commutation rates on the Kansas City, Clay County & St. Joseph Railway. John M. Olin represented the company and argued against commutation rates. P. L. Saltonstall, president of the company, also attended with J. R. Harrigan, general manager. A brief will be filed in the case by the electric railroad in the near future.

Mail Service on Illinois Traction System.—As a result of frequent conferences between W. C. Vandervoort, Chicago, acting superintendent of the mails of the sixth division; H. E. Chubbuck, vice-president executive of the Illinois Traction System, and Seth Howard, chief of the railway mail service in Peoria, it is now practically assured that the mails will soon be carried on the McKinley lines. Mail compartments will be built into the regular cars if the service is installed. It is reported that the traction company will receive the same compensation paid to steam roads. Parcel-post matter will be carried.

Petition for Exchange of Transfers in Seattle.—Corporation Counsel Bradford, of Seattle, Wash., has been authorized by the City Council to petition the State Public Service Commission for an order directing an exchange of transfers between the Seattle Municipal Railway and the lines of the Puget Sound Traction, Light & Power Company and other systems operating in Seattle. Under its franchise the Puget Sound Traction, Light & Power Company is required to issue and accept transfers to and from the Seattle, Renton & Southern Railway, but the franchise is silent as regards the exchange of transfers with a municipally owned and operated line.

Running Boards a Menace.—On June 9 the Ontario Railway Board decided that the running boards on the cars of the Toronto (Ont.) Railway were a menace to the conductors. The board did not issue an order to compel the company to discontinue their use, but Chairman McIntyre gave the company's representatives a month in which to have plans prepared with a view to rearranging the present cars. R. J. Fleming, general manager of the company, intimated during the hearing that the company might be forced to run closed cars during the summer if the board issued an order prohibiting the running board. He contended that the present cars were not wide enough to permit the installation of cross seats and a center aisle.

Philadelphia Company Announces Prizes in "Safety First" Competition.—Twenty-nine hundred and forty youthful champions of the "safety first" movement, competing for the second series of cash awards offered to school children by the safety bureau of the Philadelphia (Pa.) Rapid Transit Company, have expressed in essay, verse and drawing, a practical code of behavior for the prevention of street accidents. So gratifying has been the spirit with which the young safety conservators have entered the competition that those in charge of the bureau have decided to reward the efforts of 361 competitors. Originally, it was intended to distribute $250 in prizes, but this amount has been doubled. Awards of a first prize of $10; twenty second prizes of $5 each; fifty third prizes of $2 each, and the balance of $290 in prizes of $1 each were announced at the schools on June 10.

New Cleveland Working Schedule Accepted.—The local branch of the Amalgamated Association of Street & Electric Railway Employees at Cleveland has voted to accept the new schedules prepared by representatives of that organization and the officers of the Cleveland Railway. When the vote was taken 1500 members were present. Not an objection was made to the schedules on any of the lines. Under the new arrangements the minimum day will be eight hours, and the men will not be compelled to be at the carhouses so many hours to secure a day's work. If, under the orders of the company, men work less than eight hours they will receive pay for the minimum day. No change will be made in the operation of cars during the rush hours. More men will be required to carry the schedules into effect, however, and Street Railway Commissioner Witt it is expected will advise Council to allow the company the additional funds to meet the increased expense.

Hearing on Arlington Service.—A hearing was held by the Massachusetts Public Service Commission on June 16 on a petition of the town of Arlington for various changes in the methods of handling traffic at the terminals of the Boston Elevated Railway and the Middlesex & Boston Street Railway. The principal request of the petitioners was that a loop be built into or around the carhouse properties of the two roads, which occupy opposite sides of Massachusetts Avenue, in Arlington Heights. H. B. Potter, for the Boston Elevated Railway, opposed the expenditure of more money at this point as the company considered that it has made adequate provision for handling its traffic. George M. Cox, general manager, said that the Middlesex & Boston Street Railway, could not afford to make any changes. With close regulation of traffic by the town police the construction of additional track would be unnecessary. The company was willing to meet its share of this regulation. Chairman McLeod of the commission suggested that the companies endeavor to secure the additional co-operation of the police department as outlined by Mr. Cox and that they return to the commission if no feasible plan is worked out during the summer.

Peculiar Service Conditions in Pittsburgh on July 4.—The Pittsburgh City Council is again demanding that the Pittsburgh Railways issue transfers on July 4 as on other days. For ten years the company has not issued transfers on this holiday. P. N. Jones, general manager of the company, appeared before the Council on June 9. He said the receipts on July 4 were about one-third greater than on average days. An average day was about $30,000. Mr. Jones did not think that any other city with a corresponding population had so many different lines routed direct to the business portion of the city. On July 4 radical changes were made in some of the routes to afford direct service for the people to the parks and other places of amusement. Travel was light during the first half of July 4, but congested during the afternoon and evening, and consequently it would be next to impossible to issue transfers, keep the cars on schedule and avoid confusion, abuse, disputes and possibly disorder. In cases where cars were operated over strictly transfer routes the cars were operated as usual on July 4, but no fare was charged on such cars in either direction. On this account Mr. Jones did not think it was reasonable to ask the company to change a method of operation that had been in effect so long.

Rerouting Plan in Columbus.—The Columbus Railway, Power & Light Company, Columbus, Ohio, has submitted a plan to the City Council for rerouting cars. The Council committee on street railways has invited a public discussion of the plan, with a view to securing an idea as to whether it will meet with the approval of a majority of the people. In connection with this Walter L. Lillie has advised the City Council to repeal that portion of the franchise ordinance requiring the company to sell tickets at the rate of eight for 25 cents and make the rate seven tickets for 25 cents, the difference to be used in the purchase of equipment and in improvements of other kinds. Mr. Lillie said that the city is compelling the company to haul passengers at cost and that it can have no surplus to invest in new tracks or equipment under the provisions of the ordinance. Council should take a liberal view of the matter and broaden the city's development by allowing the company to accumulate funds and carry out a policy of growth. This could be accomplished by reducing the number of tickets to be sold for a quarter. He would have the rate of seven for a quarter continue for two years. If Council should adopt this view of the situation, the company would probably be able to carry out its plans for financing needed extensions and the purchase of additional equipment. This plan has already been explained in the ELECTRIC RAILWAY JOURNAL.

Personal Mention

Mr. Samuel Russell has resigned as general freight and passenger agent of the Northern Electric Railway, Chico, Cal.

Mr. D. W. Houston, heretofore acting superintendent of the Regina (Sask.) Municipal Railway, has been appointed superintendent, vice Mr. H. Doughty, resigned.

Mr. J. R. Wilson, for nine years commercial agent of the Illinois Central Railroad in San Francisco, has been appointed general freight and passenger agent of the Northern Electric Railway, Chico, Cal., to succeed Mr. Samuel Russell.

Drs. Miguel and Teofilo Lacroze, directors of the Lacroze Tramways Company, Argentina, sailed recently on a visit to Europe and America to study the subway and electric railway systems, in connection with the proposals of the Lacroze Company to extend its system.

Gen. George H. Harries, president of the Louisville (Ky.) Gas & Electric Company, was given the degree of doctor of laws by the State University of Kentucky at Lexington on June 4. Governor McCreary of Kentucky is chairman of the board of trustees of the university.

Mr. J. W. Ground, Kansas City, Mo., a director of the Joplin & Pittsburgh Railway, has been elected vice-president of that company. Mr. Ground succeeded Mr. W. W. Calhoon, who died shortly after the last annual meeting. The vacancy on the board of directors created by Mr. Calhoon's death was filled by the election of Mr. J. F. Harrison, Carthage, Mo.

Mr. F. A. Nichols, who has been appointed manager of the East Liverpool Traction & Light Company, East Liverpool, Ohio, was graduated from the State University of Kansas in 1902. He entered business with the General Electric Company in its testing department and spent four years with the company in various capacities. He then entered the employ of the International Railway, Buffalo, N. Y., with which he served for eight years in the electrical department. The last four years that he was with the International Railway Mr. Nichols was electrical engineer of the company.

Mr. G. A. McCarthy has been appointed engineer of the railway and bridge section of the works department of the city of Toronto to succeed Mr. C. W. Power. The section of the works department to which Mr. McCarthy has been appointed is responsible for the operation of the electric railway lines owned by the city. Mr. McCarthy was graduated from McGill University. For seven years he was in the engineering department of the Intercolonial Railway. He was also employed for a time by the Canadian Pacific Railway and was assistant chief engineer of the Algoma Central Railway. He was connected with power development work at Niagara Falls, and from 1905 to 1909 was chief engineer of the Timiskaming & Northern Ontario Railway. From 1909 to 1912 he was with a private firm of engineers in Toronto. He has recently been employed on the Feather River power development in California.

OBITUARY

Walter E. Read, electrical engineer and master mechanic for the Ogden (Utah) Rapid Transit Company, was killed and two companions were injured in an automobile accident in Ogden Canyon on May 31. For many years Mr. Read was connected with the old Salt Lake City Railway, of which his father was superintendent. He was thirty-seven years old.

Peter C. Dolan, for many years active in electric railway work in western Massachusetts and in Connecticut, died at Pittsfield, Mass., on June 12. Mr. Dolan was born in Ireland on Nov. 9, 1855, and came to this country when seven years old with his parents, who settled near New Britain, Conn. When Peter C. Dolan was twenty-two he and his brother Patrick H. Dolan bought a controlling interest in the horse railway at New Britain. In 1891 they sold the New Britain property and in June, 1892, bought a controlling interest in the Pittsfield Street Railroad, a 3-mile line which had just been equipped with electricity. The road has been steadily enlarged and is now included in the Berkshire Street Railway with 110 miles of line. In 1902 the brothers bought the Hoosac Valley Street Railway. This property they sold in 1906 to the New York, New Haven & Hartford Railroad. In January, 1908, Peter C. Dolan was elected president of the Pittsfield Street Railway, of which he had previously been general manager. Following the death of his brother in 1909 Peter C. Dolan sold the Pittsfield property to the New England Investment & Security Company and retired from business.

James Campbell, chairman of the board of directors of the North American Company, New York, died at Greenwich, Conn., on June 12 at the age of sixty-seven years. Mr. Campbell was born in Ireland and was brought to America by his parents when he was two years old. He was educated in the public schools at Wheeling, W. Va., and entered business in 1859 when he was eleven years old. During the Civil War he was attached to the staff of Gen. John C. Fremont as a messenger. Later General Fremont placed Mr. Campbell in the engineering department of the Southwest Pacific Railroad. He was subsequently appointed chief engineer of the Kansas City, Missouri & Mobile Railroad, which later became a part of the Frisco system. In 1877 Mr. Campbell opened an office as a broker in St. Louis. He became interested in public utility properties and was identified with the electric railways in St. Louis and with public utilities elsewhere. In addition to being chairman of the board of the North American Company Mr. Campbell was at the time of his death a director of the Utah Utilities Company, the National Bank of Commerce of St. Louis, the Mercantile Trust Company of St. Louis, the Southwestern Telegraph & Telephone Company and numerous other public utility companies.

Thomas Dolan, formerly president of the United Gas & Improvement Company, Philadelphia, Pa., and for many years a commanding figure in the financial and business activities there, died on June 12 at Torresdale, Pa., at the age of seventy-nine years. Mr. Dolan was for many years identified with the Whitney-Widener-Elkins street railway syndicate. He was born in Montgomery County in October, 1834, and was educated in the common schools of that county. He became a clerk in a retail dry goods store in Philadelphia. During the depression incident to the Civil War the firm with which Mr. Dolan was connected failed and he embarked in the knit goods manufacturing business in 1861 on his own account. This business subsequently became the prosperous Keystone Knitting Mills. Mr. Dolan is credited with being one of the organizers of the Brush Electric Company. In 1892, five years before his retirement from the manufacturing field, Mr. Dolan was offered the presidency of the United Gas Improvement Company. In the meantime he had become identified with street railway development in Philadelphia, in connection with P. A. B. Widener and the late William L. Elkins. These men formed the Philadelphia Traction Company and subsequently took over the holdings of the Welsh syndicate in the Philadelphia Union Traction Company. Later the organization of the Philadelphia Rapid Transit Company, as the successor to the separate companies, was brought about. Mr. Dolan was one of the participants in the syndicate which negotiated all these deals. He was also associated with Mr. Elkins, Mr. Widener and William C. Whitney in the Metropolitan Street Railway, New York, and in many of their other operations. On March 16, 1912, Mr. Dolan resigned from the presidency of the United Gas & Improvement Company.

Propelled by energy from a battery of primary cells carried on a flat-car following it, one of the street cars of the Wichita Falls (Tex.) Traction Company was recently operated through the streets of the city without trolley connection or other source of supply. The battery used employs carbon and zinc with a secret solution which, like the zinc, must be renewed at intervals. Julius J. Krohn and John McGivney are the inventors. On its trial trip the car carried thirty-five persons, but had to be helped over some of the grades by a trolley car.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Aurora, Plainfield & Joliet Railroad, Joliet, Ill.**—Incorporated in Illinois to operate an electric railway from Aurora to Plainfield and Joliet. The line originally constructed and operated by the Joliet, Plainfield & Aurora Railroad Company and sold to the Joliet & Southern Traction Company will be used by the new corporation as well as the line formally owned and constructed by the Joliet & Southern Company. Capital stock, $25,000. Incorporators and first board of directors: W. A. S. Mulligan, J. C. Hauronic, Robert Oehmig, O. P. Steward and Frank P. Page.

***International Suburban Railway, Windsor, Ont.**—Application is being made to the Canadian Government for the incorporation of this company with power to build a railway in Essex and Kent Counties, Ont., and to connect the same by ferry or tunnel across the Detroit River, with Detroit, Mich., and to use gasoline, steam or other motive power for operation. The lines specified in the application would extend from Ojibway through Sandwich, Windsor, Walkerville and Ford City to Belle River, and thence easterly to Chatham, and from Ojibway southwesterly to Amherstburg. Rodd, Wigle & McHugh, Windsor, Ont., are solicitors for applicants.

***Pier Railway, Port Arthur, Tex.**—Incorporated in Texas to build electric railways in Port Arthur. Capital stock, $60,000. Incorporators: K. M. Smith, J. W. Williams and C. N. Bosler.

***Parkersburg Railroad & Terminal Company, Parkersburg, W. Va.**—Incorporated in West Virginia to build an electric or steam railway in Parkersburg. Capital stock, $10,000. Incorporators: K. B. Stephenson, C. B. Kefauver, E. H. Watson, H. D. Archer and R. C. Stapleton, all of Parkersburg.

FRANCHISES

***Los Angeles, Cal.**—The Joseph Ball Company has asked the Council for a franchise to build a municipally owned suspended monorail electric system for the city of Los Angeles.

East Hartford, Conn.—The Connecticut Company has asked the Public Utilities Commission for the approval of the method of construction of its tracks on Burnside Avenue in East Hartford.

Lafayette, Ind.—O. L. Brown, Indianapolis, representing the Lafayette & Northwestern Traction Company has asked the County Commissioners for a franchise through Jasper County. This line will connect Kankakee, Wolcott, Rensselaer, Brook and Morocco. [E. R. J., May 23, '14.]

***Transcona, Man.**—J. H. Kern, Moose Jaw, Sask., has received from the Council a franchise for an electric railway in Transcona. The agreement calls for the completion of the following line by October: From the Nairn Road to King Street, thence north to Regent Avenue, or to Transcona and to Leola Street and Oxford Street, thence north to Stafford Avenue, about 6 miles. The Council had been in negotiation with the Winnipeg Electric Railway relative to the building of such a line, but withdrew from the negotiations upon the question of the cost of subways.

Stonewall, Man.—The Winnipeg Electric Railway has received an extension of time on its franchise until Nov. 15 from the Councils in Stonewall and in Rockwood, in which to complete the line to Stonewall. The City Council of Winnipeg has authorized the construction of a loop on Portage, Clifton, Spruce and Classic Streets in Winnipeg. This is a temporary line, pending the construction of a modern subway.

Keansburg, N. J.—The Jersey Central Traction Company has received a fifty-year franchise from the Council for an extension of its present lines from Palmer Avenue, Keansburg, down Carr Avenue to the landing of the Keansburg Steamboat Company.

Newark, N. J.—The Public Service Railway has asked the Council for five franchises to extend and double-track some of its lines in Newark.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise on Tracy Street to connect the Grant line at West Avenue with the Elmwood and Hoyt Street lines in South Elmwood Avenue in Buffalo.

Sydney, N. S.—The City Council has authorized its officials to sign a supplementary agreement with the Cape Breton Electric Company respecting the construction of the extension from Sydney to New Waterford.

Lancaster, Ohio.—The Lancaster Traction & Power Company has received a twenty-five-year franchise from the Council to extend several of its lines in Lancaster.

Hamilton, Ont.—The Hamilton Street Railway has received a franchise from the Wentworth County Council to build a line on Main Street between Ottawa Street and Kenilworth Avenue, Hamilton.

Ottawa, Ont.—The Western Central Railway Company's application for an extension of time for construction and for increased powers was withdrawn from further consideration before the railway committee of the House of Commons. The company has power to build electric lines from London to Windsor, from London to Toronto and branches to Woodstock, Stratford and other points in Ontario. [E. R. J., May 16, '14.]

Astoria, Ore.—The Pacific Power & Light Company has received a franchise from the Council to extend its lines in Astoria to Alderbrook and into Taylor's Astoria.

Grove City, Pa.—Thomas H. Greer, Butler, representing the Northwestern Pennsylvania Traction Company, has received a franchise from the Council for a line through Grove City.

Charleston, S. C.—The Charleston Consolidated Railway, Gas & Lighting Company has asked the Council for a franchise for a right-of-way through Chicora Park, North Charleston.

Dallas, Tex.—O. S. Thomas, Dallas, has asked the County Commissioners for a fifty-year franchise to build a double-tracked electric line over Atkins Boulevard to the Southern Methodist University in Dallas.

Orange, Tex.—Augustus M. Hodges, C. E. McKee and C. F. Smythe, Orange, have received a franchise from the Council to build an electric railway over certain streets in Orange. [E. R. J., May 30, '14.]

***Casper, Wyo.**—John B. Fleming has received a twenty-five-year franchise from the Council to build an electric railway in Casper.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has received a franchise from the Council in Seattle for an extension on Ravenna Boulevard. The company has asked the Council for a franchise for an extension on Avalon Way from West Spokane Street to the junction of West Alaska Street and Twenty-ninth Street in Seattle.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—An extension from Ensley to Wylam is being planned by this company.

Mobile & Baldwin County Railroad, Mobile, Ala.—During the next four weeks this company expects to purchase rails for an extension. The first section of this line has been completed, and within the next sixty days a 5-mile extension will also be completed. This line will eventually connect Mobile, Bay Minette, Blakely, Volanta, Fairhope, Yerkon, Magnolia Elberta and Pensacola.

***Medicine Hat, Alta.**—Estimates are being prepared by the City Council for the building of an electric line along Ansley Spur to the West Industrial site, a distance of 3½ miles, to handle products and supplies from the various factories.

***Tucson, Ariz.**—A company is being formed to build an electric railway to extend from Stone Street and University Street in Tucson across Bronx Park and out to Pastime Park, a distance of 13 miles. This railway will be independent of the Tucson Rapid Transit Company. No names are yet given of those interested in the new company.

Northern Electric Railway, Chico, Cal.—Work has been begun by this company on its extension to North Sacramento, 1½ miles.

Fresno (Cal.) Interurban Railway.—This company has been granted authority from the State Railroad Commission to issue $120,000 in bonds and $60,000 in stock to build an electric railway from Fresno to Clovis, 9 miles. This line will connect in Fresno with the lines of the Fresno Traction Company. J. B. Rogers, Fresno, president. [E. R. J., June 6, '14.]

***Los Angeles, Cal.**—Proposals for the city to build a suspended electric monorail railroad system, which would require a bond issue of $7,000,000 to finance, were filed with the Council recently by the Joseph Ball Company.

San Francisco-Oakland Terminal Railway, Oakland, Cal.—This company is asked to extend its main line through Castro Valley in the near future.

Sacramento Valley West Side Electric Railway, Willows, Cal.—About 3 miles of track has been laid on the first unit of this railway from the junction with the Oakland, Antioch & Eastern Railway to Dixon, and the grading has been completed to the city limits of Dixon. Rails are being laid from the south towards Dixon. With the completion of the bridge, track laying on the remaining 8 miles will progress rapidly. The work so far has been delayed by the building of culverts and small bridges. [E. R. J., May 16, '14.]

Jacksonville (Fla.) Traction Company.—Extensive improvements and betterments generally are being planned by this company on the line out North Main Street and in the East Springfield section of Jacksonville.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Grading has been completed by this company from South Jacksonville a distance of 6 miles and plans are being made to build a new bridge to cross the bay from North Beach. This is part of a plan to build an electric railway from South Jacksonville to Beach Junction, Diego, Pablo Beach and St. Augustine. Thomas R. Osmond, St. Augustine, general manager. [E. R. J., March 28, '14.]

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—A 2-mile extension from O'Dowd's corner in Augusta to Aumond is being planned by this company.

La Salle County Electric Railway, Chicago, Ill.—Work has been resumed by this company on its line between Ottawa and Mendota. W. C. Vittum is interested.

Chicago, Peoria & Quincy Traction Company, Quincy, Ill.—Citizens of Dalzell have petitioned this company to build a line to Dalzell. This railway will connect Chicago, Peoria and Quincy. [E. R. J., June 6, '14.]

Union Traction Company of Indiana, Anderson, Ind.—Surveys and plans of proposed changes in bridges are being made by this company in Anderson.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—This company has placed in operation its line between Kansas City and Bonner Springs. Ultimately this line will be extended to Topeka. J. D. Waters, Bonner Springs, president. [E. R. J., May 2, '14.]

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—The entire right-of-way has been purchased by this company for its line through Stony Mountain. Grading will be begun at once.

Transcona, Man.—In connection with the proposed electric railway in Transcona press reports state that negotiations are in progress with the Canadian Northern Railway, which, if completed successfully, will result in the electrification of a portion of the Dundee branch, with which connection would be made by the extension of the present Winnipeg Electric Railway line running through St. Boniface to the Dawson Road. To carry out this project, about 3 miles of the Canadian Northern Railway branch would be electrified. An alternative proposal is for the building of a special track for an electric railway on the Canadian Northern Railway right-of-way for 3 miles.

Boston (Mass.) Elevated Railway.—A new line has been placed in operation by this company from Eighth Street in East Cambridge, to North Point, Marine Park, South Boston, via the Charles River Dam, Park Square and Summer Street Extension.

Detroit (Mich.) United Railway.—This company has agreed to construct a line into the Fourth Ward over the route to extend out West Court Street in Detroit. The company is asked to consider plans to extend the crosstown line from Mount Elliott Avenue, the present terminus, to Cadillac Avenue in Detroit.

Electric Short Line Railroad, Minneapolis, Minn.—This company has awarded a contract to the Roufs & Pfleghaar Company for grading the section of its line between Watertown and Winsted.

St. Paul, Minn.—A. Guthrie & Company, 391 Endicott Building, closed a contract recently with the Board of Regents of the University of Minnesota for work on the electric line which is to connect the agricultural college campus with the main campus. The line in reaching the main campus will extend up Fourth Street to Seventeenth Avenue southeast, run in front of the armory to a "Y" in the rear of the electrical engineering building. At the agricultural college end the line will begin at the Belt line bridge and take a straight course to the plaza in front of the administration building of the university farm. For the intervening distance the lines of the St. Paul City Railway will be used. An appropriation of $60,000 made by the last Legislature will cover the cost of construction and equipment. Arrangements also will be made for the hauling of freight. [E. R. J., May 16, '14.]

***Fulton, Mo.**—F. S. Mordaunt, Chicago, representing capitalists of that city, spent a week at Fulton, Mo., recently to ascertain the possibilities for an electric line from Fulton to Montgomery City, where it would connect with the main line of the Wabash Railroad between Kansas City and St. Louis. He also contemplates an extension of the line to Columbia, with a city system there, and an extension to Jefferson City.

Keyport & Matawan Street Railroad, Keyport, N. J.—A new roadbed and new rails will be laid from Walnut Street at Keyport to West Keyport by this company.

Long Island Electric Railway, New York, N. Y.—This company has been ordered by the Public Service Commission, First District, to double-track its line in New York Avenue between South Street and Farmers Avenue, Borough of Queens. That part of the additional trackage between South Street and Oak Street must be constructed immediately, or at the same time as the paving of that portion of New York Avenue is done; and between Oak Street and Farmers Avenue the additional tracks must be constructed within 18 months from July 1 next, or at the same time that the paving of this part of the avenue is done, provided it is done before the expiration of 18 months.

Port Jervis Electric Light, Power, Gas & Railroad Company, Port Jervis, N. Y.—Plans are being made by this company to extend its line to Milford, Pa.

Cleveland (Ohio) Railway.—This company is asked to extend the East Seventy-ninth Street line in Cleveland to Kinsman Road, S. E.

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—This company has received the approval of the State Public Utilities Commission to finance the proposed electric railway from Chardon to Jefferson, 10 miles. The company has been given authority to issue $400,000 of 5 per cent bonds and $300,000 common stock. [E. R. J., May 9, '14.]

Cleveland, Youngstown & Eastern Railway, Cleveland, Ohio.—Plans are being considered by this company to rebuild the greater part of its railway. New rails are ordered for nearly the entire line, and 75 per cent of the ties will be replaced with new ones. About half the bridges must be made that amount to new construction.

Tri-State Railways, Toledo, Ohio.—Right-of-way has been secured and surveys are being made by this company on its line between Hillsdale, Mich., and Pioneer, Ohio. The main line will extend from Elkhart to Adrian and connect there with the lines of the Toledo & Western Railroad for Toledo. A branch from Adrian to Jackson, which will connect several lake resorts in Lenawee and Jackson Counties, also is planned. Miles T. Davis, Hillsdale, is interested. [E. R. J., Oct. 14, '14.]

Portland & Oregon City Railway, Portland, Ore.—Right-of-way has been secured by this company on its 25-mile line from Portland to Viola and other suburban points to the southeast. This line will also extend through Clackamas Station, Stone and Logan.

***Lancaster & Berks Railway, Lancaster, Pa.**—The Public Service Commission has approved this company's petitions for certificates of public convenience and necessity to build this electric railway in Lancaster.

Scranton & Binghamton Traction Company, Scranton, Pa.—Plans are being made by this company to double track the line from Scranton, where the city line terminates, to Factoryville.

Rhode Island Company, Providence, R. I.—Tracks are being laid by this company on the new Franklin Street extension in Providence.

Regina (Sask.) Municipal Railway.—The following contracts for electric railway material have been awarded by the City Council: United States Steel Products Company, Winnipeg, for 100 tons 7-in. steel tee rails and specials; Canada Cement Company, Winnipeg, 9000 bbls. Portland cement; Northern Electric & Manufacturing Company, Winnipeg, 2 miles trolley wire; Ohio Brass Company, trolley wire and fixtures; General Railway Signal Company, Winnipeg, interlocking plants.

Saskatoon (Sask.) Municipal Railway.—The ratepayers have voted in favor of a by-law to raise $25,000 for extensions to the municipal railway, and to raise $55,000 to reconstruct a portion of the Long Hill. This latter work is being undertaken in view of the early construction of an extension of the municipal railway.

North Anderson Street Railway, Anderson, S. C.—A 5-mile extension is being built by this company to Brown Park.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Work will be begun at once by this company on the extension of its Vance Avenue line to Highland Park.

Middle Tennessee Traction Company, Franklin, Tenn.—Preliminary arrangements are being made by this company to begin the construction of this line in the near future. It will connect Franklin, Columbia, Shelbyville, Fayetteville and College Grove. [E. R. J., May 16, '14.]

Nashville Railway & Light Company, Nashville, Tenn.—Extensive improvements are being planned by this company in Nashville.

Clarksville, Tex.—Financial arrangements are being made to build an electric railway between Clarksville and Texarkana.

Fort Worth Southern Traction Company, Fort Worth, Tex.—This company, recently acquired by the Stone & Webster Corporation, Boston, Mass., has filed amended articles of incorporation, changing the name to the Tarrant County Traction Company and increasing the capitalization from $1,500,000 to $2,500,000. George H. Clifford, Fort Worth, general manager.

McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.—Fred A. Jones, Dallas, Tex., who has the contract to make surveys for this railway, has selected Blue Ridge as the point to be touched between McKinney and Bonham. [E. R. J., June 6, '14.]

Southwestern Traction Company, Temple, Tex.—Work will be begun in a short time by this company on a line from Waco to Austin.

Ogden (Utah) Rapid Transit Company.—Contracts have been awarded by this company for all the material for the construction and operation of its extensions in Cache Valley north and south from Logan. Much of the material for the Hermitage-Idlewild extension has also been awarded. Surveys have been completed and contracts for grading will soon be awarded.

***Seattle, Wash.**—The City Council has voted to issue $500,000 in public utility bonds to be used with a like amount in general bonds recently authorized to build 8 miles of municipal electric railway through Rainier Valley. The route of the proposed line parallels the line of the Seattle, Renton & Southern Railroad.

SHOPS AND BUILDINGS

Mobile & Baldwin County Railroad, Mobile, Ala.—This company has completed its new passenger station at East Fairhope.

Springfield (Mass.) Street Railway.—This company is asked to consider plans to build a new passenger station in Mittineague.

Twin City Rapid Transit Company, Minneapolis, Minn.—A new carhouse will soon be erected by this company at Washington Avenue, north, in Minneapolis. The cost is estimated to be about $75,000.

Public Service Railway, Newark, N. J.—This company has awarded a contract to build the foundation and connecting subway of the new terminal in Park Place, Newark, to Holbrook, Cabot & Rollins Corporation, New York.

Hudson Valley Railway, Glen Falls, N. Y.—A new passenger station will be built by this company at Broadway and Congress Street in Saratoga.

POWER HOUSES AND SUBSTATIONS

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company has contracted with the Babcock & Wilcox Company for furnishing and installing two 450-hp boilers in the existing station, making the total capacity 4900 hp at normal rating. The company has also contracted with the Westinghouse Machine Company for the improved type of Roney stokers to be installed under the new boilers, as well as in connection with the present boiler equipment. It is planned to set these latter stokers 3 ft. from the old setting, thus increasing materially the combustion chambers. Sargent & Lundy, Chicago, are the engineers.

Iowa Railway & Light Company, Cedar Rapids, Ia.—Announcement was recently made of the approval of plans for the enlargement and partial rebuilding of this company's gas and electrical plants in Cedar Rapids. These improvements include the construction of a new building for the gas plant and the tearing down and rebuilding of the boiler room of the electric plant and the equipment of both with new machinery. The work of enlarging and rebuilding the power plant will be begun in July. The estimated cost is about $50,000.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—Plans are being made by this company to build a new substation at Stony Mountain. The contract for the construction of this building will be awarded as soon as the location is decided.

Berkshire Street Railway, Pittsfield, Mass.—This company is building a new substation at Otis.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company will add to its substation equipment a 500-kw motor generator set, switchbord and accessories. The order for the apparatus has been placed with the General Electric Company.

Port Jervis Electric Light, Power, Gas & Railroad Company, Port Jervis, N. Y.—This company has recently bought a site in Middletown on which it plans to build a new power house. The cost is estimated at about $150,000.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company has purchased for one of its substations a 1120-kw motor-generator set and switchboard. The apparatus was purchased from the General Electric Company.

London & Lake Erie Railway & Transportation Company, London, Ont.—This company's steam power plant at London has been overhauled and put into condition for use as an auxiliary plant during the summer. Steam will be kept up, so that in case of a breakdown of the hydroelectric power plant at any time the service will not be interrupted for more than a very short time.

Ottawa (Ont.) Electric Railway.—The equipment of a new steam auxiliary power plant on Middle Street is being installed, consisting of three Babcock and Wilcox water tube, marine type boilers, with chain feed stokers, and a 4000-hp steam turbine.

Beaumont Electric Light & Power Company, Beaumont, Tex.—This company will add to its substation equipment a 700-kva motor-generator set and has ordered the machine from the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Mobile & Baldwin County Railroad, Mobile, Ala., expects to purchase within a month one additional gas electric car.

Batavia (N. Y.) Traction Company has ordered four single-truck cars from the G. C. Kuhlman Car Company.

Mahoning & Shenango Railway, Youngstown, Ohio, has ordered from the Standard Steel Car Company twenty new steel street cars to cost about $7,000 each.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 25, 1914, as expecting to purchase two passenger cars, has ordered these cars from the Pullman Car Company.

Interborough Rapid Transit Company, New York, N. Y., is reported to be preparing plans for a new design of steel trailer car in anticipation of the expected third tracking of its elevated system.

Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has ordered two 55-ft. passenger cars from the Tillsonburg Electric Car Company, Tillsonburg, Ont.

Moncton Tramways, Electricity and Gas Company, Ltd., Moncton, N. B., is considering the purchase of three single-truck cars and one double-truck car during this year.

Regina (Sask.) Municipal Railway.—This railway has indefinitely postponed the proposed purchase of four double-truck cars, tenders on which were invited recently, as noted in the ELECTRIC RAILWAY JOURNAL of May 16, 1914.

Port Arthur (Ont.) Street Railway has received three single-truck car bodies, mounted on Brill 21-E trucks, 8 ft. wheelbase, from the Preston Car & Coach Company. The cars are being equipped at the railway shops at Port Arthur.

New Orleans Railway & Light Company, New Orleans, La., noted in the ELECTRIC RAILWAY JOURNAL of June 6 as having issued specifications for fifty new city cars, has ordered these cars from the Southern Car Company. The cars will be equipped with Brill 39-E trucks. The total weight of the car will be 35,000 lb., car body, only, 16,000 lb. Orders have not yet been placed for the electrical equipment or air brakes. The builders are to commence delivery about Oct. 1, 1914.

Walla Walla Valley Railway, Walla Walla, Wash., has ordered one 41-ft. 4-in. combination electric locomotive and express car from the Russell Car & Snow Plow Company. This car will be used chiefly to handle less than car-load fruit shipments. The car will be equipped with four GE 55-H motors. Tractive effort per motor will be 16,400 lb., maximum tractive effort at starting, 25,000 lb. Control will be Type M. Other dimensions are: Length over car body, 34 ft.; length of open end platform, 3 ft.; width over all, 9 ft.

Union Electric Company, Dubuque, Ia., has specified the following details for the six prepayment closed cars which are being built by the American Car Company:

Seating capacity	40
Bolster centers, length,	18 ft. 4 in.
Length of body	27 ft. 4 in.
Length over vestibule	41 ft.
Width over sills	8 ft.
Width over all	8 ft. 2 in.
Height, rail to sills,	32⅜ in.
Height, sill to trolley base,	8 ft. 8½ in.
Body	wood
Roof	plain arch
Underframe	metal
Air brakes	G. E.
Axles	Brill
Bumpers	⅜ x 6-in. plate
Cables	G. E.
Car trimmings	Brill
Control	G. E.
Couplers	Am. Car Co.
Curtain fixtures,	Cur. Sup. Co.
Curtain material	Pantasote
Fare boxes	Johnson
Wheelguards	H. B.
Gears and pinions	G. E.
Gongs	Elec. Ser. Sup. Co.
Hand brakes,	Am. Car Co. and Peacock
Weights	Consol.
Headlights	Esterline
Journal boxes	Brill
Motors	2 G. E. No. 203 outside hung
Paint	Am. Car. Co.
Registers	International
Sanders	Elec. Ser. Sup. Co.
Sash fixtures,	Dayton and O. M. Edwards
Seats	Brill winner
Seating material	rattan
Springs	Brill
Step treads	Universal
Trolley catchers	O. B.
Trucks	Brill 39-E
Varnish	Murphy
Ventilators	Brill exhaust

Manhattan Bridge Three-Cent Fare Line, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 11 as having ordered six semi-convertible, prepayment cars from the Southern Car Company, has specified the followings details for this equipment:

Seating capacity	48
Weight (car body only),	16,500 lb.
Bolster centers	21 ft.
Length of body	33 ft. 3 in.
Length over vestibule,	43 ft. 6½ in.
Width over sills	8 ft. 4 in.
Height, rail to sills,	30¾ in.
Height, sill to trolley base,	8 ft. 7 in.
Body	composite
Interior trim	cherry
Headlining	Nevasplit
Roof	arched
Underframe	composite
Air brakes	West.
Axles	Baldwin
Bumpers	Hedley
Cables	West.
Car trimmings	Wallace
Control	H. L.
Curtain fixtures,	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Fenders	H. B.
Gears and pinions	Bliss
Gongs	Wallace
Hand brakes	Peacock
Heaters	Consol.
Headlights	Esterline
Journal boxes	Symington
Motors	2 West. 323-A, inside hung
Paint	Devoe & Reynolds
Registers	International
Sash fixtures	Wallace
Seats	Hey. & Wake.
Seating material	rattan
Springs	Ry. Steel Spring
Step treads	Mason
Trolley base	Nuttall
Trucks,	Baldwin 54-18 M L-2
Varnish	Devoe & Reynolds
Ventilators	Railway Utility
Wheels	Standard Steel & Star special

TRADE NOTES

National Steel Rail Company, St. Louis, Mo., has purchased from the Chicago & Alton Railroad seventy track miles of 60, 70 and 80 lb. section relaying steel T-rails. The purchase was a cash transaction. It is understood that part of these rails are sold to an interurban line in the Southwest.

Curtain Supply Company, Chicago, Ill., has received orders to equip with its Ring-89 fixtures and Rex rollers twenty-five cars of the Third Avenue Railway, one car of the Binghamton (N. Y.) Railway, three cars of the Washington, Baltimore & Annapolis Electric Railway, and six cars of the Jamestown, Westfield & Northwestern Electric Railway.

Terry Steam Turbine Company, Hartford, Conn., announces that it has just finished one of the largest months in its history in the point of orders received, in spite of the prevailing dull conditions reported by many manufacturers. In order to properly take care of this business and possible additional business extra machine tools have been installed, increasing the capacity of its plant approximately 25 per cent.

Westinghouse Machine Company, East Pittsburgh, Pa., has appointed W. A. Bole as vice-president in charge of production and erection, a new position. Mr. Bole has since 1882 been in the employ of this company successively in the positions of general shop foreman, superintendent, manager of works and consulting engineer. He will have charge of the plants at East Pittsburgh and Trafford City.

Julius Andrae & Sons Company, Milwaukee, Wis., manufacturer and dealer in electrical supplies, has appointed L. W. Orear in charge of its engineering department. Mr. Orear, who graduated from the electrical engineering department of the Missouri State University in 1900, was for many years connected with the United States Steel Corporation and later with the Jones & Laughlin Steel Works and the Lehigh Portland Cement Works, at New Castle, Pa.

National Brake Company, Buffalo, N. Y., has received an order to equip with Ackley adjustable brakes the eighty-five new cars which have been ordered by the United Railways & Electric Company from The J. G. Brill Company. This item is a correction of an unavoidable error which appeared in the specifications for these cars in the ELECTRIC RAILWAY JOURNAL of May 9. Since the year 1904 every car purchased by this railway has been equipped with brakes made by the above company.

H. Scholey, of the firm of Scholey & Company, Ltd., London, England, is at present paying a visit to the United

States, and his headquarters for a short time will be The Engineers' Club, New York, N. Y. Scholey & Company represent a number of American specialties in England, and have a valuable connection among the various municipalities operating stations both for electric lighting and tramways, and among the various electric-lighting and electric-tramway companies. They have also a valuable connection among the electric railway companies now in existence in England, and have been particularly successful recently in securing orders for Tool Steel gears for various electrification schemes now being carried out.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., owing to the increased activities of its railway and lighting department in connection with the work of railroad electrification and heavy power house apparatus, has created the positions of assistant managers of this department. E. P. Dillon and M. B. Lambert have been appointed to these positions. Mr. Dillon will have charge of the commercial activities of the company in connection with the generation and distribution of power, involving power house, substations, transformer stations and similar apparatus. Mr. Lambert will have charge of all sales work pertaining to electric traction, including steam, interurban and city railway propositions. Both Mr. Dillon and Mr. Lambert have been connected with the railway and lighting department of this company for a number of years and are widely known in the electrical field.

ADVERTISING LITERATURE

Nichols-Lintern Company, Cleveland, Ohio, has issued a bulletin describing its pneumatic sand traps, sander valves, sand hoppers and accessories.

Holland Manufacturing Company, Erie, Pa., has issued Catalog No. 22 describing its various kinds of devices and tools for use in electric railway shops.

Lumen Bearing Company, Buffalo, N. Y., manufacturer of autobronze sticks and bushings, has issued a leaflet which gives a review of the prices of non-ferrous metal for May, 1914.

General Railway Signal Company, Rochester, N. Y., has issued Catalog Section B, Part 3, which gives detailed data on its mechanically operated train order signals. Part 6 gives data on its table and wall lever stands.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34-C describing its class H-SG and N-SO pneumatic gasoline and fuel oil engine driven compressors for use with rock drills and pneumatic tools. Another leaflet describes its "Giant" fuel oil and gas engines for all power purposes.

Westinghouse Electric & Manufacturing Company, East Pittsburgh Pa., has issued its *Westinghouse Railway Data Exchange* No. 8, which deals with the efficient use of cars, giving considerable data as to the relative cost of operation of different systems. The cost of stops is also treated and some interesting data in dollars and cents given as to the cost of different lines.

Whitman & Barnes Manufacturing Company, Akron, Ohio, has issued its new machinists' supply catalog No. 82, which describes and illustrates its complete line of twist drills and reamers, drop forged and screw wrenches, spring cotters and other machinists' supplies. The catalog also contains numerous tables of speeds and feeds, decimal equivalents, and rules for proper grinding and ordering.

Canadian Consolidated Rubber Company, Ltd., Montreal, Que., has issued Catalog A which describes and illustrates its general line of mechanical rubber goods, most of which is adapted for electric railway use. Among the products described are belting, hose for every special use, including air brake and fire hose, packing and gaskets. The company has also issued a Catalog F, which describes its line of textile goods.

Wasson Engineering & Supply Company, Milwaukee, Wis., has issued a catalog explaining the method of operation of its air retrieving trolley, which was described in an illustrated article in the ELECTRIC RAILWAY JOURNAL of June 6. Views are shown of standard cars of the Milwaukee & Northern Railway, Pacific Electric Railway and Chicago & Milwaukee Electric Railroad, equipped with the air-retrieving trolley base.

Williams, Dunbar & Coleman, New York, have issued a booklet entitled "Short Stories of Public Utilities." The booklet is prefaced by a brief sketch of the growth of public utilities, and contains general descriptions and financial statistics of the American Light & Traction Company, Cities Service Company, Denver Gas & Electric Company, Utah Securities Corporation, Tennessee Power Company and Denver Gas & Electric Light Company.

Manganese Track Society and the Manganese Steel Foundries Society have just issued their book of standards No. 2. In this book the joint standardization committee of the two societies, whose membership includes the principal manufacturers of steam and electric railroad special work in this country, presents what in its opinion constitutes the best practice in regard to the design of manganese steel crossings for steam railroads. Drawings of ten types of crossings are shown as being those best suited to the different angles and varying conditions in steam-railroad layouts.

Electric Service Supplies Company, Philadelphia, Pa., has issued the 1914 edition of its catalog on protected rail bonds and appliances. This book consists of 72 pages and covers the subject of rail bonding in its entirety. The illustrations, besides showing the many different types of bonds, show clearly the value of proper installation, the importance of accurate testing apparatus and the use of bond compressors. The section of the catalog describing and illustrating the methods of installing rail bonds enters into the subject in detail and shows graphically the importance of assuring a perfect moisture-proof contact between the bond and the rail.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 41,302 which covers the complete line of its standard polyphase induction motors. The characteristics of the different forms of these motors are analytically described, and the windings used for various classes of service are shown. The illustrations show in detail the construction of the component parts of the motors and describes the various types of compensators and control apparatus required. The illustrations are keyed by suitable letters to a list of parts to facilitate ordering. Bulletin No. 46,201 describes Type I-14 single-phase watt-hour meters of low capacity, 5 to 25 amp. Bulletin No. 43,402 describes systems of lighting in machine shops.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a very clever folder inviting everybody to attend the June meeting of the Central Electric Railway Association at Toledo, Ohio. The written composition is ingenious in that it is a play on the names of the various members of the association, telling why all should attend and what is on the program. The closing paragraph is as follows: "This bulletin issued in light vein is for a C.E.R.A.ious purpose. We want a big meetin' and it's goin' to be one. So put away your hammer, dust off yer pass book, send yer best string tie to the laundry and come with us because the summer meetin's in Toledo on the 25 and 26 and there won't be anybody anywhere else on them two days but the crossin' flagman, and he's on the job for 'Safety First' and can't be with Drew."

H. A. Strauss Data-Card Service Company, Chicago, Ill., has issued an announcement and sample cards of its data card service, which is conducted by subscription. At least four cards every fortnight are mailed to the subscriber. These cards contain data taken from actual practice. The range of subjects covers the entire field of engineering. The cards are designed to furnish concise, accurate and reliable predigested information for the engineer who is suddenly called upon to write a specification, report on an engineering project, post himself for a conference or advise himself in general upon the subjects treated on the cards. Among various kinds of information supplied is that relating to interurban railways. One card shows unit operating data compiled from an analysis of fifty typical interurban electric railways, together with an explanation of how to work out the problem of the probable annual financial statement of the prospective typical interurban railway. Another specimen card of handy reference value supplies data as to weight, cost and electrical operating information of a typical modern passenger car for high-speed interurban electric railway service.

Electric Railway Journal

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THE SEMI-ANNUAL INDEX

With this number is published the semi-annual index covering the issues of the ELECTRIC RAILWAY JOURNAL since the first of the year, it being bound in with the regular issue and occupying the eighteen pages just in front of the editorial section. Although this practice has been followed for many years past some of our readers seem to have overlooked it, because during the past few weeks we have received several requests for the index from readers who wish to bind their back numbers. As a matter of fact, when the twenty-six issues for the half year are bound together the index is automatically included, for the reason that it always forms part of the last issue for each half year. We consider this plan more satisfactory to the reader, although it involves more trouble and expense to the publisher than that of mailing the index in loose form a week or two after the volume has closed. Those who have made extensive use of past indexes will notice in the present one an innovation which consists of a list of the keywords that are used for grouping references to articles in the index. This has been introduced to aid the occasional user of the index in locating promptly the various groups of articles in the index. In general these keywords are the same as have been used in the past, and those who have made use of the index extensively with previous volumes will find no cause for confusion on account of the innovation.

AN UNWISE SMOKING PERMIT

It has been a long-established and reasonable rule of American electric railways to permit smoking on two or three of the rear benches of open cars. We cannot but feel, however, that a bad precedent has been set by the Public Service Commission of the First District, New York, in ordering the Brooklyn Rapid Transit System to permit smoking on the four rear seats of its convertible cars. Such an order is a step backward at a time when electric railways are doing all that lies within their power to keep their cars sanitary. On the open-bench car, at least, one can avoid both smoke and a dirty floor by going directly to the forward benches; but on a drop-platform car with rear entrance a walk through the noisome section cannot be avoided. In issuing this anachronistic order the commission seems to have been misled by the clamor of a well-organized claque of tobacco dealers instead of showing a sensible regard for the public welfare. The same question is constantly coming up in other cities, and, as a rule, the proper policy for the railway companies to pursue is to allow the decision to be made by the constituted authorities, as in this case, or by a referendum vote of the public, as was done in Kansas City. At the same time, we believe that the best interests of both the company and the passengers, so far as city cars are concerned, is in the prohibition of smoking on all cars except upon open cars with a side running board, and we do not consider that a rule of this kind would work a serious hardship on anyone.

AGAIN THE QUESTION OF GEAR RATIO

Among the many interesting papers presented before the Central Electric Railway Association this week and abstracted on another page, that one which gave the results of power consumption tests with field-control equipment warrants more than passing comment, not so much because of its undoubted interest but because its figures, if taken too literally, may be the cause of misconception. In the test in question two cars were operated over the same route, one of them having field-control motors and the other standard motors. The cars were exactly similar with the exception of gear ratio, and this one point of difference was necessarily of such importance in the final result that the actual figures obtained in the test may be misleading. Of course, it is well known that field control can make savings in power. The fact is obvious and cannot be disputed. But it is not clear, in a comparative test, why the advantage should be accorded to field-control motors of a higher gear ratio than their competitors on a run where the stops average nearly nine per mile. Certainly a gear ratio of 15:72 is preferable to 17:70 where free-running time constitutes such a small part of the total time as it did on the line where the test was made, and when test apparatus is being operated under obviously unfavorable conditions it is manifestly unreasonable to set up its performance as a standard. It would be interesting to see what results would be obtained with the cars in question either on a run more suitable to the gearing or else with similar gear ratios that were suitable for the run.

MEGAPHONE ANNOUNCEMENTS

It is quite possible occasionally to apply to one business a scheme which was devised for an utterly different one. Some time ago the Pittsburgh Railways discovered that dental cement could be applied successfully to the, shall we say "decayed" teeth of commutators? More recently the Boston Elevated Railway has found something worth learning from a college football game, to wit: the use of megaphones for announcements. The possibility of using dental cement on a commutator may be regarded as a happy discovery, but the utility of the megaphone is so obvious that it ought to have been a fixture in electric railway service long ago. A terminal or loop is generally a pretty noisy place where the voice of anyone but that of the famous Stentor would be lost. The most desirable method would be to display signs indicating the destination of the car next approaching, but where this is not practicable megaphone announcements would prevent confusion and insure a better distribution of passengers. An excellent field for the megaphone exists on a certain electric railway system where at several places passengers have the opportunity to board cars which have already been partly loaded farther down the line, or to get on empty cars which are operated over loops. Unfortunately, the boarding places for both classes of cars are so located that people waiting for the through car from downtown cannot readily see the loop car from uptown. Thus it is not uncommon for some of the passengers to crowd on to the through car until the loop car comes in sight and then for the remainder to make a mad rush through masses of people and vehicles for a car which is already in motion. Yet this practice could be readily ended if the starter was supplied with a megaphone and an elevated position from which he could survey all of the tracks.

RAIL ELEVATION AND PANTOGRAPHS That electrification of a steam railroad line introduces additional responsibility for the maintenance of way department is a generally accepted fact, but frequently the vital necessity for maintaining the relative rail elevations when pantographs are used appears to be overlooked. The average length of 4 ft. for a pantograph shoe is, of course, ample to take care of any staggering of the contact wire and to provide a margin for the swaying of the cars or locomotives on the rails if the rails are level. But when the two rails are not maintained at the relative heights at which they were when the contact wire was erected it becomes a very easy matter for the pantograph to slide off the wire and wreck itself. In general, a superelevation of 2 in. in one rail, unless compensated for by moving the wire, will cause serious pantograph trouble. Theoretically, of course, if one rail is raised 2 in., the movement of the pantograph shoe, 22 ft. above the rail, will be but 10 in., so that, with the wire originally centered on a 4-ft. shoe, there remains a margin of safety amounting to 14 in. However, this calculation does not take into account either the increased compression of the truck springs on the low side of the car when it is tilted, nor does it take into account the swaying of a car passing at high speed, and the consequence is that many pantographs have been, in the past, wrecked from this cause, although the responsibility for the damage is by no means always properly placed. When the track and the line departments are not consolidated, as is the case on many roads, the influence of rail elevations on overhead work can very easily be neglected, and whenever pantograph damage takes place it would be well to have the subsequent investigation include consideration of the work of the track men as well as of those responsible for the overhead construction.

COMMON SENSE IN REGARD TO STRAY CURRENTS

A few years ago there was more or less prevalent hysteria in regard to the electrolytic corrosion due to stray currents from electric railway return circuits. This is disappearing as scientific information becomes more plentiful and accessible. There was and still is much mischievous current roaming at will in the earth-return circuits of many electric railways, but owners of pipes and cables are coming to realize that the distribution of this current follows familiar electrical laws whose application will control or eliminate it. In the application of these laws the main features are: How serious is the trouble? How much money can be spent to remedy it? How can this money be spent most effectively? Who shall furnish the money?

With the increase in the financial burdens which street railways are called upon to carry they cannot be expected to undertake large expenditures to prevent fancied injury to other users of the soil. If there is real injury and the course can be traced to electrolysis, then there is cause for arbitration. Electric traction is a public necessity just as are gas, telephonic communication, water or electric power. The courts have also held generally that the railways have certain superior rights in the streets, as they furnish the kind of transportation for which the streets were originally dedicated. However, we do not intend here to discuss the legal aspects but will take the view that all users of underground conductors in the highways are equally interested in keeping all leakage losses from the return electrical conductors within reasonable values.

We use the word "reasonable" because leakages are involved in the underground transmission in the streets of gas and water as well as in the return trolley circuit, but the other users of the streets have no right to throw more than a reasonable amount of the burden of correcting the trouble on one utility. Suppose, for example, that a high-pressure gas main paralleled an electric railway feeder subway and that gas leaked into the latter. The railway company might complain that work in its manholes was hazardous and that the burden was upon the gas company to prevent all leakage from its pipe line. But if the pipe line was in practically gas-tight condition and some slight leakage could be considered an operating necessity, the remedy to be applied should be that which at the least ultimate cost would give the necessary protection, whether the change was made in the gas pipes or in the conduit of the railway company. The cost ought then to be equitably shared in accordance with the facts.

In the case of electrolysis the facts can be determined with a fair degree of accuracy. The remedy to be applied is more difficult to decide upon. No one remedy can be applied economically to all cases. What is needed most just now is a development of the spirit of co-operation. Evidence of such a spirit is seen in the recent formation of the joint committee of representatives of national associations recently formed at the suggestion of the American Institute of Electrical Engineers. Of this Bion J. Arnold is permanent chairman. All of the interested societies have now joined this movement with the exception of the American Water Works Association which, it is hoped, will soon see the desirability of doing so. The joint committee is approaching its work with the desire to see all sides of the question in the belief that each case must be considered on its merits, and the results of its deliberations cannot but have a beneficial effect upon all of the interests which are concerned in the investigation.

THE CURE FOR RAILWAY ILLS

In any case of physical sickness the first matter of importance is a correct diagnosis of the trouble. The same rule applies in political matters. Relief may not come immediately after the cause of the trouble is determined, but at least the remedy may more easily be chosen. In the case of railway ills, the patient has at least one advantage over the individual. He cannot die. Whatever happens the railways will be kept in operation because they are a social necessity. But they can be so deathly sick that they will be of little benefit either to the owners or the public.

The question to determine is the proper relation between these two, the owners and the public. The old idea that these systems were a kind of personal property, and that the owners could have complete control over the service given and the fares charged has passed away. While no substitute plan has yet received general acceptance, a brief statement of the fundamental principles upon which any new plan must be based to be permanently successful was recently given by Ivy L. Lee, executive assistant of the Pennsylvania Railroad. The principles are so self-evident that they may properly be called axioms. According to Mr. Lee, there are three of these principles.

The first is an implied promise on the part of the public to pay for what it demands and receives. This seems to be only justice. Within certain limits the railways can give almost any class of service desired and charge either a high or a low fare, but the public should not expect either the good service or the poor service to be furnished below cost.

The second of Mr. Lee's principles is the establishment of a definite policy toward the railroads by all of the government agencies, so that the man who invests in a railroad security may know what to expect. At present, particularly with the interstate roads, there is a clash in authority, such as that between the Interstate Commerce Commission and the State commissions. Even with intrastate roads radical changes in policy may occur through a change in State administration or in the personnel of the regulatory commission.

Finally, and most important, there should be the restoration of popular faith in the good intentions, patriotism and fidelity of earnest and able railway men even when they are successful. As Mr. Lee says, "The time must come when experience and ability in the actual conduct of a railroad shall not of themselves disqualify a man for membership on a railroad commission. When these three factors are firmly and clearly established, our railroads can go forward. Investors will know what they can depend on, the public will not embark in ill-considered legislation, and railroad officers will experience that enthusiasm in constructive work which is bred of the knowledge that public service is recognized and appreciated."

HIGH ACCELERATING RATES ON SUBURBAN SERVICE

The advantages of large gear ratios and rapid rates of acceleration in city service are so generally accepted without question that the same theory seems occasionally to be extended to suburban service on electrified steam railroads where the stops may occur hardly once in 2 miles. To some degree the case of the electric locomotive versus the multiple unit train is affected by this reasoning, although, as a matter of fact, the increased schedule speed through the use of an accelerating rate of 1 m.p.h.p.s., as might be expected from a train of multiple-unit cars, involves but a very small decrease in running time from that required by the use of an accelerating rate of 0.5 m.p.h.p.s., such as would be obtained normally with an electric locomotive.

This may be easily demonstrated by considering a concrete case in which generally accepted values for the various factors are adopted.

Assuming a free running speed of 50 m.p.h., the period of acceleration for the locomotive and train would be 100 seconds and for the motor car train fifty seconds. As the distance covered during acceleration equals the product of the square of the time by half the rate of acceleration, the locomotive would cover 3660 ft. during the 100 seconds of acceleration. The motor-car train would cover 1830 ft. in fifty seconds and then would run at 50 m.p.h. for another 1830 ft. to reach the point at which the locomotive would also acquire a speed of 50 m.p.h. This distance would be covered in twenty-five seconds, providing a total time for covering the 3660 ft. equal to seventy-five seconds for the motor-car train as against 100 seconds for the locomotive. The net saving in time at each stop would be twenty-five seconds.

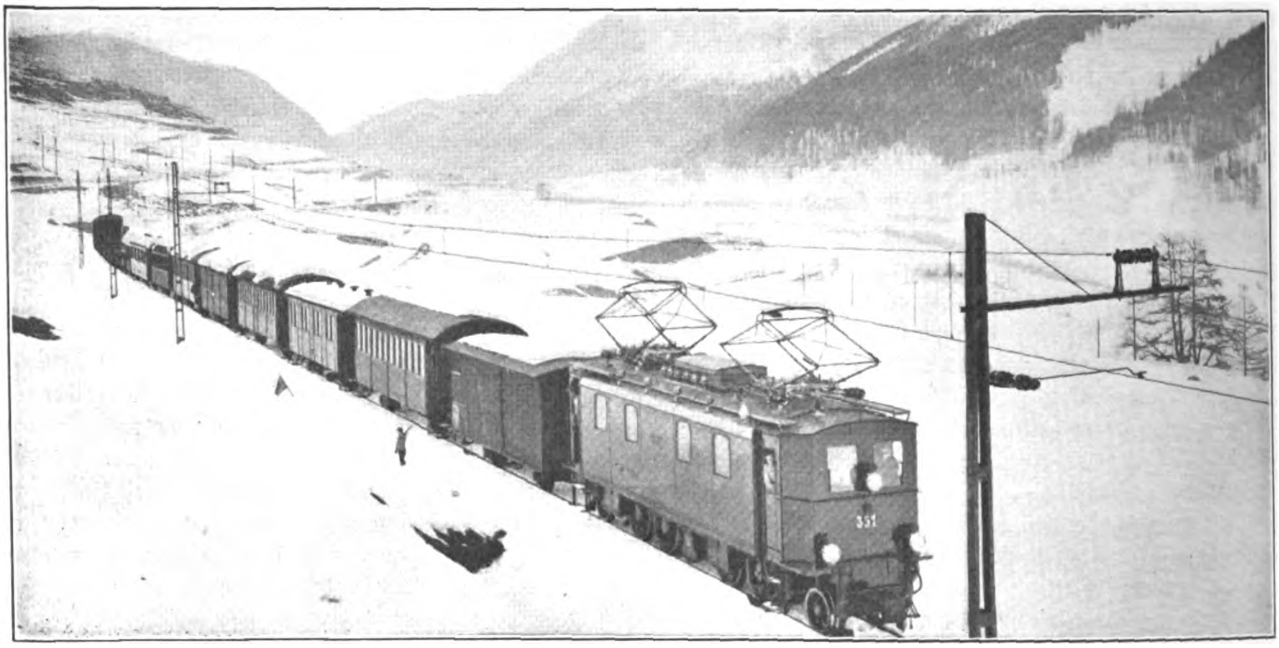
If the run was, say, 20 miles in length and ten stops were made in that distance, the total decrease in running time would amount to four minutes, and as it may be safely said that such a suburban run would be made in not much less than fifty minutes, the saving in time would amount only to 8 per cent. This is, of course, appreciable, but it is by no means extraordinary in view of the fact that double the tractive effort would have to be exerted to produce the higher rate of acceleration. Of course, this increased force, when installed in the form of d.c. motors on multiple-unit cars, could be obtained at a much lower first cost per unit of power than in the form of a locomotive, but this does not alter the fact that where stops are infrequent and trains are long the advantages of multiple-unit cars over locomotives are due to their economy in terminal movements rather than to their ability to produce high rates of acceleration.

Locomotives on the Rhätian Railway

These Single-Phase Locomotives for the Leading Narrow-Gage Line of Switzerland Are Equipped with Series Type Motors and Voltage Step Control Without Contractors

The ELECTRIC RAILWAY JOURNAL for April 4 contained a general reference to the 10,000-volt, 16 2-3 cycle single-phase electrification of the Rhätian Railway on 39 miles of meter-gage track, and a detailed description of the 600-hp 1-D-1 locomotive furnished by the Allgemeine Company. The data in the following paragraphs relate to a pair of 600-hp 1-D-1 locomotives furnished for this line by the Oerlikon Company. It may be added that Brown-Boveri & Company furnished seven 300-hp 1-B-1 locomotives and one 600-hp 1-D-1 locomotive. The catenary material was furnished by the Siemens-Schuckert Company and the high-tension and converter station equipment by the Alioth Company.

All Rhätian locomotives have frame-mounted motors and the same type of parallel rod drive, the only difference being that the 1-B-1 type has two driving axles and the 1-D-1 type four driving axles.



Rhätian Railway—View of Steel Pole Catenary Construction and Train with Passenger and Freight Cars

REQUIREMENTS OF LOCOMOTIVES

The principal data on the Oerlikon locomotives are given in the following table:

LINE AND LOCOMOTIVE DATA

Average single-phase line voltage	10,000 volts
Voltage variation, + or —	10 per cent
Frequency	16⅔ cycles
Frequency limits	15 to 18 cycles
Gage	39.37 in.
Maximum grade	2.5 per cent
Minimum radius of curves on open track	525 ft.
Minimum radius of curves at switches	262 ft.
Maximum pressure on axles	11 metric tons
Maximum speed	31 m.p.h.
Maximum height of pantograph shoe above head of rails	20.7 ft.
Minimum height of pantograph shoe above head of rails	13.6 ft.
Diameter of driving wheels	42 in.
Diameter of trailing wheels	28 in.
Diameter of arc made by parallel rods	23 in.
Length over buffers	35 ft. 5 in.
Total wheelbase	26 ft. 11 in.
Rigid wheelbase	7 ft. 10 in.
Weight per driving axle	9.9 tons
Weight per trailer axle	4.85 tons
Total weight	49.3 tons
Weight available for adhesion	39.4 tons
Weight of mechanical parts	21.7 tons
Weight of electrical parts	27.6 tons

The locomotives must be capable of drawing a total weight of 200 tons. The hour rating of the locomotives was set at 600 hp. This corresponds to a speed of 17.36 m.p.h., a one-hour tractive effort of 12,672 lb. at the periphery of the wheels, or the pulling of a 180-ton load at 17.4 m.p.h. on a grade of 2½ per cent. The maximum tractive effort as exhibited during acceleration was specified at one and one-half times the hour rating. This corresponds to an acceleration of 0.33 m.p.h.p.s. on a maximum grade of 2.5 per cent. It corresponds also to an acceleration of 0.55 m.p.h.p.s. on level track. The motors must operate sparklessly at all loads.

MECHANICAL PART

The number of coupled axles was fixed by the maximum permissible axle pressure of 11 metric tons and also by the maximum tractive effort. On account of the high elevation, which subjects the line to more unfavorable climatic conditions than a lowland railway, it was not held advisable to permit the coefficient of friction to fall below one-seventh. The two middle driving axles are rigidly fixed in the locomotive framing and are located 7.9 ft. centers. The end driving axles have a side play of 2 in. x 1 in. and are connected with the adjacent pony axle to form a so-called Bisell truck. Pony trucks were not considered necessary owing to the comparatively small pressure on the free axles, the relatively low speed and the low unbalanced weights. The Bisell trucks do not guide the locomotive on tangents but they ease the entrance to curves.

Power is transmitted from the motors to the driving axles by means of gearing in connection with a jackshaft and coupled side rods. The pinions of both motors operate on a common gear. To prevent a displacement of the jack shafts relative to each other both bearings were placed in a heavy cast steel frame. These side rods are placed at an angle of 90 deg. to one another.

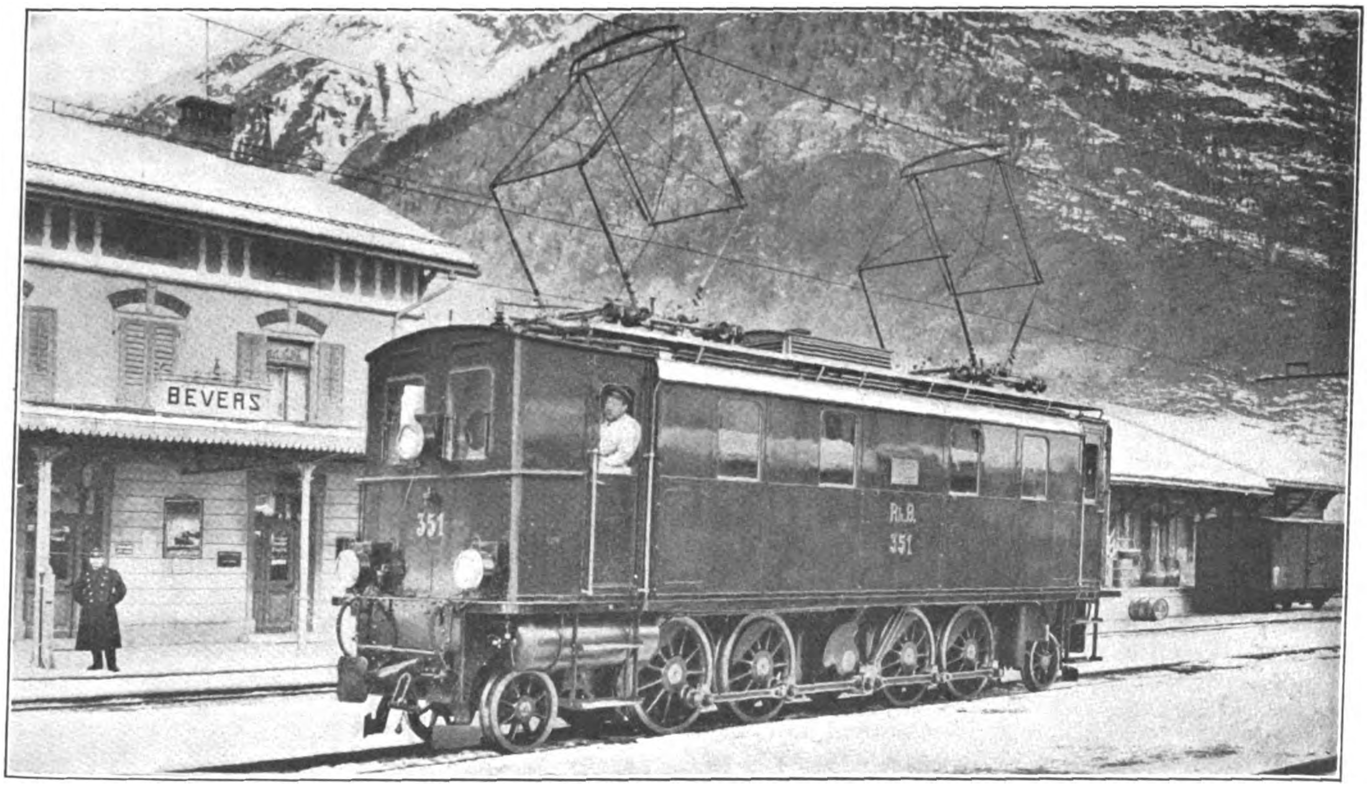
To conform with previous standards the Hardy vacuum type was chosen for power braking. The vacuum is obtained from an electrically-driven pump which is regulated from the cab at either end of the locomotive. The maximum braking application is equivalent to 75 per cent of the weight of adhesion with a brakeshoe movement of 1 in. The eight brakeshoes are outside-hung. Owing to the use of vacuum braking a separate air compressor was required for the current collectors, whistle and sanders. This compressor has the usual automatic governor. A hand pump is used to raise the current collectors before starting the train.

The locomotive body consists of the two cabs and the machine room. The superstructure is made entirely of sheet steel, and the roof is formed into removable sections to permit the easy exchange of equipment. The vacuum and compressor equipment can be removed through openings in the side. The motor resistances are installed under a louver in the middle of the roof to get the benefit of natural ventilation. The folding ladder at one end of the locomotive is connected with the current collector circuits in such fashion that the air in the pipe to the collectors is exhausted, thus forcing them to drop away from the line, as soon as the ladder is used.

The mechanical equipment in each cab consists of a hand brake, valves for the current collectors, and sanders, hand pump, pressure gage, vacuum gage, speed meter, device for operating the signal whistle, sand box, tool box and time card. Special tools and facilities for hanging clothing are provided in the main machine room.

ELECTRICAL EQUIPMENT

The two current collectors are of the pantograph type with auxiliary bows capable of operating with a variation of 13.6 ft. to 20.7 ft. in the height of the trolley wire. It was feared that if only one collector was used interruptions at the point of contact would cause dangerous overvoltages at the end turns of the high-tension coils of the transformers, thus causing breakdowns between the individual windings and to ground. Furthermore, if such a single collector left the wire while going up a heavy grade the automatic no-voltage release high-tension switch would open, the motors would no longer receive current and the speed of the train would rapidly decrease. An appreciable loss in time would elapse before the motors could be placed in circuit again. This loss of time could be made up only by severely overloading the electrical equipment. The use of a second current collector also reduces the rate of wear. The pressure of the contact piece is the same at all heights, but by means of springs may be varied from 6.6 to 22 lb. Oil dash-pots are used to prevent the contact mechanism from rising too rapidly. The porcelain spool insulators used to insulate the pantograph bases from the roof were tested up to 50,000 volts. The roof of the locomotive also carries horn arresters and carborundum resistors in series therewith. The circuits on the roof are carried in bare metal pipe, but a substantial insulator is used at the point where the circuit passes to the high-tension compartment. Entrance insulators are also used above the motorman's cabs at the points where the pipe lines for the pantographs are carried.

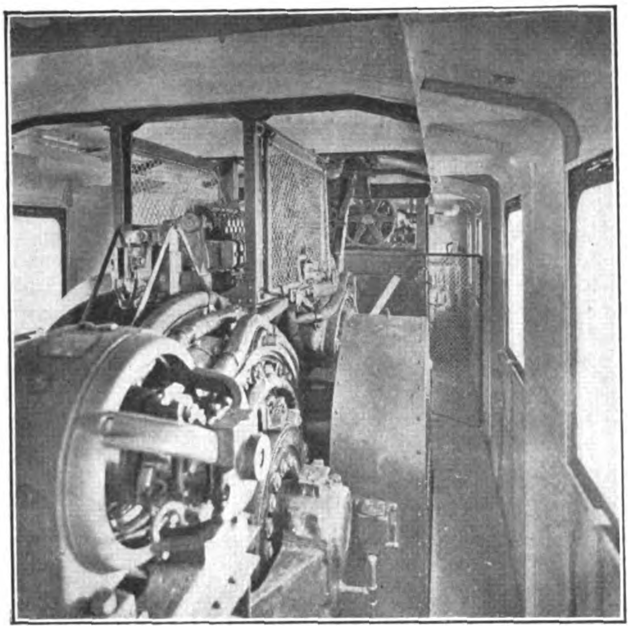


Rhätian Railway—Standard Single-Phase Locomotive, Showing Pantographs, Ventilating Louver in Roof, Character of Drive, Etc.

After the high-tension line has passed the entrance insulators it must pass a choke coil and an automatic oil switch with overload and zero-voltage release. This switch can be cut in and out electrically from the motorman's cab, in addition to which an emergency mechanical cut-out is provided in the form of a lever and cable transmission. One cab is also furnished with handwheel control for the same purpose.

The high-tension oil switch is provided with a series resistor to minimize the current when the transformer is first cut into circuit. All parts about this switch may be grounded immediately in emergencies, and the pantographs cannot be lowered until this switch is cut out.

The transformer, which has an hour rating of 700



Rhätian Railway—Apparatus Room with Motor in Foreground and Screened High-Tension Equipment Beyond

kva, is of the dry, self-cooled type. It transforms the potential from 10,000 volts to a maximum of 390 volts. For the traction motors the secondary winding is divided into twelve steps with a maximum increase of 37 volts per tap. The heating circuit is connected to the 300-volt tap. The voltage regulator or step switch is mounted directly on the transformer and directly connected thereto with copper buses. This regulator replaces the individual contactor system hitherto generally used in locomotive service. The Oerlikon Company asserts that it was the pioneer in departing from the exclusive use of contactors for interrupting large currents.

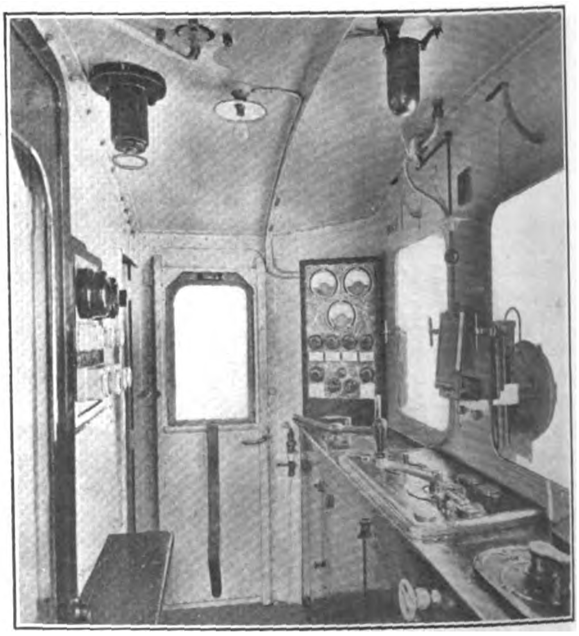
The step regulator is operated by remote control from the cabs through a mechanism which includes a servo-motor to keep a catch in permanent movement. This catch is magnetically attracted to enter the gear of the regulator shaft and thus turn the shaft in the desired distance. Magnetic blow-outs are provided at two places to extinguish the arc at any step. The advantages of this form of switching as compared with contactors are stated to be compactness, short connections between the transformer and the step switch, possibility of hand operation of the switch, reliable successive backward and forward switching and confinement of arc blow-outs. The last advantage is considered particularly important because the circuit is not broken along a whole series of contacts. Choke coils are used to prevent interruption in current, as the circuit is changed from step to step, one coil being connected to the transformer at all times.

The two traction motors are of self-cooling series type with phase displacing auxiliary field. The stator windings are divided into an exciter, compensation and auxiliary field winding. The armature winding is of the ordinary d.c. type. The exciter winding generates the necessary flux for torque. The compensation winding serves only for the compensation of the cross-magnetization by the armature, and can be short-circuited on itself. The auxiliary winding, the current in which is displaced 180 electrical time degrees against that in the exciter winding, eliminates sparking due to transformer short-circuit voltages and commutating currents. In d.c. motors the commutating current would be compensated by auxiliary poles. The transformer short-circuiting voltage is peculiar to the single-phase motor. To suppress the two voltages mentioned, it is necessary to use in the stator an auxiliary field which is displaced 92 space degrees. In general, the auxiliary field of the Oerlikon single-phase motor is characterized by the condition that relative to the excitor field the time phase is displaced to the degree necessary to obtain the desired component in the direction of the exciting field and in space quadrature thereto. In this case the means for time-phase displacement is an ohmic resistance connected in parallel to the auxiliary winding. In theory, it would have been necessary to use this ohmic resistance as a regulating resistance to obtain sparkless operation at all loads and speeds. In practice this is not necessary because the auxiliary field is built for a certain load based upon the hour rating. Based upon the recent Seebach-Wettingen experiments, the armature slots have been cut at an acute angle to minimize the influence upon the neighboring weak current circuits. Change of direction is afforded by two electromagnetically operated reversers which are carried on top of the motors for remote control from the cabs, but they may also be operated directly by hand. Each reverser can be operated alone.

A special motor-generator set and storage battery was installed to have the lighting independent of the frequent variations in voltage and interruptions in current collection, and also to have direct current for control. Voltage variations which would affect the lighting are prevented automatically by a light regulating apparatus. In addition to the heaters in the cabs, means are provided to furnish electric heating for train service.

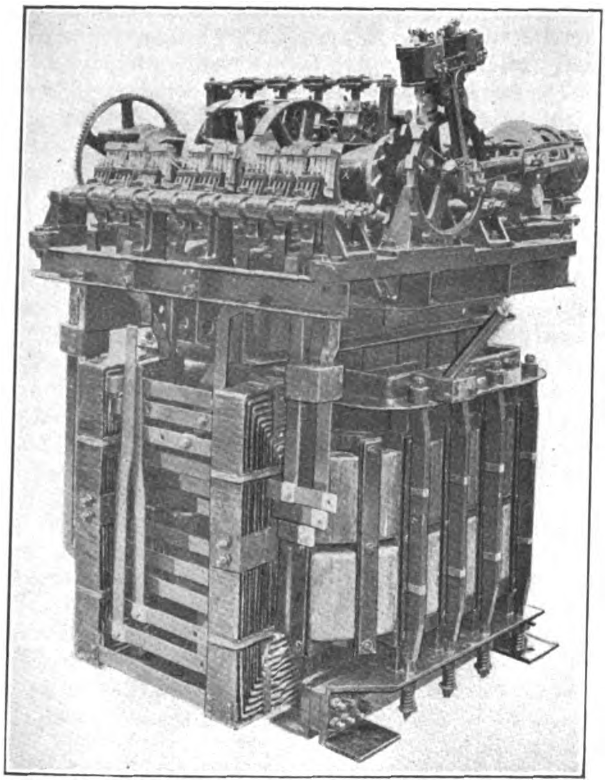
The transformer and high-tension apparatus, as well as the step regulator, is separated from the rest of the machinery equipment by partitions and wire screens. It is impossible to touch any live parts of the high-tension gear accidentally. The high-tension room can be entered only by means of a key, the use of which causes the cylinders of the pantograph mechanism to exhaust and thus break the circuit. Contrariwise, the pantographs cannot be raised until the high-tension room is closed. When the high-tension doors are opened all parts of the high-tension equipment are grounded.

All circuits are in conduit under the floor of the locomotive. The cabs, as previously noted, are isolated



Rhätian Railway—Motorman's Cab with Main Control and Braking Apparatus in Table, Showing also Location of Snap Switch and Meter Panels

from the machine room, so that the motorman is not disturbed by the operation of the machinery. From the view of a cab as reproduced it will be observed that one side is taken up by a table through which the master controller and brake handles project. As is customary, the reverser cannot be operated except on zero position of the main cylinder. The position of the reverser is indicated by a pilot lamp built in the deck plate of the controller. The zero position of the step regulator is also indicated by a pilot lamp in the deck plate of the controller. A lever, the vertical prolongation of which is connected to the pantograph mechanism, serves to raise or lower the pantographs. At the position mark "pantograph down" air escapes from the cylinder and the pantograph goes down. The high-tension oil switch always cuts out first so that the break in the circuit is not made between the collector and the wire.



Rhätian Railway—Transformer and Main Controller Combined

Other apparatus in the cab consists of measuring instruments, snap switches for auxiliary circuits, etc., mounted on two panels, one alongside the motorman and one behind him.

OPERATION.

Competitive tests of the different types of locomotives were made between St. Moritz and Schuls from Oct. 1 to Oct. 10, 1913. While the Oerlikon Company states that it would be unfair to anticipate the official report of these tests, it announces that the present locomotives showed the least energy consumption, and that the motors operated practically without sparking under the heaviest starting conditions. The motor heating was also proved to be below the permissible limits. The rates of acceleration were exceeded both on level tracks and grades.

One of the most meritorious features of the motor system described is that an appreciable drop in line voltage can readily be compensated merely by connecting the motor to a higher tap of the step transformer. The motors also are not influenced by variations in frequency. Normal speed is obtained at three to four times synchronous speed. To start with normal tractive effort calls for about one-third the normal motor voltage, at which voltage the full tractive effort may be exerted continuously, a feature which gives the motor an appreciable overload capacity at the higher speeds.

As the line voltage at starting and at full tractive effort is also one-third of normal, the conditions for the power station are most favorable. The voltage conditions are of particular importance in switching service. It is asserted that, other conditions being equal, three switching locomotives equipped with motors of this type would not make a greater demand on the power station than one switching locomotive equipped with repulsion motors.

REPLACING A BROKEN BRIDGE PANEL POST UNDER TRAFFIC

An interesting piece of repair work on a bridge while in use was recently carried out by the Illinois Traction Company. The bridge in question spans the Sangamon River at Riverton, Ill., and through a derailment one panel post in the third panel of the 116-ft. 10-in. pin-connected iron span became broken, two main diagonals became bent and three counter diagonals were broken. The eight 14-ft. 7¼-in. panels are 22 ft. center to center of pins vertically, and the trusses have a clearance between them of 16 ft. The top chord and end posts are made up of channels and cover plates, with lattice work below. The panel posts are two channels latticed together, while the lower chord and all diagonals are eyebars.

To make immediate temporary repairs, two sets of blocking were set across the bottom chord bars and on this blocking were erected 8-in. x 8-in. timber shores each side of the broken post; these were wedged to take the sag out of the top chord. This expedient enabled the bridge to carry the traffic for about ten days while the new post was being made. In the interval falsework was placed under the damaged truss.

The removal and replacement of the pins was a difficult proceeding, as they were rusted and coated with dry, hardened paint. Replacing the lower-chord pin was particularly arduous, as high water continually scoured the river bed around the base of the falsework, which consisted of 6-in. x 16-in. shoes or sills bolted to the 12-in. x 12-in. posts set in the river bed as nearly as possible under each panel point. The posts were braced and capped in line with the damaged truss, a set of wedges being placed under each floorbeam. With these wedges the truss was raised several times to a true camber line before it was possible to insert the pin. But finally, by jacking and wedging the truss above a true camber pin was inserted.

While the pin in the lower chord was out two pull jacks with chains were connected to the pins in the first panel on each side of the damaged post. Ratchet jacks were used to force the end posts in.

To obviate the difficulty of removing pins on either side of the broken post for replacement of the broken diagonals, a U, or yoke, was hooked over the pins and connected to the old counter at the turnbuckle. The main diagonals were straightened with a clamp and ratchet jack at the bend. To reinforce the bent main diagonals temporarily to carry the traffic after the new post was in and the falsework had been swept away, two pull jacks with chains were attached to the top chord in the second panel and to the pin in the lower chord of the third panel.

The work was carried on by G. A. Wright, division foreman of bridges and buildings, under the general supervision of L. B. Martin, engineer maintenance of way for the Illinois Traction Company.

Overhead Charges in Valuations[*]

An Analysis and Description of the Overhead Charges in Valuation, Based Upon the Classification of Overhead Charges of the Accountants' Association

BY HARRY G. ABENDROTH, VALUATION COMMITTEE, THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

Overhead charges to be included in appraisals, such as our company is at present attempting, are one of the most discussed problems of valuation. Every accountant and engineer knows that these costs exist, but, unfortunately, we are not always so certain as to how large they are. Like any measuring device, any cost accounting system has its shortcomings and like every machine, it does not have 100 per cent efficiency. This accounts for the difference between costs on the books and actual costs.

But there are differences other than the discrepancy between book costs and actual costs, which must be considered in a valuation. Frequently book costs are not available and we must estimate the cost. Our company's engineers are confronted with this task of estimating in requisitioning work orders. Finally, there are the omissions in inventory for which the overhead charge in any fair valuation of property must compensate. Have you ever attempted to inventory every bit of furniture in your home? If you have and have attempted to recheck it, you have probably been sufficiently impressed with the impossibility of a perfect inventory. Imagine, then, the difficulties surrounding the inventory of a great public utility property, the continuous operation day and night, the heat of the power plant, the danger of live equipment, the miles of area covered and the network of pipes, conduits and cable carefully concealed from inspection. Suppose also that the work of inspection covers a long period of time and is done by a large number of appraisers, whose assignments are not sufficiently definite to insure against the omission of frequent miscellaneous items. It is inconceivable that under such conditions the inventory can be even substantially correct although many commissions have so assumed in passing upon the inventories submitted by engineers. Observations under such conditions contain large probable errors, and these must be covered by the overhead charges added to the valuation.

Just what items are classified as overhead charges and their actual amount, as disclosed by recent investigations carried on by the company, are best explained in the order outlined in the classification of overhead charges adopted by the American Electric Railway Accountants' Association at its last annual meeting. Under this classification overhead charges were grouped under the following main divisions: promotion, organization, construction, appraisers' omissions, and intangible values. Only those overhead items will be referred to as affect the appraisal of tangible property.

1. Promotion.—Under the head of promotion we find initial engineering expense. This includes salaries of surveyors and assistants, meals and lodging, livery, railroad fare, instruments, tools, etc. On $1,500,000 worth of interurban road construction, these costs amounted to approximately 2.7 per cent of the total tangible property or cost, including right-of-way. In the construction of the power plants, 4 per cent of the total work order cost was expended for salaries of company's engineers and inspectors, for architect's service, draughting, consulting engineers' services, traveling expenses, telegrams and telephone calls, surveying, blue prints, petty expenses and general office expenses. Expenses such as these are necessary before work on any undertaking can be attempted.

Another promotion charge, which becomes a part of tangible property, is initial legal expense. In the construction of an interurban line on highways in this State, the company is required to obtain the consent of abutting property owners. The property owner is generally reluctant to give his consent, and large payments for releases and easements are incurred before the right to operate is granted. Suits entailing large court costs are not uncommon, and to have work literally held up by the man with the gun is no myth. Before a transmission line can be constructed tree trimming rights and privilege to set poles must be obtained. In the acquisition of right-of-way, condemnation proceedings with their attendant costs are of frequent occurrence. The overhead charges for these items vary with different portions of the property.

2. Organization.—Under the head of organization, the second main topic, are grouped incorporation expenses including fees and expenses incident to organization and the securing of certificates of public necessity and convenience. Costs for legal advice and attorney's services, railroad fare and miscellaneous expenses are overhead charges associated with this step in the procedure. Underwriting expense forms another group of organization charges. Before any construction project can be commenced there must be funds on hand to secure payment to the contractors. Financial institutions must be retained to issue securities. In times of a stringent money market large discounts must be offered in order to interest investors in the undertaking and thus secure the necessary funds preliminary to construction. Where utility properties are originally built up through a merger of several properties it is difficult to ascertain the total amount of organization cost. In instances where records are available this overhead charge has exceeded 15 per cent.

3. Construction.—Under construction, the third group of overhead charges as found in the outline of the American Electric Railway Association, are a large number of items which are here discussed in the order in which they are listed in the report and are illustrated with concrete examples from the experience of this company.

a. Engineering—While a piece of track or a building is under construction, men are on the job to superintend the work and to see that the specifications are followed. Experts are hired to inspect and test the material used. These precautions are necessary to insure first-class construction and to forestall payments for neglected or omitted services or payment for work never done. In practice it is difficult to separate this item from administrative expenses.

b. Administrative Expenses—These include payments for the services of timekeepers, material clerks, dirt clerks, cost of clerks, paymasters, watchmen, and the necessary office supplies and expenses, such as heat, light, stationery, printing, rent, etc. The timekeepers are necessarily employed that the construction crews may receive the proper compensation for their services. Material clerks facilitate the delivery and order of material, keep a check on the quantities used and prevent premature and delayed deliveries of material. Watchmen, in addition to protecting the constructed property at night, are a necessary safety precaution against injury to the public. Street barricades and danger signals must be maintained. Lumber is needed for the barricades and oil for the lamps. Since teaming contractors are generally paid by the load, dirt clerks are necessary to check the amounts of excavated material removed. A paymaster, cost clerks, stenographers and an office, together with the necessary supplies, are all requisites to construction work. In our experience[1] these items generally exceed 5 per cent and may approach 10 per cent of the total work done in the way and structures department construction.

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[*] Abstract of paper read at meeting of American Electric Railway company-section of Milwaukee Electric Railway & Light Company, Milwaukee, June 11, 1914.

c. Stores Expenses—The term stores expense explains itself. Any expenses incident to the handling of material in the storerooms and yards, loading and unloading construction supplies, storekeepers and stock clerk's time in pricing of material requisitions from stock, care of stock cards and purchase of necessary supplies are a part of construction costs. An addition of 5 per cent to 10 per cent to the cost price of the material has been found necessary to cover such storeroom expenses.[2]

d. Utility Expense—Any large traction company operates a utility department, whose function it is to deliver material to the job. This company delivers by utility train, auto truck and by wagon. To maintain this service requires labor to operate vehicles, dispatch them when needed, and provide for them. Expenses must be incurred to keep utility equipment in operating condition. Stables, garages and sheds must be provided to house the equipment. Such a portion of this expense as is devoted to construction should be included in capital expenditures. The percentage of overhead charge to be added to material for this item will vary with the bulk and ton miles carried. Extensive investigations covering these items have been made by the company and the rates per car hour for different kinds of equipment determined.[3] These rates have formed the basis for determining the schedule of utility charges to various jobs.

e. Labor Expense—The overhead charges incident to labor are many and various. Extensive construction work such as the building of an interurban line frequently necessitates the importation of labor from other cities. Employment agencies are often called upon to assist in securing a large construction gang. Railroad fare and sundry expenses are necessary to transport the men to the job. Housing and sleeping quarters and commissary must be provided. Stables and shelters for contractor's and company's horses must be erected and moved as the work progresses. Another unavoidable expense always associated with construction work is the unproductive charge for layoffs on account of sickness and weather, on pay. The analysis of the payroll for one of the company departments for the year 1913 shows that the value of time off for sickness, vacations, etc., amounted to 3.49 per cent of the total payroll. In another department the percentage in 1912 was 1.51 per cent and in 1913, 2.38 per cent of the total. The total percentage for this group will vary with the size of the job, nature of the work, and its geographical location with reference to the base of supplies.

f. Contractor's Expense—Contractor's profit has been a disputed item in overhead charges. Some appraisals have included this item and others have excluded it. Experienced contractors generally allow a large margin above actual costs to insure against losses due to unusual and unforeseen difficulties, and to care for their profit. Unless adequate provision is made for similar contingencies elsewhere in the overhead charges, a similar percentage must be included under this heading where construction work is not done by contract.

g. Equipment and Tools—With regard to equipment and tool expenses the experience of a subsidiary construction company is submitted. This company did the greater part of the track construction for our company during the year 1913. An accurate record was kept of all tools used. Their value was determined at purchase and an appraisal made at the close of the season. The expenses for maintenance and depreciation amounted to 9.15 per cent of the total payroll charges. Investigation discloses that the care and depreciation on track tools is higher than in other departments. Generally considered, about 5 per cent of the total payroll charges will cover the use of tools. This does not cover shop expense on material used in process of construction, which ranges from 25 per cent to over 100 per cent.

h. Preliminary Construction—Every type of construction undertaken by a traction and light company involves some preliminary and protective construction. Stretches of interurban track are built and later are moved because of operating and legal necessities. In tunnels and large buildings thousands of feet of lumber are used for false work which later is usually worth its value as fire wood. Circumstances frequently arise which change plans completely, and parts already constructed are torn out to conform with new specifications.

i. Injuries and Damages—Through the operation of adequate safeguards the cost of injuries and damages during construction can be reduced to small proportion of the total cost. This item is present, however, and no appraisal purporting to determine the actual value can disregard it. From an analysis of claim department charges for this company for the years 1911, 1912 and 1913, the total costs of claims and releases, physicians' fees, attorneys' fees, claim department salaries and expenses, etc., chargeable to construction ranges from 0.08 to 0.28 per cent of the total capital expenditures. If the construction job involves great risks such as are involved in the erection of a large building, bridges, tunnels and tower lines, the proportion will of necessity be greater. The operation of the workmen's compensation act has generally raised the costs over those obtaining in prior years.

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[1] An analysis of twenty-three separate jobs discloses the following figures:

Median	5.03 per cent	Includes switchmen and flagmen and temporary track, but excludes timekeepers, material clerks and dirt clerks.
Maximum	9.30 per cent	
Arithmetic average	5.12 per cent	
Minimum	2.12 per cent	

A five-year average for all construction was 4.17 per cent for general administration, that is, the salaries of the general officers and clerks, the office supplies, rent, etc., and 2.65 per cent for local administration.

[2] A table showing the average overhead charges on all material in percentage of material cost follows:

	A— per cent	B— per cent
Purchase and receipt of material—total	2.24	2.67
Teaming, auto and utility service	0.59	0.64
Salaries and wages	1.65	2.03
Care and disbursement of material—total	2.98	3.17
Salaries and wages	1.77	2.00
Light, heat and janitor service	0.04	0.04
Breakage, obsolescence and shrinkage	0.85	0.92
Insurance	0.32	0.21

These percentages do not include delivery of material to the job.

[3] The following rates per hour have been determined for different classes of equipment:

	Cost per Car Hour
Motor car	$0.60
Double truck flat car	.60
Dump car	.30
Single truck flat car	.30

j. Legal Expenses During Construction—It frequently happens that during the construction of a transmission line, suits are instituted relating to removal of poles and alleged damages to property. The violation of contract provisions also entails litigation, and claims for unpaid wages or shortage frequently necessitate attorneys' services. This item will also vary with different parts of the construction about to be appraised.

k. Taxes During Construction—When work is in process of construction for a number of years, as in the case of several of our power plants, the terminal building and the interurban lines, taxes are payable on the parts completed. Such properties are not operating for long periods, and before operation begins and earnings accrue substantial sums have been expended for this item.

l. Insurance During Construction—As a protection against fire, cyclones, lightning and floods, property constructed and materials delivered on the job must be insured. Employees handling money and material, such as timekeepers, cashier, superintendents, etc., must be bonded. These precautionary measures, whether covered by insurance in outside companies or carried by our company, involve costs, which any adequate overhead charge must include.

m. Interest During Construction—This item has been generally agreed upon as a proper overhead charge. The Wisconsin Railroad Commission has allowed from 3 per cent to 4 per cent of total construction cost for this item. If the construction period does not cover more than one year this allowance is adequate. However, attention may be called to the time it frequently takes to construct some of the properties of our company.[4] One item necessarily involved from the very inception of the property is land. Long before any part of the property can operate, money has been lying idle in land investments, and this value assumes large proportions in such extensive properties as those cited. The discounts and necessary cost involved in handling a bond sale have been alluded to.

n. Unforeseen Contingencies—The unforeseen contingencies allowance during construction is probably the most disputed and least understood item of construction cost. It is always difficult after work is completed to appreciate the existence and consequent cost of unusual items included in this group. Generally speaking, contingencies are those unexpected and unusual difficulties or incidents arising during construction which it is difficult to anticipate and which cause a departure from the estimated costs. Because an appraisal will not reveal these departures in the estimated costs, an allowance must be made in the overhead charges. The character of these contingencies is varied, as will be apparent from the following illustrations:

On the interurban line No. 1, the right-of-way at a certain point could not be obtained, and the track was constructed on a curve to the north. Later the railway company gave a deed of land sufficient to make the line straight, and the track was constructed as it now exists. Bridges were strengthened and reconstructed and settlement had to be made for damages to land in numerous instances all along the line. Near one of the lakes a very large sink hole was encountered. The grade at this point when first established was about 15 ft. high, and one morning it was probably that many feet under water. The spot was graded three times, hundreds of piles were driven, and more or less filling has been going on ever since.

On interurban line No. 2 the company practically graded a street for six blocks due to the construction of the subway under the tracks of the steam road. One sink hole on this line probably caused three times as much grading work to be done as would have been necessary under ordinary circumstances. At another sink hole the ground sank until the original culvert entirely disappeared and the company had to excavate across the entire width of the fill and put in the present existing iron culvert. The right-of-way at another spot revealed an underground lake. When the grade was established the line began to settle, and efforts to stop it were futile. Piles were driven until it was found impossible to hold the grade. All the available timber in the vicinity, used in preserving the fill, is now probably many feet underground. Fully five years intermittent work was necessary to stop the settling.

On interurban line No. 3 another costly sink hole developed. Double sections of piling were driven; about forty acres of trees and underbrush was cut and spread over the top of the marsh over which hundreds of train loads of refuse, dirt and cinders were dumped.

This type of contingency, which might be called the contingency due to uncertain foundations, has been elaborated upon largely because it illustrates costly

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[4] The accumulation of charges on the construction of two large power plants and the terminal building lasted over six years, on interurban lines over five years, etc.

TABLE SHOWING OVERHEAD CHARGES USED IN VARIOUS TRACTION APPRAISALS

	Total	Promotion and organization	Legal	Engineering and superintendence	Interest during construction	Contractor's profit	Taxes and insurance	Contingencies	Brokerage and commissions
1. Chicago Surface Railways, 1906 B. J. Arnold, M. E. Cooley and A. B. DuPont.	21.7	...	...	[1]11.7	...	...	...	[2]10.0	...
2. Puget Sound Electric Railway Washington R. R. Commission.	15.7	...	0.5	5.9 and 1.7	4.6	...	...	3.0	...
3. Appraisal of Street Rys. for Massachusetts Valuation Board, 1911	29.0	...	4.0	5.0	10.0	...	...	...	10.0
4. Chicago Consol. Traction Co., 1910 B. J. Arnold and George Weston	38.4	...	...	[1]14.6	[3]5.8	...	...	...	18.0
5. Metropolitan St. Ry. System, Kansas City, Mo.	[4]33.0	8.0	7.0	...	7.0	...	...	...	...
6. Coney Island & Brooklyn R. R.—									
Pub. Serv. Comn., First Dist., N. Y.	24.81	5.15	...	5.15	...	9.36	...	5.15	...
Ford, Bacon & Davis	34.0	...	...	...	...	...	...	...	...
7. Cleveland St. Railway—									
U. S. Dist. Judge Robert W. Tayler	22.18	...	...	...	...	...	...	...	...
Ford, Bacon & Davis	17½-35.0	...	...	[5]5-10	...	7½-15	...	5-10.0	...
William Barclay Parsons	[6]30.0	...	...	5.0	...	10.0	...	10.0	...
Stone & Webster	...	...	...	10.0	...	...	...	...	...
8. Brooklyn Rapid Transit System	[7]21.0	...	...	...	...	...	...	...	...
9. The Mil. Elec. Ry. & Lt. Co Prof. M. E. Cooley.	[8]28.0	2.5	...	4.0	6.0	...	0.5	5.0	...
10. G. T. Bishop, President Washington, Baltimore & Annapolis Elec. Ry	[9]20.0	...	...	...	...	...	...	...	...
11. Reorganization Third Ave. Ry., New York. Henry Floy.	40.0	...	...	...	...	...	...	...	...

NOTES—

[1] Includes organization and incidentals.

[2] Includes legal expense, interest and brokerage.

[3] Includes legal expense and contingencies.

[4] Eleven per cent average of additions to separate departments.

[5] Includes organization.

[6] Five per cent for miscellaneous.

[7] Contractor's profit, incidentals, engineering and administration.

[8] Acquiring land, 10 per cent.

[9] Considered an underestimate.

construction work which an appraiser viewing the right-of-way at this time is certain to omit.

Contingencies due to weather often play havoc with construction work. Cloudbursts and washouts in this country are not infrequent occurrences. Where trenches are dug in the city, ready to receive the track structure, it often happens that a heavy rain will fill the trenches sufficiently to cause serious delay and consequent expense. On interurban lines heavy rains have washed away miles of newly constructed fills and ballast. Floods have caused great damage to bridges. Work in progress has been seriously impaired by breaking cofferdams.

Contingencies due to labor difficulties are more frequent occurrences than is generally anticipated. Strikes or sudden stoppage of work by unskilled laborers, ranging from a day to longer duration, disarrange the schedule of completion and cause costly delays.

Contingencies due to public requirement are not uncommon. The delays due to securing necessary permits are frequently costly. In our experience changes in grade have on numerous occasions been ordered while work was in progress, causing a substantial increase above the estimated or normal cost.

Contingent expenses due to trespass cover many unexpected incidents of construction. In the building of transmission and distribution lines, trimming trees and the evident trouble in securing the right to trim, are common occurrences. Property owners are not always disposed to allow the stringing of wires and the erection of poles near their premises. Sometimes poles after being placed have to be moved on complaint of the property owners abutted.

Unforeseen physical obstructions to the progress of the work are particularly common in underground excavation work. In running conduit the obstructions encountered are conduits of other companies, tunnels, storage vaults, gas and water pipes, manholes, steam and water mains. Additional tunneling, recompense for damages to private properties, and repairs to other properties, are but a few of the contingent costs. In the building of manholes, old pavement, heavy boulders and often solid rock are encountered. Frequently long runs must be made to make the necessary sewer connections. In running services, besides such contingencies as mentioned, large trees inside the curbline, cement sidewalks and retaining walls must be contended with. When pulling in cables, ducts are sometimes shattered due to gas explosions, and ducts in which dirt has piled up must be cleaned out. In building excavation and foundation work, difficulties of a more or less serious nature are cave-ins, the falling of concrete walls due to the removal of the false work, the freezing of mortar in freshly-laid brickwork, necessitating extensive rebuilding of the same, and the shifting of walls.

The items which have been illustrated or referred to are not mere fancies of some creative imagination. They are isolated instances of contingencies which have actually occurred, and when assembled represent the expenditure of large sums. Many can be separately substantiated by vouchers, others cannot be segregated from the total construction charges, but serve to explain what a mere estimator of figures would term "abnormal costs." Every construction engineer can probably add his testimonial to the list. In an effort to arrive at some figure showing what the contingency item alone amounts to, a comparison was made of the bare physical reproduction new value of certain properties of this company as determined by separate appraisal, and the value as shown by the original cost records. In isolated instances where such a comparison was possible, the excess of actual costs over the appraisal ranged from 8.55 per cent to 12.7 per cent.

While this paper does not attempt to decide the question of overhead charges, it is submitted in an effort to determine what the term embraces and to assist in arriving at some definite conclusions as to how such allowances must be calculated. Overhead charges submitted in appraisals of traction properties cover a wide and conflicting range. On page 1436 is a table of some of them. What is particularly needed is an historical study by engineers and accountants of the actual overhead costs. In no other way can much of the doubt as to actually existing costs be dispelled and all past outlays for property be recognized.

REPORT OF PUBLIC UTILITIES COMMISSION OF CONNECTICUT

The Public Utilities Commission of Connecticut recently issued its second annual report for the year ended June 30, 1913, stating the general conduct and financial condition of all public service corporations in the State as ascertained by it during the year. During the year the commission entered seventy-nine general findings and approved eighty-nine applications for construction or reconstruction of tracks of railway companies. During the period in which the commission had been in operation only one bill has been taken to the courts from its decisions, and this, according to the report, has apparently been abandoned. The report of the chief engineer of the commission for the year on the subject of street railway lines indicates in general that the physical condition of the properties improved during the period. The number of operating railway companies increased from thirteen to fourteen during the year. There was a net increase in the amount charged to construction and equipment of lines owned of $1,097,333; of lines leased, $486,831. There was an increase in investments held by street railways of $496,962. Operating revenues increased $664,970 and operating expenses increased $437,333, all divisions of each group showing increases. The results of operation showed an increase in net operating revenue of $227,638. The taxes increased $35,919, and dividends declared decreased $4,537. The grand surplus for all companies showed a decrease for the year of $134,352. The total number of fare passengers reported for all roads, with the exception of the Rhode Island Company, was 220,019,829, and the total increase was 11,814,631. The total average fare revenue for all passengers on lines charging 5-cent fare was 4.35 cents.

ELECTRIC STREET RAILWAY PROGRESS IN PERNAMBUCO, BRAZIL

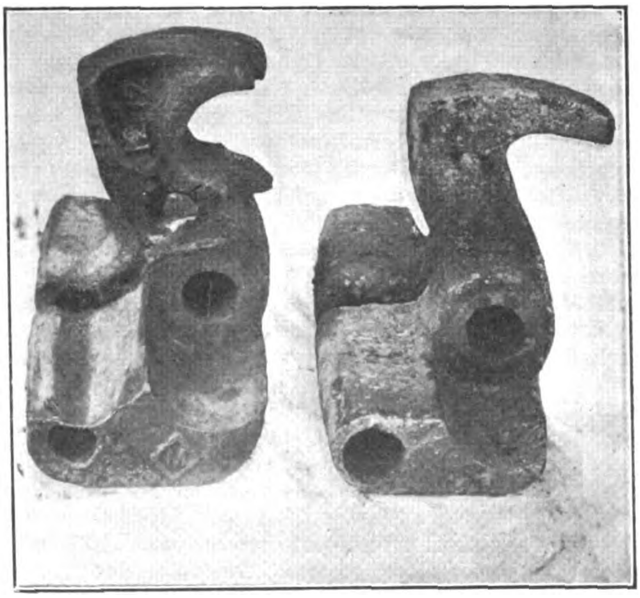
The street railway at Pernambuco, Brazil, was placed in operation on May 13, 1914. The electric cars will be operated only to the ends of the first pay divisions, from which points, until the different lines are in operation, horse cars will continue to convey passengers to their destination in the suburbs. The main power station when completed will generate 4400 kw and will be equipped with four 1000-hp boilers (B. & W. marine type), four 1000-kw turbines, and a 400-kw engine set. The electrical equipment is American and English. The carhouses are being built of steel imported from England. The cars are English and American, about fifteen of which have been set up and are ready to run. All the steel rails have been imported from the United States. The city at present is being partially lighted by a plant temporarily erected. The suburban car lines are being extended and the entire work is expected to be completed by Jan. 1, 1915.

Oxy-Acetylene In an Electric Railway Shop

This Article Describes the Great Variety of Welding and Cutting Jobs Possible with Oxy-Acetylene Equipment, from Broken Gear Teeth and Chipped Wheel Flanges to the Shafts of Large Machine Tools—The Descriptions and Costs Apply to Work Done on the Illinois Traction System

Through the courtesy of the Illinois Traction System several interesting welding and cutting operations were recently performed in the presence of a representative of this paper at the large interurban shops of the Illinois Traction System at Decatur. These operations included such work as repairing cracked air-compressor castings, building up gear teeth and armature shafts, and several other filling-in and patching jobs. Repairs were made to cast iron, cast steel, wrought iron and wrought steel. One of the most interesting jobs was that of making a cut across the underframe of a large interurban car.

The means employed was the oxy-acetylene welding and cutting equipment supplied by the Prest-O-Lite Company, Inc., Indianapolis. This equipment is of the portable type. It consists of one cylinder of acetylene gas, one cylinder of oxygen, one oxygen regulator, one acetylene regulator, one welding blowpipe with interchangeable heads and one cutting torch. The welding blowpipe had a series of welding tips suitable for all classes and thicknesses of work likely to be met in electric railway shop practice. These welding tips ranged in capacity from 1.5 to 35 cu. ft. of free acetylene per hour, the consumption of oxygen being approximately 1.2 parts to one of acetylene.



Oxy-Acetylene Welding—Fig. 1—M.C.B. Knuckles with Worn and Built-Up Faces

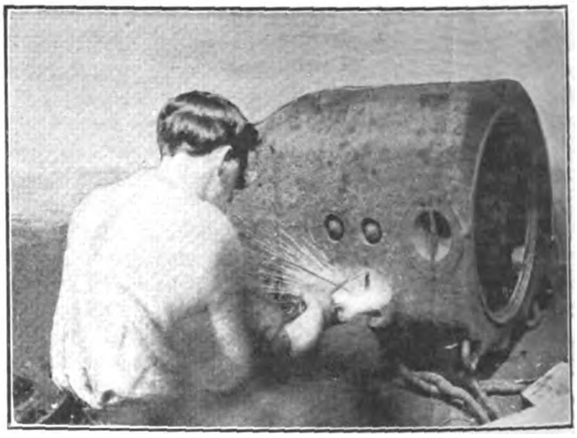
The entire equipment was mounted on an ordinary two-wheel truck, and one man could easily take it to any part of the shop or shop yards. The extreme portability of this type of apparatus is one of the advantages asserted for it by the manufacturer. It is pointed out that in general shop and track use the cost of making repairs will be reduced considerably if a portable welding outfit is employed. Then the outfit can readily be wheeled to the work for much less cost than that for transporting heavy castings about the shop.

A brief description of the essential features of each of the welding and cutting jobs done at the Illinois Traction shops will be presented. In connection with the costs, as given in these descriptions, it should be noted that these are based on a charge of 2 cents per cubic foot for oxygen, 2 cents per cubic foot for acetylene, at atmospheric pressure, and 30 cents per hour for labor. The cost of filler metal is small, so small in fact that ordinarily it can be neglected because scrap found around the shop can be used; or if new filler metal is desired it can be purchased at 3 cents per pound.

One advantageous feature in connection with blowpipe welding using the oxy-acetylene flame is that it does not affect the skin. The glare, of course, is injurious to the eyes unless properly tinted glasses are used. These glasses, however, need not be very dark. It is unnecessary to protect the face and hands as in electric arc welding, where the injurious rays destroy the skin.

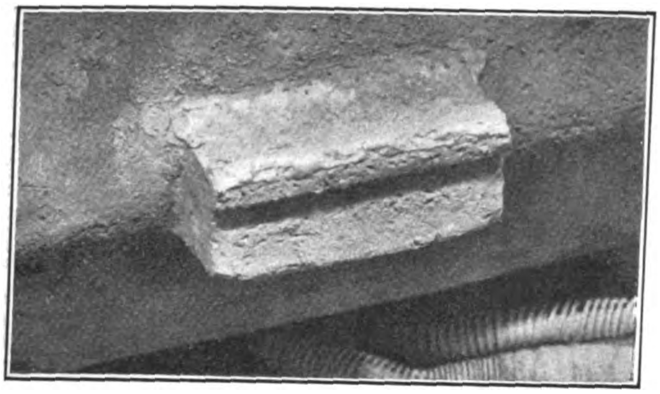
BUILDING UP COUPLER FACES

All of the interurban rolling stock of the Illinois Traction System is equipped with the Bosenbury type M.C.B. radial couplers. These couplers conform strictly to M.C.B. requirements, except that they are radially mounted, and those on the passenger cars have extra high knuckles. The total height of the I. T. S. passenger car knuckles is 16 in. Freight car knuckles are M. C. B. standard, and as the road has more than 1200 cars and locomotives, practically all of which are in train service some part of the day, the couplers get considerable wear. Hence their maintenance is a regular feature of shop work.

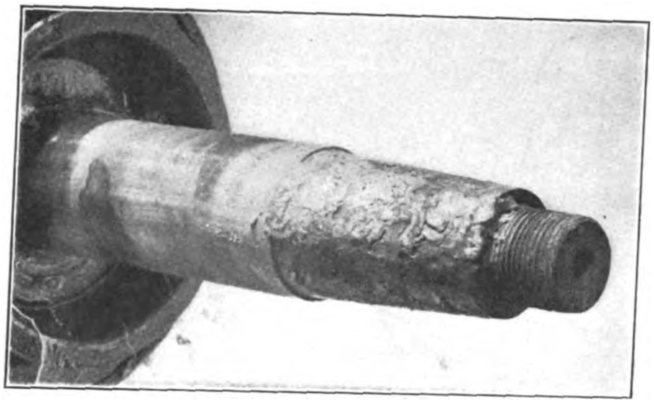


Oxy-Acetylene Welding—Fig. 2—Applying Steel to a Motor Nose

Fig. 1 shows a worn passenger car knuckle and a knuckle after new metal had been applied to build up the engaging face. These knuckles are of cast steel. Their cost new is $3, and their exchange value 60 cents. They have a scrap value of about 30 cents. The worn part of the knuckle had an area of 13 in. x 3½ in. to which new metal was applied to a depth of approximately ½ in. This new metal is a tough steel which will withstand more abrasion than the original face of the knuckle. The total time for building up the face



Oxy-Acetylene Welding—Fig. 3—Half Inch of Hard New Steel Built on Motor Nose



Oxy-Acetylene Welding—Fig. 6—Flame-Welded Steel Filling Armature Shaft Keyway

of this knuckle was twenty-five minutes for welding and ten minutes for preheating with an oil torch. The cost (gas and labor) of adding the new metal was 69 cents.

BUILDING UP WORN MOTOR NOSE

In order to demonstrate the ease with which new, hard, tough metal can be applied to large steel castings without any preliminary preparation, the nose on a GE-73 motor was built up by the addition of ½ in. of new mild steel. Fig. 2 shows the operator at work, and Fig. 3 shows the appearance of the nose directly after welding. The top face of the nose is 6 in. long by 2½ in. wide. Ordinarily a mechanical patch would be put on by first dressing off the nose, then drilling it and riveting on a ½-in. piece of steel. Without any preheating new metal to a depth of ½ in. was added with the Prest-O-Lite welder in sixteen minutes' welding time and at a cost for labor and gas of but 76 cents. The new metal so applied is tough and has a smooth surface and required no grinding before it was put in service.

BROKEN LUG ON COMPRESSOR FRAME

Fig. 4 shows a lug which was broken off the corner of a GE type CP-22 compressor case. This lug was welded in place for 29 cents. The appearance of the lug after welding is shown in Fig. 5. It was finished and redrilled in ten minutes. The lug had been broken evenly along the axis of the bolt hole. The welder operator first chipped and ground the faces of the break to make them V-shape. Then the broken part was set in place without any fastening, and the torch was applied. The welding required but five minutes, and the total time for doing the job was less than nine minutes. A mechanical patch would have cost about $5 and would have required the forging of a yoke as well as drilling and tapping the casting.

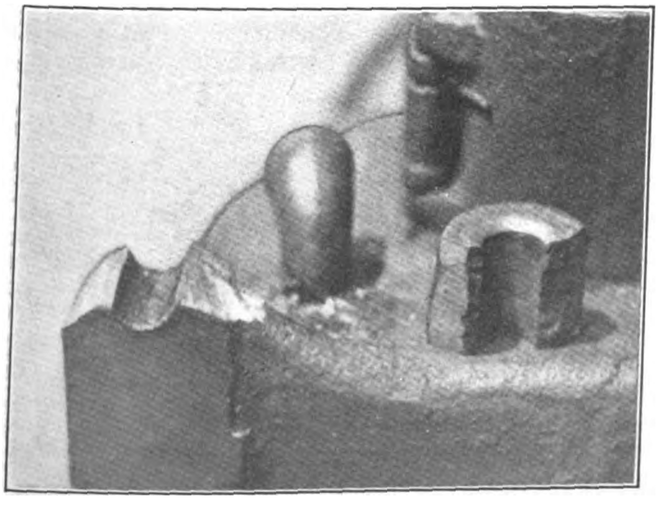
FILLING WORN KEYWAY

Fig. 6 shows the new metal applied to fill the worn keyway of an armature shaft of a GE-57 motor. This keyway, 4¾ in. long x ¼ in. deep, originally was ¾ in. wide. It had been worn to a width of 1⅛ in. This slot was filled with new steel in twenty minutes. But two minutes was required to get the shaft ready for welding. The only preparation necessary was that of cutting a piece of sheet asbestos to fit over the shaft and protect the end of the armature from sparks.

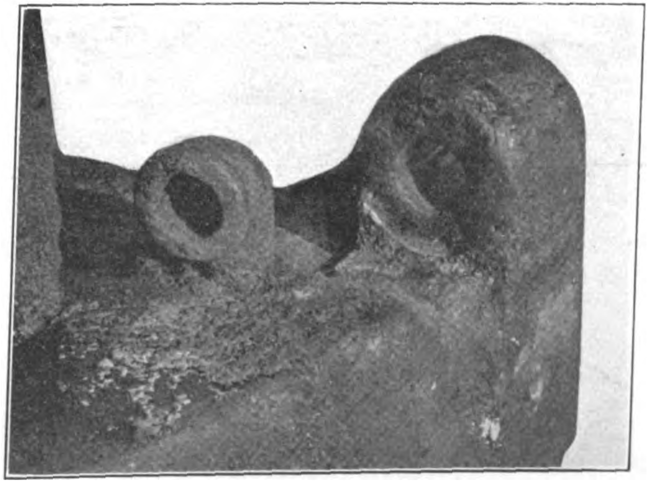
The cost of filling in this new metal was 44 cents for gas and 10 cents for labor, a total of 54 cents. It was found that the weld was quite soft and easily machined. The comparatively smooth surface of the weld simplified the making of the roughing cut, and the character of the new metal was such that the new keyway could be cut at any point on the perimeter. This illustrates a feature for which the advocates of flame welding make strong claims, namely, that with flame welding a molten bath is obtained into which the new metal is melted, and thus when a weld has been made there is no line of demarcation between the new and the old metal.

WORN EQUALIZER BAR

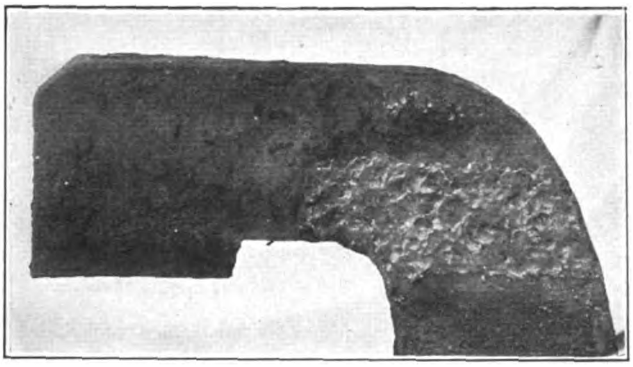
Heretofore when equalizer bars have been badly chafed by the top of the pedestal jaws it has been the practice to repair them in the blacksmith shop. The worn ends have been cut off and new ends welded on at a cost of about $1.50 per equalizer. The repair shown



Oxy-Acetylene Welding—Fig. 4—Compressor Frame Lug Ready for Welding



Oxy-Acetylene Welding—Fig. 5—Lug Welded on Compressor Frame



Oxy-Acetylene Welding—Fig. 7—Worn Area on Equalizer Filled with Welded Steel

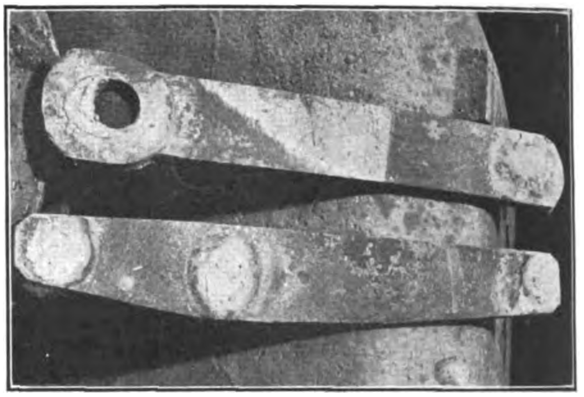
in Fig. 7 was made with the welder complete and ready for putting back into service in eighteen minutes at a cost of but 48 cents. This equalizer had been worn at both ends. At one end the depression was 5½ in. x 2 in. in area x 3/16 in. deep, and at the other end the depression was 6½ in. x 3 in. in area x ⅜ in. deep. Both of these depressions were filled in with new steel which, while still hot, was hammered flat with a machinist's hammer, so that when the welder had finished the equalizer was ready for use without grinding or machining.

CHIPPED FLANGE OF M.C.B. WHEEL

An interesting repair, which meant the salvage of a new 625-lb. cast iron M.C.B. freight-car wheel was made by filling in a chipped place with new cast iron. This wheel had been chipped in unloading. The missing chip in the back of the flange was 5 in. long x 2½ in. wide and had a maximum depth of ½ in. This new wheel could not be put into service because it would not pass M.C.B. inspection. The money loss of this wheel, unless the repair had been made, would have been about $4.

New metal was built into the chipped place until the flange was full, and this was done at a cost of 42 cents for labor and gas, in addition to the cost of twenty minutes' preheating with an oil torch. The cost of dressing was 20 cents. Fig. 8 shows the chipped flange before filling, and Fig. 9 is a close view of the repair.

No special preparation was necessary for making this repair. The wheel was lifted with the shop crane and laid flat on four fire brick, so that the oil-torch flame could heat it moderately. Care was taken in the preheating and in the welding not to remove the chill in the tread. The filler used in welding was a cast-iron rod containing a percentage of ferro-silicon. Thus the new metal is practically uniform with that of the body of the wheel, and after the surface of the weld was ground off the wheel was put into service.



Oxy-Acetylene Welding—Fig. 10—Holes Plugged in Link and Lever

WORN BRAKE LEVER AND SWING LINK

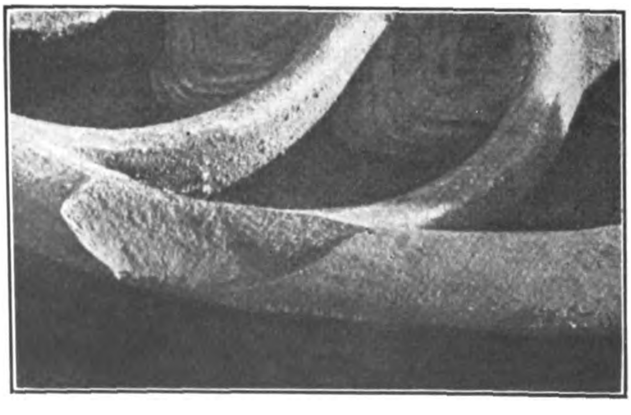
Fig. 10 shows the welds made to a brake lever and a swing link for a Baldwin truck. The hole in the link had been worn until it had a long diameter of 2¼ in. The thickness of the metal was 1½ in. It was repaired by the addition of ½ in. of new metal, which made the hole slightly smaller than its original diameter. The slot at the other end of the link was also completely filled with new metal. The total welding cost for this job was 37 cents.

All of the brake lever holes were filled with new metal. As in the case of the swing link, the brake lever was set upon fire brick, and the holes were filled with new metal which flowed into a close weld with the sides of the old hole. The cost for filling these holes was 42 cents. Both the brake lever and the swing link were preheated for five minutes in an oil furnace so that the welding time would be reduced and the amount of welding gas thus kept at a minimum.

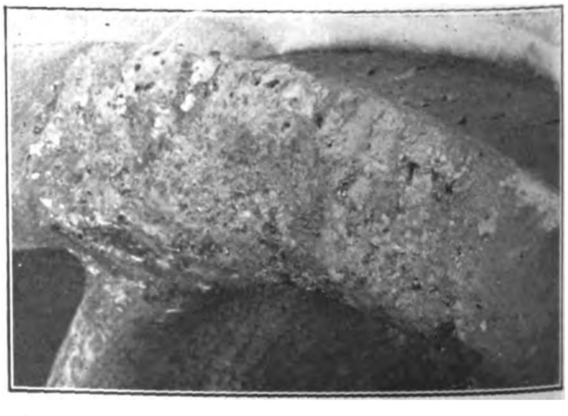
PATCHING A GEAR CASE

Fig. 11 shows the repairs made to the lower half of a worn GE-69 gear case. This had been worn through to a length of 9 in. where it had formerly been patched. This patch had been torn off in service. The case also had a crack 8 in. long at one corner of the 6-in. x 9-in. hole, and six ¼-in. rivet holes were to be filled, so that the case would be made oil-tight. The cost of the new case was given as $10.77, its scrap value 25 cents. The cost for welding on a patch, plugging the six holes and filling in the crack to make the case ready for service was but 49 cents.

On this job the cutting blow pipe was first used. In less than two minutes the operator had squared out a



Oxy-Acetylene Welding—Fig. 8—Broken C.I. Flange



Oxy-Acetylene Welding—Fig. 9—Repaired C.I. Flange

Oxy-Acetylene Welding—Fig. 11—Gear Case with Patch Welding In and Crack and Holes Plugged

6-in. x 9-in. hole. In the meantime a patch of that size had been cut in the tin shop. This patch was welded on in fifteen minutes, and the crack and six holes were filled in in another minute. This job could have been completed in a much shorter time if the gear case had been preheated, but it was welded without preheating to permit a study of its contraction and expansion characteristics.

BROKEN MAIN SHAFT OF BOLT CUTTER

On the day previous to the arrival of the welding apparatus at the Decatur shops the main shaft of the shop bolt cutter broke. This shaft was welded and put back in operation with less than two days' loss of service. If this repair had not been made at the shop the bolt cutter would have been out of service about three weeks while the new part was being ordered and delivered. Further, the renewal cost would have been about $20 as compared with a cost of 84 cents for welding and $1.50 for machining.

Fig. 12 shows the shaft, which was of hollow cast iron. It had an inside diameter of 2 in. The metal was ¾ in. thick. It was broken close to the fillet of the end flange. A large gear was keyed onto the other end of the shaft, and the repair was made without removing the gear.

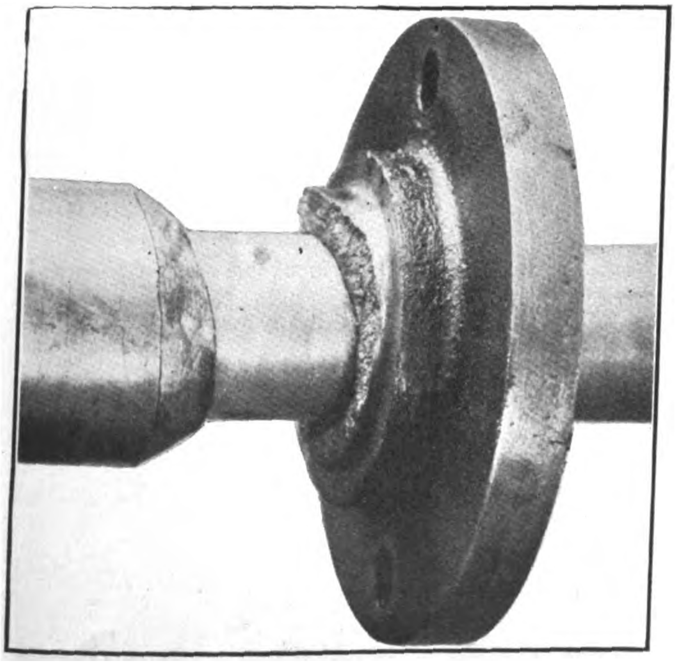
The first step was to grind one end of the break to a bevel, so that the blowpipe flame could reach the full surface of the break. Next, the two parts were slipped onto a mandrel and a clamp was placed against the face of the flange to hold it square with the shaft. Before welding, the parts were heated in an open oil flame for four and one-half minutes. Then new iron was welded in, Fig. 13, and the break was over-filled so that there would be plenty of metal for machining. It is stated that this shaft machined very nicely, free from flaws and that it has been in severe service since.

BROKEN GEAR TOOTH

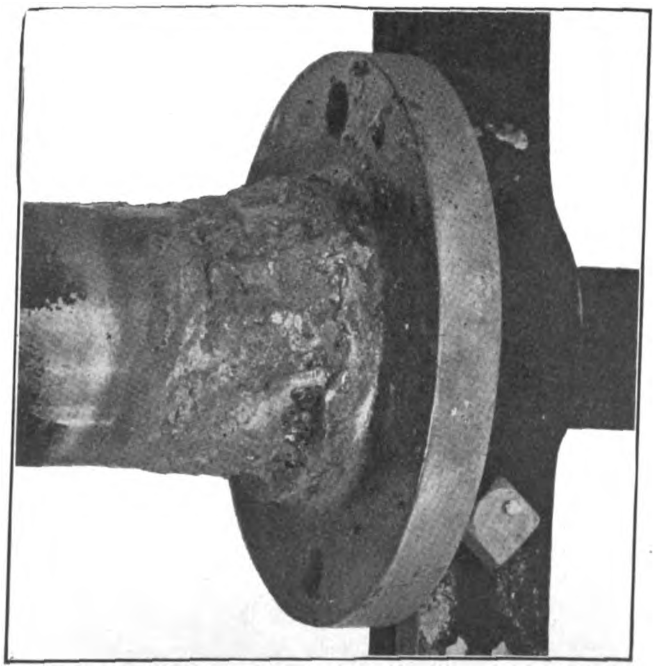
Fig. 14 shows one broken tooth in a GE-69 motor gear. This gear has sixty-eight teeth and a 5¼-in. face. It consists of a steel rim shrunk on a cast-steel center. The tooth was broken in unloading and therefore the new gear could not be used. This tooth was built up ready for grinding, Fig. 15, at a welding cost of but 42 cents. No special preparation was required other than that the broken tooth was heated with an open-flame oil torch for about ten minutes. In adding new metal a nickel-steel filler was used, and especial care was taken to match the metal of the gear and to manipulate the temperature so that the new metal would correspond closely in characteristics with the other teeth. The tooth was built up to full contour ready for grinding in fifteen minutes and with the use of but 8 cu. ft. of acetylene and 9 cu. ft. of oxygen. The total welding cost, exclusive of preheating, was 42 cents.

CUTTING UP CAR UNDERFRAME

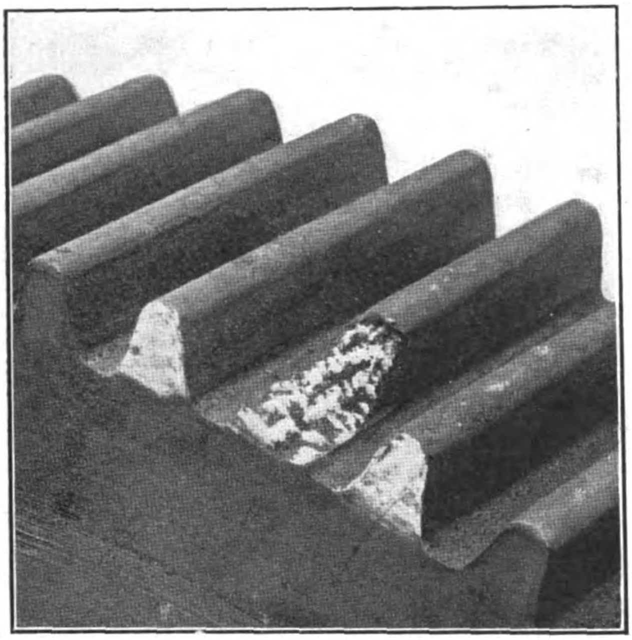
Figs. 16 and 17 show how the Prest-O-Lite cutting apparatus was used at the Illinois Traction System shop to cut up a car underframe for scrap purposes. This underframe was that of a large interurban car which had been burned. The underframe was in the scrap yard near the shop, and as it was unwieldy and difficult to break up, the cutting torch was used to disassemble the principal members. The underframe included four 6-in. I-beam center sills, four 3-in. x 3-in. x ¼-in. angles attached to two 18-in. x ¼-in. plate side sills, eight ¾-in. tie rods and four 2½-in. x 5/16-in. truss bars. The foregoing is an inventory of a section across the frame near the middle. This section was cut through and the frame entirely severed with the oxy-acetylene cutting torch in twenty minutes, even though some delay was occasioned by wood filler blocks on the four center sills, the wood preventing the torch from blowing the metal away from the cuts. After the frame had been cut, as shown in Fig. 16, the tie rods were cut so



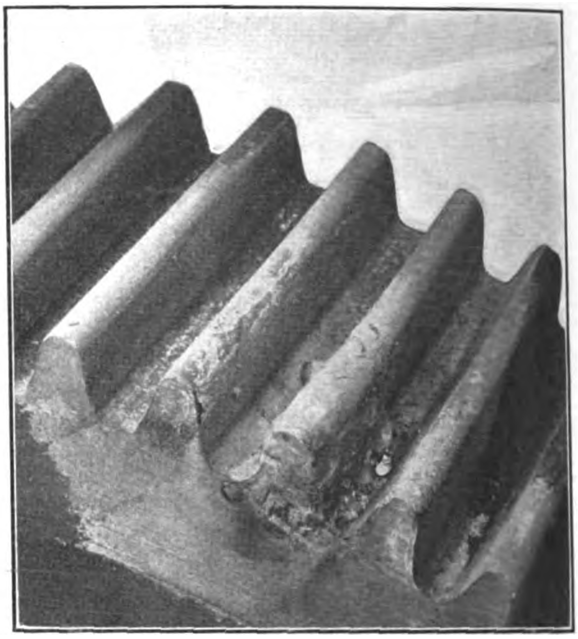
Oxy-Acetylene Welding—Fig. 12—Broken Cast Iron Shaft Ready for Welding



Oxy-Acetylene Welding—Fig. 13—Shaft with New Cast Iron Welded in Place



Oxy-Acetylene Welding—Fig. 14—GE-69 Gear with Broken Tooth



Oxy-Acetylene Welding—Fig. 15—New Nickel Steel Tooth Built in Gear

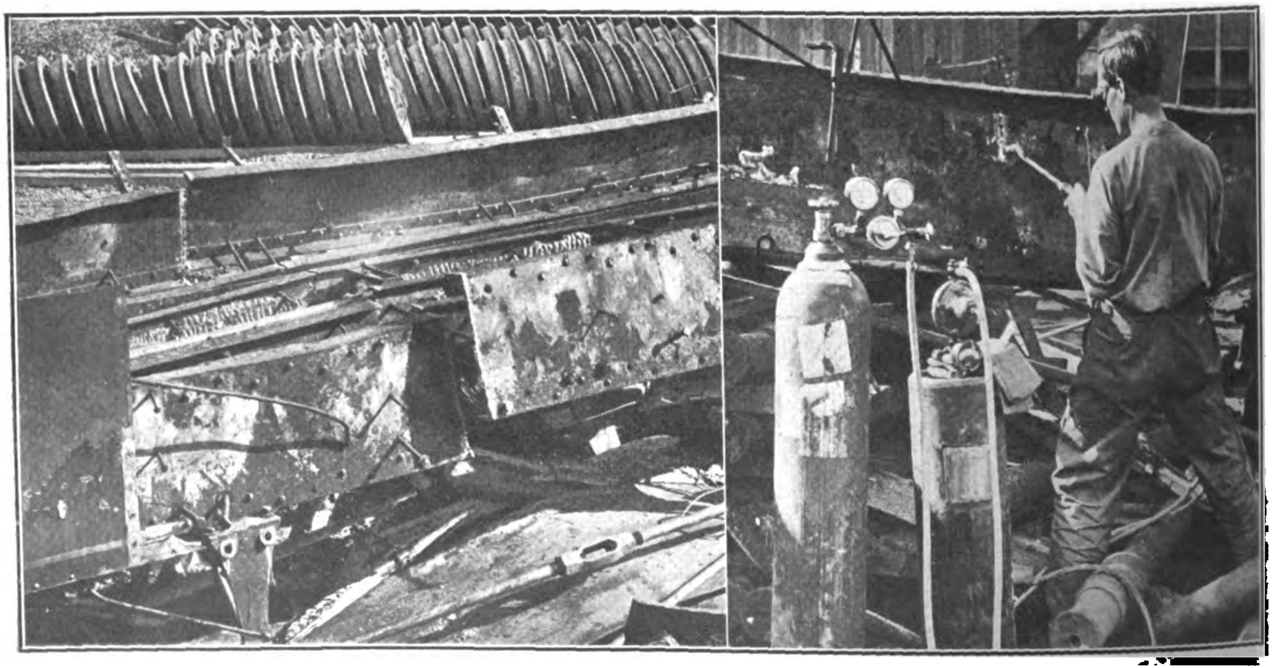
that the side sills and the four center sills fell apart. The cost (labor and gas) for making the cut across the center of this underframe was $1.02. Fig. 17 shows the operator at work in making a cut on one side of the 18-in. side sills. All of the apparatus required for the job is shown in view.

Another job which demonstrated the large saving by the use of the blow-pipe was that of cutting off the heads of the bolts and rivets which hold the coupler anchorages between the steel sills of 80,000-lb. capacity freight cars. This task ordinarily requires three men's work for ten hours, but one man with the oxy-acetylene torch did the same stint in forty minutes.

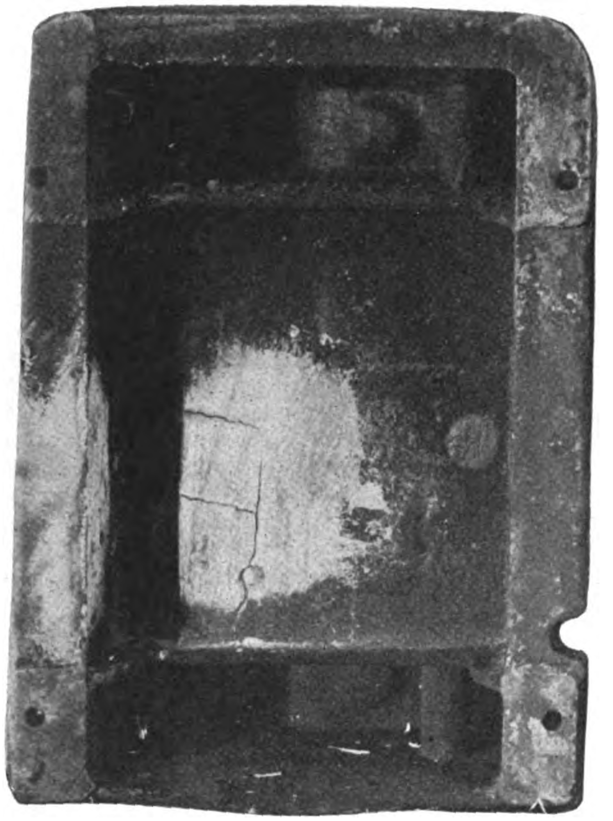
CRACKED MOTOR-COMPRESSOR CASTINGS

Figs. 18 and 19 show a National B-2 motor-compressor case before and after repairing with the blow-pipe. This case, which costs new $37.50, has a scrap value of about 75 cents and was repaired ready for reassembling at a cost of 30 cents, exclusive of a few cents worth of oil and labor required for preheating. The case had four bad cracks in the bottom and side of the oil well just below the cylinders. The ordinary way of repairing would have been to rivet on a steel patch, but this would have been exceptionally difficult to make tight, because the cracks were on two sides of the oil well. The repair was made with the blowpipe in twenty-five minutes.

The case was stood bottom-side up on the shop floor and an inclosure of loosely piled fire brick was built around it. The bricks were piled so that a hole was left through which an oil torch flame could be directed into one of the cylinder openings for preheating the casting. A sheet-iron cover was laid over the brick inclosure and the preheating was carried on for twenty-five minutes until the compressor casting had been brought to a dull red heat. Then the sheet-iron cover was removed and the four cracks were welded in eight minutes. A

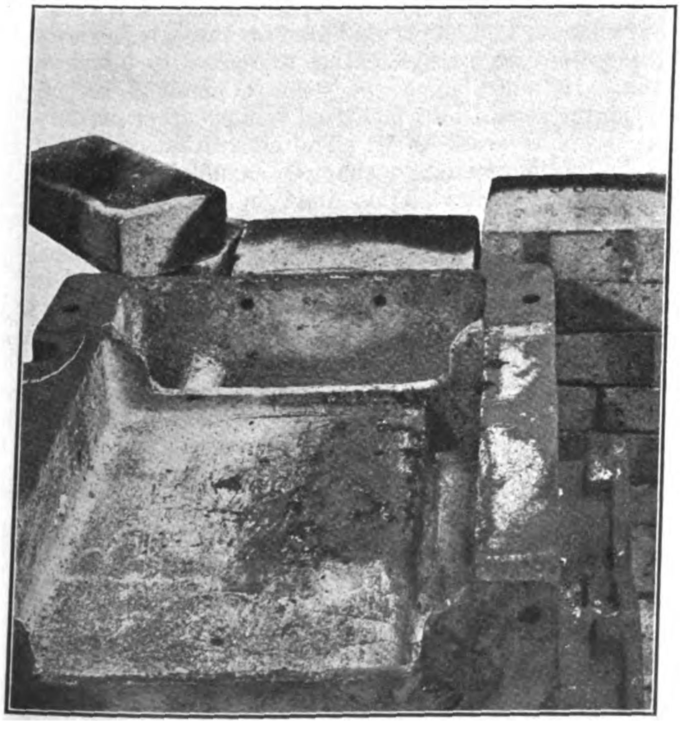


Oxy-Acetylene Welding—Figs. 16 and 17—Interurban Underframe as Cut Across with Blow Pipe, and Operator with Outfit Used in Cutting Underframe



Oxy-Acetylene Welding—Fig. 18—Cracks in Bottom of Compressor Case

small blowpipe nozzle was used in this work. This nozzle discharges 15 ft. of acetylene and 17 ft. of oxygen per hour at atmospheric pressure. Thus the approximate amount of gas consumed for repairing this casting was 4 cu. ft. of acetylene and 4½ cu. ft. of oxygen at a cost for gas of not more than 17 cents. The labor cost was 13 cents. The total cost of repairing this expensive casting and of making it oil-tight and ready for reassembling was less than 50 cents.



Oxy-Acetylene Welding—Fig. 19—Compressor Case After Welding Cracks

STUDY OF TRAFFIC CONDITIONS IN NORFOLK

The Chamber of Commerce of Norfolk, Va., has recently been making a study of the traffic conditions in Norfolk. The matter came up through a request of the Virginia Railway & Power Company to the City Council for a modification of its franchise provisions which are complicated largely because the present system is a consolidation of a number of smaller lines. Among other requests the company asked to be relieved of the obligation to carry passengers for three cents and sell tickets at the rate of 2½ cents on one of its lines between the hours of 5 a. m. and 8 a. m. and between 5 p. m. and 7 p. m., also from the obligation to sell twenty-five tickets for $1. On other parts of the system the company sells six tickets for 25 cents, and the company proposed to make this fare standard on all its lines. It also agreed to increase the number of transfer points, to change the gage of all of its lines to that of the greater part of them, namely 5 ft. 2 in., and make other improvements. It also suggested that the license tax on lines in Norfolk, which was not definitely fixed in the existing franchises, should be established on an equitable sliding scale. The company also requested a renewal of its lighting contract with the city.

This proposition has been before the Council for more than a year but no action has been taken. Some time ago the Chamber of Commerce engaged Delos F. Wilcox of New York to investigate the situation, and his report has recently been rendered. On the question of fares, he gives the following distribution of earnings on the different classes of tickets for an average day:

ANALYSIS OF AVERAGE DAILY PASSENGER EARNINGS

Transfers and complimentary..	9.5 per cent =	6,080 =	$0.00
School tickets at 2½ cents.....	1.1 per cent =	704 =	17.60
Labor tickets at 2½ cents.....	3.1 per cent =	1,984 =	49.60
Labor fares at 3 cents.........	3.3 per cent =	2,112 =	63.36
Book tickets at 4 cents........	3.9 per cent =	2,496 =	99.84
Strip tickets at 4⅛ cents......	22.4 per cent =	14.336 =	597.38
Cash fares at 5 cents..........	56.7 per cent =	36,288 =	1,814.40
Total daily passengers.....	100 per cent =	64,000 =	$2,642.18

Mr. Wilcox says that he cannot say whether any particular rate of fare is reasonable without a further examination into the investments and operating costs of the system, but he does recommend a uniform rate of fare on all city lines and at all hours of the day. He also criticises the complexity of the present car license system and recommends one which is simpler and less arduous in the following words:

"Careful students of public utility problems are pretty well agreed that the policy of 'soaking' the companies with heavy license fees and franchise taxes, to be used in helping to run the city government, is not conducive to a proper adjustment of the relations between the public and the utilities. What far-sighted public policy demands of a public utility from the financial standpoint is, first, good service; second, the maintenance of the physical property in first-class operating condition, with adequate provision for depreciation and the writing off from capital account of all portions of the investment representing superseded or discarded property; and third, reasonable and uniform rates."

Mr. Wilcox's recommendation as to gage was that all lines should be changed to 4 ft. 8½ in. He further urged the city to enter into negotiations with the company for a resettlement of the relations between them so far as street railways are concerned on the basis of a new thirty-year franchise with uniform provisions covering all lines, adequate protection for investment, effective supervision and a reasonable scheme for insuring the construction of immediate extensions in the future.

Meeting of Central Electric Railway Accountants' Association

This Meeting Was Held in Toledo, June 24—E. L. Kasemeier Read a Paper on "Compiling Operating Expenses" —Reports Received from Committees on Passenger Accounts and Freight Accounts

The meeting of the Central Electric Railway Accountants' Association was held at the Hotel Secor, Toledo, Ohio, on June 24, preceding the meeting of the Central Electric Railway Association. The president, L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, called the meeting to order.

Mr. Hixson reported that no answer had been received to a letter addressed to the Secretary of the Treasury on behalf of the association, requesting an early construction of certain parts of the income tax law. This letter was drafted by a committee composed of Henry J. Davies, secretary Cleveland Railway; H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway, and E. L. Kasemeier, auditor Ohio Electric Railway. The letter was sent to the Secretary of the Treasury on Jan. 12, 1914.

H. B. Cavanaugh, chairman of the compiling committee, reported in regard to the work of that committee.

COMMITTEE ON PASSENGER ACCOUNTS

The report of the standing committee on passenger accounts was read by the chairman, Walter Shroyer, auditor, Union Traction Company, of Indiana. The other members of this committee are C. E. Thompson, Chicago & Milwaukee Electric Railroad; F. Pantel, Chicago, Lake Shore & South Bend Railway; E. D. Gault, Reading, Pa., and E. O. Reed, Western Ohio Railroad. An abstract follows:

The committee held a meeting at Fort Wayne, Ind., on May 21, 1914. Various matters were taken up and acted upon, as follows:

The committee received a complaint that its recommendations in regard to reporting C.O.D. baggage checks was at variance with the instructions printed on the back of the checks. The committee recommends that the present method of reporting be continued and that the instructions printed on the backs of the checks should be changed to conform therewith as soon as new checks are printed.

The committee recommends, further, that when baggage is forwarded under a C.O.D. to a point on the line of a foreign carrier, the accounting department of the forwarding carrier should promptly notify the accounting department of the terminal carrier on standard blank form, giving full information to enable the terminal carrier to make proper collection and distribution of the revenue.

Further discussion of the C.O.D. baggage proposition by the two members of the committee present resulted in a final conclusion that in their opinion, the association should by resolution record itself as being in favor of discouraging C.O.D. baggage shipments, recommending that all charges should be settled for at the starting point before baggage is forwarded. The exceedingly small number of these checks used would indicate that the traveling public does not demand this service and their use only adds to the burdens of agents and the auditor's office.

Another suggestion was that the date of rendering the interchangeable mileage statements be changed from the fifth to the tenth of each month, but the committee recommends that no change be made. It also recommends that the mileage bills and coupons should be addressed to the auditor of the company instead of to the company only, as heretofore.

No mention was made of exchange orders in the last report of this committee. This is a form used in isolated cases by electric lines interchanging passenger business with steam roads, and then only in case of absolute necessity. Such orders consist of going and return coupons for use on the issuing line between the issuing station and point of exchange with the steam road, together with the usual form of agent's stub and form of order on the agent of the connecting steam line for a ticket to destination. On presentation of the order to the agent of the foreign line at the point of exchange, the same is taken up and a ticket to the destination shown and return to the point of exchange is issued. The initial carrier sends to the carrier on which orders are drawn a report of all such orders. The total of the amount column is added to the regular interline ticket report to the exchanging carrier for the current month. If orders are drawn for tickets to points beyond the line of the exchanging carrier, such carrier will report the proportion accruing to each connecting carrier.

The report of the committee was adopted.

COMMITTEE ON FREIGHT ACCOUNTS

The report of the standing committee on freight accounts was read by the chairman, E. L. Kasemeier, auditor Ohio Electric Railway. The other members of this committee are: George L. Ford, Evansville Railways; H. E. Vordermark, Ft. Wayne & Northern Indiana Traction Company; C. B. Baker, Toledo, Bowling Green & Southern Traction Company, and H. W. Bradtmiller, Ft. Wayne & Northwestern Railway.

The report of this committee recommended a number of changes and additions based on the existing recommendations of the association in regard to interline billing. In addition to the definite changes recommended, the committee considered various other matters which were referred to it. The committee concluded that in its judgment, no changes should be made on the following items: Time limit on corrections, separate tracer for each unreported waybill, astray freight waybill, holding open received abstracts for several days after end of month to get in all waybills dated in that month, and moving up date for sending in reports to other roads.

The committee was unable to make a report at this time on trail car rates, reports, records and payments and asked for further time for the consideration of this subject, stating that it would include this in its next report.

The report was discussed in detail. Among those who took part in the discussion were: F. T. Loftus, Indianapolis & Cincinnati Traction Company; L. T. Hixson, and Walter Shroyer. The report of the committee was accepted with slight changes.

Mr. Cavanaugh reported that no questions had been submitted to the query box committee.

AFTERNOON SESSION

At the afternoon session, W. B. Wright, assistant business manager of the Toledo *Blade*, made an address on "Some Accounting Problems—Not Electric." Mr Wright was a charter member of the association and is now an honorary member.

E. L. Kasemeier then made an address on "Compiling Operating Expenses." An abstract of this address is published below.

In answer to a question Mr. Kasemeier stated that he tried to get bills on one voucher for each firm. In the case of discount bills this, of course, was not possible. It was sometimes simpler to make vouchers immediately than to delay them for other bills. He also said that he found it was better to make all corrections on bills in one entry at the end of the month.

Mr. Shroyer referred to his experience with payrolls. He has found that the most satisfactory results have been obtained since he began to keep the time in his office.

Mr. Cavanaugh explained the accounts payable ledger which he uses. As soon as invoices are received from the purchasing agent, they are entered in the ledger. A balance is taken every month.

President Hixson said that he had received letters from F. J. Pryor, Jr., American Railways Company, chairman of the committee on education of the American Electric Railway Accountants' Association, in regard to the course of education in accounting which is to be introduced under the auspices of that association.

After discussion, it was decided that the secretary should send a letter to members, describing the plans of the American association and expressing the approval of the Central association in regard to the movement. A motion formally endorsing the work was passed.

The new classification of accounts of the Interstate Commerce Commission was discussed briefly, so far as information in reference to it was in the hands of the members. It was stated that the latest advices from Washington were that the classification would reach the electric railways affected by June 24.

T. P. Kilfoyle, auditor Cleveland Railway, said that he would be glad to send copies of his forms in case they should be finished before copies of the new classification reached all members.

The meeting then adjourned.

COMPILING OPERATING EXPENSES

BY E. L. KASEMEIER, AUDITOR OHIO ELECTRIC RAILWAY

This subject embraces many thoughts and ideas, and a number of them will be briefly referred to.

Taking up first the contracts, we have those with: (1) Supply firms for purchases of material in large quantities, such as cross-ties, steel rail, etc.; (2) Railroads for joint arrangement for stations, power, use of tracks, etc.; (3) Contractors, for construction of tracks, buildings, bridges, etc.; (4) Sundry individual firms or companies for many reasons, the originals of which are usually filed in the vault of the company in custody of the secretary or auditor. Copies of these contracts should be made for each official of the company interested, and particularly should the auditor be furnished with a copy of each contract affecting the receipts or disbursements of the company. These contracts, or copies, when received in auditor's office, should receive consecutive numbers, filed in that manner and indexed under party and place so that they can be instantly referred to. Extracts in condensed style should be made of such contracts that provide for payment of money to or by the company, and such extracts furnished to the various clerks interested.

The clerk handling the voucher payable or the collection voucher desk will file these extracts alphabetically, or in numerical order and indexed, so that bills from other companies or bills against other companies will be checked against the contract extract. A rubber stamp should be used to indorse each voucher payable or collection voucher stub, somewhat as follows:

"Checked Against Contract No. —— by ————."

It is preferable to have the vouchers payable and the collection vouchers made in other departments and passed to the auditor's office, although for the sake of economy the vouchers payable may be prepared in the auditor's office from bills approved by superintendents, chief engineer, storekeepers, etc.

FORM OF VOUCHER

In my opinion, the best form of voucher is one with perforations at top between the face or pay part, and the stub or carbon copy, both the pay portion and the stub being made at one writing by the use of carbon paper. The lower half of the face of the voucher should be a check or draft and should be separated from the upper half by perforations. On the upper half should be written an explanation of what the payment is intended to cover, such as list of invoices, showing dates, numbers, order numbers, etc. This upper half should be retained by the party to whom payment is made, he tearing off the lower portion or check, indorsing it and placing in bank for collection. Both the upper half and the lower half of the face should be numbered so that when the payee retains the upper portion, he can properly show the voucher number on his books and keep a detailed list of items covered by payment in his files.

On the back of the stub portion is placed the number, name, amount and distribution. The bills or other memoranda are fastened to the face portion of the stub, which is folded and becomes a cover or protection for such papers. Vouchers are numbered consecutively and so filed temporarily in an upright position in wooden boxes, made to clasp the papers easily and tightly and to be quickly opened when vouchers are to be extracted. After a few months, the vouchers are transferred to permanent covered pasteboard boxes. If sufficient numbers are allotted to take care of any month, the numbering can be easily done for any month, before all are made for previous month; that is, if vouchers run from 1500 to 2500 per month, 3000 numbers should be allowed, beginning the first month with 1, the second month with 3001, the third month with 6001, and so throughout several years.

ENTRY OF VOUCHERS

After the vouchers have been properly verified as to rate, calculations, distributions, etc., they should be written on a voucher payable register. On the left-hand side of the book is shown the number, in whose favor, address, for what period covering, total of voucher, date paid. On the right-hand side of the page is the distribution, columns for each group of operating expenses, such as ways and structures, equipment, etc., material accounts, outside parties, betterments, and general ledger items. After all vouchers for the month's account have been entered in the register book, a recapitulation is made and from such recapitulation, a journal entry, charging operating expenses, material or other accounts and crediting the vouchers payable account.

Vouchers payable, after being recorded in the register book, should also be entered in an index book. This index book should be loose leaf, and the names should be entered thereon in alphabetical order so that no page index is necessary. Both sides of the sheet can be used and four names written on each side. Some companies use a card index for this purpose, but I prefer the loose leaf ledger, because it can be handled more quickly and reduces the work of indexing 25 per cent. The amount for any name can be found much more quickly than if on a card, when reference is necessary, and the danger of losing a card is not present. This is an index only showing month, voucher number, amount and for what. The ledger account is kept on the register book, already mentioned. When the vouchers are paid, the column headed "date paid" is stamped with a band dater, and all items unstamped are drawn off as a detailed statement to balance with the general ledger item.

COLLECTION VOUCHERS

Collection vouchers, or bills against individuals, other roads or companies, should be prepared in duplicate; that is to say, the auditor's office should retain a carbon copy of the portion sent out for collection. The auditor's stub should have a place for distribution on the back of the stub, just as with the vouchers payable referred to.

Collection vouchers should be numbered consecutively, or in the same manner as outlined for vouchers payable, with the exception that usually less numbers will have to be allotted for each month. They should be recorded in a register book somewhat like the vouchers payable register, this book showing, on the left-hand side, number, name, address, date mailed out, to whom, for what period and amount. On the right-hand side, the distribution is shown.

After collection vouchers are entered in this register, they should be posted into a loose-leaf ledger. The cash items should also be posted into this ledger and the closed-out items checked in red ink. Trial balance from this ledger should show an analysis of the general ledger balance for the collection voucher account. This ledger shows sufficient information to make "dun" statements at the end of the month or when desired. A series of numbers should be allotted for dun files, and a number should be given to each account, this number being placed on the ledger sheet near the party's name for quick reference to the file. All copies of statements, letters sent and also those received should be put on this dun file so that complete correspondence in regard to the account is at hand when needed.

On most large roads where a great many collection vouchers are returned for correction (this especially for steam roads' car repair bills), it is advisable to make one journal entry each month to increase or decrease the amount of all bills. This is very conveniently handled by listing these changes on a sheet of paper under the following headings: Bill No.; Against whom; Original total; Changed to; Increased amount and account credited; decreased amount and accounted debited.

In making the journal entry, only the figures under the columns "increased" and "decreased" are taken into consideration.

PAYROLLS

Payrolls should be divided into classes, such as: general officers and general office clerks; superintendents' offices, dispatchers, etc.; agents; roadway; power house and substation; linemen; mechanical; trainmen.

A recapitulation should be made of sheets for each class by each superintendent's office for its district, and a distribution sheet for each recapitulation sheet. From the payroll sheet is written up a payroll register. Rolls should be numbered and recorded on these sheets in the same order each month so that they may be instantly turned to after being bound. A total for each roll is shown, and the distribution entered in columns to the right, the same as on the voucher register book, one journal entry being made for all the rolls, charging operating expenses, etc., and crediting payrolls or the pay check account.

DIVISIONAL ACCOUNTS

On roads, where it is necessary to keep a separation of earnings, operating expenses, etc., between sundry divisions or districts, this is done on what may be called detailed sheets. They also serve as a quick reference for locating the increases in operating expenses for the present month compared with previous year. A sheet, half sheet or necessary part of a sheet is allotted for each account number. On this sheet is first entered the payroll distribution items, next the vouchers payable, then the charges from material or store issues, fuel issues, sundry other journal entries, both debits and credits, then the credits from the collection vouchers. Debits are entered in black ink and credits in red ink.

For a small road where the expenses are not kept separate to operating divisions or districts, this detail sheet for comparative purposes should be made on one form which will cover an analysis of the account for an entire year and indicate very quickly where the increases arise.

DISTRIBUTION OF CHARGES TO OPERATING EXPENSE ACCOUNTS

To avoid mistakes in getting the various charges to the proper operating expense account numbers, also to enable the clerks to close up the expenses promptly when all the journal entries are finished without having to look for possible mistakes, the following method is used in my office. You will note the voucher payable register book has a small column for the account number under each of the general and operating heads or groups and that the vouchers are entered on the register to show the exact account numbers. In the same manner, we register the collection vouchers and also the payrolls. About the tenth of the month, or after all the payroll distributions have been entered on the register sheet, a pick-off is made from these sheets to a large sheet to get the total charge to each operating account number. These total charges to each account are checked against the total of items entered on the detailed sheets. Any differences can be quickly located and adjusted. Then these charges from the payrolls are entered on a large sheet, under the vertical column headed "payrolls," opposite the corresponding expense account number at the left. The same procedure is used with the vouchers payable and the collection vouchers. Then the store issues and fuel issues are entered in their respective columns, and the various debits and credits from all other entries are abstracted on a separate sheet of paper to get the totals for each account which are entered on a large cross-ruled sheet. This large sheet is then added horizontally for each line or account number, and the figures standing in the last column, net debit, are checked against the totals of accounts shown by detailed sheets and are the proper expenses for the month. By the use of this method, mistakes cannot easily be made in arriving at the total charge for each account, and if an error has been made somewhere, it is surely and quickly caught. The totals of the groups as shown by this form are checked with the general ledger before being recapped.

At first glance, this method may appear to be too cumbersome and expensive, but the work of picking off the items from the register book, the collection voucher book and payroll register and putting them on this form takes very little time, and is by far the quickest way of verifying the correctness of the charges to each account as shown by the detail sheets.

Papers at The C. E. R. A. Convention

Abstracts of Three Papers Read at Toledo Meeting on June 25 — They Relate to "Credit of Public Utility Companies," "Field Control Equipments" and "Central Electric Railway Traffic Association."

FIELD CONTROL TEST IN TOLEDO.

BY F. E. WYNNE, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY.

Last month some tests were made on the Long Belt Line of the Toledo Railways & Light Company for the purpose of determining the relative energy consumptions of similar equipments with and without field control. The line is a loop, 7 miles in length, and in general is level. There are three railroad crossings, and the observations taken during the test showed that there were twenty-two points at which the cars always stopped.

Duplicate, single-end, double-truck, pay-as-you-enter type cars, Nos. 669 and 670, were tested. Both were built by the company. Car No. 669 had a double equipment of 310-C motors, 17:70 gear ratio, and K-36-J controller. Car No. 670 had a double equipment of 310-C-3 field control motors, 15:72 gear ratio, and K-51-A controller. The 310-C motors were geared 17:70 in order to match with the speed of previous equipments, this being found necessary for maintaining the schedules on certain lines where a considerable amount of full speed running was secured. Car No. 670 was given a gear ratio of 15:72 in order that its speed on normal field might match that of the 310-C, with 17:70 gear ratio, as nearly as possible.

Each car weighs 41,000 lb. completely equipped, exclusive of load. Car No. 670 was tested on May 6, and car No. 669 on May 7 and 9. On each of the first two days, thirteen complete consecutive trips were made, and on the third day twelve such trips were made.

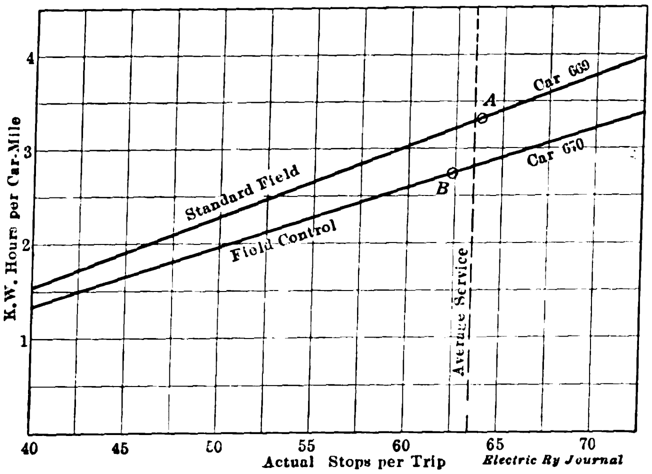
The table gives in condensed form the service conditions as derived from the three days' tests. It was deemed unnecessary to take voltage readings on all of the trips, therefore voltages are marked approximate. The remaining items are averages for ten daily trips on which complete observations were made, with the exception of number of stops, slow-downs and kilowatt-hours per car mile which cover the total number of trips made. In deriving the equivalent number of stops, two slow-downs were considered equivalent to an actual stop of zero seconds duration.

AVERAGE RESULTS OF FIELD CONTROL TEST BY TOLEDO RAILWAY & LIGHT COMPANY

	No. 310-C Standard Equipment	No. 310-C-3 Field Control Equipment
Voltage—Power on*	505	494
Voltage—Power off*	522	512
Passengers and crew—Average No. per trip	38.11	35.24
Average weight of loaded car—pounds	46,335	45,934
Time of trip, excluding lay-over—minutes	50.58	50.45
Schedule speed—m.p.h.	8.52	8.54
Actual stops per mile	8.90	8.70
Average length of actual stop—seconds	9.44	8.53
Slow-downs per mile	1.28	1.70
Equivalent stops per mile	9.54	9.55
Average length of equivalent stop—seconds	8.80	7.82
Kilowatt-hours per car mile	3.34	2.76
Watt-hours per ton mile	147.2	119.9

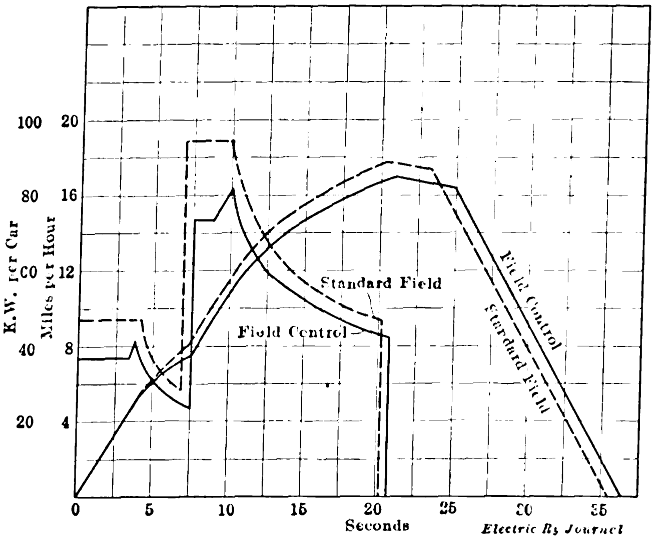
*Approximate.

From this table it will be seen that the voltage, total weight of loaded car, schedule speed and number of equivalent stops per mile were almost identical, the principal difference in the services of the two cars being the average length of stop. The next to the last line in the table shows that the kilowatt-hours per car mile for the total thirty-eight trips indicate that the motor without field control takes 21 per cent more energy for its operation than the motor with field control. The figures in the last line as derived from the thirty trips on which complete observations were made indicate that the watt-hours per ton mile for the motor without field control were 23 per cent greater than for the motor with field control. These percentages were higher than would be obtained with identical service for the two cars because the service conditions for the field control cars were less severe than those for the car without field control.



Field Control in Toledo—Fig. 1—Comparative Energy Consumptions

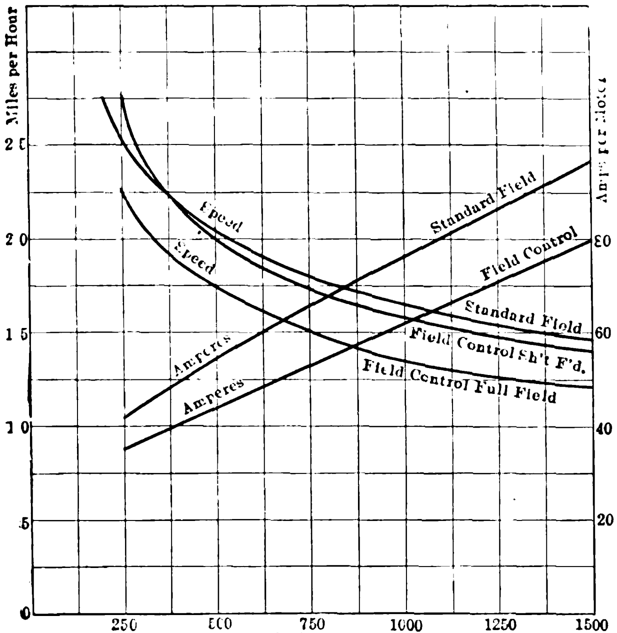
Fig. 1 shows the average power consumptions of both cars plotted on the same sheet for comparison. The point *A* corresponds to the average service conditions for car No. 669, while point *B* corresponds to the average service conditions for car No. 670. The broken vertical line is drawn through the point of average service for all thirty-eight trips with the two cars. While the energy consumption at *A* is 21 per cent higher than at *B*, as shown by the table, the difference between the values at which this average service line



Field Control in Toledo—Fig. 2—Speed Time and Speed Power Curves of Both Motors for Average Runs cuts the two curves is 17 per cent. This checks very closely with the calculated difference for this service. It is, therefore, safe to state that, under the average service conditions on the Long Belt Line in Toledo, the equipment without field control requires 17 per cent more energy than the field control equipment.

Fig. 2 gives calculated speed-time and energy curves for the average observed services with the two cars and shows clearly that the greater length of stop for car No. 669 on the days when the tests were made was responsible for the fact that this car actually used more than 17 per cent more energy than car No. 670.

The inherent advantage of field control is due to the difference in motor characteristics as illustrated by Fig. 3. This curve shows that the short field characteristic of the field control motor with 15:72 gear ratio is very close to that of the standard motor with 17:70 gear ratio. In fact, the two are as close as can be secured with standard gearing. It will be seen that the field control motor runs slightly faster than the other so long as the tractive effort is less than 375 lb. per motor. With the car used in Toledo 375 lb. per motor corresponds to a tractive effort of 32.5 lb. per ton, which should be sufficient to propel the car at maximum speed on any grade up to 0.75 per cent. On heavier grades, it will be seen that the field control motor is slightly slower than the other, the maximum difference being 5 per cent. In city service where the stops are frequent, this slight difference in speed at the higher tractive effort is immaterial, so far as maintaining the schedule is concerned.



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Field Control in Toledo—Fig. 3—Comparative Speeds, Currents and Tractive Efforts

The full field speed curve for the field-control motor is also given in this figure, and shows that the resistance on the car is cut out at a little less than 80 per cent of the speed at which this resistance is cut out on the standard motor. This means that the time the resistance is in circuit with the field-control motor is only 80 per cent of that with a non-field-control motor. No resistance is used in passing from full field to short field. When the car is running on resistance the current for developing a given tractive effort, that is, for a given rate of acceleration, is slightly less than 80 per cent of the current which would be required with the standard motor.

In closing, it should be said that field control is not to be considered a cure-all. Excessive energy consumption results from the use of heavy cars, unskilful motormen, incorrect gearing, poor voltage and other everyday incidents of operation. There are certain combinations of service conditions where field control equipment would be an unnecessary refinement. However, it may be taken as a well-established general principle that in service with frequent stops, field-control equipments are well worth while, and that the more frequent the stops the greater will be the benefit secured by using them.

THE CREDIT OF PUBLIC UTILITY COMPANIES

BY C. EDGAR ELLIOTT, OF BREED, ELLIOTT & HARRISON, BANKERS, CHICAGO, ILL.

As you all know, the three most important things that go to make up credit are:

1. The real property itself, that is, the plant.
2. The net earnings with which to pay the interest.
3. The ability to repay the money at maturity date.

It makes no difference how fine the plant, if it is incapable of earning not only the exacted interest return on the money loaned but a fair margin above interest requirements, to give what the banker calls "the margin of safety."

The banker and the investing public have no fault to find, as a rule, with the utility companies of this country in the matter of the physical conditions of their property, as they, through the liberality of the investing public, have, in the main, the best railway, gas and electric facilities in the world. So, it is not with this that any fault can be found, but there is a fear that there will be an ever-decreasing margin of safety of earnings, due to unfair regulation by the public.

The public demands the very best possible service, at the very lowest possible cost, and in this latter lies the danger. It has become the custom for every community to regulate the selling price per unit of service of every public utility company, and in this itself there can be no fault found if the public, in its greed and desire for the lowest possible charge for service, had not entirely overlooked the cost of that service to the company itself. The members of the public do not realize that it is necessary for the company to have such net earnings that its credit will not be impaired and that they themselves should be the ones most interested in keeping the credit of their own public utilities sound. It is only in the companies' ability to borrow money that they can be furnished with the best service.

The present street railways began with the horse car, which was discarded for the cable, and it, in turn, for the storage-battery car, and that was discarded for the modern trolley car, with its first central station. The station itself went through the same evolution, discarding one type of machinery for another, so that to-day the people of American cities are not compelled to live in crowded, restricted areas but live largely in their own homes, far away from the business district. All of this has been made possible by the discarding of obsolete motive power, rails and coaches long before they were worn out. There is no need to follow the many changes that have taken place in the plants of the other public utilities, such as telephone, gas and electric light, as they have passed through the same evolution, discarding good machinery for that which would give the best possible service at the lowest possible cost.

We are now asking, how was it possible for the different companies to keep constantly changing their good machinery for better and more efficient equipment? It was through the credit given them by the investing public, under the guidance of the investment banker.

After the first venturesome speculative capital proved that these companies were not only a necessity but a profitable venture, the storehouses of investing wealth were at the command of the different companies and will remain so, as long as the companies can show that, above operating expenses, they earn more than enough to pay the interest on capital borrowed and will have credit or money, with which to pay the principal at maturity date.

THE SORT OF CREDIT NEEDED

Now, what sort of credit do the public utility companies need? It is not the same sort that the merchant or manufacturer desires—thirty, sixty or ninety days—but it is for a long period of time, say, thirty, sixty or even 100 years. Therefore, the investor or the one loaning the money has to feel sure that the company borrowing will either have earned enough money during that period of time to pay the necessary interest and principal, or that it will be able to keep its plant and earnings in such shape that it will be able to secure a new loan with which to repay the old one at the maturity date.

In looking this situation over, two conclusions were reached by the investment banker:

1. That if the companies were required to take from their earnings the amount necessary to pay the interest and repay the principal at maturity date, they could not give the best possible service at the lowest possible cost.

2. That these companies would have at the end of the given time, provided they were properly maintained and a sufficient allowance was made for depreciation and obsolescence, as good a property or plant as they had when the loan was first made, and upon these plants or properties they ought to be able to negotiate a new loan with which to pay off the old one.

This latter method was the one which was generally adopted and has made it possible for the communities to receive these different necessities at the cost that they have. You all know that if the other method, that of being able to save enough from their earnings to repay the principal, had been adopted, it would have been impossible to furnish the communities with service at anywhere near the price at which they have received it.

THE PRESENT SITUATION

But, now we are facing an entirely new situation. The tendency of the last few years has been for the communities to regulate the selling price of the unit of service without giving due regard to the ever-increasing operating expenses and the necessary charge-off for depreciation and obsolescence. Consequently, the investor no longer feels that he can loan his money for a long period of years but must make it for a short time.

What the companies need is assurance on the part of the public that they are going to receive for a period of years the right to operate their properties under such conditions that they can not only make a profit upon the capital represented but also maintain them in the highest state of efficiency and that, at the expiration of that period of years, they will have the right, for another period of years, to operate their property under as favorable conditions as they have in the last period. I do not mean that it is necessary for the selling price of the unit of service and the conditions as fixed in the original franchise or grant to remain forever the same but that the relative position of fixed charges to net earnings must be maintained and this, after an ample allowance has been made for depreciation and obsolescence.

It is the duty of you gentlemen to arouse the public, in their own selfish desire for good service, to realize the necessity that, in regulating rates, it is absolutely indispensable to bear in mind the need of maintaining the company's credit, so that it can at all times go into the money markets of the world and secure funds with which to make the necessary extensions and improvements and repay their debts.

Remember that this cannot be done under the methods that are now in vogue in this country; that is, for the public to keep the selling price of the unit of service down to the lowest possible cost for the longest possible time and then stingily grant a small increase, without regard to the future need and credit of the companies. To illustrate what I have in mind, I call your attention to the present railroad rate case. After a considerable number of years, in which the railroads have been selling their service at a fixed price, while their operating expenses have yearly and almost daily increased, and after having made several futile efforts to increase their selling price, we are now told that they are about to have the privilege of a small increase. Bear in mind that during these last few years they have been forced so to operate their properties that the margin of net earnings, over and above their fixed charges, has been constantly decreasing, thereby weakening the margin of safety for their interest bearing securities to such an extent that the holders of their long-time securities have become disturbed and worried. With this slight increase, given without regard to the future necessities of the companies, they are told to go to the money markets and seek money with which to refund their present debts and to make improvements. Are you surprised when I tell you that the investor and the investment bankers are not going overjoyously to welcome them?

Again, allow me to call your attention to conditions which exist within your very association, which is even a more flagrant violation of the investors' confidence! Some years ago the investor was invited to purchase securities or interest-bearing evidences of indebtedness of the Toledo Traction Company, with the distinct understanding that they would receive a given rate of interest thereon and that on July 1, 1909, they would receive their money back. This contract was made in good faith, and the Toledo company received the funds at the rate of interest which money at that time was commanding for similar use. On the day the investor expected to have his funds returned to him, he was advised that the community which the company served declined to give it a new contract, which would allow it to secure new funds on its physical property with which to pay him his principal and, therefore, he would have to extend his loan. The bond, which he expected to be paid, was extended against his will for an indefinite period, and not only that but there was some danger of his capital becoming impaired, or rather, he might have to take, in part, another form of security from that which he first had.

I could recite numerous other cases similar to this situation. I could tell you about Kansas City, Detroit, Cleveland and others, but what does all this prove? It proves that the investor has history to tell to him that no matter what showing the public utility company is making at the time he loans his money, that he must look further and see to it that the community in which his company is doing business agrees for all time to allow the company to charge enough for the service which it renders, to pay its interest, maintain its property, charge off a proper amount of obsolescence and to have a fair margin for emergency and profit, to interest proper management, so that its credit will always be unimpaired.

THE FORMULA FOR THE MAINTENANCE OF CREDIT

But we are told that the managers of the past have milked the properties, have sought to pay dividends on watered stock and have committed all kinds of sins against their fellow man. Believing, as I do, that the managers of the past have been, on the whole, honest, upright and respectable citizens, giving their time and securing the necessary capital, not only at the least possible cost to the companies they represented but to the communities which they served, I say that what has been done in the past is not nearly of so great an interest to the people who are living to-day as how to secure for the to-morrows the proper management and the necessary funds to give them the best possible service at the lowest possible cost. With this in mind, I will give you my formula for the maintenance of the credit of public utility companies:

1. Good physical property, capable at all times of giving the best possible service at the lowest possible cost.
2. Good and honest management.
3. An assurance or contract, which cannot be violated, from the community which it is serving, that it will at all times be allowed to earn enough and operate under conditions that will assure maintenance of property, earning of interest on capital invested and an additional sum, as a margin of safety, to maintain the credit of the company. This assurance should not be based on any theoretical idea of what the company may be able to do, but on what has actually been accomplished in the past. In other words, the several communities should make the terms and rates such that the investors would be in the position of being sure of receiving their interest and return of their principal.
4. Publicity of earnings and financial condition of the company.

It is the right of every bondholder or creditor, and for that matter of every stockholder, to know at all times the exact condition of the company to which he has loaned his money. When any of the companies is desirous of securing new funds it does not hesitate, or, if it did, it should be compelled, to show not only its physical condition but its financial condition. Therefore, it is right and just for the investor, who loans his money for a long period of time, to have access to such a report, so that he may himself decide whether the company is in as good a position as it was at the time he made the loan. I am well aware of the arguments that have been used against publicity of earnings—trouble with labor, unjust taxation, burdensome and unfair regulations from the communities which are being served. However, I insist that labor troubles have arisen, unjust taxes have been levied and unfair and burdensome regulations have been imposed against the companies which have not published their earnings to a greater degree than against those which have.

On the other hand, it has become a matter of general knowledge that the companies that have given the greatest publicity to their affairs, both good and bad, are to-day enjoying the best credit.

In brief, what I have tried to impress upon you, gentlemen, is the fact that one of the very necessary adjuncts to your business, credit, has not been receiving from you the attention it deserves; that if you wish to maintain and improve your credit you must realize that reckless regulation of rates and operating conditions must cease. If you, as operators, are satisfied to continue under a hand-to-mouth "sufficient unto the day is the evil thereof" policy, accepting each niggardly increase or taking every decrease upon the theory that you may be able to make both ends meet, the investor is not. He is insisting, and will continue to insist to an ever-larger degree, that his security not only be perfectly safe at the time he purchases it, but that it remain the same through its lifetime and that at its maturity it will be paid. The time-worn statement "the franchise contains no burdensome features" will no longer satisfy the investment public.

That it is for you, realizing that the regulation of your companies by the public has come, to create some proper, constructive legislation which will assure the investor that you are going to be allowed to operate your properties under such conditions, that you will be able to pay a reasonable return on all capital invested and repay your debts at their maturity.

That you must also realize that the investor must at all times be kept advised as to the physical and financial conditions of your property.

OUR TRAFFIC ASSOCIATION

BY A. L. NEEREAMER, SECRETARY CENTRAL ELECTRIC RAILWAY ASSOCIATION AND CHAIRMAN CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The Traffic Association is one of the subsidiaries of the Central Electric Railway Association and is composed of the traffic officials of many of the member companies. The Traffic Association is the only electric railway association of its kind in this country and, so far as the writer knows, in the world. The steam roads have associations of like character in the different territories, having two in this section, the Central Passenger Association and the Central Freight Association. We combine the two into one. So far, the details and office work of this association have been handled by the chairman and one clerk, but the business of the association is rapidly expanding to such an extent that this office force will soon have to be increased.

The traffic department of a large manufacturing concern has charge of the transportation, rates and routing of the shipments, while the sales department adjusts the sale price, advertises and places on the market the articles produced by that company. The traffic department of a railroad company is a combination of the two. It not only advertises and sells, but compiles and transmits to the public the rates, schedules and routings of its commodity—transportation. It is therefore a very important factor in railroad operation. Through its efforts the earnings of the property must be kept to the maximum and increased wherever possible, thus forming a vital adjunct to the successful operation of the road. It is not an independent branch as it must be able to carry out the policy outlined by the operating management and work in accord with the other departments.

The successful traffic manager must have executive ability, a good salesman, a Chesterfield, somewhat of an attorney and have a general idea of accounting and transportation. The representatives of the traffic department come in contact and deal with the general public more than any other branch of our business and therefore should be fully equipped to cope with any proposition pertaining to their office that may be presented. They must know what their own company can do, under all conditions, as well as the connecting lines over which through traffic to or from their line may move. Co-operation with various associations helps to achieve the desired results. Such co-operation must have been in the minds of the managing officials in the Central Electric Railway Association, as during the year 1907 the association took up the subject of organizing the Traffic Association and appointed a committee which, after a complete investigation, made a report on the subject at the meeting held in Dayton, Ohio, in January, 1908. At that time the organization was instituted upon the following platform:

"The purposes of this organization are to promptly secure to each of the parties authentic information in relation to the tariffs, rate sheets and ticket regulations of the respective parties, and changes therein, and the due filing and publication thereof; to aid in securing compliance with the federal and state laws relating to and regulating commerce, and to enable the parties thereto to mutually confer, advise and act in relation to the above subjects stated and the proper methods to secure the purpose aforesaid."

In March, 1908, the action of the previous meeting was confirmed and the association launched. For a time the meetings were held jointly with the executive committee of the Central Electric Railway Association, but on Sept. 3, 1908, the first independent meeting was held in Indianapolis and the active work taken up. Meetings are now held monthly in order to keep in touch with conditions and are of inestimable value to the members.

TARIFF COMPILATION

One of the most important features of an association of this kind is the compiling, publishing and filing of tariffs. All tariffs must comply with the rules and regulations of the Interstate Commerce Commission and the various state commissions. The association makes a study of these various rules and regulations by keeping in close touch with the requirements of these various commissions, thus enabling its members to be at all times in harmony therewith and, if I may be permitted to say so, has resulted in benefits mutual to both the commissions and the companies.

Tariffs are furnished to the participating carriers at the cost of printing, plus the carriage and at times one or two small incidental expenses such as telegrams or notary fee in application for special permission to file in less than statuatory time. In some cases the cost of the composition is several times greater than the amount paid by any one member company for its entire supply. For example: the Interstate Commerce Commission promulgated a set of demurrage rules which were adopted by the different state commissions and were ordered filed as tariffs. The cost of the composition on this equaled one-half of the cost of the supply for the entire association. It can readily be seen that this was a saving to each member company. Another case: the last joint and local baggage tariff, containing twenty pages of rules and tabulated matter, was billed to the members at 4 cents per copy. Do the managing officials of any carrier know or realize what it would have cost them to have as complete an individual tariff printed as this one, or the time and expense it would have required to compile the same and secure the necessary concurrences to be used in filing? The composition in this case was more than 66 per cent of the entire cost of the tariff, and it would have been the same for each company had individual tariffs been issued.

The first tariff was issued by the association in December, 1908, and covered the interchangeable 1000-mile ticket. This was participated in by twenty member lines and represented less than 1800 miles of electric railway. The present interchangeable mileage tariff has thirty-one participating carriers, representing over 2900 miles. This ticket is limited to one year from day of sale, is good for bearer and party, and is sold for $17.50, or 1¾ cents per mile. The average sale of approximately 5000 of these tickets per annum since its inception speaks for its popularity. During the first year about 2000 of these tickets were sold, but the demand has increased since then, making this average.

The second tariff compiled and filed with the commissions covered the transportation of baggage, both interline and local. Here the first difficulty was encountered. The regulations of each state were different from the other states, and the various carriers had their own rules. The compilation of a tariff that would comply with the varied regulations and conditions and at the same time be acceptable to the commissions as well as being in conformity with the law, took considerable time and thought, which resulted in a publication that is now in general use throughout the territory. Wherever a through ticket is sold by an interurban line through baggage may be checked. This tariff has been revised and reissued several times to keep pace with the various changes in transportation and the regulations of the commissions.

Prior to 1907 it was impossible to purchase an interurban ticket from a point on one line to a station on another. Tickets were sold to junction points only, and passengers were instructed to rebuy and recheck their baggage. Early in the year mentioned the representatives of the Indianapolis lines compiled and published the first joint interline interurban passenger tariff. This tariff quoted rates between ten headline points and the more important stations on the participating lines. This publication was reissued twice and not only served its purpose well but paved the way for a more complete issue and was the only one in force when the association honored the writer by electing him chairman on March 27, 1908. On Nov. 14, 1909, this tariff was replaced by Association Joint Passenger Tariff No. 3, quoting rates between thirty-two headline points and 385 other stations. Over a year was consumed in compiling this issue, as it was necessary to start everything new and practically build the tariff up from nothing. During the compilation of this tariff one general manager complained to the writer of the time consumed in the work. He stated that if he had a clerk who could not do this work in forty-eight hours he would throw him out of the window. The last I heard of this ex-manager he was peddling maps in Texas.

In order to keep pace with the increased membership, this tariff was reissued adding thirty more stations under each headline point as well as making a number of reductions in rates to meet steam railroad competition, and opening up new routes which were not represented in the first publication. The revision of the latter tariff is now under way and when published will quote rates between 495 stations and thirty-six headline points, via every available route. At this time and in order to show the increased business, due very largely to this tariff, the following figures are submitted, covering the interline ticket sales only, at the joint ticket office:

1906	$32,199.00	1910	$176,616.00
1907	47,390.00	1911	181,540.00
1908	72,865.00	1912	182,861.00
1909	98,783.00	1913	160,247.00

The decrease in 1913 is due to the flood in March and the strike in November of that year. There is no doubt that the increase of nearly 80 per cent in 1910 over 1909 is to a great extent due to the complete tariff that was issued in November, 1909, as there is every reason to believe that the same conditions prevailed throughout the territory during the same period, and that the continued natural increase is maintained by the same cause.

The first freight tariff that was filed by the association for its members covered Official Classification No. 36 and had only twenty-one participating carriers: No. 42 just filed covers thirty-nine. Owing to orders issued by the Interstate Commerce Commission from time to time it is often necessary to secure special permission from all the commissions to file supplements to this publication on less than statutory notice, which requires affidavits and much other work that is done by the chairman, thus saving time and expense to the member companies, as well as the members of the commission. The above are only a small part of the publications of this association and are given only as an example of what has been accomplished in that line, and the great advance made by the association.

It is not compulsory for every member to be represented in every tariff that is published. A member may participate in one or all, as desired, and can be represented in any way desired so long as such representation conforms with the federal and state regulations.

STANDARD FORMS OF TICKETS AND BAGGAGE CHECKS.

Standard forms of tickets and baggage checks have been worked out and are now in use by practically all lines in the association territory. Interline freight tariffs, based on the official classification and divisions, are now published by the freight carrying lines. The traffic departments now having authentic information at hand are soliciting long distance traffic as a means of increasing the revenue of their respective lines. This is interline or interchange business and has been rapidly increasing. For example, the following figures show that three lines, which shall be known as A, B and C, interchanged during the year 1913:

A to B		B to A	
Passenger	$6,355.00	Passenger	$8,480.00
Freight	2,486.00	Freight	3,071.00
Total A to B	$8,841.00	Total B to A	$11,551.00
A to C		**C to A**	
Passenger	$2,891.00	Passenger	$2,355.00
Freight	1,457.00	Freight	1,398.00
Total A to C	$4,248.00	Total C to A	$3,753.00

These are authentic figures secured from an accounting department and can be verified. These figures only cover the interchange between railway A and railways B and C, and it is to be supposed that the same proportionate conditions exist throughout the territory, and in some cases the volume is greater.

JOINT WEIGHT AND INSPECTION BUREAU

During the year 1912 the association made an experiment with a joint weight and inspection bureau at Indianapolis, Ind. The expense of this experiment, which was about $300, was taken care of by twenty-one lines members of the association, on a mileage basis. This experiment covered a period from May 25 to Aug. 31, 1912, and showed a net gain in weight due to corrections of 789,691 lb. and in revenue $1,250.40, or an average per working day of 11,362 lb. and of revenue $17.99. The above results were accomplished by one man laboring at a disadvantage, as he had four freight houses to cover, and quite frequently the unloading and loading was going on at three of them during the same period. During the early part of the inspection a great many irregularities in the weights as furnished by shippers were discovered, but as the work progressed and the shipper realized that the inspector was watching all points, these irregularities practically ceased and the shipments were usually tendered at correct weights. The proposition to establish a permanent bureau is now in the hands of one of our committees and will probably be worked out in the near future.

At all stages of progression and development the Central Electric Railway Accountants' Association has kept pace with us and has been at all times ready and willing to assist in working out any of the problems that would better traffic conditions and increase the revenue. It has never been found wanting when called on. This is the harmony that should exist, as there are no two departments in railroads that are more closely interlaced than the traffic and accounting.

MAP AND GUIDE

One of the presidents of the Central Electric Railway Association made a number of suggestions, two of which were very valuable, *i.e.*, an official interurban map and a joint interurban folder or guide. The question of preparing and distributing the official map was referred to the Traffic Association and was worked out by it. Over 100,000 copies have been placed, free of charge, in the hands of the traveling public and the different shippers. The map is a work of art and was engraved and printed by one of the most experienced firms of that kind in the world. Every line that uses this map in its local territory not only advertises itself but all its connections. As an advertising medium it cannot be excelled. Its distribution and fame is worldwide. The writer has, on request, sent copies to localities in nearly every country in Europe and now has on file in the office a reproduction of it, with a complete description taken from a German technical paper (*Elektrische Kraftbetriebe und Bahnen*).

JOINT FOLDER

Regarding the joint folder, this will be made another valuable advertising medium, and the writer is of the opinion that it will greatly assist in securing long distance travel. From the number of requests for routings and connections received in the chairman's office it seems as if much time could be saved for both the ticket agent and the passenger if a folder showing all time cards and through schedules could be published and placed with the agents for distribution. These requests only come from people who do not know where else to write to. The passenger department, being the advertising department, would supervise such a folder and distribute it, and a publication of this kind would help the freight business, for the reason that a man will ship his freight the way he travels if the service is satisfactory.

Auto bus and truck lines are now operated between some cities and near-by towns and have had an effect on the local earnings of the interurban lines in the same territory. These auto lines do not file tariffs and are not amenable to any of the commissions. This makes it all the more important that interurban lines should endeavor to secure long distance traffic, and a joint folder with our official map will greatly assist in accomplishing this result.

MEETINGS

The association holds a meeting every month, except during July and August. These meetings, as well as the discussions, are open to all officers of the electric railways which are members, and as a result, the benefits obtained are almost beyond value. It is here that the benefits of standard practice are discussed, the federal and state laws, rules and regulations are studied and digested so that if there should be any violation in traffic matters it is an error and not intentional, and every traffic official is thus kept fully informed. No one person is infallible or knows everything, so that the free expression of personal experiences in connection with the broadening results of discussion must be of great value. If information is requested that cannot be furnished at the time, someone knows where it may be found or to whom to go to secure it.

INTANGIBLE BENEFITS

The foregoing are merely some of the tangible benefits that may accrue to the members. The intangible benefits are many and may be more than we know. It is impossible for the writer to enumerate them, because who knows how much any one member may profit by the experiences of others, the discussions that take place in the meetings, the reports of some committee which has solved a knotty problem, or the co-operation of other lines in securing through traffic. The friendly feeling that always exists between the members of the association is always beneficial and leads to co-operation, and co-operation leads to success. Some misguided ones, especially those who believe in the complete reconstruction of society and business, claim that co-operation eliminates competition. There is no need to waste time on this argument, but Elbert Hubbard covered the situation when he said "Savages compete; wise men co-operate. He who assumes that co-operation and conspiracy are one should have his mentality rated in guinea-pig power." The writer cannot but feel that every member has received great benefit, either tangible or intangible, through co-operation with this association.

Since the organization of the association and the adoption of rational and standard practices for the handling of traffic, the relations with the steam roads have improved and many of the interurban lines are interchanging with them. The principal objection of the steam lines previous to this was the lack of uniformity, the different modes of handling interchange, the use of various classifications differing from the one used by them, the diversity of opinions regarding the checking of baggage and forms of tickets, and many other things that made it impossible to issue a through bill of lading or sell a through ticket. The elimination of these defects has been a benefit to all carriers and has greatly assisted the general public in the transaction of its business. Uniform rates and methods are what the public has been asking for, during the last twenty years. The public does not want different modes of handling traffic on the various transportation lines but desires the same general rules to apply. The shipper objects to different classifications, bills of lading, demurrage rules, etc., as applied by different companies and wants classifications that are uniform.

As the association increases in value it has been gradually growing in size and now has a membership of forty-eight lines covering 3686 miles. It does not as yet include quite all the members of the Central Electric Railway Association, but there is no reason why it should not as there is no additional cost outside the amount paid for tariffs, which is less than the cost for individual publications.

It would not do to close this paper without paying a tribute to the far-seeing and progressive men who fathered the association and who stood by it in the early days of its adversity. These men were not looking at the present or seeking personal gain, but were building for the future, and to their untiring efforts our present success is due. These men had faith in their convictions and the tenacity to stay with them until they were proven. They are all living, in fact very much alive and just as energetic and progressive as ever. May they live a long time and continue to build monuments that will keep their memory fresh in the minds of those who follow after, for an endless period after they have been called to the great and unknown beyond.

THE MEETING THURSDAY NIGHT

T. N. McCarter, president Public Service Corporation of New Jersey, was the only speaker at the session on Thursday night. He was introduced by Mr. Schneider, of Cleveland. Mr. McCarter said in part that he could speak from experience as he was administering one of the biggest public utility properties in the country. He knew that under present-day conditions it was impossible to operate and carry the overhead expenses of an electric railway for a 3-cent fare. Did those who clamor for such a fare know whereof they spoke? Had they studied the situation scientifically? To him the 3-cent fare agitation was a will-o'-the-wisp and the happy catch-word of the politician. Now was the time to fight rather than to be trampled on. It was essential to show that the 3-cent fare was an unsound, uneconomic proposition. The Public Service Railway Company's lines were operated in splendid territory by highly talented men, yet since the year 1908 the percentage of expenses to gross receipts has ranged from 59.1 to 63.6. As 60 per cent of 5 cents is 3 cents, it followed that with a 3-cent fare his company would have paid operating expenses but once during the last six years.

Some 3-cent advocates had asserted that low fares increased riding and in turn increased the receipts. The gas business of the Public Service Corporation of New Jersey had proved this argument to be a fallacy. He believed in general that the men who had had the hardihood to invest when the industry was new and untried were entitled to a higher rate of return. Of course, after a property had become established different problems presented themselves, but those who had borne the hazard should always be entitled to more than an ordinary return. Eight per cent, indeed, was small. Any community that scaled down the return would harm the utility, of course, but it would harm itself still more. The electric railway had been the greatest agent for the development of American cities, and would continue to be so if it was not hampered. As an instance, he said that his company had secured $5,000,000 for a large passenger terminal in Newark without any trouble. In Toledo, on the other hand, it would have been impossible to raise the money owing to the attitude toward the local company.

The policy of short-time return franchises was wrong in principle and unsound economically. Now that regulation was here, the question of length of franchise term had become relatively unimportant to the public at large, but not so to the company. It was a short-sighted policy to limit the franchise term because the railway must amortize its investment within the life of the grant, with the result that the present generation alone rather than several generations must pay for the entire equipment. As to municipal ownership, the municipal government was not on the same plane as the federal and state governments. Was it wise to turn over to these municipal governments the burdens of the railroads when they were neither organized nor equipped to handle them? Further, if the city did take this financial burden, the cost of raising municipal money would rise to 6 per cent, whereas the roads only asked to be permitted to earn 8 per cent. The difference of 2 per cent would quickly be lost in the difference in operating efficiency between municipal and private management.

Work on the electrification of the London & South-Western Railway's suburban system is progressing favorably, and it is hoped that trains will be running over certain routes before the end of the year.

C. E. R. A. Convention at Toledo

The Sessions Were Devoted Largely to the Questions of Public Relations and the Toledo Electric Railway Situation—Mr. Brady Speaks on Government Ownership

The summer meeting of the Central Electric Railway Association was held at the Hotel Secor, Toledo, Ohio, on June 25 and 26. The business sessions were devoted in large part to questions of public relation and to the Toledo electric railway situation.

The meeting was called to order by the president, E. F. Schneider, Cleveland, Southwestern & Columbus Railway, at 9.40 a.m. on June 25. After the reading of the minutes of the previous meeting by the secretary, A. L. Neereamer, the reports of committees were taken up.

Mr. Boardman, Service Director of the city of Toledo, made an address of welcome to the association in the absence of Mayor Kellar. President Schneider responded on behalf of the association to the welcome thus extended.

STANDARDIZATION COMMITTEE REPORT

R. N. Hemming, Anderson, Ind., reported for the standardization committee and gave in abstract the discussion of the committee meetings of Jan. 8 and May 12, 1914. Printed copies of Association Bulletin No. 67 were distributed. These show "Controlling Dimensions of Standard 6-in. Trolley Wheel"; "Proposed Arrangement of Electro-Pneumatic Signal System"; "Proposed Standard Trailer Light Connector" and "Standard End Connections for Interurban Cars."

With regard to the subject of "Mounting Radial Couplers," a table of carbody clearances and car coupler information which had been prepared by the Ohio Brass Company was shown and recommended for publication in the association proceedings. This table was compiled on the basis of a curve of 35 ft. center radius and shows various carbody clearances and coupler information data for cars varying in length from 40 ft. to 70 ft. and in width from 8 ft. to 10 ft., truck centers from 18 ft. to 48 ft., all having a uniform overhang of 11 ft. and a buffer radius of 5 ft. Formulas also are given from which similar information may be figured for curves and cars of other dimensions.

The subject of "Standard Train Signal Systems" also had had thorough consideration because the committee thought that its previous recommendation relative to the employment of the electro-pneumatic system could be broadened in scope to include the all-electric system which the committee thought appeared to possess certain advantages, principally in point of simplicity and lower first cost. The two systems should be inter-operative, the chief features embodying the installation of suitable signed switches in each car to be operated by the bell-cord extending from end to end, energizing the signal line extending throughout the train, with direct current at 500 volts to 650 volts. Print No. C-4-A was distributed. It showed fully the proposed arrangement of either electric or electro-pneumatic systems.

The committee recommended also that a set of uniform rules governing the operation of such signals as proposed be formulated and adopted.

The association accepted the standardization committee report.

REPORT OF CLAIMS COMMITTEE

The report of the claims committee was then read by Secretary Neereamer. This report was in part as follows:

"A meeting of the committee was held with William Tichenor, E. E. Slick and Fred R. Fahlsing present.

"The question of standardization of forms and blanks and accounts to be used in and by the claim departments of the various companies was under discussion as far as time permitted, but we did not arrive at any final conclusion; we beg to report, however, that the American Electric Railway Claims Association has the same matter under consideration with the hope and expectation of standardizing the same thing throughout the entire country, and since many of the members of this association are also members of the American Association it would seem to be an excellent thing to work in harmony with the committee of the American Association and, if possible, agree upon the same forms. We therefore recommend that this matter be continued with the hope of getting our committee and other claim agents and members of the association jointly interested in a meeting for the purpose of discussing the question fully and determining upon the best possible forms and if possible agreeing with the American committee."

Mr. Tichenor, speaking in support of the report of the claims committee, urged that the association take steps toward a meeting of claim agents of all member companies. This meeting should be called by the officers and executive committee of the association and be held at some central point before the next regular meeting of the association. It should be attended by all the claim agents and by representatives of the claim departments and other officials of the companies specially interested. A motion providing for a special meeting of claim agents was carried.

A report of the committee on appraisals was presented by the members, George Whysall, Columbus, Marion & Bucyrus Railway; Robert B. Rifenberick, Detroit United Railway, and T. P. Kilfoyle, Cleveland Railway. In the absence of the chairman of the committee the report was read by L. E. Gould, ELECTRIC RAILWAY JOURNAL.

Harry Atwood, the aviator, extended an invitation to the members on behalf of President F. R. Coates, of the Toledo Railways & Light Company, to visit Toledo Beach and take part in the air flights. Mr. Atwood referred to his flights as a new interurban development of the Toledo Railways & Light Company, and said that he expected to make trips to other cities near Toledo in the near future.

MR. COATES ON TOLEDO SITUATION

Owing to the unavoidable absence of Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, who had expected to address the meeting, President Coates, of that company, described the Toledo situation to the members. He expressed the deep regret of Mr. Doherty, who had been called out of the city unexpectedly after having been in Toledo continuously for 90 days. Mr. Coates added that Mr. Doherty had led the effort to effect a settlement of the franchise controversy and that he appreciated the action of the association in going to Toledo. The contest with the city had been long drawn out, but he thought that the attitude and influence of the association would be of some assistance.

In expressing confidence that the company would win in the end, Mr. Coates rehearsed briefly the events of the last two and one-half years. He showed that the company established a fare system in 1912 with the distinct understanding that the arrangement was temporary, and was designed to be an expedient during such time as a new franchise should be under negotiation. Afterwards the control of the property was transferred to new interests and the city asked an ordinance providing for a straight 3-cent fare. Mr. Coates quoted the testimony of Carl Nau, of Cleveland, before the United States Circuit Court, to the effect that it was impossible for the Toledo property to operate at a 3-cent fare. He then described the conditions which led to the desire of Mr. Doherty to operate on a "fair play" basis. The percentage of free riders was gradually decreasing. While the percentage each day was smaller, it had decreased from the beginning, showing that as time went on fewer people were willing to take advantage of the company by riding free.

Mr. Coates also quoted the statement of Peter Witt, city street railroad commissioner of Cleveland, that while he wanted a 3-cent fare Toledo, with its present layout, was not a city in which this rate of fare could be given and the needed service provided. While Mr. Witt advocated public ownership, he had said that the city should not go forward to effect this until it had the necessary money and could see the way clear to avoid failure in it. Mr. Coates then outlined the conditions of the franchise which was under negotiation with the city and the franchise which citizens have drafted in an effort to settle the controversy. He thought that the feeling in the city was growing better toward the company each day. He emphasized the fact that the controversy had not disorganized the trainmen. The company had the most loyal set of men in the country. The conductors had tried in every way to get passengers to pay full fares. Whatever success the company might have as a result of the policy of "fair play" which it had followed, it had to give credit to the conductors and motormen. Certainly the men had borne the brunt of the battle. Mr. Coates added that he would take off his hat to the men. They were doing good to the electric railway business as a whole. Under the most trying circumstances the men had held their tempers in all but a few cases and they were doing their best to aid the company to win the confidence, esteem and help of the people.

S. D. Hutchins, Westinghouse Traction Brake Company, spoke of the plans for June 26, which day was devoted entirely to entertainments at Toledo Beach.

S. W. Greenland, Ft. Wayne & Northern Indiana Traction Company, chairman of the committee on charges for repairs in interchange of equipment, said that no report would be presented at the Toledo meeting. The committee, however, had arranged for a joint meeting with the standardization committee and would report at the next meeting.

Arthur W. Brady, president Union Traction Company of Indiana, then made an address on the subject of government ownership. An abstract of this address is published on this page.

Following Mr. Brady's address C. Edgar Elliott, of Breed, Elliott & Harrison, read a paper on "The Credit of Public Utility Companies." This is found in abstract on page 1448 of this issue. This paper was followed by the papers of Messrs. Neereamer and Wynne, also abstracted in this issue.

In the discussion on the paper of F. E. Wynne, general engineer railway department Westinghouse Electric & Manufacturing Company, on "Economies in Operation of Field Control Equipment on the Toledo Railway & Light Company's Lines," Mr. Wynne said that the more frequent the stops the greater the saving with field control motors. In reply to a question by Mr. Rolston, Michigan City, on temperature readings, he added that the readings showed 6 deg. less temperature rise for field control motors.

F. D. Carpenter, Western Ohio Railway, spoke of the use which his company had made of the Cronin Electrical Appliances Company's tools for changing the cross-arms and insulators of high-tension lines with power on. These devices were demonstrated at the beach on Friday.

After Mr. Schneider had announced that Thomas N. McCarter, president Public Service Corporation of New Jersey, would make an address at the public meeting to be held in the evening, the meeting adjourned. A brief report of Mr. McCarter's address is published on page 1453; a more extended report will be published in next week's issue. The delegates took a trip through the historic territory traversed by the Maumee Belt Line.

The entertainment provided on Thursday was an automobile ride for the ladies in the morning followed by luncheon at the Inverness Club. In the evening the ladies were invited to a theater party.

The entire day of Friday, June 26, was given up to a visit to Toledo Beach. In the afternoon there was a ball game between the railway and the supply men.

ADDRESS OF ARTHUR W. BRADY ON GOVERNMENT OWNERSHIP

In introducing his remarks Mr. Brady said that the subject of public ownership of public utilities was so large that it could not be covered comprehensively in an address, but he hoped to present some of the considerations bearing on the present situation.

Mr. Brady spoke of an address regarding public ownership of railroads made by William J. Bryan in Madison Square Garden, New York, in 1896. The lack of public acceptance of the ideas advanced at that time made it appear that the question was one that had been set at rest. It looked then as if the decision of the country was almost unanimously against public ownership. The determination of the large question of public ownership of railroads would determine also the policy on the general question of public ownership which this country would adopt for other public utilities.

DECISION ON STEAM RAILROADS

While there might be sporadic cases where public ownership would be a sharp issue and where the decision of the people might be for or against this policy, it appeared to be almost a self-evident fact that the question of the policy of the people as a whole would be decided by the final determination of the question of steam railroads. One reason why the proposition advanced by Mr. Bryan fell flat was probably to be found in the fantastic character of his recommendations. These were that the main lines should be operated by the federal government while local lines should be under the control of states. This division introduced an element of confusion and disorganization that was enough to lead to the failure of the suggestion. Another reason was the fact that under the Hepburn act railroads were to be brought under public regulation and supervision. Since that time, instead of a diminishing opinion in favor of public ownership, so far as the matter had received attention at all it might be said that sentiment had been growing. There could now be seen on the horizon a natural phenomenon in which some people would see a ray of hope for government ownership and others would see a portentous warning and danger for the people.

In referring to the post-office department Mr. Brady said that the last year had seen the department advocate federal ownership of telegraph and telephone lines.

It had seen this suggestion backed up by a member of Congress who held himself responsible for the federal parcel post, a government development which had interfered with the public utility companies engaged in the express business. Another impetus had been given by the law providing for government ownership and probably operation of railroads in Alaska. There had been Senators who had made lengthy speeches advocating public ownership of railroads.

From a survey of these conditions it might be fairly said that a start had been made in the direction of public ownership on a large scale. Another sign was the fact that the committee on the District of Columbia of the House of Representatives had reported the Crosser bill. All the signs were pointing in one direction. The situation should be faced. The fact should be recognized that an issue was approaching which would have to be met in the near future. Some party would raise the issue. Some people would have an opportunity within a short period of determining their position on this question.

GREATEST EXTENSION OF ACTIVITIES EVER UNDERTAKEN

Mr. Brady declared that purchase and operation of the steam railroads by the federal government would involve the greatest extension of activities ever undertaken by this government or any other government. The mileage of all of the railways of the world was 640,000. In the United States there were 250,000 miles. The Interstate Commerce Commission returns covered 240,000 miles. They showed a net capitalization outstanding in the hands of the public in 1910, including both stock and bonds, of $14,500,000,000. The gross operating revenues were $2,750,000,000. Operating expenses were $1,822,000,000, or twice the disbursements of the government. The receipts were three times the receipts of the federal government during the same year. Federal ownership of railroads would mean that the financial affairs of the government would be quadrupled, and that expenses would be trebled, without regard to the interest on the money invested. One of the arguments advanced by Senators who had discussed the subject in speeches at Washington was that the government could supply capital at vastly less cost than private companies. The theory was that the capital would be represented by securities that had the entire credit of the United States behind them; not the United States as owner and operator of the railroads but the credit and resources of the nation as a whole. The interest rate on outstanding government obligations was very much less than on the obligations of private companies. It was estimated that the total purchase price for the railways would be from $14,000,000,000 to $19,000,000,000. It would probably be not far from $16,000,000,000. Some people said that it might be $8,000,000,000, $9,000,000,000 or $10,000,000,000. They proceeded on the theory that the steam railroad properties had a vast amount of water in them. That question would be determined with some degree of accuracy by the Interstate Commerce Commission valuation.

THE COST OF CAPITAL

Some indication of the probable result could be obtained from a study of the state valuations. In Minnesota a valuation had been made by the State for the purpose of showing the value of the railroads within the borders of the State. It was believed confidently by steam railroad men that the value of the steam railroads, taken as a whole, would be fully as much as, and may be more than, the outstanding stocks and bonds in the hands of the public. If robbery did not take place it was probable that instead of $16,000,000,000 nearer $20,000,000,000 would have to be paid. In 1910, Mr. Brady said, the railroads paid $680,000,0000 interest and dividends. The United States was then paying on a comparatively small debt only about 2 1/3 per cent. The German government had to pay about 4 per cent on its bonds. It was only fair to believe that with privileges taken away from the government bonds of this country, such as the right to deposit them as the basis of currency issues, an interest rate of 3½ per cent was as low as could be expected with any degree of conservatism. The total cost of capital to be paid on the purchase price at this rate would be $560,000,000 which would be an apparent saving of say $120,000,000. The argument based on this showing was the one which carried the most weight. If, however, the rate of interest should be advanced to 3¾ per cent, it would reduce the saving on this account.

EFFECT ON PRESENT GOVERNMENT BONDS

Mr. Brady also mentioned the effect which the issue of additional government obligations would have on outstanding government securities. In time those securities must be paid or refunded. If they were refunded they would have to bear the same rate of interest as other government securities unless they were aided by the introduction of some special privilege as in the case of the present government bonds. The government would lose by a refunding operation, so that the net amount of any saving of this kind would be nearer $100,000,000 than $120,000,000. The argument could not be gainsaid so far as it went. The securities must have a better standing as government securities than they could possibly have at the present time.

Another side of the question was the fact that railroad securities were now subject to taxation of one kind or another. The moment these bonds became government obligation they would pass out of the field of taxation; then, if the bonds had borne 3½ per cent interest they would certainly bear 3¾ per cent, if not a greater rate of interest.

The saving from standardization, centralization and consolidation was mentioned by Mr. Brady. It would be unnecessary for the railroads to maintain separate expensive offices and stations and traffic and advertising departments. The business would be an absolute monopoly. Provided the government could get without effort the business which came to the railroads now, there would be a saving on this account.

EFFECT ON OPERATING EXPENSES

Against these considerations there was to be charged the question of what would be the effect on operating expenses. Would government railroads be efficiently and economically operated? Could the government embark in this activity, doing three times as much business as the federal government did now and conduct the properties as efficiently and economically as the companies? That was the critical question in all operation by public authorities. The answer would appear to be plain to anyone who observed the action of public governments.

Mr. Brady believed, and thought that those who observed government operations believed, that governments could not carry on any business with the same degree of efficiency and economy as those who owned the properties under consideration. As an illustration he cited the operation of the Panama railroad by the federal government. This road was acquired in 1904 or 1905. At the time it was purchased the capitalization was $220,000 per mile. The federal government reconstructed the road at an additional cost of $225,000 or $230,000 per mile. In 1904 the operating ratio was

61.9 per cent. For ten years prior to 1904 it had not exceeded 66 per cent. Under public ownership the operating ratio had been as follows: in 1905, 77.5 per cent; in 1906, 79.5 per cent; in 1908, 74.5 per cent; in 1910, 71.4 per cent; in 1911, 70.8 per cent. The increase in earnings between 1904 and 1911 was 84 per cent. The increase in expenses in the same period was 110 per cent. Mr. Brady also discussed the operation of the Intercolonial Railroad of Canada. The operating ratio of this system for 1911 was 97.2 per cent as compared with 69.4 per cent for all other lines in the Dominion, or a difference of 30 per cent. The conditions in Canada probably presented the nearest parallel to the conditions in this country. In referring to the government-owned Western Railroad of France, which was bought by the government in 1908, Mr. Brady said that from 1909 to 1912 there was a decrease in net profits of 66 per cent, while in the same period the operating ratio had increased to 91 per cent.

AUTOCRATIC GOVERNMENTS AND RAILROADS

It was true, said Mr. Brady, that some railroads in the world were pointed out as profitable examples of government ownership. The roads of Germany and Japan were notable among the examples thus cited. The roads were successful in those countries because there was no democratic control of the government. The government in each country was virtually autocratic. It had been estimated that only 15 per cent of the population of Germany controlled the acts of the government. The government was practically on a military basis in its control of railroads. The people who operated railroads in Germany and Japan were part of a military organization. The question that had to be decided here, however, was not whether government railroads were a success in any other country, but whether the general question of public ownership would be a success in the United States, whether it would be adapted to the conditions in this country. The Western Railroad of France had had a large increase in operating expense, a decrease in net earnings, and an increase in hazard. While suffrage was widely extended in France, the individual did not count as in this country. The people of Continental Europe expected to be supervised, regulated and controlled in every direction. Since they looked to the government for everything the argument with them was: Why should they not look to the government for operation of the railroads?

Bearing on the question of governmental efficiency and operation Mr. Brady quoted from the last report made to stockholders of the American Telephone & Telegraph Company by Theodore N. Vail, the president. He also quoted from a letter written by Halford Erickson, member of the Railroad Commission of Wisconsin, in regard to the need and difficulty of supervision of the accounting methods of municipal public utilities. This letter was published in part in the ELECTRIC RAILWAY JOURNAL of May 30, 1914, page 1194. Inefficient operation by public authorities of such utilities was an inherent weakness as was developed by the statements of Mr. Vail and Mr. Erickson. In an address made in Indianapolis some years ago B. H. Meyer, who was at that time a member of the Wisconsin commission, stated that that commission had more difficulty in regulating municipal plants than in regulating privately owned plants.

POLICIES WOULD GOVERN OPERATION

There was the danger, Mr. Brady said, that politics would govern operation and that places would be provided for the man who did good for his party. It was also necessary to guard against graft. Mr. Brady referred to the fact that Mayor Mitchel, of New York, had found it practically impossible, on account of the civil service laws, to make important changes in the police department. Ex-President Taft had also discussed the operation of civil service laws in an article published recently in the *Century*. Mr. Brady said that he believed in civil service laws and that the good which they did outweighed the bad. He said, however, that they protected mediocrity. The difference between working hard enough and not quite hard enough was often the difference between efficiency and inefficiency.

Suppose, said Mr. Brady, that the hours of railroad men should be cut from a normal ten-hour day to a normal nine-hour day without an increase in efficiency. The effect of that alone would be to add $117,000,000 to the expenses of the railroads, against a possible saving in interest of $120,000,000. If there should be an addition of 5 per cent to the wages that would mean $58,000,000, or practically one-half of the saving in the cost of capital. If the increase in wages and the shorter day should both be established the result would be to wipe out the saving in the cost of capital and add 50 per cent. Could it be doubted that with 2,000,000 employees government railroads would exercise a powerful influence upon legislators and there would be legislators in Congress who would be even more careful than now to conciliate the labor vote and add indirectly and directly to railroad costs?

In conclusion Mr. Brady said that without the slightest doubt the question which the country would have to decide was whether the doctrine of private ownership of public utilities with public regulation or public ownership should prevail. When this question was decided for the railroad and telegraph and telephone lines it would be decided for all utilities.

BLACKSTONE ON DEMOCRACIES, ARISTOCRACIES AND MONARCHIES

Mr. Brady quoted the following from Blackstone saying that the words were as true now as when they were first written:

"In a democracy, where the right of making laws resides in the people at large, public virtue or goodness of intention is more likely to be found than either of the other qualities of government. Popular assemblies are frequently foolish in their contrivance and weak in their execution; but generally mean to do the thing that is right and just and have always a degree of patriotism or public spirit. In aristocracies there is more wisdom to be found than in the other forms of government; being composed, or intended to be composed, of the most experienced citizens: But there is less honesty than in a republic and less strength than in a monarchy. A monarchy is indeed the most powerful of any; for, by the entire conjunction of the legislative and executive powers all the sinews of government are knit together and united in the hand of the prince; but then there is imminent danger of his employing that strength to improvident or oppressive purposes. Thus these three species of government have, all of them, their several perfections and imperfections. Democracies are usually the best calculated to direct the end of a law; aristocracies to invent the means by which that end shall be obtained, and monarchies to carry those ends into execution."

ALL ADVANTAGES CANNOT BE REALIZED

Mr. Brady said that it could not be expected in a country like this, where each person had exactly the same say, that all of the advantages of every form of government could be realized. That the Emperor of

Germany could operate railroads to advantage did not mean that this country could do so. At meetings like the one in which the members were gathered together they were sometimes accused of thinking of the pockets of their bondholders and stockholders. There was not one among the attendants who was not deeply interested in the welfare of his country. There were found in history records of nations which were just as strong in their time as this country now, but it was found that great governments had shrunk. Though there was a time when Spain had appeared to be more powerful than this country, it had now disappeared from all parts of the world except the seat of its government. Lawyers had a saying that "it's hard cases that make bad law." There was always a beginning. It was to the interest of all as citizens to settle the question of government ownership and to settle it right. If there was a mistake it would be exceedingly costly to withdraw from the results of the error. It might be that such a thing would require a strong government such as Germany has instead of the government under which we live and in which we believe.

PROSPECTS OF THE CROSSER BILL

Although announcement has been made on the floor of the House of Representatives that an effort will be made to secure the passage of the Crosser bill for the government ownership of the street railway systems in Washington, D. C., during the summer session, there seems to be little possibility of such action. Unless a special rule were presented by the Democratic House managers, the measure could come up only on the "District of Columbia" days on the House calendar which are limited to two Mondays in each month. This is in control of Chairman Ben Johnson of Kentucky, who is opposed to the Crosser bill. The formal reports are now promised for the last week in June. Representative Robert Crosser of Ohio is at work on the affirmative report, while Representative Samuel E. Winslow of Massachusetts is drafting a minority report.

The statement that efforts will be made to force immediate action upon the Crosser bill was made in the session of June 8, the first of the District days for the present month. At that time the House Democratic leaders determined to abrogate the District days to make way for the sundry civil appropriation bill. This was opposed by Representative Frank Buchanan of Illinois, who wanted action on the "workingmen's safety act" for the district, and by Representative Nathan P. Bryan of Florida, who said he wanted action on the Crosser bill. The vote that displaced the District days was 202 against 64.

POSITION OF CAPITAL TRACTION COMPANY

The position of the Capital Traction Company on the bill is set forth in a letter sent early in the history of the hearings to Hon. Ben Johnson, chairman House committee on the District of Columbia, by George E. Hamilton, president of the company. In part Mr. Hamilton says:

"We oppose public ownership of street railways because:

"First—Public ownership, if fairly acquired and based upon all the elements and items of value now approved by commissions and allowed by courts, would, in the District of Columbia, impose upon the people of the District and the general government in equal proportion a burden of expense which would be very much larger than the estimate given by Mr. Crosser.

"Second—Municipal ownership of street railways is practically untried in the United States. No effort at such operation has been made on a scale sufficiently large or for a sufficient length of time to give any idea of its practicability. Mr. James Dalrymple, manager of the Glasgow Tramways, probably the best operated municipal street railway in the world, stated after a careful examination of conditions made at the request of the Mayor of Chicago, that in his opinion municipal ownership was not now to be desired in this country. There is nothing to indicate that the governmentally owned utilities in this or other countries have given as good service or as low rates as those privately owned. On the contrary, this country, where practically all utilities are privately owned, is pre-eminently superior to all others in the development of these utilities, particularly street railways, and gives many illustrations of much superior service and equally low rates when service is considered.

"Third—It has been stated that the satisfactory operation of Washington's excellent water works system is an argument for government ownership and operation of the street railways and other utilities, but it should be remembered that in the operation of the water system the cost to the consumer takes no consideration of the large investment, most of which was made by the United States government, and is based purely on operating expenses. Notwithstanding this, the cost of water service has steadily increased, while the cost of street railway fare has remained the same, although changed conditions have necessitated complete changes in system on several occasions, and very largely increased service, due to extensions and improved facilities.

"Fourth—For more than fifty years it has been the aim and effort of the stockholders, nearly 1800 in number, and of the management of the Capital Traction Company, who are almost entirely citizens of the District of Columbia, to give to Washington and its people a service at least equal to any in this country. In this effort, we submit, the company has been and is successful. Manifestly it would be unfair to these citizens whose money has been used in the building, equipment and operation of this system, and subjected always to the risks involved, to deprive them now of their investment and its advantages.

"Fifth—There is no demand for public ownership and no evidence of a desire therefor on the part of the people of the District. The street railways are chartered by Congress and are now under regulation of the Public Utilities Commission created by Congress, clothed with all the power and authority given to similar bodies in the States. It is known that the District Utilities board has strongly advocated public ownership and bases its position on the belief that satisfactory regulation is impossible. It should be borne in mind, however, that this declaration is made before the members have had time to become even moderately acquainted with conditions relating to street railway operation, conditions as to which they had no prior knowledge or education, and their position is taken without a full or fair trial. Commissions in other States and cities where conditions are much more complex and perplexing have succeeded in bringing public utilities under efficient regulation, and the confession of inability on the part of the District Board is, it would seem, too hastily made and might be construed into a confession of weakness. We believe and confidently assert that private ownership under strict public regulation is all that is needed or to be desired, and such regulation by the experience throughout the country is practical and has been usefully established and exercised."

Proceedings of the Illinois Electric Railway Association

Among the Topics Considered Were Tendencies in the Regulation of Public Utilities, the Maintenance of Electric Railway Equipment and Hydro-Electric Developments

The summer meeting of the Illinois Electric Railways Association was held at Keokuk, Ia., on June 24, 1914. About fifty members of the association assembled in the Keokuk High School Auditorium with President Britton I. Budd presiding. The first order of business included the reports of various standing committees. E. E. Soules, chairman of the publicity committee, reported progress. Regarding the map showing the electric railroads in the state of Illinois, the committee decided that a stock map could not be utilized to advantage, so that a special map showing electric lines prominently and the steam roads in light lines, is being sketched especially for this purpose. This map will be made in two sizes, the large size being 14 in. x 21 in. and a letterhead size for use on the back of traffic department correspondence paper. Mr. Soules reported that a proof copy of this map was just about ready to send out to the members and non-members for final checking. It will show all the stations on each road's line, as well as the exact alignment. This committee is also considering the publication of a booklet containing information regarding the company members of the association, maps, schedules, etc., as well as other editorial matter setting forth the advantages of electric railway travel. President Budd emphasized the importance of such a pamphlet, not only from an income standpoint, but for its educational value as well. The committee's report was received as representing progress.

John Leisenring, chairman of the signal committee, reported that it was making a study of signal maintenance and organization for the purpose of setting down a few principles and instructions outlining a standard practice. Other committee reports were made by Marshall E. Sampsell, chairman of the executive committee, and F. E. Johnson, chairman of the membership committee.

TENDENCIES OF PUBLIC SERVICE REGULATION

Immediately following these reports the regular program was opened with an address by the Hon. Walter A. Shaw, member of the Public Utilities Commission of Illinois. He discussed the waterway and water-power possibilities in the Mississippi River Valley, emphasizing especially the need of water-terminal facilities and water powers. In connection with the latter he said that they could be controlled either by the state or by private ownership, but in either case they should be supervised or regulated by a competent commission of experts. He believed that steps should be taken at once to develop these water-powers as a means of conserving the coal supply for future generations. In any case, however, these water-power developments should be considered only on a basis of a fair return on the investment whether they were publicly or privately owned.

He discussed briefly the Illinois public utility law in its relation to present-day consolidation tendencies. He stated he believed the public was convinced that consolidation of lighting and railway properties were for the good of all, if properly managed. The problem facing it at this time, however, is one of whether these consolidated properties should be governed locally or by state body. He was of the opinion that the state body would be the best solution, and its first duty would be to investigate the adequateness of the service furnished. This problem should be attacked by listening to complaints and through expert investigations, following which such rules and regulations as were necessary to eliminate the cause of complaint should be adopted. Following the correction of service difficulties, it was the commission's second duty to investigate the question of rates, basing its conclusions on a fair valuation of the property. In connection with rate regulation he stated that in many cases local friction often interfered with a fair solution of the problem, consequently the state body was in a better position to study the problem from an unbiased point of view.

HYDROELECTRIC DEVELOPMENTS

At the conclusion of Mr. Shaw's address, E. N. Lake, of the Stone & Webster Engineering Corporation, gave an illustrated talk on the low-head hydroelectric development at Keokuk and the high-head development at Big Creek, Cal. In connection with the Keokuk development Mr. Lake confined his talk largely to construction problems and views illustrating them, leaving the pictures of the finished plant to be viewed by the members on the inspection trip following the meeting.

MAINTENANCE OF ELECTRIC RAILWAY EQUIPMENT

The next speaker was Miles B. Lambert, railway and lighting department, Westinghouse Electric & Manufacturing Company, who spoke on the maintenance of electrical equipment. He said that while many companies were doing all that they could to maintain their rolling stock in good condition, there were other properties, notably the smaller ones, which neglected the rolling stock, even though they took good care of the power system. Economical shop maintenance was largely a question of men. With the right man on the job there was little need to work out inspection systems, comparative records, etc., because to-day there were opportunities on all sides for a live man to learn through the weekly technical magazines and otherwise just what was being accomplished elsewhere, and he could forthwith apply many such ideas to his own problems.

The old scheme of car maintenance was to fix things up after trouble developed. It would be difficult to find a road to-day which was not trying to follow the method of prevention rather than cure. Unfortunately, however, many roads had apparently never caught up with regular repairs to a point where they could apply the better way. Where such conditions existed it would be money well spent to put on a sufficient extra force until the desired condition was reached. As the work of inspection required a most conscientious man, the master mechanic should be permitted to pay wages that would attract good men. The company should also provide quarters where the men could work under agreeable conditions. An inadequate or poorly kept storeroom also had much bearing on the general cost of maintenance. Thus a $6,000 to $10,000 car might be kept out of service for long periods for lack of a part costing only a few dollars. It was good economy to carry adequate repair parts, and to use such machine tools as were best adapted for many classes of work. A most desirable repair shop device was an arc welding outfit.

The proper selection of apparatus for the service was a most important matter. The adoption of the later forms of motor and control were particularly important factors in reducing maintenance cost. It would be well worth while to study the repair costs of old and new motors to see what types should become obsolete.

One of the most important things in the selection of equipment was proper gear ratio. Usually the stops and slow-downs imposed by the conditions of city traffic made it of little importance whether the car was geared for a maximum speed of 25 m.p.h. or 30 m.p.h. The ability quickly to reach a speed of 10 m.p.h. to 12 m.p.h., however, was important. The lower the maximum speed for which a car was geared the more easily the motors developed the large tractive effort necessary to secure the maximum acceleration. Also the lower the maximum speed for which a car was geared, the lower would be the current required to develop a good tractive effort. The low-speed gearing not only reduced the heating of the motors, and consequently their maintenance cost, but also reduced the energy consumption. After studying these facts as applied to their own special conditions a number of railway companies had reduced their pinions from eighteen to fifteen teeth or the equivalent, thus effecting large reductions in maintenance and energy with no change in the schedules. The same principle held in interurban service except that the additional factor of excessive drop in line voltage entered. Thus a car geared to run at 55 m.p.h. with 500 volts might require so much more current than one geared to run 50 m.p.h. that with the limited feeder available the higher speed gearing would cause a sufficient additional drop in the line voltage, and consequent loss in speed, great enough to overbalance its ratio. In short, the car would run at practically the same speed as one geared for 50 m.p.h. Furthermore, the extra current which the first car took on account of its higher-speed gearing would impose greater loads on the motors and thus tend to increase their maintenance without giving any advantage in return. The influence of voltage drop was so pronounced on some lines that the maximum speed was limited to a certain definite value no matter how great the capacity of the motors or the number of the pinion teeth. The only remedy for a condition of this kind was to install additional feeder capacity.

The intelligent handling of equipment by the employees of the transportation department was another place where maintenance could be decreased, say, by avoiding excessively heavy trailing loads, permitting time for proper inspection, teaching the motormen to handle equipment properly, etc.

In conclusion Mr. Lambert said that it would pay railways of reasonable size to have in charge of the electric railway equipment a man who would not be tied down to routine work. A man thus unhampered by detail would have the opportunity to work out bigger and more important methods of efficiency and economy. It was also desirable to have an understudy for every man in charge of important work. Frequent changes in organization were not good, and general changes in personnel were occasionally due to one-man organization. Every branch of the work should be self-contained so that in the absence of the foreman the second in command would take charge, and so on throughout the organization. This meant that the assistants would take more pride in their work, and the old adage "Two heads are better than one, even if one is a cabbage head" would be justified.

President Budd, in commenting on Mr. Lambert's paper, emphasized the importance of systematic inspection, stating that his road recently had thoroughly tested its inspection system without failure. He stated that all the equipment on the elevated railways was inspected on a mileage basis. Recently when the through routing of cars through the elevated loop was put in operation it was necessary for trainmen to operate and inspectors to inspect strange equipment. This was considered an especially severe test when it is considered that more than 1500 cars were involved. At this time the inspection system did not break down because failures were no more than usual, varying from 3 to 5 per cent of the total rolling stock out of service.

ENTERTAINMENT

Upon the completion of the program the association luncheon was served in the Keokuk Elks' Club House, after which the members were the guests of the Mississippi River Power Company on an inspection tour of the Keokuk hydroelectric development. Every part of this important plant was visited and every courtesy was extended the members to see the entire plant and show how it was operated. Following this inspection trip, the association boarded a boat for a trip up the Mississippi River from Keokuk to Fort Madison, whence they returned to their homes. The Chicago members of the association made the round trip to Keokuk in two special cars.

STEEL CARS ON THE PENNSYLVANIA

The Pennsylvania Railroad System, with 2554 all-steel passenger cars in service and 379 others under construction, owned more than one-third of all the steel passenger equipment cars in use in the United States on Jan. 1, 1914. These figures are exclusive of sleeping and parlor cars, but out of 2115 steel sleeping and parlor cars in service on all roads on Jan. 1, 1914, 750, more than one-third of the total, were in use on the lines of the Pennsylvania System, where every sleeping car normally in use is of all-steel construction. The Pennsylvania Railroad announced in 1906 that all future additions to its passenger equipment—passenger coaches, postal cars, baggage cars, express cars, etc.—would be of all-steel construction, and the above figures show that on Jan. 1, 1914, almost exactly one-half of its passenger equipment had been replaced with steel cars, as the road had 6100 passenger cars in service on that date.

FIRST-AID EQUIPMENT FOR SERVICE CARS

In response to an inquiry as to the contents of the "first aid" box referred to in the article by Edward Dana on "The Removal of Surface Obstructions," published in the issue of the Electric Railway Journal for May 23, page 1137, Mr. Dana states that the box is supplied by the company and contains the following:

Two tourniquets.
Two rolls ½-in. adhesive plaster.
One roll 1-in. adhesive plaster.
Two rolls 2-in. adhesive plaster.
Four packages gauze bandages.
10 yd. gauze.
Eleven emergency slings.
5 yd. canton flannel.
One pair scissors.
500 corrosive tablets.
1 lb. absorbing cotton.
Two quart bottles (empty).
Two pillows.
One package common pins.
Three dozen safety pins.
One 8-oz. bottle ammonia.
3 quarts Caron oil.
One wash basin.
Six white wood splints.

The Turin-Cirié-Lanzo Railway in Italy has decided to electrify its present line. The system adopted is direct current at 1500 volts and is 28 miles long.

American Association News

Committee on Equipment Receives Reports on Various Subjects from Sub-Committees—Meeting of the Committee on Power Generation—Other Committee Activities.

COMMITTEE ON EQUIPMENT

A meeting of the committee on equipment was held at the Fort Pitt Hotel in Pittsburgh on Friday, June 19. There were present F. R. Phillips, chairman, superintendent of equipment Pittsburgh Railways; J. P. Barnes, general manager Syracuse & Suburban Railroad; D. E. Crouse, electrical engineer Maryland Electric Railway; L. M. Clark, master mechanic Indianapolis Traction & Terminal Company, and W. R. McRae, master mechanic Toronto Railway. W. E. Johnson was also present as representative of W. G. Gove, superintendent of equipment Brooklyn Rapid Transit System.

At the committee meeting reports from the following sub-committees were presented: Wires and cables for car equipments, lighting of electric street cars, air-brake hose specifications, specifications for solid wrought carbon steel wheels for electric railway service, and lightning protection for car equipment. These sub-committee reports were discussed in detail by the committee as a whole and certain changes were suggested in accordance with the views of the committee. In addition to these reports the committee considered action upon various matters which had been brought to its attention during the year; namely, the apparent desire for association specifications covering gears and pinions; modification of the present standard design of journal brass to meet the advent of high-speed cars with high braking power and revision of the specifications for heat-treated carbon-steel axles, shafts and similar parts. At the meeting all miscellaneous business of the committee for the year was completed and final plans were made for the preparation of the committee's report at the convention.

COMMITTEE ON POWER GENERATION.

A meeting of the committee on power generation was held in New York on Thursday, June 18. There were present B. F. Wood, chairman, chief engineer United Gas & Electric Engineering Corporation; W. H. Sawyer, vice-chairman, Ford, Bacon & Davis; L. P. Crecelius, electrical engineer Cleveland Railway Company; J. W. Welsh, electrical engineer Pittsburgh Railways; Fay Woodmansee, Woodmansee & Davidson, Inc.; L. R. Lee, chief engineer E. W. Clark & Company, and R. J. S. Piggott, mechanical construction engineer Interborough Rapid Transit Company. The meeting was held primarily for the purpose of discussing the details of various subjects that had been assigned to the committee for consideration and also for selecting the sub-committees which were to prepare the various sections of the report of the committee as a whole.

The discussion first centered upon the general subject of automatic stokers and the possible advantages of their installation in small plants. In this connection the point was raised that every new power plant designed for railway use would probably be equipped with stokers, so that the question as to the size of the plant in which stokers became profitable depended upon the cost of changing over the plant from hand firing to stokers, and that the fixed charges on the cost of the change had to be balanced against the generally admitted savings due to the improved efficiency and capacity of stokers. The subject, notwithstanding previous consideration in technical papers, merited attention on account of the new conditions which had arisen through the existing practice of over-rating boilers, with the consequent increase in importance of estimating standby losses.

The subject of reactance for power circuits was then taken up, and the possible use of time-limit relays instead of reactance and the relation of resistance and reactance in a circuit were discussed at length, it being decided that the report should include consideration of general types of reactance for reducing short-circuit currents.

The relative advantages of sixty-cycle and twenty-five-cycle systems of power distribution for railway systems was then taken up, and Mr. Sawyer presented a paper which he had prepared in advance of the meeting. This was discussed by the committee as a whole and approved for inclusion in the report before the convention.

Of the subjects which had been suggested to the committee, that of capacity and efficiency in the boiler room, including consideration of the relative merits of automatic stokers and giving consideration to the size of plant in which stokers could be profitably introduced, was assigned to Messrs. Piggott, Sinclair and Lee for preparation as a part of the final report. The subject of control and safety devices for power stations and feeder circuits with special reference to reactance was given to Messrs. Welsh and Woodmansee. It was also decided that the subject of advantages and disadvantages of sixty-cycle apparatus for railway use should be reported on by Messrs. Sawyer and Crecelius. The matter of control of currents in three-conductor, high-tension feeders so as to limit them to a predetermined value was assigned to G. C. Hall, Interborough Rapid Transit Company, who was to consult with the sub-committee that was to prepare the part of the report dealing with control and safety devices for power stations and feeder circuits.

MEETING OF COMMITTEE ON RULES

A meeting of the committee on rules was held in New York on Friday, June 12, at which were present L. H. Palmer, chairman, with Harrison Williams, New York; W. R. W. Griffin, vice-chairman, general manager Tri-State Railway & Electric Company; W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad. In addition, J. W. Brown, assistant general superintendent Public Service Railway of New Jersey, attended the committee meeting as a representative of the committee on block signals for electric railways, for the purpose of considering the subject of block signal rules.

The first subject considered by the committee was the possibility of establishing a standard joint code of rules for both interurban and city service, and after a thorough discussion this was decided to be inadvisable at the present time. The committee then took up in detail the series of changes suggested in the proposed revision of the existing interurban code. These changes were generally minor in character and were designed to make the wording of both the city and interurban codes harmonize wherever possible.

During the committee session the subject of contactor signal rules was taken up. A set of proposed rules was submitted to the committee by Mr. Brown so that it could pass upon them prior to the submission to the committee on block signals for electric railways. This proposed code of rules included definitions for the fundamentals of signals of the contact type, together with rules suitable for trainmen who would be likely to use them. They were discussed in detail by the committee of the whole and placed in the form in which they would be submitted for consideration to the committee on block signals.

MEETING OF BLOCK SIGNAL COMMITTEE

The joint committee on block signals of the Engineering and the Transportation & Traffic associations met at Toledo on June 23. Those in attendance were J. M. Waldron, New York; C. D. Emmons, South Bend, and H. A. Nicholl, Anderson. The manufacturers were represented by Carl P. Nachod, Nachod Signal Company, Inc.; Roy V. Collins, United States Electric Signal Company; H. W. Griffin, Union Switch & Signal Company, and S. M. Day, General Railway Signal Company. The principal discussion was on the proposed rules and definitions for trolley contact signals. All the sub-committees on other subjects reported, and plans were completed for transmitting the year's work of the committee to Secretary Burritt for early publication.

BOARD OF ACCIDENT PREVENTION

A sub-committee of the Board of Accident Prevention, which was appointed at the convention of the American Electric Railway Association at Atlantic City last October, met at the association headquarters June 24 and 25, for the purpose of devising ways and means to prevent accidents to the public and the employees of public utilities companies, by co-operation with member companies throughout the country, the general public and the civic authorities. The purpose of the committee is to gather and classify information from all sources as to what is being done to prevent accidents, based upon their varied experiences. This information will be used for the purpose of drafting recommendations for a general and systematic country-wide effort in preventing accidents that result in personal injury.

MANITOBA PUBLIC UTILITIES COMMISSION REPORT

The second annual report of the Manitoba (Canada) Public Utilities Commission for the year ended Nov. 30, 1913, contains a general itemization of applications made to the commission during the year, of proceedings and orders upon the commission's own motion, and all formal applications, decisions and offers. At the end of the report there is appended a 77-page report on the Winnipeg Street Railway service prepared by Robert N. Feustel under date of Sept. 15, 1913. This covers the general subject of the traffic problem existing in Winnipeg, such as the factors entering into the problem of furnishing adequate street railway service in that city, the necessary changes in cars, track and track structures, car routing, and the like. At the end of his report Mr. Feustel emphasizes the need for proper understanding between the public and the company and the need for co-operation on the part of the public. He stated that best service can be had only by an intelligent effort on the part of the public to understand operating conditions and to aid the company in all possible ways to meet them.

COMMUNICATIONS

STATUS OF PREPAYMENT PATENTS

Prepayment Car Sales Company
50 Church Street
New York, June 22, 1914.

To the Editors:

I note in the Electric Railway Journal of June 20, 1914, page 1397, the report of a paper presented by C. H. Cross, mechanical engineer of The Milwaukee Electric Railway & Light Company, at a meeting of that company's section of the American Electric Railway Association, held in Milwaukee on June 2.

Under the title "Improvements in Car Design" Mr. Cross takes occasion to discuss the "Prepayment" type of car and the legal status of the Prepayment Car Sales Company. In this connection Mr. Cross does not state all the facts and makes broad statements and references to the patents owned by this company and its rights, which are entirely misleading, and I welcome this opportunity, so far as possible in a short letter, of putting before the street railway fraternity the facts in the case.

Mr. Cross is evidently misinformed as to the situation and the facts involved in the suits which we found necessary to institute against the Orange County Traction Company to protect our rights under our patents. As an example of his lack of correct knowledge of the facts he states that the cars in question were equipped with a type of mechanism developed in Milwaukee. This is not the case. The mechanism in use on the Orange County Traction Company's cars is one of our original type that was developed early and is in use on many cars operating to-day throughout the country under our license. The present type of car operating in Milwaukee, while coming under several of our patents, is different from most types of regular prepayment cars so far as details of platform design are concerned.

We originally equipped twelve of the Milwaukee cars with our standard inclosed platform type of construction, for which the Milwaukee company paid us our regular royalty charge. Subsequently that company equipped other cars with a somewhat different arrangement. These cars, by the way, as so changed, also come under our patents. None of these changes made in the Milwaukee cars was adopted in the Orange County cars. Not a single part of the Orange County car construction originated in Milwaukee.

Again, Mr. Cross would leave us under the impression that the patent to which he alludes contains twenty claims. He is evidently not familiar with the patent, and his statements are misleading. The fact is this patent contains sixteen claims, fourteen of which were concerned in the suit. Mr. Cross also conveys the impression that only five of the claims of this patent mention means for operating the door. All of the claims but one include means for operating the door.

I mention these inaccuracies merely as illustrating Mr. Cross's evident lack of knowledge of the situation.

The facts as to the litigation between the Orange County Traction Company and the Prepayment Car Sales Company are that the latter company brought two infringement suits against the Orange County Traction Company. In one of these suits was involved one patent, and in the other suit another patent. In one of these suits, being the suit upon our basic prepayment patent, the court held the patent valid and infringed as to all of the claims involved, and judgment was entered in favor of the Prepayment Car Sales Company for the full amount of our standard royalty of $100 per car and costs. In the other suit, upon the patent referred to by Mr. Cross, out of fourteen claims of the patent involved, four were held to be invalid and ten not infringed. Evidently Mr. Cross is not aware of the fact that our basic prepayment patent was sustained, as above stated—at least he does not mention that fact.

Since the decisions were rendered in the two suits above mentioned, we have brought another suit against the Orange County Traction Company upon another patent owned by our company, which suit is pending.

It appears to me that the paper by Mr. Cross is not so much a paper on car design as an attempt to discredit the patents of the Prepayment Car Sales Company.

The Prepayment Car Sales Company is an organization whose business has been from the first, and is to-day, centered solely on the designing and development of car platforms for street railway service and of mechanisms for the operation of platform doors and steps. It is a member of the American Electric Railway Manufacturers' Association and has done everything possible in its power to further the aims and interests of its parent association, the American Electric Railway Association. The Prepayment Car Sales Company has been a great factor in the improvement of street car practice generally and in the methods of fare collection, and, notwithstanding the criticism in the article referred to, its business is continuously increasing, which is evidence of the support being given it by street railway companies throughout the country.

That the Prepayment car has been a success and a decided advantage to street car companies throughout the country, is beyond question; its admitted benefits have been referred to in many papers written by some of the oldest, ablest and most experienced street car men in the country, and presented to the different street railway associations from time to time.

That the "Prepayment Car" was unknown until introduced by us is proven beyond question or cavil by sworn testimony given voluntarily by many of the ablest and most successful street railway operators, who in all cases frankly state that the "Prepayment" car was absolutely unknown in the field before it was exhibited by us at the American Street Railway Association Convention, held in Columbus in 1906, where it attracted marked attention and favorable comment. Since that time it has been the constant aim of our company to keep abreast of the times and aid the street car companies in the improvement of their service, and in doing this we have developed types of mechanism and platform car design to meet any new conditions.

Mr. Cross closes with the legal conclusion that anyone can operate in this country "Prepayment" cars without paying royalty. This assertion, in view of the contracts entered into with us, and royalties paid and being paid to us by numerous street car companies throughout the country, upon the advice of their attorneys after most careful examination of our patents, scarcely merits comment, but reminds us of the old proverb to the effect that a cobbler should stick to his last, and of that other saying, that a certain class of people rush in where angels fear to tread. Mr. Cross evidently entirely overlooks and ignores the fact that our basic Prepayment patent has been sustained by the courts; that we own exclusive rights for Prepayment cars under about seventy United States letters patent, a considerable number of which cover different types of door and step mechanism, and jumps to the remarkable conclusion that because four claims in one of our patents were held invalid we have no rights in the premises, and that all of our other patents may be ignored.

T. W. CASEY,
President, Prepayment Car Sales Company.

ALL-STEEL CARS FOR CITY SERVICE

June 25, 1914.

To the Editors:

I have read with interest the editorial comment on my communication relative to "All-Steel Cars for City Service" in the June 13, 1914, issue of the ELECTRIC RAILWAY JOURNAL and I am glad to find such a strong proponent of the steel car for city service.

I feel, however, that my remarks in regard to the use of commercial rolled shapes and pressed sections were somewhat misinterpreted. I would be last to suggest the use of heavy, inefficient sections simply because they are easy to obtain. I have used commercial rolled sections in designs of steel cars and believe in their use to just about the extent that they are used on the New York Municipal Railway car, namely: in the long bottom sill sections, such as bottom side sills and center sills. Here, for mechanical and other reasons, long uniform sections are desired, and it is easy to reinforce them with cover plates when it is necessary. However, for short members where variations in sections are desired, such as bolsters, crossings, end sills and platform knees, the pressed section lends itself admirably to the work, and its use results in a member of high efficiency for its weight.

There are, however, many places where stiffeners or light tie members are required, and these can be furnished with light angles or other commercial rolled sections with no perceptible increase in weight over pressed sections. In the drawings of the New York Municipal car presented in the June 13, 1914, issue of the ELECTRIC RAILWAY JOURNAL I note that angles and Z-bars are used in several places. It will be seen also that the major sills of the car frame are of rolled channels, namely, the side and center sills.

There is another point with reference to the use of pressed and rolled sections that might be brought out at this time. Consider the channel section. For a given depth and weight, and with substantially the same flange widths, the commercial rolled shape will show a greater section modulus than the pressed section. This is due to the better distribution of the metal in the rolled section, because the flanges are relatively heavier than the web. If a pressed member was used, the thickness of the metal would be uniform at all points, therefore requiring additional weight to obtain the same strength. The rolled section is also stiffened by the fillets. Moreover, an outside bottom sill to which are to be riveted the finish sheets forming the web of the girder may be supplied by the rolled section to much better advantage because it presents a flat square corner member with which the web plates can be neatly aligned.

With regard to the weight of steel cars, that is, the structure only, not including the weight of appurtenances, sashes, doors, curtains and steps, over which the designer has no control, the steel street cars to which I referred in my previous communication have a weight per running foot of approximately 325 lb. This figure is for a car with monitor roof, 49 ft. 2 in. long, 8 ft. 9 in. wide over guard rails, and 8 ft. 8½ in. from bottom of side sill to top of roof. I believe that with an 8-ft. 6-in. width and the use of an arched roof this unit weight figure could be safely reduced to well below 300 lb. per running foot.

In connection with the discussion of the growing use of steel cars in city service I note in the June 20 issue of the ELECTRIC RAILWAY JOURNAL that a city property has recently contracted for twenty steel street cars. May the good work go on.

"EQUIPMENT ENGINEER."

Equipment and Its Maintenance

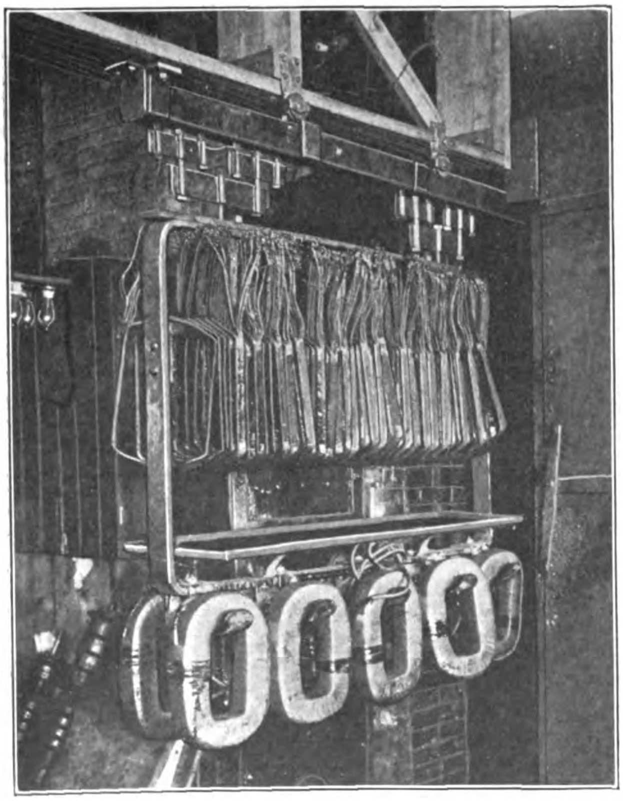
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

IMPROVEMENTS IN DETROIT'S COIL BAKING OVEN

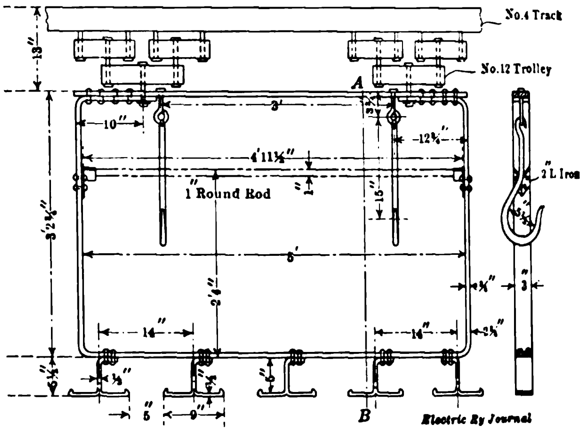
BY T. L. KELLER, ASSISTANT MASTER MECHANIC, DETROIT UNITED RAILWAY

In order to hasten the coil-baking process as well as to facilitate the handling of coils to and from the oven, the Detroit United Railway's mechanical department has made several interesting improvements in its baking oven. The oven occupies a small room, 9 ft. x 13 ft. in plan, in the old shop building, and is often taxed to its limit to meet the increased demands. Not having sufficient heat or ventilation to permit of hastening the baking process, additional ventilators were placed in the roof and the entire floor of the oven covered with steam-heating pipes. These heater coils were made up of 1-in. pipe with return bends resting on 2-in. angle irons, so as to provide air circulation from the floor level through the pipe coils, thence to the ventilators. Since it was necessary for workmen to enter the oven the coils had to be covered with sheets of ¼-in. boiler plate perforated with 1½-in. holes at 5½-in. centers. These plates rest on 3-in. rails, which separate the boiler-plate floor from the pipe coils. In addition to the heat provided by the steam coils, air is forced over electric heaters into the oven at the floor level. By this means the oven may be kept at a temperature of from 200 to 220 deg. Fahr. and absolutely free from fumes and gases.



Detroit Coil Baking-Oven—Suspended Carrier

In order to remove the weight of coils undergoing the baking process, from the boiler plate floor, ordinary floor trucks were abandoned for an overhead system of suspended carriers. One of these carriers filled with coils is shown in one of the accompanying illustrations. The suspended carrier track is formed of a heavy rectangular tubing such as used with extra large sliding doors. This track is supported on the roof beams inside of the oven and extends a sufficient distance outside the oven door to permit the carrier to be loaded and unloaded. As shown in one of the illustrations the suspended carrier is about 2½ ft. above the floor and is made up of ¾ x 3-in. bar iron. The frame is 3 ft. 3 in. x 5 ft. over all, and fitted with a pair of semicircular sockets for a 1-in. round rod on which the armature coils are hung in the baking process. The field coils are swung from T-shaped hooks riveted to the bottom of the frame. Other details of this suspended carrier are also shown.



Carrier for Detroit Baking Oven

TESTING TYPE M CONTACTOR COILS WITHOUT REMOVAL

BY F. E. CASE, ENGINEER RAILWAY EQUIPMENT GENERAL ELECTRIC COMPANY

If a contactor of type M control fails to pick up properly with the minimum voltage at which it was intended to operate, the mechanism may be binding at some point, or the coil may be partly short-circuited. The former defect can be readily detected by inspection.

Probably the simplest way of testing the contactor coil is to connect it in series with a resistance of known value, such as the tubes used in type M control, and place it across a 600-volt circuit. Measure simultaneously with two voltmeters the drop around the coil and the resistance. The resistances of the two will be proportional to these voltages. The resistance of the coil is determined by multiplying the number of ohms of the known resistance by the volts drop across the coil and dividing by the volts drop across the resistance. The coils can be tested in this way without removal from the contactors.

All contactor coils are marked with specification numbers, which are also given on diagrams, and the resistance of any particular coils can be obtained through our local offices. If a coil is impaired, the test suggested should indicate whether or not it is in bad shape.

EQUIPMENT DEFECTS—CIRCUIT BREAKERS AND HOOD SWITCHES—III

BY C. W. SQUIER, E.E.

Periodic tests should be made on all circuit breakers to make certain that they will open at the desired current setting. When properly adjusted they compel the motorman to handle his controller with more care than otherwise and so save energy and prevent excessive heating of the motors and equipment. A proper adjustment decreases the liability of accidents, burnouts and fires. In case of damage suits, the ability to prove regular circuit-breaker inspection and adjustment has great weight with the judge and jury. Several kinds of apparatus for testing and setting circuit-breakers are employed. These comprise portable outfits, motor-generator sets, low voltage tests, balancing tests, etc. I will describe some of the least expensive outfits that have been found to give satisfaction.

TESTING CONDITIONS

The best practice is to test and set all car circuit breakers at periodical intervals. This time can be arranged to conform to the regular overhauling or inspection of other parts of the equipment so that it will not be necessary to bring in a car solely to adjust and test the circuit breakers. At the same time the breakers can be cleaned and all worn or burned parts renewed. Where this is done, it is best to remove the circuit breakers from the cars and take them to the bench where the renewals of contact tips can be made most efficiently, after which the circuit breaker can be placed in a rack for testing. This rack should be arranged to hold the breakers in the same position as when installed on the cars. There are certain times, however, when it would seem advisable to test the breakers without removing them from the car, as, for instance, after a car has had a short-circuit or burnout which a properly-adjusted circuit breaker should have prevented. The removal of the breaker from the car in such a case might remove the cause that made the circuit breaker hold in, and so prevent its detection. With little extra expense, the same testing set can be arranged to test the circuit breakers both on and off the car. Where a permanent testing set is provided, its location should be such that it will be convenient to the bench where repairs are made and also to a track where cars can be brought for testing the circuit breakers in their normal operating position.

TESTING SETS

Fig. 1 shows the connections for a stationary test set that can be used for adjusting circuit breakers either on the car or in the testing rack. It consists of a water rheostat, *F*, for varying the current through the circuit breaker on test, an ammeter, *A*, for measuring the current at which the circuit breaker blows, a protective circuit breaker, *D*, a double-throw switch, *S*, and a reel, *R*, for holding the lead used when testing breakers without removing them from the cars.

The water rheostat *F* consists of a wooden tank filled with water and having a ground plate at the bottom so that the solution is grounded. An electrode, *G*, made of sheet iron is used to vary the adjusting current. This may be raised and lowered by means of a rope running over pulleys with a weight, *W*, at the end to counter-balance the weight of the electrode. The ammeter *A* is direct reading, and for ordinary testing should have a scale reading 500 amp. The protective circuit breaker *D* should be set sufficiently high so as not to blow while the test breaker is being adjusted while still providing a safeguard against abnormal currents and short-circuits. If an ammeter with a full scale reading of 500 amp is used, the protective circuit breaker should be set to blow at about 400 amp. The double-throw switch *S* enables the same apparatus to be used for testing breakers either on or off the car, and should have the contacts so arranged that the fulcrum will not carry current. When it is thrown to the "down" position the circuit is closed for testing breakers on the car, and when in the "up" position breakers may be adjusted in the rack *P*, which is arranged to clamp the breaker in the same position as when on a car. An insulated cable about 40 ft. or 50 ft. long is required for testing breakers on the cars, and the reel *R* affords an effective and easy means of keeping this off the floor and out of the way when not in use. A slip ring *C* with a brush contact is provided at one end so that the turning of the reel does not disturb the connections.

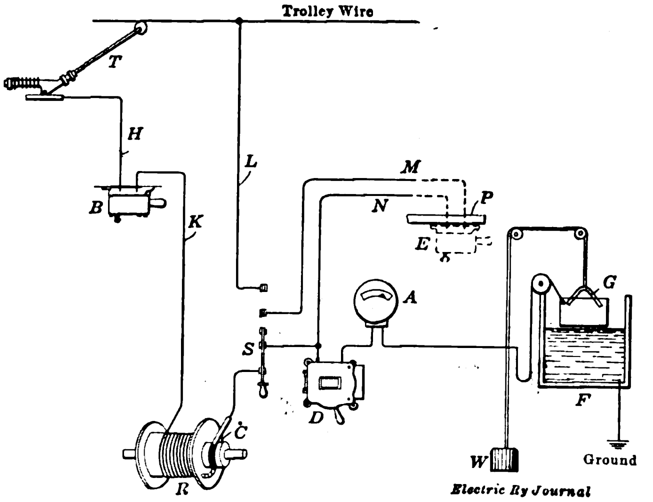


Fig. 1—Stationary Test Set with Water Rheostat and Ammeter

To test a circuit breaker on the car, remove the lead connecting the circuit breaker with the controller and insert the test lead *K* from the reel in its place. Close the circuit breakers *B* and *D* and then put the trolley pole of the car on the wire. Then by lowering the electrode *G* into the water of the water rheostat, a circuit is created from the trolley pole through the circuit breaker *B* on test, out the lead *K* and through the reel *R* to the switch *S*, through this switch, the circuit breaker *D*, ammeter *A* and the water rheostat to ground. By lowering and raising the electrode *G* any desired current range may be obtained.

To test circuit breakers off the car, place them in the rack *P* and attach the leads *M* and *N* to the terminals of the breaker. Close both circuit breakers *D* and *E* and throw the switch *S* to the "up" position. Then by lowering the electrode *G* into the water, we have a circuit from the trolley wire through the lead *L* and switch *S* to the circuit breaker under test *E*, and from this breaker through the protective circuit breaker *D* and ammeter *A* to the water rheostat and to ground.

Fig. 2 shows the connections and apparatus required for a "limit" method of setting circuit breakers. This differs from the method just described in that no ammeter is required, the adjustment of the circuit breaker being between two current values indicated by the burning of lamps. The apparatus used is the same as that previously described except that the ammeter is replaced by a grid resistance, two low-voltage relays and a bank of lamps. To determine the values of the grid resistance R_1, R_2, let us assume that circuit breakers are to be set so that they will blow when 250 to 260 amp are flowing through them, and that the relays *K* and *L* will operate at 6 volts. Relay *K* should close the circuit for the lamps when 250 amp flow through the resistance R_1 and relay *L* should open the circuit when the current through the resistance R_2 reaches or exceeds 260 amp. From Ohm's law, resistance equals volts divided by current. Therefore, we get R_1 equals 6/250 or 0.024 ohms, and R_2 equals 6/260 or 0.02308 ohms.

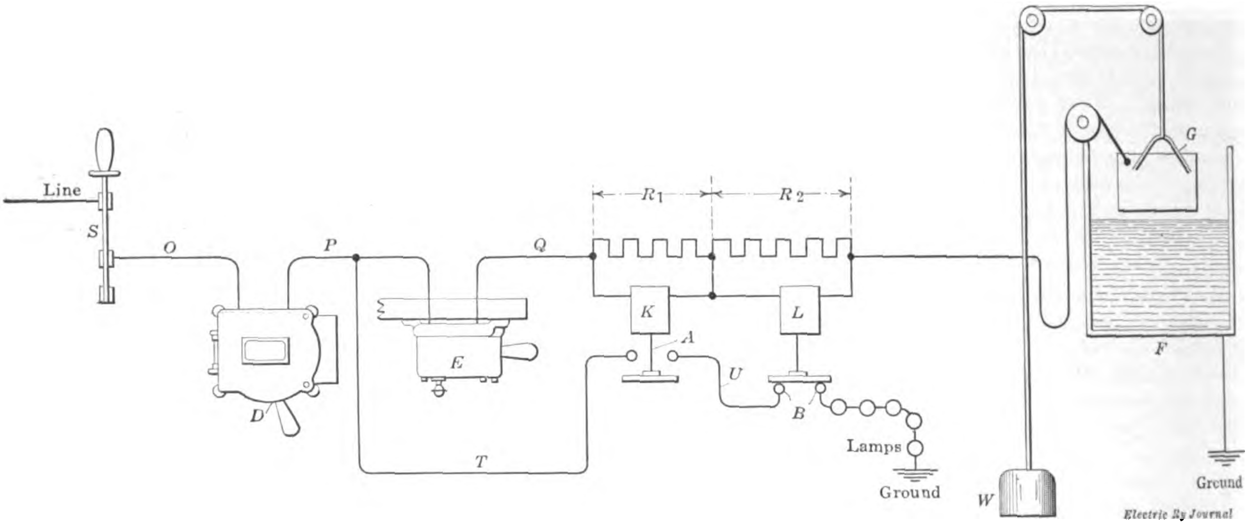


Fig. 2—Limit Method for Setting Circuit Breakers Without Using an Ammeter

The operation of the apparatus is as follows: Connect the circuit breaker to be adjusted in the circuit at *E* and close the protective breaker *D* and switch *S*. By lowering the electrode *G* into the water rheostat we then have a circuit from line through the switch and two circuit breakers, resistances R_1, R_2 and water rheostat to ground. When the current rises to 250 amp the drop across the resistance R_1 will be 6 volts and the relay *K* will close. We then will have an additional circuit from the breaker *D* across the contacts *A* and *B* of the relays and through the lamps to ground. This circuit remains closed and the lamps continue to burn until the current through the resistance R_2 reaches 260 amp, when the drop across this resistance will be 6 volts and the relay *L* will open the lamp circuit. The circuit breakers should then be adjusted to blow while the lamps are burning. The resistances R_1 and R_2 should be of such capacity that they will not get hot while the breakers are being tested, as the resistance changes in value with the temperature and this will affect the value at which the relays will operate.

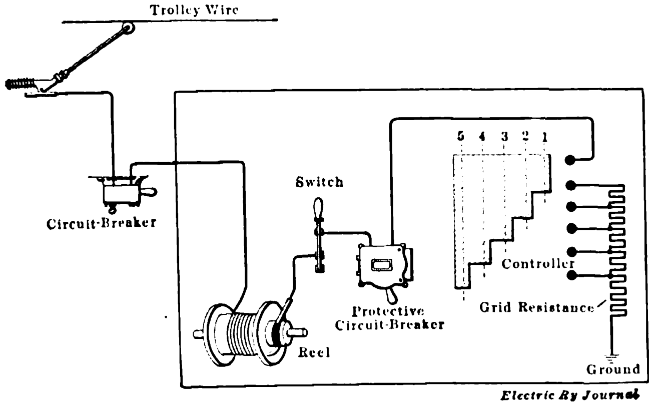


Fig. 3—Portable Circuit Breaker Testing Set

By substituting a double-throw for the single-throw switch and adding the reel with a long insulated lead, the latter method may be adapted for testing the circuit breakers without removing them from the cars.

While either of the test sets just described could be mounted on a truck and so made portable a water rheostat does not lend itself readily to being hauled around on account of its weight and the solution which it contains. A more satisfactory form of portable outfit is obtained by replacing the water rheostat with a few frames of grid resistance and connecting a controller for cutting this resistance in and out of the circuit to get the necessary current variation. Fig. 3 illustrates such an arrangement. An ammeter is required only initially for adjusting the resistance, after which each point of the controller will have a definite current value, providing, of course, that the line voltage is reasonably constant. On a road operating two general types of equipment, let us assume that it is desired to have the circuit breakers on one class set at 275 amp and on the other at 325 amp. With a five-point controller, convenient current values would be 260, 270, 280, 320 and 330 amp. Circuit breakers for the first class of equipment should not blow on the second but should blow on the third point of the controller, and circuit breakers for the second class should not blow till the fifth point of the controller is reached. This would assure that circuit breakers for the first class of equipment would be set to blow between 270 and 280 amp and breakers for the second class between 320 and 330 amp.

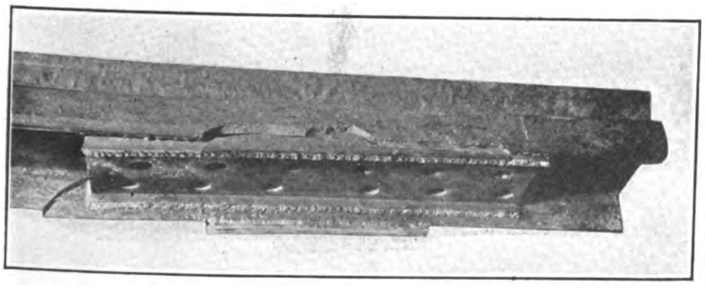
The third annual field day of the office employees of the Boston (Mass.) Elevated Railway was held at Riverside, Mass., on June 13. About 500 persons attended. There were numerous athletic events on the grounds of the Riverside Recreation Club, and a baseball game between a team from the legal department and an "all L" nine recruited from the company as a whole. The ball game was won by the legal department by a score of eight to five. H. B. Potter was chairman of the committee on arrangements. Many officials of the company were present.

ELECTRIC WELDED JOINT AND RAIL BRACE USED IN CINCINNATI

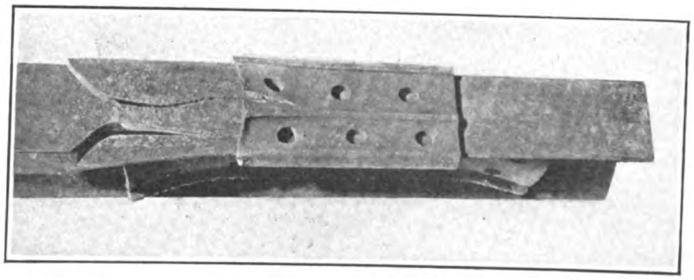
The Cincinnati (Ohio) Traction Company has recently developed an electrically welded joint and combination tie plate and rail brace which is of especial interest because extremely low first cost has been combined with durability. In fact, this joint offers an opportunity to consume scrap material which otherwise would be worth scrap prices only.

The welded joint was made on 140-lb. Lorain section 402, girder-grooved rail with standard 36-in. plate and one-half of a standard 119-lb. Lorain section 341 connection plate welded to the rail base. Three or four of these test joints have been made at a cost of a little less than $4 each. It is believed that in an actual installation this cost will be reduced about 50 cents, which should make a joint of this kind very attractive when one considers that this figure includes labor and material. The actual welding was done with the rail in position as in the track, and required one hour and ten minutes, during which time 160 sq. in. of welding contact was covered. A portable electric welding outfit furnished by the Indianapolis Frog & Switch Company was employed on the work.

In order to be positive that the weld between the rail and the joint would be secure, both the edges of the rail and joint were carefully ground free from scales and the joint pressed in position. A grinding tool was used only because it was near at hand, as it was felt that a sand blast would prove just as satisfactory. In order to demonstrate the effect of failure to remove scale from the joint and the rail, a portion of the joint and rail was left unground. In the accompanying illustration where the ball of the rail is in the foreground, it will be seen that at the upper portion of the angle bar the weld has parted, but at the exact point where grinding began the weld was so secure that instead of breaking along the weld or through the angle bar, it split the ball of the high-carbon rail. This also is true of the weld between the base of the bar and the base of the rail. The reversed rail in another illustration shows that the base of the rail has split away from the web. The purpose of this test was to determine the quality of bond after the electric weld had been made. Ordinary track chisels were inserted behind the bars, one wedge at a time being driven with a 14-lb. sledge. The results of the test, as illustrated, required one and three-quarter hours of continual swinging of the hammer on the wedges. The weld failed only where the rail and joint had not been ground.

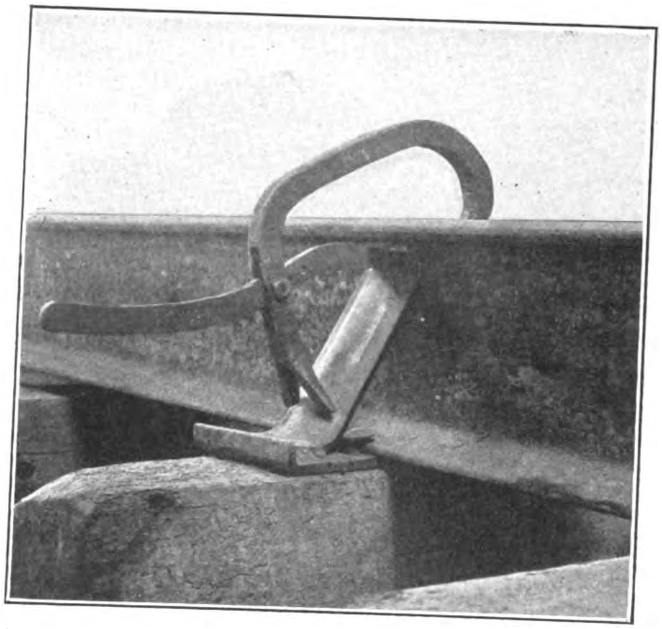


Cincinnati Welded Joint After Test, Looking at Head



Cincinnati Welded Joint After Test, Looking at Base

The engineers of the Cincinnati Traction Company believed that better progress with the paving between track rails could be made if tie rods were eliminated. Accordingly, a combination tie plate and rail brace was devised for standard track construction with the 140-lb. Lorain section 402, girder-grooved rail. In other instances, however, only the standard rail brace has been used, and this was spiked direct to the tie independent of the rail. In this class of construction five spikes to the rail to each tie were required, one on the inside of the rail base, two on the outside and two in the rail brace. The latter construction, however, was not considered as substantial as the combination rail brace and plate, and accordingly attention was turned to the electric welding outfit to provide the combination plate and brace at a lower cost than they could be purchased in the open market.



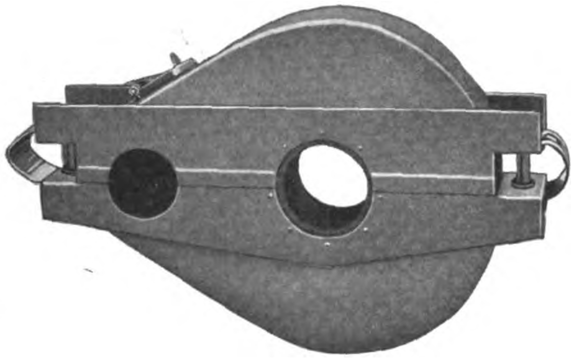
Cincinnati Welded Tie Plate and Rail Brace, with Clamp in Position

The Cincinnati Traction Company uses a tie plate of 6-in. x 12-in. x ⅜-in. size, to which a standard rail brace with the spike hole section cut off is welded. During the welding process the brace is held in position against the rail with a special clamp which forces the top of the brace under the ball of the rail and the base down against the tie plate. With this class of combination rail brace and tie plate, only spikes are necessary to each tie with braces 6 ft. apart. In a demonstration but two minutes were required to complete the weld, and the entire piece including brace and tie plate welded together cost only 25 cents. While very little more time is required to install the welded tie plate and brace than was the case with the brace alone, the welded brace and plate are equal to a combination brace and plate and about 15 cents cheaper. In case steel ties instead of wooden ties are used, the brace may be welded directly to the steel tie and may be placed to serve as a lock to the nut on the rail clip. The combination brace and tie plate is shown held in position with the special clamp used during the welding process.

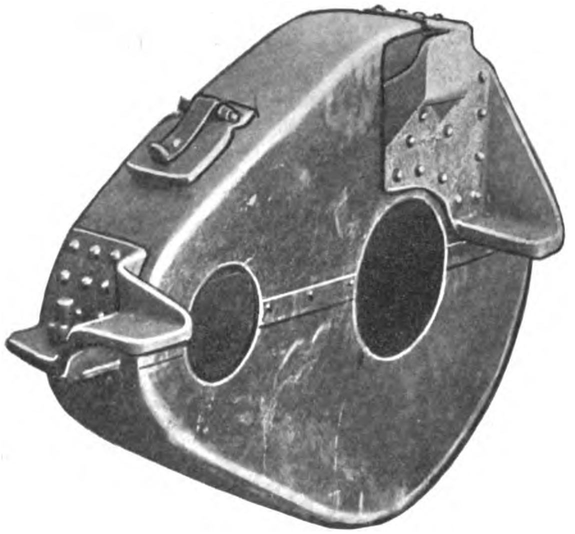
SEAMLESS AND RIVETLESS GEAR CASES

The Chillingworth Manufacturing Company introduced its seamless drawn-steel gear case to the American market in 1912, but it was not until May, 1913, after the designs had proved themselves adapted to American requirements and conditions of electric railway service that actual manufacturing was commenced, and the sale of the product in the United States and Canada was taken over by Thayer & Company, Inc., New York.

Since that time this type of gear case has proved so successful that it is now in use on more than seventy-five electric railways in the United States and Canada, some of the largest being the Public Service Railway, Newark, N. J.; Brooklyn Rapid Transit System, Brooklyn, N. Y.; United Railways & Electric Company of Baltimore, the Chicago surface lines, Cleveland Railway, Toronto Railway, Montreal Tramways, and on some of the properties of J. G. White & Company, Stone & Webster and the American Railways. The General Electric and Westinghouse Companies have also purchased this type from time to time for their most advanced types of motor equipment.



End-Suspended Gear Case for Westinghouse-101 Motor



Side-Suspended Gear Case for GE-80 Motor

The accompanying illustrations represent the construction peculiar to this case and the types of suspensions adopted in the most recent designs. The most vital feature is the elimination of seams, rivets and unnecessary weight, and this is accomplished by the process of drawing each half of the case from a single sheet of steel. Two general types of suspensions are required by railway motors, one for side-suspended cases and the other for end-suspended cases, whichever type the motor frame is designed to accommodate. The former design is more commonly required on General Electric motors and the latter on Westinghouse motors.

The Chillingworth bracket for side-suspended cases is shown in the accompanying illustration of the GE 80 gear case. These brackets are arranged to overlap the top of the case which distributes the area of stress. Further strength is secured by the addition of reinforcing plates underneath the total area of the brackets inside the case to obviate the loosening of rivets and the tearing away of the brackets from the case. The weight of this case is 110 lb.

The design of suspension adopted for the end-suspended cases is shown in the illustration of the Westinghouse 101. This type permits an ideal arrangement of suspensions by the attachment of plates that run longitudinally from end to end on each side of the case, secured by a special method of spot welding. Not a single seam or rivet is used throughout on this type which is, on this account, unique in gear case construction. The weight of this case is 100 lb.

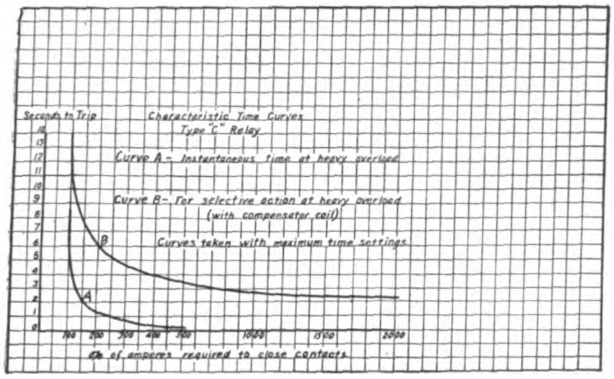
TORQUE COMPENSATORS

The Westinghouse Electric & Manufacturing Company has introduced a device known as a torque compensator, intended primarily for modifying the time element characteristics of an a.c. overload relay. It reduces the torque of the relay at heavy overloads without reducing the torque at light loads. The compensator thus increases the time element of the relay at overloads, its effect being in proportion to the overload. An example of the effect of the torque compensator on the time element characteristic of a relay is shown in the accompanying curves. Curve A shows the natural characteristic of the type C relay. When used with the torque compensator, a definite minimum time element at heavy loads is obtained, as shown in curve B.

Torque Compensator

The overload relay with definite minimum time element obtained by a torque compensator provides selective action of circuit-breakers where feeders are placed in series. The relays which control the breakers nearest the source of power can be set for a slightly greater time element than those further along. The difference in time is retained at all overloads with sufficient accuracy to cause the breakers nearest the trouble to open, thus confining the inoperative section to the smallest area, without interruption of service on the part of the system between the trouble section and the source of power.

Another use of the relay with definite minimum time element is in relieving circuit-breakers. It is well known that the ultimate breaking capacity of a circuit-breaker depends on the time of breaking. If a ground or short-circuit can persist for two seconds before the circuit is opened, the ultimate breaking capacity is greatly increased; that is, the strain on the breaker is reduced very materially, owing to the drop in voltage and current occurring during the interval.



Characteristic Time Curves of Relay

The torque compensator consists essentially of a small auto-transformer connected between the relay and the current transformer on the line. It is so designed that at a certain value of current, the core of the compensator becomes saturated, and any further rise in current results in an increasing impedance drop so that the current in the relay circuit does not increase in proportion to the current in the line. The ordinary time adjustment provided on standard relays will give the desired definite minimum time element within the range characteristics to each relay. In this maker's relay this range is from zero to two seconds. The winding and core are enclosed in an iron box with sides perforated for ventilation. The compensator can be mounted on any convenient place, such as the rear of a switchboard behind the relay it controls.

SELF-PROPELLED FREIGHT-PASSENGER CAR

The Minneapolis & Northern Gasoline Motor Railway has recently purchased a gasoline motor freight car from the McKeen Motor Car Company for freight and express service between Minneapolis and Anoka, Minn. It is a semi-convertible car which, during periods of heavy passenger traffic, can be used for the transportation of passengers, removable seats and chairs being installed for that purpose.

The car is equipped with the McKeen Motor Car Company's Type "A" motor truck, in which have been incorporated many of the important foolproof and economic features of the latest model Type "C" motor truck. The air-brake system has a special Gregory motorman's valve for the operation of straight air on the motor car and automatic air on trailers.

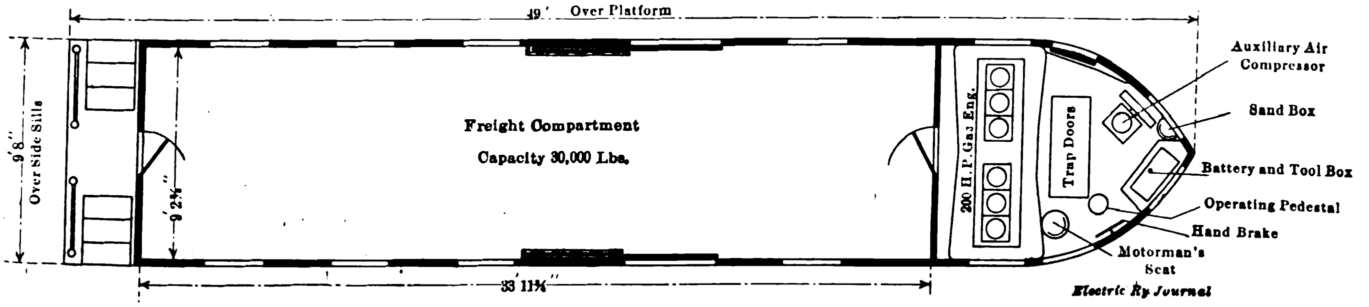
The length of the car over the end sills is 45 ft. while the total length is 52 ft. 2 in. The accompanying floor diagram present the design and equipment layout of the car, from which it will be noted that the front end is wedge-shaped and that the rear end has a platform for ingress and egress of passengers. The McKeen depressed center-side entrance is not a feature of this car, in as much as it is to be used chiefly for freight and express service. The car structure consists of a metal underframe, and continuous 2 in. grooved steel combination side posts and carlines extending from side sill to side sill with metal diagonal bracing. The outside and inside wall sheathing is of 13/16-in. fir. The floor is of 1⅝-in. fir. The main dimensions follow:

Length over the end sills	45 ft. 0 in.
Length over the platform	49 ft. 0 in.
Length over all	52 ft. 8 in.
Width over the side sills	9 ft. 8 in.
Width over the sheathing	9 ft. 9⅝ in.
Width over all	10 ft. 4⅛ in.
Width inside	9 ft. 2⅜ in.
Length of freight compartment	33 ft. 11¾ in.
Height from rail to roof	11 ft. 11 3/16 in.
Weight	56,000 lb.

CARNEGIE LIBRARY OF PITTSBURGH SECURES EARLY TECHNICAL BOOKS

The Carnegie Library of Pittsburgh recently had the good fortune to secure a collection of early technical books, including more than 100 volumes on electricity and its applications. Among them are many standard works which at the time of publication adequately represented the highest development of electrical engineering, especially with respect to European practice, making the collection a valuable record of electrical work during the eighties and nineties. The library has in its technology department the "Catalogue of the Wheeler gift of books, pamphlets and periodicals in the Library of the American Institute of Electrical Engineers" which includes "practically every known publication in the English language previous to 1886 on magnetism, electricity, galvanism, the lodestone, mariner's compass, etc." The Carnegie Library is especially strong in the recent literature of electrical engineering. It files more than thirty electrical journals, the contents being made available to visitors by means of a card-index.

The ninth annual convention of the Federation of Trade Press Associations, will be held in Chicago Sept. 24 and 26. This association includes in its membership 250 class, trade and technical publications.



Plan of Self-Propelled Freight-Passenger Car, Showing Also the Operating Equipment

News of Electric Railways

Toledo Marking Time

The members of the Council and the citizens of Toledo, Ohio, are studying the franchise proposal made by the Toledo Citizens' Franchise Association on June 16. No public meetings have been held since that date, and the consensus of opinion is that the administration is giving the proposal most careful consideration with a view to tangible action. The franchise committee of the Council is understood to have held several private conferences since the business men's proposition was made public. This proposition would probably be acceptable to the administration were it not for the fact that it does not provide for a flat 3-cent fare. The written pledges to that rate made before the election appear to be the barrier in this connection.

The Citizens' Franchise Association is still increasing its membership and the natural presumption is that an exhaustive effort will be made to secure the adoption of the proposed franchise ordinance. The membership now includes most of the prominent business men of the city all earnest in their desire for a settlement at the earliest date possible. The association has done nothing toward forwarding the movement in favor of its proposition, aside from the work that would naturally be done by its members, but has given time for all to become perfectly familiar with the terms of the proposed ordinance and the ideas that dominated the members of the committee in formulating the instrument.

No statement has been made by the company or by Henry L. Doherty, who has had charge of the negotiations for it. Comparison shows that the new proposition and the one proposed by Mr. Doherty are similar in many respects, but even where they differ the possibility appears to be greatly enhanced of adjusting such matters and reaching an agreement. Mr. Doherty looks upon the efforts of the business men as a most valuable aid in reaching tangible results.

The publicity plans have been continued and some very interesting advertisements have appeared recently. One of the most pointed was a reply to an editorial in the Toledo *Blade*. This reply appeared in the *Times* and the *Blade* on June 24. Such editorials give Mr. Doherty an opportunity to go into phases of the business of which the public is particularly ignorant.

F. R. Coates, president of the Toledo Railways & Light Company, said on June 24 that the operation of the road does not differ materially from past years at this particular season. Everything possible is being done to give proper service, notwithstanding the fact that some riders continue to proffer 3 cents for fare. This is always refused, but trouble from this source occurs infrequently.

The members of Council remain silent as to their opinions of the proposed franchise and have refrained from discussing the matter.

Appeal to Courts from Order of New York Commission

A writ of certiorari signed by Justice Greenbaum of the Supreme Court of the State of New York and returnable in twenty days from June 16 was served on June 24 on the Public Service Commission of the First District of New York requiring it to produce for the court to review the record in the case of the application of the New York Railways to the commission for permission to issue $1,050,000 of bonds to cover the purchase of 175 new cars, in which proceeding the commission is willing to allow the company to issue only $640,000 of bonds. The company wants to capitalize the entire cost of the 175 cars. The commission has taken the stand that as an equal number of old cars, each of which cost the Metropolitan Street Railway, the predecessor of the New York Railways, originally about $3,200 have been retired, the cost of these should be deducted from the amount of bonds which the New York Railways may now issue. This would permit the company to raise only $499,200 for its new cars, but as the bonds would have to be sold at a discount the actual amount of new bonds the commission is prepared to authorize is $640,000. The company is protesting against being forced to write off the entire first cost of the old cars it has discarded. The company contends that when it took over the Metropolitan Street Railway it paid only $700 a piece for the cars, and that their reasonable value to-day is only $300. It objects to paying the cost of their entire depreciation from the time when the cars were purchased by the Metropolitan Street Railway as they were worth only $700 apiece when they came into its possession. The company regards the action of the commission in this matter as unauthorized, illegal and in violation of the rights of the company, and as the commission refused on a rehearing to modify its order the company decided to appeal to the courts for relief.

Connecticut Company Discontinues Mail Service

Dissatisfied with the terms of the arrangement under which it has been serving the post office department the Connecticut Company, New Haven, Conn., operating 672 miles of electric railway, discontinued carrying mail on June 21 at midnight. The company served notice on April 14 of the proposed discontinuance of the service and subsequently extended the time. The statement of the company explaining its position follows:

"The Connecticut Company desires to make clear to the public the position regarding discontinuance of carrying the United States mail on passenger cars after midnight of June 21, 1914. Negotiations have been conducted with representatives of the post office department for some months in an earnest endeavor to secure relief from conditions which are unjust and burdensome in the extreme.

"On April 14, 1914, the post office department was advised that, unless some readjustment was effected and an effort made to afford relief, we would be forced to discontinue the handling of mails after May 3, 1914. This was, later, extended to June 15, then June 22. Since our letter of April 14, correspondence has been conducted with the department and conferences have been held between representatives of the department and officers of this company, but no reasonable proposition has been submitted by the department. In justice, therefore, to ourselves and our employees, we shall be obliged to withdraw from this service.

"Since the establishment of these electric car mail routes by the post office department some fifteen or sixteen years ago, our employees operating the cars have been obliged, by the regulations of the department, to carry the mail pouches between the cars and the different post offices along the line. These pouches, in many cases, are extremely heavy and invariably covered with dust and dirt. To require our men to handle these pouches, and, at the same time, keep their uniforms clean and neat, in accordance with our rules, is unreasonable, and has been continually protested against by the representatives of the men, and we do not feel that this burden should be imposed upon them. In a few cases, however, where women or infirm men were in charge of the post offices, we offered to make the necessary arrangements to handle the pouches. The post office department, while willing to relieve us from this service at a few points, still insists that we perform the work at twenty-four different post offices, which we think is unreasonable. Another serious objection is that the transferring of these pouches oftentimes occasions serious delays to the car schedule with the resulting inconvenience to our patrons. Furthermore, in the interest of safety, the car crews should be free to devote themselves to the proper operation of the cars and not be required to leave the car and passengers without protection.

"On many of the routes the number of pouches carried is excessive, twenty to thirty pouches per car in some cases, and, during the Christmas rush and other heavy periods this amount is increased beyond reason. We have received no more money for carrying a large number of pouches than we have for carrying one, as compensation is on a mileage basis. The department was requested to limit the number of pouches to a maximum of six per car. The main reason for requesting this was out of consideration for the safety of our patrons. We do not feel that the front vestibules of closed cars, or the front platform of open cars should be filled with mail sacks. In many cases the amount of mail is so bulky as to prevent safe egress from the car in case of accident. The motorman is also hampered in the performance of his duties. He should have clear access to all the apparatus he is called upon to control, which is impossible under the present conditions. Also, the loading of these sacks on to the front platform is injurious to the clothing and comfort of patrons and we do not feel that we should have to bear the onus of such complaints. The department offered to split up a few of the routes, so as slightly to reduce the number of sacks in some cases, but they have stated that they are not disposed to place any limit on the number to be carried.

"The following statement of method of computing compensation is given, that there may be no confusion in the mind of the public as to the compensation allowed by the government. The postmaster general fixed the rates of pay on July 1, 1896, at 3 cents per mile per annum for miles run on routes where the annual mileage was over 8,333 miles. The vast majority of our routes are under this classification, and there are a few routes for which we are paid a fixed sum, from $150 to $250 per annum. These rates of pay are established regardless of the number of sacks or pouches carried and no extra compensation is allowed for carrying the sacks between the cars and the post offices.

"Assuming that the rates established in 1896 may have been equitable at that time, any one at all familiar with the tremendously increased cost of material, rails, supplies, labor, pavements and other matters affecting the operating costs of street railroads, will admit that these rates are not equitable under present conditions. In addition to our greatly increased operating costs, the volume of mail has increased to such an extent, particularly since the advent of the parcel post, that the compensation allowed by the post office department is entirely inequitable and utterly inadequate for the service performed. The department offered to allow us 4 cents per mile, instead of 3 cents on three routes, out of a total of eighteen. This, together with the fact that some of the routes would be split, thereby making more trips and increased mileage, would amount to an increase in our total compensation of about 18 per cent, whereas it is well known that the volume of mail has increased several hundred per cent.

"The above will show that relief was requested on the following three issues:—

"First—A limit of six sacks per car, in the interest of safety and maintenance of schedules.

"Second—Relief of the car crews from carrying sacks to and from cars and post offices; a request of our employees.

"Third—An increase in rate commensurate with the increase in our costs and increased weight of mail.

"Having endeavored in every way to secure such relief and additional compensation, but without success, we regret that we will have to discontinue the transportation of the mails after midnight of June 21, 1914. This with a full appreciation of our responsibilities to our patrons, our employees and the communities served by our lines."

Connecticut postmasters were instructed by Second Assistant Postmaster-General Stewart to hire automobiles or trucks to deliver mail which the Connecticut Company refused to transport. Mr. Stewart is quoted as follows:

"I have not yet determined whether any action can be taken against the company. The post office department agreed to meet, as far as the law would permit, all demands made by the company, but the company refused to accept our offer and discontinued service. Upon my authorization, the postmasters have put into operation a substitute service, which, I am informed, is working successfully. At present the post office department contemplates no further steps in this matter."

Mayor Attempts to Remove George Weston from Chicago Board of Supervising Engineers

In anticipation of a report from the local transportation committee of the Chicago City Council vindicating the Board of Supervising Engineers and George Weston, the city's representative, Mayor Harrison on June 23 discharged Mr. Weston. In his letter to Mr. Weston the Mayor claims that he has concluded "to make this removal in order that the city should be represented on the board by a member more aggressively active in guarding the city's interests and securing full compliance with the terms of the traction ordinances of 1907 and 1908." With the exception of the two Hearst papers all the local newspapers defend Mr. Weston and the work of the Board of Supervising Engineers. Since the Mayor has disregarded the investigations into the accounting affairs of the board now being carried on by the local transportation committee of the Chicago City Council, as mentioned in the ELECTRIC RAILWAY JOURNAL for May 23, and since it is believed that the Mayor no longer controls the Council, it is considered improbable that Mr. Weston's removal will be confirmed or that a successor will even be considered.

Mr. Weston's response to the Mayor's communication removing him from office follows in part:

"I am advised by counsel that you have no right or authority to remove me without the concurrence of the City Council, and I shall decline to recognize your authority unless and until that concurrence has been expressed by appropriate action. I deny not only the right but the justice of your action. I do not claim to be infallible, but I do claim to have done all that could reasonably have been expected within the authority of my position. I confidently expect to establish this claim convincingly before the local transportation committee, and I assume that neither the committee nor the City Council will follow your example in acting before it has heard my side of the controversy.

"Your letter raises two questions: one with regard to the present street railway service, and the other with regard to the extent to which I have consulted the legal representatives of the city in obtaining advice as to the correct construction of the traction ordinances.

"As to the first question, the Board of Supervising Engineers has never been given the power to regulate the street railway service. On the contrary, that power was expressly reserved in the ordinances of 1907 and in all subsequent ordinances to the City Council, which acts in such matters largely on the recommendation of the Mayor and his appointees. By authority of the City Council you appointed a traction expert to attend to these very matters. Upon you rests the chief responsibility for improving the street railway service. I can only carry out those provisions of the ordinances which relate to the board and I can act only in the manner in which those ordinances provide. I have at all times gone to the limit of my authority as a member of the board and have even exceeded my official duties to take advantage of every opportunity to recommend the passage and enforcement of more effective regulations of the service. I have vigorously contended for the utmost stretch of the authority of the board to provide adequate construction and equipment, and where that authority has been denied by the companies I have called the attention of the city authorities to the necessity and advisability of action by them to enforce the provisions in the ordinances which the board has been given no authority to enforce. I have appeared before council committees and I have repeatedly, but in vain, sought to obtain your co-operation in these matters.

"I have also repeatedly conferred with the office of the corporation counsel, and have joined with the other members of the Board of Supervising Engineers in seeking to secure, and sometimes in securing, the attendance of the legal representatives of the city at meetings of the board at which the construction of some provision of the traction ordinances was under consideration. The traction ordinances were adopted in 1907, and in the very nature of the case it was necessary during that year and the years immediately following to determine the construction of the more important provisions of the traction ordinances. Upon all matters which seemed to be of substantial importance, and upon many matters of relatively minor importance, the board secured the advice of counsel representing the city as well as of counsel representing the street railway companies. I have at all times sought and followed the advice of the counsel representing the city.

"It is gratifying to know that in practically every instance the action of the board has been sustained by public and official opinion, which finally culminated in the approval of the unification ordinance in November, 1913. I have no desire to rest up this approval, but stand ready now, as at all times, to have my good faith, my professional capacity, my industry and my earnest devotion to the interests of the city determined by any fair and competent tribunal."

Mayor Jost Signs Kansas City Ordinance

Mayor Henry L. Jost, of Kansas City, Mo., signed the proposed Metropolitan Street Railway franchise on June 15, with two changes incorporated after they had passed both houses of the City Council. The first change consisted of an addition to the interurban clause, reading, "It is agreed that interurban traffic to and within the city shall be encouraged to a fully practicable degree." The second clause originally read: "Before the city shall have the right to begin a proceeding to enforce said forfeiture it shall give notice to the company in writing of the specific dereliction or derelictions complained of, and unless the company within sixty days thereafter shall fully remove such alleged cause of forfeiture, the city shall have the right to begin and proceed with the enforcement of said forfeiture." The amendment eliminated the clause, "sixty days thereafter shall," and substituted the following: "Shall promptly and with expedition. For a second or subsequent breach of the same provision the city shall have the right to proceed without further notice to enforce such forfeiture."

The passage of the amendments made it necessary to repass the ordinance providing for the election on July 7, and this was done. Alderman W. C. Tabb, who voted against the ordinance at its first passage, did not vote on the amendments. He was excused by request.

The Metropolitan Street Railway on June 18 deposited with the city comptroller a check for $32,500, the estimated cost of the franchise election on July 7. The money will cover the expense of legal advertising in addition to the actual expenses. The city is authorized to draw on the company for further funds, if necessary.

The franchise committee of the Kansas City Commercial Club, the leading commercial organization, reported favorably to the organization on June 18, referring to the ordinance as "a fair and equitable arrangement for both the city and the company." The Commercial Club met on June 25 finally to ascertain the sentiment of its members.

As a result of statements appearing in the Kansas City *Star* and the *Times*, which are combating the franchise, Henry L. Doherty, of the Doherty Operating Company of Toledo, sent the following telegram to William R. Nelson, owner of the two papers:

"I have just been shown your issues of June 12 and 15. Your statements about the writer and of the Toledo situation reek with false testimony. If you are not deliberately trying to mislead your readers, you should endeavor to secure the facts on these matters and publish them. And if you do not correct your misstatements the citizens of Kansas City who stand for good morals, fair play and decency should undertake your moral regeneration. As a first move they should present you with an engrossed copy of the ninth commandment."

The Nelson papers, in their fight against the franchise, have sought to prove that in all of the cities which have had street railway troubles long franchises have been responsible for the complications.

The labor situation is still unsettled. Frank Hagerman, attorney for the receivers of the company, wrote labor leaders on June 20, calling attention to the franchise clause which provides that the company shall not discriminate against any employee because of his affiliation with any labor organization.

Middlesex & Boston Arbitration Board Decides Upon Wage Increase

A majority of the arbitration board sitting in the wages case of the Middlesex & Boston Street Railway has granted an increase of approximately 15 per cent in pay to the employees of the company. The award was signed by Chairman George L. Mayberry and James H. Vahey. A dissenting report was filed by Arthur A. Ballantine, who represented the company on the board.

The finding increases the wages of platform men from the present scale of 20½ to 27 cents an hour to a temporary scale of from 23 to 29 cents an hour for the past thirteen months, with a new scale of 24 to 30 cents, reaching the maximum in five years, for the two years beginning July 1, 1914. Carhouse and other employees for the entire period are awarded an increase of from 2 to 5 cents an hour. Pitmen, car cleaners or night men are to receive from 17 to 29 cents an hour, blacksmiths 30 and 35 cents, firemen 27 cents, track greasers, 23 and 25 cents; trackmen, 26 and 29 cents, and teamsters, 24 cents. The board finds further, that after the date of the award overtime for carhouse employees shall be 50 per cent above the regular rate, and that the computation of back pay shall be made upon the basis of the actual number of hours worked. Extra men will receive back pay only for the weeks in which their time, computed at the new rates, exceeds the agreed minimum guarantee.

In his dissenting report Mr. Ballantine says that the wages fixed by the majority necessitate either a reduction of the present 4 per cent return upon the capital stock of the company, higher fares or the acceptance of a less adequate service by the public, and perhaps all three. After reviewing the company's financial condition he concludes that the award will tend to discourage capital from investing in public service enterprises.

New Franchise Proposal in Des Moines

Emil G. Schmidt, president Des Moines (Ia.) City Railway, has presented to the City Council a tentative franchise for the extension of the company's rights in Des Moines for twenty-five years. The conditions which Mr. Schmidt has outlined differ in several essentials from the terms of the franchise passed a few months ago by the Council and rejected by the company as being too onerous. Under both the old and new proposals it is planned to determine the fare on the basis of the company's earnings after the question of valuation has been settled. Mr. Schmidt suggests a straight 5-cent fare at the outset with a sliding scale of fare reductions varying as the dividends on the present fixed capital of the company increase. Under this plan it is proposed that when the net earnings after the payment of all fixed charges are sufficient for a dividend of more than 7 per cent upon the capital stock, six tickets shall be sold for a quarter. By a similar process an 8 per cent dividend would result in the sale of five tickets for 20 cents; a 9 per cent dividend of four tickets for 15 cents, and a 10 per cent dividend of ten tickets for 35 cents. The bonds outstanding amount to $2,754,000, the stock to $1,305,000 and the floating debt to $1,356,000, or a total of $5,415,000. It is proposed to fund the floating debt and to capitalize improvements which are to be made, to the amount of $1,500,000, making the total capital liabilities approximately $7,000,000. Two supervisors to determine questions of service, fixed schedules, etc., are provided for in the draft. The city would name one of the supervisors and the company the other, but the company would pay the salary of both.

Depreciation Charges in Ohio

E. W. Breyer has been employed as an expert by the Ohio Public Utilities Commission to prepare a system of depreciation charges for public utility companies. Mr. Breyer does not employ the word "depreciation" in his system, but rather contemplates the creation of reserves by contemporaneous charges to the operating expense to defray what he terms "extraordinary maintenance, deferred upkeep and contingencies," which, taken together, include the charges generally accepted as coming under depreciation. By the term "extraordinary maintenance" Mr. Breyer contemplates repairs of an extensive nature, but something less than the replacement of an entire unit of buildings or machinery. Such a charge would accrue through deterioration for a long period of time. "Deferred upkeep" would mean the necessary replacement of complete units, retired by inadequacy, advancement in the arts or because of becoming obsolete. "Contingencies" contemplates extraordinary losses occasioned by fires, floods, earthquakes or storms. The corporations would act as trustees of the funds accumulated for these purposes, as representing trust funds paid in advance by the public. It is contemplated that such funds be used for working capital or for financing extensions and improvements temporarily. Interest must be paid and evidences of indebtedness executed when the funds are used for purposes other than those for which they were established.

Preliminary Legal and Valuation Reports in San Francisco

On June 17 the public utilities committee of the Board of Supervisors of San Francisco, Cal., instructed City Attorney Long to investigate and report on the city's legal status in the event that the acquisition of the property of the United Railroads by the city is deemed expedient. At the same time the committee requested the city engineer's office to estimate the physical value of the company's properties. No definite date was set for further consideration of the matter, but Chairman Alex Vogelsang of the committee announced that it would be taken up again as soon as reports are received from the city attorney and the city engineer. In the case of the city engineer, the report will be of a purely preliminary nature and will be made without the aid of any special appropriation. The work of the city attorney will consist in determining the various avenues by which the city may legally acquire the United Railroads.

Hearing in Manila on Service.—The new public utility board in Manila has begun its administration by requiring reports of earnings from all inter-island shipping companies and with a hearing on the service of the Manila Electric Light & Railway Company.

Public Service Commission Publication.—The Public Service Commission of the First District of New York is to issue every month the *Public Service Record*, in which the doings of the commission are to be set forth. The first number contains an article signed by Chairman McCall explaining the purposes of the new magazine.

Organization Changes of the Northern Electric Railway.—Louis Sloss, president of the Northern Electric Railway, Chico, Cal., has announced that in the future the auditor, the traffic manager and the secretary of the company will all report to him. W. A. McGovern, the new general manager, will be in charge of operation. He, too, will report to Mr. Sloss.

Electric Operation on New Haven Extended.—On June 22 regular service with a schedule of sixteen passenger trains a day was established over the recently completed electrified section of the main line of the New York, New Haven & Hartford Railroad between Stamford and New Haven, Conn. The electrified line between the Grand Central Terminal, New York, and the Union Station, New Haven, via Stamford, is 73 miles long.

Toronto to Take Over Small Railway Section.—Corporation Counsel Geary, of Toronto, Ont., has recommended the City Council to serve notice on the Toronto & York Radial Railway that it proposes to take over a portion of the Metropolitan Railway on Yonge Street, at the expiration of the franchise granted by the Corporation of the county of York to the Metropolitan Railway, by agreements dated June 25, 1884, and Jan. 20, 1886.

Inspection of European Terminals.—An inspection of the steam railroad terminals in a number of European cities may be made by a committee from the Chicago Council and the engineers in charge of the terminal plans in that city. The party would start about the middle of July and be gone about six weeks. It would probably include John F. Wallace, Walter Fisher, B. J. Arnold, Corporation Counsel Bennett and Aldermen Geiger, Richert, Capitain and W. J. Healy.

New Michigan Road Ready for Service.—Announcement is made of the proposed formal opening on July 1 of the new electric railway between Romeo and Almont, known as the Detroit, Almont & Northern Railway. Officers of the Detroit United Lines, officials of the city of Detroit, newspaper representatives and a number of guests will constitute the party to be present at the road's opening. For the immediate future cars running from Detroit to Romeo will be sent through to Almont and return. The length of the extension is 10 miles.

National Guard at Kentucky Park.—The maintenance by the Kentucky Traction & Terminal Company of Blue Grass Park near Lexington has been the means of that company assuring itself of a greatly increased traffic during the first ten days in July, when the Kentucky National Guard will be encamped there. To take care of the militiamen, who will be augmented by the addition of a company of U. S. regulars, the Traction & Terminal Company will erect a storage tank to hold 10,000 gallons of water. Gen. J. Tandy Ellis, accompanied by F. W. Bacon, vice-president of the company, and George McLeod, chief engineer, recently inspected the park.

Negotiations Regarding Detroit Valuation Compensation.—Prof. E. W. Bemis and the members of the Detroit Street Railway Commission have not as yet agreed upon the terms for making an appraisal of the property of the Detroit United Railway within the city of Detroit. It is understood that Professor Bemis wants compensation by the day while the commissioners favor a fixed amount for the entire work. J. C. Hutchins, president of the company, has assured the commissioners of the company's fullest assistance to the city in arriving at an equitable valuation of the property. The inventory submitted by the company to the commission last December will be amplified, and every detail will be placed at the disposal of the city's appraisers.

Extension of Lake Burien Line Proposed.—The plan to extend the Lake Burien line, known as Division "C" of the Seattle (Wash.) Municipal Railway from Lake Burien, the present terminus, to Three Tree Point on Puget Sound, a distance of 2 miles, has been discussed with the Council by the property owners of the territory, who have suggested that they construct the line and deed it to the city without incumbrance except for an agreement on the part of the municipality that cars will be operated regularly to the Sound terminus. Hourly service is now maintained on the Lake Burien line and A. L. Valentine, superintendent of public utilities of the city, who is in charge of the railway, recently announced a package service on Tuesday, Thursday and Saturday.

New Cleveland Shops Described.—At a recent meeting of the street railway committee of the City Council of Cleveland, Ohio, Joseph Alexander, street railway engineer, described the new repair shops that are now being erected by the Cleveland Railway at Harvard Avenue and Independence Road. An office building, with twenty-four shower baths in the basement, a hospital with a physician in attendance constantly, dining room space and other up-to-date ideas are to be provided. The Council has authorized the company to enter into contracts for new buildings for this group, to cost about $500,000. The three buildings making up the repair shop section proper have already been erected at a cost of about $387,000. There will be fourteen buildings in the group and between 400 and 500 people will be employed.

Resumption of Toronto Purchase Negotiations Likely.—At the meeting of the City Council of Toronto, Ont., on June 15 Comptroller Church moved to instruct the Corporation Counsel to table the draft agreement for the purchase of the property of the Toronto Railway and Toronto Electric Light Company by the city and to report on the causes of delay in completing the legal negotiations. Several extraneous proposals were eliminated from the motion by an amendment introduced by Alderman Graham, after which it was carried unanimously. Mayor Hocken told the Council that Z. A. Lash, chief counsel for the Mackenzie interests, promised to resume negotiations with the city's lawyers immediately after the adjournment of the House of Commons. He considered the company's excuse for delay was reasonable.

Meridian Power Plant Explosion.—A boiler explosion in the power plant of the Meridian Railway, Light & Power Company, Meridian, Miss., on June 8 caused the death of a negro, injured two employees and badly wrecked the power house. Though the cause of the explosion is still unknown, there was a flaw in one of the boiler heads, which was torn off. This boiler was hurled by the impact of the explosion through a brick wall and landed outside of the building. Another boiler was torn off its foundation. The generators were injured by falling bricks. One of the boilers remained uninjured. Immediately after the explosion every effort was made to repair the wreckage, with the result that in two days street railway service was resumed. The two boilers which were wrecked have been replaced by the purchase of a 750-hp and a 350-hp Stirling boiler from the Babcock & Wilcox Company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The joint committee on metropolitan affairs and street railways has decided to draft a resolve referring the proposed merger of the Boston Elevated Railway, the Bay State Street Railway and the Boston, Revere Beach & Lynn Railroad, with other electric railways in the Boston metropolitan district, to the next Legislature, providing for an investigation and report upon the subject at the next session by the Public Service Commission. The resolve is being drafted by Messrs. Williams, Mack, Cox, Robinson and Lomasney, and will probably be passed.

PROGRAM OF ASSOCIATION MEETING

Pacific Claim Agents Association

The sixth annual convention of the Pacific Claim Agents Association will be held at the Hotel Spokane, Spokane, Wash., on July 9, 10 and 11. At the first session at 10 a. m. on July 9 addresses of welcome will be delivered by William J. Hindley, Mayor of Spokane; D. L. Huntington, president of the Washington Water Power Company, and Waldo G. Paine, vice-president of the Spokane & Inland Empire System. The program of papers for the session on the afternoon of July 9 follows:

"What Methods Should be Pursued in Keeping Informed of the Movements of Witnesses in Cases Where Litigation is Likely to Arise?" by A. N. Lee, assistant general claim agent of the Northern Pacific Railway, Seattle, Wash.

"What are the Most Effective Methods that can be Adopted by Public Service Corporations in Prosecuting Fraudulent Claimants and Professional Witnesses?" by Harrison Allen, attorney of the Portland Railway, Light & Power Company, Portland, Ore., and John S. Mills, assistant superintendent of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

The program of papers to be presented at the sessions on July 10 and July 11 follows:

July 10

"The Prevention of Automobile Accidents," by S. A. Bishop, general claim agent of the Pacific Electric Railway, Los Angeles, Cal., and J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.

"Statistical Information Showing the Accident Cost of Trainmen with Respect to Length of Service," by H. G. Winsor, claim agent of the Tacoma Railway & Power Company, Tacoma, Wash., and Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash.

"To What Extent Can the Claim Department Co-operate with the Operating Department in the Matter of Selecting Trainmen as to Their Moral, Mental and Physical Fitness?" by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company, Portland, Ore., and A. E. Beck, claims solicitor of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

"What Can Be Done Toward Remedying the Trespassing Evil?" by H. K. Relf, general claim agent of the Spokane, Portland & Seattle Railway, Portland, Ore.

July 11

"Is It Advisable for a Statement to Be Secured from an Injured Person Immediately After an Accident Occurs Without Regard to Liability or the Intention of the Injured Person to File a Claim?" by George Carson, general claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and T. A. Cole, claim agent of the Los Angeles Railway Corporation, Los Angeles, Cal.

"The Evolution of 'Safety First,'" by T. M. Lyall, assistant claim agent of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

"What Policy Should Be Adopted in the Disposition of Claims of Doubtful Liability?" by T. J. Rupli, assistant claim agent of the Puget Sound Traction, Light & Power Company, Ltd., Seattle, Wash., and Mrs. Ida P. Newell of the Portland Railway, Light & Power Company, Portland, Ore.

"Safety (A) From Standpoint of (1) The Public, (2) The Companies; (B) Safety Work of Various Companies, by George Carson, chairman of committee.

Financial and Corporate

Stock and Money Markets

June 24, 1914.

The trading on the New York Stock Exchange to-day was the most active in many weeks and the net loss was the most pronounced movement recorded during a considerable period. The sales of stock to-day totaled 353,600 shares, compared with 194,900 yesterday and 112,200 a week ago. The principal railroad issues and the industrials sold down, some yielding several points. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¼ @ 2½ per cent; four months, 3 @ 3¼ per cent; six months, 3¼ @ 3½ per cent.

In the trading in Philadelphia to-day most of the local issues ruled fractionally weaker and were in very light demand.

The Boston market was fairly active to-day in the early and late dealings. Prices declined.

The Chicago market was narrow and inactive to-day with losses general. Bond quotations were unchanged, but the market was very narrow.

Dealings were light in Baltimore to-day in a narrow market. The sales of stock totaled 369 shares and of bonds $57,500, par value.

Quotations of traction and manufacturing securities as compared with last week follows:

	June 18	June 24
American Brake Shoe & Foundry (com.)....	90½	88⅛
American Brake Shoe & Foundry (pref.)....	138	134
American Cities Company (com.)...........	*29	*29
American Cities Company (pref.)...........	65¼	*65¼
American Light & Traction Company (com.).	340	341
American Light & Traction Company (pref.).	109	109
American Railways Company................	37	37⅛
Aurora, Elgin & Chicago Railroad (com.)....	34¾	34
Aurora, Elgin & Chicago Railroad (pref.)....	78	76
Boston Elevated Railway	87½	90¾
Boston Suburban Electric Companies (com.).	7	7
Boston Suburban Electric Companies (pref.).	65	*65
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	35
Brooklyn Rapid Transit Company...........	90¾	90
Capital Traction Company, Washington......	98½	97
Chicago City Railway	135	135
Chicago Elevated Railways (com.)..........	20	25
Chicago Elevated Railways (pref.)..........	65	75
Chicago Railways, ptcptg., ctf. 1............	96	99
Chicago Railways, ptcptg., ctf. 2............	33¼	34
Chicago Railways, ptcptg., ctf. 3............	5	6
Chicago Railways, ptcptg., ctf. 4............	2	2½
Cincinnati Street Railway	102¾	105
Cleveland Railway	103½	103¾
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company.........	13	13
Columbus Railway (com.)..................	*53	*53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	80
General Electric Company	147⅝	147½
Georgia Railway & Electric Company (com.)	120½	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)..	14¼	14
Interborough-Metropolitan Company (pref.)..	62⅝	61¼
International Traction Company (com.)......	*30	*30
International Traction Company (pref.)......	*85	*85
Kansas City Railway & Light Company (com.)	22	22
Kansas City Railway & Light Company (pref.)	39	39
Lake Shore Electric Railway (com.).........	*6	*6
Lake Shore Electric Railway (1st pref.)......	*90	*90
Lake Shore Electric Railway (2d pref.)......	*22	*22
Manhattan Railway	129¼	130
Massachusetts Electric Companies (com.)....	11	11¼
Massachusetts Electric Companies (pref.)....	61	56
Milwaukee Electric Ry. & Light Co. (pref.)..	95	95
Norfolk Railway & Light Company..........	26	*26
North American Company	68¾	71
Northern Ohio Traction & Light Co. (com.)..	60	a60
Northern Ohio Traction & Light Co. (pref.)..	a101	101
Philadelphia Company, Pittsburgh (com.)....	38¾	39½
Philadelphia Company, Pittsburgh (pref.)....	37	37
Philadelphia Rapid Transit Company........	15¾	15¾
Portland Railway, Light & Power Company...	47	*47
Public Service Corporation	112	112
Third Avenue Railway, New York...........	41½	41
Toledo Traction, Light & Power Co. (com.)..	13	a13
Toledo Traction, Light & Power Co. (pref.)..	70	70
Twin City Rapid Transit Co., Minn. (com.)..	103	103¼
Union Traction Company of Indiana (com.).	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore).	27⅝	28
United Rys. Inv. Company (com.)...........	11	11
United Rys. Inv. Company (pref.)...........	32	32½
Virginia Railway & Power Company (com.).	49	49
Virginia Railway & Power Company (pref.)..	97	87½
Washington Ry. & Electric Company (com.).	86	86
Washington Ry. & Electric Company (pref.).	82⅝	82½
West End Street Railway, Boston (com.)....	67¾	66½
West End Street Railway, Boston (pref.)...	88	85
Westinghouse Elec. & Mfg. Company.........	75¾	74¾
Westinghouse Elec. & Mfg. Co. (1st pref.)....	124	124

* Last sale. a Asked.

ANNUAL REPORTS

Puget Sound Traction, Light & Power Company

The comparative statement of income, profit and loss of the Puget Sound Traction, Light & Power Company, Seattle, Wash., for the years ended Dec. 31, 1913 and 1912, follows:

	1913	1912
Earnings:		
Railway department	$5,950,786	$5,599,130
Light and power department	2,244,705	2,177,542
Gas department	57,443	55,742
Steam heat department	315,712	299,589
Other earnings	44,953	181,844
Total earnings	$8,613,599	$8,313,847
Expenses:		
Operating expenses	$4,266,977	$4,182,035
Taxes	741,398	590,263
Total operating expenses and taxes	$5,008,375	$4,772,298
Net earnings	$3,605,224	$3,541,549
Interest charges	1,811,436	1,752,376
Balance	$1,793,788	$1,789,173
Bond sinking funds	251,583	223,874
Balance	$1,542,205	$1,565,299
Dividends paid:		
Dividends paid:		
By Puget Sound Traction, Light & Power Company:		
Preferred	$641,542	$428,193
Common	742,253	549,301
By subsidiary companies (before acquisition) to others		300,293
Total dividends paid	$1,383,795	$1,277,787
Balance	$158,410	$287,512

The gross earnings for 1913 showed an increase of $299,752 or 3.6 per cent over 1912. The earnings of the railway department increased $351,656, or 6.3 per cent, while the light and power earnings increased $67,162, or 3 per cent. The operating expenses increased $84,942, or only 2 per cent, but taxes increased $151,135, or 25.6 per cent, owing to greatly increased tax rates brought about by many public improvements. In spite of this large increase in taxes, however, the net earnings in 1913 increased $63,675, or 1.8 per cent over 1912 and 4.2 per cent over 1911.

Among some of the improvements made to the property during 1913 may be noted the following: Construction of a 55,000-volt transmission line from Snoqualmie Falls to Everett; extensions to the transmission system to Bellingham and Tacoma; a considerable amount of paving in the railway department; the purchase of twenty new passenger cars and five new box cars; the purchase of monitor nozzles to reduce the fire hazard and the installation of window guards, additional air-brake equipment, electric heat, etc., to a number of cars in Seattle.

The Puget Sound Traction, Light & Power Company is operating 561 passenger and 195 freight, mail and miscellaneous street cars, and 45 passenger and 252 freight and miscellaneous interurban cars. The number of passengers carried, including transfers on all divisions, amounted to 142,049,229, while the transfers taken up numbered 30,399,145.

Illinois Traction Company

The comparative statement of income, profit and loss of the Illinois Traction Company, Peoria, Ill., for the years ended Dec. 31, 1913 and 1912, follows:

	1913	1912
Earnings:		
Interurban lines	$3,055,519	$2,964,955
City lines	2,129,804	2,030,994
Electric	1,977,349	1,689,477
Gas	466,449	428,977
Heat	247,530	219,170
Miscellaneous	71,445	82,074
Total	$7,948,097	$7,415,647
Operating expenses and taxes	4,613,336	4,353,214
Net from operating	$3,334,761	$3,062,433
Interest on bonds, etc.	2,072,538	1,975,969
Available for dividends	$1,262,223	$1,086,464
Dividend on preferred stock	406,372	344,547
Surplus income	$855,851	$741,917
Dividend on common stock	224,805	
Net surplus	$631,046	

The gross revenue increased during the year $532,450, or 7.8 per cent; net earnings $272,328, or 8.89 per cent, and surplus income $113,933, or 15.35 per cent. During the year there was expended for maintenance $1,343,489, which was 16.9 per cent of the gross receipts as compared to 15.7 per cent of the previous year. During the year there was also expended for improvements on the properties controlled by the company $1,660,156. The surplus income for the year, after paying 6 per cent dividends on the company's preferred stock, was $855,851, equivalent to 8.56 per cent upon the common stock of the company, as compared to 7.43 per cent for the preceding year. The balance carried forward to the surplus amounted to $2,550,206.

The report states that the installation of electric automatic block signals started between Springfield and Carlinville and between Staunton and Edwardsville was 50 per cent completed at the end of the calendar year. The interurban line now has 145 miles of trackage protected by these signals, whose operation during the year was 99.97 per cent perfect. Improvements made during the year include three new grain elevators, five miles of industrial tracks and side tracks, track connections with four railroads, and fourteen bridges replaced with permanent concrete openings. A new three-story brick terminal office building was constructed at Champaign, and the company expects to proceed with the work on the Peoria terminal building this year.

The annual report of the company, besides the above information, contains a list of the principal component properties, a résumé of the service (exclusive of interurban) in the various cities, a comparative statement of receipts and expenditures for the years from 1908 to 1913, inclusive, a table showing the indebtedness of the properties controlled by the Illinois Traction Company, and a man showing the diversity of location and character of the city properties controlled by the company.

Merger of Wisconsin and Minnesota Properties

The La Crosse Gas & Electric Company has changed its name to the Wisconsin-Minnesota Light & Power Company, and under the authority of the Railroad Commission of Wisconsin has increased its capitalization to acquire all the properties of the Chippewa Valley Railway, Light & Power Company and valuable water power rights on the Chippewa and Red Cedar rivers capable of developing approximately 100,000 hp of electrical energy. The new company will control the entire electric business in La Crosse, Eau Claire, Chippewa Falls, Menominee and cities located along its 100 miles of transmission lines, the gas busines in La Crosse, Eau Claire and Chippewa Falls, the street railway systems in Eau Claire and Chippewa Falls and an interurban railway connecting these two cities. The Wisconsin-Minnesota Light & Power Company has an authorized capitalization of $20,000,000 and will have outstanding $988,000 of common stock and $1,700,000 of 7 per cent cumulative preferred stock. Its authorized bond issue is $20,000,000, of which $3,750,000 is now issued. The preferred stock has been purchased by Paine, Webber & Company, Boston, and the bonds have been bought by the Harris Trust & Savings Bank, Chicago. The common stock of the company will all be owned by the American Public Utilities Company, Grand Rapids, Mich. Kelsey, Brewer & Company, Grand Rapids, Mich., will manage the newly acquired properties.

Chicago Bank Failure

The efforts of the promoters of the Southern Traction Company of Illinois, East St. Louis, Ill., in its behalf are said to be responsible in a large measure for the failure of the LaSalle Street Trust & Savings Bank, Chicago, with four subsidiary banks in the outlying district. These banks are known as institutions of the Lorimer-Mundy syndicate. Former United States Senator William Lorimer, of Illinois, the head of the Lorimer-Gallagher Construction Company, Chicago, the contractors who financed and built the Southern Traction of Illinois, carried on the work with the aid of the Lorimer-Mundy banks. When the company was thrown into the hands of a receiver following Mr. Lorimer's failure to finance the railway in Europe, an investigation by the state bank examiner showed that the Lorimer-Mundy banks held a considerable amount of the paper of the traction company.

Following the closing of the LaSalle Street Trust & Savings Bank William Lorimer resigned as one of the trustees of the Southern Traction Company. William A. Trautman, formerly a federal attorney in the Danville, Ill., district and a stockholder in the Southern Traction Company, has been named trustee for the company by Federal Judge Francis M. Wright, to succeed Mr. Lorimer.

Boston (Mass.) Elevated Railway.—In a recent article on the distribution of the stock of the Boston Elevated Railway among investors the Boston *News Bureau* said: "The stockholders' list of the Boston Elevated Railway as of April 1, 1914, in comparison with April 1, 1913, presents a most interesting commentary of the faith of shareholders—owning 300 shares or more—in the property. On that date there were ninety-seven shareholders having 300 shares or more. Of these ninety-seven stockholders only four sold any of their shares during the year to April 1, 1914, the total reduction in their shareholdings being only 1308 shares. On the other hand, fifty-four shareholders increased their share interest in the property, shareholdings of thirty-two were unchanged, while seven persons who were not on the list of larger stockholders last year appear this year with total holdings of 5206 shares. Only one stockholder owning 600 shares or over disposed of any stock last year."

Central Park North & East River Railroad, New York, N. Y.—The committee of shareholders of the Central Park, North & East River Railroad has decided to discontinue its action against the former directors of the Metropolitan Street Railway and the New York City Railway as such owing to the recent decision of Justice Davis of the Supreme Court of New York dismissing the suit of minority stockholders of the company against former directors to recover $2,000,000 damages. This decision was referred to briefly in the ELECTRIC RAILWAY JOURNAL of May 16. The committee has, however, issued a circular which it concludes in part as follows in regard to separate actions which it proposes to institute: "The action is being continued against those who were directors of the Central Park, North & East River Railroad, several of whom were also directors of the Metropolitan Street Railway and the New York City Railway. It seemed wisest not to carry the case to the Court of Appeals, particularly as your committee had started a similar suit in Pennsylvania against certain directors who could not be served in New York. In this way it was felt that we could try out, at less expense and more promptly, the issues against the old directors who were responsible for your losses, and from whom we believe we can collect any judgment that the courts will give us. We are pushing these matters as fast as possible. The funds in our hands provided by the initial assessment of $1 per share are about exhausted, and a further assessment of $1 a share is hereby called, payable forthwith at the office of the Equitable Trust Company, New York, making so far $2 called out of the agreed $3 a share assessment."

Chicago (Ill.) Elevated Railways.—The new first mortgage 5 per cent bonds of the Northwestern Elevated Railroad have been purchased by a syndicate composed of Lee, Higginson & Company, N. W. Halsey & Company and the National City Bank of New York. There are $12,000,000 out of the total of $17,000,000 to be offered shortly. The price at which they are to be sold to the public has not yet been given out. The National City Bank is also forming a syndicate to bring out the notes and debentures which are to care for the balance of the $30,000,000 of notes maturing July 1.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has declared a dividend of 1 2-3 per cent on the second preferred stock for the four-month period ended June 30, payable on July 1 to stock of record of June 15. This is the first dividend that has been declared on the $1,000,000 of 5 per cent cumulative second preferred stock since the readjustment of the company's finances a few months ago. The present second preferred stock was formerly the first preferred.

Geary Street, Park & Ocean Railroad, San Francisco, Cal.—The Mercantile Trust Company, San Francisco, as successor trustee, has brought suit against the Geary Street, Park & Ocean Railroad to foreclose the mortgage under which $484,000 of 5 per cent bonds have been issued and on which interest has been in default since October, 1912. The principal remaining assets consist of the property at Buchanan and Geary streets, and at First Avenue and Geary Street, valued at more than $270,388, while the liabilities are $526,000. It is requested that a receiver be appointed to take charge of the property and that he be given power to require stockholders to pay the full amount of their subscriptions. The capital stock authorized and issued is $1,000,000 in shares of a par value of $100, of which $37.50 was paid in. Following the expiration of the franchise of the Geary Street, Park & Ocean Railroad the route over which the company operated was converted to the use of the present Geary Street Municipal Railroad.

Lehigh Valley Transit Company, Allentown, Pa.—The Easton Consolidated Electric Company, which is owned by the Lehigh Valley Transit Company, with the exception of the directors' shares, has made its dividend rate of 4 per cent payable on the full par value of the stock, $1,500,000. Only one-half of the capital, or $750,000, has been paid in. The Lehigh Valley Transit Company now will receive dividends from the Easton Consolidated Electric Company amounting to $60,000 a year, whereas formerly the dividends paid by the latter amounted to $30,000.

Michigan Railway, Jackson, Mich.—E. W. Clark & Company, Philadelphia, together with Hodenpyl, Hardy & Company, New York, and the National City Bank, New York, are offering for public subscription $5,000,000 of first lien 6 per cent five-year gold notes of the Michigan Railway at 98½ and interest, to yield 6.35 per cent. The issue, which has been approved by the Michigan Railroad Commission, is guaranteed, principal and interest, by the Commonwealth Power, Railway & Light Company, through individual endorsement on each note. The notes are dated June 1, 1914, and mature on June 1, 1919. They are issued in denominations of $1,000, $500 and $100 and are redeemable at 103 and interest on June 1 or Dec. 1, 1916; 102 and interest on June 1 or Dec. 1, 1917, and 101 and interest on June 1 or Dec. 1, 1918. The authorized issue is $7,000,000. As security for its guaranty of the notes, the Commonwealth Power, Railway & Light Company has placed with the Bankers Trust Company, New York, and the Detroit Trust Company, Detroit, trustees, stocks of other subsidiaries having an earning power in excess of the interest requirements on the notes. Net earnings of the Commonwealth available for the payment of dividends on its preferred and common stocks amounted, for the year ended April 30, 1914, to $2,203,350, or more than seven times the obligation which the company assumed through its guaranty of the interest on the notes. The notes are secured by first mortgage, through pledge of the entire outstanding amount ($6,250,000) of first mortgage 5 per cent bonds of the Michigan Railway, upon the entire property of that company, comprising 45.35 miles of interurban electric railway in actual operation; 42.42 miles of steam railroad now being equipped for electric operation, and 56.83 miles additional interurban electric railway, which it is expected will be put in operation by Jan. 1, 1915.

Northern Electric Railway, Chico, Cal.—The Railroad Commission of California has authorized the Northern Electric Railway to operate under lease the property of the Northern Electric Railway—Marysville-Colusa Branch. The authority is granted on the condition that the Railroad Commission, or other competent public authority, shall at all times have the right to revise or alter all or any of the terms of the lease. The Railroad Commission has also authorized the Northern Electric Railway to operate under lease the property of the Sacramento & Woodland Railroad. The lease is subject to revision or alteration by the Railroad Commission or other competent public authority, at any time, in any rate fixing inquiry or otherwise.

New York (N. Y.) Railways.—The Public Service Commission of the First District of New York has granted the application of the Broadway & Seventh Avenue Railroad for authority to issue $500,000 of refunding 5 per cent bonds, maturing on Dec. 1, 1914. The proceeds are to be used to refund a like amount of outstanding second mortgage bonds, payable on July 1, 1914, and if there should be any surplus from the sale it is to remain in the treasury of the company until the commission makes an order as to its disposition. The application of the company was referred to in the ELECTRIC RAILWAY JOURNAL of June 20, 1914, page 1416.

Ohio Service Company, New Midland, Ohio.—The State Public Utilities Commission of Ohio has authorized the Ohio Service Company to issue securities aggregating $1,489,807, and to acquire the property of the following companies: County Electric Company, having plants at Canal Dover, Denison, Urichsville and New Philadelphia, $694,000; Lafayette Light & Power Company, transmission lines between these towns, $45,807; New Midland Power & Traction Company, electric plant at Cambridge and an interurban railway between Cambridge and Pleasant City, $750,000.

Philadelphia Company, Pittsburgh, Pa.—At the special meeting of the stockholders of the Philadelphia Company on June 16 the proposed reduction in the authorized capital stock of the company from $73,400,000 to $69,433,400 was approved. The reduction is to be in the 5 per cent preferred shares.

Public Service Corporation, Newark, N. J.—The Board of Public Utility Commissioners of New Jersey has reserved decision on the application of the Public Service Railway for approval of an extension of payment of $300,000 of bonds of the Paterson Railway for a period of thirty years from Oct. 1 with interest at 5 per cent.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—A copy of the contract, under the terms of which the controlling interest in the San Francisco-Oakland Terminal Railways was transferred from the Oakland Railways to the Realty Syndicate, has been filed with the Railroad Commission of California. This contract was filed in connection with the application of the San Francisco-Oakland Terminal Railways for authority to issue bonds. Copies of three of the so-called "George Moore contracts" have also been filed with the commission.

Shreveport (La.) Traction Company.—All of the outstanding $150,000 of first mortgage 5 per cent bonds of the Shreveport Traction Company had been called for payment on June 20 at 105 and interest at the office of the Hibernia Bank & Trust Company, New Orleans, La.

Taunton & Pawtucket Street Railway, Taunton, Mass.—The full bench of the Supreme Court of Massachusetts has granted the petition of the Federal Trust Company, Boston, Mass., to foreclose the mortgage for $250,000 given by the Bristol County Street Railway. The Taunton & Pawtucket Street Railway took over the Bristol County Street Railway at receiver's sale on Dec. 17, 1904, subject to $200,000 of bonds issued under the mortgage of the Bristol County Street Railway authorizing $250,000 of bonds.

Twenty-third Street Railway, New York, N. Y.—Hallgarten & Company, New York, N. Y., have purchased the $1,500,000 of 5 per cent bonds of the Twenty-third Street Railway recently authorized by the Public Service Commission of the First District. The proceeds from the sale of the bonds are to be used to liquidate notes made by the Twenty-third Street Railway to the Mercantile Trust Company as trustee in 1907.

Twin City Rapid Transit Company, Minneapolis, Minn.—Pursuant to a resolution of the board of directors of the Twin City Rapid Transit Company the company is offering to all stockholders of record of June 15, 1914, for subscription pro rata at par $1,900,000, par value of the authorized but unissued common stock of the company and $25,000, par value of treasury stock. Under this authority each stockholder owning either preferred or common stock may subscribe to new stock to the amount of one-twelfth of a share for each share held.

United Light & Railways Company, Grand Rapids, Mich.—The usual quarterly cash dividend of 1 per cent has been declared on the common stock of the United Light & Railways Company, payable on July 1, the same as in April last when 1 per cent was paid on stock. In regard to the omission to declare a stock dividend in addition to the cash distribution, Frank T. Hulswit, president of the company, says: "Our treasury and surplus would stand it, but in view of the present business depression the board did not consider it conservative to declare the stock dividend at this time, although declaring the regular cash dividend. When action will be taken on the stock dividend I am not prepared at present to say. It was purely a matter of business policy."

United Railways & Electric Company, Baltimore, Md.—The Public Service Commission of Maryland has authorized the United Railways & Electric Company to issue and sell $1,000,000 of two-year 5 per cent collateral trust notes convertible into common stock of the company at its par value of $50 a share. The commission had refused to authorize the issue of notes convertible into stock at the rate of $33.33 per share. In order to comply with the decision of a majority of the commission in connection with the original application the company filed an amended petition fixing the rate of conversion at $50 instead of $33.33 and the commission agreed to this, with certain conditions. The order states that, as the commission is engaged in making an investigation of the property and business of the company and the rates that should be charged by it, the authorization of the sale of notes and their conversion into stock at par shall not "be taken or construed in any way as a determination by the commission that such common stock is now or will be at any time within the period of conversion actually worth its par value, or as evidence of any intention upon the part of the commission . . . to hold the owners of such common stock or any other common stock of the company entitled to a return upon the basis of such or any other valuation." W. A. House, president of the company, has announced that all subscribers, to whom allotments were made originally, who desire to take the notes with the change in the conversion price should communicate with Alexander Brown & Sons, agents for the company.

West Penn Traction & Water Power Company, Pittsburgh, Pa.—The West Penn Traction & Water Power Company has decided to discontinue dividends for the present on its $6,500,000 of preferred stock, $3,094,800 of which is owned by the American Water Works & Electric Corporation. Guy E. Tripp, president of the company, in a statement which he issued, says that in consultation with the leaders of the syndicate which bought the $6,000,000 of notes it was deemed advisable to defer dividends until the company has sufficient cash in reserve to enable it to meet from time to time drafts upon the construction fund which is to be created out of net earnings. The dividends on the preferred stock are cumulative and will be resumed as soon as all contingencies are guarded against to a reasonable extent. Mr. Tripp says that the intrinsic value of the property will be enhanced and its financial position strengthened by the expenditures of earnings on construction.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Chicago City & Connecting Railways, Chicago, Ill., $2.25, preferred.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, 2½ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Elmira Water, Light & Railroad, Elmira, N. Y., 1¾ per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Interstate Railways, Camden, N. J., 3 per cent, preferred.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 5 per cent, common.

London (Ont.) Street Railway, quarterly, 3 per cent.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

United Light & Railways, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-quarters of 1 per cent, second preferred; quarterly, 1 per cent, common.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

West End Street Railway, Boston, Mass., $2 preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

DALLAS (TEX.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$179,086	*$106,896	$72,190	$27,335	$44,856
1 "	"	'13	166,008	*99,185	66,823	24,635	42,188
12 "	"	'14	2,270,136	*1,339,920	930,216	312,062	618,154
12 "	"	'13	1,947,360	*1,142,779	804,581	296,787	508,794

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$52,519	*$32,365	$20,154	$8,212	$11,942
12 "	"	'14	570,783	*344,953	225,831	89,639	136,192

EL PASO (TEX.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$81,419	*$47,940	$33,479	$4,522	$28,957
1 "	"	'13	70,657	*40,093	30,564	4,176	26,388
12 "	"	'14	944,339	*513,504	430,835	51,267	379,568
12 "	"	'13	844,778	*455,217	389,561	56,245	333,316

GALVESTON-HOUSTON ELECTRIC COMPANY, HOUSTON, TEX.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$196,149	*$109,759	$86,391	$35,669	$50,721
1 "	"	'13	185,508	*109,574	75,934	34,755	41,179
12 "	"	'14	2,434,215	*1,375,662	1,058,553	432,241	626,312
12 "	"	'13	2,147,048	*1,242,851	904,197	408,752	495,445

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$24,345	*$15,357	$8,988	$5,660	$3,328
1 "	"	'13	25,699	*14,765	10,935	5,465	5,470
12 "	"	'14	290,492	*176,943	113,548	67,492	46,057
12 "	"	'13	312,187	*177,340	134,847	69,040	66,807

JACKSONVILLE (FLA.) TRACTION COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$62,836	*$70,239	$22,597	$12,735	$9,862
1 "	"	'13	56,364	*36,633	19,731	11,118	8,613
12 "	"	'14	711,162	*452,208	258,854	141,148	107,706
12 "	"	'13	579,168	*391,136	188,032	124,948	63,084

PADUCAH LIGHT & TRACTION COMPANY, PADUCAH, KY.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$23,941	*$16,677	$7,264	$7,666	†$402
1 "	"	'13	13,701	*14,088	387	7,340	†7,727
12 "	"	'14	308,257	*198,024	110,232	91,300	18,932
12 "	"	'13	281,033	*186,886	94,137	87,276	6,871

PENSACOLA (FLA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$22,323	*$14,470	$7,853	$7,173	$683
1 "	"	'13	21,156	*15,328	5,828	6,404	575
12 "	"	'14	285,373	*180,072	105,301	84,480	20,821
12 "	"	'13	287,099	*178,445	108,655	76,427	32,228

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	May,	'14	$2,178,843	*$1,260,510	$918,333	$805,473	$112,859
1 "	"	'13	2,173,825	*1,263,454	910,371	762,658	147,413
11 "	"	'14	22,195,756	*13,089,983	9,105,773	8,817,810	287,963
11 "	"	'13	21,884,863	*13,095,569	8,789,295	8,387,622	401,673

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$702,770	*$427,455	$275,315	$175,267	$100,048
11 "	"	'13	689,941	*414,102	275,839	171,728	104,111
12 "	"	'14	8,726,264	*5,028,377	3,697,887	2,088,303	1,609,584
12 "	"	'13	8,320,185	*4,865,208	3,454,977	2,011,187	1,443,790

SAVANNAH (GA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$70,842	*$47,762	$23,080	$22,876	$204
1 "	"	'13	66,378	*43,689	22,689	22,552	137
12 "	"	'14	843,082	*559,719	283,364	272,523	9,841
12 "	"	'13	776,153	*564,357	211,795	211,287	508

TAMPA (FLA.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$79,258	*$44,590	$34,668	$4,454	$30,214
1 "	"	'13	60,181	*33,105	27,075	4,552	22,524
12 "	"	'14	907,485	*505,862	401,623	55,851	345,772
12 "	"	'13	765,345	*399,198	366,147	54,810	311,337

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*Includes taxes.
†Deficit.

Traffic and Transportation

Recommendations Regarding Service in Albany

The report of Charles R. Barnes, electric railway inspector of the Public Service Commission of the Second District of New York on the United Traction Company, Albany, has been filed with the commission. The report being received by the commission as in the nature of an exhibit, its official consideration and the adoption in whole or in part of its conclusions and recommendations await a formal hearing after the corporation shall have been served with a copy of the report and been afforded an opportunity to be heard thereon. The report embodies nearly 400 pages and constitutes nearly 150 separate heads. Mr. Barnes says that his work was greatly facilitated by the co-operation of individuals and civic associations in all parts of the city and that every facility was afforded to him by the United Traction Company and its officials. The investigation of the company was very much delayed by the severe weather conditions of January, February and March. During this time Mr. Barnes states there was little opportunity for a fair estimate of the average service furnished by the company, and the figures as to service are not based on the extraordinary conditions of the winter. These extraordinary conditions, however, furnish the basis for recommendations in regard to the company's snow fighting equipment. In this connection Mr. Barnes severely critisises the regulation of vehicular traffic by the city authorities. Mr. Barnes says of his report:

"In this report an attempt has been made to confine the statements to fact and make the discussion on them in an impartial manner. The predominating influence in the affairs of this company includes broad gage men of wide experience in railroad operation who, it is believed, will recognize the necessity for the improvements suggested and will, no doubt, put them in force, after which they should receive the support and assistance of the people and the municipality. This report is based entirely upon the requirements of present population, and in it consideration has not been given to necessary future increase of service. It has also been based upon winter operation only. With the exception of the use of open cars, the service furnished during the summer season would seem to be a reasonable one."

Mr. Barnes' recommendations are as follows:

"1. That the company put in proper operating condition the 13.26 miles of track classified in the track table as in fair condition.

"2. That it construct the track suggested for the Arbor Hill and New Scotland extensions, also for the connection of the tracks in Trinity Place and Hamilton Street. Unless delayed by reasons beyond its control, this recommendation to be complied with in full before Dec. 1, 1914.

"3. That it construct curves in both directions on the east side of Pearl Street connecting the tracks in State and Pearl Streets. This recommendation to be complied with before Nov. 1, 1914.

"4. That it provide additional means to prevent a car from running into the river when the draw of the Greenbush Bridge is open.

"5. That on or before Nov. 1, 1914, it improve its snow fighting equipment in Albany by replacing the three 5½-ton snow plows by plows of modern type; also, that it replace the 30-hp motors on the sweepers by 50-hp motors.

"6. That it comply with the suggestions contained in this report on pages 259, 260 and 261 in reference to additional service on the various lines and at the time mentioned, with the understanding that while the averages of the checks made show the additions are required at the specific time mentioned, it shall be provided at such times as to best accommodate the travel, this to be determined by continuous and close observation of traffic. This recommendation to be fully complied with not later than Nov. 1, 1914.

"7. That it increase the service on the Belt line by decreasing the present headway of seven minutes to five during the non-rush hours, and the five minute headway between 5 p. m. and 6.30 p. m. to three; and a four-minute during the morning rush hours between 6.30 and 9 o'clock.

This recommendation to be complied with by Nov. 1, 1914.

"8. That it increase the service on the Delaware Avenue line by decreasing the present headway of ten minutes to seven during the non-rush hours. This recommendation to be complied with by Nov. 1, 1914.

"9. That it comply with the detailed suggestion on page 262 of this report in reference to service during church hour.

"10. That it furnish a reasonable service during what is known as the theater hours, especially the travel from the theater, and in accordance with the suggestion for this service contained on page 262 of this report.

"11. That it immediately modify its rules in reference to transfers so that a second transfer will be issued to persons on Pine Hill cars, eastbound, desiring to go to points on the West Albany Line west of Quail Street, and persons on the West Albany Line, eastbound, desiring to go to points on the Pine Hills line west of Quail Street, enabling them to make their journey via Quail instead of Lark Street, as they are now obliged to do by the use of only one transfer; also, enabling persons on the Arbor Hill-Kenwood line, northbound, whose destination is points on the Delaware Avenue line south of Madison Avenue to make a transfer at Delaware and Second Avenue and vice versa.

"12. That it arrange with the Schenectady Railway so that passengers boarding the latter company's cars eastbound within the city limits can procure a transfer to take them on other lines to points within the 5-cent fare zone.

"13. That it change the route of the Troy-Albany (red line), running these cars from Broadway, through State and South Pearl Streets, returning through Second Avenue, Broad Street, Trinity Place and Madison Avenue.

"14. That it rearrange its passenger stops on the basis of rapid transit with the least possible inconvenience to patrons, and report such rearrangement to the commission by Aug. 1, 1914.

"15. That it cause cars to be operated up the State Street hill between Pearl and Eagle Streets on average schedule speed.

"16. That it equip all of the single truck cars (open and closed) which are to remain in service after Nov. 1, 1915, with an auxiliary breaking system to be approved by this commission, this recommendation to be complied with by Nov. 1, 1914.

"17. That it equip all of its cars in the city of Albany with conspicuous route and destination signs, properly illuminated during hours of darkness.

"18. That it replace the twelve 18 ft. cars 100 series by twelve modern cars seating not less than forty, by Nov. 1, 1914.

"19. That it replace forty 20 ft. 400 series by modern cars seating not less than forty, twenty of these to be replaced by Nov. 1, 1914, and twenty to be replaced by Nov. 1, 1915.

"20. That as new cars are added it make retirements from service of the open cars used in the city of Albany, the intent of this recommendation being that all open cars should be retired as soon as they can be replaced by a closed car suitable for summer operation.

"21. That it cause the steps on six of the open cars which are 21 in. or more in height, to be lowered, or these cars withdrawn from service.

"22. That it construct a new transformer station, replacing the present North Albany station as near as practicable to the center of gravity of the feeder system, as shown in this report, and that it rearrange its feeder system as suggested in this report; this recommendation to be complied with before Nov. 1, 1914.

"23. That it construct an additional high tension transmission line between Mechanicville and Watervliet, a distance of 12½ miles; this recommendation to be complied with by Nov. 1, 1914.

"24. That it make material yearly extensions of its underground conduit and feeder system necessary to the continuity of service, facilitate the work of the fire department and improve the general appearance of the streets; that it notify the commission before Aug. 1, 1914, of the extensions it will make this year, and that such modification be given of the amount of work to be done in this direction before April 1 of each succeeding year.

"25. That before Aug. 1, 1914, it notify the commission what it proposes to do before Nov. 1, 1914, in increasing the amount and reliability of its power supply and providing a reasonable 'stand-by' service.

"26. That before Nov. 1, 1914, it add to its wrecking equipment a motor truck of sufficient size, properly equipped, manned and located.

"27. That it instal a telephone system, exclusively for its use, with telephones, switchboards, and appliances, as described in this report on page 346 and located as indicated; this recommendation to be complied with before Nov. 1, 1914."

In addition to the above recommendations directed to the company, it is respectfully suggested to the municipal authorities that improvement in the enforcement of the ordinance in reference to vehicles obstructing cars would be a benefit to the traveling public in Albany, and that improvement in methods employed by it in removing snow last winter might be materially improved to the benefit of vehicular traffic and street car movement. Also, that rapid transit requires a modification of the present ordinance in reference to passenger stops.

Favorable Board of Trade Report on Fare Increase

The Board of Trade of Vancouver, B. C., has adopted the majority report of the special committee appointed to investigate fares as levied by the British Columbia Electric Railway, Ltd., Vancouver. The majority report follows in part:

"The committee has held ten meetings and has obtained information with respect to the cost of fares and areas served by such fares from Montreal, Toronto, Winnipeg, Edmonton, Calgary, Seattle, Portland, San Francisco and Los Angeles. It has also obtained a great deal of information from officers of the British Columbia Electric Railway, who have invariably treated the committee with courtesy.

"The board finds that the company was justified under existing conditions in raising its fares, but that as soon as the present high proportion of expense to earnings can be reduced a reconsideration of the fares charged will be justifiable.

"The money actually expended up to June 30, 1913, amounted to $45,168,312, and the amount paid out in interest and dividends for the year amounted to $1,888,139, equal to 4.18 per cent on the entire investment. During the last ten years the cost of equipment, supplies and wages has increased at least 25 per cent. The wages paid by the company are about 10 per cent higher than those paid in any other Pacific Coast city, and from 20 to 25 per cent higher than those paid in the cities of eastern Canada.

"Equipment and supplies are about 15 per cent higher in Vancouver than in other coast cities, and 10 per cent higher than in eastern Canadian cities. For example, a car costing $7,407 at Vancouver can be purchased in Seattle for $5,986 and in Toronto for $6,522. With respect to operating expenses the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, shows the operating expense ratios of forty of the leading electric railway systems of this continent. The average is 59.09 per cent and the British Columbia Electric Railway has the highest ratio, amounting to 70.03 per cent. The figures given relate only to straight operating expenses and do not include any charge for renewals, depreciation, taxes or accidents reserves.

"It has been put forward in a criticism of the British Columbia Electric Railway that other companies serve a greater area for the same fare. The committee consider that the area served by any railway is no indication of the service rendered to the public unless the population, track mileage and number of cars operated within that area are also considered. The North Vancouver service with nearly 10 miles of trackage and a population of about 8000 covers an area almost as large as the city of Vancouver with a population of 120,000 people and 70 miles of track.

"Another argument advanced in some quarters is that owing to the policy of the company of contesting so many accident claims in court the expenses in connection with this department have been excessive. This statement has not been borne out by the facts, as the following figures will show: The total number of accident cases dealt with by the company from Jan. 1, 1911, to Feb. 20, 1914, was 1420. Of these sixty-six were contested in court and 1354 amicably settled without reference to law. This shows an average contested of less than 5 per cent.

"The committee asked the company to state the cost of power and was informed that it could not answer specifically as to the charge per horse-power on per kw-hr., but the officers submitted the following table showing the cost per car mile in cents for the year ended June 30, 1913, as compared with the cost on other systems in Canada: British Columbia Electric Railway, 2.98; Montreal, 2.62; Toronto, 2.58; Winnipeg, 2.81; Edmonton, 11.22; Calgary, 5.23.

"The revenue per car mile for four of the leading electric railway systems of Canada in 1912 shows Vancouver the least remunerative in that regard. Toronto provided $42,846 per car mile; Montreal, $30,259; Winnipeg, $23,230, and Vancouver, $22,038.

"The committee finds further that with few exceptions the usual fare charged in the principal cities of the United States is 5 cents. In Canada the fare is usually about the same as that charged by the British Columbia Electric Railway previous to September last. The straight 5-cent fare is charged in nearly all the Pacific Coast cities, including Seattle, San Francisco and Los Angeles. In Portland the fare is 5 cents or fifty tickets for $2.25.

"To the best of the committee's knowledge the British Columbia Electric Railway is the only company on the Pacific Coast selling workingmen's tickets at 4 cents. These are issued in ten tickets for 40 cents, five white and five green, the white tickets being good from 5 a. m. to 8 a. m. and the green good at all hours.

"A good deal has been said about the distance that passengers are carried in other cities for one fare as compared with Vancouver. The committee thinks there is not much to complain of in this respect, as city passengers can travel from Alma Road and Tenth Avenue to Hastings Street and Boundary Avenue, a distance of 8.35 miles, and settlers are carried from Dunbar Street and Wilson Road to Hastings Street and Boundary Avenue, a distance of 11.78 miles, for 5 cents.

"Notwithstanding the fact that the number of passengers carried has been steadily falling off from June last, the company is giving better service than ever. The number of car miles at present averages about 90,000 per year more than in 1912. The growth of traffic in years previous to 1913 warranted liberal outlays in development and equipment, and the operating expenses increased very considerably on account of these outlays. In 1908 the operating expenses of the railway department, exclusive of interest on the outlay, were 71.09 per cent of the gross earnings; this ratio increased to 91 per cent in 1913. In 1913 the gross earnings were three and one-half times as much as in 1908, but the net earnings were the same as in 1908, notwithstanding the fact that three times the amount of capital was employed in 1913 as in 1908. The total capital invested by the company has increased by about $6,000,000 annually for the last five years, and now totals about $45,000,000. The committee has taken into consideration that securing capital for such undertakings as this is naturally dependent upon a fair return on the investment.

"The conditions justify the increase in fares, call for and have resulted in strict economy in expenses and management, and it may be reasonably expected that in time these economies will reduce the present high proportion of operating expenses sufficiently to warrant a reconsideration of fares charged. Such reductions, however, cannot be expected to influence greatly the return on invested capital until passenger traffic increases."

Hearing on Middlesex & Boston Fares and Tickets

The Massachusetts Public Service Commission recently held a hearing on a petition by the selectmen of Hopkinton for an extension of the fare limit from the Hopkinton station to Elm Street and for the issue of a twenty-five-ride ticket book in addition to the existing fifty-ride book. The petitioners contended that as the length of the proposed extension is 1700 ft., the company would lose no revenue by placing the fare limit at Elm Street. The local fare unit on the road in this section of the system is 6 cents, but the purchaser of fifty-ride tickets gets the benefit of a 5 cent rate.

Chairman McLeod, of the Public Service Commission, stated that with the knowledge the commission has of the general financial condition of the company, it cannot properly consider anything which is likely to mean any serious reduction in present revenues, which are no larger than necessary to enable the company to maintain proper service. In the last analysis the preservation of the service itself was of the very first importance to the community. The board has taken the case under advisement.

Police Chiefs Discuss Uniform Traffic Regulations.—Steps toward uniform traffic regulations throughout the country were taken up at the recent convention of the National Association of Police Chiefs in Grand Rapids, Mich., and a committee composed of one member from each State was appointed to adopt uniform regulations, such as signaling at crossings.

New Express Franchise Desired in Ottawa.—The Chicago, Ottawa & Peoria Railway is circulating petitions in Ottawa, Ill., for the purpose of securing a new passenger, freight, express, baggage and mail franchise for the next fifty years. The company has entirely outgrown its present freight and passenger terminal facilities and it now seeks to change and extend its trackage in Ottawa so as to make that city a more important freight terminal. It is proposed to change the location of both the freight and the passenger stations in Ottawa.

Kansas Commission Orders Fare Adjustment.—The Kansas State Public Utilities Commission has ordered changes in fares between points reached by the Joplin & Pittsburg Railway, as the result of complaints by authorities at Mulberry, Kan. The commission ordered a rate of 15 cents between Pittsburg and Franklin, a distance of 8 miles, instead of 10 cents; 10 cents between Franklin and Mulberry, a distance of 5½ miles, instead of 15 cents; 5 cents from Franklin to Croweburg, and 5 cents between Cemetery Lane and Crowe station, instead of 10 cents. The changes, effective within thirty days, will compel a readjustment of fares at a number of points.

Near-Side Stops Only at Springfield.—The Springfield (Ill.) Consolidated Railway has been ordered by the City Commission to stop its cars on the near side only within certain congested districts in the downtown area. In order to remove as far as possible the confusion which is certain to arise when changes are made in the operation of cars, the signs will be removed in the area affected which announce that all street cars will stop on both sides of the street and for several days the company will employ a man with a megaphone at Fifth and Monroe Streets, the most important street intersection, to announce the change and to aid passengers getting on and off the cars.

Adams Express on Illinois Traction System.—The Adams Express Company will take over the express business on the lines of the Illinois Traction System, Peoria, Ill., when the United States Express Company dissolves on July 1. The United States Express Company had a contract with the Chicago & Eastern Illinois Railroad and as a result was able to place Chicago shipments into Central Illinois territory in remarkably short time. The Adams Express Company has not heretofore reached central Illinois cities to any great extent. The Vandalia, connecting with the Illinois Traction System at Peoria, Decatur and a few smaller points, was previously about the only direct Adams line into the central Illinois agricultural region.

Holiday Transfer Request Before Commission.—The Public Service Commission of Pennsylvania has announced that it cannot order the Pittsburgh Railways to give transfers on July 4, as demanded by the City Council of Pittsburgh, because under the law a complaint against an existing tariff of a public utility must be filed and the defendant company must have fifteen days to reply, and then a public hearing be granted, all of which would carry the matter beyond the date the transfers are asked for. The commission will take the matter up in the regular way if it is desired. The explanation of P. N. Jones, general manager of the company, regarding the peculiar conditions which govern in Pittsburgh on July 4 was referred to in the ELECTRIC RAILWAY JOURNAL of June 20, 1914, page 1420.

I. C. C. Case Against Insull Lines.—Manufacturers and shippers in Louisville, Ky., are following with interest the steps which the Indianapolis & Louisville Traction Company, known as the Insull lines, is taking to comply with an order issued May 29, 1913, by the Interstate Commerce Commission. A letter has been published in Louisville from Chairman Harlan of the Interstate Commerce Commission to Chester P. Wilson, president of the Interstate Public Service Company, the principal Insull concern in Indiana, in which the commissioner says that unless the Insull interests comply with the order of the commission by July 1, the commission itself will proceed to enforce the order. The order resulted from an investigation of a complaint made by the Louisville Board of Trade that the electric railways between Louisville and Indianapolis were operating under a system detrimental to the interests of Louisville business.

Sixty Thousand Children Carried Safely at Boston.—On Saturday morning, June 6, the Boston (Mass.) Elevated Railway transported 60,000 children to and from Fenway Park, in connection with an elephant show held on the grounds. Several elephants have been added to the municipal zoo through the contributions of Young America, and the purchasers were afforded the first opportunity to see the beasts at close range on Saturday. The show lasted from 10 a.m. to 12 noon, with a homeward rush between 12 and 1. About 370 extra cars were run, and every available street inspector was detailed to the service. Many of the cars traversed special routes, and the regular service over the Ipswich Street line was diverted during the period of greatest travel, the park being in a sparsely populated section in which the diversion could be accomplished with minimum inconvenience to the public. When the show was over children were directed by megaphone toward large semi-convertible cars on various lines, these being of the prepayment type and affording the maximum protection against accident.

Law Firm Guilty of Irregular Practices.—Held guilty by the court of irregular practices in the bringing of a suit against the Louisville Railway, the members of the Louisville, Ky., law firm of Popham, Trusty & Roose have been suspended until Jan. 1 next and the firm ordered dissolved. The members of the firm, Arthur C. Popham, Samuel L. Trusty and William H. Roose, threw themselves on the mercy of the court, pleading that other attorneys were indulging in practices similar to those of which they were accused. The court held, however, that the uncontroverted charges involved persuading an uninjured man to bring suit for damages and then ordered temporary disbarment. Referring at the close of his opinion to general conditions Judge William H. Field, who himself proceeded against the attorneys, said: "It is well known that these defendants are not the only offenders in the particulars here considered. It may not be out of place to observe that the activities of some physicians who sell their patients to the highest bidders, and of those men commonly denominated as 'runners' are equally offensive to the administration of justice and equally calculated to obstruct it. Doubtless effective processes are available to reach these evils."

Suburban Day in Kansas City.—Wednesday, June 10, was Suburban Day in Kansas City, Mo., merchants and interurban railroads co-operating to attract residents of neighboring towns to Kansas City. Every Wednesday will be suburban day in the future. While the initial occasion is regarded as an unqualified success, plans are on foot whereby the program will pass off more smoothly. On the first day set apart for suburban trade, most of the electric roads running into Kansas City operated extra cars for the benefit of the out of town patrons. The Missouri & Kansas Interurban Railway, known as the Strang line, went a step further and distributed 500 free tickets to women along its route. It will be unnecessary to do this in the future, as the Kansas City Merchants' Association plans to refund transportation to all visiting patrons who purchase a certain amount of goods. It is believed that this method will result in increased traffic for the electric roads and greater business for Kansas City retailers. Posters are being distributed along the routes of the interurban railway to further the project. The placards bear illustrations of cars taking shoppers into the city, buyers on the streets and in the stores and the general activity of a metropolis.

Personal Mention

Mr. W. A. McGovern, formerly with the Oregon Short Line, has been appointed general manager of the Northern Electric Railway, Chico, Cal., to succeed Mr. A. D. Schindler, resigned.

Mr. N. P. Zech has resigned as assistant to the general auditor of H. M. Byllesby & Company to become treasurer and general auditor of the Atlantic Gas & Electric Company, with headquarters in New York City.

Mr. H. A. Tolberg has been appointed superintendent of the Edwards River power plant of the Rock Island Southern Traction Company, Monmouth, Ill. Mr. Tolberg has been serving as chief engineer and purchasing agent of the company.

Mr. Hugh McCoy has been appointed chief engineer and purchasing agent of the Rock Island Southern Traction Company, Monmouth, Ill., to succeed Mr. H. A. Tolberg, who has been appointed superintendent of the Edwards River power plant.

Mr. E. M. Scofield, president of the Scofield Engineering Company, Philadelphia, has been appointed vice-president of the Texas Southern Electric Company, financed by Warner, Tucker & Company, Boston, Mass., and owning and operating public utilities in southern Texas.

Mr. D. A. Faut has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Mr. F. M. Weld, resigned. Mr. Faut was formerly superintendent of shops of the Chicago (Ill.) City Railway but resigned that position in 1909 to engage in other work.

Mr. John H. Adams has been appointed engineer in the power department of the West Penn Traction Company, Pittsburgh, Pa. Mr. Adams was born in Augusta, Ga., in 1874. He began work at the age of sixteen years in the motor winding department of the Augusta (Ga.) Railway, now the Augusta-Aiken Railway & Electric Corporation, and worked through the car shops, power stations, overhead line department, maintenance of way department, etc. He was made chief engineer and assistant to the general manager of the company at the time the late Edward H. Harriman purchased the property at Augusta in 1908 and continued in this capacity until J. G. White & Company, New York, took over the operation of the property, when he was made engineer of maintenance of way and superintendent of motive power. Mr. Adams resigned from this last position to become connected with the West Penn Traction Company.

Mr. F. M. Weld has resigned as master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Mr. Weld began his railway career in 1901 with the Wakefield & Stoneham Street Railway, Wakefield, Mass. Later he was employed as an armature winder with the Haverhill & Amesbury Street Railway, Haverhill, Mass. He also served for a time as master mechanic of the Creighead-Kintz Company in Massachusetts. In 1895 Mr. Weld accepted the position of master mechanic of the Interstate Consolidated Street Railway, Attleboro, Mass., which position he resigned to become master mechanic of the Evansville & Southern Indiana Traction Company, Evansville, Ind. In 1908 he was transferred to the Chicago, South Bend & Northern Indiana Railway as master mechanic, both of these properties being controlled by the same syndicate. In September, 1910, he resigned from the Indiana properties to become master mechanic at Birmingham.

Mr. Arthur W. Redderson, formerly acting superintendent of shops, Chicago (Ill.) Railways, has been appointed superintendent of motive power of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., to succeed Mr. F. J. Stevens, resigned. Mr. Redderson began his electric railway career in November, 1895, in the office of Mr. F. T. Brydges, superintendent of equipment of the West Chicago Street Railway. At the end of the first six months he was transferred to the car shops storeroom where he served as storekeeper until December, 1899, at which time he was placed in charge of all shop materials as general material man. In addition to the duties incident to the foregoing position, he had charge of all shop time-keeping. In December, 1902, he was assigned to the position of general timekeeper in charge of materials and stores, which position he held until November, 1904, when he was made assistant superintendent of shops. Following the death in February, 1912, of Mr. R. J. Foulkes, then superintendent of equipment of the Chicago Railways, Mr. Redderson was appointed acting superintendent of shops, which position he held until May, 1913. During the period Mr. Redderson was in charge of the Chicago Railways' shops he assisted in the design and constructed the first 250 arched-roof cars used in Chicago.

Mr. G. W. Dunlap, superintendent of equipment of the International Railway, Buffalo, N. Y., has been appointed superintendent of power and equipment of that company. Mr. Dunlap became connected with the International Railway in November, 1912, as mechanical engineer, and in February, 1913, took over the work with that company which was performed previously by Mr. P. J. Mitten, who resigned as master mechanic to become connected with the Philadelphia Rapid Transit Company. Before becoming connected with the International Railway, Mr. Dunlap was electrical engineer for the Public Service Commission of the First District of New York in charge of the bureau of transit inspection under Mr. E. G. Connette, now president of the International Railway. Mr. Dunlap was born in North Berwick, Maine, and was connected with industrial work and steam railroading for a number of years before he entered the public service field. He has been chief engineer of the Waltham Gas & Electric Company, Waltham, Mass.; chief engineer of the Newton (Mass.) Street Railway, and chief engineer of the Hyde Park Electric Company. He also was largely responsible for equipping the power plant of the Biddeford & Saco Street Railway, Biddeford, Maine. Before becoming connected with the Public Service Commission of New York, Mr. Dunlap was engineer of power stations of the Worcester (Mass.) Consolidated Street Railway.

Mr. P. P. Crafts, vice-president and general manager of the Iowa & Illinois Railway, Davenport, Ia., has resigned that position to become manager of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Crafts began work in a small power house when he was sixteen years old. His first important position was that of night foreman of the Hawkins Street station of the Boston (Mass.) Edison Company. After about two years' service with the Boston Edison Company he resigned to become electrician of the Brookline (Mass.) Gas Light Company, in charge of generating apparatus, meters, and arc lamps. In 1898, after successfully passing an examination for electrician of the Charleston Navy Yard, he entered the employ of Stone & Webster. During the period he was employed by the latter company his work included the inspection of heavy maintenance, and the reorganization of power house operation, testing and other practical engineering work. Subsequently he reorganized the operating department of the Brockton & Plymouth Railway, Brockton, Mass. Just prior to his leaving Stone & Webster Mr. Crafts was appointed receiver of the Minneapolis (Minn.) International Electric Company. In 1902 he resigned as receiver to become general manager of the Saginaw Valley Traction Company, Saginaw, Mich., which position he held until 1904, when he was appointed general manager of the Iowa & Illinois Railway. At the time of the purchase of the last-mentioned property by the United Light & Railways Company, in February, 1913, Mr. Crafts was retained as vice-president and general manager, and in addition was placed in charge of the Davenport & Muscatine Railway.

P. P. Crafts

Mr. Albert H. Stanley, managing director of the London Underground Electric Railways, London United Tramways, Ltd., the Metropolitan District Railway and the London General Omnibus Company, Ltd., London, England, was knighted by King George on June 21, together with twenty-seven others upon whom titles were conferred in recognition of distinguished public service. Mr. Stanley is very well known in the United States. He was born in England about forty years ago and began his career with the Detroit City Railway in the horse-car days. After serving the company and its successor as timekeeper, bookkeeper, traffic superintendent, division superintendent, assistant general superintendent, and finally as general superintendent, he was in October, 1903, appointed assistant general manager of the street railway department of the Public Service Corporation of New Jersey. In February of the following year he was appointed manager of that department. In January, 1907, Mr. Stanley assumed the duties of the general manager of the corporation, but resigned three months later to accept the general managership of the Underground Electric Railways, London. In 1910 he was in addition appointed managing director of the London United Tramways. This company owns and operates an extensive surface railway system in the northwestern part of London, and its stock is largely owned by the Underground Electric Railways. This appointment came to Mr. Stanley as an extension and broadening of his duties. In his position with the London United Tramways he succeeded the late Sir J. Clifton Robinson, long one of the most prominent figures, if not the most prominent, in tramway circles in England. In 1912, in a long biographical sketch covering Mr. Stanley's career, the London *Evening News* referred to him as the traffic king of London. The high esteem in which Mr. Stanley is held by the other railroad officials of the British Isles was illustrated by his selection to accompany the officers of the Midland Railway of England to the United States last fall in an extensive tour which those gentlemen made for the purpose of studying important steam railroad electrifications and operating practices preparatory to the electrification of the Midland Railway in London and vicinity.

OBITUARY

Albert Sherman, superintendent of transportation of the Saginaw-Bay City Railway, Saginaw, Mich., for several years, is dead.

James J. Robison died in Toledo, Ohio, on June 11, of apoplexy at the age of fifty-nine years. With his father and brother Mr. Robison organized the Toledo Street Railway in 1888 and was identified with the company as general manager until the concern was absorbed by the Toledo Traction Company, now the Toledo Railways & Light Company.

New York Subway Section Contracts

The Public Service Commission for the First District of New York has awarded the contract for the construction of Section No. 7 of Route No. 5, the Lexington Avenue subway in Manhattan, to the Rapid Transit Subway Construction Company, the lowest bidder, for $1,915,164. This subway is for operation by the Interborough Rapid Transit Company and will be connected with the existing subway south of Forty-second Street. Section No. 7 covers that portion of the line in Lexington Avenue between Forty-third and Fifty-third Streets. With this section all the Lexington Avenue work north of Forty-third Street is under contract. The connection with the existing subway, which will include the diagonal station under Forty-second Street, is yet to be awarded.

On June 16 the commission for the First District opened bids for the construction of Section No. 1 of Route No. 12, the Eastern Parkway subway in Brooklyn. This subway is to be operated by the Interborough Rapid Transit Company. Four of the tracks will be used for the Interborough Rapid Transit Company and the other two for the New York Municipal Railway Corporation. The lowest bidder was the Cranford Company, Brooklyn, at $2,195,296.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***San Bernardino (Cal.) Mountain Railroad.**—Incorporated in California to build an electric or steam railway. Capital stock, $50,000. Directors: J. Treanor, G. A. Fisher and O. K. Dunham.

***Cincinnati, Indiana & Ohio River Railway, New Albany, Ind.**—Incorporated in Indiana to build an electric railway from Cincinnati, Ohio, to Louisville, Ky. L. S. Cook, Cincinnati, incorporator.

***Gleasonton & Paddy Run Railroad, Gleasonton, Pa.**—Incorporated in Pennsylvania to build an electric railway from Gleasonton to a point north of Renovo, 10 miles. I. W. Gleason, Gleasonton, president.

Berks & Lancaster Railway, Lancaster, Pa.—Chartered in Pennsylvania to build an electric railway from Lititz, Lancaster County, to Womelsdork, Berks County, via Lebanon County. Capital stock, $200,000. Incorporators: Frank J. Duckett, T. Holland Paist, William Grimshaw, Oscar R. Dare, Howard Hendricks, Joseph J. Dimond, Frank J. Reilly and H. B. Longbottom, Philadelphia, and V. J. McGlesney, Phoenixville. [E. R. J., June 20, '14.]

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a forty-year franchise to build a double-track elevated electric railway on private right-of-way and over certain streets. The Board of Public Works has adopted a resolution requiring the company to apply for franchises for the operation and maintenance of tracks on Long Beach Avenue between Ninth Street and Slauson Avenue. The company also is ordered to lower its tracks on Long Beach Avenue in Los Angeles.

Oakland, Cal.—The San Francisco-Oakland Terminal Railways has asked the Council for a franchise to reconstruct its roadbed in Twelfth Street from Fallon Street to Jefferson Street and from Market Street to Union Street in Oakland. The company is also contemplating the reconstruction of its Telegraph Avenue and San Pablo Avenue lines in Oakland.

San Diego, Cal.—The Point Loma Railroad's twenty-one-year franchise over its present line on Point Loma and for extensions to the wireless station and to the government reserve at La Playa was recently accepted by the Council in San Diego.

Augusta, Ga.—The Augusta-Aiken Railway & Electric Corporation has received a franchise from the Council to extend its lines from the intersection of Walton Way and Monte Sano Avenue westwardly on Walton Way to the city limits of Augusta in the direction of Aumond.

Des Moines, Ia.—The Des Moines City Railway has asked the Council for a twenty-five-year extension of its present franchise in Des Moines, as noted on page 1472 of this issue of the ELECTRIC RAILWAY JOURNAL.

Emporia, Kan.—The Emporia Railway & Light Company has received a franchise from the Council to extend its tracks on South Avenue to Oak Street in Emporia. The grant releases the company from building a track on Rural Street.

Hutchinson, Kan.—The Hutchinson Interurban Railway has asked the Council for a franchise to build a single track loop about ½ mile in length in Hutchinson. This loop is in anticipation of the construction of an interurban line from Hutchinson to Wichita, as well as for local use.

Salina, Kan.—The Salina Street & Interurban Railway has changed its original plans of routing in order to extend its lines to the eastern section of the city and has asked the City Council to widen an alley on the east side for use as a street. H. C. Smither, president.

Boston, Mass.—The Dedham & Medway Street Railway has asked the Public Service Commission of Massachusetts for authority to exercise the franchise rights of the Dedham & Franklin Street Railway and the old Medfield & Medway Street Railway, through Medford, Millis, Medway and Franklin, in connection with a plan to reopen and operate the electric line through these towns. The Dedham & Medway Street Railway has been organized as a successor to the Dedham & Franklin Street Railway.

Columbia, Mo.—An election will be held at Columbia, Mo., on a date not yet set for the purpose of voting a franchise to F. S. Mordaunt, Chicago, who proposes to construct an electric railway in Columbia. M. G. Quinn, secretary of the Columbia Commercial Club, is handling the matter. Mr. Mordaunt and his associates also expect to operate an interurban line which will extend to a pleasure resort to be established and into the coal fields near Harrisburg, Mo. [E. R. J., June 20, '14.]

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to extend its lines westerly from Military Road into the Reusens Park section of Northwest Buffalo, through the new Skillen Street extension between Military Road and Ontario Street and later on to O'Neil Street, and to Riverside Park.

Cortland, N. Y.—The Public Service Commission, Second District, has issued an order giving authority to the Cortland County Traction Company to construct in Cortland a double track railroad (instead of a single track now existing) beginning at a point in Main Street and running thence northerly along said street to North Main Street and along North Main Street to the north line of Lincoln Avenue, together with the necessary connections.

Brantford, Ont.—The Ontario Legislature has authorized the Brantford Council to take over and operate the Grand Valley Railway, which includes the old Brantford Street Railway, and the line from Brantford to Paris and Galt. The act provides for the appointment of a commission to manage the line. It is said that it is not intended to appoint such a commission until the municipal elections in January, 1915. In the meantime a manager will be appointed by the Council, and it was decided to advertise for one.

Toronto (Ont.) Railway.—Corporation Counsel Geary has forwarded to the City Council a copy of the order issued by the Ontario Railway Board approving of plans for the construction of an intersection at the corner of King and Front Streets, the double tracking of Spadina Avenue from Front Street to King Street, and curves on Spadina Avenue at the junction of the King Street line. This work will be carried out as an extension of the company's railway.

Avoca, Pa.—The Wilkes-Barre Railway has received a franchise from the Council for an extension into West Avoca.

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has asked the Public Service Commission for permission to complete the rerouting of the surface lines in Philadelphia. The final step in the rerouting, as planned by the company, will provide better transportation in that section of the city lying between Spring Garden Street and Allegheny Avenue, Twenty-first Street and the Schuylkill River, and on Green Street, through the combination of four routes into two, the elimination of one route entirely, and changes in four other routes.

Shippensburg, Pa.—The Chambersburg & Shippensburg Railway has asked the Council for a franchise to extend its tracks to the Western Maryland Railroad in Shippensburg without involving the payment of $2,000 asked by the Council for permission to cross the cement bridge over the "Branch."

Nashville, Tenn.—The County Court of Davidson County, Tenn., will be asked at the July meeting to grant a right-of-way along the Murfreesboro pike for an electric railway to reach from Nashville to the town of Una. This extension, the Nashville Traction Company already holding a franchise which takes its line to the edge of the city, will be a part of the Nashville-Gallatin Interurban Railway, which is projected. This line is to connect Goodlettsville, Ridgetop and Springfield.

Dallas, Tex.—The Dallas Consolidated Electric Railway has received a thirty-year franchise from the Council in Dallas, to double-track its Highland Park Street Railway to the Southern Methodist University in Dallas, a distance of 1 mile.

TRACK AND ROADWAY

Tuscon (Ariz.) Rapid Transit Company.—A 1-mile extension in Tuscon will be built at once by this company from the present terminus at the gate of the university grounds north on Park Avenue and east on Speedway. The right-of-way has been donated to the company for the extension.

Norwalk & New Canaan Street Railway, Norwalk, Conn.—At a recent meeting of the stockholders of this company directors were chosen, who will in turn choose the officers of the company, which will then be formally organized. This is part of a plan to build an electric railway between Norwalk and New Canaan. [E. R. J., Dec. 16, '11.]

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Plans are being considered by this company to double track its lines on Central Avenue and several other streets in St. Petersburg.

Central of Florida Street Railway, Daytona, Fla.—An extension of its lines is being built by this company in Daytona.

Savannah (Ga.) Electric Railway.—Plans are being considered by this company to extend its Habersham Street line to Forty-fourth Street in Savannah.

Kewanee, Bradford & Henry Interurban Railway, Kewanee, Ill.—A meeting of the citizens of Osceola was held on June 19 for the purpose of considering plans to build the 35-mile electric line from Kewanee through Osceola, Bradford and other towns to Henry on the Illinois River. C. G. Lampman, Cedar Rapids, is interested. [E. R. J., May 2, '14.]

Mattoon, Shelbyville, Pana & Hillsboro Traction Company, Pana, Ill.—Interest has been revived in the construction of this line and it is reported that financial backing has been secured to build the line between Mattoon, Shelbyville, Pana and Hillsboro. Robert Jones, Pana, president. [E. R. J., Feb. 21, '14.]

Pekin (Ill.) City Railway.—Sealed proposals for the construction, rehabilitation and equipment of about 3½ miles of electric railway in Pekin, Ill., will be received at the office of the city clerk until 7:30 o'clock p. m., July 6, 1914, and will be opened at 8 o'clock p. m. on the same day. Bids are based upon the plans and specifications adopted by the City Council and now on file in the office of the city clerk.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—At a directors' meeting held in Peoria a number of the men active in the promotion of this line were present and great interest was taken in the affairs of the company. C. D. Chapman, of the Chapman Construction Company, who is to build the railway, was present and he has made the preliminary plans for the work. John L. Soebbing, president.

Emporia Railway & Light Company, Emporia, Kan.—Work has been begun by this company on the extension on South Avenue and repaving and improving certain sections of its lines in Emporia.

***Limestone, Maine.**—Preliminary surveys are being made to build a 9-mile electric railway between Caribou and Limestone. George Cook, Caribou, is interested.

***Abington, Mass.**—Plans are being considered by the Brockton Chamber of Commerce and representatives from the boards of trade from South Weymouth, Pond Plain, West Abington and Abington to build an electric line between Brockton, through West Abington and South Weymouth, to the south shore. Among those interested are William S. O'Brien, Abington; Arthur Andrews, Brockton; Henry H. Morse and F. J. Wheatley, Abington.

Winnipeg (Man.) Electric Railway.—This company is extending its line in the municipality of Fort Garry from the end of the present line to St. Norbert, a distance of 3 miles.

Muskegon Traction & Lighting Company, Muskegon, Mich.—This company has been asked to extend its Allen Street line in Muskegon.

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Work has been begun by this company on the section of its line between Minneapolis, Kimball, Maine Prairie and St. Cloud. James MacMillan, Minneapolis, is interested. [E. R. J., April 11, '14.]

***Burlington, N. J.**—Electric railway developments of importance to New Jersey and to adjacent parts of Pennsylvania are to follow the construction of the proposed Burlington-Bristol bridge across the Delaware River, according to reports circulated. An electric line giving Bucks County, Pa., a direct route to the New Jersey seashore is one of the possibilities of the rumored extensions by the Public Service Railway. Burlington is to be the Delaware River terminus of the reported electric line to Atlantic City. A route has already been surveyed through Lumberton, Medford, Atsion and on to Hammonton, connecting with the present Burlington County Traction Company's line at Mount Holly. It is rumored that the Absecon-Pleasantville electric line is to be extended to Hammonton.

Public Service Railway, Newark, N. J.—The new Hawthorne Avenue line from Elizabeth Avenue to Wolcott Terrace has been placed in operation by this company. This new line will operate in conjunction with the Mulberry line.

New York & Long Island Traction Company, Hempstead, N. Y.—Plans are being made by this company to connect its present lines in the Jamaica section with the elevated extension on Liberty Avenue, Jamaica. A certificate of extension was filed recently with the Queens County Clerk. The company will extend a line from the Rockaway Plank Road to Liberty Avenue at Ozone Park, where connection will be made with the new elevated line, and will add a loop on Ocean Avenue.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Frank A. Dudley, vice-president of this company, has confirmed the closing of a contract between this railway and the Niagara, Lockport & Ontario Power Company to use the transmission line right-of-way of the power company for its line between Lockport and Niagara Falls.

Cincinnati (Ohio) Traction Company.—This company is asked to consider plans to extend its Gilbert Avenue line out Fairfax, Wold and Hewitt Avenues in Cincinnati.

Columbus Railway & Light Company, Columbus, Ohio.—Plans are being considered by this company to double-track its Oak Street line in Columbus.

Dayton & Xenia Traction Company, Dayton, Ohio.—The State Public Utilities Commission has approved the financing of this railway.

***Dayton, Ohio.**—Work has been begun on the line from Delco Dell to the tracks of the Ohio Electric Railway in Dayton. While this line is being built by private individuals it will be operated by the Ohio Electric Railway.

Lake Erie & Youngstown Railroad, Youngstown, Ohio.—As soon as the necessary financial backing is secured by this company work will be begun at several points by the Caldwell Construction Company to build the electric line between Erie and Youngstown. [E. R. J., Nov. 1, '13.]

Bartlesville (Okla.) Interurban Railway.—Work has been begun by this company to build 2 miles of new track for city loop extensions in Bartlesville.

Toronto (Ont.) Railway.—Plans are being considered by this company to reconstruct its entire line. Among the improvements will be the relaying of 13½ miles of track.

Toronto, Ont.—The City Council was on June 15 informed by the secretary of the Hydro-Electric Power Commission of Ontario that the chief engineer had been instructed to confer with the commissioner of works for the city, respecting a system of radial railways under the hydro-electric railway act, running into and from Toronto, particularly the contemplated railway from Toronto to Port Perry, Uxbridge and Newmarket.

***Columbus, Tenn.**—A group of electric railway men spent several days recently in the vicinity of Franklin and Columbia, Tenn., going over the two proposed routes of the projected electric line from Columbia to Franklin. In the party, which covered the territory in automobiles, were J. T. Newman, New Orleans; T. H. Tutwiler, manager of the Memphis Street Railway, and a number of engineers.

Nashville Railway & Light Company, Nashville, Tenn.—This company has begun construction of a loop from its Nolensville line to connect with the Tennessee State Fair grounds. This will give the company a second line to the grounds, and it is estimated that the extension will be about ½ mile in length.

Austin (Tex.) Street Railway.—Work has been begun by this company on the extension of its line on East Sixth Street in Austin.

Texas Traction Company, Dallas, Tex.—Plans are being contemplated by this company to double-track Main Street in Dallas.

Dallas (Tex.) Consolidated Electric Railway.—Plans are being made by this company to double-track some of its lines through the business section of Dallas.

***Hillsboro, Tex.**—A meeting of commercial organizations will be held at Hillsboro, Tex., in the immediate future to make arrangements for the construction of an electric railway between Fort Worth and Mexia, Tex. E. N. Farris, secretary of the Hillsboro Commercial Club, is among those interested. Three companies are said to be ready to build the line.

Pier Railway, Port Arthur, Tex.—This company, recently incorporated, plans to build an electric railway from the corner of Austin Avenue and Procter Street to the end of the causeway on the pleasure pier in Port Arthur. All material has been ordered and work will be begun at once. J. W. Williams, is interested. [E. R. J., June 20, '14.]

San Antonio, San José & Medina Interurban Railway, San Antonio, Tex.—A contract was signed on June 15 for the construction of one section of the proposed electric railway between Alamo City, Tex., and the Medina dam. The distance of the first section will be 13 miles, from San José to Kirk. The proposed route of the line is through Castroville, La Coste, Kirk and San José, 38 miles. J. G. Miller, San Antonio, general manager. [E. R. J., June 6, '14.]

Ogden (Utah) Rapid Transit Company.—Contracts for the construction of the extension to Huntsville has been awarded by this company to the Utah Construction Company. Construction will be begun at once. All material has been purchased.

***Weston, W. Va.**—Right-of-way is being obtained to build a new electric line to connect Buckhannon and Weston, and from Buckhannon to Philippe, there to connect with the proposed line of the Monongahela Traction Company, from Clarksburg to Philippi. F. N. Schanley is interested.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—Plans are being considered by this company to extend its lines in both the east and west sections of Fond du Lac.

SHOPS AND BUILDINGS

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Work has been begun by this company rebuilding its carhouses on Holman Street and Chestnut Street in Fort Wayne.

Dallas (Tex.) Traction Company.—This company has acquired a site for its new terminal station in Denison at the corner of Houston Avenue and Woodard Street. The cost of the station is estimated to be about $25,000.

POWER HOUSES AND SUBSTATIONS

Meridian Railway, Light & Power Company, Meridian, Miss.—This company's power plant, in the western section of Meridian, was wrecked on June 8 by a boiler explosion. The two boilers which were wrecked have been replaced with a 750-hp and a 350-hp Sterling boiler.

Moncton (N. B.) Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.—This company is installing three 200-hp boilers of high pressure, to replace four low pressure boilers which have been used for several years. A portion of the plant is already equipped with high pressure boiler and when these additional ones are installed the entire plant will be worked by high pressure boilers. A. B. Coryell, superintendent.

Hershey (Pa.) Transit Company.—This company has awarded a contract to Stohler Brothers, Hershey, to build a new power house near Gingrich's Meeting House, about 2 miles from Hershey. The structure will be 38 ft. x 28 ft., one story high and of stone construction. The company has been purchasing the power for the operation of its line between Lebanon and Mount Pleasant from the Edison Electric Company. The purpose of the new power house is to enable the company to provide its own current.

Manufactures and Supplies

ROLLING STOCK

New York State Railways, Rochester, N. Y., has been sending out inquiries on prices for equipment for a number of new single-end interurban cars.

Manila Electric Railroad & Light Company, Manila, P. I., is completing the construction of six double-truck, center-entrance closed cars in its own shops.

Chicago (Ill.) Elevated Railways has placed an order for 122 additional all-steel motor cars with the Cincinnati Car Company. This makes a total of 250 all-steel cars now being constructed in this shop for the elevated railways.

United Traction Company, Albany, N. Y., has been recommended in a report to the Public Service Commission published elsewhere in this issue, to replace forty of its 20-ft. cars by new cars seating not less than forty persons, twenty of these to be replaced by Nov. 1, 1914, and twenty to be replaced by Nov. 1, 1915.

Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y., has specified the following details of equipment for the six cars which were recently ordered from the Southern Car Company: brakes, Giant; heaters, Gold; headlights, Crouse-Hinds; trolley bases and sand boxes, Sterling. The above details are corrections of those which, owing to an unavoidable error, were formerly specified in the ELECTRIC RAILWAY JOURNAL of June 20, 1914. The cars are not prepayment as formerly noted.

Third Avenue Railway, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 18 as having ordered twenty-three single-truck, low-level, end-entrance, pay-within semi-convertible cars from The J. G. Brill Company, has specified the following details for this equipment:

Weight, car body only,	15,270 lb.
Length of body	22 ft. 11½ in.
Length of vestibule,	33 ft. 11¾ in.
Width over sills	8 ft. 2 ⅜ in.
Height, rail to sills	31 in.
Body,	metal posts and carlines
Headlining	Agasote
Roof	plain arch
Underframe	metal
Air brakes,	National Brake & Elec. Co.
Bumpers	Brill angle
Car trimmings	Brill
Couplers	Brill
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Gongs	Brill
Hand brakes	Brill
Headlights	Incandescent
Motors	West. No. 328
Registers	International
Sanders	Brill
Seats	Brill
Seating material	cane
Trucks	Radiax
Ventilators	Ry. Utility
Wheels	24 in.
Casting	iron

Jacksonville (Fla.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of April 18 as having ordered fifteen double-truck, single-end prepayment cars from the American Car Company, has specified the following details for this equipment:

Seating capacity	42
Bolster centers, length,	22 ft. 2 in.
Length of body	29 ft. 6½ in.
Length over all	41 ft. 3½ in.
Width over sills	8 ft. 4 in.
Width over all	8 ft. 8 in.
Height, rail to sills	32⅞ in.
Height, sill to trolley base,	8 ft. 10 in.
Body	composite
Roof	plain arch
Underframe	metal
Air brakes	West. S-M-3
Axles	Baldwin
Cables	West.
Car trimmings	Dayton
Conduits and junction boxes,	Am. Car Co.
Control	K-36 J
Couplers	Am. Car Co.
Curtain fixtures	Cur. Sup. Co.
Curtain material	Pantasote
Destination signs	Hunter
Fare boxes	Johnson
Fenders	H. B.
Gears and pinions	West.
Gongs	Elec. Serv. Sup. Co.
Hand brakes	Am. Car Co.
Headlights	Crouse-Hinds
Motors,	2 West. No. 307, inside hung
Paint	Flood & Conklin
Registers	International
Sash fixtures	O. M. Edwards
Seats	Hey Bros. & Wake.
Seating material	rattan
Springs	Baldwin
Step treads	Feralun
Trolley retrievers	Knutson
Trolley base	West.
Trucks	Baldwin
Varnish	Berry Bros.
Ventilators	Am. Car Co
Wheels	Baldwin

TRADE NOTES

U. S. Metal & Manufacturing Company, New York, N. Y., has discontinued the Eastern agency of the Pollak Steel Company of Cincinnati, Ohio.

Rail Joint Company, New York, N. Y., has appointed George C. Isbester in charge of its Chicago office, No. 215 Railway Exchange. Mr. Isbester has been for the past three years connected with the New York office of this company.

Welding Material Company, New York, N. Y., has appointed W. B. Elliott of the Hicks Motor Manufacturing Company as president, with offices at 114 Liberty Street, New York. The Welding Material Company is sole agent for the Lincoln arc welding equipment.

Lord Manufacturing Company, Brooklyn, N. Y., has added the services of R. V. Mackey to its sales force. Mr. Mackey was formerly in charge of the test work for the car equipment department of the Interborough Rapid Transit Company. He will represent the Lord Manufacturing Company in the Middle West.

Niles-Bement-Pond Company, New York, N. Y., has received a first prize of $20,000 from the Chilean Parliament as an award for the best designs out of those submitted by competitors from various parts of the world for a general railroad shop having capacity for 500 to 600 locomotives, 500 passenger cars and 6000 freight cars.

Electric Service Supplies Company, Philadelphia, Pa., has secured a number of large orders for protected rail bonds this spring from electric railway properties, electrified steam roads and electrically operated coal mines. Four of the important orders received are from the Boston (Mass.) Elevated Railway for a total of 34,500 protected rail bonds; Brooklyn Rapid Transit Company for a total of 25,000; the Norfolk & Western Railroad for their steam line electrification has ordered 13,500; the Pennsylvania Railroad Company has ordered for the Philadelphia-Paoli electrification a total of 17,150, together with all high tension porcelain insulators and hardware for this new project.

Traylor Engineering & Manufacturing Company, Allentown, Pa., has completed arrangements with Charles A. Jacobson for the manufacture and sale of his gas engines. Mr. Jacobson will give his entire attention to the designing, building and selling of his engines with the aid of the engineers of the organization of the Traylor Company. The Jacobson gas engine is of the scavenging type and can be used on natural producer and illuminating gases of all kinds. The starting device is an air starter, assuring ease in starting the engine. The engines are built with single and multiple cylinders and are particularly adapted for direct connection to alternators running in parallel.

The J. G. Brill Company, Philadelphia, Pa., has recently equipped a car with the Safety electric brake, an apparatus which has been thoroughly tested and is to be immediately placed on the market. The manufacturers claim that this type of brake secures an unusually quick and smooth start, thus tending to reduce operating and maintenance costs, lower the wear on brake shoes and prevent flattening of wheel treads. The brake, which is of light weight, is applicable to both single and double track cars and to standard brake rigging. It is said to decelerate automatically at a constant rate, giving a straight line stop, as shown on the curve sheet.

ADVERTISING LITERATURE

Pittsburgh Transformer Company, Pittsburgh, Pa., has issued a catalog describing its pressed steel case distributing transformers.

Reading Specialties Company, Reading, Pa., has issued a folder describing its trolley retailers, reversible railbenders, step joints and guard-rail clamps.

Link-Belt Company, Chicago, Ill., has issued a catalog describing its Ewart detachable link belt and sprocket wheels for general industrial purposes.

F. M. De Weese Company, Chillicothe, Ohio, has issued a booklet describing its lifting jacks for heavy lifting purposes, such as lifting cars for inspection purposes.

The "Engineer," London, England, has issued a directory for engineers. The directory contains an abridged and classified index to articles published in the *Engineer* during 1913. The directory also contains a foreign buyers' guide, which constitutes an alphabetical list of technical terms translated into French, German, Italian and Spanish.

Dielectric Manufacturing Company, St. Louis, Mo., has issued a data booklet which contains curves and tables showing the insulating properties of its various insulation products.

Mahl Manufacturing Company, Minneapolis, Minn., has issued folders illustrating its kerosene torches for burning paint off of cars and portable torches for use in steel car repairing, boiler shops and foundries.

American Electrical Works, Phillipsdale, R. I., has issued a folder which gives data and prices on its bare copper wire and cables, galvanized iron, coarse magnet, flat magnet, annunciator and rubber covered wire and pendant lamp and reinforced portable cord.

Western Electric Company, New York, N. Y., has issued a catalog which describes in detail its various systems and apparatus of inter-phones and supplies. The catalog also contains helpful suggestions as to the selection and installation of interior telephone systems.

Pratt & Whitney Company, Hartford, Conn., has issued a large catalog describing and illustrating its side head boring mill. A feature of this boring mill is its independent side head, which may be lowered below the work table thus permitting an increased swing. Rapid traverse is provided in all directions for vertical and side heads. All controlling levers are placed within arm's reach of the operator and are advanced in the direction in which the movable member is to travel.

Railway Improvement Company, New York, N. Y., has issued a catalog describing its Rico terminal clock for accurately and automatically recording running time at terminals or time points. In this system each motorman is provided with a daily card or envelope, as shown by a sample envelope in the catalog, on which he automatically records his arrival and leaving time at all terminals and time points. This system is designed to overcome the inaccuracies of the ordinary "pencil" method. Illustrations of the clock in service on the Third Avenue Railway, British Columbia Electric Railway and Manhattan Elevated Railway are shown.

Electric Service Supplies Company, Philadelphia, Pa., has issued a new loose-leaf catalog containing descriptions and list prices of its line of Keystone truss pins. On account of the many additions continually being made to the Keystone line it was deemed advisable to arrange this catalog in loose-leaf form so that customers may at once be furnished with information and data on new designs of pins as they are placed on the market. Illustrations showing methods of installation and assemblage of Keystone pins accompany descriptions of each type. Another catalog recently issued by this company describes its portable and stationary types of Keystone lamp guards. The features of strength and durability in the guards are effectively shown by an illustration.

Hubbard & Company, Pittsburgh, Pa., who have taken over the business of the Pittsburgh Reinforcing Pole Company, have issued an attractive catalog entitled "Net Results," which describes the Orr process of pole reinforcing. In this process a hole about 6 in. wide is opened around the decayed pole. The rotted wood is chopped away, reinforcing rods are driven into the sound wood above and below the decayed section, and the upper part of these rods encircled with a strip of expanded metal. The concrete is then poured around the pole, forming a protective sleeve which comes above the ground in the form of a slightly tapering collar and extends below the rods underneath the ground. The catalog contains letters, showing satisfactory practical results from reinforced poles from the standpoint both of physical permanence and cost compared with renewed poles, from the following electric railways: Baton Rouge (La.) Electric Company; San Francisco, Napa & Calistoga Railway; Iowa Railway & Light Company; Helena Light & Railway Company; East St. Louis & Suburban Railway; Oregon Electric Railway; Pensacola (Fla.) Electric Company; Owensboro (Ky.) City Railroad; Niagara, Lockport & Ontario Power Company. The end of the catalog contains interesting photographs and statistics showing results of tests made on reinforced poles.

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ANNEX LIB.